



for the greatest good



# Upper White Salmon Wild and Scenic River

## Upper White Salmon Wild and Scenic River Comprehensive River Management Plan

Gifford Pinchot National Forest  
July 2017

# Table of Contents

Introduction.....	3
Purpose of this Plan .....	3
Background.....	4
River Corridor Boundary.....	5
Management Direction .....	7
Desired Future Condition .....	8
Consistent and Inconsistent Uses.....	8
Outstandingly Remarkable Values .....	8
Geology.....	9
Hydrology .....	15
Scenery.....	17
Other Resources.....	22
Recreation .....	22
Wildlife .....	26
Fisheries .....	28
Vegetation and Ecology .....	29
Administrative and other uses.....	32
Other Management Direction .....	32
Monitoring Plan.....	33
Public Involvement and Consultation.....	36
References.....	37
Appendix A. Standards and Guidelines .....	1
Appendix B. Capacity Estimate Formula .....	1
Appendix C. Resource Assessment .....	1
List of Preparers.....	37

# Introduction

The White Salmon River originates within the Gifford Pinchot National Forest on the western slopes of Mount Adams and flows downstream to its confluence with the Columbia River. The upper White Salmon River is one of two portions of this river that have been added to the National Wild and Scenic River System. This designated portion of the river includes the headwaters downstream to the National Forest Boundary, as well as Cascade Creek –one of its significant tributaries.

The highly fractured layers of basalt, andesite, and breccia that form the slopes of Mount Adams create excellent pathways for vertical and lateral transmission of water. The river originates as a spring in a forested portion of the Mount Adams Wilderness not far from the Pacific Crest Trail. Its tributary Cascade Creek, originates at the foot of the White Salmon and Avalanche glaciers in the Mt. Adams Wilderness and travels through subalpine terrain before entering forest. Gradients along the White Salmon River are steep, with an average drop of 150 feet per mile and a steeper drop of 700 feet per mile in the headwaters area. After Cascade Creek joins the White Salmon, the river descends into a deep canyon characterized by late successional and old-growth forest and bedrock outcroppings. Water quality is high in both the upper White Salmon River and Cascade Creek. Water temperatures remain low throughout the year, indicative of its groundwater source.

This entire portion of the Upper White Salmon River is free-flowing. There are no water diversions, dams, or other impoundments on this reach of stream. Shorelines are natural except in the immediate vicinity of two road crossings (an additional road crossing was decommissioned). The bridges are above the ordinary high water mark and do not disrupt the river's free-flowing character. The river corridor is a landscape dominated and defined by natural forces. With its natural components intact and dominant, it provides a high level of scenic attractiveness.

## Purpose of this Plan

The goal of the upper White Salmon Wild and Scenic River Comprehensive River Management Plan (CRMP) is to protect and enhance the river values for which the upper White Salmon River was included into the Wild and Scenic Rivers System. In addition to free flow and high water quality, several Outstandingly Remarkable Values (ORVs) were determined in a Resource Assessment (USFS 2012). The ORVs unique to this designated portion of river were identified as: Geology, Hydrology, and Scenery. The following sections briefly discuss existing conditions to provide context, prior to summarizing applicable management direction and defining the desired future condition of the river corridor. Examples of consistent and inconsistent uses are included to provide further clarification on how to interpret standards and guidelines. Actions that lead toward the desired conditions over the long term are consistent with this plan. Actions that lead the corridor away from desired conditions over the long term are not consistent with this plan. A monitoring plan with measures, indicators and action trigger points is also outlined.

This plan will be implemented through three primary mechanisms, including intergovernmental coordination, individual agency action, and partnerships with non-governmental organizations and the public. Ultimately its success will depend on community involvement and stewardship. The Gifford Pinchot National Forest Land and Resource Management Plan (USFS 1990) was amended to support this Comprehensive River Management Plan. Future actions or projects would require appropriate National Environmental Policy Act (NEPA) analysis, documentation, and public involvement.



## Background

In 1968, Congress passed the Wild and Scenic Rivers Act (P.L. 90-542) and established a nationwide system of outstanding free-flowing rivers. For a river segment to be considered eligible for Wild and Scenic River status it must be “free-flowing” and possess “outstandingly remarkable values” within its immediate environment. These rivers are protected for the benefit and enjoyment of present and future generations. In 1968, Congress identified 27 rivers for study with the enabling legislation. To date, 208 rivers in 40 states and the Commonwealth of Puerto Rico have been added to the National Wild and Scenic Rivers System.

In 2005, as a result of the Final Legislative Environmental Impact Statement (LEIS 1997) that recommended 38.4 miles of the upper White Salmon be added to the National Wild and Scenic Rivers System, Congress added 20 miles of the upper White Salmon River (including Cascade Creek) to the System through Public Law 109-44. This portion of the river is referred to in this document as the upper White Salmon River and should not be confused with the portion of the river downstream which was designated Wild and Scenic in 1986. The remaining 18.4 miles of the upper White Salmon River examined in the Legislative Environmental Impact Statement (LEIS 1997) fall outside the boundary of the Gifford Pinchot National Forest and were not included in the Congressional designation. That segment of river remains suitable for future addition to the National Wild and Scenic Rivers System.

### **Timeline of the White Salmon Wild and Scenic River Designation:**

**1986 – Lower White Salmon Wild and Scenic River:** In 1986 Congress designated a 7.7-mile segment of the White Salmon River to the National Wild and Scenic Rivers System in the Columbia River Gorge National Scenic Area Act (Public Law 99-663). Referred to as the Lower White Salmon River, this piece of river flows from its confluence with Buck Creek at river mile 5 to its confluence with Gilmer Creek at river mile 12.7. A separate Comprehensive River Management Plan has been developed for this section of river, and it is administered by the Columbia River Gorge National Scenic Area.

**1997 – Wild and Scenic River Study and Legislative Environmental Impact Statement:** Through this same 1986 legislation, 13.5 miles of the White Salmon River located upstream of the designated Lower White Salmon River were authorized for study (Gilmer Creek at river mile 12.7 upstream to its confluence with Trout Lake Creek at river mile 26.2).

To ensure comprehensive evaluation of the river, the Forest Service expanded the study to include the short portion of the river above its confluence with Trout Lake Creek to the Gifford Pinchot National Forest boundary (approximately 4 miles), the portion of the White Salmon from the Gifford Pinchot National Forest boundary to its headwaters in the Mount Adams Wilderness (13.4 miles), and the entire length of its tributary Cascade Creek to its headwaters located in the Mount Adams Wilderness (6.6 miles).

The entire 38 miles were studied and found suitable for designation, as reported in the upper White Salmon River Wild and Scenic River Study Report and Final Legislative Environmental Impact Statement (USFS, 1997).

**2005 – Designation of the upper White Salmon River:** In 2005, as a result of the previous LEIS, Congress added 20 miles of the White Salmon River and Cascade Creek to the National Wild and Scenic Rivers System through Public Law 109-44. This component, which includes only the congressionally designated portions of the White Salmon River and Cascade Creek, is referred to in this document as the upper White Salmon River. It includes portions of the river and

creek from their headwaters in the Mount Adams Wilderness to the Gifford Pinchot National Forest boundary.

**2013 – Resource Assessment for the upper White Salmon River:** A Resource Assessment was conducted in 2013 to identify outstandingly remarkable values exclusive to the designated Wild and Scenic component of the upper White Salmon River. This Resource Assessment was completed in 2013. It is based on the 1997 study and includes additional analysis. The Resource Assessment confirmed scenery, geology, and hydrology to be outstandingly remarkable values (ORVs) for the upper White Salmon River.

**2017 – Environmental Assessment for the upper White Salmon River:**

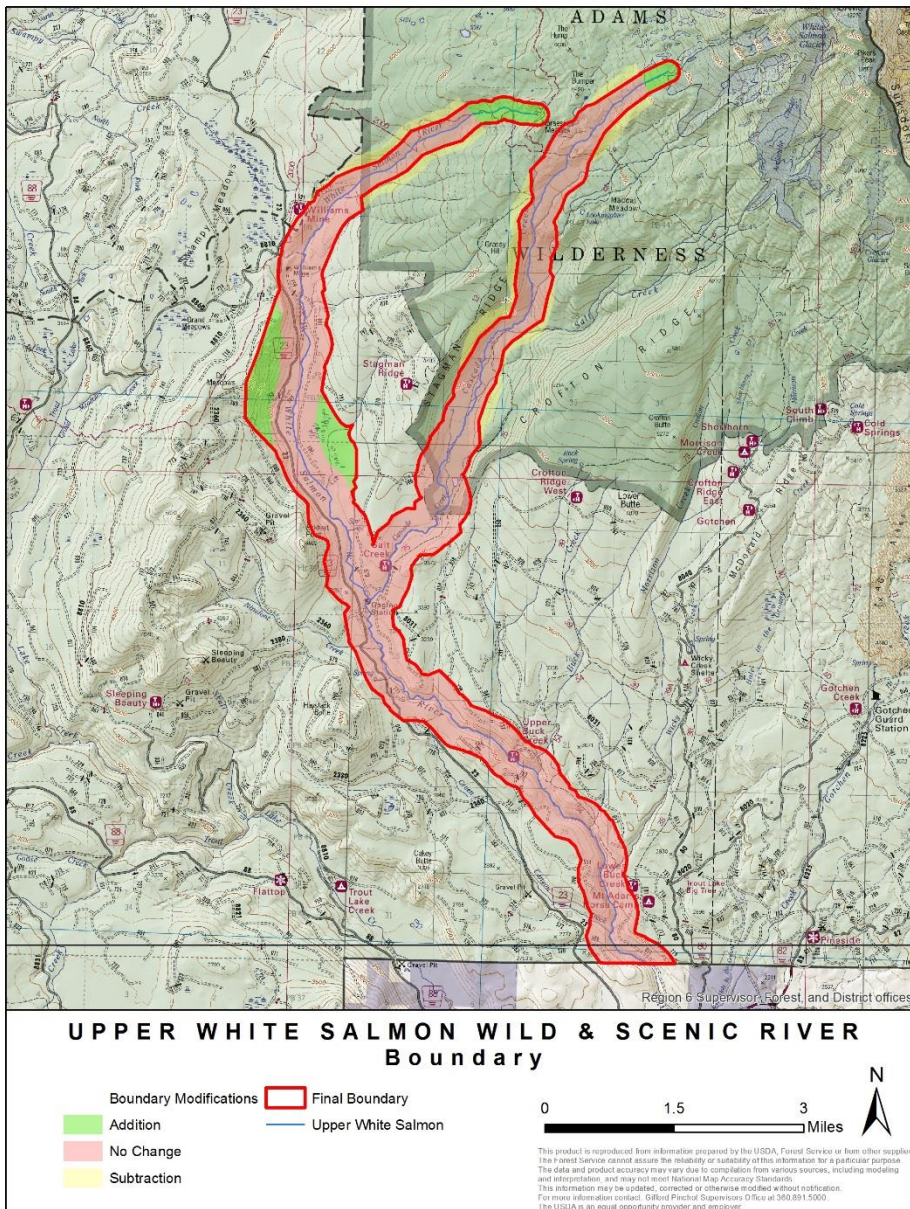
This Environmental Assessment amended the Forest Plan to provide specific Forest Plan guidance for the upper White Salmon as well as to identify a final River Corridor boundary as required by the Wild and Scenic Rivers Act. This Comprehensive River Management Plan is an outcome supported by this environmental assessment.

The selected alternative in in the Environmental Assessment:

- Described the desired future conditions within the river corridor;
- Established a final river corridor boundary;
- Established Forest Plan standards and guidelines specific to the upper White Salmon Wild and Scenic River corridor;
- Made an initial determination of recreational use capacity; and
- Developed a monitoring plan related to management and recreational use within the corridor.

## River Corridor Boundary

The 2005 designation of the upper White Salmon Wild and Scenic River established an interim river corridor boundary with a width of 0.25 miles from the ordinary high water mark on either side of the river for interim management during the preparation of the final boundary and comprehensive river management plan. The final corridor boundary was determined as part of the upper White Salmon Wild and Scenic River Environmental Assessment (2017). The adjustments to the upper White Salmon Wild and Scenic River boundary were intended to provide for protection and enhancement of river values. Additions and subtractions to the boundary were balanced to ensure that total acreage remained the same. This plan does not apply to any portions of the White Salmon River downstream of the Forest boundary and thus outside of the designated Wild and Scenic River Corridor.



### Boundary Modifications: Additions

The main channels for the headwaters of both Cascade Creek and the upper White Salmon were mapped more accurately after the congressional designation of the upper White Salmon River in 2005. Both rivers extend farther up the slopes of Mount Adams than was previously mapped, and the headwaters were outside of the 0.25-mile interim corridor boundary. Inclusion of these sections matches the intent of the legislation, which describes the designated stretches to include the headwaters.

The boundary was also expanded to include a short section of river that is comparatively flat and contains several springs and marshy areas. This is a location where the primary stream channel might shift during significant flood or lahar events. Including this location ensures that the river will stay within the Wild and Scenic River corridor, and allows for natural river processes to occur.

The Dry Meadows ridgeline has numerous rocky outcroppings that frame the river below, and highlight the river’s geology and scenery ORVs. This includes the viewpoint on Forest Road 23, which provides one of the best views of the river drainage and is undoubtedly the most visited viewpoint for the upper White Salmon River drainage. There is potential for future road failure along this section of Forest Road 23 due to unstable slopes. The boundary was expanded to include this section so that any future road reconstruction or realignment efforts would consider river values, and the Scenery ORV would be protected.

**Boundary Modifications: Subtractions**

The corridor was narrowed within and proximate to Wilderness to provide the acreage needed to make the above additions and stay within the total acreage allowed. It was determined that these areas were already well protected under the Wilderness Act and not directly associated with the river or river values.

**River Classifications**

<b>Table 1. River Classifications.</b> Within the river corridor four segments were classified as either “Wild” or “Scenic” river.	
Wild River Segments: “Wild” classification definition: free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.	
<u>Segment A (Wilderness):</u>	Approximately 1.6 miles of the White Salmon River from its headwaters on Mount Adams in section 17, township 8 north, range 10 east, downstream to the Mount Adams Wilderness boundary.
<u>Segment B (Wilderness):</u>	Approximately 5.1 miles of Cascade Creek from its headwaters on Mount Adams in section 10, township 8 north, range 10 east, downstream to the Mount Adams Wilderness boundary.
Scenic River Segments: “Scenic” classification definition: free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.	
<u>Segment C:</u>	Approximately 1.5 miles of Cascade Creek from the Mount Adams Wilderness boundary downstream to its confluence with the White Salmon River.
<u>Segment D:</u>	Approximately 11.8 miles of the White Salmon River from the Mount Adams Wilderness boundary downstream to the Gifford Pinchot National Forest boundary.

**Management Direction**

Management direction on the Gifford Pinchot National Forest comes from the *Gifford Pinchot National Forest Land and Resource Management Plan* (Forest Plan, 1990), as amended by the *Record of Decision for Amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl* (Northwest Forest Plan, 1994). These two documents guide planning on the forest through the categorization of land allocations (known as Management Area Categories) across the Forest, and each management area category contains prescribed standards and guidelines that must be adhered to. A new Management Area Category; including standards and guidelines specific to the upper White Salmon was developed as a part of the upper White Salmon Wild and Scenic River EA (2017). This new Management Area Category was applied to areas within the final upper White Salmon River Wild and Scenic River Boundary to ensure that Wild and Scenic River values were protected.

The Management Area Category includes many standards and guidelines specific to certain resource areas. It also includes two overarching standards and guidelines for all activities.

- All activities within the corridor will preserve the river’s free flow, water quality and Outstandingly Remarkable Values.
- In instances where there is conflicting or overlapping direction, apply the most restrictive direction.

These guidelines help ensure that river values are protected in any unanticipated future activities. Full text of the new Management Area Category can be found in Appendix A.

## Desired Future Condition

River management will support a condition where landscapes within and near the channel of the upper White Salmon River and its tributaries possess a concentration of complex, diverse, and highly scenic geological and hydrological features. Water quality remains high in springs, tributaries and the upper White Salmon River, due to the presence of intact riparian forests and functional, free flowing natural water routing pathways on mountain slopes. Natural processes, including disturbance, continue across the watershed, occurring at natural rates and scales. The landscape scenery is dominated by a natural character and retains the high level of scenic attractiveness and integrity that led to its Wild and Scenic River designation.

## Consistent and Inconsistent Uses

The desired future condition presents a broad vision of the desired state for resources in the river corridor, and standards and guidelines provide more detailed management direction. Uses that are consistent and inconsistent with the standards and guidelines are discussed for each Outstandingly Remarkable Value (ORV), as well as other resource areas. Actions that lead toward the desired conditions over the long term would be considered consistent with this plan. Actions that lead the corridor away from desired conditions over the long term would be considered inconsistent with this plan. While it may not be possible to anticipate every potential future use, discussion of consistent and inconsistent uses is intended to provide additional clarification on how to interpret standards and guidelines if conflicts arise.

## Outstandingly Remarkable Values

The Wild and Scenic Rivers Act, requires the protection and enhancement of river values. i.e., the values that caused it to be included in the National Wild and Scenic Rivers System. The Wild and Scenic Rivers Act states that to be considered for designation, a river or portion of river must be free-flowing and possess at least one “outstandingly remarkable value.” The 2013 Resource Assessment confirmed *scenery, geology, and hydrology* to be outstandingly remarkable values for the upper White Salmon River.

The following criteria were used to determine ORVs for the upper White Salmon River:

Values are river-related. To be considered river-related, values should:

1. Be located in the river or its immediate environment,
2. Contribute substantially to the functioning of the river ecosystem, and/or
3. Owe their existence to the presence of water.



Outstandingly Remarkable Values (ORVs) were defined as unique or exemplary features that are significant at a comparative regional or national scale, a resource or combination of resources that are either one-of-a-kind, or one of the better examples of that type of resource. The region of comparison was identified as “the Columbia River Gorge area between the Cascade Mountains to the west and the Columbia Plateau to the east. This included all major tributaries to the Columbia River spanning the crest of the Cascades, from the Umatilla River in eastern Oregon to the Sandy River near Portland.” Values which were not determined to be ORVs are considered in this document according to the ways they contribute to the protection and enhancement of river values. Some of these values may also have additional non-river related management considerations. Such considerations are generally covered in other planning and management documents and are outside of the scope of this Comprehensive River Management Plan.

A summary of each ORV follows, and the full resource assessment is included in Appendix C.

## *Geology*

Geology is one of the outstandingly remarkable values identified for the Wild and Scenic designation (Upper White Salmon River Resource Assessment, 2013). Although the geology of the upper White Salmon River drainage basin is similar in character to that of other rivers originating on the flanks of volcanoes within the region, the geomorphic landforms and processes that formed them are not. Narrow bedrock river canyons within the region are relatively rare, and the gorge through which the upper White Salmon flows is comparable in length, width, and depth to the gorge downstream, in the middle reaches of the White Salmon, which was found notable in the LEIS for its length and continuous vertical walls (3-3). Additionally, glacial processes occurring in the headwaters of the White Salmon River drainage basin are not found anywhere else within the region. Due to the rarity of the geomorphic landforms and the uniqueness of the glacial processes found in the upper White Salmon drainage, geology was found to be an outstandingly remarkable value.

Geologic units along the upper White Salmon River and Cascade Creek consist mainly of Quaternary volcanic rocks that are principally basaltic to andesitic in composition, and inter-fingered late Pleistocene to Holocene glacial deposits with associated drifts and debris flow/avalanche deposits (Korosec, 1987). The headwaters of Cascade Creek (segment B) are fed by the White Salmon and Avalanche glaciers, and numerous debris flows and debris avalanches have carved deeply incised canyons along its channel

downstream of the glaciers. The lithology for the Wild and Scenic River area is composed of 5 different rock groups (Map 1) (Table 1). By the nature of geologic processes, lithology is susceptible to mechanical and chemical weathering processes.

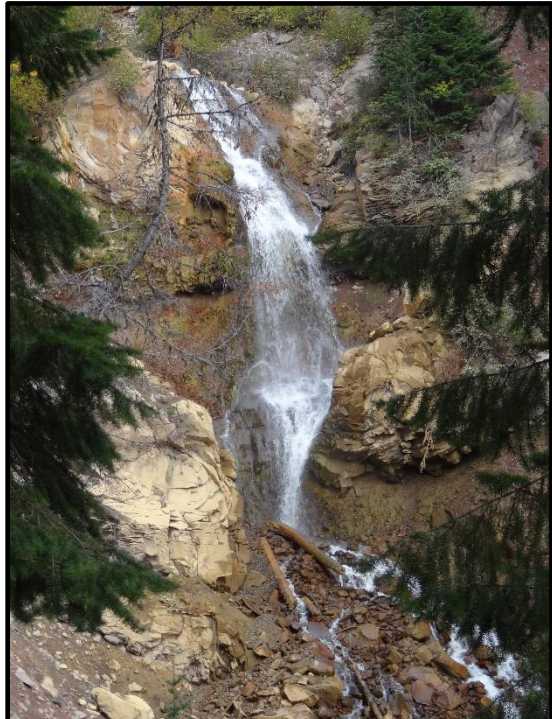


Photo (J. Ewer) Water fall in Cascade Creek

The youngest rock group is the Quaternary alluvium, found primarily along the main stem of the White Salmon River (Korosec, 1987). Mapped on 145 acres (2.2%), highly susceptible to erosion, it is composed of well to poorly sorted and stratified clay, silt, sand and gravel. The unit consists of stream-channel, side stream, overbank, fan and lacustrine deposits and may include some glacial deposits and postglacial terrace gravels.

The next younger rock group is Quaternary colluvium composed of well to poorly sorted cobbles and boulders. Highly susceptible to erosion, the 1, 574 acre unit (23.7%) consists of older weathered glacial deposits from the Frasier period (30,000 years to 10,000 years).

The extrusive rock group is mainly composed of the numerous Quaternary basalt and andesite flows from the construction of Mt. Adams. The 2,728 acres of andesite and basalt (41.1%) tend to be very resistant to erosion. They form the canyon walls along the White Salmon River, the base for the scenic waterfalls in Cascade Creek and the other cascades through the area.

The Tertiary pyroclastic rock group are composed of pumice and rock fragments and are highly susceptible to chemical and mechanical weathering processes. The 529 acres (8%) are mapped along the northern western edge of the White Salmon River.

The Quaternary Glacial Till (30,000 to 10,000 years old) is composed of alpine glacial drift. The well to poorly sorted sand, gravel and cobbles are highly susceptible to mechanical and chemical weathering processes. The 1,658 acres (25%) erode easily when disturbed.

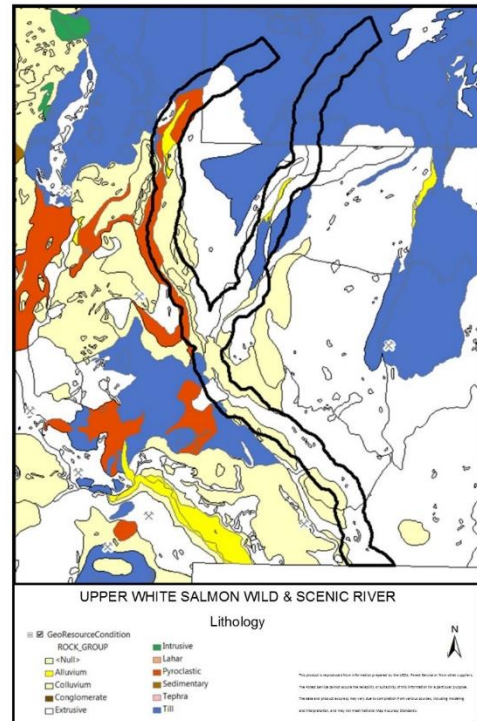
Over 59% of the analysis area is highly susceptible to mechanical and chemical weathering processes which means that the unconsolidated material is prone to erosion. The resistant solid basalt and andesite, forming the bottom of the channels and the sidewalls is more impervious to alteration.

<b>Lithology – Rock Group from Geologic Resource Conditions</b>			
Rock Group	Acres	Percent	Susceptibility to Mechanical and Chemical Weathering Processes
Alluvium	145	2.2	Highly Susceptible
Colluvium	1574	23.7	Highly Susceptible
Glacial Till	1658	25	Highly Susceptible
Extrusive (Qaa)	2728	41.1	Resistant
Pyroclastic (Qmt)	529	8	Highly Susceptible
Total Acres	6634	100%	

## Processes

The processes occurring on the surface at the headwaters of the upper White Salmon River drainage basin (which includes Cascade Creek) are regionally rare as they are found only on volcanoes outside the region (i.e. Mount Baker and Mount Rainier (LWA, 1989)). A cirque located at the accumulation zone of the White Salmon and Avalanche glaciers was created as a result of a slope failure. This slope failure initiated multiple mass-wasting movements, resulting in deposits estimated to be 85 km<sup>3</sup> in volume (Vallance, 1999). This cirque is unique due to the fact that it was formed during large mass-wasting events rather than during the process of glacial erosion, which is the more typical origin of cirques. Additionally, it is hypothesized that slope failures originating at the cirque were caused by hydrothermal alteration of volcanic rock that effectively reduced permeability and porosity of the rock, ultimately leading to failure of slope materials (Vallance, 1999), which is an uncommon process for volcanoes in the region.

Recent basaltic and andesitic eruptions from Mount Adams flowed down paleo-channels of Cascade Creek and the upper White Salmon River (Korosec, 1987). The intra-canyon lava flows have been actively down cut by the river since emplacement, resulting in the formation of a steep-walled and narrowly incised gorge. The gorge of the upper White Salmon River (segment D) is approximately 8 miles long, beginning near the Ninefoot Creek confluence between RMs 35 and 38, and ends near RM 30. The gorge is approximately 200 feet deep and ranges from 30 to 100 feet in width. Vertical-walled gorges like those found on the upper and middle reaches of the White Salmon River are unique to this area of Washington, and similar gorges in the region have only been found on the Wind River. Of the 750 river miles analyzed in the region, less than 7% contain gorges of similar character (LWA, 1989).



Alpine glaciation further carved and shaped the terrain during the Frasier period, 30,000 to 10,000 years ago. Thick blankets of till fill the valley bottoms.

## Groundwater

The complex volcanic units composed of basalt and andesite lava flows, mixed with lahars and pyroclastic flows, in addition to the blanket of glacial till, combine to provide a rich healthy groundwater component of perennial cold water (further described in the hydrology section). The groundwater moves within the permeable zones between the lava flows. It also flows through the permeable pyroclastic flows and glacial tills. The groundwater exits as cold water refugia springs along the canyon walls and in the rivers.

## Geohazards

A geohazard is a geological state that may lead to widespread damage or risk. Geohazards are geological and environmental conditions and involve long-term or short-term geological processes. Geohazards can be relatively small features, but they can also attain huge dimensions (e.g., submarine or surface landslide) and affect local and regional socio-economy to a large extent (e.g., tsunamis).

Risk can be thought of as the intersection between hazards and assets. Assets is a term that encompasses all the things that make a community livable including the people, land use/zoning and buildings, critical facilities, and primary infrastructure such as transportation corridors, electrical transmission lines, dams, and so on. In this case, the structural assets are roads, trails and bridges. In addition, hikers and other visitors commonly utilize the Wild and Scenic River corridor.



Photo (C. Gordon) Mt. Adams from the southwest.

Mount Adams, according to the US Geological Survey (USGS) website, is the largest active volcano in Washington State and among the largest in the Cascades. The volcano, 12,277 feet in elevation, has produced a larger volume (about 300 km<sup>3</sup> or 70 mi<sup>3</sup>) of eruptive material during the past million years than any other Cascade stratovolcano except Mount Shasta (about 350 km<sup>3</sup> or 85 mi<sup>3</sup>). Mount Adams lies in the middle of the Mount Adams volcanic field—a 1,250 km<sup>2</sup> (about 500 mi<sup>2</sup>) area comprising at least 120, mostly basaltic volcanoes that form spatter and scoria cones, shield volcanoes, and some extensive lava flows. The volcanic field has been active for at least the past one million years. Mount Adams was active from about 520,000 to about 1,000 years ago and has erupted mostly andesite. Eruptions have occurred from ten vents since the last period of glaciation about 15,000 years ago. The most recent eruption was 3,800 years ago. Approximately 6,000 and 300 years ago, debris avalanches from the southwest face of Mount Adams generated clay-rich lahars that swept more than 30 km<sup>2</sup> (11 mi<sup>2</sup>) south of the volcano along the White Salmon River. The summit of Mount Adams contains a large section of unstable altered rock that can spawn future debris avalanches and lahars.

### **Volcanic Lava Flow and Lahar Hazard**

All of the Wild and Scenic River area is within a lava-flow hazard zone (Vallance, 1998). Because no lava flows of post glacial time have reached much more than 50 meters up onto topographic obstructions, lavas originating from flank zones are unlikely to affect high areas.



Of a slightly greater concern is the higher risk of a lahar and debris-avalanche. According to the USGS Volcano Hazards Program, during the past 10,000 years, several large debris avalanches have occurred from Mt. Adams. Some of these events have traveled as far as Trout Lake and Husum. The debris avalanches start as rock fall, then gather water to become a slurry of mud and rocks, termed a lahar. These lahar floods travel down valley, following the stream and river valleys. The 1980 eruption of Mt. Saint Helens is a very recent example of what a lahar can do.

In the upper White Salmon drainage, the 1921 debris avalanche, starting at Avalanche Glacier, flowed down Salt Creek to the confluence with the White Salmon River. There have been smaller events over the intervening years.

At the first sign of unrest at Mt. Adams, information regarding the nature and degree of risk from the volcanic events needs to be publicized. The U.S. Forest Service and other Federal, State and Local authorities can restrict access to areas likely to be affected by the events.

### **Minerals**

Minerals have played an important role in the analysis area. Locatable minerals (gold and copper) are present within the watershed. Salable mineral materials are mined for federal use within the watershed. Although there has been mineral activity in the past, it is unlikely there will be interest in locatable mining outside of the wilderness boundary.

### **Locatable Minerals**

According to the LR2000 BLM mining claims report for June 10, 2016, there are no active claims in the analysis area.

### **Abandoned Mine Land**

Within the Wild and Scenic River corridor, there is a known copper prospect at the Williams Mine. It is reported to have a 40 foot long adit. The site has not been evaluated as abandoned mine land. A review of the LR 2000 BLM database did not show any active claims within the area.

23 Road Mineral Material Source (T 8N, R 9 E, Sec. 25) appears to be a closed site. It is just north of the Williams Mine and within the Wild and Scenic River corridor. The location is currently a viewpoint for Mt. Adams. Further site evaluation is recommended to consider the safety of the back face. A future potential use might be to formalize the viewpoint along Rd 23. This closed material source should be reclaimed.

### **Mineral Materials**

There are no active mineral material sources within the corridor. For future projects proposed within the corridor, there are 2 mineral material sources available for use in the near vicinity. Eckhart Material Source, located on Rd 2360 at Eckhart Point, at T 7N, R 9 E, Section 2, and Bureau Material Source, located further south on Rd 2300-574 at T 7N, R 10 E, Sec. 33. Both are basalt material sources.

### **Paleontology**

The Paleontology Potential Fossil Yield indicates that the west side of the upper segment along the White Salmon river has unknown fossil occurrence for vertebrate and/or invertebrates within the corridor. The lahars have been known to contain fossils depending on the level of preservation.



Photo (J. Ewer) 23 Road Material Source.

## **Geothermal**

According to the 2009 Geothermal Resources Leasing EIS, all of the area is within a Known Geothermal Resource Area. A portion of the area within the corridor is both suitable for lease and has high temperature potential. All of the Mount Adams Wilderness is unavailable for lease, as well as several other small parcels. Geothermal leasing, if proposed, would follow standards and guidelines proposed in the Programmatic Geothermal Resource Leasing EIS (USDA Forest Service and BLM 2008) for no surface-use occupancy.

## **Oil and Gas**

According to the Washington Department of Geology, Department of Natural Resources, there is no current interest in exploring oil and gas on the west flank of Mt. Adams.

## **Transportation**

Most of the roads within the River corridor are primitive gravel roads. Forest Road 23, is a paved road which travels to the west of the upper White Salmon River and portions of this road are within the Wild and Scenic River Boundary. There are two small landslides that Forest Road 23 crosses within the boundary. The pavement in the vicinity of one of the landslides is showing evidence of movement. These two landslide areas could potentially reactivate in the future and require extensive road reconstruction.

There are existing bridge crossings of the upper White Salmon river and Cascade Creek along Forest Road 8031. These crossings are bridges that span the entire channel without piers or footings in the river. They do not disrupt the river's free-flowing character.

## **How the Geology ORV contributes to Desired Future Conditions**

Land forming processes will continue at a natural pace. Landscapes within and near the channel of the White Salmon River and its tributaries possess a concentration of complex, diverse, and highly scenic geologic features created by glacial and volcanic events. Steep and narrow canyons, deep bedrock canyons and numerous waterfalls will inspire those that find them. The diverse and varied geological features of this area are protected, and provide opportunities for learning about the unique volcanic and glacial forces that formed this mountain landscape.

## **Consistent and inconsistent uses**

- Installation of scientific monitoring equipment with negligible impacts would be consistent.
- Installation of permanent monitoring equipment in Wild River corridors would not be consistent.
- Extraction activities with visible surface activity would not be consistent.

## **Standards and Guidelines**

- Roads will not be permitted in Wild River segments.
- New road crossings on the upper White Salmon River and Cascade Creek should not be considered. Existing bridges on Forest Road 8031 or culverts on others road within the corridor may be maintained and replaced.
- Mineral exploration and development within the river corridor will be regulated to prevent unnecessary and undue degradation to Outstandingly Remarkable Values.
- Common (saleable) mineral material sources will not be inventoried, developed, or authorized within the corridor.

- Leasable minerals such as oil, gas and geothermal will remain open for leasing on National Forest lands. Use, occupancy or surface disturbance will not be allowed within the river corridor.
- The Forest reserves rights to sub-surface minerals throughout the river corridor.

## *Hydrology*

High-volume springs emanating from volcanic rocks of Mount Adams form the headwaters of the White Salmon River, and contribute significant quantities of flow. Discharge in the upper White Salmon River is further built by glacial meltwater from Cascade Creek and other tributaries. The hydrologic character is exemplary of both spring-fed and glacially fed streams as the upper White Salmon River displays both exceptionally cold water and consistent year-round flows. As a result of these characteristics hydrology was found to be an outstandingly remarkable value.

Portions of the upper White Salmon River are identified as Tier 2 Key Watershed under the Northwest Forest Plan, indicating the importance of this system as a source of high quality water. A Watershed Analysis was completed for the upper White Salmon River watershed in 1998. The analysis describes the resources in the watershed, the important ecological processes in this drainage, and provides recommendations for restoration across the watershed. For the past two decades, restoration in the upper White Salmon River watershed has included decommissioning of roads, improving drainage on roads, improving floodplain function and fish passage at existing stream crossings, and vegetative treatments to restore forest health.

The White Salmon River corridor is forested for its entire length through the Gifford Pinchot National Forest. The river originates in a series of springs high on the mountain in the Mount Adams Wilderness. Cascade Creek originates at the foot of the White Salmon and Avalanche glaciers in the Mount Adams Wilderness and travels through alpine areas before entering the forest. After Cascade Creek joins the White Salmon, the river descends into a deep canyon characterized by late successional and old-growth forest and bedrock outcroppings. Gradients along the White Salmon River are steep, with an average drop of 150 feet per mile and a steeper drop of 700 feet per mile in the headwaters area (LEIS 2-5).

Streamflows in the upper White Salmon River are fed by springs and by melting snowpacks and glaciers high on Mount Adams. The largest flows of the year occur in mid-winter in response to rain-on-snow events, and again in late spring, coinciding with warm weather snowmelt. In some years, the lowest flow of the year also occurs in winter during periods of extremely low temperature, when moisture is locked up in snowpacks. Mean monthly streamflows are greatest in spring, and reach annual lows in the late summer and fall. Average low flows in the fall drop to around 40-50% of spring-flow levels on the White Salmon River. In neighboring watersheds that lack a glacial component, fall streamflows are more typically in the range of 20% of the average spring flow.

The highly fractured layers of basalt, andesite, and breccia that form the slopes of Mount Adams create excellent pathways for vertical and lateral transmission of subsurface water. Meltwater that percolates the ground surface high on the mountain emerges in the form of highly productive springs further downslope. Some noteworthy springs along the upper White Salmon reach of river include the source springs that form the headwaters of the White Salmon River at 5500 feet elevation, and a series of springs located near the lower terminus of the designated reach, collectively known as Glacier Springs (S34, T7N, R10E and S3, T6N, R10E).

Approximately 1200 gallons of water per minute are collected from Glacier Springs to provide a community water supply for the town of Trout Lake (personal communication with Mike Kaufman,

manager of Glacier Springs Water District, October, 2012). Numerous other springs in this same vicinity are not collected, and instead flow downslope into the White Salmon River.

Water quality is high in both the White Salmon River and Cascade Creek. Water temperature and fecal coliform have been measured in the past and found to meet state water quality standards in both streams. Water temperatures remain low throughout the year in the upper White Salmon River, indicative of its groundwater source. Cascade Creek has higher peak temperatures than the White Salmon River, but maintains cooler water than most non-glacially fed streams in the vicinity. During warm days of late summer, turbidity in Cascade Creek can be quite high with increased melt and associated glacial flour carried by the stream.

The entire designated component of the White Salmon River is free-flowing. There are no water diversions, dams, or other impoundments on these reaches of stream. Shorelines are natural except in the immediate vicinity of two road crossings (one of which has been decommissioned) on the upper White Salmon River, and one crossing of Cascade Creek. The existing crossings are bridges that span the entire channel without piers or footings in the river. They do not disrupt the river's free-flowing character.

### **How the Hydrology ORV contributes to Desired Future Conditions**

Streamflows in the upper White Salmon River and Cascade Creek remain strong throughout the year, fed by annual melt cycles on the glaciers and high-elevation snowpacks of Mt. Adams. Springs and tributaries that contribute to the upper White Salmon River continue to produce abundant year-round flow. Water quality remains high in springs, tributaries and the White Salmon River, due to the presence of intact riparian forests and functional, largely unimpeded natural water routing pathways on mountain slopes. Seeps, wetlands, ponds and other aquatic features continue to produce and provide storage for surface and subsurface waters. Riparian forests continue to develop and mature, experience disturbance processes, and contribute a wide array of organic litter, nutrients and woody structure to aquatic and riparian habitats. Disturbance processes across the watershed occur at natural rates and scales. Native aquatic and riparian species continue to be supported by the quantity, quality and timing of streamflows and other water resources on the landscape.

### **Consistent and inconsistent uses**

- Activities that would alter channel morphology would not be consistent.
- In-channel bank modifications which affect the free flow of the river would not be consistent.
- Removing or cutting instream wood would not be consistent.
- Only bridge or culvert installations which do not destabilize streambanks, alter the routing of stream substrate and wood, alter streamflow, or impede fish passage would be consistent.
- Adding riprap or gabions along streambanks would not be consistent.
- Activities with the potential to pollute the river, such as: fire retardant or a retardant mixing near the river would not be consistent.

### **Standards and Guidelines**

- Wood manipulation to allow boating passage should not be allowed.



## Scenery



Photo (J. Ewer) White Salmon River near the Forest Boundary.

The change in elevation and water features over this river system results in highly diverse scenery and visual attractions. The steep gradient and narrow canyon focus the viewer's perspective on the water's interaction with its watercourse, rock formations, and riparian vegetation, with past human activities noticed only occasionally. The presence of exposed bedrock outcrops and the narrow rock gorge constitute a distinctive Class A landscape, are uncommon within the region of comparison, and give the upper White Salmon River its high scenic value. The scenery of the upper White Salmon River was found to be an outstandingly remarkable value.

The upper White Salmon River originates as a spring at the foot of the White Salmon and Avalanche glaciers high on the slopes of Mount Adams, as does Cascade Creek one of the river major tributaries. From its origins it travels through alpine and subalpine parkland areas before descending into mountain hemlock, pacific silver fir and grand fir forest. After Cascade Creek joins the White Salmon, the river descends into a deep canyon characterized by late successional and old-growth forest and bedrock outcroppings. The rivers steep gradients create a variety of river features and contribute to a visually attractive watercourse. The diversity of ecotypes, geologic and hydrologic features visible highlight a landscape with a high level of scenic attractiveness.

The entire designated component of the upper White Salmon River is free-flowing. There are no water diversions, dams, or other impoundments on these reaches of stream. Shorelines are natural except in the immediate vicinity of two road crossings (one of which has been decommissioned, and is no longer visible to the casual observer) on the upper White Salmon River, and one crossing of Cascade Creek. The river itself is not a common observation point due to the lack of developed access near the river that would allow the average forest visitor an opportunity to reach it. Forest visitors who do reach the river are likely to only view it at a specific point and not use it as a travel way. The result is a seen environment where natural forms and processes dominate. It is a landscape with a high level of scenic attractiveness and integrity.

Some notable highlights include:

### **Pacific Crest Trail (PCT) #2000 (Segment A)**



Photo (J Ewer) Area burned in 2012 Cascade Creek Fire.

The Pacific Crest National Scenic Trail (PCT) is located immediately to the north of Segment A and enters the temporary boundary on several occasions. The trail does cross the upper White Salmon, however at the crossing the flows are seasonal and intermittent, so the crossing is unlikely to be noteworthy to the average visitor. The trail starts out in old-growth mountain hemlock forest with a thick closed canopy which limits views, and this section of trail is typical of many trails in the area.

Several miles north of the Williams Mine Trailhead the trail enters area burned in the 2012 Cascade Creek Fire. The high severity burn killed most of the standing trees, which has reduced the scenic attractiveness of the landscape in the foreground. Significant and diverse understory regrowth has begun to soften this effect to scenic attractiveness. The fire opened up views of the surrounding topography and rock outcrops as well as the broader landscape, and this improved the viewer's ability to appreciate scenic attractiveness of the middle ground and background views. This portion of the trail and surrounding landscape is typical of mid elevation forest throughout the region that have been affected by recent wildfire.

As the trail ascends it begins to enter the subalpine parkland ecotype. This portion of the trail has occasional pocket meadows and burn severity was more mixed. The meadows offer eye-catching wildflower displays when in bloom, and background views of Mount Adams and the surrounding landscape provide context and give the viewer a sense of place in the landscape. This portion of the trail and surrounding landscape is distinctive due to its outstanding scenic quality which attracts visitors to this area.

### **Horseshoe Meadows and Headwaters Area (Segment B)**



Photo (J. Ewer) Cascade Creek headwaters.

Horseshoe Meadows is a named feature near the intersection of the Round the Mountain Trail #9 and the PCT #2000. It is a comparatively flat location on the slopes of Mount Adams and is composed of several acres of open grassy meadows interspersed with stringers of trees. The meadows and topography offer views of the surrounding landscape. The 2012 Cascade Creek Fire burned in the area, but the overall burn severity was low. In addition to the ecological benefits of the fire in this area, it served to reduce the



number of trees that had begun to encroach on the meadow, which preserves views of the surrounding landscape as well as the parkland ecotype. This area is used occasionally for camping, however the meadows are large enough that camping impacts are dispersed, and there are few noticeable recreation-related impacts in the area. Cascade Creek cuts through the eastern portion of the meadows.

Above Horseshoe Meadows the terrain changes to an alpine landscape with seemingly limitless opportunities to explore. At this point there is not a clearly defined main channel, and water funnels in from a variety of springs and melting snowfields. The rocky, stair-step nature of the landscape results in occasional small waterfalls. From below, the observer often experiences the illusion that the water is flowing from a flat ridgeline above and defying the common rules of hydrology and gravity which dictate that water flows through incised stream channels. Expansive background views of the surrounding landscape and Mount Adams are common. The viewing position high on the slopes of the mountain provide views of the upper White Salmon drainage below. The views extend beyond to include the broader landscape to Mount Saint Helens and across the Columbia River Gorge to Mount Hood. Partially regenerated clear cuts and land cleared for agriculture in the Trout Lake Valley are the primary evidence of humans on the landscape and provide a pastoral contrast to the natural character of the landscape seen in the immediate foreground and middle ground. However these are very distant in the background, and are substantially unnoticeable to the casual observer. This special place and surrounding landscape is distinctive due to its outstanding scenic quality which attracts visitors to this area.

### **Salt Creek Trail #75 (Segment B and C)**



This trail travels through relatively flat old-growth Pacific silver fir forest along an old roadbed which has been converted to trail. As the trail approaches the Wilderness boundary it passes through several stands that were harvested in years past and a few intersections with old temp roads and skid trails are visible.

Near the Wilderness boundary there are several visible meadows and marshy riparian areas, which are frequented by wildlife. The trail then passes through forest that experienced a mixed severity burn in the 2012 Cascade Creek Fire. Some of the trees are quite large and the canopy is predominately closed, so there are minimal views of the landscape beyond the immediate Cascade Creek drainage. The trail ends about 0.5 miles below the confluence of Cascade Creek and Salt Creek. The trail used to travel farther and eventually connect with the Round the Mountain Trail #9, however none of the old tread remains at this point in time. Near the confluence of Cascade Creek and Salt Creek there is extensive evidence of past flooding and debris flows. The visible recent activity is likely predominately a result of the 1997 glacial outburst event which originated higher on the mountain. Upstream from this point the gradient of the Cascade Creek drainage becomes steeper as it begins to climb the slopes of Mount Adams in earnest. Further cross country travel takes one through rugged terrain, and there is no visible evidence of regular human visitation. The old-growth Pacific fir forest, which includes an area of beaver ponds and evidence of mudslides originating on Mount Adams, provides a distinctive landscape character.

### **Forest Road 23 (Segment D)**

Forest Road 23 generally follows the western boundary of Segment D, and is the primary travel route for the area. It is a paved roadway and most vehicles travel between 30 and 45 miles per hour. It is a designated viewshed corridor under the Forest Plan.

The most noticeable scenic feature of the road is the verdant forest it winds through as it slowly ascends in elevation. The ecotype at lower elevations is grand fir ecotype, and it transitions to a pacific silver fir ecotype as one travels up in elevation and to the north. The age of stands varies, primarily due to past vegetative treatments, timber clear cuts in particular, which occurred over the last century. In sections that go through older stands the viewer is able to see into the stand and the well-developed tree trunks are noticeable. In younger stands, thick regeneration and undergrowth limit the ability to see into the stand. The human modification to the landscape would not be apparent to the casual visitor even in the youngest of stands. At no point is the upper White Salmon River visible from the roadway, and the two would not be considered related visual features of the landscape to the casual viewer. The relative youth of many stands, lack of vegetative diversity, and poor visual penetration make much of this roadway an attractive, but typical landscape for most of the year. Autumn colors make this area more distinctive for a short period of time every year.

Near Williams Mine the road begins to climb in elevation and steep drop-offs to the east offer distinctive views of Mount Adams and the adjacent upper White Salmon River drainage. The slope rises to the west and the foreground view is dominated by rocky outcroppings near the top of Grassy Meadows Ridge. There are several wide areas on the side of the road where visitors frequently pull off and take pictures. One of the pull-offs is signed as a “viewpoint” but is otherwise undeveloped. The large rock pit just to the north of this viewpoint is a particularly noticeable foreground development, although it offers the same stunning views as the viewpoint. This rock pit is often used as a dispersed campsite. From all of these viewpoints there are several places in the middle ground where there is a visible straight line that demarcates the boundary between old stands that were clear cut and uncut stands. For three of these stands, that line is also the Wilderness boundary. The effects of the 2012 Cascade Creek fire are also noticeable higher on the slopes of Mount Adams.

### **Buck Creek Trail #54 (Segment D)**

This distinctive trail is entirely within the interim 0.25-mile boundary, and it skirts the eastern portions of the Green River Gorge section of the upper White Salmon River. It travels predominately through old growth forest, although the canopy breaks on occasion to provide views of the Green River Gorge. The river can be heard below, but is not visible other than the occasional glimpse through the trees. There are notable bridge crossings at Wicky Creek and Buck Creek. The Wicky Creek crossing in particular offers a beautiful pocket of shade and water.

The trail is predominately located on south and east aspects, and has a slightly drier vegetation component than the surrounding grand fir ecotype in places. There are several pockets of large ponderosa pine and Douglas fir. There are also a few scattered Oregon oak which are notable. The vegetation and fire scars suggest the presence of fire in this area historically. Much of the area has grown in significantly, and might represent a change from expected ecological conditions under a natural fire regime for a grand fir ecotype.



### Grassy Meadows (Segment D)



Photo (J. Ewer) View to east, old timber harvest lines and shape still visible in middle ground.

This distinctive ridgeline frames the White Salmon River drainage before it turns to the east and ascends the slopes of Mount Adams. Its rocky outcroppings provide the western background for a visually impressive section of Forest Road 23. The ridge itself can only be accessed via cross country travel. From the ridgeline there are expansive views of the White Salmon River drainage and Mount Adams to the east. You cannot see water in the river itself, although you can hear the White Salmon River below as well as occasional road noise from the 23 Road below. Eckhart Point above the 23 Road to the south is another notable feature that helps frame the river drainage.

### Forest Road 8031 (Segment D)

This road includes the only bridge crossing of the Upper White Salmon currently in use. It also includes a bridge that crosses Cascade Creek just upstream of its confluence with the Upper White Salmon. These bridges are relatively non-obtrusive and do not have in-stream components. The bridge provides a brief glimpse of rushing water surrounded and shaded by old growth vegetation. The view at this point is distinctive as this is one of the only places where the upper White Salmon and Cascade Creek can be viewed from the road. There are several spur roads that cut off near the river, and there are several pullouts and one large intersection. There is a significant dispersed camping component near this area and several large sites with a large



Photo (J. Ewer) 8031 Rd Crossing White Salmon River.

amount of bare area, which lowers the scenic integrity. The proximity to water may have played a role in the popularity of these campsites. Several of these sites are accessed by user-created non-system roads. The overall scenery for this area is typical of many locations across the Forest.

### Williams Mine (Segment D)

Williams Mine is a notable but indistinctive feature on many maps, which has the potential to attract curious visitors. While it is shown on many maps Williams Mine is no longer a visible feature on the ground. Remnants could be located by attentive or trained observers, however it is a feature the average visitor would not be able to find. From the general location of the mine there are sections of old trail tread that climb out of the drainage and eventually connect with the PCT near its crossing of Forest Road 23.

This area is accessed via the 531 spur of Forest Road 23. The 531 spur used to cross the upper White Salmon River, but that crossing has been decommissioned. The bridge is gone and the approaches were blocked with an earthen berm. Now thick alder provides vegetative screening of the old river crossing.

### How the Scenery ORV contributes to Desired Future Conditions

The landscape scenery is dominated by a natural character and retains the high level of scenic attractiveness that led to its Wild and Scenic River designation. In Wild classifications an "untrammled" landscape character is expressed, which highlights the unimpeded natural processes. In both Wild and Scenic classifications, fire effects on the landscape may temporarily reduce scenic attractiveness, but fire effects are not undesirable because of their natural role, temporal nature and ecological benefits. Scenic integrity is maintained where it is currently high and very high, and is improved in locations where it is not.

Immediate foreground and foreground scenic views for primary travel corridors exhibit a vegetative diversity of species, age, and size class that add a sense of mystery to the landscape. Foreground views are punctuated by occasional middle and background views of the surrounding landscape. Direct views of water may be limited, but its presence on the landscape should be sensed and felt. Middle ground and background scenic views from, or into, the Wild and Scenic River corridor are of a naturally appearing landscape dominated by natural form, line, texture and shapes. Grand fir, pacific silver fir, and western hemlock forest ecotypes provide a visual canvas which is punctuated by occasional geologic and hydrological features such as rock outcroppings and waterfalls. At higher elevations subalpine parkland and alpine ecosystems invite exploration and provide a visual transition to Mount Adams, which provides a dramatic geologic backdrop and influence.

### Consistent and inconsistent uses

- Vegetation management activities would be consistent where they maintain or enhance scenic integrity. Mitigations to protect scenic integrity would be expected.
- Vegetation management activities that result in long-term evidence of human activity that would be noticeable to the casual observer would not be consistent.
- Development of significant facilities or developed recreation sites that might be viewed from the river would not be consistent.
- Minor features utilizing natural materials which were designed to protect riparian vegetation (e.g. stone steps at a boating put in) may be consistent provided they did not affect the free flow of the river.

### Standards and Guidelines

- Under Scenery Management System terminology the Scenic Integrity Objective (SIO) is "High" for scenic sections and "Very High" for wild sections.
- Under Visual Management System terminology the Visual Quality Objective (VQO) is "retention" for scenic sections and "preservation" for wild sections

## Other Resources

### *Recreation*

Water-based recreation opportunities throughout the Wild and Scenic River corridor are very limited. There are no established or visible put-ins or take-outs for the river. The river is too swift to be well suited

for flatwater boating, and there is too much woody debris for whitewater rafting to be viable. Whitewater kayaking is possible in the section of river from the vicinity of the 8031 Road crossing downstream to the Forest boundary. A handful of people, at most, may run this section of the river on any given year. According to kayakers, river hazards are a major factor in this section receiving little use. It is technical boating, and only highly skilled boaters are likely to attempt it. Channel-spanning woody debris is known to be common, and scouting and portages are an expected part of the run. Another factor is that there is a significant amount of other class 4-5 whitewater in the area that is more accessible, easier to run, and which offers more attractive whitewater boating opportunities.

Fishing is another activity that may occur along the river. This activity is limited by river access and is not a particularly desirable activity for this stretch of river. Local managers' experience suggests this type of use is very minimal.

Wild river segments A and B overlap with the congressionally designated Mount Adams Wilderness. The two designations share some similar legislative intent, and are generally seen as compatible. Wilderness management is largely based on the preservation of the qualities of wilderness character: natural, undeveloped, untrammeled, and with opportunities for solitude or primitive and unconfined recreation. Analysis of permit data by wilderness area suggests an overall trend of steady if not slightly increasing visitor use for trails in the Mount Adams Wilderness within or adjacent to the Wild and Scenic River corridor. Recreation site inventories are a significant measure of the undeveloped character of wilderness, and can also be impacts to the biophysical resource as a result of recreation. Monitoring indicates that campsite density, quantity, and condition are within Forest Plan Standards for the sections of Wilderness that overlap the river corridor.

There are three trails within or immediately adjacent to the Wild and Scenic River corridor. A section of the Pacific Crest Trail (#2000) is relatively popular and use has been increasing in recent years. This increase in use has correlated with an increase in use across the length of the PCT. Horseshoe Meadows, a popular destination near the trail for camping. The Salt Creek Trail (#75) is a relatively low use trail near Cascade Creek. Mushroom harvesting is common in the area and this does result in occasional visible trash left behind and disturbed soil. The trailhead is also occasionally used as a dispersed campsite, and has a rather large footprint. The Buck Creek Trail (#54) skirts the eastern portions of the Green River Gorge section of the upper White Salmon River, and receives moderate use. Both the northern and southern trailhead are minimally developed. Near the southern trailhead there is a non-system trail that continues in the downstream direction to the Forest boundary and eventually ends on Forest Road 80 outside of the Forest Boundary. This trail is maintained by unknown parties, and is likely associated with use at the Mount Adams Horse Camp nearby.

There is minimal winter recreation visitation within the Wild and Scenic River corridor. The only notable use is the Forest Road 23, which is a designated snowmobile route. It is primarily used to connect with other trails and access more desirable terrain elsewhere.

Dispersed camping occurs on the Forest outside of developed recreation sites. This type of camping is typically allowed, but not developed or promoted by the Forest Service. The Forest Service does not provide any amenities for dispersed camping. There are no toilets, picnic tables, etc., but there may be visitor-created developments such as vehicle pullouts and fire rings. Dispersed campsites are typically associated with roads and travel corridors. Disturbed areas such as timber landings are often converted to dispersed campsites by visitors. There are locations with long histories of dispersed camping occurring, but other locations may only be used infrequently, or even just one time. Visitors occupy sites on a first-come first-served basis, and across the Forest there are large numbers of existing or potential sites that allow for dispersed camping. In 2016 a total of 40 dispersed campsites were mapped within the Wild and Scenic River corridor.

This greatest concentration of dispersed sites is along Forest Road 8031 nears its crossings of the White Salmon River and Cascade Creek (see Appendix Map 7). The proximity to water may have played a role in the popularity of these campsites. Several of these sites are accessed by non-system roads. Several of these sites have associated shoreline impacts and large areas of reduced vegetation. There is not any use data collected for these sites. Local managers' experience suggests that these camps receive use throughout the snow-free season, but are most heavily used in the fall by forest products collectors and hunters. This busy fall period is generally the only time of the year where all of the well-established campsites are in use, and is likely when the establishment and proliferation of new campsites has occurred.

The Salt Creek Trailhead is the only developed recreation resource within the Wild and Scenic River corridor. It is a minimally developed trailhead and consists of a trailhead bulletin board and a turn around. There is also a minimally developed scenic viewpoint along Forest Road 23. It consists of a pullout and "Scenic Viewpoint" sign.

There is incidental use of the Wild and Scenic River corridor by outfitter guides and for recreation events. Notably:

- A few outfitter guides have educational backpacking trips that may utilize Wilderness trails within the Wild and Scenic River corridor.
- There are several recreation events for runners, road bikers, and equestrians that utilize portions of the corridor. The most consistent events in recent years have been the Wild Woman Trail Marathon and Relay and the Mount Adams Endurance Ride. This is an area where demand could conceivably increase in the future.

The Scenic sections of river are consistent with the desired 'Roaded Natural' ROS. Recreation facilities, trails, and events are managed to provide for low to moderate concentrations of recreation users. There are opportunities for dispersed motorized or non-motorized activities, and scenic values are emphasized. Wild sections of river defer to the Wilderness Recreation Opportunity Spectrum (WROS). Sections of river fall within several Physical WROS areas: Primitive, Semi Primitive and Pristine. The Forest has also developed a "Niche" statement to augment and clarify direction for recreation opportunities and developed sites. The Wild and Scenic River corridor is predominately within what is referred to as the "Solitude Niche." This niche includes most of the Forest's Wildernesses, this setting provides solitude at its best with incredible views of a changing landscape. Key activities are horseback riding, hiking, and backpacking. A portion of the river corridor near the Forest boundary is also within the "Backcountry Niche." Located between the day use and solitude settings, this setting and provides a sense of "getting away" with low standard roads and rustic development. Key activities are attraction-based camping, long-distance hiking, horseback riding, OHV riding, and berry and mushroom gathering.

## How Recreation contributes to Desired Future Conditions

There are sustainable recreation opportunities that allow for enjoyment of the Wild and Scenic River, and that are consistent with the preservation of river values. In Wild segments, management is consistent with the preservation of Wilderness character, and with the public purposes of wilderness. Recreation supports public appreciation of the Wild and Scenic River.

### Consistent and inconsistent uses

- Road closures, restoration of unneeded roads, and conversions of road to trails would be consistent.
- Trails or roads in ecologically sensitive areas would not be consistent.

- Consolidation, removal, relocation, and maintenance of trails, roads, and campsites to emphasize the protection of streams and riparian areas would be consistent.
- Removal of down wood from the river to facilitate recreational activities would not be consistent.
- Recreation that does not damage geological features would be consistent.
- Recreation such as hiking, backpacking, mountain biking or equestrian riding would be consistent.
- Recreation activity that does not leave evidence of human activity noticeable to the casual observer would be consistent.
- Development of trails, scenic viewpoints, or interpretive sites would be consistent where they allow for public enjoyment and appreciation of the Wild and Scenic River.
- Development of significant facilities or developed recreation sites within a volcanic hazard zone would not be consistent.
- River-related recreation that impacted shoreline vegetation or water quality would not be consistent.
- Whitewater boating which does not involve impacts to river values would be consistent.
- No management would occur within the Mount Adams Wilderness that was not consistent with the Wilderness designation.

### **Standards and Guidelines**

- Volcanic hazards will be considered before installing any new permanent recreation facilities within the river corridor. Any recreation sites should blend with the natural landscape, and be screened from the river.
- The quantity, location, and density of dispersed camping sites may be regulated to protect river values.
- New opportunities for hiking, mountain biking or equestrian uses may be considered.
- Off-road, vehicles are not permitted in Wild River corridors. New opportunities for off-road, wheeled vehicles are discouraged in Scenic River corridors.
- Wood manipulation to allow boating passage should not be allowed.
- Interpretive and educational themes stress resource protection, stewardship, low impact recreational practices, visitor responsibility, and river values.
- Guide services, recreation concessions, events, and other commercial and non-commercial special uses may be permitted if they meet the following criteria:
  1. The use does not require any new permanent facilities or infrastructure in Wild River corridors. New facilities and infrastructure are discouraged in Scenic River corridors
  2. The use is of a size, scope or duration that it would have a nominal effect, or the use does not diminish the river's free flow, water quality or Outstandingly Remarkable Values



## Visitor Capacity

Section 3(d)(1) of the Wild and Scenic Rivers Act directs agencies to address visitor capacities in a comprehensive river management plan. This is to ensure that use levels in the river area do not threaten river values or established desired conditions. Overall visitor use within the upper White Salmon River area is quite low and does not appear to be threatening river values. Commensurate with this there has not been a large degree of investment in data collection, monitoring, and analysis to support visitor capacity estimates. As a result the visitor capacity estimates included in this comprehensive river management plan recognize the likelihood that visitor capacity decisions may need to be reviewed and revised as more data becomes available.

The monitoring plan in the proposed action includes trigger points that would trigger an appropriate level of data collection, monitoring, and analysis to support these initial visitor capacity decisions or make well-informed modifications. The monitoring trigger points were set relatively low in comparison to visitor capacities to provide a buffer between a re-examination of visitor capacities and any negative effects to river values.

<b>Table 3. Initial Visitor Capacity Estimates</b>
<b>Wild Sections</b>
<p>No more than:</p> <ul style="list-style-type: none"> <li>• 2 campsites per acre in Wilderness classified as semi-primitive.</li> <li>• 1 campsites per acre in Wilderness classified as primitive or pristine.</li> </ul> <p>Wild sections align with established Wilderness capacity standards in the Forest Plan.</p>
<b>Scenic Sections</b>
<ul style="list-style-type: none"> <li>• No more than 250 whitewater kayakers per year.</li> <li>• No more than 7,800 people per year on the Buck Creek Trail.</li> <li>• No more than 11,100 dispersed campers within the river corridor per primary season of use.</li> </ul>

## Wildlife

The wide range in elevation along the length of the river corridor results in a diversity of habitat and associated wildlife species found within the river corridor. In addition, the river corridor is located in the transition zone between the western and eastern Cascades forests and therefore contains elements of both. The vegetation ecoclasses within the river corridor reflect the potential natural vegetation communities, and can be grouped into five classes (Table 3). These ecoclasses reflect the changes in elevation from the grand fir ecoclass in the lower elevations to the glacial outwash at the headwaters. They also reflect the diversity found in a transition zone, with the presence of the silver fir ecoclass, which is more common west of the Cascades, and the grand fir ecoclass, which is more common on the east side.

<b>Ecoclasses within the WSR corridor</b>		
Ecoclasses	Acres	Percent
Silver Fir	2,668	41%
Grand Fir	2,057	31%

Mountain Hemlock/Sub-Alpine Fir	1,239	19%
Wet/Mesic	217	3%
Rock	298	5%

The Forest Service Wildlife database records the wildlife sightings that have been documented on the National Forest, including in the vicinity of the White Salmon River. The database only contains sightings that have been recorded in the database, and it does not include all the species that are likely to inhabit the area in the vicinity of the river. Table 12 displays the species that have been documented within about a mile of the river. These are species likely utilize the habitat within the WSR corridor. Those that are river-related or riparian-related are indicated by an asterisk.

<b>Species documented in NRIS on National Forest Lands in the vicinity of the White Salmon River.</b>	
Species	Status
Cascades Frog*	N/A
Harlequin Duck 2 sightings of male-female pairs (1998 and 2002)*	USFS Sensitive
Spotted Owl	Federal Threatened, Management Indicator Species
Kestrel	N/A
Pileated Woodpecker	USFS Management Indicator Species
Great Blue Heron*	N/A
Goshawk	USFS Sensitive
Pygmy Owl	N/A
Wild Turkey	N/A
Bald Eagle*	USFS Sensitive, State Sensitive
Cascades Red Fox	USFS Sensitive, State Candidate
Pine Marten	USFS Management Indicator Species
Wolverine	USFS Sensitive, Federal Candidate
Black Bear	N/A

In addition to the species that have been documented (Table 4), other Forest Service Sensitive and Forest Plan Management Indicator Species likely to occur in the vicinity of the river corridor are Cascade torrent salamander, mountain goat, elk, black-tailed deer, and various cavity excavating birds. Other common species in the area around the river include cougar, bobcat, and a variety of neotropical migratory birds. Pikas (*Ochotona princeps*) likely inhabit the upper elevations where boulder and talus slopes are found.

A large wetland complex, consisting of more than 80 acres, exists along Cascade Creek inside the Wilderness. This type of habitat is relatively rare in this landscape, and is likely important for many of the species listed above, including some species of neotropical migratory birds, Cascades frog, elk, and deer.

A small portion of the corridor overlaps the Gotchen Late-Successional Reserve, where the emphasis is to develop and maintain late-successional forest habitat capable of supporting spotted owls and other species that use similar habitat. The stands in the overlap area are not currently suitable spotted owl nesting or foraging habitat.

Another small portion is designated elk and deer winter range, where a mix of optimal thermal cover consisting of multi-story conifer stands and more open foraging areas would benefit elk and deer. The area is currently a mixture of older and younger age conifer stands, with the older stands representing the desired condition for thermal cover.

## How Wildlife contributes to the Desired Future Conditions

Late-successional and old-growth forest habitat comprises about 37% of the area within the corridor that can produce large trees (i.e. not including the wet/mesic areas and rock). This structure represents the Desired Future Condition under the Northwest Forest Plan for Riparian Reserves. This habitat would support spotted owls, goshawks, harlequin duck, pine marten, pileated woodpecker; and could provide nesting and roosting for bald eagles and great blue herons. Another 46% of the area capable of growing trees are in the small tree and sapling/pole structure stages. In the absence of fire, these stands have the potential to develop older forest structure over time.

Outside of the Riparian Reserve, forest management should create and maintain a diversity of habitat stages and structures that are resilient on the landscape and consistent with Wild and Scenic River designation. This could include low intensity natural disturbances or active management that create openings, promote hardwood tree species, and create/retain large snags and down wood. Having a diversity of vegetation structure within the corridor that is reflective of both the drier and more moist ecoclasses, as well as the significant elevational difference between the bottom and the top of the corridor will be beneficial to wildlife, in addition to improving the scenery ORV.

Other elements of the desired future condition for wildlife are that wildlife security and refugia be maintained within the corridor. This can be accomplished by reducing road density inside the corridor over time as unneeded roads are closed; careful planning of any additional trail routes that may be constructed to avoid sensitive areas (e.g. wetlands), and areas that currently have no or minimal human presence, especially in higher elevation areas that are used by wolverines; and by managing dispersed campsites and user-created roads and trails.

The upper elevations of the corridor overlap important habitat for species like wolverine, Cascade red fox, and mountain goat. The desired condition is maintaining minimal human presence in these higher elevations habitats.

### Consistent and inconsistent uses

- Reintroducing beaver to areas to historical habitat where they aren't currently active could be consistent.
- Human disturbance including trails in undeveloped areas that currently function as wildlife refugia would not be consistent.

### Standards and Guidelines

- Structural habitat improvements should utilize native or natural appearing materials.

## Fisheries

Due to the historic presence of several downstream waterfalls, the upper White Salmon River and its tributaries do not support anadromous fish species, nor does they support more than a minimal population of native resident fish, namely rainbow trout (*O. mykiss*) and cutthroat trout (*O. clarki*). Non-native brook trout (*Salvelinus fontinalis*) have been stocked in the White Salmon River and its tributaries since at least the 1930s, though they are not currently stocked in these rivers. Although the *O. mykiss* population within upper White Salmon River system may serve as a genetic source for the federally-listed Middle Columbia River steelhead trout found in the lower and middle reaches of the White Salmon River, the fisheries resource of the upper White Salmon River in its current state is neither unique nor exemplary from a regional or national standpoint.

## How Fisheries contributes to Desired Future Conditions

Rainbow trout and cutthroat trout migrate freely along the upper White Salmon River, Cascade Creek, and their tributaries. These stream systems provide high quality fish habitat for these native fish species and the upper White Salmon River watershed regains its stature as a high-quality recreational and tribal fishing area. As instream habitat diversity improves, the distribution of the native rainbow and cutthroat trout increases, these streams are able to support a greater number of these native fish species, and non-native brook trout are outcompeted and eventually eliminated from this Wild and Scenic River corridor and all of its tributaries. The genetic integrity of rainbow trout remains intact and rainbow trout in the upper White Salmon River serve as a genetic source for downstream steelhead trout.

Natural processes keep the river well supplied with wood for pool formation, overhead cover, and organic matter for invertebrate production. Riparian vegetation of the floodplain provide streambank stability and shade. Natural inputs of groundwater from springs and tributaries, along with the glaciated headwaters of the White Salmon River, are allowed to contribute to the high water quality and cool water temperatures. Anthropogenic sources of fine sediments are of such a small magnitude that they are immeasurable beyond natural background levels at any scale. Active floodplains provide diverse off-channel habitats for all life stages of native trout, and fish travel freely along the length of the White Salmon River and its tributaries to the Columbia River.

### Consistent and inconsistent uses

- Activities that could pollute the river such as fire retardant, herbicides or other chemicals would not be consistent.
- Stream restoration which protected and improved fish habitat and water quality would be consistent.
- Fisheries monitoring which emphasized genetic composition, distribution, and abundance would be consistent.
- Monitoring and removal of non-native fish species via electrofishing, seining, and means other than chemicals (e.g., rotenone) would be consistent.
- Monitoring and removal of riparian and aquatic invasive species would be consistent.
- Removing bridges and culverts in order to provide unimpeded passage for all life-stages of native fish and other organisms would be consistent.
- Introduction of fish that may affect the genetics of native fish populations, introduce or exacerbate disease, increase competition for resources, or alter predator/prey interactions would not be consistent.

### *Vegetation and Ecology*

Forest stands are within the grand fir (*Abies grandis*) vegetation zone (Topik 1989), within the Eastern Cascades Ecoregion. The climate on the east slope of the Cascades combines features of maritime and continental regimes (Franklin and Dyrness 1973). In the upper White Salmon 5<sup>th</sup> field watershed, riparian corridors or segments of corridors, particularly where stream and/or river confluences occur, contain a high degree of structural and spatial complexity, and host relatively high levels of botanical and animal diversity (Camp et al. 1997). Species that persist on the landscape in such refugia are able to re-colonize surrounding areas after fire and other disturbance events, and thus play a vital role in re-establishing ecological functions in disturbed areas.



This area historically experienced frequent, low to mixed severity fires, which tended to maintain early-seral conditions, favoring shade-intolerant, and fire-resistant overstory species, including ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), and western larch (*Larix occidentalis*), with shade-tolerant species including grand fir persisting as the most common shade tolerant species in the understory. Native Americans were likely the source of many fires, but lightning ignitions were common, too, and without suppression, had the capability of burning across this gentle topography for months” (Agee 1993).

More than a century of fire suppression by the Forest Service has prevented fire from functioning as a “natural manager” over the past century. This, combined with historical logging practices that tended to remove the largest most-fire resistant species of trees (Ponderosa pine, Douglas-fir, and larch), has led to the development of dense grand-fir forests that have proved susceptible to disease and insect outbreaks, causing pockets and expanses of diseased, dying, and down trees. In this state, these grand-fir zone forests lacks resiliency to fire, and tend to support stand replacing fires, such as the Cougar Creek fire of 2015, and the Cascade Creek fire of 2012.

There are known occurrences of invasive plant species along roadsides within or directly adjacent to the proposed corridor, including Forest Roads 230000, 8031000, 8031070, 8031101, and 8031041. Many invasive species share a need for open, sunny conditions to thrive, and that is why occurrences tend to be concentrated along road corridors. Riparian corridors are at risk of invasion by non-native species when disturbances to soil and reductions in canopy cover create favorable conditions. Activities that create soil disturbance, and/or create more solar penetration to the understory/soil level, and/or that may inadvertently introduce non-native or invasive seed to new sites through contaminated equipment use, are considered high risk for invasive plant establishment and spread. Invasive species known to occur include:

- tansy ragwort (*Senecio jacobaea*)
- Canada thistle (*Cirsium arvense*)
- bull thistle (*Cirsium vulgare*)
- St. John’s wort (*Hypericum perforatum*)
- diffuse knapweed (*Centaurea diffusa*)
- spotted knapweed (*Centaurea biebersteinii*)
- meadow knapweed (*Centaurea debeauxii*).

Non-native hawkweed (*Hieracium*) spp. Are also suspected to be present within this area, and houndstongue (*Cyanoglossum officinale*) is known to occur in sites to the east of the proposed corridor.

## How Vegetation and Ecology contribute to Desired Future Conditions

The desired future condition includes maintenance of native species habitat integrity and function. This implies a management approach designed to maintain or improve existing native plant diversity, prevent opportunities for invasive species establishment and spread, and facilitate ecosystem resilience to large scale disturbance events such as fire and climate change. By protecting the ORVs for which the area was designated as a Wild and Scenic River—free flow of the river; clean, cool water (water quality); scenery; geology; and hydrology—it is anticipated that the full range of habitats and biodiversity of botanical resources will also be protected.

Passive or active vegetation management may be used when needed to preserve habitat integrity and function, or to preserve river values. Active management includes: grass, forb, shrub, and tree planting, tree cutting/leaving, tree cut/remove, burning, snag creation, and weed control. Active management is

generally incompatible with Wild sections of the river that overlap with the Mount Adams Wilderness which is managed for its naturalness and untrammeled (wild) character. Natural processes are allowed to occur and vegetation is the product of natural succession. The removal of wood or other forest products is not allowed. Active management may be compatible within Scenic River corridors, provided it protects and preserves river values. For example, as funding allows, roadside occurrences of tansy ragwort, Canada and bull thistle, and all species of knapweed are treated. Some active management treatments may have short term impacts which are outweighed by longer term benefits. Any active management actions are expected to be infrequent and non-recurring, and must not impact free flow, water quality, and ORVs.

Where appropriate, fire will be allowed to play a natural role, and suppression strategies to consider include confine, contain and control. Naturally-occurring fires will be permitted to burn in specific areas if parameters established and certain planned objectives for that practice are met. (Forest Plan Pg. Plan III-9). Managing unplanned fire occurrences and prescribed fire in the Wild and Scenic River corridor will help restore and maintain varied vegetation, species, and age, and is predominantly the product of natural succession. Vegetation in all three categories may vary from natural openings through stands of mature and old-growth timber. (Forest Plan pg. Plan IV-108). All suppression strategies will utilize Minimum Impact Suppression Tactics (MIST), and retardant avoidance measures will be applied within the entirety of the Wild and Scenic River corridor.

#### **Consistent and inconsistent uses**

- Vegetation management that meets all other direction and protects stream temperature and sediment regime, and that provides for long-term wood input would be a consistent use.
- Installation of scientific monitoring equipment with negligible impacts would be a consistent use.
- Vegetation management, including prescribed burning, would be consistent where it increases the health and resiliency of the forest, protects and enhances ORVs, and complies with management standards and guidelines for Wild and Scenic Rivers.
- Vegetation management which removed future instream wood, caused erosion, or reduced streamside shade would be inconsistent.
- Management actions or non-action that result in departure from stable ecological conditions and increase the risk of catastrophic wildfire would not be consistent.
- Wildfire suppression techniques that cause more damage to the river's water quality and riparian areas than direct and indirect wildfire effects would not be consistent.

#### **Standards and Guidelines**

- Timber harvest will not be scheduled. Ordinary timber salvage is not permitted.
- Suppression techniques that minimize impacts to the resource and preserve a natural appearance should be utilized.
- The full range of fire management options may be considered, as well as the potential resource benefits of allowing fire to play a natural role. Prescribed fire may be used to meet management objectives.
- Firewood cutting for home or commercial use will not be permitted in the Wild River classification. It may be permitted in the Scenic classification, but may be regulated in the foreground to protect ORVs. Gathering firewood for campfire use may be permitted in any classification.

- To minimize visual disturbance, vegetation treatments should not occur within the visible foreground of the river.
- Logs and debris generated from management activities should be removed from foreground areas as seen from the river, use areas, and major travel routes.
- Genetic improvement activities in Scenic Rivers are limited to select trees.

### ***Administrative and other uses***

There is an active grazing allotment within the portions river corridor. District staff complete range allotment monitoring each year, and are not observing measurable utilization by cattle within the Wild and Scenic River corridor. Likewise other district staff are not observing cattle in this area.

### **How Administrative and Other Uses contribute to Desired Future Conditions**

The grazing allotment does not provide any direct benefits to Wild and Scenic River values, however it is not incompatible with them as long as grazing is not causing detrimental impacts. Forest Service policy (FSM 2354.42a) provides direction on this issue: “Permit livestock grazing within the designated river area provided it does not substantially interfere with public use or detract from the values which caused the river to be included in the National Wild and Scenic River System.” The monitoring plan includes a trigger of 5%, that was designed to provide an early warning and mechanism to address issues, should they arise.

### **Consistent and inconsistent uses**

- Livestock grazing which resulted in impacts to shoreline vegetation or water quality would be inconsistent.

### **Standards and Guidelines**

- Livestock grazing may be permitted on existing allotments. New grazing allotments will not be authorized.

## **Other Management Direction**

Late-Successional Reserves are an element of the Northwest Forest Plan that overlaps with the Wild and Scenic River Corridor. The objective for Late-Successional Reserves is to protect and enhance conditions of late-successional and old-growth forest ecosystems, which serve as habitat for late-successional and old growth related species, including the northern spotted owl (NWFP ROD, p. C-9). Habitat improvement projects designed to improve conditions for fish, wildlife, or watersheds are consistent and should be considered (NWFP ROD, p. C-17).

The Aquatic Conservation Strategy is another element of the Northwest Forest Plan that overlaps with the Wild and Scenic River Corridor. The Aquatic Conservation Strategy was implemented to protect and improve the health of the region’s aquatic ecosystems. Riparian Reserves are one component of the strategy. The main purpose of the riparian reserves is to protect the health of the aquatic system and maintain and restore riparian structures and functions. Riparian Reserves have been identified for every type of aquatic feature on the forest landscape: streams, lakes, ponds, wetlands, springs, etc. areas where special standards and guidelines direct land use decisions. These Reserves are critical for meeting many of the Aquatic Conservation Strategy Objectives, and as such require special attention in developing management strategies for activities occurring within them. Key watersheds are another component of the strategy. Portions of the upper White Salmon River were identified as a Tier 2 Key Watershed. Watershed

Analysis is a systematic procedure to characterize the aquatic, riparian and terrestrial features within a watershed, is required in all key watersheds to prescribe management activities and develop monitoring programs. A Watershed Analysis for the upper White Salmon watershed was completed (USFS 1998).

## Monitoring Plan

This section identifies activities that will be conducted to assess the progress and results of implementing the upper White Salmon Wild and Scenic River Comprehensive River Management Plan. The ecological and social conditions of an area can be expected to occur as a result of natural and human factors. Monitoring is important to ensure that changes stay within acceptable levels and do not compromise the protection and enhancement of river values.

For each river value to be monitored, one or more key indicators are selected that will allow managers to keep attuned to changes in the ecosystem or social setting. The indicator description provides an example of how the indicator might be measured, but these sample methods can and should be changed if better means become available. When possible, monitoring indicators that are already being collected for other management purposes were selected to help assure this monitoring plan is attainable.

For each key indicator, a threshold is set. This threshold value indicates the point at which river management objectives are no longer being met. A trigger is also set for each indicator at a level below the threshold value. In most cases the existing low use in the upper White Salmon River means that current conditions of indicators are all far from reaching either triggers or thresholds. In cases where limited data is currently available, reaching a trigger point may result in further investigation, monitoring and evaluation. Trigger points were set low to provide an opportunity for early and responsive management actions that prevent a threshold from being reached. In this manner, indicators, triggers and thresholds provide managers with information to determine if the resource values and opportunities they are being used to manage are actually being provided.

**Table 4: Monitoring Plan Elements. Including Values, Indicators, Thresholds, Triggers, & Actions**

River Value(s)	Indicator Type	Indicator Description	Threshold	Trigger(s)	Possible Management Actions
<b>All River Sections</b>					
Scenery	Social	Scenery Photo Points	Long-term decreases in scenic integrity class.	Any decrease in scenic integrity class from baseline conditions.	Develop management options to improve scenic integrity.
Water Quality, ORVs	Resource	TRACS Trail Condition Surveys	Any effects to water quality, free flow or ORVs as a result of trails.	>20% decrease in the number of trail miles maintained to standard within the Wild and Scenic River corridor.	Verify whether or not decrease in trail maintenance has the potential to affect water quality or ORVs. If there is potential for effects, develop management options for implementation.
				Any major trail events (e.g. washouts, landslides or flood events.)	Evaluate whether or not there is potential to affect water quality or ORVs. If there is potential for effects, develop management options for implementation.
Water Quality	Resource	Non-system trails within WSR corridor	Erosion and other trail impacts that affect water quality, free flow or ORVs.	Any new non-system trails that come within 200' of the upper White Salmon River or Cascade Creek	Evaluate whether or not there is potential to affect water quality or ORVs. If there is potential for effects, develop management options for implementation.
Water Quality	Resource	U.S. Forest Service, Region 6 Level II Stream Survey protocol -Large wood frequency, location, and total abundance instream	Large wood pieces per mile meet or exceed watershed analysis standards.		Correct management practices that may be limiting recruitment of large wood. Public outreach and education, especially to the local kayaking community, regarding the importance of large wood to the fisheries resource. Increased monitoring of instream large wood in the stream systems within the Wild and Scenic River corridor.
Water Quality and Visual Quality	Resource	Invasive Species Presence/Absence	If possible, periodic monitoring focused within the aquatic influence zone of the Wild and Scenic River corridor should be conducted in order to practice the “early detection rapid response” paradigm, which is the most effective approach to invasive species management.		
Water Quality and Free Flow	Resource	Surface water and springs within Wild and Scenic River Corridor	This monitoring element would provide better baseline data for several as of yet unmapped streams and springs which are connected with the upper White Salmon River. Monitoring this element would involve walking streams in the Wild and Scenic River corridor to identify unmapped surface water contributions. Estimating source discharge and recording water temperature.		
<b>Scenic Sections</b>					
Water Quality	Resource	Water Quality Monitoring -Turbidity -E. Coli -Temperature	State Water Quality Standards	Any observable trend of decreasing water quality over three consecutive sampling sessions.	Take steps to determine the source of water quality issues and take steps to address issues.
				Any sampling that exceeds State Water Quality Standards.	Develop management options to address issues.



Water Quality	Resource	Grazing Utilization Monitoring	40%-50% utilization in upland areas.  30%-40% utilization in riparian areas.	Greater than 5% utilization in the Wild and Scenic River corridor in either upland or riparian.	Conduct more thorough monitoring to understand the extent of utilization and verify whether there is the potential for impacts to river values.
Water Quality and Scenery ORV	Resource	Dispersed campsite surveys	Impacts to riparian vegetation with the potential to affect water quality or scenic integrity.	10% increase in number of sites from previous survey.	Verify whether or not the increase in the number of sites has the potential to affect water quality or ORVs.
				Any site with greater than 10' of continuous reduction in shoreline vegetation.	Develop management options for implementation that address the issue.
				Any sites or grouping of sites which reduces the scenic integrity of the area below desired conditions	
Water Quality Hydrology	Resource	Number of observed kayaking parties	Kayaking that adversely affects water quality, free flow or ORV's	More than 8 groups observed within any year	Take further steps to determine if use is increasing. If it appears that use is increasing, re-evaluate potential methods to monitor use levels, and survey river corridor for potential cut large woody debris in river and river access sites.
Not Applicable	Social	Trail Encounters	This is an indirect indicator of overall use and not a measure that relates specifically to the Wild and Scenic River.	Standards exceeded and trending upward for more than two consecutive years.	Action is likely to be taken on the basis of managing for Wilderness.
<b>Wild Sections</b>					
Water Quality Hydrology	Resource	Wilderness Campsite Forest Plan Standards Forest Plan Standards - Site Conditions - Site Density - Sites per acre	Exceeding Forest Plan site conditions standards	Trend of worsening site conditions.	Take preemptive management actions to keep Wilderness campsites within standard. Evaluate whether any campsites have the potential to affect water quality or ORVs.
				Wilderness Campsite Standards exceeded	Develop management options for implementation that address the issue.
Not Applicable	Social	Wilderness Permits	This is an indirect indicator of overall use and not a measure that relates specifically to the Wild and Scenic River.	WROS Standards exceeded and trending upward for more than two consecutive years.	Action is likely to be taken on the basis of managing for Wilderness.

---

## Public Involvement and Consultation

Throughout the planning process for the LEIS (1997), Resource Assessment (2013), and Environmental Analysis (2017) the public was engaged through public meetings, newsletters, and mailings to interested parties. For the LEIS (1997), a citizens' Task Force was created to ensure the viewpoints of a diverse stakeholder group were considered in the planning process for the river. The Task Force was comprised of 24 stakeholders representing a variety of interests and concerns relating to the river. Members of the Task Force included residents, farmers and ranchers along the White Salmon River, Yakama Indian Nation, Washington Department of Fish and Wildlife, Klickitat County, private river floaters and anglers, commercial outfitters, Pacific Power and Light Company, Mt. Adams Orchards, Friends of the Columbia Gorge, SDS and Champion International timber companies, Friends of the White Salmon, and the Washington Environmental Council. The Task Force played a critical role in helping to identify important river resources, draw attention to issues that needed to be addressed by the LEIS, review comments on the draft, and craft the preferred alternative.

The Gifford Pinchot Task Force, Friends of the White Salmon River, and Friends of Mount Adams provided input which was incorporated into the Resource Assessment (2013).

In 2016 and 2017 the Forest Service partnered with Cascade Mountain School to provide Wild and Scenic River education to their summer residency camp for high schoolers. These students also helped collect updated water quality data (temperature, turbidity, and *E Coli*). Future opportunities to include partners in the implementation of this plan and overall river management will be considered. Monitoring and education are likely areas where there will be ongoing needs for collaborative efforts.

A public listening session was held on April 28, 2016. Input from that session was considered when drafting the Environmental Assessment. Common points of discussion included the boundary, Forest Plan standards and guidelines, monitoring, recreation access, grazing, vegetation management, ORVs, mining, and roads. Several participants also expressed interest in partnership opportunities.

Completion of the upper White Salmon Wild and Scenic River Environmental Assessment (2017) also involved public involvement. The Forest Service received also comment letters during the initial project scoping and in response to the draft Environmental Assessment. Comments were generally supportive of the development of a comprehensive river management plan, and in some cases offered suggestions for specific protection measures the respondents wanted to see considered, such as; river access, kayaking, recreation capacity, grazing, geohazards, mining and minerals. Public input was used to inform and refine the Environmental Assessment and this Comprehensive River Management Plan.

---

## List of Preparers

Member of the interdisciplinary team were:

<b>NAME</b>	<b>POSITION</b>
Stephanie Caballero	Fisheries Biologist
Erin Black	NEPA Specialist
Chris Donnermeyer	Archaeologist
Andrea Montgomery	Botanist
Bengt Coffin	Hydrologist
Mitch Wainwright	Wildlife Biologist
Justin Ewer	Recreation Planner
Jon Nakae	Timber Planner
Caroline Gordon	Geologist
Mike Muelhbauer	Fire Management Officer

---

## References

- Agee, J.K. 1993. *Fire Ecology of Pacific Northwest Forests*. Washington, D.C.: Island Press.
- Camp, A., C. Oliver, P. Hessburg, R. Everett. 2007. Predicting late-successional fire refugia pre-dating European settlement in the Wenatchee Mountains. *Forest Ecology and Management* 95 (1997) 63-77.
- Franklin, J. F. and C. T. Dyrness 1973. *Natural Vegetation of Oregon and Washington*. Oregon State University Press.
- Hudec, Jessica. 2016. *Personal communication with GPNF fire ecologist*. On file at Mt. Adams Ranger District, Gifford Pinchot National Forest. Trout Lake, WA.
- Kaufman, Mike (manager of Glacier Springs Water District) 2012. Personal communication, Oct 2012.
- Korosec, Michael A., 1987. *Geologic Map of the Mount Adams Quadrangle, Washington*. Washington Division of Geology and Earth Resources, Washington State DNR, Open File Report 87-5.
- Orr, Elizabeth L. and William N. Orr, 1996. *Geology of the Pacific Northwest*. McGraw-Hill Companies, Inc., ISBN 0-07-04818-4, 409 p.
- Topik, C. 1989. *Plant Association and Management Guide for the Grand Fir Zone*. Gifford Pinchot National Forest. R6-ECOL-TP-006-88. USDA – U.S. Forest Service, 1974. National Forest Landscape Management Volume 2.
- U.S.D.A. Forest Service, 1989. *Gifford Pinchot National Forest land and resource management plan*, Vancouver, WA
- USDA – U.S. Forest Service, 1989. *Plant Association and Management Guide for the Grand Fir Zone*. Gifford Pinchot National Forest
- USDA – U.S. Forest Service, 1990. *Gifford Pinchot National Forest Land and Resource Management Plan; Amendment 11*
- USDA – U.S. Forest Service and USDI Bureau of Land Management. 1994. *Record of Decision for amendments to Forest Service and Bureau of Land Management Planning Documents within the Range of the Northern Spotted Owl*. Portland, Oregon.

---

USDA - U.S. Forest Service. 1997. Upper White Salmon River Wild and Scenic River Study Report and Final Legislative Environmental Impact Statement. Columbia River Gorge National Scenic Area, Hood River, Oregon.

USDA – U.S. Forest Service, 1998 Upper White Salmon River Watershed Analysis; Mount Adams Ranger District - Gifford Pinchot National Forest, Trout Lake WA.

USDA – U.S. Forest Service and WDOE. 2000. Memorandum of Agreement between the USDA Forest Service, Region 6 and the Washington State Department of Ecology Meeting Responsibilities under Federal and State Water Quality Laws. Washington Department of Ecology, Olympia, Washington and U.S. Forest Service, Portland, Oregon.

USDA – U.S. Forest Service, 2001 Wilderness Resource Protection Environmental Impact Statement. Gifford Pinchot National Forest

U.S.D.A. U.S. Forest Service and BLM, December 2008, Programmatic *Geothermal Resources Leasing EIS*. [http://www.blm.gov/style/medialib/blm/wo/MINERALS\\_REALTY\\_AND\\_RESOURCE\\_PROTECTION/energy/geothermal\\_eis/final\\_programmatic.Par.90935.File.dat/ROD\\_Geothermal\\_12-17-08.pdf](http://www.blm.gov/style/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION/energy/geothermal_eis/final_programmatic.Par.90935.File.dat/ROD_Geothermal_12-17-08.pdf)

USDA Forest Service. 2008. Record of Decision and Final Environmental Impact Statement and Forest Plan Amendment #20: Gifford-Pinchot National Forest and Columbia River Gorge National Scenic Area (Washington Portion) Site-Specific Invasive Plant Treatment Project and Forest Plan Amendment - Skamania, Cowlitz, Lewis, Clark and Klickitat Counties in the State of Washington. U.S. Forest Service-Region 6, Portland, Oregon.

USDA 2008. Gifford Pinchot National Forest and Columbia River Gorge National Scenic Area (Washington Portion) Site-Specific Invasive Plant Treatment Project and Forest Plan Amendment.

USDA Forest Service Pacific Northwest Region.

USDA Forest Service. 2010. Environmental Assessment for the Whychus Creek Wild and Scenic River Management Plan. Sisters Ranger District, Deschutes National Forest, Deschutes County, Oregon.

USDA Forest Service. 2010. Whychus Creek Wild and Scenic River Management Plan. Sisters Ranger District, Deschutes National Forest, Deschutes County, Oregon.



---

USDA Forest Service and WDFW. 2012. Memorandum of Understanding between Washington Department of Fish and Wildlife and USDA, Forest Service, Region 6 regarding Hydraulic Projects Conducted by USDA Forest Service, Pacific Northwest Region. Updated January 2012. Washington Department of Fish and Wildlife, Olympia, Washington and U.S. Forest Service, Portland, Oregon.

USDA-Forest Service. 2012. *Gifford Pinchot Fire Management Plan*. Vancouver, WA.

USDA – U.S. Forest Service, 2012, National Best Management Practices for Water Quality Management on *National Forest System Lands*, 177 pages

USDA Forest Service. 2012. Upper White Salmon River Wild and Scenic River Resource Assessment. Unpublished. Mt. Adams Ranger District, Trout Lake, Washington.

USDA – U.S. Forest Service, 2013. Upper White Salmon Wild and Scenic River Resource Assessment

USDA Forest Service. 2016. Upper White Salmon River Comprehensive River Management Plan: Hydrology Report. Written by Bengt Coffin, South Zone Hydrologist. Mt. Adams Ranger District, Trout Lake, Washington.

USDA – U.S. Forest Service, Visual Quality Objectives in Douglas-Fir Forests. Publication. R6-REC\_TP-016-90

U.S. Congress, 1986. Columbia River Gorge National Scenic Area Act; Public Law 99-663

U.S. Congress, 2005. Upper White Salmon Wild and Scenic Rivers Act; Public Law 109-44

Vallance, James W., 1999. *Postglacial Lahars and Potential Hazards in the White Salmon River System on the Southwest Flank of Mount Adams, Washington*. U.S. Geological Survey Bulletin 2161.

Washington Department of Ecology (WDOE). 2011. Water Quality Standards for Surface Waters of the State of Washington. Chapter 173-201A WAC, amended May 9, 2011. Washington Department of Ecology, Olympia, Washington.

Washington State Legislature. 2016. Washington Administrative Codes: WAC Chapter 220-110-070, WAC 220-660-190. Olympia, Washington. Website accessed July 11, 2016:  
<http://apps.leg.wa.gov/wac/>

---

# Appendix A. Upper White Salmon Wild and Scenic River

## Management Area Category (MAC) (WS)

### Goal

Protect the Wild and Scenic River Characteristics which lead to the designation of the upper White Salmon River to the National Wild and Scenic Rivers system.

### Description of Lands where this MAC is Applied

Within the river corridor four segments were classified as either “Wild” or “Scenic” river.

**Wild River:** defined as free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted.

- Segment A (Wilderness): Approximately 1.6 miles of the White Salmon River from its headwaters on Mount Adams in section 17, township 8 north, range 10 east, downstream to the Mount Adams Wilderness boundary.
- Segment B (Wilderness): Approximately 5.1 miles of Cascade Creek from its headwaters on Mount Adams in section 10, township 8 north, range 10 east, downstream to the Mount Adams Wilderness boundary.

**Scenic River:** Scenic River Segments: “Scenic” classification definition: free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.

- Segment C: Approximately 1.5 miles of Cascade Creek from the Mount Adams Wilderness boundary downstream to its confluence with the White Salmon River.
- Segment D: Approximately 11.8 miles of the White Salmon River from the Mount Adams Wilderness boundary downstream to the Gifford Pinchot National Forest boundary.

### Standards and Guidelines

- All activities within the corridor will preserve the river’s free flow, water quality and Outstandingly Remarkable Values.
- In instances where there is conflicting or overlapping direction, apply the most restrictive direction.

### Wild River

- VQO – Retention
- WROS – See Wilderness MAC (amended 2001)+

### Scenic River

- 
- VQO – Retention
  - ROS – Roaded Natural

### **Geology**

- Mineral exploration and development within the river corridor will be regulated to prevent unnecessary and undue degradation to Outstandingly Remarkable Values.
- Common (saleable) mineral material sources will not be inventoried, developed, or authorized within the corridor.
- Leasable minerals such as oil, gas and geothermal will remain open for leasing on National Forest lands. Use, occupancy or surface disturbance will not be allowed within the river corridor.
- The Forest reserves rights to sub-surface minerals throughout the river corridor.

### **Hydrology**

- Wood manipulation to allow boating passage should not be allowed.

### **Scenery**

- Under the Scenery Management System terminology the Scenic Integrity Objective (SIO) is “High” for scenic sections and “Very High” for wild sections.
- Under the Visual Management System terminology the Visual Quality Objective (VQO) is “retention” for scenic sections and “preservation” for wild sections

### **Recreation**

- Any recreation sites should blend with the natural landscape, and be screened from the river to the extent feasible.
- Volcanic hazards will be considered before installing any new permanent recreation facilities within the river corridor. Any recreation sites should blend with the natural landscape, and be screened from the river.
- The quantity, location, and density of dispersed camping sites may be regulated to protect river values.
- New opportunities for hiking, mountain biking, whitewater boating or equestrian uses may be considered.
- Off-road, vehicles are not permitted in Wild River corridors. New trail opportunities for off-road, wheeled vehicles are discouraged in Scenic River corridors.
- Wood manipulation to allow boating passage should not be allowed.

- 
- Interpretive and educational themes stress resource protection, stewardship, low impact recreational practices, visitor responsibility, and river values.
  - Guide services, recreation concessions, events, and other commercial and non-commercial special uses may be permitted if they meet the following criteria:
    1. The use does not require any new permanent facilities or infrastructure in Wild River corridors.
    2. The use is of a size, scope or duration that it would have a nominal effect, or the use does not diminish the river's free flow, water quality or Outstandingly Remarkable Values

### **Wildlife**

- Structural habitat improvements should utilize native or natural appearing materials.

### **Vegetation Management**

- Timber harvest will not be scheduled. Ordinary timber salvage is not permitted.
- To minimize visual disturbance, vegetation treatments should not occur within the visible foreground of the river.
- Logs and debris generated from management activities should be removed from foreground areas as seen from the river, use areas, and major travel routes.
- Genetic improvement activities in Scenic Rivers are limited to select trees.

### **Special Forest Products**

- Firewood cutting for home or commercial use will not be permitted in the Wild River classification. It may be permitted in the Scenic classification, but may be regulated in the foreground to protect ORVs. Gathering firewood for campfire use may be permitted in any classification.

### **Special Use Management (Nonrecreation)**

- Utility corridors, dams, diversions and hydro-electric power facilities will be prohibited to the extent of Forest Service authority. Existing facilities will be maintained.
- Locating new utility lines will be discouraged. Where no reasonable alternative exists, routes should cross not parallel, the river.
- Federal licenses or permits for water resource projects, including dams and transmission lines, will not be recommended.

### **Range**

- Livestock grazing may be permitted on existing allotments. New grazing allotments will not be authorized.

---

**Roads**

- Roads will not be permitted in Wild River segments.
- New road crossings on the upper White Salmon River and Cascade Creek should not be considered. Existing bridges on Forest Road 8031 or culverts on others road within the corridor may be maintained and replaced.

**Fire**

- Suppression techniques that minimize impacts to the resource and preserve a natural appearance should be utilized.
- The full range of fire management options may be considered, as well as the potential resource benefits of allowing fire to play a natural role.
- Prescribed fire may be used to meet management objectives.
- Heavy equipment should not be used in the foreground as seen from the river.

**Pest Suppression and Prevention**

- Strategies which protect the Wild and Scenic character of the area and avoid the degradation of water quality should be used to control the outbreak of pests.
- Unacceptable damage to sensitive visual areas should be prevented with integrated pest management strategies; cultural methods should be preferred.
- Pest Suppression and prevention methods which maintain the visual and recreational attributes of the area and protect adjacent resource values should be emphasized.



## Appendix B. Capacity Estimate Formula

Table 12: Capacity Examples		
Description of River	River Value(s)	Capacity
River Sections (Wild classification)	Water Quality, Scenery	27,200 Visitor Days per year within Mount Adams Wilderness. This wilderness wide capacity is broader in scale than the Wild and Scenic River corridor, but it is the best data available. If this number was exceeded trail use within the river corridor could be evaluated more closely to see if there was any potential for effects to river values. Capacities for “Wild” sections defer to the more stringent Land and Resource Management Plan Standards for Wilderness. These standards are designed to preserve elements of wilderness character and are well below use levels where there would be expected effects to river values.
River Sections (Scenic classification)	Free Flow, Water Quality, Scenery	<p>250 whitewater kayakers per year. More in-depth monitoring and capacity evaluation will be required if this amount of use appears to be occurring.</p> <p>7,776 maximum number of people per year for the Buck Creek Trail. Any additional trails added in the future could use the same formula (Days in season of use x trailhead capacity maximum # of vehicles x average group size x turnover (8 hour visitor day/average hike time)). Buck Creek = 180 days in Season x 8 vehicles x average 2 people per vehicle x 2.7 turnover.</p> <p>11,088 Dispersed campers per season of use. The following formula was used to determine this capacity. Capacity = number of sites x season of use x 1/3 site occupancy rate x average of 4 campers per group.</p>

---

## Appendix C. Resource Assessment

### Upper White Salmon Wild and Scenic River Resource Assessment

3/6/2013

## Introduction

### History of White Salmon Wild and Scenic River Designation

- **1986: Lower White Salmon Wild and Scenic River:** In 1986 Congress designated a 7.7-mile segment of the White Salmon River to the National Wild and Scenic Rivers System (NWSRS) in the Columbia River Gorge National Scenic Area Act (Public Law 99-663). Referred to as the Lower White Salmon River (LWS River), this piece of river flows from its confluence with Buck Creek at river mile (RM) 5 to its confluence with Gilmer Creek at RM 12.7. A Comprehensive River Management Plan has been developed for this section of river, and it is administered by the Columbia River Gorge National Scenic Area.
- **1997: Wild and Scenic River Study and LEIS:** Through this same 1986 legislation, 13.5 miles of the White Salmon River located upstream of the designated LWS River were authorized for study. This included the segment from its confluence with Gilmer Creek at MP 12.7 to its confluence with Trout Lake Creek at RM 26.2.

To ensure comprehensive evaluation of the river, the Forest Service expanded the study to include the short portion of the river above its confluence with Trout Lake Creek to the Gifford Pinchot National Forest boundary (approximately 4 miles), the portion of the White Salmon from the GPNF boundary to its headwaters in the Mount Adams Wilderness (13.4 miles), and the entire length of its tributary Cascade Creek to its headwaters located in the Mount Adams Wilderness (6.6 miles).

The entire 38 miles were studied and found suitable for designation, as reported in the Upper White Salmon River Wild and Scenic River Study Report and Final Legislative Environmental Impact Statement (LEIS; USFS, 1997).

- **2005: Upper White Salmon River:** In 2005, as a result of the previous LEIS, Congress added 20 miles of the White Salmon River and Cascade Creek to the NWSRS through Public Law 109-44. This component, which includes only the congressionally designated portions of the White Salmon River and Cascade Creek, is referred to in this document as the Upper White Salmon River (UWS River). It includes portions of the river and creek from their headwaters in the Mt. Adams Wilderness to the Gifford Pinchot National Forest boundary.

## Resource Assessment Process

---

The Wild and Scenic Rivers Act states that to be considered for designation, a river or portion of river must be free-flowing and possess at least one “outstandingly remarkable value”. The act categorizes outstandingly remarkable values as scenic, recreational, geologic, fish and wildlife, historic, or cultural. It also includes a category for “other similar values”, which may be identified locally as situations warrant. Under the Wild and Scenic Rivers Act, the Forest Service is required to develop a comprehensive river management plan (CRMP) for the UWS River to ensure management direction protects and enhances its values (free-flowing condition, water quality, and outstandingly remarkable values). This resource assessment (RA) is a document to guide interim management and to serve as the foundation for the development of the CRMP and final boundary. The RA determines which river-related values or features are outstandingly remarkable, or contribute substantially to the river setting or functioning of the river ecosystem.

The Gifford Pinchot National Forest Land and Resource Management Plan (1990) initially identified the values that made the portion of the Upper White Salmon River on the Gifford Pinchot National Forest (GPNF) eligible for designation as a Wild and Scenic River. These values were further defined through the Upper White Salmon Legislative Environmental Analysis (LEIS) in 1997, which evaluated the entire upper White Salmon River (including the portions not currently designated) through an extensive public involvement process. Outstanding resources were defined in the 1997 LEIS as “resources that are either unique or exemplary from a regional or national standpoint. To be unique, a resource or combination of resources should be one-of-a-kind. To be exemplary, a resource should be one of the better examples of that type of resource.” The same document identified the region of comparison as “the Columbia River Gorge area between the Cascade Mountains to the west and the Columbia Plateau to the east. This includes all major tributaries to the Columbia River spanning the crest of the Cascades, from the Umatilla River in eastern Oregon to the Sandy River near Portland.”

This RA was conducted to identify outstandingly remarkable values (ORVs) exclusive to the designated Wild and Scenic component. It is based on the 1997 study and includes additional analyses. GPNF resource specialists reviewed the LEIS for information and analyses pertinent specifically to the designated portion of the Upper White Salmon. This information, in combination with professional knowledge and field visits, was used to evaluate each potential ORV for the river. The RA refers to the Columbia River Gorge as the comparison region, as was used in the LEIS. The criteria used to determine the significance of river-related values are from the Interagency Wild and Scenic Rivers Coordinating Council. The RA also includes an analysis of the Upper White Salmon’s hydrology, an “other similar value”, the criteria for which was based on language from the 1997 LEIS.

The resource values evaluated in this document, as in the LEIS, include recreation, geology, hydrology, scenery, and wildlife. Fish, cultural resources, and vegetation were considered, but none rose to a level of significance to merit further consideration. For further discussion of these three values, refer to *Values Discussed but Not Analyzed in Detail* on page 13 of this document.

## **Findings Summary**

This assessment confirmed scenery, geology, and hydrology to be outstandingly remarkable values for the UWS River. The major features associated with each ORV are located within .25 miles of the UWS River’s ordinary high water mark. Recreation and wildlife<sup>1</sup> were determined to not represent rare or unique values within the region of comparison.

## **Discussion of River Values**

---

<sup>1</sup> This differs from the ORVs identified in the LEIS, primarily because the designated portion of the White Salmon does not include downstream features included in the study that made these other values outstandingly remarkable.

---

This section presents a narrative description of each resource value, beginning with a definition of the criterion used to judge whether a value is outstandingly remarkable. The criterion is followed by an evaluation of the present situation and findings, as well as rationale for the determination of significance.

## **Recreation**

### **Criteria for Outstandingly Remarkable Rating**

Recreational opportunities are, or have the potential to be, popular enough to attract visitors from throughout or beyond the region of comparison or are unique or rare within the region. Visitors are willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but are not limited to, sightseeing, wildlife observation, camping, photography, hiking, fishing, hunting, and boating.

- Interpretive opportunities may be exceptional and attract, or have the potential to attract, visitors from outside the region of comparison.
- The river may provide, or have the potential to provide, settings for national or regional usage or competitive events.

---

## Evaluation of the Present Situation

Segments A and B (wild) are located within the Mount Adams Wilderness. Segments C and D (scenic) are located within the semi-primitive motorized management area category from the Gifford Pinchot National Forest Plan (USFS, 1995). Within the Mount Adams Wilderness and along the canyon below the confluence with Cascade Creek, the Upper White Salmon and Cascade Creek have a rugged, primeval character.

While opportunities exist in all segments of the Upper White Salmon for recreation activities such as camping, picnicking, fishing, hunting, nature study, hiking, horseback riding, skiing, climbing, and backpacking, the river is largely inaccessible, resulting in low use of the area. Access to water's edge typically requires bushwhacking. The river is not generally boated; it is narrow, shallow, steep, rocky, and brushy with poor access. A few extreme kayakers hike into the river corridor to ride standing waves and waterfalls, but this is not a common activity. There are no developed campgrounds or recreation sites on or along any segments of the White Salmon River or Cascade Creek.

There are 15 miles of maintained trail in the corridor, 12 of which are in the Mount Adams Wilderness (segments A and B). These include the Pacific Crest, Round the Mountain, Buck Creek, Stagman Ridge, and Salt Creek trails. The Pacific Crest and Salt Creek trails are the only trails to actually cross or run parallel to the river. Other trails parallel the canyon or adjacent drainages.

Access to the river outside of the Wilderness is generally difficult and facilities are limited. There is a paved forest access road paralleling the river for most Segment D (Forest Road 23), used by recreationists to access the Mount Adams Wilderness and connect to the north end of the Forest. Although the road parallels the river and affords scenic views of the drainage and Mt. Adams, no access or views of the river itself are available. The road is several hundred feet above the river. Forest Road 8031 crosses both the White Salmon River (Segment D) and Cascade Creek (Segment C). While limited recreation use occurs at the crossing of the White Salmon River, the crossing at Cascade Creek provides access to a dispersed camping area, popular with hunters in the fall months.

### **Finding**

The designated UWS River has limited road access, and cross-country access is limited by terrain. Within the region of comparison, other rivers offer this type of river experience. Recreation opportunities on the Upper White Salmon do not stand out as unique or rare, nor do they have the potential to attract visitors from long distances or for competitive events. Recreation is not found to be an outstandingly remarkable value<sup>2</sup> on the UWS River.

## **Geology**

### **Criteria for Outstandingly Remarkable Rating**

---

<sup>2</sup> The Recreation ORV identified and described in the LEIS applied primarily to the middle segments (the Gorge and Trout Lake segments) of the White Salmon River; i.e., the portion below the National Forest boundary. Those segments provide many recreation access points and use sites along the river for activities such as sightseeing, wildlife observation, camping, photography, hiking, fishing, and boating. Of particular note is the whitewater boating access provided in the Gorge segment of the river. However, those segments were not designated as part of the Upper White Salmon Wild and Scenic River, and are therefore not evaluated in this document.

---

The river, or the area within the river corridor, contains one or more examples of a geologic feature, process or phenomenon that is unique or rare within the region of comparison. The feature(s) may be in an unusually active stage of development, represent a “textbook” example, and/or represent a unique or rare combination of geologic features (erosional, volcanic, glacial or other geologic structures).

### **Evaluation of the Present Situation**

The geology of the Upper White Salmon River and Cascade Creek, from their headwaters to the Gifford Pinchot National Forest boundary, is similar in some ways to that of other rivers originating on the flanks of volcanoes of the Cascade Range in southwest Washington and northwest Oregon. Geologic units along the Upper White Salmon River and Cascade Creek consist mainly of Quaternary volcanic rocks that are principally basaltic to andesitic in composition, and inter-fingered late Pleistocene to Holocene glacial deposits with associated drifts and debris flow/avalanche deposits (Korosec, 1987). The headwaters of Cascade Creek (segment B) are fed by the White Salmon and Avalanche glaciers, and numerous debris flows and debris avalanches have carved deeply incised canyons along its channel downstream of the glaciers.

The processes occurring on the surface at the headwaters of the Upper White Salmon River drainage basin (which includes Cascade Creek) are regionally rare as they are found only on volcanoes outside the region (i.e. Mount Baker and Mount Rainier (LWA, 1989)). A cirque located at the accumulation zone of the White Salmon and Avalanche glaciers was created as a result of a slope failure. This slope failure initiated multiple mass-wasting movements, resulting in deposits estimated to be 85 km<sup>3</sup> in volume (Vallance, 1999).

The White Salmon/Avalanche cirque is unique due to the fact that it was formed during large mass-wasting events rather than during the process of glacial erosion, which is the more typical origin of cirques. Additionally, it is hypothesized that slope failures originating at the cirque were caused by hydrothermal alteration of volcanic rock that effectively reduced permeability and porosity of the rock, ultimately leading to failure of slope materials (Vallance, 1999), which is an uncommon process for volcanoes in the region.

Recent basaltic and andesitic eruptions from Mount Adams flowed down paleo-channels of Cascade Creek and the Upper White Salmon River intra-canyon flows (Korosec, 1987). The intra-canyon lava flows have been actively downcut by the river since emplacement, resulting in the formation of a steep-walled and narrowly incised gorge, similar to the regionally significant gorge found on the middle reaches of the White Salmon River between RM 21.5 and BZ Corner. The gorge of the UWS River (segment D) is approximately 8 miles long, beginning near the Ninefoot Creek confluence between RMs 35 and 38, and ends near RM 30. The gorge is approximately 200 feet deep and ranges from 30 to 100 feet in width. Vertical-walled gorges like those found on the upper and middle reaches of the White Salmon River are unique to this area of Washington, and similar gorges in the region have only been found on the Wind River. Of the 750 river miles analyzed in the region, less than 7% contain gorges of similar character (LWA, 1989).

### **Finding**

Although the geology of the Upper White Salmon River drainage basin is similar in character to that of other rivers originating on the flanks of volcanoes within the region, the geomorphic landforms and processes that formed them are not. Narrow bedrock river canyons within the region are relatively rare, and the gorge through which the Upper White Salmon flows is comparable in length, width, and depth to the gorge downstream, in the middle reaches of the White Salmon, which was found notable in the LEIS for its length and continuous vertical walls (3-3). Additionally, glacial processes occurring in the headwaters of the White Salmon River drainage basin are not found anywhere else within the region.



---

Due to the rarity of the geomorphic landforms and the uniqueness of the glacial processes found in the Upper White Salmon drainage, geology is found to be an outstandingly remarkable value.

## **Hydrology**

### **Criteria for Outstandingly Remarkable Rating**

The Interagency Wild and Scenic Rivers Coordinating Committee has no established criteria written for hydrology. Instead, it refers to hydrology as an example of an “other similar value” that can be locally identified where appropriate. The LEIS for the White Salmon River identified hydrology as an outstanding resource. It defined outstanding resources as those that are unique or exemplary from a regional or national standpoint and that should be at least regionally significant in order to make a river eligible for designation as a Wild and Scenic River (LEIS p. 3-2). To be unique, a resource or combination of resources should be one-of-a-kind. To be exemplary, a resource should be one of the better examples of that type of resource (LEIS p. 3-2). Elements of hydrology that were analyzed in comparison with other regional rivers include depth, depth-to-width ratio, length, volume of flow, bedrock, and hydrologic features (e.g., rapids, waterfalls) (LEIS 3-3).

### **Evaluation of the Present Situation**

Within the Columbia River Gorge region, the White Salmon River’s flow regime is exemplary of both a spring- and glacially-fed hydrologic system. The result is a river with consistently reliable flows through the entire year.

Streams in the Columbia River Gorge region typically derive the significant majority of their flow from surface runoff of rainfall and melting snow. This results in flow regimes characterized by wide seasonal fluctuations that coincide with periods of precipitation and snowmelt, with high winter flows and very low summer discharge. The White Salmon River differs from the typical gorge stream because it maintains relatively high discharge throughout the entire year, including the summer months when many other streams demonstrate low flows.

The White Salmon River begins (segment A) at highly productive springs on the flanks of Mount Adams, and receives significant springflow contributions along its path to the Trout Lake Valley floor, and ultimately to the Columbia River. The springs that form and contribute to the White Salmon River produce large volumes of high-quality and very cold water throughout the year. Because the flow volumes of springs are not heavily influenced by individual rainfall and snowmelt events, springs along the White Salmon provide a relatively consistent volume of flow over the course of the year. Springs contributing flow to the White Salmon River can be found in a variety of landscape positions and with a wide range of discharge characteristics. Springs emerging from the ground immediately adjacent to the river’s edge discharge their flow directly into the river, whereas those located upslope can form small channels or tributaries that contribute to the White Salmon River. Springs in the vicinity of the Glacier Springs system, described earlier in this report, range in productivity from less than 100 gallons per minute to over 1,300 gallons per minute. The characteristics of these springs are indicative of the range of locations and productivity of springs found along the river corridor.

In the vicinity of the Glacier Springs system, a number of springs have been documented along a half-mile length of river. Water from six of these springs is captured and routed to the town of Trout Lake for that community’s drinking water system. The remaining springflows are not collected, and instead flow unimpeded to the White Salmon River. Collection boxes for the Glacier Springs system consist of concrete boxes built into the hillside around existing springs. The collection boxes capture 100% of the flow from each of the six springs at their source. A pipe from each collection box leads to a main pipeline

---

that delivers water to a reservoir in the Trout Lake Valley. From there, water is delivered to customers throughout Trout Lake.

Cascade Creek (segment B) is the largest tributary to the White Salmon River in the designated reach, and receives a majority of its flow from melting of seasonal snowpacks and glaciers on Mount Adams. The volume of flow from the high elevation snowmelt increases as air temperatures rise during summer months. As such, streamflows in Cascade Creek help sustain strong discharge in the White Salmon River through the late summer.

The White Salmon River and Cascade Creek are excellent examples of streams formed and maintained by springs and high-elevation snowmelt. The confluence of these two streams (segments C and D) offers a unique opportunity to see water quality differences in streams sourced at springs versus glaciers. Both streams are colder than others in the region during summer months. Because the White Salmon River has a higher proportion of its flow contributed by springs, which tend to have very cold water, it maintains lower temperatures than Cascade Creek. During late summer, the flow from Cascade Creek is heavy with glacial flour, a signature of its source from the Avalanche and White Salmon glaciers. Because its source is groundwater, which is typically very clear, naturally filtered water, the Upper White Salmon River maintains more clarity even while glaciers are rapidly melting. When combined, these streams form a river that has reliable and cold water through the summer months. Streams to the west and east of the White Salmon River tend to have high water temperatures and very low flows in the summer months due to different precipitation regimes and different geologic conditions that affect water movement across and through the ground.

## **Finding**

High-volume springs emanating from volcanic rocks of Mount Adams form the headwaters of the White Salmon River, and contribute significant quantities of flow. Discharge in the UWS River is further built by glacial meltwater from Cascade Creek and other tributaries. The UWS River is a reliable coldwater resource that provides substantial flow to downstream reaches throughout the entire year. The hydrologic character is exemplary of both spring-fed and glacially-fed streams as the UWS River displays both exceptionally cold water and consistent year-round flows.

Hydrology is found to be an outstandingly remarkable value on the UWS River.

## **Scenery**

### **Criteria for Outstandingly Remarkable Rating**

The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions. When analyzing scenic values, additional factors—such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed—may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment.

### **Evaluation of the Present Situation**

The Upper White Salmon River corridor has been classified by the Gifford Pinchot National Forest as Class A – Distinctive; that is, an area where features of landform, vegetation patterns, and water features combine to form outstanding scenic quality. The riverine setting is generally natural in appearance with human activity (e.g., recreation use, historic management activity, river access) having relatively little impact on the natural scenic character and feeling of remoteness.

---

The river's gradient is steep; elevations range from approximately 2,160 feet at the forest boundary to 7,000 feet at the headwaters of Cascade Creek. This range in elevation, as well as the river's location in the transition zone between marine and continental physiographic zones, contribute to considerable vegetative diversity. The lower elevations support grand fir as the predominant forest type along the river corridor, along with Douglas-fir, western hemlock, western larch, western red cedar, lodgepole pine, and western white pine. The understory typically is composed of salal, bear grass, and a variety of herbs. Higher elevations are dominated by Pacific silver fir along with noble fir and Engelman spruce, transitioning to mountain hemlock and subalpine fir in the highest elevations.

Timber harvesting has occurred within a quarter mile of the Upper White Salmon River, along the designated "scenic" reach between the Gifford Pinchot NF boundary and the Mt. Adams Wilderness. The harvesting, both partial cuts and clear cuts, was conducted between 1958 and 1990. In those older clearcut areas, planted and naturally regenerated trees are now approximately 100 feet tall. The most recent clearcuts are now revegetated with trees approximately 20 feet tall. The level of impact to the scenic value depends on the viewer's location and vantage point. In the lower stretch of the scenic-designated reach, the river flows through a deep gorge that is covered with mature and old-growth forest. The upper stretch, north of the 8031 road crossing, has more gentle sideslopes and some evidence of past timber management may be visible within 100 feet of the river.

Over its course, the narrow river displays a variety of water features including crystal clear water, waterfalls, white water rapids, and still, clear pools. Moss-covered rock and logs scattered over much of the watercourse and riparian area adds to the scenic diversity of the riverine setting. Along the upper portion of Segment D, as viewed from the river, dense vegetation and/or landforms along both sides of the river prevent views from stretching beyond the foreground and the river, and instead are focused primarily on the watercourse. Also in Segment D, a narrow rock gorge forms along a short section of river and contributes to the river's unique and outstanding scenic variety. In the lower portion of the river, some views are long and extended to the forested slopes and ridges above the river. Unique bedrock outcrops and volcanic intrusions are prominent at these elevations and also contribute to the outstanding scenic character of the river watershed.

## **Finding**

The change in elevation and water features over this river system results in highly diverse scenery and visual attractions. The steep gradient and narrow canyon focus the viewer's perspective on the water's interaction with its watercourse, rock formations, and riparian vegetation, with past human activities noticed only occasionally. The presence of exposed bedrock outcrops and the narrow rock gorge constitute a distinctive Class A landscape, are uncommon within the region of comparison, and give the Upper White Salmon River its outstanding high scenic value. The scenery of the UWS River is found to be outstandingly remarkable.

## **Wildlife**

### **Criteria for Outstandingly Remarkable Rating**

Wildlife values may be judged on the relative merits of either terrestrial or aquatic wildlife populations or habitat or a combination of these conditions.

Populations: The river, or area within the river corridor, contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species considered to be unique, and/or populations of federal or state listed (or candidate) threatened,

---

endangered or sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of “outstandingly remarkable.”

Habitat: The river, or area within the river corridor, provides exceptionally high quality habitat for wildlife of national or regional significance, and/or may provide unique habitat or a critical link in habitat conditions for federal or state listed (or candidate) threatened, endangered or sensitive species. Contiguous habitat conditions are such that the biological needs of the species are met. Diversity of habitats is an important consideration and could, in itself, lead to a determination of “outstandingly remarkable.”

## Evaluation of the Present Situation

This analysis considered the habitat that currently exists on National Forest System Lands within .25 miles of the designated UWS River (Figure 1). The elevation ranges from 2,160 feet at the Forest boundary up to about 7,000 feet at the headwaters of Cascade Creek. This wide range in elevation results in a diversity of habitat and wildlife species found within the river corridor. In addition, the river corridor is also located in the transition zone between the western and eastern Cascades forests and therefore contains elements of both.

The vegetation ecoclasses within the river corridor reflect the potential natural vegetation communities, and can be grouped into eight classes (Table 1). These ecoclasses reflect the changes in elevation from the grand fir ecoclass in the lower elevations to the glacial outwash at the headwaters. They also reflect the diversity found in a transition zone, with the presence of the silver fir ecoclass, which is more common west of the Cascades, and the grand fir ecoclass, which is more common on the east side.

**Table 1. Ecoclasses within the WSR corridor**

<u>Ecoclasses</u>	<u>Acres</u>	<u>Percent</u>
Glacial Outwash	446	6%
Open Subalpine/Alpine	706	10%
Mountain Hemlock	1,060	15%
Silver Fir	2,500	35%
Grand Fir	2,016	29%
Lodgepole Pine	88	12%
Wet Meadow and Shrub Wetlands	195	28%
Rock	31	4%

The Forest Service Natural Resource Information System (NRIS) Wildlife database records the wildlife sightings documented on the Gifford Pinchot National Forest, including in the vicinity of the UWS River. The NRIS database only contains documented sightings that have been input in the database; it does not include all the species that are likely to inhabit the area in the vicinity of the river. Table 2 displays the species that have been documented in NRIS within about a mile of the river. These species likely utilize

the habitat within the designated corridor. Those that are river-related or riparian-related are indicated by an asterisk.

**Table 2. Species documented in NRIS on National Forest Lands in the vicinity of the White Salmon River.**

<u>Species</u>	<u>Status</u>
Cascades Frog*	N/A
Harlequin Duck 2 sightings of male-female pairs (1998 and 2002)*	USFS Sensitive
Spotted Owl	Federal Threatened, Management Indicator Species
Kestrel	N/A
Pileated Woodpecker	USFS Management Indicator Species
Great Blue Heron*	N/A
Goshawk	N/A
Pygmy Owl	N/A
Wild Turkey	N/A
Bald Eagle*	USFS Sensitive, State Sensitive
Cascades Red Fox	State Candidate
Pine Marten	USFS Management Indicator Species
Wolverine	USFS Sensitive, Federal and State Candidate
Black Bear	N/A

In addition to the species documented in NRIS, other Gifford Pinchot Forest Plan Management Indicator Species likely to occur in the vicinity of the river corridor are mountain goat, elk, black-tailed deer, and various cavity-excavating birds. Pikas likely inhabit the upper elevations where boulder and talus slopes are found. None of these species are directly river-related.

Based on documented sightings during surveys, it appears that harlequin ducks breed along the Upper White Salmon River. Even though they have fairly narrow requirements for suitable breeding and brood-rearing habitat, harlequin ducks have been found in several other river systems across the Gifford Pinchot National Forest, so they are not unique to the UWS River. Similarly, the Cascades frog, great blue heron,

---

and bald eagle are also known to inhabit other rivers on the Forest as well as those that are tributaries to the Columbia River, and are not unique to the UWS.

Late-successional and old-growth forest habitat comprise about 30% of the area within the corridor, and represent the Desired Future Condition for Riparian Reserves under the Northwest Forest Plan. This habitat would support spotted owls, goshawks, pine marten, and pileated woodpecker, and could provide nesting and roosting habitat for bald eagles and great blue herons. While these are important species because they are federally listed, are designated as Management Indicator Species, or are otherwise protected by standards and guidelines in the Forest Plan, they are found throughout the forest and are not unique to the White Salmon.

## **Finding**

Although the Upper White Salmon River corridor contains a diversity of habitat and species, this diversity is related to the location of the area in a transition zone and the wide range in elevation, and is not directly related to the river or associated riparian area. Similar conditions are found on rivers elsewhere on the Gifford Pinchot National Forest, as well as other rivers tributary to the Columbia River. The LEIS noted the presence of nesting spotted owls near the confluence of Buck Creek and the White Salmon River, and a small portion of land within this vicinity was designated a Habitat Conservation Area. The LEIS considered areas "designated as significant habitat for sensitive species... as regionally significant." However, the presence of spotted owls does not qualify wildlife as an outstandingly remarkable value because their presence is not likely dependent on UWS River or to its riverine habitat.

Neither wildlife nor wildlife habitat is found to be an outstandingly remarkable value on the UWS River.

## **Values Discussed but Not Analyzed in Detail**

The following values were not identified in the LEIS as outstandingly remarkable. Specialists, however, revisited these values to determine if there were any unique features of the UWS River that would merit a determination of outstandingly remarkable. No specific features were identified that would constitute the presence of an ORV.

## **Fish**

Due to the historic presence of several downstream waterfalls and Condit Dam (removed in 2011), the UWS River does not support anadromous fish species, nor does it support more than a minimal population of resident fish, namely rainbow trout (*O. mykiss*). Although the *O. mykiss* population within UWS River may serve as an important genetic source for the federally-threatened Middle Columbia River steelhead trout in the LWS River, the fisheries resource of the UWS River is neither unique nor exemplary from a regional or national standpoint.

## **Cultural Resources**

Cultural resources were not evaluated for their potential to be outstandingly remarkable due to two factors: 1) the general lack of a thorough, extensive cultural resource inventory within the project area, and 2) a lack of evaluation for cultural significance of the known cultural resources within the project area. Several sites have been previously noted within the UWS River corridor but they have not been thoroughly investigated or evaluated for eligibility to the National Register of Historic Places. According to the predictive model developed for the Gifford Pinchot National Forest (Hollenbeck 1985), the majority of the project area is classified as having a high probability for pre-contact archaeological sites, due primarily to close proximity to a permanent water source. Currently, however, the general lack of

---

substantive data means that an evaluation of the potential for cultural resources within the project area to be outstandingly remarkable cannot be conducted.

## **Vegetation**

The habitat within the UWS River hosts a diversity of native species, but no rare species (i.e. Threatened, Endangered, Proposed, or Sensitive), unusual species, or outstanding examples of plant communities or habitat. No unique or exemplary features exist in the UWS to identify vegetation as outstandingly remarkable.

## **Sources**

- Land and Water Associates, 1989. Evaluation of the Geologic and Hydraulic Resource Values on the Klickitat and White Salmon Rivers.
- Korosec, M., 1987. Geologic map of the Mount Adams quadrangle, Washington, Washington, 1:100,000, Division of Geology and Earth Resources open file report 87-5.
- US Congress, 1986. Columbia River Gorge National Scenic Area Act; Public Law 99-663
- US Congress, 2005. Upper White Salmon Wild and Scenic Rivers Act; Public Law 109-44
- US Forest Service, 1997. Upper White Salmon River; Wild and Scenic River Study Report and Final Legislative Environmental Impact Statement
- US Forest Service, 1995. Gifford Pinchot National Forest Land and Resource Management Plan; Amendment 11
- Vallance, J., 1999. Postglacial lahars and potential hazards in the White Salmon River system on the southwest flank of Mount Adams, Washington, U.S. Geological Survey Bulletin 2161

## **Resource Assessment Team**

- Ryan Brown, Recreation Planner and Team Lead (Gifford Pinchot National Forest)
- Stephanie Caballero, Fisheries Biologist (Mount Adams Ranger District)
- Bengt Coffin, Hydrologist (Mount Adams Ranger District)
- Jackie Diedrich, Wild and Scenic Rivers Private Consultant
- Chris Donnermeyer, Archeologist (Mount Adams Ranger District)
- Kellie O'Neill, Landscape Architect (Gifford Pinchot National Forest)
- Robin Rose, Wild and Scenic Rivers Program Manager (Region 6)
- Andrea Ruchty, Botanist (Mount Adams Ranger District)
- Cheryl Seath, Geologist (Gifford Pinchot National Forest)
- Mitch Wainwright, Wildlife Biologist (Mount Adams Ranger District)
- David Wickwire, Recreation Program Manager (Mount Adams Ranger District)