

SECTION 4

**BUMPING RIVER SUB-BASIN
SHORELINE INVENTORY AND ANALYSIS
DISK #2**

TABLE OF CONTENTS

BUMPING RIVER SUB-BASIN CONTEXT SUMMARY	3
Bumping River Sub-basin Overview	3
Geology	4
Geomorphology	5
Vegetation	6
Proposed, Endangered, Threatened, and Sensitive (PETS) Plant Species.....	6
Noxious Weeds	6
Wildlife	7
Proposed, Endangered, Threatened, and Sensitive (PETS) Wildlife Species.....	7
Flow	8
Hyporheic.....	9
Irrigation	9
Salmon	10
Fish Distribution	10
Passage.....	11
Salmon Habitat	11
Channel Condition	11
Riparian.....	12
Streambank Condition	12
Large Woody Debris.....	13
Pools.....	13
Off-Channel Habitat.....	13
Water Quality.....	14
BUMPING RIVER SUB-BASIN REACH DESCRIPTION	16
Reach 1	
Abiotic.....	17
Biotic.....	18
Cultural Modifications	19
Cultural Jurisdictions	20
Ecological Function Summary.....	21
Opportunities for Protection	21
Opportunities for Restoration	23

Bumping Lake

Abiotic.....24
Biotic.....24
Cultural Modifications25
Cultural Jurisdictions25
Ecological Function Summary.....26
Opportunities for Protection26
Opportunities for Restoration27

APPENDIX.....28

Figure B1. Geology and Geohazards in the Bumping River29
Figure B2. Wetlands and Soil Characteristics in the Bumping River.....30
Figure B3. Cultural Modifications in the Bumping River31
Figure B4. Public Resources and Access in the Bumping River.....32
Figure B5. SMP Jurisdiction Breaks for the Bumping River33

Table B1. SMP Reach Breaks for Inventory and Analysis, Bumping River Sub-basin.....34
Table B2. Geology and Geohazard Characteristics for the Bumping River.....34
Table B3. Soil Characteristics for the Bumping River35
Table B4. Stream Characteristics for the Bumping River36
Table B5. Habitat Characteristics for the Bumping River.....37
Table B6. Fish Characteristics for the Bumping River.....38
Table B7. Fish Characteristics for the Bumping River, cont.....38
Table B8. GAP Analysis of SMP Jurisdiction Characteristics for the Bumping River.....39
Table B9. Land-use Characteristics for the Bumping River.....40
Table B10. Cultural Jurisdiction Characteristics for the Bumping River.....41
Table B11. Transportation Characteristics for the Bumping River41
Table B12. Cultural Modifications for the Bumping River.....42

BUMPING RIVER SUB-BASIN CONTEXT SUMMARY

Portions of the following text have been primarily taken, in whole or in part, from the following reports: (Tieton Watershed Plan 1996, and USFS 1998).

BUMPING RIVER SUB-BASIN OVERVIEW

The Bumping River watershed is located in central Washington State, on the southern part of the Wenatchee National Forest. This watershed is part of the Yakima River basin. The Bumping watershed encompasses a total of 114.8 square miles (73,479 acres) (United States Forest Service [USFS], 1998).

The Bumping River extends from its confluence with the Little Naches River at an elevation of 2560 feet to the crest of the Cascade Range at elevations in excess of 7000 feet. With a drainage length of approximately 15.9 miles, the stream gradient is characteristic of headwater streams in the region, exhibiting high-gradient upper reaches that terminate in a low-gradient (1%) glacial valley stream-bottom. Prominent in the Bumping River drainage is Bumping Lake; formerly controlled by a glacial moraine, it was the first of four glacial lakes to be functionally altered to create a water storage reservoir in 1910. This conversion precluded upstream anadromous fish passage and changed normal hydrologic patterns downstream of the lake over the entire SMP jurisdiction of the Bumping River. The SMP jurisdiction for the Bumping River is comprised of one reach extending from the Little Naches River to the irrigation storage reservoir at Bumping Lake.

The Bumping River watershed originates on the Cascade crest in the greater Naches River basin. The western boundary of the Bumping River basin adjoins Mt. Rainier National Park. Significant portions of this watershed lies within the William O. Douglas Wilderness Area. The river runs generally northeast from its headwaters to its confluence with the American River to form the Naches River. The Bumping River watershed includes some private inholdings. Several patented mining claims are located in the Morse Creek drainage and the Bumping and Summit mining districts are recognized (USFS, 1998).

Mid-century timber sales have been practiced within the Bumping River basin, but generally, there has been little large-scale or recent logging in the watershed (USFS, 1998).

The Bumping River watershed is managed predominantly for recreation. Bumping Lake is a magnet for summer camping of all types and for winter use. Dispersed camping, wilderness camping, and day use, developed campground camping, trail use, cross-country skiing, and snow-shoeing are all popular activities in this area. Snowmobile use is common along the roads in the Bumping River area, and a County ordinance allows dual use of snowmobiles on the Bumping Road between Goose Prairie and Bumping. Dispersed camping and road use is not legal on non-system roads within the Bumping

River watershed. Wilderness designation does not permit the use of motorized equipment, wheeled vehicles, air drops, or mountain bikes. The Pacific Crest National Scenic Trail traverses the Bumping River basin to the west from Tumas Mountain north to Norse Peak, a distance of 22 miles (this includes the American River basin) (USFS, 1998).

The Bumping River watershed is a destination area, being literally at the end of the road. The Bumping River watershed attracts people who are interested in more minimally-developed campgrounds or dispersed recreational activities including camping, pleasure driving, and hunting/viewing wildlife. Others are interested in the primitive experience offered in the William O. Douglas wilderness (USFS, 1998).

The Bumping River Road is the primary forest travel route in the Bumping River watershed, providing year-round paved access to Bumping Lake, and paralleling the Bumping River for over 10 miles. Developed campgrounds within the SMP jurisdiction of the Bumping River include Lower Bumping, Cougar Flat, Soda Springs, Cedar Springs, and American Forks campgrounds. There are also numerous dispersed campsites along the lower Bumping River, most in close proximity to the river. There are several trailheads within the Bumping River watershed that service trails leading into the wilderness area. Each trailhead is, generally, associated with a developed campground (USFS, 1998).

GEOLOGY

As in most mountainous regions, uplift, faulting, and folding has influenced landform and geomorphic processes in the Bumping River basin. Rocks of the lower third of the watershed display the northwest-southeast trending structure of the Olympic-Wallowa Lineament. This orientation is expressed through high-angle faulting of American Ridge in the Goose Prairie area, as well as faulting, anticlines, and synclines that cut American Ridge in the Fifes Creek area. Other structural features include a rhyoclastic dome (Old Scab Mountain) and the Bumping Lake Pluton (USFS, 1998) (Fig. B1).

Glaciation has played a major role in landform development within the Bumping River watershed. Effects of glaciation are readily apparent from about Goose Prairie westward (downstream). The Bumping River displays the classic U-shaped form of glaciated valleys. Till deposits flank the valley walls, and the valley bottom through which the Bumping River flows, is draped with a thick mantle of till in the form of old lateral, terminal, and ground moraines. Glacier fluvial outwash is also extensive. Numerous collapsed till deposits and mass-wasting features are found throughout the watershed (USFS, 1998).

From Goose Prairie to the confluence of the Bumping and American rivers, the landscape is dominated by structurally-controlled landtypes made up of pyroclastic and sedimentary deposits. In this area, steep, incised, V-shaped valleys are common. Relatively friable and erodible bedrock, combined with bedrock orientation gives rise to valleys where

debris flows and severe erosion are common. Evidence is found in the numerous alluvial fans lining both sides of the lower Bumping River (USFS, 1998).

Where the relatively erodible and friable bedrock was overlain by more competent rocks, large periglacial failures are present. Wetter conditions during the Pleistocene are thought responsible for these failures. As groundwater was delivered to the weaker formations, weathering of the pyroclastics undermined the more competent rock, and large failures resulted. Such conditions are responsible for the large landslides and resulting basalt escarpments from the junction of the Bumping and American rivers downstream to the Little Naches River. Today, these landslide deposits can be important near-surface aquifers, which often contain numerous seeps, springs, and bogs (USFS, 1998).

Geomorphology

The Bumping and American river-basins have been divided into geomorphic terranes based on the dominant expression of the landscape. Bedrock geology is predominantly volcanic and/or pyroclastic, with secondary sedimentary formations. The structural geology has influenced landform and geomorphic processes. Major ridges and the Bumping River follow generally west-northwest trending geologic faults and folds. The Bumping River follows a synclinal (down-warped) fold (Bumping/American Watershed Analysis, 1998).

Twenty-four different landforms are mapped and distributed throughout the Bumping/American river-basins: grouped into seven geomorphic terranes. The two terranes constituting the SMP jurisdiction are the Alluvial Fan and Toe Slopes, Floodplain, and Terraces (Bumping/American Watershed Analysis, 1998).

The Alluvial Fan and Toe Slope geomorphic unit consists of gently sloping alluvial and colluvial deposits that occur at the base of steep slopes. Slopes are generally less than 20% on fans and 35% on colluvial deposits. Alluvial fans are cone or fan-shaped and located at the mouth of relatively steep, confined tributary streams. Fan deposits can be highly variable. This landform has high subsurface water storage capacity. Colluvium is a wedge-shaped deposit that includes poorly-sorted, angular rock. Alluvial fans and colluvial deposits frequently adjoin terraces and floodplains (USFS, 1998).

The Floodplain geomorphic unit is the relatively flat surface occupying the valley bottom adjacent to the Bumping River. It is comprised of unconsolidated sediment deposited by lateral migration of streams and overbank floods. Slope is usually less than 20%. Sediments are commonly stratified, but vary with location in the floodplain and depositional process. Subsurface water storage capacity is relatively high. Fluctuation of groundwater is characteristic. Subsurface and instream flows are in continuity. These areas flood occasionally, but surface runoff rarely occurs (USFS, 1998).

The Terrace geomorphic unit consists of nearly level terraces and floodplains in the Bumping River valley. Slope is generally less than 10%. These features were leveled by river flooding, induced by melting of glaciers. The terraces are dissected by high-energy,

low-gradient perennial streams. Substrate varies by location and depositional process, but generally consist of moderately to well-sorted cobble-size deposits (glacial outwash). Ponds, marshes, and overflow channels occur with a range of finer-grained deposits. This landform is subject to frequent flooding. Terraces have a high subsurface flow rate. Subsurface and instream flow are in continuity. Deposits are stable, but soils on terrace escarpments may unravel. This unit commonly adjoins, but can include, alluvial fans and colluvial deposits along the valley sides (USFS, 1998).

VEGETATION

Within the Bumping River watershed, the natural vegetation is generally distributed along a gradient of moisture and temperature. Four major groups of natural vegetation have been described: the dry forest group, the mesic forest group, the wet forest group, and the non-forest group. Of these, the mesic forest group and non-forest group predominate within the SMP jurisdiction. North aspects, riparian areas, and mid-elevations support mesic forest vegetation consisting of wet grand fir and Western hemlock plant series. These communities comprise approximately 35 percent (25,718 acres) of the Naches River watershed. Approximately 28 percent (20,574 acres) of the watershed is comprised of non-forest vegetation types that include the mesic, wet, and wet shrub meadows, and the deciduous and gravel bar riparian communities (USFS, 1998)(Fig. B2).

Proposed, Endangered, Threatened, and Sensitive (PETS) Plant Species

Documented, systematic surveys for PETS plants are extremely limited in the Bumping River watershed. Those PETS plants most likely to occur within the SMP jurisdiction are *Cypripedium montanum* (mountain lady's slipper), which is commonly found along benches above streams, and *Hemitomes congestum* (gnome plant), which is found in mesic to wet coniferous forests. The diversity of habitat conditions present within the analysis area provides potentially suitable habitat for several sensitive plant species not presently documented to occur within the Bumping River watershed (USFS, 1998).

Noxious Weeds

The State of Washington describes weeds as "any plant which, when established, is highly destructive, competitive, or difficult to control by cultural or chemical practices." In general, they are either introduced or early seral native species that become established on sites that have experienced ground-disturbing activities. Noxious weed surveys in the Bumping River basin are extremely limited. Reconnaissance has been, for the most part, incidental along roadway from vehicles. Noxious weed species of primary concern within, on the approach to, or threatening the Bumping River watershed that are most likely to occur within the SMP jurisdiction include: *Centaurea diffusa* (diffuse knapweed) and *C. maculosa* (spotted knapweed), *Chrysanthemum leucanthemum* (oxeye daisy), *Cichorium intybus* (chicory), *Cirsium vulgare* (bullthistle) and *C. arvense* (Canada thistle), *Hypericum perforatum* (St. Johnswort), *Hypochaeris radicata* (spotted cat's-ear), and *Linnaria dalmatica* (dalmation toadflax) (USFS, 1998).

WILDLIFE

Regarding solely the SMP jurisdiction, riparian areas constitute the predominance of wildlife habitat types. Riparian areas are the most critical wildlife habitats, as seen by the disproportionate use of them as compared to other habitat types by wildlife. There is also greater wildlife species diversity in riparian habitat as compared to other habitat types (USFS, 1998).

Some of the characteristics that make riparian areas important to wildlife are: 1) access to food, cover, water, and space (riparian areas always afford water, and often all four components), 2) increased diversity of plant species and structural diversity within the community, 3) linear shape (maximizes the development of edge, which is quite productive in terms of wildlife use), 4) micro-climates that differ from surrounding areas (wildlife are attracted to these areas and some are dependent on it), and 5) provide migration routes, travel corridors, and connectivity between habitat types (Tieton Watershed Plan, 1996).

Proposed, Endangered, Threatened, and Sensitive (PETS) Wildlife Species

Six wildlife species, either currently inhabiting or with the potential to inhabit the Bumping River watershed, are federally-listed as either threatened or endangered (American peregrine falcon, gray wolf, Northern spotted owl, Northern bald eagle, marbled murrelet, and American grizzly bear). Of the six species, four (American peregrine falcon, gray wolf, Northern spotted owl, and Northern bald eagle) are known to occur within the Bumping River watershed. Habitat is present for all six species. Portions of the Bumping River watershed have been designated critical habitat for the Northern spotted owl.

The Northern bald eagle was federally listed as threatened in Washington, Oregon, Minnesota, Wisconsin, and Michigan in 1978. At the same time, bald eagles were listed as endangered in the remaining coterminous 48 states, due to population declines resulting from DDT use, shooting, poisoning, habitat alteration, changes/declines in prey base, and human disturbance. In 1995, the status of the Bald eagle was re-classified to threatened throughout the lower 48 states. In 1999, the U.S. Fish and Wildlife Service proposed removing the Bald eagle from the Endangered Species Act list. A decision is pending.

Nesting habitat for this species consists of mature to old-growth stand conditions, usually within 0.5 miles of large bodies of water that are ice-free in the spring (breeding season) and support and abundant fishery. Nests are built in large, open trees with heavy lateral limbs, and are used year after year. Snags are also needed to provide perch and roost sites. Bald eagle feed primarily on fish during the summer months. There are no known nesting pairs of bald eagles within the Bumping River watershed.

In addition to nesting habitat, wintering bald eagle habitat, both roosting and foraging, must also be present to support existing populations and allow for increases in the populations and recovery of the species. Winter habitat consists of ice-free bodies of water with an abundant fishery and/or large winter waterfowl populations. Winter habitat also includes big game winter ranges where winter-kill carrion provides a food source.

Snags are needed for perch and day-time roost sites, and contiguous mature to old-growth stands are needed for nocturnal roosts. Bald eagles have been documented within the Bumping River watershed, primarily in summer and fall, however, winter habitat use has not been documented in the Bumping River watershed.

The marbled murrelet was federally listed in 1992, primarily due to the loss of nesting habitat (late succession/old-growth forests). The greatest inland distance of a marbled murrelet nest in Washington State is 52.5 miles from a marine environment. As of 1993, 98.5% of all murrelet detections were recorded in areas less than 40 miles inland from marine environments. The nearest marine environment to the Bumping River watershed is Puget Sound. There are a total of 35,700 acres of the Bumping and American river basins (combined) within the potential flight distance of murrelets (55 miles). The majority of this area is in mature to old-growth forested habitats that are required for murrelet nesting. However, the actual acres of suitable nesting habitat is probably less due to the specific individual nest-tree requirements of marbled murrelets (USFS, 1998).

The grizzly bear was federally listed as threatened in 1975 due to declining populations as the result of habitat loss and overhunting. Grizzly bears require large, wild, mountainous areas rich in food (high elevation meadows, shrubfields, avalanche chutes, lowland meadows, and marshes). Denning habitat, used from late fall through March, is often located in high elevations on steep slopes with deep snow accumulations. Spring emergence habitat is lower elevations containing drainages with avalanche chutes and ungulate winter ranges. In late spring to early summer, grizzly bears follow plant phenology to higher elevations. Pre-denning habitat, used in late summer and fall, finds grizzlies transitioning to fruits and nuts as well as other herbaceous material. Essential grizzly bear habitat includes all the components of denning, spring emergence, summer and pre-denning habitat, along with isolation from human disturbance. The Bumping River watershed contains habitat suitable for grizzly bears, and has more isolation from human disturbances due to the amount of area designated as wilderness. While there are no known confirmed sightings within the Bumping River watershed, grizzly bears have been confirmed as occurring within the Wenatchee National Forest to the north (USFS, 1998).

FLOW

The Bumping River watershed is east of the crest of the Cascade Mountain Range, in the rain shadow. The climate of the Bumping River basin ranges from generally cold and wet at the higher elevations in the western portions to mesic at the eastern edge. Average annual precipitation ranges from nearly 100 inches in the uplands along the crest of the Cascade Mountains to approximately 35 inches at the confluence of the American and Bumping rivers. The majority of precipitation falls as snow in the November to March period. Average annual rainfall for the entire watershed is 64.6 inches (USFS, 1998).

Most of the Bumping River watershed (57.6%) is in the highland zone (66.1 mi.²/42,300 acres). The remainder of the watershed falls in the snow-dominated zone (37.9%) (43.5

mi.²/27,868 acres) and the rain-on-snow zone (4.5%) (5.2 mi.²/3,311 acres) (USFS, 1998).

A considerable amount of flow data has been collected in the Bumping River drainage. A gauging station has been operated by the U.S. Bureau of Reclamation on the Bumping River just below Bumping Dam beginning in 1909, with 94 years of continuous data. Average monthly flows in the Bumping River below Bumping Dam range from a low of approximately 115 cubic feet per second (cfs) in October, increasing with the return of Fall rains to approximately 235 cfs before receding again, then increasing dramatically to approximately 750 cfs in June with spring runoff, before steadily declining through October (USFS, 1998).

Flood flows, calculated from gage records indicate the 100-year flood for the Bumping River below the dam to be approximately 4190 cfs (USFS, 1998).

Flows in the Bumping River are regulated by Bumping Dam. Bumping Lake stores approximately 33,700 acre-feet. This amount of storage is only 10 percent of the average annual flow of the Bumping River at its mouth (3.15% of the total storage in the Yakima Basin). The reservoir typically fills in early June, with peak snowmelt and is kept at nearly maximum levels until mid to late August. The Bumping River has slightly lower flows in April and May while the reservoir is filling, and then slightly elevated flows in July, August, and September when releases are being conducted (USFS, 1998). (III-13)

Hyporheic

Water emerging as numerous springs along the margins and internal to the floodplain indicates substantial hyporheic flow throughout the SMP. This water is derived from both glacial valley slopes and from down-welling and upwelling processes internal to the floodplain. Importantly the role of the Bumping Lake Reservoir in this regard is unknown. Relatively narrow floodplain configuration and gradient suggest that ground water storage potential is not high.

Water from the Bumping River basin probably plays an important role in recharge of groundwater aquifers that are utilized in the Yakima Valley for domestic and irrigation uses. The Bumping River area is included in the Bumping Lake groundwater subbasin of the Upper Naches Basin. (Kinnison and Sceva 1963 in USFS, 1998).

Irrigation

There are no surface water diversions on National Forest lands with the Bumping River watershed. Information on groundwater resources with the Bumping River watershed is limited. There are several domestic or irrigation wells within the National Forest lands in the basin associated with minor domestic uses. Spring developments also supply summer homes with water. Water from the Bumping River basin contributes to flows in the Naches and Yakima rivers, which are diverted downstream for irrigation and domestic purposes. The average annual water yield from the Bumping River basin contributes approximately 40 percent of the annual flow in the Lower Naches River (USFS, 1998).

The flow regime of the Bumping River downstream of Bumping Dam is highly choreographed in a management scenario known as "flip-flop." The retention of waters in Bumping Lake through the irrigation season until early September results in reduced flood peaks associated with spring runoff, "standardized" summer flows, and increased flows in September. Flow modification is limited due to the limited storage capacity of the 33,000 acre-foot Bumping Lake until flip-flop commences. Low flows in fall, winter, and spring associated with the storage of irrigation water in the reservoir is a potential impact to both spawning and rearing.

Bumping Lake has been proposed for enlargement since at least the late 1970s. Several studies have been initiated by the U.S. Bureau of Reclamation to investigate the feasibility of a larger dam located slightly downstream from the current dam site, with a proposed storage capacity of at least 450,000 acre-feet. An enlarged Bumping Lake would influence flows and water temperatures in the Lower Bumping River considerably. Flows would be lowered from current levels through the spring snowmelt period and elevated during the summer irrigation season. Water temperatures most likely would be decreased from the current extremes in the lower Bumping River. If a multi-elevation outlet works was installed, water temperatures and dissolved oxygen could be regulated to desirable levels (USFS, 1998).

SALMON

Fish Distribution

The Bumping River supports anadromous fish including spring chinook, steelhead, and coho. Resident populations of rainbow trout, brook trout, cutthroat trout, bull trout, mountain whitefish are present, as well sculpins, and other fish species (Washington Department of Fish and Wildlife [WDFW], 1998).

Chinook salmon are known to occur in the Bumping River from the mouth to Bumping Dam. These reaches of stream provide spawning and rearing habitat, as well as deep pools for adult holding habitat. Also, juvenile chinook likely rear in the lower Bumping River (USFS, 1998).

Little is known about the distribution of summer steelhead in the Bumping River watershed, but they are known to occur, and it is assumed that their distribution is similar to that of the redband. Adult steelhead likely enter the Bumping River in February, and spawn in March, April, and May. Fry emergence has been estimated to occur from May to August. It is also thought that the majority of steelhead fry have emerged by the end of June (Conf. Tribes and Bands of the Yakima Nation 1990 and Harvester 1997 in USFS, 1998).

Resident Rainbow trout (redband) are known to occur in the lower Bumping River, from the mouth to Bumping Dam. All life stages of redband use the areas where they are known to occur. Westslope cutthroat trout are known to occur in much of the Bumping River watershed. The genetic purity of these stocks is uncertain due to the extensive

stocking of cutthroat and rainbow in the headwater lakes. Cutthroat trout are known to occur in the Bumping River from the mouth to Bumping Dam (USFS, 1998).

Bull trout and brook trout are known to occur in the watershed. Bull trout are known to spawn in Deep Creek, which flows into Bumping Lake. This subwatershed has been identified as significant because it is the primary spawning area for the Bumping Lake population. Brook trout are known to occur in the lower two miles of an unnamed stream which flows into the right bank of the lower Bumping River (USFS, 1998).

Bumping Lake contains a variety of fish, including kokanee. The kokanee population is self-reproducing with no supplementation. It is uncertain where the kokanee are spawning, but it is likely they are spawning, in part, in the lower Bumping River (USFS, 1998).

Passage

Bumping Lake Dam is an insurmountable barrier with respect to migratory fishes, precluding access and utilization of upstream habitat. The Bumping Lake reservoir is a major structural and operational discontinuity affecting the SMP jurisdiction particularly with respect to abiotic and biotic functions. The impoundment structure truncates the interchange of matter and energy within the river ecosystem and has eliminated significant movement of anadromous and other aquatic species in and out of the lake. Most glaring is the elimination of ecologically and culturally significant runs of sockeye salmon in 1910.

SALMON HABITAT

Spring chinook and summer steelhead utilize the reach for both spawning and rearing. Research indicates that significant rearing habitat, particularly for chinook salmon, exists within the reach.

Channel Condition

The condition of stream channels is influenced by upstream channels, because inputs (runoff, large woody debris, fine sediment, and coarse sediment) from upstream channels help shape channels downstream. The condition of stream channels is also influenced by upslope condition and processes. Channel segments respond to inputs based on confinement and gradient. Based on confinement and gradient combinations and the resulting characteristics, stream segments can be divided into four channel-response types. The response type implies the role each segment plays in the channel network. The categories of response types include: source, transport, response/transport, and response (USFS, 1998).

In general, the Bumping River is a “source and transport” channel, characterized by channel gradients which range from 4 to 10 percent, bankfull flows that have a step/pool character, a high capability for sediment transport, and low capability for sediment deposition and storage due to the inherent channel steepness of valley types in which they

occur. Small segments of the Bumping River are “response” channels, exhibiting a well-developed floodplain, channel slopes of less than two percent, a riffle/pool bedform morphology, and are responsive to upstream changes to input of coarse or fine sediment and large woody debris, or changes in flow. Response-type channels provide important spawning and rearing habitat for trout and salmon. Other segments of the Bumping River are “equilibrium” that are the most efficient stream types, exhibit well-developed floodplains, tend to occur in alluvial valleys with low elevational relief, are predominantly riffle/pool streams with a high number of pools, but are very sensitive to disturbance. These channel types generally provide high-quality fish habitat, including resting pools. Channel substrate and floodplain sediments are comprised of a complex mosaic of large cobbles grading to fine silts (USFS, 1998).

No actual sediment or turbidity data has been collected in the Bumping River, however, during stream surveys qualitative observations regarding streambank stability and fine sediment have been recorded. Based on these observations, at its mouth, the Bumping River exhibits a large degree of bank erosion. Above this reach, to the confluence of the American River, stream banks are relatively stable, with occasional cutbank. Within the lower Bumping River, only one segment (approximately RM 5.0 to RM 8.0) is rated as “properly functioning” because cobble is dominant and is not embedded. The remaining segments are rated “at risk” because cobble is either dominant or subdominant and is embedded (USFS, 1998).

Riparian

Riparian communities occur on the banks and shorelines of rivers, creeks, and ponds. Riparian communities are significantly influenced by perennial or intermittent water, high water-tables, and associated soils. Hydrology, solar exposure, and air temperature and humidity are key factors associated with this ecosystem (Tieton Watershed Plan, 1996). The riparian community is dominated by a complex mix of deciduous trees and shrubs and coniferous overstory.

The riparian reserves in the majority of the Bumping River watershed is rated as “properly functioning” since very little management activity has occurred in the riparian areas. However, from Bumping Dam to the mouth, the Bumping River has been rated “at risk” due to the presence of roadways (developed and dispersed) within or adjacent to the floodplain, and a large amount of dispersed and developed recreation sites (USFS, 1998).

Streambank Condition

Bank condition was inventoried during stream surveys using two different methods to assess percent ground-cover. Ground cover refers to anything providing physical armor to the streambank, including vegetation and rock. With the exception of the lowest segment of Bumping River, which was rated as “not properly functioning” because of insufficient ground cover resulting from the influence of roads and recreation, the remaining portions of the Bumping River from Bumping Dam to the mouth were rated as “properly functioning” (USFS, 1998).

Large Woody Debris

Large woody debris is woody material derived from tree limbs, boles, and roots, in various stages of decay. The production and accumulation of large woody debris is dependent on several factors, including: plant association, successional stage, insect and disease activity, weather events (e.g., relative to blowdown), fire return intervals, decay rates, and vegetative management activities (Graham et al. 1994, USFS 1998).

Between 1992 and 1996, several segments of the Bumping River were surveyed for large woody debris (LWD). The inventory protocol identifies LWD/mile as an evaluation parameter. Large woody debris/mile is a good indicator of habitat quality. (Peterson et al. 1992, Wash. Forest Practices Board, 1993 in USFS, 1998). The Wenatchee National Forest Plan calls for at least 100 pieces (80% > 12" diameter, 20% > 20" diameter and 50 feet long) of LWD per mile. Most of the Bumping River below Bumping Dam met, or was very close to meeting the Forest Plan standard (USFS, 1998).

Large woody debris is an important input factor for stream channels within forested vegetative types. Large woody debris for streams in the Bumping River watershed is primarily contributed from debris flows. Once LWD is in the channel, it slows water velocities resulting in fine and coarse sediment sorting and deposition. Therefore, the presence or absence of LWD determines how a channel will respond to inputs of fine and coarse sediment and runoff (USFS, 1998).

Pools

For pool frequency, the standard is based on how many pools per mile there should be for specified bankfull widths. Fore Forest Plan calls for at least one pool every 6 bankfull widths for streams with gradients of > 3%, and at least one pool every 3 bankfull widths for streams with gradients < 2%. In addition, the Forest Plan calls for pools to have a depth > 3 feet. Based on only a few surveys, the pool frequency in the Bumping River does not meet Forest Plan standard. However, this could be due to the stream survey pool standard only including pools which spanned the full channel width and are longer than they are wide, so pools partially spanning the channel and pools with greater width than length were no counted (USFS, 1998).

Off-Channel Habitat

Off-channel habitat is important as rearing habitat for juvenile salmonids, and important as refugia during high flows. The Bumping River is rated as "properly functioning" due to the amount of available habitat that consists of side channels. Primarily because much of the watershed is wilderness, habitat refugia buffered by intact riparian reserves exists throughout most of the Bumping River watershed. As a result, the majority of the watershed is rated as "properly functioning" with the exception of the Bumping River below Bumping Dam. The riparian reserves of the lower Bumping River are rated "at risk" because they have been impacted by dispersed and developed recreation and the presence of major roads within or adjacent to their floodplains (USFS, 1998).

Water Quality

A very limited amount of water-quality data has been collected in the Bumping River watershed. The state water-quality standards that are most applicable to the Bumping River include fecal coliform, dissolved oxygen, temperature, and turbidity. All surface water in the Bumping River watershed must meet the state Class AA Extraordinary standards. Based on these standards, the highest designated beneficial use for the basin is “salmonid spawning and rearing” habitat. The Bumping River was designated as “water quality limited” by the state Department of Ecology on the 1996 and 1998 lists of impaired waterbodies for exceeding water quality standards for temperature (USFS, 1998).

Monitoring and review of existing data in compliance with the Clean Water Act regulations for non-point source pollution identified anomalous levels of several minor elements (lead, copper, zinc, arsenic, and selenium) in fine-grained sediments. The presence of these minerals were attributed to the high levels of these elements in the volcanic geologic materials in the area. (Fuhrer et al. 1994 in USFS, 1998).

Several monitoring sites for stream water temperature have been measured. Recording thermograph measurements were taken at several sites in the Bumping River watershed beginning in 1991. Temperatures in tributaries are believed to be meeting the state water quality standard of 61F for most of the summer months, with occasional periods of exceedance in some of the streams. Maximum temperatures in the mainstem of Bumping River below Bumping Lake have typically exceeded the 61°F for over two weeks of the mid-June through September measurement period. The maximum seven-day average of daily maximum temperatures, which is an indicator of sustained temperatures was established at 58°F in the Wenatchee Forest Plan. This seven-day average was also exceeded in the lower Bumping River for most of the summer measurement periods (USFS, 1998).

Monitoring was conducted in 1996 and 1997 to try to determine the influence of Bumping Lake on the elevated stream temperatures in the lower Bumping River. Temperatures at Bumping Crossing below the dam averaged 10°F warmer than the Bumping River upstream of the reservoir. Bumping Lake, with a surface area of 1310 acres and a storage volume of only 33,700 acre-feet, has the largest surface area to volume ratio of all the major reservoirs in the Yakima Basin. This results in a significant amount of thermal heating due to the relatively shallow water depths (USFS, 1998).

Riparian canopy closure was also assessed to determine the extent of altered stream shading levels in the Bumping River watershed. The largest percentage of the channels in the Bumping River watershed has greater than 40 percent crown closure. Water temperatures most likely have only been minimally affected by removal of riparian shading due to road locations. The area of most loss of shading due to roading is along riparian areas in the lower Bumping River drainage, and it is in these same areas where stream water temperatures have exceeded 68°F (USFS, 1998).

High temperatures have been observed in late summer at American Forks campground between 1991-1994. These temperatures are not thought to be the result of anthropogenic influences (USFS, 1998). The lower reach of the Bumping River is listed on the 303(d) impaired water quality list because of high temperatures recorded in late summer (Washington Department of Ecology, 1998).

BUMPING RIVER SUB-BASIN REACH DESCRIPTION

The Bumping River SMP jurisdiction is in nearly pristine condition, providing critical spawning and rearing habitat for anadromous and resident fish populations. Significant side channel habitat exists in concert with adequate amounts of large woody debris. Riparian functions are judged to be in properly function conditions (USFS, 1998). Localized impacts to riparian structure are associated with developed and undeveloped campsites and with the County road. The primary use of the area is recreational. Altered flow conditions exist in association with the operation of Bumping Lake Reservoir. The reservoir is a major discontinuity with respect to aquatic and biotic connectivity within the larger Bumping River Basin.

The Bumping River throughout the SMP jurisdiction is low gradient (1%) reflective of the glacially carved valley bottom setting.

General Description

The Bumping River reach comprises the lower 15.9 miles of the river from its confluence with the Little Naches River upstream to Bumping Lake (Fig. B5; Table B1). The Bumping River is located in a classic U-shaped, glacial valley-bottom setting and is characterized by a low stream gradient with extensive side channel development.

Meandering and braiding are channel characteristics where the valley widens and a single channel predominates when the floodplain is narrowed by side stream alluvial fans, landslides, avalanche chutes, or narrowing valley walls. Channel substrate and floodplain sediments are comprised of a complex mosaic of large cobbles grading to fine silts reflective of the glacial processes that once dominated the valley setting. The hydrograph is altered by water storage and irrigation systems operational releases at the Bumping Lake Reservoir.

Riparian vegetation is comprised of both deciduous shrubs and trees interspersed with a coniferous over story. The riparian condition is considered excellent for this glacial valley setting with impacts occurring in isolated areas of summer home development, campsites, and along the main road corridor (WDFW 1998). Large woody debris exceeds WNF standards of 100 pieces per mile (USFS 1998). A riparian disturbance analysis (300 foot riparian width) indicated that approximately 15% of the riparian area is disturbed (USFS 1998).

REACH 1

ABIOTIC – See Bumping Physical map and Bumping Physical (soil characteristics) map (*Bumping_Physical.pmf and Bumping_soil_characteristics.pmf*)

Geology/Landforms (Table B2)

The glacially carved Bumping River Valley exposes deposits of andesite, rhyolite, basalt, tuffs, and volcanoclastic rocks (Washington State Department of Natural Resources [WDNR], 2000). Bumping Lake is confined and dammed by alpine glacial drift (Fraser-age), which extends down-valley along the toe of steep valley slopes. The Bumping River flows through and across glacial drift deposits that comprise 9.8% of the SMP jurisdiction. From this point downstream to the junction with the Little Naches River, the Bumping River is bedded in alluvium. The alluvium comprises 77.4% of the SMP jurisdiction and widens and narrows corresponding to impinging valley walls associated with intrusive rhyolite structures (1.1% of the SMP jurisdiction), tuffs and tuff breccias (1.4% of the SMP jurisdiction), mass-wasting deposits (5.9% of the SMP jurisdiction), and basalt (3.1 % of the SMP jurisdiction). Mass-wasting deposits are major geological structures, forcing substantial confinement of the stream corridor just prior to the Bumping River's intersection with the American River. From the Bumping River's junction with the American River to its confluence with the Little Naches River, basalt structures dominate the valley walls, expressing a typical stepped-cliff valley wall. In places, the floodplain is confined to a narrow canyon.

Given the steepness of the valley walls the valley bottom is heavily influenced by hill slope processes and the composition of the alluvium ranges from large cobbles to areas of fine silt and sand. Alluvial fans, landslides, over steepened slopes, and avalanche activity add substantial material to the alluvium of the SMP (Yakima County, 2003c). In fact, over-steepened slopes classified as a high risk comprise 10.3% of the SMP jurisdiction, while 8.1% of the SMP jurisdiction is classified as a high risk for landslides. Further, although the bulk of the alluvial material in the alluvial corridor has been glacially derived angular and sub-angular rock is present particularly in the area dominated by mass wasting processes.

Geological hazard areas resulting from flash flooding, landslides, over steepened slopes, and stream undercutting encompass a total of 27.1% of the Bumping River SMP jurisdiction and 18.2% of the Bumping Lake SMP jurisdiction.

Soils/Soil Properties (Table B3)

The soils within the SMP jurisdiction are predominantly silt loams and are the result of floodplain processes acting on glacially derived sediments. Soil permeability is primarily rapid (61.8%), and the hazard for erosion is principally rated as slight (74.8%) and moderate (20.6%)(USDA Natural Resources Conservation Service [NRCS], 2003).

Stream Type/Channel Form (Table B4)

Although the channel is expressed as very low gradient over the length of the SMP jurisdiction, there is significant roughness in the channel attributable to adequate large

woody debris and large cobble sizes. The lower 3.5 miles of the SMP jurisdiction is classified as pool-riffle, while the upper 13.5 miles is classified as a combination of plain-bed and pool-riffle. Detailed stream surveys classified the Bumping River from the lake to the American River as a “low gradient riffle” (Kalin and Ackerman 2002).

Numerous side channels are present in areas where the floodplain widens and in these areas, the river expresses a braided channel form. Large cobbles and boulders attributable to the abundance of glacially-derived material dominate the channel substrate upstream of the confluence with the American River. Below the American River, cobble size decreases as the alluvium and floodplain overlies basalt flows. Adequate large woody debris encourages channel diversity. Approximately 37.1% of the SMP is classified as having a high potential for being in the channel migration zone.

Stream Flow

Bumping Lake Reservoir alters natural hydrological patterns throughout the SMP jurisdiction. Fall, winter, and spring flows are potentially truncated by storage (33,000 acre feet) while late summer flows are augmented due to irrigation releases. Average peak flows in June are approximately 800 cfs, while minimum flows resulting from irrigation storage may fall below 200 cfs, particularly in late fall and winter. Low fall and winter flows potentially impact salmon spawning and rearing habitat.

BIOTIC - See Bumping Biological map (*Bumping_Biological.pmf*)

Natural Vegetation (Table B5)

Upland

Historic vegetation lies within the balsam fir – mountain hemlock association (as designated by ICEMP). Potential vegetation is also balsam fir – mountain hemlock association.

Riparian

The riparian community consists of a diverse association of deciduous shrubs and trees within an overstory of conifers dominated by grand fir and Western hemlock. Old growth forests dominate the Holocene floodplain, providing an adequate supply of large woody debris. Assessments of riparian areas along the Bumping River have reported the riparian condition as excellent. These reports have noted riparian vegetation removal associated with roads, campgrounds, and summer homes, but concluded that 85% of the riparian vegetation within 300’ of the river was undisturbed (WDFW 2004b, USFS 1998). Most river channels in the Bumping River SMP jurisdiction are shaded by greater than 40% canopy closure (USFS 1998).

Impacts to riparian areas in the Bumping River are primarily related to recreational activity associated with “campsites” as well as the 6.2 miles of County road that lies within the SMP jurisdiction.

Wetlands

Wetlands occupy 16.3% of the Bumping River SMP jurisdiction (United States Fish and Wildlife Service [USFWS], 2003). An additional 18.5 acres of wetland may be classified as associated wetlands within the final SMP jurisdiction, either intersecting the draft SMP jurisdiction boundary directly or being located in the 100-year floodplain.

Wildlife

Aquatic (Tables B6 and B7)

This reach plays a key role in the life history of spring chinook, summer steelhead, bull trout, rainbow trout, cutthroat trout, brook trout, and mountain whitefish. The Bumping Lake Dam blocks spring chinook salmon and summer steelhead from entering the lake. Significant spring chinook spawning and rearing occurs in the SMP jurisdiction and concerns over low flows in recent years have been addressed (Kalin and Ackerman 2002). Steelhead spawning and rearing also occurs within the SMP jurisdiction.

Avian (Tables B5 and B8)

One Wildlife Heritage location for northern goshawk exists in the Bumping River SMP jurisdiction (WDFW, 2003). GAP analysis data indicates that 67.8% of the reach may provide habitat for one species of current concern, the spotted owl (WDFW, 2004a). Similarly, the US Forest Service has classified 61.7% of the jurisdiction as being suitable habitat for the spotted owl.

Terrestrial (Table B8)

GAP analysis data indicates that the Bumping River reach may provide habitat for one species of current concern, namely the Townsend's big-eared bat (WDFW, 2004a). Approximately 19.3% of the Bumping River SMP jurisdiction is classified and Priority Species Habitat for the Rocky Mountain elk (WDFW, 2004b). Smaller portions of the jurisdiction (0.4-1.5%) also provide priority habitats in the form of cliffs, talus slopes and meadows. These areas are designated because of the critical habitat elements they possess over other areas within the SMP. Both elk and deer range throughout the jurisdiction. Terrestrial fauna comprises an extensive list including bear, bobcat, cougar, and potentially gray wolves (WDFW, 2003).

CULTURAL MODIFICATIONS – See Bumping Cultural Modifications map (*Bumping_Cultural_Modifications.pmf*)

Land Use (Table B9)

The Bumping River SMP jurisdiction is almost entirely (99.2%) in public ownership (WDNR, 2003). The Wenatchee National Forest administers this area ownership under various land designations (67.8%) and as wilderness designation (31.4%). The primary use of the SMP is recreational. Eleven formal "campsites" exist in the Bumping River SMP jurisdiction and include "summer home" use areas as well as developed and undeveloped campsites (USFS, 2003). These "campsites" are clustered in the lower third of the SMP jurisdiction and the clusters are dispersed along the Bumping River.

Transportation (Table B11)

Roadways occupy 6.2 miles of SMP jurisdiction lands (Yakima County, n.d.a) (Yakima County, 2004a). The main county road directly impacts the river channel through confinement, removal of vegetation, and the addition of rip-rap and other bed materials. This road is the primary reason that 3.3% of the SMP area is classified as having more than a 25% impervious surface. Even with this modification the floodplain of the Bumping River is rated a “properly functioning” given the density of side channel habitat (USFS 1998).

Revetments (Table B11)

Other than the main county road, no other revetment structures are located in the jurisdiction.

CULTURAL JURISDICTION – See Bumping Cultural Jurisdictional map (*Bumping_cultural_jurisdictional.pmf*)

Zoning (Table B10)

Current zoning within the Bumping River SMP jurisdiction is predominantly Forested Watershed (99.6%)(Yakima County, 2004b). A very minor portion of the Bumping River jurisdiction is zoned Mountain Rural (0.4%). This area is located at Goose Prairie and represents a long-standing private land use area surrounded by public land. The entire Bumping River reach, as well as the Bumping Lake reach is designated as Conservancy by the current SMP).

Cultural Resources (Table B12)

Currently, there are thirteen Archeological Site Form records of cultural sites within the SMP jurisdiction on file with the Washington State Historic Preservation Office: both prehistoric and historic (Washington State Historic Preservation Office [WSHPO], 2004.). Cultural resources sites include lithic scatters, rock shelters, rock depressions, historic cabins, shelters, and places associated with the construction of Bumping Lake Reservoir.

Cultural sites are primarily clustered from the junction of the American River downstream to the Little Naches River. Above the junction with the American River few cultural resource sites have been located but are expected (Uebelacker 1980, 1986). Cultural resources are again clustered around the upstream end of the SMP in association within the lake environment.

Prehistoric cultural resources relate, in part, the former abundance of anadromous fish and the proximity of the river setting to upland resources.

DOE Sites/facilities and 303(d) Listings (Table B12)

The lower 1.2 miles of the Bumping River is 303(d)-listed for temperature (Washington Department of Ecology [WDOE], 1998). Temperature in this portion of the reach is elevated at base flow during late summer; however, this may be a natural condition (USFS 1998).

ECOLOGICAL FUNCTION SUMMARY

Reach 1 Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
Steep Slopes: 11.8% High soil permeability: 68.2% Channel migration: 37.1%	Wetlands: 16.3% Vacant/natural: 70.5% Priority habitats: 4 Species of concern: 1 Wildlife Heritage Locations: 1 Anadromous habitat: 15.6 mi Total fish species: 6	Public land: 100%	Principal land use: Vacant/natural >10% Imperviousness: 4.7% Roads: 6.2 mi Barriers: Impassible dam

Ecological functions along Reach 1 are principally impaired by forestry practices and industrial transportation development, which covers 14.4% of the jurisdiction. These land uses, in addition to the 6.2 miles of roads, account for the majority of the estimated 4.7% of the reach that is greater than 10% impervious. There is one impassable dam within the SMP jurisdiction. Upland vegetation has been removed and replaced with roads, buildings, and lawns, which can promote increased runoff and nonpoint source pollution. There are 1.2 miles of 303(d)-listed stream segments found in the SMP jurisdiction. Assessments of riparian areas along the Bumping River have reported the riparian condition as excellent. These reports have noted riparian vegetation removal associated with roads, campgrounds, and summer homes, but concluded that 85% of the riparian vegetation within 300’ of the river was undisturbed . Much of the reach is presently undeveloped (70.5%), while 16.3% is covered by wetlands. The reach provides habitat for one species of concern, the spotted owl, as well as four priority habitats, one wildlife heritage location for the Northern goshawk, and aquatic habitat for six fish species, including anadromous fish.

ECOLOGICAL PROTECTION OPPORTUNITIES – See Bumping Opportunity for Protection map (*Bumping_Opp_Protection.pmf*)

The following list refers to the similarly numbered locations on the digital ecological protection maps for Bumping River.

- 1) Rationale: Cultural significant sites found on public land. Suggested Action: Protect cultural sites.

- 2) Rationale: Cultural significant sites found on public land. Suggested Action: Protect cultural sites.
- 3) Rationale: Existing riparian buffer and wetlands on forestry land protecting a recognized anadromous spawning habitat. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.
- 4) Rationale: Cultural significant sites found on public land. Suggested Action: Protect cultural sites.
- 5) Rationale: Existing riparian buffer on forestry land protecting a recognized anadromous spawning habitat. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.
- 6) Rationale: Wetlands found on public land. Suggested Action: Protect wetlands.
- 7) Rationale: Cultural significant sites found on public land. Suggested Action: Protect cultural sites.
- 8) Rationale: Existing riparian buffer on forestry land protecting a recognized anadromous spawning habitat. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.
- 9) Rationale: Wetlands found on public land. Suggested Action: Protect wetlands.
- 10) Rationale: Wetlands found on public land. Suggested Action: Protect wetlands.
- 11) Rationale: Existing riparian buffer on forestry land protecting a recognized anadromous spawning or rearing habitat. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.
- 12) Rationale: Rocky Mountain Elk Priority Species habitat in riparian zone. Suggested Action: Protect Rocky Mountain Elk habitat.
- 13) Rationale: Existing riparian buffer on forestry land protecting a recognized anadromous spawning habitat in an area with high soil erosion potential. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.
- 14) Rationale: Rocky Mountain Elk Priority Species habitat in riparian zone. Suggested Action: Protect Rocky Mountain Elk migration route.
- 15) Rationale: Wetlands found on public land. Suggested Action: Protect wetlands.
- 16) Rationale: Existing riparian buffer on forestry land protecting a recognized anadromous spawning or rearing habitat. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.
- 17) Rationale: Rocky Mountain Elk Priority Species habitat in riparian zone. Suggested Action: Protect Rocky Mountain Elk migration route and calving habitat.
- 18) Rationale: Existing riparian buffer on forestry land protecting a recognized anadromous spawning or rearing habitat. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.
- 19) Rationale: Existing riparian buffer on forestry land protecting a recognized anadromous spawning or rearing habitat. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.
- 20) Rationale: Wetlands found on public land. Suggested Action: Protect wetlands.
- 21) Rationale: Existing riparian buffer on forestry land protecting a recognized anadromous spawning or rearing habitat. Suggested Action: Work with U.S. Forest Service to protect riparian buffer.

- 22) Rationale: Spotted owl habitat in riparian zone. Suggested Action: Protect Spotted Owl habitat.
- 23) Rationale: Wetlands found on public land. Suggested Action: Protect wetlands.
- 24) Rationale: Cultural significant sites found on public land. Suggested Action: Protect cultural sites.

ECOLOGICAL RESTORATION OPPORTUNITIES- See Bumping Opportunity for Restoration map (*Bumping_Opp_Restoration.pmf*)

The following list refers to the similarly numbered locations on the digital ecological restoration maps for Bumping River.

- 1) Rationale: Marginal riparian buffer protecting an anadromous spawning habitat. Suggested Action: Establish a larger riparian buffer.
- 2) Rationale: Marginal riparian buffer protecting an anadromous spawning habitat in an area. Suggested Action: Establish a larger riparian buffer.
- 3) Rationale: Marginal riparian buffer protecting an anadromous spawning habitat. Suggested Action: Establish a larger riparian buffer.
- 4) Rationale: Marginal riparian buffer protecting an anadromous spawning habitat. Suggested Action: Establish a larger riparian buffer.
- 5) Rationale: Marginal riparian buffer protecting an anadromous spawning habitat. Suggested Action: Establish a larger riparian buffer.
- 6) Rationale: Marginal riparian buffer on residential land protecting an anadromous spawning habitat. Suggested Action: Establish a larger riparian buffer.

BUMPING LAKE

ABIOTIC – See Bumping Physical map and Bumping Physical (soil characteristics) map (*Bumping_Physical.pmf* and *Bumping_soil_characteristics.pmf*)

Geology/Landforms (Table B2)

The glacially carved Bumping River Valley exposes deposits of andesite, rhyolite, basalt, tuffs, and volcanoclastic rocks (WDNR, 2000). Bumping Lake is confined and dammed by alpine glacial drift (Fraser-age) (70.6%), which extends down-valley along the toe of steep valley slopes. Andesite flows (14.5%), and alluvium (13.2 %) comprise the remaining geologic classes along Bumping Lake. Geologic hazards along the lake include oversteepened slopes (14.0%), alluvial fan/flash flooding (2.3%), and avalanche risk (2.0%)(Yakima County, 2003c).

Soils/Soil Properties (Table B3)

Soil permeability along Bumping Lake is primarily rapid (53%) to moderately rapid (40.9), and the hazard for erosion is principally rated as severe (54.7%) and moderate (38.9%)(NRCS, 2003).

Stream Flow

Bumping Lake Reservoir alters natural hydrological patterns throughout the SMP jurisdiction. Fall, winter, and spring flows are potentially truncated by storage (33,000 acre feet) while late summer flows are augmented due to irrigation releases. Average peak flows in June are approximately 800 cfs, while minimum flows resulting from irrigation storage may fall below 200 cfs, particularly in late fall and winter. Low fall and winter flows potentially impact salmon spawning and rearing habitat.

BIOTIC - See Bumping Biological map (*Bumping_Biological.pmf*)

Natural Vegetation (Tables B5)

Upland

Potential vegetation is also balsam fir – mountain hemlock association (as designated by ICEMP).

Wetlands

Wetlands occupy 2.2% of the Bumping Lake SMP jurisdiction (WDFW, 2004b).

Wildlife

Aquatic (Tables B6 and B7)

The Bumping Lake Dam blocks spring chinook salmon and summer steelhead from entering the lake but brook trout and cutthroat both reside in the area.

Avian (Tables B5 and B8)

Two Wildlife Heritage locations for the common loon and osprey lie along Bumping Lake (WDFW, 2003). Also, the US Forest Service has classified 51.2% of the jurisdiction as being suitable habitat for the spotted owl.

Terrestrial (Table B8)

GAP analysis data indicates that Bumping Lake may provide habitat for one species of current concern, namely the Townsend's big-eared bat (WDFW, 2004a). One Wildlife Heritage location for the lynx lies at the west end of the lake (WDFW, 2003).

CULTURAL MODIFICATIONS – See Bumping Cultural Modifications map (*Bumping_Cultural_Modifications.pmf*)

Land Use (Table B9)

The Bumping Lake SMP jurisdiction is almost entirely (97.4%) in public ownership (WDNR, 2003). Four “campsites” exist in the Bumping Lake SMP jurisdiction and include developed and undeveloped campsites (USFS, 2003). These “campsites” are clustered toward the east end of the lake.

Transportation (Table B11)

Roadways occupy 1.6 miles of SMP jurisdiction lands (Yakima County, n.d.a) (Yakima County, 2004a). There is a paved road that runs along the north shore of the lake and is the primary reason that 17% of the SMP area is classified as having more than a 25% impervious surface.

CULTURAL JURISDICTION – See Bumping Cultural Jurisdictional map (*Bumping_cultural_jurisdictional.pmf*)

Zoning (Table B10)

Current zoning within the Bumping Lake SMP jurisdiction is entirely Forested Watershed (Yakima County, 2004b). The entire Bumping Lake reach is designated as Conservancy by the current SMP.

Cultural Resources (Table B12)

Currently, Archeological Site Form records of cultural sites within the SMP jurisdiction are on file with the Washington State Historic Preservation Office: both prehistoric and historic (WSHPO, 2004.). Cultural resources sites include lithic scatters, rock shelters, rock depressions, historic cabins, shelters, and places associated with the construction of Bumping Lake Reservoir.

Cultural sites are primarily clustered from the junction of the American River downstream to the Little Naches River. Above the junction with the American River few cultural resource sites have been located but are expected (Uebelacker 1980, 1986).

Cultural resources are again clustered around the upstream end of the SMP in association within the lake environment.

Prehistoric cultural resources relate, in part, the former abundance of anadromous fish and the proximity of the river setting to upland resources.

DOE Sites/facilities and 303(d) Listings (Table B12)

Bumping Lake is not listed as a section 303(d) waterbody but does contain one DOE listed site/facility (WDOE, 1998).

ECOLOGICAL FUNCTION SUMMARY

Bumping Lake Characterization Summary

Hazard Potential	Habitat Conditions	Public Access	Key Modifications
High erosion soils: 54.8% High soil permeability: 53%	Wetlands: 2.2% Vacant/natural: 70.5% Species of concern: 1 Wildlife Heritage Locations: 3 Total fish species: 3	Public land: 100% Boat launches: 2	Principal land use: Vacant/natural >10% Imperviousness: 17% Roads: 1.6 mi Barriers: Impassible dam

Ecological functions along Bumping Lake are principally impaired by residential development, which covers 21.5% of the jurisdiction. These land uses, in addition to the 1.6 miles of roads, account for the majority of the estimated 17% of the reach that is greater than 10% impervious. There is one impassable dam within the SMP jurisdiction. Upland vegetation has been removed and replaced with buildings and lawns, which can promote increased runoff and nonpoint source pollution. One DOE site/facility is found in the SMP jurisdiction, though the lake is not listed as a 303(d)-listed waterbody. Much of the reach is presently undeveloped (70.5%), while 2.2% is covered by wetlands. The reach provides habitat for one species of concern, the Townsend’s big-eared bat, three wildlife heritage locations, and aquatic habitat for three fish species.

ECOLOGICAL PROTECTION OPPORTUNITIES – See Bumping Opportunity for Protection map (*Bumping_Opp_Protection.pmf*)

The following list refers to the similarly numbered locations on the digital ecological protection maps for Bumping River.

- 1) Rationale: Spotted owl habitat in riparian zone. Suggested Action: Protect Spotted Owl habitat.
- 2) Rationale: Existing natural vegetation on forestry land in an area with high soil erosion potential. Suggested Action: Work with U.S. Forest Service to protect natural vegetation.

- 3) Rationale: Existing natural vegetation on forestry land in an area with high soil erosion potential. Suggested Action: Work with U.S. Forest Service to protect natural vegetation.

ECOLOGICAL RESTORATION OPPORTUNITIES- See Bumping Opportunity for Restoration map (*Bumping_Opp_Restoration.pmf*)

The following list refers to the similarly numbered locations on the digital ecological restoration maps for Bumping River.

- 1) Rationale: Mitigate 303(d) facility.

APPENDIX

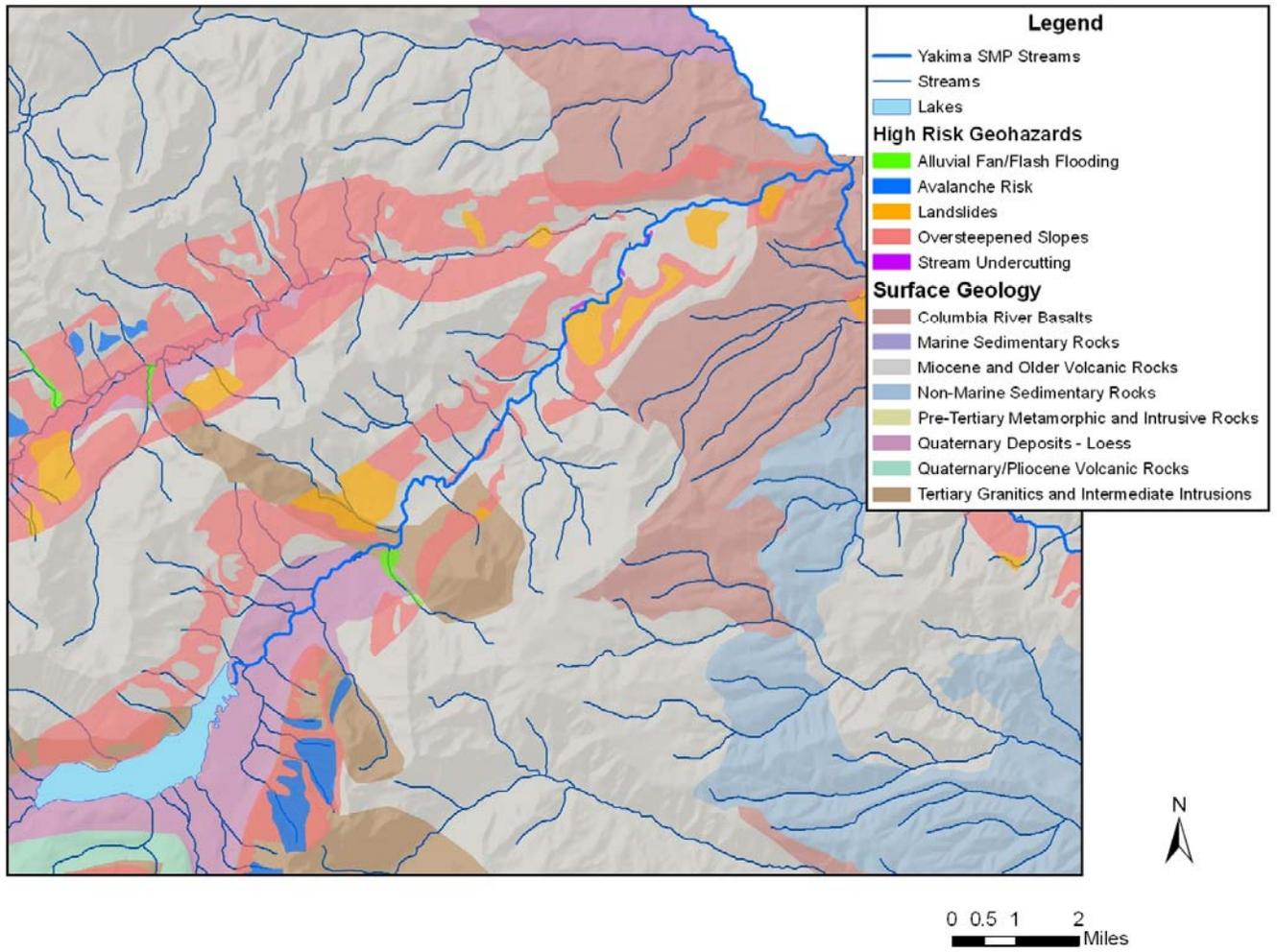


Figure B1. Geology and Geohazards in the Bumping River.

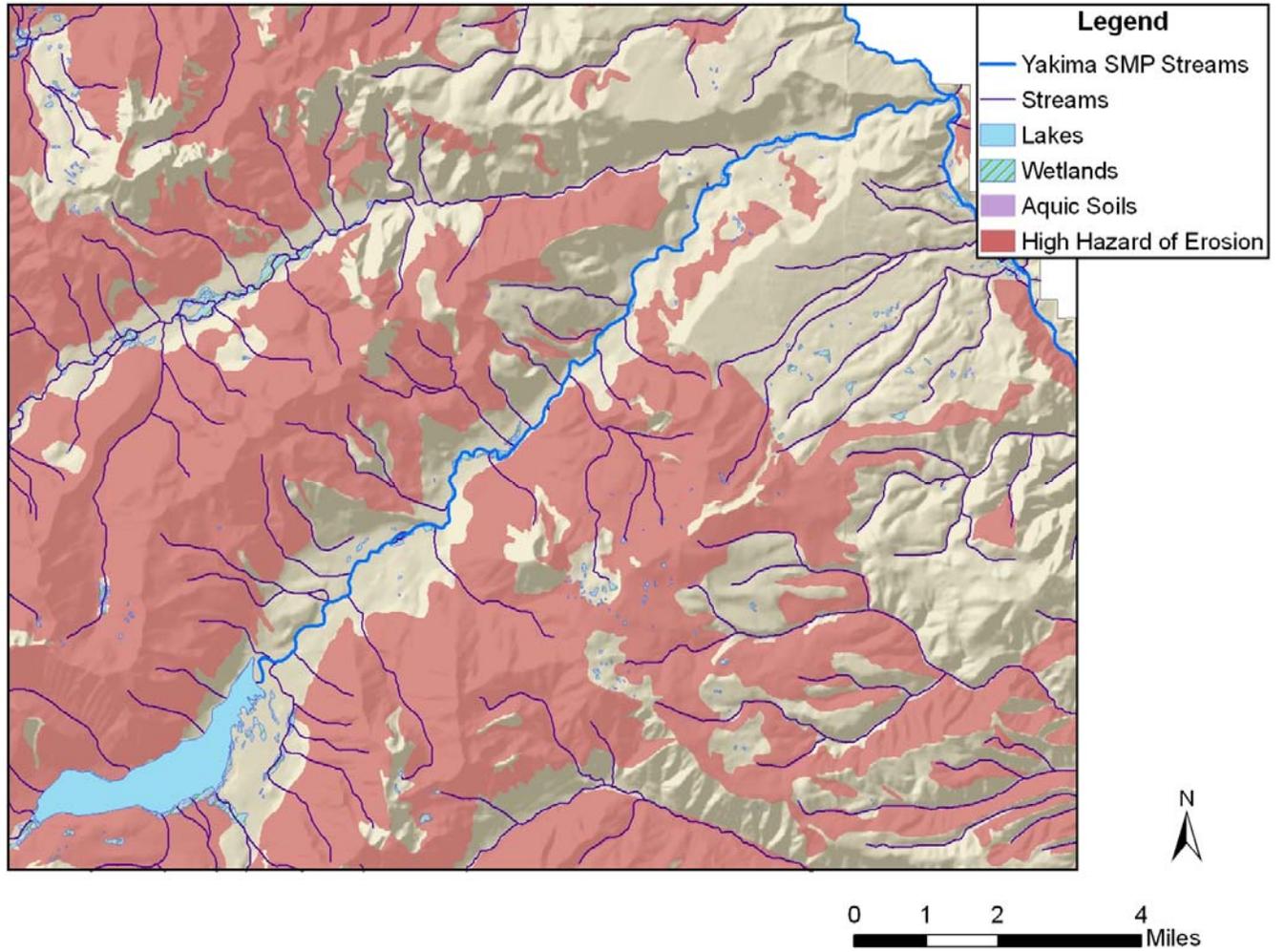


Figure B2. Wetlands and Soil Characteristics in the Bumping River.

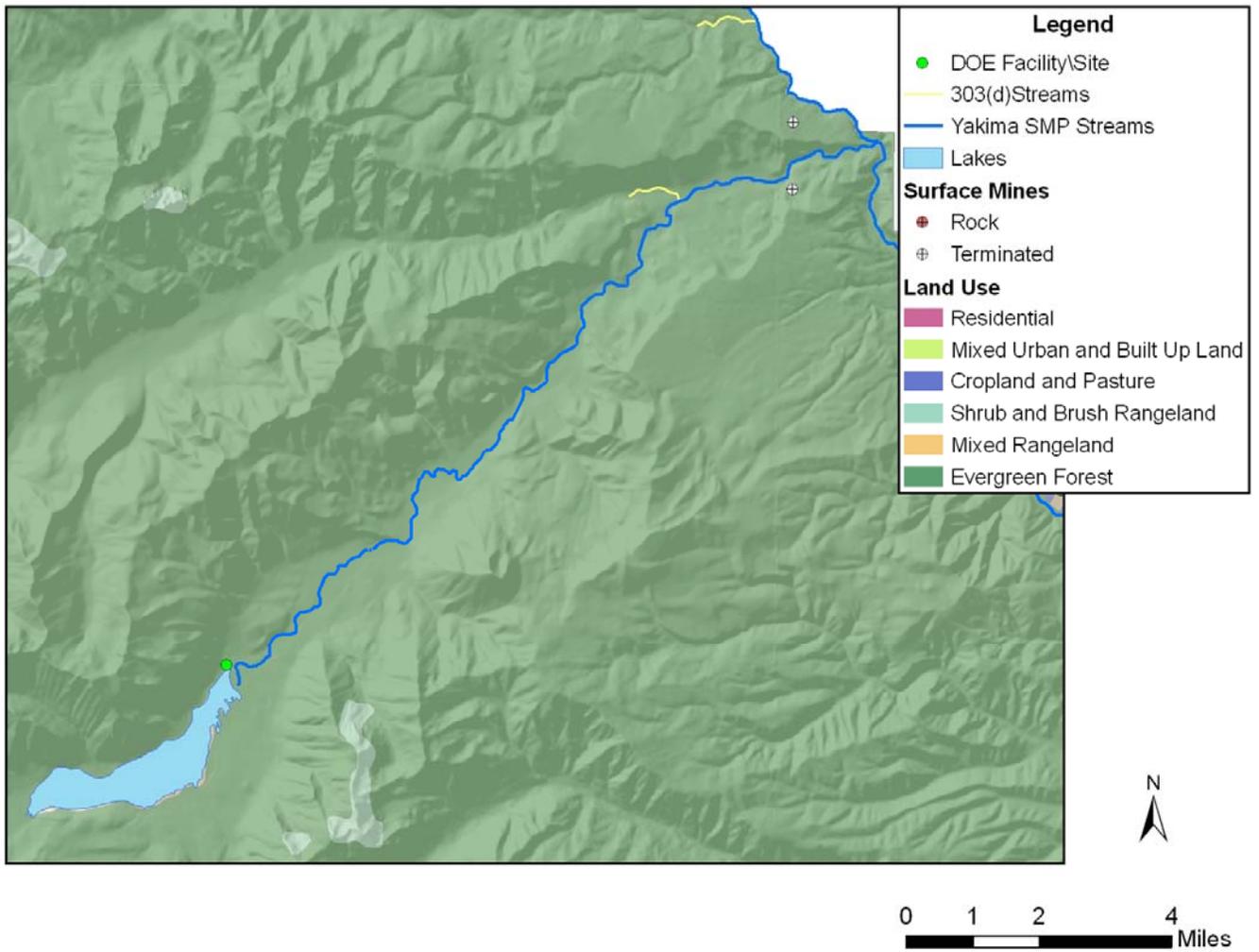


Figure B3. Cultural Modifications in the Bumping River.

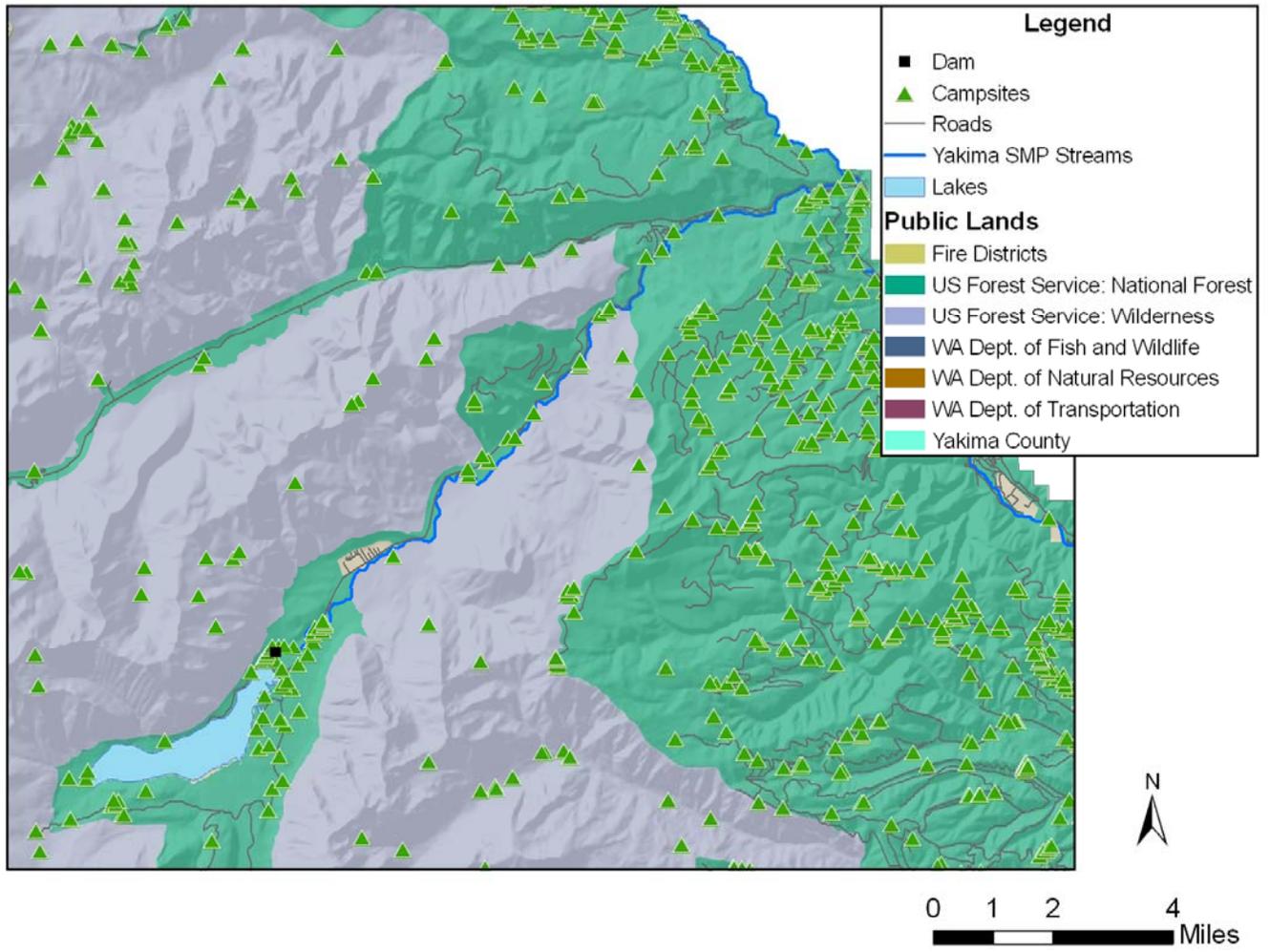


Figure B4. Public Resources and Access in the Bumping River.

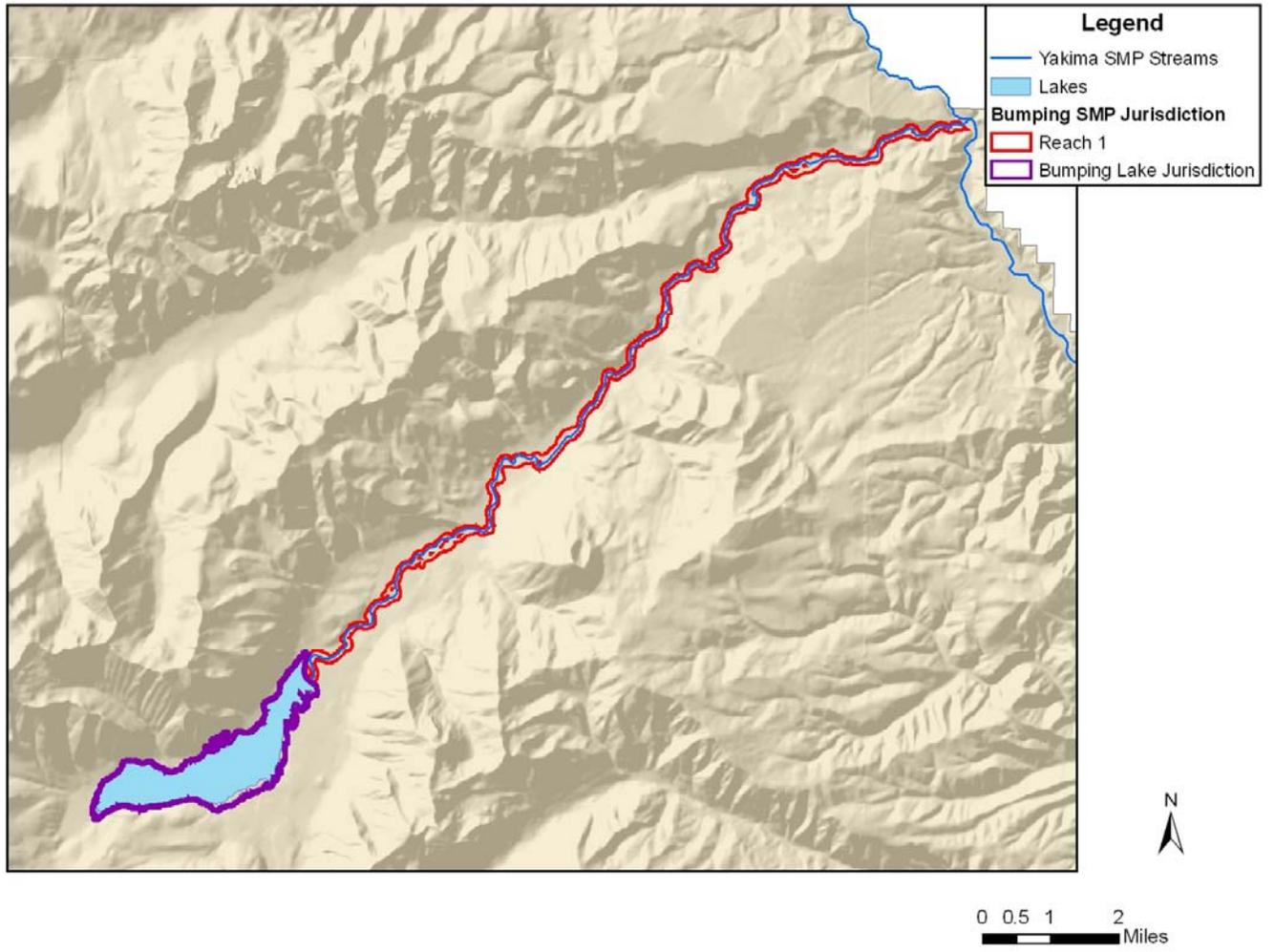


Figure B5. SMP Jurisdiction Breaks for the Bumping River

Table B1. SMP Reach Breaks for Inventory and Analysis, Bumping River Sub-basin.

Reach	Length	Start	Reach Break Justification	End
1	15.9 Miles	NW¼, SE¼, S4, T17N, R14E	Geomorphic: Confluence with Naches River	Confluence with Bumping Lake (T16N, R12E, S23)

Table B2. Geology and Geohazard Characteristics for the Bumping River.

REACH	Geology		Geohazard	
	Lithology	Area (%)	Geohazard	Area (%)
1 Area: 1166.0 Acres	Alluvium	77.4	Alluvial Fan/Flash Flooding (Intermediate Risk)	0.2
	Alpine Glacial Drift, Fraser-Age	9.8	Landslides (Intermediate Risk)	5.0
	Andesite Flows	0.3	Landslides (High Risk)	8.1
	Basalt Flows	3.1	Oversteepened Slopes (Intermediate Risk)	1.5
	Intrusive Rhyolite	1.1	Oversteepened Slopes (High Risk)	10.3
	Mass-Wasting Deposits, Mostly Landslides	5.9	Stream Undercutting (High Risk)	1.9
	Tuffs and Tuff Breccias	1.4		
	Volcaniclastic Deposits or Rocks	1.1		
Bumping Lake	Acidic intrusive rocks	0.5	Avalanche Risk (Intermediate Risk)	2.0
	Diorite	1.2	Alluvial Fan/Flash Flooding (Intermediate Risk)	2.3
	Alluvium	13.2	Oversteepened Slopes (High Risk)	14.0
	Alpine Glacial Drift, Fraser-age	70.6		
	Andesite Flows	14.5		

Table B3. Soil Characteristics for the Bumping River.

REACH	Soil Characteristics						Aquic Soils
	Permeability	Area (%)	Runoff	Area (%)	Hazard of Erosion	Area (%)	Area (%)
1 Area: 1166.0 Acres	rapid	61.79165	No Data	N/A	moderate	20.6	NO DATA
	moderate	18.73902			slight	74.7	
	moderately	1.221808			no data	3.4	
	slow	0.409138			severe	1.2	
	slow	7.930042					
	moderately	3.449492					
	rapid	6.459257					
Bumping Lake *Bumping Lake intersected the jurisdiction	moderate	53.03	No Data	N/A	moderate	39.0	NO DATA
	moderately	40.98			severe	54.8	
	rapid	4.22			slight	4.5	
	very rapid	1.77			Bumping Lake	1.8	
	Bumping Lake*						

Table B4. Stream Characteristics for the Bumping River.

REACH	Stream Lengths		Channel Migration	
	Total Streams (Miles)	SMP Stream (Miles)	Potential	Area (%)
<p>1</p> <p>Length: 15.9 Miles Area: 1166.0 Acres</p>	17.6	15.9	high	37.1

Table B5. Habitat Characteristics for the Bumping River.

REACH	Wildlife Heritage Locations Common Name	Wildlife Heritage Locations (#)	Wetlands Area (%)	Riparian Areas (%)	Priority Species & Habitats		Forest Type/Series		Successional Stage	
					Habitat	Area (%)	Plant Series	Area (%)	Forest Type Stage	Area (%)
1 Area: 1166.0 Acres	Northern Goshawk	1	16.3	No Data	Cliffs/Bluffs	0.4	Grand Fir	31.17	Grand Fir - Middle	8.43
					Meadows	1.5	Grassland	1.55	Grand Fir - Late	22.74
					Rocky Mountain Elk	19.3	Riparian	30.66	Riparian - Middle	3.87
					Talus Slopes	0.8	Rock Outcrop	3.66	Riparian - Late	26.79
							Western Hemlock	30.26	Western Hemlock - Early	0.56
							Meadow	0.90	Western Hemlock - Mid	6.45
		Water	1.78	Western Hemlock - Late	23.25					
Bumping Lake Area: 290.0 Acres	Osprey Lynx Common Loon	2 1 1	2.2	No Data	None	0	Pacific silver fir	7.22	Pacific silver fir - Late	7.22
							Grand Fir	53.82	Grand fir - Middle	53.82
							Riparian	0.14	Riparian - Late	0.14
							Rock Outcrop	5.67	Western hemlock - Early	0.02
							Western Hemlock	20.26	Western hemlock - Middle	0.73
							Water	10.87	Western hemlock - Late	19.52
Avalanche	1.99	Water	10.87							

Table B6. Fish Characteristics for the Bumping River.

REACH	Anadromous Fish						Barriers	
	Presence		Spawning		Rearing		Type	Species Blocked
	Species	Length (Miles)	Species	Length (Miles)	Species	Length (Miles)		
1 Length: 15.9 Miles	Spring Chinook Summer Steelhead	15.6 15.6	Spring Chinook Summer Steelhead	15.6 15.6	N/A	N/A	Impassable Dam	Spring Chinook Salmon, Summer Steelhead
Bumping Lake	N/A	N/A	N/A	N/A	N/A	N/A	Impassable Dam	Spring Chinook Salmon, Summer Steelhead

Table B7. Fish Characteristics for the Bumping River, cont.

REACH	Bulltrout		Resident Fish	
	Presence	Length (Miles)	Species	Length (Miles)
1 Length: 15.9 Miles	Currently Occupied	15.9	Eastern Brook Trout Mountain Whitefish Rainbow Trout	12.5 12.4 12.6
Bumping Lake	Currently Occupied	N/A	Eastern Brook Trout Westslope Cutthroat	N/A N/A

Table B8. GAP Analysis of SMP Jurisdiction Characteristics for the Bumping River.

REACH	GAP Analysis						Spotted Owl Habitat	
	Mammals		Birds		Vegetation		Suitability	Area (%)
	Type	Area (%)	Type	Area (%)	Type	Area (%)		
<p>1</p> <p>Area: 1166.0 Acres</p>	Townsend's Big-Eared Bat	100.0	Spotted Owl	67.8	Grand Fir Western Hemlock	77.5 22.5	Suitable Non Suitable	61.68 38.30
Bumping Lake	Townsend's Big-Eared Bat	100.0	Spotted Owl	47.5	Interior Western Red	100	Suitable Non Suitable	51.19 48.78

Table B9. Land-use Characteristics for the Bumping River.

REACH	Land Use		Land Use Type on Rapid Runoff Soil		Impervious Surface	
	Type	Area (%)	Type	Area (%)	Range	Area (%)
1 Area: 1166.0 Acres	Forestry	11.2	Forestry	9.3	0%	84.8
	Industrial - Power Generation	1.1	Industrial - Transportation	1.2	1-10%	10.5
	Industrial - Transportation	3.2	Residential - Single Family	0.2	11-25%	1.4
	Residential - Single Family	0.3	Vacant/Natural	49.3	26-50%	1.0
	Vacant/Natural	84.2			51-75%	0.1
Bumping Lake	Residential-Single Family	21.5			0%	62.5
	Vacant/Natural	77.4			1-10%	20.5
	Government	1.1			11-25%	0.0
					26-50%	15.9
					51-75%	0.0
				76+%	1.1	

Table B10. Cultural Jurisdiction Characteristics for the Bumping River.

REACH	Zoning		Public Land Ownership		Environmental Designation (1981)	
	Type	Area (%)	Owner	Area (%)	Designation	Area (%)
1 Area: 1166.0 Acres	Forested Watershed	99.6	No Data	0.8	Conservancy	100.0
	Mountain Rural	0.4	US Forest Service: National Forest	67.8		
			US Forest Service: Wilderness	31.4		
Bumping Lake	Forested Watershed	100.0	US Forest Service: National Forest	92.1	Conservancy	100.0
			US Forest Service: Wilderness	5.3		
			No Data	2.6		

Table B11. Transportation Characteristics for the Bumping River.

REACH	Revetments		Total Road Length (Miles)	Length of Railroads		Bridge Crossing (#)
	Type	Length (Miles)		Active (Miles)	Abandoned (Miles)	
1 Length: 15.9 Miles	n/a	0.0	6.2	0.0	0.0	0
Bumping Lake	n/a	0.0	1.6	0.0	0.0	0

Table B12. Cultural Modifications for the Bumping River.

REACH	Boat Launches (#)	Campsites (#)	Known Cultural Sites (#)	DOE Sites/facilities and 303(d) Listings	
				Sites/facilities (#)	Stream (Miles)
1 Length: 15.9 Miles	0	11	13	0	1.2
Bumping Lake	2	4	N/A	1	N/A