White Paper:
The Ecological and Recreational Benefits of the Molalla River, Oregon

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Executive Summary

The Molalla River is an Oregon natural treasure. This 53-mile river originates in coniferous forests in the foothills of the Cascade Mountains and travels downstream through forests and agricultural land before joining the Willamette River. The Molalla is a valuable and necessary feature for local communities in the Willamette Valley of Oregon – it provides drinking water for the cities of Canby and Molalla, offers many acres of native fish habitat including cold water tributary fish spawning streams, and is an attraction for recreational users of many kinds. However, the river and its surrounding lands are at risk from impacts of urbanization, over-use by visitors, clear cut timber harvesting, and global and regional climate change. There is a need to address these threats and assess how they will affect the river’s values and determine what management and legislative actions can be taken to protect the river.

The following White Paper summarizes the ecological and recreational values of the Molalla River, with a specific focus on the upper part of the watershed above the city of Molalla. It highlights the historical uses of the watershed, the current recreational and cultural uses, and the critical spawning and rearing habitat for native fish. It also discusses some of the limitations and challenges that the upper part of the river and surrounding riparian areas face in terms of water quality limitation and land use practices. Improving the resiliency of native fish and the larger river system to warming temperatures will be vital in ensuring the health and productivity of the river and its native fish runs are not compromised. To achieve this goal, certain tools, such as Wild and Scenic River designation, will be invaluable in protecting the Molalla River’s ‘outstandingly remarkable values’, as are river restoration efforts that enhance fish passage and allow fish to migrate to cold water thermal refuges.

The objective of this White Paper is to educate and inform both decision-makers and the public who will shape the management and use of this Oregon natural treasure in the coming years. This report is not a comprehensive analysis of all issues pertaining to the upper Molalla River, but rather serves as a synopsis of the current situation of river and land management, and suggests ways to protect and manage the river in the short and long term.
The Molalla River

The Molalla-Pudding Subbasin is located in the north-eastern portion of the middle Willamette Basin and covers approximately 878 square miles in area. The headwaters of the 53-mile-long Molalla River are located near the Table Rock Wilderness within the Cascade Range. The river drops down from these higher elevations through basalt rock canyons, and forests of hemlock, cedar, and Douglas-fir before reaching more low-lying agricultural land.

Figure 1: The Molalla River Watershed

The Molalla River flows into the Willamette River between river miles 35 and 36, and the Pudding River is a tributary to the Molalla River less than a mile upstream of the Molalla River mouth. The subbasin, a part of the larger Upper Willamette watershed, is located within Clackamas and Marion Counties and includes the communities of Woodburn, Mt. Angel, Silverton, Canby, Molalla, Hubbard, Gervais, Aurora, Brooks, Barlow, Colton and Scotts Mills and portions of Salem, Keizer, Donald, and Wilsonville.

Most land in the Molalla-Pudding Subbasin is privately owned, with the U.S. Bureau of Land Management (BLM) administering the largest portion of public land (67 square miles in the upper Molalla watershed, known as the Molalla River Recreation Corridor). Land use in the Molalla-Pudding Subbasin is 53 percent forestry and 40 percent agriculture, with the remaining percentage...
urban, residential, and industrial. Ecoregions range from high elevation Cascade Highlands to low elevation Prairie Terraces.

**Figure 2: Molalla River below Horse Creek**

The Molalla River contains many attributes that are valuable to the local landscape and community. The corridor supports important habitats for many fish—including native winter steelhead and salmon runs, resident rainbow and cutthroat, and a naturalized population of Coho salmon—as well as wildlife such as the northern spotted owl, pileated woodpecker, beaver, elk, deer, cougars, and numerous other species.

In addition, the river is the primary clean drinking water source for the cities of Canby and Molalla. The Molalla River Recreation Corridor is an attraction for the thousands of visitors each year who come to hike, kayak, white water raft, mountain bike, fish, hunt, swim, and view the geological formations located within the river corridor. Historically, the river and the adjacent Table Rock Wilderness were significant in providing important trade routes across the Cascades between indigenous peoples of the northern Willamette Valley and Eastern Oregon.

The Molalla River is located only 50 miles from downtown Portland—Oregon’s largest city. This proximity means that the river is expected to experience more and more visitors each year as the populations of the greater Portland area and the Willamette Valley grow. Increasing visitors can raise the risk of over-use or inappropriate use of the river. There are also land uses within the watershed that negatively impact native fish, water quality, and recreational values. Both growing use and detrimental management actions should be addressed and factored into land and river management planning in the watershed. Exacerbating these threats are the impacts projected to occur to Molalla River and other Northwest rivers due to global and regional climate change.

The purpose of this White Paper is to summarize some of the key benefits and uses of the river, with a specific emphasis on the upper Molalla River and surrounding forest lands, located above the city of Molalla. This upper part of the watershed is currently at the center of efforts to extend Wild and Scenic designation to 22 miles of the Molalla, an initiative led and supported by the Molalla River Alliance. The Upper River is also benefiting from various river restoration efforts that will enhance native fish migration and overall river health. These current actions provide an opportunity for decision-makers to ensure that the Molalla River and its values are protected and managed for the benefit and enjoyment of the local ecology and communities.
**Historical Use of the Watershed**

The Molalla River and its tributaries were heavily logged from the late 1940s through 1970, including the use of splash dams, temporary structures that would block the flow of the river. At the time there were no forest practices or standards, and logging occurred clear to the river edge. Local residents reported that the slightest rains during this time caused the river to run bright red due to large amounts of exposed soils and sediment.

The majority of the Upper River is now managed by BLM, and both state and federal practices currently require riparian buffers on public and private land. Now the river only runs red with the heaviest of rains (3-5 times a year on average), and clears much quicker than its nearby neighbors, the Sandy and Clackamas. This historical change however should not be an excuse to ignore impacts forestry on public and private lands in the watershed – some of these effects on water quality and native fish can be and are significant.

**Recreational and Cultural Uses**

The Molalla River Recreation Corridor is the main area visited along the upper Molalla River. The corridor is managed by the BLM and is located between Trout Creek Road and the Table Rock Wilderness. Thousands of visitors each year travel to the Molalla River Recreation Corridor, emphasizing the importance of maintaining a clean and attractive river corridor. In 2008 the Corridor saw a 33 percent increase in use compared to previous years, a record number of visitors. The Corridor and its extensive trail system is used by a wide variety of groups including hikers, mountain bikers, equestrian, kayakers, rafters, anglers, campers, picnickers, nature observers, and swimmers.

BLM conducted a visitor survey that was published in May 2007. The survey was divided into river and wilderness visitors. Some highlights of this survey are:

- 77 percent of river respondents and 78 percent of wilderness respondents listed natural qualities as a reason for being attracted to the area.
- Just under half of the respondents stayed overnight, and those visitors stayed for an average of 4.25 nights.
- The top reasons for visiting the Corridor for the river respondents were picnicking, camping, sightseeing, trail-hiking, and fishing, in that order.
- 88 percent of river respondents and 92 percent of wilderness respondents were satisfied or very satisfied with their visit.

![Figure 3: Kayaking on the Molalla](image)
The recreation and cultural importance of the river in the local community has also resulted in the creation of a local coalition. The Molalla River Alliance was established in 2008 and is made up of more than 45 public and private, regional, local, state and federal organizations, and property owners. Its mission is to “safeguard, enhance and sustain the ecosystems and natural resources of the Molalla River for enjoyment and benefit of all people forever.” The Alliance regularly meets to discuss initiatives and projects to protect the Molalla River, including efforts to extend Wild and Scenic protections to the river, discussed further below.

**Figure 4: Fly fishing on the Molalla**

Over the past year, the Alliance has evolved into an important community forum for improving the safety and quality of the Recreation Corridor. The Alliance was the impetus for a much-needed increase in law enforcement in the Molalla River Recreation Corridor, which saw a dramatic drop in littering, vandalism, vagrancy, and under-age drinking in 2008. The Alliance has consequently become a key player in raising awareness of the river in the local community.

**Native Fish and Upper Willamette Recovery Plan**

The Molalla River has a history of salmon and steelhead runs, with various species existing at different levels of abundance and productivity. Healthy native fish runs are an integral part of the larger river system, and efforts for recovery planning, river restoration, and river protection should be prioritized to ensure these fish populations remain in the Molalla River system.

The Molalla spring Chinook run is part of the Upper Willamette Evolutionary Significant Unit which was federally listed as Threatened under the Endangered Species Act in 1999. Recovery planning efforts have identified the need to recover all historic populations of Chinook in the Upper Willamette ESU, including the Molalla River.

The Molalla River historically supported a native population of spring Chinook salmon, believed to be 8,000 strong. In 1950, researchers estimated that the Molalla River had sufficient habitat for 5,000 adult salmon (Myers *et al*. 2006). But as early as 1903, Oregon Department of Fisheries reported a dramatic decline in Chinook in the Molalla. By the 1940s estimates ranged from 500 to 1,000 adults. Since then, due to forest practices, out of basin stockings, and poaching in summer holding areas (among other things), the wild population has shown a steady and significant linear decline (Molalla Watershed Analysis, 1999; Upper Willamette Recovery Plan draft, 2008). Recent spawning surveys indicate a relatively low density of salmon spawning in the Molalla. Of those fish returning, nearly all are of hatchery origin. Only 4–10 percent of escapement is thought
to be naturally produced (Upper Willamette Tributary Habitat Information, 2006). Pre-spawning mortality in 2003 in the Molalla was estimated at 69 percent (9 of 13 female carcasses recovered still contained eggs and therefore indicated pre-spawning mortality). In 2008, less than an estimated 50-100 spring Chinook (both hatchery and wild) were able to successfully spawn in the Molalla (Schmidt et al. 2008).

Figure 5: Molalla salmon holding in Trout Creek, a thermal refuge, in the summer

Taken together, these data indicate that little, if any, natural production of spring Chinook occurs in the Molalla. Based on abundance and productivity information, the Molalla Chinook population is likely destroyed or nearly so and has been assigned the very-high extinction risk category (Upper Willamette Recovery Plan draft, 2008).

The current hatchery stock of Chinook released into the Molalla River is an out-of-basin stock from the South Santiam Hatchery. About 100,000 smolts are released in the river annually.

The Molalla wild winter steelhead run is part of the Upper Willamette Evolutionary Significant Unit, which was federally listed as Threatened under the Endangered Species Act in 1999. The Molalla River population is in full recovery and is now considered a stronghold population.

Before 1997, the Molalla River was stocked for decades with out-of-basin summer steelhead, winter steelhead, Coho salmon and catchable trout. These stockings along with the massive timber harvest in the mid-Century led to the massive decline of this population. Those stockings stopped with the listing of native winter steelhead and spring Chinook. Only a decade ago, Molalla River wild winter steelhead were estimated to be less than 200 fish, but in 2007 and 2008, the estimate was more than 1,500 fish, according to Oregon Department of Fish and Wildlife (ODFW) and NFS reports.

The Upper Molalla River has a healthy population of native cutthroat and resident rainbow trout. A remnant population of Pacific lamprey remains in the river. A run of naturalized Coho salmon from a stocking program that was discontinued in 1998 has had a steady and significant linear increase based on NFS observations and Willamette Falls fish counts.

The above data also suggest that some native fish in the Molalla River, such as wild winter steelhead, are viable and stronghold populations while other species, such as spring Chinook, are in dire need of recovery efforts. Several actions should be taken to ensure these populations remain healthy or are put on the road to recovery. The draft Upper Willamette Recovery Plan lists water quality, such as temperature, habitat access, and physical habitat quality, as some of the limiting factors to fish population viability in the Upper Willamette and its tributaries (2008, pp. 6-6).
The Plan consequently recommends several strategic actions, such as restoring fish passage or improving water quality, for example by reducing nutrient loading (2008).

Several of these actions for improving native fish viability for are discussed below - improving water quality (especially temperature in the face of climate change), improving habitat access through river restoration, and protecting habitat quality through reducing forestry impacts and designating Wild and Scenic protections. These are all critical components in the long term sustainability of these fish runs.

**Water Quality**

Section 303(d) of the federal Clean Water Act requires states to periodically list rivers and other bodies of water that do not meet water quality standard. The Oregon Department of Environmental Quality (ODEQ) published the Total Maximum Daily Loads (TMDLs) for the Molalla-Pudding Subbasin in December 2008. The document highlights that fourteen stream reaches of the subbasin are listed as impaired by high stream temperature, which affects rearing and spawning habitat for salmonids. These reaches include the entire main stem of the Molalla River and the Table Rock Fork.

There are seven stream reaches listed as impaired by bacteria contamination in the subbasin (including two reaches impaired both in summer and fall/winter/spring). Bacteria listings are based on standards for water-contact recreation. These reaches include the first 20 miles of the Molalla River.

**Stream temperature and climate change**

The summary of TMDLs above demonstrates that the water quality of the Molalla River is largely temperature-limited. It is therefore important to recognize where opportunities exist to manage and mitigate for temperature in the watershed.
Figure 8 below compares the colder waters of the tributaries of Copper Creek and Pine Creek to stream temperatures in the main stem of the Molalla River in 2004 during the summer, when temperatures are at their maximum. As illustrated by the graph, these creeks are notably cooler than the main river during the period shown. Even though Pine Creek is temperature-limited itself according to the ODEQ TMDL criteria, relatively it is cooler than the Molalla main stem, and Copper Creek is not limited for temperature and is significantly cooler than the main river. Given the 2004 summertime temperature differences illustrated below, these tributaries provide critical colder waters and act as refuges for juvenile native winter steelhead and other salmonids which use these and other cold water creeks, like Trout Creek, as spawning and rearing habitat.

Figure 8: 2004 Summer stream temperatures for the Molalla River, Copper Creek, and Pine Creek (Degrees °C)

![Graph showing stream temperatures](image)

Improving water quality in the river system will mean that some of the causes of impaired water quality in the Molalla River basin need to be addressed. Studies have shown that detrimental management actions, such as the removal of riparian vegetation, logging, and road-building, can raise stream temperatures due to decreased streamside shade and increased sediment and debris
These activities threaten the water quality in cold water creeks (Sullivan et al., 2000).

Furthermore, the warming temperatures, that are projected to occur over the next several decades in the Pacific Northwest as a result of climate change, will have significant impacts on river systems. Scientists predict that Northwest river systems will experience higher warmer summer temperatures, lower summer stream flows due to a reduction in winter snowpacks, and shifts to earlier peak flows (Climate Impacts Group; Mote et al., 2003). Salmon and steelhead species will be affected by such hydrologic changes as the amount of suitable thermal habitats will shrink, and the location of such habitats will change (Eaton and Scheller, 1996). Small cold water tributaries such as Copper Creek, Trout Creek, and Pine Creek will therefore be vital in ensuring the Molalla River system is as resilient as possible to these expected changes, and that it remains healthy and productive for native fish and as a drinking water source. To achieve this, such tributaries need to be protected from an excess of nutrients and debris due to logging, and stream side shade needs to be retained to keep streams cool.

Short and long-term watershed management planning should incorporate the projected hydrologic and ecological changes associated with climate change, and should also ensure that management activities in the riparian area do not degrade cold water fish-bearing tributaries and other native fish habitat.

Watershed Management and Restoration

Forest Harvesting

Intact forests play an integral role in the health of a watershed – they capture and store carbon, reduce erosion, fix nitrogen into the soil, provide wildlife habitat and streamside shade, and act as drinking water sources. Therefore, how forests are managed can have implications for the larger watershed. Approximately one-third of the Molalla River Watershed is in federal ownership by the BLM and the U.S. Forest Service (USFS) (BLM and USFS, 1999). The upper Molalla River runs through private forest lands and public forest lands managed by the BLM and Mount Hood National Forest. On both these public and private forest lands there are timber harvesting practices that occur which expose the river and its fish-bearing streams to increased sediment and debris and removal of stream-side shade.

Scientific studies in the Cascades have determined that timber harvesting within or near stream corridors can increase sedimentation and impact stream temperature, water quality, peak flows, and native fish (Johnson and Jones, 2000; Jones and Grant, 1996; Cederholm et al. 1980). Native fish are particularly at risk from timber harvesting as they rely on cold, clean streams to spawn and rear.

The 1999 Molalla River Watershed Analysis acknowledges how land use allocations, such as timber harvest patterns, can affect downstream water quality. It also confirms that the high road density in the watershed (more than 1,000 miles of roads) exacerbates flooding and surface runoff which increases sediment additions to streams (BLM and USFS, 1999). It is therefore evident that timber harvesting, and associated activities such as road usage, are detrimental to watershed health and resiliency, especially in the face of climate change.
This should be of concern to federal agencies, Clackamas County, and local municipalities, not only because of impacts on fish and habitat, but because the Molalla River and its surrounding forests are the main drinking water source for the cities of Canby and Molalla. Maintaining and improving the health of the Molalla River for native fish and drinking water requires that the effects of forest harvesting are reduced or mitigated through various management actions. Such management actions may include the following: limiting timber harvesting to levels on BLM and private lands; fully prohibiting logging from occurring anywhere near native fish-bearing stream corridors in order to ‘buffer’ streams from associated impacts; retaining live trees and woody debris in clear-cut harvest areas; and adopting selective restoration thinning in the majority of areas instead of clear-cuts to reduce erosion, debris flows, and sediment (Swanson and Franklin, 1992). These actions could go a long way to ensuring the upper Molalla River and its fish runs remain healthy through the next several decades.

River Restoration and Education

Several local organizations and many volunteers are working with federal, state and local agencies as well as local landowners to protect the Molalla River, restore its fish and wildlife, and encourage tourism. Some of these efforts are outlined below.

Fish Barrier Culvert Removal and Habitat Enhancement:

A fish barrier culvert on Russell Creek was replaced with a bridge three years ago that opened up several miles of stream and a large wetland of rearing habitat for wild Molalla River fish, including winter steelhead, Coho and resident rainbow and cutthroat. Local organizations are actively seeking funding to open more streams to fish passage, including Cedar, Trout, and Pine creeks. Funding is also being sought to improve the habitat of several stream reaches to increase ideal spawning and rearing habitat for ESA-listed fish.
Wild Fish Restoration
Each year, local volunteers place more than 3,000 hatchery salmon carcasses in the upper drainage to provide nutrients to the entire food web. These same volunteers also conduct winter steelhead spawning surveys, spring Chinook spawning/carcass surveys, Coho carcass surveys, and winter steelhead creel surveys. These volunteers are working with ODFW, NOAA, and a private fisheries consultant to recover wild spring Chinook in the river.

Angler/Public Education
Local concerned citizens suggested several angling regulation changes in 2008 that were accepted by the ODFW Commission to protect Molalla River fish, including moving the deadline downstream to protect spawning steelhead and salmon.

Environmental Education
Volunteers regularly bring local junior high and high school students into the Molalla River Recreation Corridor for environmental/stewardship education.

River clean-ups and trail work parties
Each year in the spring and fall, hundreds of volunteers pick up trash along the upper river. Local volunteers also work with BLM to improve the Corridor’s many multi-use trails.

Public Outreach
The Molalla River Alliance, Molalla RiverWatch, and the Native Fish Society created the Molalla River Resource Center in downtown Molalla so the community has a central location for information on the Molalla River and its recreational opportunities.

Wild and Scenic River Protection
The above sections highlight the benefits of the upper Molalla River, and also warn of threats to the river’s drinking water and native fish. Sustainable river management of forested lands and river restoration efforts to improve fish passage and viability are both necessary and important in achieving a healthy river corridor.

Another mechanism for safeguarding the river and its values is to designate it as a Wild and Scenic River. Wild and Scenic Rivers (WSRs) are part of the National Wild and Scenic River System and are designated through the 1968 Wild and Scenic Rivers Act. A WSR designation protects important riverside lands, blocks dams and other harmful water projects, and preserves a river’s free-flowing nature. It also helps protect and improve clean water, as well as the river’s unique historic, cultural, scenic, ecological, and recreational values.

The federal land managing agency, in this case the BLM, is responsible for managing a WSR for these purposes, and is required to develop a river management plan within three years of
designation that will guide the management direction of the river corridor. Designation largely does not impact private landowners within a corridor – however it has implications for how the BLM will manage the Molalla and allocate land use within the WSR corridor.

American Rivers, the Native Fish Society, and the Molalla River Alliance, are working together to pursue Wild and Scenic designation for 22 miles of the Molalla River (Figure 10). This designation would also protect a quarter mile buffer on each side of the river, and would therefore protect approximately 7,000 acres of riparian land along the BLM-managed sections of the river. These protections include a segment of the main Molalla River and also the Table Rock Fork.

Figure 10: Proposed Wild and Scenic Rivers in Molalla Watershed

The river has been found suitable for WSR designation by the BLM in the 2008 Salem District RMP. The ORVs attributed to the Molalla River are scenic, recreation, and geology, and there is a case to be made for cultural and community ORVs also. The federal agency’s support for this designation is an impetus to ensure such designation is achieved. Even more so, the support of the local community through the broad-based Molalla River Alliance confirms that WSR protection is a priority for stakeholders and river users.

Designation by Congress would mean that the river’s values will be permanently protected in perpetuity. WSR protection will benefit the local community and economy also as WSRs put a river on the ‘map’ and serve as attractions for visitors and tourists. The riparian buffer of a quarter mile on each bank also guarantees that land use within the river corridor is consistent with protecting native fish and other values.

At the time of publication of this paper, Congressman Kurt Schrader (D – 5th) had introduced Wild and Scenic legislation for the Molalla River in the House of Representatives. The Molalla River Alliance and partners will continue to pursue this designation over the coming months to ensure the legislation is passed as soon as possible and the Molalla River is safeguarded into the future.
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