Chapter 3: Affected Environment

This chapter describes the character and resources of the BLM administered lands within the Sandy River basin. The chapter first describes a general setting and description of the planning area and continues by establishing planning area boundaries. It then provides an overview of the physical, biological, social, and economic resources being analyzed. The chapter provides a basis from which to assess the environmental effects of the established management alternatives outlined in chapter 2.

3.1 Setting and Description

The Sandy River Basin planning area encompasses 14,850 acres of BLM administered lands within six watersheds. The planning area is broken up into two separate management areas, River Planning Area and Upland Planning Area, in order to spatially identify resource-specific values, restoration considerations and recreation opportunities.

The planning area is near Portland, Oregon on the west side of the Cascade mountain range, a region exhibiting faunal, floral and topographic diversity. The wet coastal maritime climate of western Oregon is characterized by mild temperatures, wet winters, a long frost-free period, and narrow daily fluctuations in temperature. Annual precipitation in the Sandy drainage ranges from 40 inches near the mouth to 110 inches near its' source with the heaviest rainfall occurring in the late fall and early winter. The river area incorporates portions of two major physiographic zones, the Willamette Valley and Western Cascades regions.

3.1.1 River Planning Area

The River Planning Area boundary follows a topographical, river based corridor, stretching from River Mile (12) to River Mile (42). The boundary extends for a ¼ mile in both directions from the centerline of the river. The final boundaries were established to correspond with a typical Wild and Scenic river corridor, and best plan for the protection of outstandingly remarkable river values, fish and wildlife habitat, and vegetation. This boundary stratifies out restoration opportunities specific to riparian reserves. The river boundary also provides a logical framework for evaluating river access and river related recreation opportunities, experiences, and associated benefits.

3.1.2 Upland Planning Area

The Upland Planning Area boundary encompasses all BLM administered lands in the Sandy River Basin that fall outside of the ¼ mile River planning area boundary. The upland boundary was established to address varying land use allocations, congressional designations, and to identify resource conditions and opportunities not reflected within the River planning area.

3.2 Socioeconomics

The Sandy River Basin lies directly east of the Portland-Vancouver metropolitan area and includes portions of Multnomah and Clackamas counties. Due to the high percentage of federal ownership, population distribution is generally clustered along Highway 26. Portions of the cities of Sandy, Gresham and Troutdale fall within the planning area as do the unincorporated communities that make

up the Villages at Mount Hood (Brightwood, Welches, Wemme, Zigzag and Rhododendron). The Villages were officially recognized by Clackamas County in May 2006 under the Complete Communities initiative and function as a quasi-government organization overseeing issues related to the Mount Hood Corridor. Other unincorporated communities not included in the Villages (such as Government Camp) also fall within the Basin.

For purposes of population and demographic analysis, a regional approach will be taken that takes into account counties and cities within and surrounding the planning area. This perspective, which utilizes geospatial information provided by the USFS Region 6 and population statistics taken from the Center for Population Research, will highlight the regional importance of the planning area and provide context for understanding recreation use and demand, demographic changes and economic conditions.

Population: Population growth both within and adjacent to the planning area is above the national average. Statistics indicate that the Portland-Vancouver-Beaverton metropolitan area (which includes portions of six Oregon and Washington counties) and the Willamette Valley are growing nearly twice the national average. Consistent growth has occurred over the last several decades; recent estimates by Portland State University's Population Research Center indicate that the population of the Portland-Vancouver-Beaverton metro area is roughly 2,160,000. Growth is expected to continue; the tri-county Metro government estimates an additional million people will occupy the metropolitan area by 2030.

Consistent population growth throughout the region translates into increasing pressures on public lands within the planning area. Recreation demand is expected to increase proportionate to population growth. As a result, the recreation resources within the Basin are likely to experience increases in visitation. For instance, USFS is expecting an 18% increase in visitation to the Mount Hood National Forest by 2020. Recreation resources managed by other agencies including the BLM, Oregon Parks and Recreation Department and Portland Metro are likely to experience similar increases.

Social Environment and Demographics: The two counties included within the planning area, Clackamas and Multnomah, have a median age of 37, slightly above the national average, and an average household size of 2.5, just below the national average. Household and per capita income statistics place the counties near the upper middle of national trends, with Clackamas County exhibiting a higher than average median household income of $71,877 (compared to $58,400 for the more urban Multnomah county). Both counties exhibit higher than average levels of high school and college education as well as owner occupied housing.

Population growth in the Portland-Vancouver-Beaverton metropolitan area is characterized by an increase in several key demographic groups. These in-migrations, combined with overall population trends, provide context for planning efforts in the Basin.

Key demographic trends include an increase in retirees and 'baby-boomers', as well as an influx of the 25-34 year old age group to the Portland metro area. Increasing diversity also characterizes the Multnomah/Clackamas region. This diversity, primarily composed of an increase in the Hispanic community, has the potential to have a substantial impact on socioeconomic trends.

Economic Environment: Tourism has taken a central role in the area's local economy in recent years. The Sandy River Basin serves as a prominent recreation destination for Portland-area residents and as a draw for out-of-region tourists. Attractions in the Basin such as Mount Hood National Forest and Timberline Lodge form a nationally-known and regionally important tourist destination. Efforts such as the 'Mt. Hood Territory' campaign highlight the importance of tourism to the local economy.

According to the Oregon Tourism Commission, travel spending in Clackamas County totaled $448.5 million dollars in 2007. This number has risen dramatically over the past two decades; in 1990, county-wide travel spending amounted to $177.4 million. The Commission estimates this spending creates roughly 4,870 jobs within the County.

In terms of employment, this impact can be observed especially in the upper portions of the Basin most dependant on tourism and recreation-related economic activity. For instance, the Villages at Mount Hood exhibit a much higher proportion of those employed in the accommodation and food services industry (17.7%) compared to the rest of Clackamas County (6.1%). This is true to some extent in the middle Basin; the same industry accounts for 10.4% of employment in Sandy.

3.3 Use and Ownership

Land Ownership: The Sandy River Basin exhibits a varied land use and ownership pattern. Of the 321,635 total acres in the planning area, nearly three quarters (241,076 acres) are under federal management by the Mount Hood National Forest or Bureau of Land Management, Salem District. Much of the remaining quarter (72,624 acres) of the planning area is under private ownership. Acres under state, local and regional government ownership (8,935 acres) make up less than five percent of the planning area. It is important to note that nearly 350 acres of land surrounding the Marmot and Little Sandy dams has yet to be conveyed to BLM ownership via PGE and Western Rivers Conservancy. Currently this acreage is listed under the 'Other Private' category.

Table 3 provides a breakdown of land ownership in the Sandy River Basin. Generally speaking, nearly the entire upper Basin is under federal management except for privately owned acreage in the proximity of Highway 26 that make up the unincorporated communities of Zigzag, Welches, Wemme, Wildwood, Brightwood Rhododendron, Marmot and Government Camp. The proportion of private and non-federal ownership increases in the middle and lower portions of the Basin including portions of the incorporated cities of Sandy, Gresham and Troutdale. Appendix A provides a geographic representation of land ownership in the planning area.

Ownership Type	Total Acres	Percent Composition
Federal		
Mount Hood National Forest: Non-Wilderness	162,593	74%
Mount Hood National Forest: Wilderness	63,633	
Bureau of Land Management	14,850	
State, Local, Regional Government		
Local Government (City, County, Regional)	6,557	3%
Parks (State, County, City)	2,117	
State of Oregon	261	
Private		
Private Nature Reserve (The Nature Conservancy)	438	23%
Other Private	72,186	
TOTAL	322,635	100%

Table 3: Land Ownership

Land Use: Land use within the Sandy River Basin shows tremendous variability, covering the spectrum from designated Wilderness to rapidly-growing urban development. Primary uses of the landscape include forest administration, agriculture and urban (residential, commercial and industrial) development.

Private and public forests account for the majority of the land cover, especially in the upper portions of the Basin. Timber harvest has historically played a prominent role in the Basin's economy; extensive logging in the lower elevations of the Basin took place in the late nineteenth and early twentieth centuries. By the middle and late twentieth century, however, portions of the upper and middle Basin had received land use protections prohibiting timber harvest. The Mount Hood Wilderness was designated under the Wilderness Act 1964 and was followed by the designation of the Salmon-Huckleberry Wilderness under the Oregon Wilderness Act of 1984. The Bull Run Watershed, the source of Portland's water supply, was declared a federal reserve via Presidential proclamation in 1892 and was protected from timber harvest and grazing by the Bull Run Trespass Act of 1904. Additional harvest restrictions on federal land came with late successional reserve designations under the Northwest Forest Plan and the designation of nearly 60 miles of rivers and streams as Wild and Scenic under the 1968 Wild and Scenic Rivers Act.

Land in the lower Sandy River Basin has and continues to see agricultural use in the form of row crops. The early portion of twentieth century saw the most intensive agricultural activity. The decades after World War II saw many of these operations cease and reversion to forest take place.

Within the last 25 years a reversal of this trend has taken place due to increase in development pressures. Residential development has increased on land previously under forest management or agricultural use.

Another considerable land use within the Sandy River Basin is outdoor recreation and tourism. As described in section 3.2 (Socioeconomic Conditions) the Sandy River Basin/Mount Hood Corridor serves as a regional and national draw for recreationists and tourists. Much of this visitation, and the accompanying economic impact, is dependent on a relatively natural setting, pleasing scenic vistas and the availability of recreation resources. In response, land use practices in the planning area have steered toward those that facilitate and enhance recreation and tourism-related economic activity.

The Sandy River Basin also serves as an important source of water for several municipalities in the area. Portland, Sandy and the various communities along the Mt. Hood Corridor all depend on the Sandy and its tributaries (including the Bull Run River and Alder Creek) for drinking water.

3.4 Navigability and State Ownership of River Bed and Banks

The people of the state of Oregon own all 'submerged and submersible' lands underlying navigable streams, rivers and lakes in the state. This ownership has been established under the Equal Footing Doctrine which bestows upon states the full rights of the original thirteen colonies. In Oregon, the navigability determination is made through a study conducted by the Department of State Lands or by a court of competent jurisdictions.

A navigability study for the Sandy River was completed in 2002 and submitted to the Department of State Lands (DSL). DSL concluded that there was sufficient evidence that the Sandy River meets the federal test for title navigability on a segment of the river that extends from its confluence with the Columbia River up to its confluence with the Salmon River (RM 37.5). In February of 2002, the State Land Board adopted the conclusions of the Sandy River Navigability Study and asserted a state claim of ownership to the bed and banks of the lower 37.5 miles of the river, making it one of only twelve rivers to be deemed navigable in the state. This claim extends to all land that underlies the river during low water ('submerged') as well as all the land covered during the river's normal annual rise ('submersible').

The Sandy River navigability determination does not extend to other waterways (i.e. Little Sandy, Zigzag, etc.) that lie within the planning area. The ownership of the 'submerged and submersible' lands underlying these waters has not yet been determined by the State Land Board or the courts.

3.5 Recreation

Common to River and Upland Planning Areas: Throughout the River and Upland Planning Areas, recreation activities and opportunities are diverse. This diverse mixture leads to a range of experiences and beneficial outcomes. Most of the recreational uses on BLM lands in the Sandy River Basin are dispersed in nature including fishing, hiking, swimming, kayaking, picnicking, site seeing, and nature study. Non-motorized boating also occurs along the lower portion of the Sandy River. The primary visitor use season is from late spring through early fall. Recent data on visitation levels indicates over 200,000 visits annually.

Visitor experiences associated with these activities vary throughout the planning area. Experiences range from: enjoying frequent exercise, enjoying strenuous exercise, having easier access to a wide range of challenges, testing physical endurance, developing skills, abilities, and self confidence, enjoying family and friends, enjoying having access to hands-on outdoor natural resource educational facilities and activities. These activities and experiences were derived from public comments received during open house and focus group meetings and specialist knowledge of the planning area.

Activities and associated experiences lead to personal, community, and economic benefits, including: improved outdoor recreation skills, improved maintenance of physical fitness, increased work productivity, increase in local tourism dollars, increased property values, increased desirability as a place to reside, increase in time spent with family and friends, better health and maintenance.

The market for the planning area is destination. Only 30 miles from the Portland metropolitan area, the planning area offers a scenic corridor with a mix of both high-quality developed and dispersed recreation, interpretive facilities and river greenway open space. The corresponding markets for this plan will be the small communities of Welches, Wemme, Government Camp, and Sandy as well as the Portland metropolitan area.

Typical of a rural-urban interface area, unauthorized recreation use on both public and private property has been observed in the Sandy River Basin. Vehicle trespass, unauthorized campsites, user-created trails and recreation-related litter and dumping present the potential for damage to botanical, wildlife and fisheries resources. This type of use also increases the possibility of spreading non-native invasive species. The problem is worsened by the non-contiguous nature of land ownership within the Basin. Frequently, there is little to no indication for recreationists whether they are on private or public property. Irregular ownership patterns also constitute a challenge for law enforcement officers as they attempt to enforce laws and regulations across administrative boundaries.

OHV Use: Most of the motorized use on BLM lands is limited to designated or existing roads and designated trails. Due to the patchwork ownership pattern, no off-road motorized trails have been designated and many of the main roads accessing BLM lands in the Basin have been gated to restrict the substantial unauthorized OHV that has been observed in the Basin. These restrictions have been implemented due to problems with dumping, vandalism and damage to sensitive resources.

Recreation Setting: Modifications such as roads, houses, businesses, utilities, and forestry and agricultural activities are readily observable from U. S. Highway 26 and many of the county roads in the Basin. Lands managed by the BLM within the Sandy River Gorge ACEC are still dominated by a natural forest appearance with limited trail development. Modification to other lands historically managed by the BLM has been primarily related to road construction and forest management activities. Lands more recently acquired by the BLM have also been modified by past forestry and agricultural activities. It is expected that those lands within BLM special management areas will move towards a more natural appearance in the future as restoration projects are implemented.

Developed Recreation: Due to the popularity and prominence of the area, there is a wide range of developed recreation areas within the Sandy River Basin offered by Portland Metro, Oregon Parks and Recreation, local government, Portland Water Bureau, Mount Hood National Forest and the BLM.

Oxbow Regional Park: Portland Metro manages over 1,600 acres of the land in the Sandy River Basin including the popular Oxbow Regional Park. Oxbow offers a wooded campground (open year round), reservable picnic shelters, playgrounds, equestrian trails, and a number of environmental education opportunities. Oxbow also is home to the annual Salmon Festival which takes place in October and celebrates the return of the Chinook salmon.

Dodge Park: The Portland Water Bureau manages Dodge Park as a day-use area that provides picnic sites and access to the Sandy River.

Dabney, and Lewis and Clark State Parks: Both parks are managed by the Oregon Park and Recreation Department and are day-use areas that have facilities for hiking, picnicking, fishing, swimming and access to the Sandy River including boat ramps.

Glenn Otto Park: The City of Troutdale manages Glenn Otto Park which features a meeting hall, swimming beach, river access, picnic area, and a playground.

Wildwood Recreation Site: The BLM operates this day use site offering picnic sites, multi-use trails, sports facilities and environmental education opportunities. The site contains the Cascade stream watch fish viewing window and wetland boardwalk.

Larch Mountain Environmental Education Site: This 180-acre site is managed by the BLM as an environmental education site and is utilized by a variety of groups for outdoor education activities. The site features trails and shelters for the activities and use is by appointment only.

Roslyn Lake: The lands around Roslyn Lake, owned by Portland General Electric (PGE) have historically served as a popular recreation area attracting roughly 33,000 visitors annually. The decommissioning of the Bull Run Hydroelectric Project, upon completion, will remove the Lake's water source. It is expected that recreational use previously centered on Roslyn Lake will likely be displaced to comparable recreation sites in the surrounding area.

Mount Hood National Forest (United States Forest Service)

Campgrounds: The Forest Service offers a number of popular campsites including Still Creek, Lost Creek, Camp Creek, Tollgate, Alpine, Riley and Trillium Lake. Many serve as trailheads for a variety of popular trails.

Timberline Lodge: This historic lodge serves as a regional and national draw for tourists, hikers, mountaineers and winter sports enthusiasts.

Mount Hood Ski Bowl: Serves as a popular winter sports destination.

Dispersed Recreation

BLM Lands

Mt. Hood Corridor and Sandy River Special Recreation Management Areas: Approximately 75% of the BLM lands in the Sandy River Basin fall within the Mt. Hood Corridor or the Sandy River Special Recreation Management Areas (SRMA).

An SRMA is an area that has been administratively designated by the BLM as having high quality recreation opportunities. The intention of a SRMA designation places a higher priority for expending the time of recreation staff and other resources related to managing recreation in an area, but does not preclude other management objectives for BLM or other private or public lands.

Mount Hood National Forest (United States Forest Service): The USFS lands in the Sandy River Basin (under the jurisdiction of the Mount Hood National Forest) provide a variety of dispersed recreational opportunities. Some of these, such as camping, cross country skiing, snowshoeing, fishing, mushroom picking, mountaineering, and hiking, are activities which generally take place in or adjacent to river corridors. An extensive trail network provides access to the Mt. Hood Wilderness and alpine areas; links to "through" trails (PCT and the Timberline Trail) and popular dispersed camping locations.

3.6 Visual Resources

BLM lands in the Basin are dominated by a forested setting with a mix of seral stages interspersed with water and geologic features. In an effort to address viewshed resources on BLM-administered lands, a Visual Resource Management (VRM) classification system was developed and used to inventory all BLM-administered lands in the Salem District. Within the VRM system, there are four classes with scenic values. Class I lands are managed to preserve the landscape character where only very limited management activities may occur if they do not attract attention from key observation points. Class II lands are managed for the retention of the landscape character, where low levels of change are acceptable. Class III lands are managed for the partial retention of the landscape character, where moderate levels of change are acceptable. Class IV lands are managed to allow major modifications to the landscape character.

Over half of the BLM-administered lands in the Basin have been acquired since the Salem District RMP and have not been formally assigned a Visual Resource Management classification. Those acquired lands within the Mt. Hood Corridor are currently being managed under an interim Class I category. Acquired lands along the river not within the Mt. Hood Corridor are currently being managed under an interim Class II category.

Those BLM lands with an existing VRM designation include the following:

- **Class I:** Lands within or near the Sandy Wild and Scenic River Corridor (1,040 acres).
- **Class II:** Lands within or near Larch Mountain Environmental Education Site.
- **Class III:** No lands
- **Class IV:** All other BLM lands, primarily uplands, and unseen from major travel routes.

3.7 Cultural Resources

Common to River and Upland Planning Areas:

Cultural and paleontological resources are non-renewable and typically consist of physical evidence. Some traditional use sites and some historic sites may only be identified through written historic records or oral traditional sources and may not have physical evidence at the site.

Cultural resource locations are identified as sites (locations of a significant event, a prehistoric or historic occupation or activity, or a building or structure) or isolated finds (fewer than 10 artifacts at one location). Cultural sites may be prehistoric, historic or both. Sites may be entirely buried, may consist of above-ground or built features only (particularly historic sites), may include archeological evidence, or may consist of features not native or natural to the specific environment (for example, domestic fruit trees and a clearing may be the only remaining evidence of a homestead site). Traditional use sites play a current role in a living community's historically rooted beliefs, customs and practices. Paleontological sites consist of the physical evidence of past animal or plant life in the form of fossils.

Inventory for cultural resources sites in the Basin has primarily occurred on federally managed land administered by the United States Forest Service and BLM. These inventories were undertaken to ascertain the presence of archeological and historic sites in anticipation of ground-disturbing actions resulting from management of non-cultural resources. Less than half the federally managed land in the Basin has been inventoried however. Some inventory was also completed on private lands by Portland General Electric and by Oregon Department of Transportation. This inventory work was also conducted in response to ground-disturbing projects. In 1993, the entire route of the Barlow Road Historic Corridor was inventoried and mapped, across all land ownerships, by Clackamas County Department of Transportation and Development, coinciding with the 150th anniversary of the Oregon Trail.

Interpretation facilities for the Barlow Road (primarily signs) have been completed at locations on both the Mt. Hood National Forest and BLM lands. A cultural landscape is a geographic area that includes natural features and resources associated with a significant historic event, activity, person, or group of people. Cultural landscapes can range from thousands of acres of rural land to individual homestead sites.

Documented Prehistoric Sites in the Basin: Four prehistoric sites have been identified through previous inventory work in the Sandy watershed analysis area. Site 35CL2 located on a north terrace of the Sandy River south of Roslyn Lake contains cultural artifacts and midden deposits radiocarbon dated to 1,340 years before present. Evidence suggests the site was a seasonal camp used repeatedly in late summer/early fall. Inventory work conducted by Portland General Electric in 1999 for the Bull Run Hydroelectric Project resulted in the identification of three additional prehistoric sites in the watershed – two on private land and one on BLM administered land. Site 35CL264, near Marmot Dam on BLM administered land, is a deep, dense deposit of flakes, tools and burned animal bone. The site is radiocarbon dated to between 4,800 to 4,400 years old and was determined eligible for the National Register of Historic Places (NRHP) in April, 2003. Sites 35CL265 and 35CL266, on private land, are both heavily disturbed through plowing and other agricultural activities, housing and recreation development. These two sites appear to represent small camps or tool maintenance locations but are too disturbed to provide substantial information about prehistoric inhabitants. Both 35CL265 and 35CL266 were found ineligible for inclusion to the NRHP.

Since all lands in the Basin have not been inventoried, future inventory work or ground disturbing activities may result in identification of additional prehistoric sites.

Historic Sites in the Basin: Portions of and sites along the Barlow Road segment of the Oregon Trail are recognized as significant and eligible for inclusion on the National Register of Historic Places.

These include the Rock Corral and Barlow Road South alternate (Wildwood Recreation Site entrance) on BLM lands and the Devils Backbone segment near Marmot. Much of the Barlow Road lies under Highway 26 and Marmot Road.

Other documented sites within the Basin include railroad logging grades and features dating from the early 1900's into the mid-1940's and Depression-era Civilian Conservation Corp and Works Progress Administration constructed campgrounds, trails, administration compounds (Upper Sandy Guard Station and ZigZag Ranger Station) and lookouts (Bald Mountain, Hickman Butte and North Mountain Lookouts. In 1986, the ZigZag Ranger Station was placed on the National Register of Historic places.

The Bull Run Hydroelectric Project consisted of a dispersed group of buildings, sites and structures ranging in construction date from 1906-1913 through the late 1960's. This large historic complex has been determined eligible for the NRHP. Removal of Marmot Dam and associated and ancillary facilities constituted an adverse effect to this site. Portland General Electric completed recording of these features according to State Historic Preservation Office and Advisory Council on Historic Properties standards to mitigate this loss.

3.8 Hydrology/Water Quality and Quantity/Soils:

Common to River and Upland Planning Areas

The Sandy River Basin drains approximately 508 square miles in northwestern Oregon. The Sandy River originates from glaciers on the western slopes of Mt. Hood at an approximate elevation of 6,200 feet above sea level and travels 56 miles before flowing into the Columbia River near the City of Troutdale.

The Sandy River is the only major glacial river draining the western Cascades in Oregon. Glacially derived fine particulate matter, known as "glacial flour", gives the Sandy its distinctive milky-grey color during the summer. Major tributaries to the Sandy River include the Zigzag, Salmon, and Bull Run Rivers.

Eleven U.S. Geological Survey (USGS) flow gauging stations are currently operating in the Sandy River Basin. Most stations are located in the Bull Run watershed, where they help facilitate management of the City of Portland's Bull Run drinking water and hydroelectric system. It should be noted that historical flow information has been collected at various locations throughout the Sandy River Basin and is available on the USGS website at: http://or.water.usgs.gov/

Minimum stream flows generally occur during September or October. Many non-glacial streams in the basin have very low summer flows, while tributaries with glacial sources maintain higher summer flows. Peak flows in the watershed most often occur in December and January and are often associated with rain on snow events.

The maximum flood of record at the Marmot Gage occurred on December 22, 1964, with a recorded flow of 61,400 cubic feet per second (cfs). The maximum flood of record at the Sandy below Bull Run Gage occurred on the same day, with a recorded flow 84,400 cfs.

Based upon data collected by Oregon Department of Environmental Quality (ODEQ) and summarized using the Oregon Water Quality Index (OWQI), the Sandy River (measured at the Troutdale Bridge) exhibits excellent water quality throughout the year.
A detailed description and methodology review of the Oregon Water Quality Index can be found on the ODEQ website: http://www.deq.state.or.us/lab/wqm/wqi/wqimain.htm. The exception to the generally excellent water quality in the Sandy are stream temperature maximums which have exceeded numeric criteria.

Temperature: Four stream segments (approximately 48 miles) in the Sandy River Basin were included on ODEQ's 2002 303(d) list for exceeding numeric temperature criteria. Listed segments include the Salmon River from the mouth to Boulder Creek, the Bull Run River from the mouth to Bull Run Dam #2, Gordon Creek from the mouth to headwaters and the Sandy River from the mouth to Marmot Dam. Since stream temperature results from cumulative interactions between upstream and local sources, the Total Maximum Daily Load (TMDL) considers all surface waters that affect the temperatures of 303(d) listed waterbodies. To address the stream segments identified above, the Sandy River and all tributaries are included in the TMDL analysis and TMDL targets.

ODEQ's analyses showed that streams in the Sandy River Basin, especially those on public lands, are generally well shaded with mature stream side vegetation. Computer modeling showed that increasing stream side vegetation would not result in substantially cooler water temperatures in most major Sandy basin tributaries. However, smaller streams, particularly in the lower portions of the basin, (e.g. Beaver Creek) would likely show substantial temperature improvements by increasing mature stream side vegetation. It may take decades for trees to grow to heights that will provide the best conditions for fish, but water quality will begin to improve as soon as vegetation becomes established.

Water Rights: According to the State of Oregon Water Resources Department (OWRD), the amount of water produced in the Sandy Basin is adequate to meet current instream and out-of-stream demands in most months. However, future appropriation for out-of-stream uses may be severely restricted. There are 2,504 acres of irrigated agricultural lands within the Sandy River Basin, mostly in the lower watershed around Big and Beaver Creeks. OWRD estimates that current irrigation in the basin requires 6,900 acre-feet of water (total Sandy river discharge is estimated at 1,954,000 acre-feet). The most recent OWRD accounting of water rights in the Sandy River Basin was completed in January 1991. While these rights have been granted, they may or may not all be actively used.

Current ODFW instream water rights are intended for the protection of Anadromous and resident fish rearing and have a priority date of 1991.

PGE claims a pre-1909 right on the Little Sandy and currently diverts the entire flow for power generation. Upon the full decommissioning of the Bull Run Hydroelectric, PGE has pledged to convert these rights into an in-stream water right held by ODFW.

The other major municipal water users getting their water from surface sources in the Sandy Basin are the Corbett Water District and the City of Sandy. The Corbett Water District has water rights for 4.5 cfs on Gordon and Elk creeks. The City of Sandy has rights on Brownell Springs and Alder Creek totaling 5.1 cfs, which will provide water for 10-12,000 people. To meet future demands, Sandy has also acquired a water right for 25 cfs on the Salmon River (WRD 1991).

Soils

The soils of the Sandy Basin progress through a wide range of conditions. These range from the snow and ice fields and cold soils formed in the volcanic ash, mixed with glacial till and materials from Mt Hood's basaltic and andesitic rock through the warm, dry soils formed in the materials deposited by water and wind in the lower portions of the watershed.

The majority of BLM administered lands within the planning area fall within the middle elevations and are primarily found in two zones, the Frigid/Udic zone (characterized by cool wet winters and warm moist summers) and the Mesic/Udic zone (characterized by warm wet winters and hot moist summers).

These soils areas are moderately deep to very deep, well drained soils formed with a mixture of materials weathered from igneous rock and volcanic ash. In some of the lower valley areas the soils tend to be deeper being formed in glacial and waterborne deposits and/or wind borne silty materials high in volcanic ash.

3.9 Fisheries

Common to River and Upland Planning Areas

The Upper Basin supports both anadromous (sea-run forms) and resident species of fish. Within these species are distinct stocks, some native to the Sandy Basin and some introduced. The native stocks are adapted to the conditions found within the Upper Sandy Watershed.

Salmonid fishes (salmon, trout and char), due to their value as game fish and their sensitivity to habitat changes and water quality degradation, have been selected to monitor trends within Mt. Hood National Forest's streams and lakes. Salmon and steelhead counts passing into the upper Sandy Basin appear to be greatly reduced from pre-1850s levels, although little information is available regarding historical run size.

The majority of aquatic habitat on BLM lands in the Sandy River Basin, including the land acquisitions implemented over the last several years, is in the mainstem of the Sandy (Lower and Middle Sandy River watersheds) and Salmon Rivers. Anadromous fish use in the Lower and Middle Sandy River watersheds is primarily as a migration corridor, although spawning and rearing does occur for some species.

Habitat: Development along the Sandy River has led to less than optimal habitat conditions for aquatic species in many parts of the watershed. Stream cleaning and diking conducted in past decades has reduced the historic habitat complexity of the Sandy River. Timber harvest, home construction and road building have removed mature riparian timber in many places.

The absence of mature riparian timber precludes the natural recruitment of LWD which, in sufficient quantities would restore the habitat complexity. Where human activities have been less prevalent and less impacting, particularly in parts of the Upper Sandy River and tributaries, aquatic habitat is relatively intact and conditions do contribute to the needs of aquatic species.

Related Efforts: The Sandy River Basin supports a diverse assemblage of native and introduced fish species from its headwaters to its mouth. Of the various fish species present, the native salmonid species, chinook salmon (*Oncorhynchus tshawytscha*), coho salmon (*O. kisutch*), steelhead trout (*O. mykiss*) and coastal cutthroat trout (*O. clarki*) have the most cultural, social and economic importance. Consequently, the salmonid species are the most studied and monitored of all the fish species in the Basin and are considered key species in the numerous research and monitoring efforts, reports, assessments, analyses and characterizations that have been conducted for the SRB. Among the efforts conducted since publication of the 1996 Upper Sandy Watershed Analysis are:

- 1997 ODFW Sandy River Basin Fish Management Plan
- 2001 ODFW Fish Management Plan Amendment
- Phase 1 Watershed Assessment prepared by contractors for the Sandy River Basin Watershed Council (SRBWC 1999)
- Bull Run Project Dam Decommissioning Environmental Assessment (PGE 2002)
- Ecosystem Diagnosis and Treatment (EDT) modeling (City of Portland 2004)
- Watershed Characterization Report prepared for the Sandy River Basin Partners (2005)
- Sandy Basin Anchor Habitat Analysis (Sandy River Basin Working Group. 2006) and Sandy River Basin Restoration Strategy (2007)
- Habitat Conservation Plan (HCP) being developed by the Portland Water Bureau (PWB)(in progress)
- Sandy Watershed Analysis (2007)

Anadromous Fish:

Two stocks of coho salmon utilize the Sandy River, a native stock (commonly referred to as late run coho), and a hatchery stock (commonly referred as early run coho, Sandy Hatchery stock). Supplementation of the early run coho has been extensive. It was believed that the majority of the coho that are reproducing naturally in the basin were of the Sandy Hatchery stock.

The spring chinook salmon run in the upper Sandy Basin is composed of two stocks, a native "early-run" and a later run derived from and supplemented with Willamette stock. Natural reproduction of the introduced run is increasing over time in the watershed.

At least two stocks of fall Chinook were present in the Sandy River. A late maturing fall chinook stock is native to the Sandy subbasin. The early maturing tule fall run is believed to be descendents of strays from the Sandy Hatchery. It is unknown whether the tules were indigenous to the subbasin prior to hatchery influences.

The existing stock of native winter steelhead is composed primarily of late-run upper Sandy stocks. Prior to 1964, early-run stocks were released throughout the upper Sandy Basin. Hatchery releases of early run stocks were still conducted in the Sandy River below Marmot Dam as of 1996. Adult returns to the upper Sandy Basin had been fairly stable, averaging approximately 3,000 fish the past 30 years. Returning numbers, however, had declined during the last several years.

Historical trends in anadromous fish numbers are, in a large part, related to the history of dams within the Sandy subbasin, beginning with the construction of the Little Sandy Diversion Dam in 1906. Because of the dams with no fish passage on the Bull Run and Little Sandy rivers 81% of the historical anadromous fish habitat is available in the Upper Sandy Subbasin. This percentage will increase with the removal of the Little Sandy Dam.

ESA Listings: Chinook, coho, chum and steelhead have been listed as threatened under the federal Endangered Species Act (ESA). Final rules to list Lower Columbia River (LCR) steelhead were issued in March 1998. Similar rules to list LCR Chinook and Columbia River chum salmon were issued in March 1999, and for LCR Coho in June 2005. LCR coho are also listed as endangered under the State of Oregon's Endangered Species Act. Chum salmon are known to have utilized the lowest reaches of the Sandy River historically, but no recent occurrences in the Sandy River have been documented.

Other Fish Species Present or Potentially Present in the Basin:

Coastal cutthroat trout are considered a key species in the Sandy River Basin. Cutthroat trout were proposed for federal listing in March 1999, but were not listed, in part because of local conservation and recovery work being conducted in the planning area. Also, the states of Oregon and Washington implemented management changes to reduce mortality due to direct and incidental harvest of cutthroat and to reduce hatchery production of anadromous life history forms in the LCR. Other factors that led the USFWS to conclude that this distinct population segment did not warrant listing included changes in forest management regulations, the latest information indicating relatively healthy populations in a large portion of the distinct population segment, and an improved understanding of the ability of freshwater forms to produce anadromous progeny (USFWS 2002).

Cutthroat trout remain a species of interest in the Basin, and are often the only fish species present in the uppermost stream reaches that support resident fish populations. Fish presence/absence surveys are conducted by various agencies and landowners in the planning area generally for project related data needs. However, systematic surveys to determine the upper limits of resident fish distribution are generally lacking.

Bull trout were historically documented in the Clackamas River Basin and are currently found in the Hood River Basin and a 1960 report (Leonards, 1960, as cited in USFS, 1996) refers to bull trout in the Sandy River Basin In the last five years there have been confirmed sightings of bull trout in the Sandy River Basin (Bachmann, pers. comm., 2002).

Other Native Species: Other native fish species of ecological or cultural importance that are found in the planning area include pacific lamprey, mountain whitefish, smelt, and resident rainbow trout

Pacific lamprey (*Lampetra tridentata*) are listed as a federal species of concern and a state of Oregon sensitive species by the Oregon Natural Heritage Program. Population abundance and distribution information is limited for pacific lamprey in the Sandy River and associated tributaries.

Mountain whitefish (*Prosopium williamsoni*) are ecologically important to the health of the Sandy River Basin and its fish resources. Whitefish eggs and fry may provide a food source for overwintering native fish stocks in the Sandy River.

Although biological information on whitefish is limited, they are most commonly found in mainstems and larger tributaries. Whitefish populations in the basin appear to be healthy (ODFW, 1997).

Smelt (*Thaleichthys pacificus*), less commonly known as eulachon, historically ascended the Columbia River by the millions to spawn in the lower mainstem and tributaries, including the Sandy River. Smelt returns to the Sandy River are inconsistent, with large runs entering in some years and no smelt being observed in others (ODFW, 1997). Smelt return to the Sandy River between February and April to spawn in the sandy-silty substrates commonly found in the lower river near the mouth.

Resident rainbow trout (*Oncorhynchus mykiss*) are indigenous to the Basin, and documented populations exist above anadromous barriers in the Little Sandy River and upper Gordon Creek (ODFW, 1997). Rainbow trout are also found throughout the middle and lower reaches of the mainstem Sandy, Bull Run, Salmon, and Little Sandy rivers. Rainbow trout have not been documented above Final Falls on the Salmon River or above the falls at river mile twenty one on the Bull Run River. Historically, ODFW stocked rainbow trout in the Upper Sandy River watershed; however, such stocking was discontinued in 1995 to reduce competition with native fish stocks.

Introduced Species: Brook trout were introduced into high elevation lakes by ODFW (e.g., Cast, Trillium, Dumbbell, Palmer, and Blue lakes) via airplane in the late 1950s and early 1960s and some of these lakes remain stocked today.

The majority of non-salmonid game fish found in the Sandy River Basin were introduced in the late 1800s to early 1900s. The exception is white sturgeon, which are indigenous to the Columbia River system. The majority of the introduced species in the basin are found in the lower river near the delta where flows are typically slower in velocity and water temperatures are generally warmer. Major management concerns regarding introduced fish to be predation on native fish stocks. Physical attributes of the Sandy River (i.e., high velocity and cool water temperatures) appear to be limiting the colonization of introduced warm-water predatory fish to the lower reaches of the Basin.

3.10 Wildlife

Common to River and Upland Planning Areas

Due to the nature of the wildlife, most of the elements of the wildlife resource are found in both the River and Upland Planning Areas. Much of the wildlife resource is highly mobile and finds primary habitat in both areas. Appendix C lists Special Status Species which are documented or suspected to occur on BLM lands in the Sandy River Basin.

The Sandy River Basin offers rich wildlife resources in the region with over fifty species of mammals, over one hundred and fifty species of birds and more than fifteen species of amphibians and reptiles known or believed to be present. Mammals of the area include Roosevelt elk, black-tailed deer, black bear, coyote, cougar, bobcat, river otter, raccoon, mink, beaver, and porcupine. Birds that breed within the basin include bald eagles, osprey, great blue herons, pileated woodpeckers, dippers, spotted sandpipers, northern spotted owl and possibly the peregrine falcon. Notable wintering and migratory birds include northern goshawk, greater yellowlegs and harlequin ducks (Ciecko 1990; Dowlan 1991; Lowe and Lawyer 1980; USDI/OSP 1992). There is a rich diversity of amphibian species including the red-legged frog, Cascades torrent salamander, Oregon slender salamander, and clouded salamander (Lukas 1983).

There are a number of **Neotropical Migratory birds** known to occur in the Sandy River Basin. Neotropical Migratory birds are those birds that breed in northern latitudes and migrate to the neotropics for the winter. They face a number of threats due to their migratory habits that stretch from their breeding grounds, across international boundaries as they migrate to and from their wintering grounds in the tropics. Some of these threats include loss of quality breeding and wintering habitat, pesticides and hazards presented by man-made structures such as buildings, windows, towers and wind turbines.

The overall strategy for achieving functioning ecosystems for landbirds is described through the habitat requirements of "focal species" of birds. The focal bird species for the coniferous forests of Western Oregon and Washington include band-tailed pigeon, rufous hummingbird, olive-sided flycatcher, Wilson's warbler, and orange-crowned warbler, all of which are migratory and appear to be declining.

Other species known or suspected to occur in the Sandy River Basin that appear to be declining include the ruffed grouse, Cooper's hawk, red-breasted sapsucker, western wood pewee, willow flycatcher, Cassin's vireo, golden-crowned kinglet, Western bluebird, Swainson's thrush, Hermit thrush, Cedar waxwing, yellow warbler, MacGillivray's warbler, lazuli bunting, red crossbill, purple finch, Bullock's oriole, and Western meadowlark, some of which are Continental or Regional Concern Species (PIF, 2005).

The **Oregon slender salamander**, a Bureau Sensitive species, is found exclusively in the northern Oregon Cascades. It is found at elevations up to 4,500 feet, and its distribution appears to be limited by dry conditions at low elevations along the Willamette Valley floor, and by cold conditions at higher elevations (Dowlan, unpublished 2006). Habitat is generally described as conifer stands dominated by Douglas-fir with large amounts of down logs and woody material in more advanced stages of decay. Optimal habitat is generally described as late-successional forest conditions, however, the Oregon slender salamander has been found in stands across the full range of seral stages where suitable down logs and woody material exists. Oregon slender salamanders have been documented at a number of sites within the Sandy Basin, including the Sandy River Gorge, Gordon Creek and the Mount Hood Corridor.

The **Cope's giant salamander**, a Bureau Sensitive species, has been found in the Gordon Creek drainage, which is a major tributary of the Lower Sandy River. Larvae are generally found in smaller streams from sea level to about 3,500 feet. It is likely that it is present in other tributaries in the Sandy River Basin, but there have been few surveys, and similarities with a much more common species, the Pacific giant salamander, make identification difficult.

A number of bat species which are Special Status Species and/or former Northwest Forest Plan Protection Buffer species are documented or likely to occur in the Sandy Basin. These include the **fringed myotis**, **Townsend's big-eared bat**, the **silver-haired bat**, **long-eared myotis**, and **long-legged myotis**. These species are associated with caves, mines, bridges, buildings, cliff habitat, or decadent live trees and snags with sloughing bark or hollows. There are a number of bridge structures, older buildings, and cliff habitat within the Sandy River Basin that could provide refugia for these bat species. Some of the best quality cliff habitat is located in the Sandy River Gorge.

Large snags and standing dead trees with bark attached are used variously as solitary roosts, maternity roosts, and hibernacula. In general, standing dead snags and decadent live trees are lacking on BLM lands in the Sandy Basin. Standing dead snags and decadent live trees are more numerous and characteristic in older forest stands, which are scarce in the Lower Sandy.

The **red tree vole** is a USFW Species of Concern which is suspected to occur in the Sandy Basin. It is found in Douglas-fir forests in the Western Oregon Cascades, below about 3,500 feet elevation. The range of the red tree vole is defined by the interface between the Willamette Valley and Oregon Cascades foothills. The Lower Sandy and the lower end of the Middle Sandy Sub-basins are outside of what is typically considered to be the range of the red tree vole. The red tree vole is an arboreal species which is thought to be associated with older forest habitat, but has been found in a variety of seral stages from mid seral closed canopy to old-growth stands.

There are a number of Bureau Sensitive invertebrates which are known to occur on BLM lands in the Sandy Basin. The **evening fieldslug** *(Derocerus hesperium)*, occurs in wet meadows in forested situations. The evening fieldslug has been found in the Wildwood wetlands, which is located on BLM lands in the Sandy Basin. There is one *Colligyrus* species, the **Columbia duskysnail**, which is found in cold, pure, well-oxygenated springs in Clackamas and Multnomah Counties. The Columbia duskysnail has been found in the Gordon Creek drainage.

Standing Dead and Coarse Woody Debris (CWD): Standing dead and down CWD provide essential habitat, structure and function across both the river and upland planning areas. CWD is an important pool of energy, carbon, and nutrients in ecosystems and has an impact on site productivity. A number of vertebrate and invertebrate wildlife species find their primary habitat in standing dead snags, culls, down logs and CWD. Inventory and stand exam data for the BLM lands in the Sandy Basin show that there are very few snags in stands in the early, open or closed canopy seral stages. Snags and standing dead material are more frequent in mature seral stages, but are still low in numbers due to past management practices such as salvage and commercial thinning. Snags are most frequent in old-growth stands, which cover approximately 3% of the Sandy River Basin (See EA section 3.12).

River Planning Area

Most of the outstanding wildlife habitat in the Lower Sandy Sub-basin are included in the Sandy River Gorge, which extends along the Sandy River from Dodge County Park downstream to Dabney State Park. The Sandy River Gorge includes Oxbow County Park, the BLM's Lower Sandy River Area of Critical Concern (ACEC), and The Nature Conservancy's Sandy River Preserve. The area has high potential for scientific purposes that have long been recognized by such organizations as The Nature Conservancy, Multnomah County Park Services Division, the Audubon Society and a number of local schools and colleges (Houck 1990; Ciecko 1990).

The Sandy River Gorge and vicinity provide a diversity of habitat for wildlife species typical of low elevation sites in the Western Oregon Cascades Physiographic Province, as well as habitat for some species typical of the Willamette Valley Physiographic Province (Dowlan 1991; Houck 1990; Lowe and Lawyer 1980; Lucas 1983; Redfem 1974). The Sandy River Gorge is especially valuable because the area is relatively isolated and undisturbed, yet is located within 30 minutes of the largest metropolitan area in the state.

Terrestrial habitats within the Sandy River Gorge include mixed conifer-hardwood forests and coniferous forests in all stages of succession, including some low-elevation old-growth stands on BLM lands. Aquatic resources include the Sandy River, tributary streams, springs and wetland habitats with their associated riparian vegetation, river banks and bars. Snags and large trees along the river provide perching sites for osprey and wintering bald eagles. The cliffs and terraces could also provide important habitat for raptors (Redfern 1974; Lev 1988).

Of the lands acquired by BLM, the highest quality wildlife habitats are the riverine and streamside riparian habitat along the Sandy River itself located in T.2S., R.5E., Sections 13-17; and T.2S., R.6E., Sections 18, 20 and 21. Many of the older forest types are located in the riparian areas along the Sandy River.

Only a few species are limited or primarily occur in the River Planning Area. These include the harlequin duck and bald eagle. The peregrine falcon has been observed in the Sandy River Gorge. Harlequin ducks are known to use the Lower and Middle Sandy River, including the Sandy River Gorge, as a migration flyway between their nesting habitat on higher elevation rivers and streams and coastal wintering habitat. Harlequin ducks are known to breed upstream in the Upper Sandy Sub-basin, the Salmon River and Zigzag River Watersheds. There are no known breeding sites on BLM lands in the Sandy Basin.

There are no bald eagle nest sites located on BLM lands in the Sandy Basin. There are nest sites on other lands in the Bull Run, and in the Lower Sandy sub-basin in the vicinity of Roslyn Lake. Bald eagle use in the Sandy Basin is highest in the vicinity of the Sandy River Delta along the Columbia River, where there are several nest sites. Mid-winter bald eagle surveys of the Sandy River Gorge have shown fewer than 5 bald eagles typically use the Gorge during the winter. The bald eagles that are present during the winter in the Lower Sandy from the delta to the gorge are likely the same birds from adjacent nest sites. Further upstream from the Sandy River Gorge, bald eagle sightings become more uncommon.

Bald eagles migrate through the Sandy Basin and can be seen occasionally perching or soaring in the area. There are nest sites at high elevation lakes in the Cascades to the east of the watershed and the Bull Run to the north.

The peregrine falcon is a Bureau Sensitive species. Peregrine falcons have been observed during the breeding season as well as during migration along the cliffs in the Sandy River Gorge. Much of the gorge offers excellent hunting, roosting, and some suitable nesting habitat. A breeding pair has not been confirmed.

Upland Planning Area

Most of the BLM acquired lands in the Lower and Middle Sandy Sub-basins are in the Upland Zone. Most of the lands are at low elevations near the Willamette Valley and Western Oregon Cascades interface. Terrestrial habitats within the acquired lands consist primarily of conifer and mixed conifer-hardwood in early to mid seral stages. The acquired lands have been altered by past management practices which emphasized timber management and agricultural production. As a result, there are many acres of very dense, over stocked stands in mid seral conditions, which are the least productive from a wildlife standpoint. There is a lack of older forests and associated forest structure such as large trees, well developed understories and standing dead and down woody material due to past harvest and management of these lands for timber production.

Less than 10 percent of the acquired lands are in older forest conditions and invasive non-native vegetation predominates in many areas. Current conditions lack diversity of wildlife habitats and in many cases there is a need for restoration and successional progression into older seral stages.

The northern goshawk is a rare summer resident and breeder in the Western Oregon Cascades that prefers mature or old-growth forests with dense canopy cover at higher elevations. It would be most likely to occur in Upper Sandy and the higher elevations of the Bull Run, and to a lesser extent the Middle Sandy Sub-basin. It migrates to lower elevations in the winter. There are no known goshawk sites on BLM lands in the Sandy River Basin.

Northern Spotted Owl: The northern Spotted Owl is considered to be primarily an upland species in the Sandy River Basin. Overall habitat conditions for northern spotted owls on BLM lands were classified as either suitable for nesting, foraging, dispersal or non-suitable habitat. Non-suitable habitat was further classified as either capable of becoming suitable habitat, or non-forest habitat not capable of becoming suitable over time.

The Lower Sandy and the lower end of the Middle Sandy Sub-basins were found to be non-viable for the spotted owl due to the high percentage of non-forest habitat. Approximately 35 percent of the acquired lands are within this portion of the watershed. Although there are some older forest types in the Lower Sandy River, these late successional and old growth stands are fairly small and fragmented, and are unlikely to be extensive enough to support a breeding pair of spotted owls. The line of viability approximates the range of the spotted owl, where the foothills of the Cascades Mountain Range begin in the interface with the Willamette Valley. Immediately to the west is the Willamette Valley floor and Portland Metro, which act as an effective barrier to spotted owl dispersal. The number of barred owl sightings in the basin has increased greatly in recent years. Barred owls compete directly with spotted owls for territory and to a lesser extent prey. They are more aggressive than spotted owls and broader in their habitat requirements. Spotted owl habitat types are displayed in Table 4, Spotted Owl Habitat on BLM Lands in the Sandy River Basin.

Spotted Owl Habitat Class	Acres	Approximate %
Suitable	5529	37
Dispersal	3763	26
Capable	4497	30
Non-Capable	791	5
Not Yet Surveyed	270	2
TOTAL	14850	100

Table 4: Spotted Owl Habitat on BLM Lands

Approximately 37 percent of the BLM land in the Sandy Basin is considered suitable habitat for nesting and/or foraging, 63 percent is functional as dispersal (includes suitable and dispersal) and 35 percent is non-habitat (includes capable and non-capable). Of the non-habitat, 85 percent is capable of becoming suitable habitat over time.

The Cascades portion of the Sandy, Bull Run and Gordon Creek Watersheds is viable for dispersal of spotted owls. The BLM lands of most concern in the Sandy Basin for spotted owls are located in the Mount Hood Corridor, the area of mostly BLM lands intermingled with adjacent non-federal lands located in Township 2S., Ranges 6 and 7 East along Highway 26. The Mount Hood Corridor is located between the Huckleberry Wilderness to the south and the Bull Run Watershed to the north, and is important as a dispersal corridor between these two areas. The Mount Hood Wilderness is located immediately to the east of the corridor. The Mount Hood Corridor provides connectivity between the Bull Run Watershed and wilderness areas adjacent to the corridor.

3.11 Invasive Non-Native Plants and Botany

3.11.1 Invasive Non-Native Plants

Common to River and Upland Planning Areas

The Sandy River's tendency towards flooding and it's proximity to active nurseries and farms, as well as developed landscapes (Portland, Gresham, Sandy, the Hoodland Corridor and the growing urban/suburban fringe), make it particularly vulnerable to invasions of well-known noxious weeds such as Japanese and giant knotweed, English ivy, Himalayan blackberry, Scotch broom and new species of horticultural origin. Addressing invasive species requires substantial coordination among landowners. A diverse group of land managers, community members, and advocacy groups have been working together in order to prevent the introduction and to control the spread of harmful invasive species in the Sandy River Basin.

Plant Treatments: For the past several years various partners have been actively controlling invasive plants at priority sites within the Sandy River Basin. Most of these plant species are already so widely distributed across the landscape that they will never be eradicated except on a site specific basis. Among these species are Scotch broom, Himalayan and evergreen blackberry, and Canada thistle.

Because of these plants' wide distribution, partners within the Basin have chosen to focus control efforts at a limited number of high-quality meadow sites that they can commit to managing in the long-term. Efforts have also been made to control or eradicate butterfly bush which is well distributed across the landscape but at very low densities. The BLM has also focused control efforts of these species at recently acquired pasture land and priority riparian sites.

Invasive Species: Information concerning invasive plant species within the planning area has been collected with the help of numerous partners. Since 2002, the BLM through a partnership with The Nature Conservancy (TNC), has surveyed for knotweed on BLM lands along the Sandy River. Newly acquired land is surveyed as time allows or projects are implemented.

During the 2007 field season The Nature Conservancy (TNC) conducted surveys for nine other invasive plant species across the Basin (see below). Although the list of invasive species that was developed is not comprehensive, it includes those species that have the greatest potential to permanently alter riparian habitats but are still at population levels that can be controlled.

Estimated levels of infestation in the watershed for those sites surveyed ranged from 0.9% (shining geranium) to 40.0% (English ivy). TNC observed a correlation between level of infestation and proximity to forest edges and disturbance created by development.

Because only 70% of the sites were surveyed, the following results do not offer a comprehensive evaluation of the basin, but do indicate areas where restoration efforts might be focused.

The following is a list of species that were surveyed for by The Nature Conservancy during the 2007 field season:

Periwinkle (*Vinca minor*): The percentage of sites infested with periwinkle is relatively low at 19.5% of the sites surveyed. Populations were typically found near homes and in most cases were planted by the landowner. Periwinkle can reproduce vegetatively by means of stolons, rooting at the nodes of the stems. Germination by seed has not been documented. This invasive plant can form dense mats in forest communities by out competing native understory plants. Periwinkle is currently not designated as a noxious weed in Oregon Department of Agriculture (ODA) classification system.

Butterfly bush (*Buddleja davidii*)
Populations of butterfly bush were found in 4.8% of the sites surveyed. Infestations of butterfly bush were found in the open habitats of floodplains. Butterfly bush is a sunloving woody shrub that disperses its seeds by wind, enabling it to rapidly colonize disturbed soils. The TNC has been spot treating butterfly bush infestation when time allowed in past field seasons. Butterfly bush is designated as a class "B" noxious weed by ODA.

English ivy (*Hedera helix:* English ivy exhibited the highest level of occurrence with observation recorded in 40.0% of the sites surveyed. This highly invasive species is found throughout the Sandy River with the greatest abundance in the lower reaches and around residential communities. The seeds of English ivy are dispersed primarily by birds; however, once established, English ivy can also reproduce vegetatively, rapidly creating dense mats that eventually climb trees by means of adventitious roots growing along the stem. English ivy is designated as a class "B" noxious weed by ODA.

Traveler's joy (*Clematis vitalba*): Traveler's joy is found in pockets throughout the watershed (7.4% of the sites surveyed). The invasive woody vine is often found growing alongside ivy in open areas. Traveler's joy moves through the riparian corridor by dispersing its seed by wind, water, people, and animals. Traveler's joy is designated as a class "B" noxious weed by ODA.

English holly (*Ilex aquifolium*): English holly is scattered throughout the watershed in 31.1% of the sites surveyed. Since this plant does well in shady habitats, it is typically found in upland riparian sites where overstory vegetation provides at least 50% canopy cover. English holly is spread by seed that is primarily dispersed by foraging birds. This woody invasive can also infest an area by sending out suckers that sprout into new trees. English Holly is currently not designated as a noxious weed in ODA's classification system.

Bouncing Bet (*Saponaria officinalis*): The percentage of sites where bouncing bet was found was relatively high at 28.4%. Bouncing bet is often found scattered along sandy beaches and floodplains of the river. This invasive plant reproduces by seed but can also spread vegetatively by means of rhizomes. While the infested area of this plant was not found to be the highest, bouncing bet was the most common of the nine species to be found throughout the watershed in the riparian areas. Bouncing bet is currently not designated as a noxious weed in ODA's classification system.

Shining geranium (*Geranium lucidum*): Of the sites surveyed for shining geranium 0.9% were found to be infested. While this invasive plant currently covers a relatively small area, anecdotal evidence suggests that it's population size could dramatically increase if left unchecked. It should be noted that the vast majority of the surveys took place when this species was least visible. Most documented sightings have observed shining geranium invading oak woodlands in wet, shaded habitat. This invasive plant reproduces by seed; once dry, the plant's seed capsule explosively discharges it seeds, dispersing them across the landscape. Shining geranium is currently not designated as a noxious weed in ODA's classification system.

Black locust (*Robina pseudoacacia*): Black locust was observed scattered on floodplains and in one instance was planted. The percentage of sites where observations of black locust were recorded is 1.4%. Black locust reproduces by seed but most frequently reproduces by root suckers emerging from older branch roots. Black locust is currently not designated as a noxious weed in ODA's classification system.

Pale yellow iris (*Iris pseudacorus*): The number of occurrences of pale yellow iris (also commonly called yellow flag iris) is still small, estimated at 1.4% of the sites surveyed. The majority of the pale yellow iris populations observed were planted by landowners. One patch, however, was found escaped into a stretch of river downstream of the Partridge tract owned by The Nature Conservancy. Pale yellow iris reproduces by forming a thick mat of tuberous rhizomes that prevent the growth of other species. Additionally, its seed and rhizome fragments can be transported downstream infesting other areas. Pale yellow iris is designated as a class "B" noxious weed by ODA.

3.11.2 Other Botanical Resources

Common to River and Upland Planning Areas

Both the Sandy River riparian area and the upland ecosystems within the Sandy river basin are a mosaic of different plant communities, each with a different set of physical and environmental characteristics. Environmental factors within each zone and environmental feature type act to inhibit the reproductive success of species unsuited to a particular site and enables species suited to an environmental feature or biotic condition to thrive.

The Sandy River basin provides suitable habitat for numerous Special Status (SSS) botanical species. Due to fragmentation of ownership and the different management practices of privately owned and government owned lands, most suitable habitat for SSS is located on government lands. Currently, eighteen SSS are documented from within the basin, and suitable habitat to support many other occurs throughout. It is likely that as surveys are conducted new SSS sites and special habitat will be identified. All known SSS sites will be protected in accordance with the *Endangered Species Act of 1973, BLM Manual 6840 – Special Status Species Management, Oregon-Washington Special Status Species policy,* and the 1995 *Salem District Resource Management Plan and Record of Decision*. The level of protection for all SSS will remain the same regardless of which management scenario is chosen. Although each SSS site will receive some level of management, special management will only be given to those sites that may be impacted by proposed management actions.

The level and type of protection will be applied on a case by case basis under future NEPA analysis. A comprehensive list of Special Status botanical species known to occur in the Sandy River Basin is located in Appendix D.

River Planning Area

The River area is comprised of three environmental feature types, (1) Cobble Bars and Low Floodplains, (2) Steep Banks and Seasonal Floodplains with low terraces, and (3) High Terraces of major flood events.

Upland Planning Area

The Upland area is comprised of six environmental features, (1) Subalpine and Alpine zones, (2) Talus, Boulders, and Scree fields, (3) Mudflows, (4) Shrub Meadow, (5) Seeps, Swamps and Wetlands, and (6) the Shorelines of small lakes.

3.12 Vegetation

Common to River and Upland Planning Areas

The BLM (and its predecessor the General Land Office) has actively managed their forest lands in the Sandy Basin since the 1920's. A detailed history of acquired lands is largely unavailable, yet inventory data suggests many of the forested stands in these parcels have had timber harvest to some degree at one time or another. Many areas in the northern section of the planning area, especially Gordon Creek, were railroad logged in the 1920's and 30's. As a demand for timber grew before and after World War II, active logging and timber harvest were likely in the forested areas throughout the Basin where timber was accessible. Site preparation was largely neglected in the early 1900's, or incidental to fires in the area. Some areas seeded in naturally and produced densely stocked stands of hemlock and/or Douglas-fir.

As a result of past management, many of the areas classified as Closed Sapling exhibit a simple stand structure. The stands can be lacking species diversity, ground cover, deciduous shrub understory layers, and structural diversity. These attributes can also be prevalent in some mature stands on BLM land in the Sandy River Basin. Some of these areas that are not currently under a congressional reserve designation have been planned or may be planned for thinning, restoration or other timber harvest.

Of the 4,641 acres the BLM currently manages or acquired in the Congressional Reserve (Mt. Hood Corridor), there are approximately 1,251 forested acres less than fory years of age. Approximately seventy percent of those acres consist of even aged conifer stands that were not pre-commercially thinned. Over time, closed-sapling stands have developed as relatively homogeneous, primarily single-storied and dominated by Douglas-fir and/or western hemlock. Some of these stands have developed into exceedingly dense, conifer stands where height to diameter (H:D) ratio is very high. H:D ratios are used as a measure of the ability of a tree to resist damage or breakage from wind, or heavy, wet snow (Tappeiner et.al).

The majority of the Basin is comprised of Western Hemlock forest types, with some areas in the Douglas-fir forest type. Both types occur on warm, moist sites and tend to be the most productive in terms of rapid and large tree growth. Douglas-fir and western red cedar are conifers associated with hemlock and numerous hardwood species such as red alder, big-leaf maple, and cottonwood.

All seral stages are represented on BLM land in both the River and Upland Planning Areas. Seral stage is an important component in describing the overall structure of the vegetation and patterns across the watershed. On BLM lands, age class distribution has been categorized into age class bands corresponding to vegetative seral stage development.

Seral Stage	Age Class (years)
Barren	0
Early/Grass/Forb	0 to 10
Open sapling/brush	10 to 40
Closed Sapling	40 to 80
Mature	80 to 200
Old-Growth	greater than 200

Table 5: Seral Stage Definitions

River Planning Area

Some of the Forest Operations Inventory Units for BLM lands fall within both the Upland and the River Planning Areas. Over 70% of BLM in the River Planning Area is classified as Closed Sapling or Mature, with approximately 3% classified as Old-Growth. Acres associated with the River zone on BLM land are classified in the table below. Note that between the River and Upland planning zones, 262 acres have not been surveyed for seral stage.

Seral Stage	Approximate Acres	% of Planning Area
Barren	269	10
Open/Grass/Forb	366	13
Open Sapling/Brush	117	4
Closed Sapling	915	33
Mature	1070	38
Old-Growth	73	3
TOTAL	2810	100

Table 6: Seral Stages in the River Planning Area

Upland Planning Area

Most of the Upland Planning Area is forested with less than 17% in the Open/Grass/Forb, or non-forest seral stages. Approximately 40% of the BLM land in the designated upland zone is classified as Closed Sapling, with 25% classified as Mature. Less than 1% of the BLM land in the Upland Planning Area is classified as Old-Growth.

Seral Stage	Approximate Acres	% of Planning Area
Barren	28	less than 1
Open/Grass/Forb	1822	15
Open Sapling/Brush	2196	19
Closed Sapling	4750	40
Mature	2939	25
Old-Growth	43	less than 1
TOTAL	11778	100

Table 7: Seral Stages in the Upland Planning Area

3.13 Fire /Rural Interface Areas

Common to River and Upland Planning Areas

Weather patterns influencing fire behavior: The climate in this watershed is referred to as Pacific Maritime. The weather patterns are influenced by several factors including the position and intensity of upper level wind currents, the high and low pressure systems over the North Pacific Ocean, and the variations in the topography. High pressure during the summer and early fall brings a warming and drying trend. Forty to sixty percent of the rainfall in the area occurs from December through February. The least amount of precipitation occurs from June through October, when temperatures are highest and fuels are the driest. Thunderstorms occur most often during these months as well.

From late spring through early fall, periodic lightning storms result in ignition of wildland fires, but strong east winds often present more critical fire danger. These Foehn Winds or East winds are the weather factor that most often leads to large scale, stand replacing fires. East winds occur when high pressure builds to the east of the Cascade Mountains. Air is pushed up on the windward side; as the air passes over the mountains and descends on the lee side it is warmed. It also gains velocity as it passes through the constricted topography and accelerates as it flows down slope.

During the summer and fall seasons, these dry, warm winds reach velocities of 30 to 40 miles per hour, with stronger gusts over the higher ridges and down east-to-west oriented drainages. East wind trends are important because they often occur when fuel moistures are at critically low levels.

Fuel Conditions likely to influence fire behavior: Forest types found in the Basin include Western Hemlock, Pacific Silver fir, Mountain Hemlock and Alpine/Sub-alpine. These groups generally lack the fine fuel loadings found in other forest types and are characterized by deep duff and heavy loading of large logs. The resulting wildland fire hazard is usually low to moderate, depending on weather conditions in a given year.

Most years the associations in this group retain moisture well and are slow to dry. Once the duff dries, however, it will carry fire. Prolonged smoldering in deep duff and punky logs is common. In these stands, high severity stand replacing fire will dominate during large fires.

Wildland –Urban interface: The wildland-urban interface– where people and forest come together- is a hot spot for fires and a priority area for fire prevention, community education, risk assessment and other activities. Communities such as Rhododendron and Wemme are involved in fire related projects in conjunction with Mt. Hood National Forest, Oregon Department of Forestry and local fire districts. The past years have seen an increase in the risk of fire due to drier, hotter summers and due to the increased number of people recreating or living in the Basin. One of the main objectives of this program is to increase fire awareness and safety for people who live in the forest.

The potential for fire starts from forest management activities is highest in the wildland-urban interface. Fire ignitions in this zone could be controlled more easily because of access and ridgelines.

River Planning Area

Fire use during the fire season is regulated by the Oregon Department of Forestry and State Lands Division which closes the area to campfire use. No fires along the river have been reported that needed any control measures. The local fire departments regulate backyard burning of homeowners.

The potential for accidental fire starts from recreational users is highest in this Planning Area. Depending on the location of any fire ignition the outcome could result in a large fire since access is more limited to the river bottom and the steep slopes could carry a fire quickly up the slope.

Upland Planning Area

Fire has been a major influence throughout the 1800's and early 1900's with fires of 1,000 acres or more. From the available documentation one of the early fire occurrences was around 1852 and burned an area near Government Camp. As documented in the survey of the Cascade Range Forest Reserve in 1901, "fires burned throughout most of the Fire Management Unit with little or no human effort to suppress them." It is believed that many of the fires were intentionally set by sheepherders (to increase acreage of range land), by hunters (to drive game animals into traps), or were started unintentionally by unattended campfires. American Indians are also believed to have intentionally set fires to improve berry-picking fields and to increase forage for animals. Fire size varied from small (tens of acres) to large (thousands of acres).

In the last five decades, there have been no large fires in the watershed, but numerous small fires. ODF reports for 2006 on the North Cascade District which provides BLM and other forest land protection show 176 fires. The majority are caused by debris burning, equipment use and recreation users. Initial attack of fires has been successful for most of the last few decades.

3.14 Other Elements of the Environment

Table 8 shows other elements of the environment to be examined in environmental analyses based on authorities, and management direction (BLM Handbook H-1790-1: p. 137), (EA Section 1.4.3), [40 CFR 1508.27(b)(3)], [40 CFR 1508.27(b)(8)].

Elements Of The Environment	*Not Affected, Or Affected*	*Remarks*
Air Quality (Clean Air Act as amended (42 USC 7401 et seq.)	Not Affected	Following RMP standards and guidelines will meet air quality standards of the Clean Air Act; therefore there would be no adverse effects to air quality. Effects to air quality will be further analyzed in site-specific analyses.
Areas of Critical Environmental Concern (Ecologically critical areas)	Affected	Management actions proposed for the Sandy River Gorge ACEC will compliment the goals and objectives of the management plan. There will be beneficial affects to the established ACEC based on proposed restoration strategies (noxious weed eradication, Re-vegetation of impacted areas) for the basin.
Cultural Resources (National Historic Preservation Act, as amended (16 USC 470)	Not Affected	All projects will follow procedures in the Protocol for Managing Cultural Resources on Lands Administered by the Bureau of Land Management in Oregon; therefore there would be no adverse effects to cultural resources. Consultation with the Oregon State Historic Preservation Office will be conducted on individual projects.
Energy Policy (Executive Order 13212)	Not Present	There are no known energy resources located in the planning area. Management strategies would have no effect on energy development, production, supply and/or distribution
Environmental Justice (E.O. 12898, "Environmental Justice" February 11, 1994)	Not Affected	The Proposed Action is not anticipated to have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.
Essential Fish Habitat (Magnuson-Stevens Act Provision: Essential Fish Habitat (EFH): Final Rule (50 CFR Part 600; 67 FR 2376, January 17, 2002)	Affected	Proposed restoration strategies and project design features associated with these strategies, a beneficial impact to aquatic habitat, ESA listed fish species or Critical Habitat would be experienced.
Prime or Unique Farm Lands	Not Affected	There are no prime or unique farm lands within the project area (BLM land within the Sandy River Basin).
Floodplains (E.O. 11988, as amended, Floodplain Management, 5/24/77)	Not Affected	Restoration and recreation strategies are small in scale and would not change the character of the river floodplain, change floodplain elevations, or affect overbank flooding.
Hazardous or Solid Wastes (Resource Conservation and Recovery Act of 1976 (43 USC 6901 et seq.) Comprehensive Environmental Repose Compensation, and Liability Act of 1980, as amended (43 USC 9615)	Not Affected	There are no known hazardous or solid wastes on project sites. This project would not generate or transport hazardous or solid wastes. If hazardous or solid wastes are encountered during site surveys or project implementation, these will be reported to appropriate personnel for treatment.
Healthy Forests Restoration Act (Healthy Forests Restoration Act of 2003 (P.L. 108-148)	Affected	Fuel treatment projects would accomplish the goals of the HFRA to reduce fire danger and return our forests to a healthier state.
Noxious weed or non-Invasive, Species (Federal Noxious Weed Control Act and Executive Order 13112)	Affected	Addressed in EA section 4.10.

Elements Of The Environment	*Not Affected, Or Affected*	*Remarks*
Migratory Birds	Affected	Addressed in Text (EA section 4.9). Effects to migratory birds would be low due to the type and duration of human use and disturbance. Restoration actions would be implemented to encourage late-successional forest characteristics which would benefit migratory birds which use this habitat.
Native American Religious Concerns (American Indian Religious Freedom Act of 1978 (42 USC 1996)	Not Affected	No Native American religious concerns were identified during the public scoping period.
National Natural Landmarks / Monuments	Not Affected	No natural landmarks or monuments exist within the planning area.
Park, Recreation, or Refuge lands	Not Affected	No designated parks would be affected as part of the proposed actions within this plan.
Public Health and Safety	Affected	Beneficial affects to public health and safety would take place based on the proposed actions outlined in EA Table 2.3.
Threatened or Endangered Species (Endangered Species Act of 1983, as amended (16 USC 1531)	Affected	Addressed in Text (EA sections 4.8 and 4.9). Effects to terrestrial T&E species would be low due to the type and duration of human use and disturbance. Restoration actions would be implemented to encourage late-successional forest characteristics which would benefit spotted owls. Future projects would be subject to the ESA including Section 7 consultation requirements.
Water Quality –Drinking, Ground (Safe Drinking Water Act, as amended (43 USC 300f et seq.) Clean Water Act of 1977 (33 USC 1251 et seq.) e.g. sole or principal drinking water aquifers	Affected	Addressed in text (section 4.7)
Wetlands (E.O. 11990 Protection of Wetlands 5/24/77)	Not Affected	No wetland resources have been identified within the planning area.
Wild and Scenic Rivers (Wild and Scenic Rivers Act, as amended (16 USC 1271)	Affected	Outstandingly remarkable values or key river values would be beneficially affected on designated and eligible rivers because areas through the proposed restoration and recreation actions.
Wilderness (Federal Land Policy and Management Act of 1976 (43 USC 1701 et seq.); Wilderness Act of 1964 (16 USC 1131 et seq.)	Not Affected	There are no designated BLM wilderness areas within the project area.

Table 8: Elements of the Environment

Chapter 4: Environmental Effects

4.1 Introduction

Chapter IV, "Environmental Effects," describes the environmental effects that would occur under the implementation of each alternative. Site specific effects will be described in the environmental documentation for future projects. This section describes the effects of the alternatives described in Section 2.2.

This chapter is organized by the same resource categories used to describe the affected environment in Chapter 3. A section discussing management assumptions and impacts common to all alternatives precedes resource specific analysis.

4.2 General Assumptions

To help guide specialists through the environmental impact section of this EA, the following planning constraints and other considerations were identified. Assumptions were identified to help guide and provide a better understanding of the scope of potential impacts.

- Additional lands within the planning area may be acquired. All acquired lands would conform to the management goals and objectives outlined in this EA.
- District Designated Reserve lands within the planning area would be recommended as designated ACEC lands under the next Salem District Resource Management Plan.
- Population within the planning area is expected to increase. Increased pressure on Federal land would exist for all resources.
- Recreational use within the planning area would continue to grow and provide direct economic benefits to Multnomah and Clackamas counties.
- An increase in recreational use throughout the planning area would lead to the potential spread of non-native invasive species.
- An increase in commercial use of the Sandy River is expected due to the removal of Marmot dam and proposed increases in recreation facilities along the river.
- User fees would be required as facilities are developed, and services increase beyond BLM funding capabilities.
- Right-of-way, wind and energy corridor development, and communication tower requests will occur within the planning area.
- Visual Resource Management Classifications will remain unchanged regardless of the alternative selected for implementation.
- The Oregon Department of State Lands has administrative and management responsibility of the bed and banks along Navigable river segments.
- Under all alternatives, timber management practices on matrix lands, and their associated impacts, would remain the same.

4.3 Socioeconomic

Public land within the Basin plays a considerable role in both the economic environment of the area and its residents' quality of life. Proposed restoration strategies would enhance the natural environment (aquatic and terrestrial resources), thus leading to more desirable conditions. Management actions outlined within this EA are likely to have some direct effect on socioeconomic conditions. The type and location of recreational facilities, the amount and type of recreation-related commercial activity (such as guiding), and the type of ecosystem management within the planning area are the management actions most likely to have socioeconomic impacts. Socioeconomic impacts affected by these actions are likely to include employment, quality of life, the amount and location of recreation use, and the relative demand for emergency and tourism-related services.

Regardless of alternative, timber management practices on matrix lands, and their associated socioeconomic impacts, would remain the same.

Alternative A: Continuation of Existing Management (No Action Alternative): A continuation of current management is unlikely to have any noteworthy socioeconomic effects greater than what is currently occurring.

Recreational demand and pressures on public land would likely continue to increase proportional to overall population growth and increasing regional popularity of the Basin. Visual degradation of the riverbanks and increasing levels of private property trespass may occur due to unmanaged visitation, resulting in conflicts between visitors and local residents. Commercial activities would not be facilitated by improved river access or additional guidelines regarding Special Recreation Permits (SRPs). This alternative would not generate a substantial increase in tourism-related revenue.

Alternative B: This alternative focuses on the enhancement of ecosystem health and providing relatively undeveloped recreational opportunities.

Of the three action alternatives, alternative B would provide for the lowest recreational carrying capacity, lowest level of commercial activity translating into lower levels of service-based employment, tourism-related revenues and area visitation increases. Commercial recreation activities would be constrained by stringent Special Recreation Permit criteria, limiting the impact of those activities on the local economy. Impacts to the visual character and social setting of the river would be mitigated with resource-focused recreation management strategies. Restoration activities within the Basin could occur that have the potential to increase ecosystem health and local quality of life.

Alternative C: This alternative would encourage and enhance recreational opportunities within the planning area, which could potentially lead to an increase in service-related employment. Higher levels of recreational carrying capacities and associated commercial activity would present the opportunity for higher level of tourism-related revenues and impacts in the local economy. The BLM would facilitate commercial activities by using human use as a guiding principle for Special Recreation Permit issuance. Visitation and use patterns within the planning area would be altered in specific locations. A moderate to high increase in traffic would also occur in these locations, conceivably creating favorable conditions for particular types of businesses. Overnight camping would be provided, further augmenting these impacts.

Some social impacts (including conflicts between recreational user groups, disruptions such as non-appropriate uses loud noise, etc.) would be most likely to occur under this alternative. It is likely that increased levels of agency presence and law enforcement would mitigate these impacts somewhat. The need for emergency services would be the highest under this alternative. Proposed restoration activities within the Basin could occur that have the potential to increase ecosystem health and local quality of life.

Alternative D: The alternative balances developed recreational development with ecosystem health objectives. An adaptive recreation management strategy would provide for carrying capacities and levels of commercial activity appropriate to the area; these capacities and activities would be weighed with resource conservation needs. Increases in overall visitation to the area would likely provide a moderate increase in tourism-related revenues within the local economy. A slight increase in service-related employment may also occur. Recreational use patterns would shift as visitors utilize new facilities and multiple-use trail systems, but at a lower level than alternative C. A moderate increase in traffic is expected to occur in specific locations due to recreational development. A moderately increased level of agency patrols and demand for regional emergency services would occur.

4.4 Recreation

Effects Common to All Action Alternatives:

Recreation opportunities, experiences, and associated benefits are affected by the physical, biological, and social environment. Changes in any of these characteristics could change the type of recreation that takes place within the planning area. Interpreting the importance of these changes requires baseline data. Currently, recreational use on BLM administered lands within the planning area is estimated at 200,000 visitors per year. Each of the proposed alternatives will have a varying level of magnitude upon visitors experience within the basin. The quality of the recreation experience is influenced by the level of recreation use, the degree of regulations, and competition for resources or other types of conflicting recreation activities occurring in the area.

Recreational opportunities close to the larger populations found within the Portland Metro area will become more important in the near future. Given the proximity of the Sandy River Basin to both the I-5 corridor and the City of Portland, the demand for local developed and undeveloped recreational opportunities is expected to increase. The middle portion of the Sandy River Watershed has the potential to provide a key link to the recreational opportunities provided within the planning area.

While motorized activities are likely to decrease in the Basin, opportunities for non-motorized recreation may increase; especially if non-motorized multiple use trails are established. Motorized users will most likely be unsatisfied with the opportunities provided within this analysis. BLM managed lands within the basin are not conducive to offering motorized opportunities because of the lack of contiguous BLM ownership, and the complex rural urban interface issues within the basin.

The level and rate of implementation would be based on available funding sources for development of opportunities and long term operations and maintenance costs.

4.4.1 Management and Monitoring

Alternative A: Continuation of Existing Management (No Action Alternative): There would be little change to the current recreation management levels within the planning area. The Sandy River will continue to be a dominant recreational feature that will attract use. The problems associated with public use of the Sandy River are likely to increase if additional access points and/or facilities are not provided. An increase in unregulated recreational use will most likely cause a negative impact on the quality of a visitor's experience, and a decrease in the realization of potential benefits.

Current management means that any increase in use would be essentially uncontrolled. Physical impacts would likely include ground disturbance, bank erosion, litter, increased number of unauthorized trails and campfire rings. The potential for a greater number of incidents of recreation-related trespass and vandalism would increase.

Limited agency presence and monitoring may also result in a slight to moderate degradation of the recreational experience due to lack of visitor contacts for information, safety and interpretative purposes.

There would be no effort to implement visitor use surveys within the project area. No efforts would be made to establish preferred visitor experiences and associated benefits. This would result in the general lack of baseline information for future recreation planning efforts.

Alternative B: Primary management emphasis would be enhancing undeveloped recreational opportunities within the planning area. Recreation use levels could increase slightly above the level described in Alternative A because of limited facility development. Management would be designed to provide the public with an opportunity to access both proposed upland and river based recreation opportunities while minimizing impacts to sensitive natural resources.

Alternative C: Recreation management and monitoring would be required at a higher level than under Alternatives A and B. An increase in monitoring for the effects of recreation use on wildlife, fish, and vegetation populations and species would be required. A visitor use monitoring framework would be developed and implemented to monitor visitors'' experience levels. Additionally, an increase in recreation management would be required consistent with the facility design plans outlined for this alternative. It is anticipated that this alternative would require additional staff and resources to implement.

Alternative D: (Preferred Alternative): Recreation management and monitoring would be balanced between services provided and protection of resource values. Thresholds would be established, and management actions would be developed to reduce impacts to resource values. A less comprehensive monitoring framework would be developed to assess recreation impacts to affected resources.

Implementation of the preferred alternative would enhance recreation opportunities in the planning area, creating diverse and sustainable visitor experiences in the long term. While not every recreation experience would be available in every zone, most appropriate uses are provided for, and would be enhanced by the phased development of new designated and signed trails, parking areas, and visitor facilities. Planned opportunities correspond to the complementary resources that are available on both public and private lands within the planning area.

4.4.2 Public Facilities and Access

Alternative A: Continuation of Existing Management (No Action Alternative):
Recreation opportunities within the project area would remain at the current level with a reduction in quality and an increase in recreation impacts (establishment of unauthorized trails and campsites, etc.). Increases in recreation use combined with limited public access will lead to continued problems with trespass and litter on private and public lands. Visitor experiences would continue to be compromised by the lack of amenities, such as parking areas, signed trails, restrooms, seating, and picnic areas.

Alternative B: This alternative would provide a less developed public access and facility development plan at the Sandy/Salmon river confluence and Marmot sites, as well as levels of trail development lower than Alternatives C and D. Facility development would be consistent with the program elements that define conceptual site plans under this alternative (see Chapter 5). Recreational carrying capacities would be lowest under this alternative. Providing improved, less developed opportunities to access the river would decrease private property trespass and the establishment of unauthorized trails, and could potentially limit resource damage by controlling use and adequately providing opportunities for recreationists.

Alternative C: A substantial increase in trail users would result within the project area based on interest in non-motorized multiple use trails shown at public open houses and focus group meetings. Opportunities for non-motorized use would be enhanced through the development of miles of designated trails (8 to 10 miles), parking areas and trailheads.

This alternative would provide the highest level of both facility and trail development. Between 45 and 50 miles of trail would be completed under this alternative. Facility and trail planning would be consistent with the program elements that define conceptual site plans under this alternative (see Chapter 5). The developed nature of facilities and recreational amenities under this alternative would be able to adequately address current and anticipated future uses.

Alternative D (Preferred Alternative): This alternative would provide a balance between the level of amenities provided at both the Sandy/Salmon confluence and Marmot dam site. Facility development would be consistent with the program elements that define conceptual site plans under this alternative (see Chapter 5). Carrying capacities for site development would effectively balance resource protection with anticipated future recreation use.

By providing limited improvement to key access points, much of the existing and future public demand for additional access will be met. Additionally, a Sandy River water trail plan will be produced to assist river users. The development of established recreation sites would reduce levels of private property trespass and the establishment of unauthorized trails. By controlling and strategically locating recreational use, the possibility for resource damage would be reduced.

This alternative would provide for the development of approximately 25 to 35 miles of trails. Facilities would be developed that include restrooms, information kiosks, shade and seating areas.

These amenities would positively enhance visitor experience and comfort, providing facilities that are not currently available. An increase in visitation would likely result, but at a lower level than Alternative C.

See Chapter 5 for a detailed overview of proposed facility and trail development plans within the Basin.

4.4.3 Interpretive Services, and Public Information

Alternative A: Continuation of Existing Management (No Action Alternative): No new interpretive information and signing would be developed. Coordination with other land management agencies and educate the public about Basin-wide issues would remain at the current level. The potential for increased trespass, littering, damage to vegetation, and the establishment of unauthorized trails could result from the lack of proper signage and public information.

Alternative B: Minimal information and educational opportunities would be developed under this alternative. Any educational information developed would focus primarily on resource protection and enhancement opportunities. Educational information would aim to provide information about alternative recreational opportunities away from sensitive resources.

Alternative C: This alternative provides for the highest level of interpretive program, panel and brochure development. The development of a comprehensive interpretive and public information plan would ensure coordinated and consistent efforts across agencies within the basin. This would result in enhanced recreation experiences and reduce some of the existing social problems and associated resource damage. Enhancing opportunities for environmental education programs would also provide benefits to youth from the surrounding local communities.

Alternative D (Preferred Alternative): This alternative would provide a less developed interpretation program within the developed recreation zones. Visitor information materials and efforts would be the same as those identified in Alternative B.

Future recreation use levels and impacts to sensitive resources would be less than Alternative B since a greater emphasis would be placed on directing the public to alternate areas, encouraging use in less sensitive times of the year.

4.4.4 Recreation Experience and Benefits

The SRBIMP will focus on providing explicitly defined outcomes of recreation participation rather than on providing an identified activity; this concept is referred to as Benefits Based Management (BBM). The central tenant of BBM is to produce recreational opportunities that facilitate the attainment of beneficial outcomes. Management alternatives are characterized by the experiences offered and the personal, household and community, and economic benefits that they provide to the user. Experiences and associated benefits vary by the level of amenities provided within the Developed Recreation Zone (1), and total trail miles within the front country and primitive Zones (2 and 3).

Experiences and associated benefits were derived from river and trail based focus group meetings held during the initial phases of public outreach. Each zone is comprised of a different set of experiences and associated benefits listed below:

Zone 1: Developed Recreation

Experiences:

- Enjoying safe access to river-related recreational opportunities
- Enjoying the closeness of family and friends
- Having easier access to a wide range of challenges
- Enjoying multiple recreational opportunities within a geographical area.

Personal Benefits:

- Restored mind from unwanted stress
- More well informed and responsible visitors
- Greater cultivation of outdoor oriented lifestyle
- Greater freedom from urban living
- Greater aesthetic appreciation
- Greater environmental awareness and sensitivity

Household and Community Benefits:

- Heightened sense of community pride and satisfaction
- Maintained and enhanced group cohesion and family bonding
- Improved functioning of individuals in family and community
- Improved quality of life

Economic Benefits:

- Increased recognition of the Mt. Hood Corridor as a desired destination for river and upland based recreation opportunities
- Enhancement of gateway communities' distinctive recreation tourism niche
- Increased local tourism revenue
- Increased opportunities for commercial angling and boating services

Zones 2 and 3: Front Country and Primitive Recreation

Experiences:

- Enjoying frequent exercise
- Enjoying strenuous exercise
- Having easier access to a wide range of challenges
- Testing your endurance
- Developing skills, abilities, and self confidence
- Enjoying high quality Pacific Northwest single track trail

Personal Benefits:

- Improved physical fitness
- Better health maintenance
- Restored mind from unwanted stress
- Greater cultivation of outdoor oriented lifestyle
- Improved knowledge, skills, and self confidence
- Greater aesthetic appreciation

Household and Community Benefits:

- Heightened sense of community pride and satisfaction

Economic Benefits:

- Increased recognition of the Mt. Hood corridor as a desired destination for single track trail opportunities
- Enhancement of gateway communities' distinctive recreation tourism market niche
- Increased local tourism revenue
- Reduced health maintenance costs
- Increase local job opportunities

Alternative A (Continuation of Existing Management): Experience zones would not be established within the planning area. No outreach would be performed to solicit the types of experiences and associated benefits the public is seeking within the Basin. Diminished opportunities to provide for a high quality recreational experience to the public would result by not adequately addressing the potential to offer these services.

Alternative B: Recreation Zones 1, 2 and 3 would be established under this alternative. Total planned trail miles (8-10) would be provided at a lower level than under Alternatives C and D. This would result in a decreased likelihood that an individual could realize the full range of experiences offered with the planning area, resulting in diminished opportunities for the realization of associated benefits.

Alternative C: Recreation Zones 1, 2 and 3 would be established under this alternative. Total planned trail miles (45-50) would be provided at a higher level than under Alternatives B and D. This would result in increased opportunities to realize the full range of experiences being planned within the basin, resulting in an enhanced opportunity for the realization of associated benefits.

Alternative D (Preferred Alternative): Recreation Zones 1, 2 and 3 would be established under this alternative, at a balanced level when compared with Alternatives B and C. Total planned trail miles (25-35) would result in the potential for an individual to realize the full range of experiences and associated benefits planned within the Basin. Additionally, the adaptability of this alternative surrounds the potential for providing additional experiences as future recreation demand increases.

Cumulative Effects to Recreation: Beneficial cumulative effects would result from land use restrictions and management actions that address damaging unauthorized and unregulated activities and recreational uses. Restrictions would provide higher levels of protection for sensitive resources, improved habitat conditions, and enhanced recreation opportunities within the planning area.

No adverse cumulative impacts have been identified for the combination of any past, present, or reasonably foreseeable future actions. Cumulatively, an estimated 10 acres of currently undeveloped land within the planning area would be modified by proposed recreational facility development.

4.5 Visual Resources

Effects Common to All Action Alternatives

- Activities on private lands, including timber harvest, could potentially impact the viewshed within the planning area.

- Unregulated recreational use and future development of the river corridor within the planning area could adversely affect the visual qualities of BLM managed lands.

- Changes to the landscape character are expected to be low and would comply with Visual Resource Management guidelines. Some disturbance to vegetation would be observable after restoration-based thinning activities; and change would be unnoticeable within five years. A forested setting would be maintained.

Alternative A: The visual quality of BLM managed lands in the planning area will not change dramatically under existing regulations and established visual resource management guidelines. However, incremental impacts to the visual resource, primarily from residential development and vegetation treatments would be expected to continue. Priority acquisitions within the planning area would help to mitigate potential future impacts to visual resources by minimizing the potential for altering the forested setting that comprises the planning area.

Alternative B: Alternative B includes several proposed activities such as facility and trail construction and signing which have the potential for affecting visual resources. The visual quality of BLM managed lands with the planning area would be improved under this alternative. Increased recreation management in the form of patrols and information would reduce litter and resource damage, thereby improving visual quality. Increased volunteer work days and planned special events would also reduce the extent of trash and litter within the basin.

Alternative C: This alternative would provide for the greatest level of protection of visual resources within the planning area through the establishment of design features specific to protecting visual qualities.

Alternative D: Alternative D would have the least potential for negatively impacting visual resources and the greatest potential for improving visual resources within the planning area. This alternative includes the benefits to visuals outlined under Alternatives B and C. The enhancement of previously impacted "socially" created recreation areas would improve visual characteristics within those areas.

Limited recreational development, balanced with active restoration would enhance visual resources within the "developed" recreation zones in the planning area.

Cumulative Effects to Visual Resources: Cumulative effects of proposed restoration and recreation strategies would be low due to the nature of these projects, which involve only slight modification of the visual character of the landscape. The overall visual quality within the planning area would remain unaltered.

4.6 Cultural Resources

Effects Common to All Action Alternatives

Adverse impacts to cultural resource values occur when sites are disturbed and site material contexts become mixed or churned, materials are damaged, and site integrity is disrupted or destroyed. Cultural resource values can be adversely effected by natural events as well as human activity including timber harvest, reforestation, road building and decommissioning, burning and fire line construction, recreation development and use, trail construction and use, special forest product collection, vandalism and theft.

The amount of damage to cultural, paleontological, and traditional use sites would vary little between the alternatives. Nearly all impacts to cultural sites would be reduced or eliminated under all alternatives through the practice of pre-disturbance site discovery and the use of avoidance or protection measures. However, site avoidance would not always be possible which would result in some incidental or inadvertent loss of sites or site values. Examples include:

- Sites that cannot be entirely avoided by project redesign without eliminating the resource benefits provided by the project.
- Site values that are visually dependent on setting.
- Sites that are not fully identified prior to ground disturbing actions due to lack of surface manifestations or reduced surface visibility. For example, some sites are partially or entirely below the ground surface or surface artifacts are not visible during inventory due to dense ground vegetation and thick duff cover.

No sites on the federally managed lands in the Basin are known to have unmitigated adverse impacts. Therefore, no data is available to accurately quantify impacts to cultural resources within the planning area.

Alternative A: Continuation of Existing Management (No Action Alternative) and Alternative B: No Action would result in the continuation of cultural site current conditions and trends in the Sandy River Basin.

Alternative C: This alternative would likely result in slightly greater risk of adverse impacts to cultural sites in the planning area than under Alternatives A and B as more ground disturbance would occur with more miles of trail constructed and more recreation facilities developed.

Alternative D (Preferred Alternative): Alternative D would likely result in slightly greater risk of adverse impacts to cultural sites in the Sandy watershed than under alternative B but slightly less than under Alternative C.

Cumulative Effects to Cultural Resources: Cumulative effects of proposed recreation development (trail construction and facilities) and restoration actions would be low as the planned projects only cause specific, localized ground disturbance (the trail pathways themselves, the "footprint" and immediate surrounding landscape of constructed facilities). Once the trail system and facilities were completed, additional effects would be unlikely to occur.

4.7 Hydrology/Water Quality and Quantity/Soils:

General Assumptions common to All Action Alternatives: Sandy River Total Maximum Daily Load (TMDL), http://www.deq.state.or.us/wq/TMDLs/docs/sandybasin/tmdlwqmp.pdf), approved by the EPA in 2005, would be implemented on all public lands within the watershed.

Impacts common to All Action Alternatives: Restoration strategies would be designed to rehabilitate stream channels and wetlands that have been determined to be functioning at risk or non-functioning. Over the long-term, this would help protect beneficial uses by restoring proper functioning conditions to wetlands and stream sites.

Under all alternatives runoff and sedimentation would be reduced over the long term by rehabilitation of soil structure. Over the short term (<1 year) some additional turbidity may result at sites which intersect stream channels and running water. Turbidity is not likely to be visible more than 1,000 feet downstream from proposed trail, facility, or restoration activities. Project design features would be developed to reduce the risk of effects to water quality through project specific NEPA planning.

Under all action alternatives light, discontinuous compaction of the surface horizon of the mineral soil would be unlikely to result in any reduction in soil productivity or disturb normal soil processes. Soil bulk density and processes would likely recover to pre-disturbance condition within one year following restoration projects.

Alternative A Continuation of Existing Management (No Action Alternative) and Alternative B: No action would result in the continuation of current conditions and trends in the Sandy watershed as described in the Description of the Affected Resource section of this EA.

Alternative C: This alternative would likely result in slightly greater risk of water quality degradation in the Sandy watershed. In particular, additional disturbance could translate into increases in turbidity at the site scale, although not likely at the watershed scale. Recreational use might result in higher incidence of water contamination by fecal coliform bacteria, particularly if recreation use outpaced facility development. Nevertheless, it is unlikely that these impacts would be detectable at the watershed scale or constitute a cumulative effect to water quality.

Alternative D (Preferred Alternative): Measurable effects to stream flow, channel morphology, water quality, and wetland condition as a result of this proposed action are unlikely. This action is unlikely to alter the current condition of the aquatic system either by affecting its physical integrity, water quality, sediment regime, or in-stream flows.

Ground Disturbing Activities: This alternative is unlikely to alter stream flow or peak flow events because it would not alter the interception or routing of precipitation. Ground disturbing activities (e.g. trail construction, ground based operations associated with vegetation management, road and trail decommissioning) would not occur on steep, unstable slopes where the potential for mass wasting adjacent to stream reaches is high. Therefore, increases in sediment delivery to streams due to mass wasting are unlikely to result. This would prevent any detectable alteration in sediment supply and transport in the affected streams.

There could be short term (minutes) localized (no more than 800 meter downstream) increase in stream turbidity during the installation of stream crossings and use of the crossing after construction. Increases in turbidity are expected to be small given the type of use that would occur, the size of the stream, the flat approaches, and the rock armoring being installed to reduce the potential for erosion. These increases are expected to be minor due to short-term and localized nature of the increases as described above and would be non-detectable on the watershed scale.

In addition, potential impacts resulting from ground disturbing activities and use would be mitigated with the implementation of Best Management Practices, are unlikely to contribute measurable amounts of sediment to streams.

The riparian canopy would be retained therefore maintaining riparian microclimate conditions and protecting streams from increases in temperature. The implementation of project design features would protect the condition of wetlands and streams.

In conclusion, this proposal is unlikely to impede and/or prevent attainment of the stream flow and basin hydrology, channel function, or water quality objectives of the ACS. Due to the small scope of any possible actions, no effects to water resources, beneficial uses, or water quantity or municipal/domestic uses are expected.

Cumulative Effects to water quality: Cumulative effects of proposed ground disturbing activities would be low due to the nature of these projects, which involve only slight modification of streams and riparian areas. The overall hydrologic patterns in the basin would be unaltered. The increase in turbidity associated with stream crossings would be local in nature and short term and therefore unlikely to contribute cumulatively to turbidity in the Sandy River Basin.

4.8 Fisheries

Impacts common to All Action Alternatives: Proposed restoration strategies would increase the habitat complexity of rivers and streams within the planning area. The introduction of structure is intended to result in localized reductions in the velocity of high flow, which in turn, is expected to cause sorting and deposition of bed load materials. Entrapment of bed load materials composed of sand, gravel, and cobble would improve and create spawning areas for fish. Increased habitat complexity also improves rearing habitat for juvenile fish and aids in retaining debris and nutrients. Habitat quality is expected to improve through implementation of restoration strategies as outlined in this document, as is the condition of Critical habitat for ESA listed fish species. Effects of ground disturbing projects on lands adjacent to streams are described under Hydrology.

Alternative A. Continuation of Existing Management (No Action Alternative): The No Action alternative would not change the current level of restoration efforts within the planning area.

Fish and fish habitat would not be adversely affected because no trail and facility development would take place. It is anticipated that an increase in unregulated, dispersed visitor use could potentially impact fisheries resources through the deterioration of water quality due to human waste and possible habitat disruption. Effects to fish would be analyzed under site specific analysis for all proposed ground disturbing activities.

Alternative B: The development of trailheads and recreation facilities would have less of an effect on listed fish species or their habitats when compared to Alternative C. It is anticipated that trail stream crossing construction and use would result in small short term sediment pulses.

It is anticipated that the highest period of trail and facility use would occur during the summer and fall periods when stream flows are lowest and trail surface is generally dry, thereby minimizing impacts to fisheries.

At proposed developed sites, trail heads and trail construction would have the potential for adverse affect on listed fish species and/or their habitat. Adverse affects would most likely be from harassment, poaching, inadvertent trampling of spawning beds, and an increase in hooking mortality from increased fishing pressure at the site. Under this alternative developed recreation facilities would be open seasonally reducing the potential impacts to fisheries habitat. Due to the resource protection emphasis of this alternative it is anticipated that these effects would be small and limited to points of access.

Fish habitat restoration efforts, as reflected in the "Sandy River Basin Aquatic Habitat Restoration Strategy" would result in an improvement to the quality riparian habitat as well as stream form and function.

Alternative C: This alternative would likely result in slightly greater risk of water quality degradation and therefore a higher risk of impacts to fisheries. Total proposed trail miles are greater than compared to Alternative A, B, and D, resulting in the potential for additional disturbance and increases in turbidity at the site scale, although not likely at the watershed scale. Cutthroat trout that are present in sections for proposed trail development may be impacted at the site scale, but there is no affect on listed fish or their habitat which are located approximately 1.5 miles downstream of the lowest proposed stream crossing. The small site-scale sediment impacts would most likely result in an aversion response from cutthroat trout and not have any long or short-term negative affects on spawning and rearing.

Proposed facility development would have effects similar to those described for trail construction within the planning area. Increased human use of Marmot and the Sandy/Salmon confluence would have the potential to adversely affect listed fish and/or their habitat. Adverse affects would most likely be from harassment, poaching, inadvertent trampling of spawning beds, and an increase in hooking mortality from increased fishing pressure at the site. The magnitude of these adverse affects increases with increasing human usage of the site.

Restoration efforts on BLM lands identified under this alternative would be both restoration and mitigation.

Alternative D (Preferred Alternative): Effects to fish and fish habitat under alternative D would be less than those described under alternative C, and it is anticipated that this alternative would result in effects somewhere between those described under alternative B and alternative C.

The adaptable management framework that characterizes this alternative can be monitored and appropriate steps implemented to protect impacted fisheries resources.

Fish habitat restoration efforts on BLM lands would be a balance between restoration and mitigation. Improvement to water quality, riparian habitat and stream function would result in more favorable conditions for all species. Restoration efforts in streamside areas would improve the chances for recruitment of large woody debris.

Cumulative Effects: Cumulatively, restoration strategies would add to the recovery of habitat for Threatened and Endangered fish species. Restoration opportunities, in combination with the removal of Marmot Dam, is expected to result in improved aquatic habitat conditions and improved quality of Critical Habitat for ESA listed fish species. Adverse impacts due to proposed recreation trail and facility development would be minimal.

4.9 Wildlife

General Assumptions Common to All Action Alternatives:

Human use and related disturbance due to project implementation and subsequent recreational use would continue near current levels in the short term (three to five years) and increase in the long term (beyond five years). Overall effects to wildlife would be low due to the type and duration of human use and disturbance. Restoration actions under all action alternatives on Congressional Reserve and District Designated Reserve land use allocations would be undertaken to encourage late-successional forest characteristics in an effort improve habitat quality.

Future individual projects proposed under the Sandy River Basin Integrated Management Plan would be subject to the Endangered Species Act including Section 7 consultation with U.S. Fish and Wildlife Service. The effects to wildlife do not vary in type or nature across alternative; only the amount or scope of the impact (acres, miles of trail etc.) varies.

Alternative A. Continuation of Existing Management (No Action Alternative): In the short term under the No Action Alternative A, human intrusion and related disturbance factors would continue near current levels. However, in the long term, human use and disturbance on BLM lands in the Sandy River Basin is expected to increase under this alternative. The lack of designated trails, facilities (including toilets), and the increase of recreational uses could result in increased adverse impacts to wildlife due to unregulated use.

Currently, there are few designated trails and many user-created non-motorized as well as motorized trails in the planning area. User created trails result in an increase in wildlife disturbance. Wildlife disturbance stemming from human use includes increased noise and traffic levels and possible habitat alteration. Impacts are likely to include changes in wildlife behavior, including breeding behavior and nesting success. An increase in user-created trails, dispersed camping and a lack of agency presence including law enforcement, would likely result in greater adverse impacts to wildlife species and habitat than the action alternatives.

No restoration actions would be taken under this alternative, resulting in the continuation of past trends. These trends have resulted in sub-par habitat conditions, especially in those areas impacted by prior land use.

Alternative B: Overall effects to wildlife would be low due to the type and duration of human use and disturbance. Trail construction and facilities development would increase these impacts but only for a short duration. Subsequent recreational use would be limited to day use, and the use of the trails for foot traffic and non-motorized use. The development of designated trails may reduce further user-created trails which could reduce wildlife disturbance that stem from unauthorized or unmanaged use.

In the long term (more than 10 years), restoration through density management and thinning would accelerate the development of Late Successional characteristics for spotted owl habitat. Residual trees will increase in size and be available for recruitment or creation of snags, culls and CWD for many wildlife species, as well as prey species and nesting opportunities for spotted owls. Growth, size, branch diameter, and crown ratio of the remaining trees is increased, and development of understory and ground cover vegetation is stimulated by increased light to the forest floor. The development of key elements for wildlife habitat such as large trees, snags, CWD, understory development, and vegetation diversity would be favored by treatment.

To the extent that stream restoration projects improve habitat for fish and other aquatic animals, prey and foraging opportunities for wildlife species such as aquatic birds, mammals, and amphibians would improve.

Implementing an aggressive invasive/noxious weed control program using the principles of integrated weed management would improve wildlife habitat by eradicating, controlling, and preventing the spread of noxious weed and invasive exotic species. Planting/seeding native vegetation would restore wildlife habitats. Native vegetation would be favored and associated wildlife species would benefit.

Fuel treatments are expected to reduce the spread and intensity of fire should they start, thus reduce the potential for wildlife habitat damage. Overall effects of the actual fuel treatment projects to wildlife species and habitat would be low due to the nature and short duration (less than one year) of the projects. Fuel treatment would be primarily a disturbance related project, with slight modification of habitat due to thinning understories, cleaning up fine fuels on the forest floor and slash disposal. Few trees may need to be felled during fuel treatments, mostly saplings under six inches in diameter. The treatment areas are located in rural interface areas where human activity and disturbance factors are already high.

There would be minimal ground disturbance including disruption of litter layers, soil and CWD in areas of trail construction and facilities development. Some snags, especially smaller diameter/taller snags near trails, would be felled for safety reasons. This smaller material has less value for wildlife use and impacts to wildlife species and habitat is expected to be minimal. Any snag that is felled would remain on-site as CWD, providing important habitat for dead-wood associated species.

Wildlife disturbance stemming from human use and intrusion includes increased noise, harassment, and traffic levels. Impacts are likely to include changes in wildlife behavior, including avoidance and breeding behavior, which could affect nesting/breeding success. Possible habitat alteration could occur such as compaction and trampling of the forest floor and disturbance of CWD from unregulated user created trails.

Alternative C: The effects to wildlife under this alternative are the same in nature and type when compared to Alternative B; only the scope or size of impact would differ. Overall effects to wildlife would be higher under this alternative than compared to alternatives A, B, and D. Trail and facility construction would be of short duration, but under this alternative total trail miles would be greater than under Alternative B. Additionally, recreational use would include both day and overnight use at the Marmot dam site.

Restoration actions implemented under this alternative, including density management, would result in stand health improvement and habitat enhancement to a greater degree than that of alternative B.

Alternative D (Preferred Alternative): Alternative D would have aspects of both Alternatives B and C; disturbance would be less than Alternative C, but more than would occur under Alternative B. Under all of the action Alternatives, a planned increase in designated trails and facilities may prevent more user created trails from developing and contain use to less sensitive areas and special habitats such as wetlands.

Restoration actions implemented under this alternative including density management would result in changes to stand composition and habitat quality. Habitat enhancement would likely result as forest conditions improve, accompanied by an increase in biodiversity as stand proceed towards a more natural condition. The removal of non-native species and the restoration of native plant communities would also result in favorable conditions for native wildlife as described under Alternative B.

Cumulative Effects to Wildlife: Cumulative effects of proposed recreation development (trail construction and facilities) would be minimal due to the nature of these projects, which involve only slight habitat modification. Proposed restoration projects have the opportunity to improve and enhance wildlife habitat. The overall habitat type and seral stage would remain unchanged in the short term (less than 1 year). Seral stages would progress toward Late Successional conditions in the long term (over 10 years). The amount of habitat impacted by recreational development of any kind would be less than one percent of the BLM lands in the Sandy River Basin.

4.10 Invasive Non-Native Plants and Botany

General Assumptions Common to All Action Alternatives:

Impacts are likely to include habitat degradation, species displacement, surface disruption from recreational use and facility development and the spread of non-native invasive species. Therefore, impacts to species and habitat will increase accordingly with the absence of any agency directed management activity.

All federal actions would comply with policies and regulations of BLM Special Status Species Manual 6840 and the RMP, resulting in the protection of all officially listed species at the appropriate level.

Under all alternatives it is assumed that the human population increase within the Basin will increase the probability of new invasive plants being introduced and existing populations being spread.

The BLM will continue to participate with partners in the Sandy Watershed Invasive Species Plan in order to facilitate a coordinated and widespread effort to detect new invasive species, manage existing populations of invasive species, and restore treated sites with native species.

Invasive species will continue to be managed and controlled under the authority and direction of BLM manual 9015 - Integrated Weed Management, and the BLM will continue to work with partners on weed inventories, weed treatments, and public outreach and education. All action alternatives would result in an integrated invasive species management approach that will used for the prioritization of treatment areas based on funding and other planned projects.

Impacts common to All Action Alternatives: Restoration strategies and proposed recreational development within the planning area would attempt to restore native vegetation. As lands are acquired, they will be assessed for restoration needs. Because seeds of invasive/non-native species may already exist on site, or are located adjacent to a proposed restoration site, proposed restoration projects may result in a temporary increase in invasive/non-native plant populations due to soil disturbance. Grass seeding and planting would be used at disturbed sites to reduce non-native invasive plant establishment through competition. Over time, with competition from native species and a reduction in available sun light as native specie become established, invasive-non-native species populations would be greatly reduced. Dense plantings of trees and shrubs would likely shade out blackberry and scotch broom in twenty years.

Proposed restoration strategies would have no effect on any Threatened or Endangered Species, nor would it contribute to the need to list any Special Status/ Sensitive Species known or expected to occur in the vicinity of the project area. If any previously undiscovered Special Status/Sensitive Species are discovered on site, appropriate mitigation would be identified in project specific NEPA analysis.

Public access to acquired lands may result in the possibility of adverse botanical impacts due to increased and unregulated recreational use.

Alternative A. Continuation of Existing Management (No Action Alternative): Overall conditions of BLM land within the planning area would change as additional acreage is acquired that exhibits a wide range of botanical habitat.

With additional private lands transferred to public ownership, additional acres would be protected from development and the rehabilitation of these lands would occur where needed, resulting in changes to the botanical composition in the area. In time a more comprehensive view of the botanical species and habitat within the watershed will emerge as surveys of these new lands are conducted.

Provided that current state and county regulations on land use stay the same, the current conditions of private lands may change due to development and alterations to land use. However, these impacts are unlikely to be substantial on a Basin-wide scale.

In the short term (less than 5 years), continuing inventories of acquired land and existing land would be used to set priorities for treatment of invasive species. In the long term (greater than 10 years), an increasing number of users accessing BLM lands may result in introduction of new species at unknown sites and the continued spread of existing populations.

Alternative B: With the emphasis on resource protection the focus of this alternative, public access to many areas under BLM control would be limited, and some areas currently open to the public would be closed to allow for site rehabilitation. Private lands transferred to public ownership would be rehabilitated where needed to return these areas to a more natural condition.

Under this alternative, a greater effort to inventory, control and eradicate invasive non-native species would occur. With this increased effort on early detection and eradication, enhancement of native habitat would also occur. Prioritization of treatment areas may be more focused on special habitat and primary river zones.

This alternative would result in fewer negative impacts to native plants and their habitats due to human activities, and a positive effect in the reduction of noxious weeds as a result of public education. Mitigation measures such as trailhead information about invasive species can be used to educate the public in an attempt to reduce the chances of new invaders. Biodiversity would increase as emphasis is placed on the rehabilitation of damaged and degraded lands. Overall effects to spread and introduction of invasive species would be the less due to the decrease of human use and disturbance.

Alternative C: Many areas currently not impacted by invasive species will see a rise in these species that coincides with the increased human use of newly established recreation sites and trails. A benefit of this alternative would be an increased educational outreach effort from the BLM to inform the public about the issues with invasive species.

Alternative D (Preferred Alternative): This alternative would offer a balanced use of public lands while providing for the restoration of damaged lands, the protection of special areas, and the improvement of the overall habitat within the planning area. Management objectives would be to maintain, protect, and enhance the biological values within the Sandy River system while providing for a balanced approach to providing recreational opportunities. The addition of new recreation sites and opportunities will include an increased emphasis on public outreach and education of invasive species and natural habitat protection. An example would be the placement of informational kiosk at new and existing parks and trailheads, an increased effort on the eradication of invasive species, and an increased emphasis on invasive species partnerships.

With this alternative a balance between continuation of existing management, resource protection and human use would be reached. Although habitat modification would occur in some areas, with the increased emphasis on resource protection and rehabilitation, botanically, the overall condition of the Basin would improve.

An integrated invasive species management plan would be used to prioritize treatment areas based on funding and other planning efforts. Alternative D would have aspects of both Alternative B and C; human influences, and the accompanying level of non-native invasive plant spread and introduction, would be less than Alternative C but greater than Alternative B.

Cumulative Effects to Botany and Non-Native Invasive Plants: Cumulative effects of proposed recreation development (trail construction and facilities), and proposed restoration projects would be low due to the nature of these projects, which involve only slight modification of habitat. The overall habitat type and seral stage would remain unchanged. The amount of habitat impacted by disturbance would be less than one percent of the BLM lands in the Sandy River Basin. Known sites of listed botanical species would be protected from development or modification during the implementation of proposed restoration and public access projects.

4.11 Vegetation

General Assumptions Common to All Action Alternatives:

Under all three Alternatives, all currently proposed and potential future pre-commercial silvicultural treatments for the proposed management area will continue to be part of Salem District planning process and management goals; these can include, but are not limited to: pre-commercial or young sapling thinning treatments, manual maintenance (brushing), tree planting, invasive weed control and/or removal, and fuels reduction projects in all Land Use Allocations (LUA).

Under All Action Alternatives, wood products will continue to be provided from BLM lands consistent with the Salem District RMP. The majority of wood products will most likely come from lands in the General Forest Management Areas (GFMA) and Connectivity (CON) Land Use Allocations, although some volume may come from the currently designated District Designated Reserves (DDR). Harvesting of trees for timber production would not occur in the Congressional Reserve.

All future vegetation treatments involving the removal of timber or requiring a NEPA document will be analyzed at the time of the proposal. Specifics regarding future timber sales or restoration projects will be analyzed in separate EA documents.

All lands currently managed by the BLM in the LSR and Matrix LUA (includes GFMA and CON lands) will be managed according to direction given in the Salem District RMP. This management direction for LSR and Matrix lands in the Sandy Basin will be consistent across all proposed alternatives in this analysis.

Other potential negative impact to vegetation from the proposed recreation developments across all alternatives is expected to be minimal, with the exception of certain botanical species or weed populations (see botany section).

Alternative A Continuation of Existing Management (No Action Alternative): Under the no action alternative, all lands currently managed by the BLM in the LSR and Matrix LUA (includes GFMA and CON lands) will be managed according to direction given in the Salem District RMP.

In the currently designated DDR lands and the Congressional Reserve, the BLM would continue to manage the lands as they have done since their acquisition, which includes young sapling thinning and silvicultural treatments and surveys, but no projects that involve the removal of trees or thinning of closed sapling, mid-seral or mature stands.

In some of the acquired lands now designated as Congressional Reserve, several hundred acres of even-aged, young conifer stands were never pre-commercially thinned as saplings. Under the no action alternative, restoration treatment options will not be considered in these areas. These areas will continue to develop as relatively homogeneous, even-aged stands, primarily single-storied and dominated by Douglas-fir and/or western hemlock. Opportunities for diversified forest stands would be compromised.

Under this alternative, it is likely that these stands would not develop into multi-storied stands without altering their current growth and development trajectories. Without treatment, there would be insufficient sunlight to allow for shrub, conifer and hardwood regeneration in the understories.

Where current stand densities exceed or are near suppression related mortality thresholds canopies will remain closed and the crowns of individual trees will continue to recede. Decreasing diameter growth, as well as increased mortality among the suppressed trees will continue to occur as trees compete for water, light and nutrients. As the trees increase in height, with little increase in diameter, they become unstable and more susceptible to wind damage (Oliver and Larson, 1996). These stands would also become less capable of adapting to and surviving disturbances such as wildfire, insects and diseases.

Alternative B: Under this alternative, density management treatments could be incorporated in some of the forested areas within the DDR land use allocation. In the Congressional Reserve, additional treatments other than sapling thinning and brushing may occur; these can include girdling and weed control or removal.

The objective of Density Management thinning treatments in the DDR and sapling treatments in the CR would be to promote the development of multi-layered stand characteristics, reduce stocking, increase understory species development and hardwoods. Density Management and other restoration treatments would consist of variable thinning prescriptions to promote diversity in otherwise even-aged, contiguous stands that currently exist throughout the DDR and CR LUA's in the Sandy Basin.

Potential impacts of these restoration treatments to the treated stands can include a decrease in stand densities in even aged stands; an objective being to increase overall stand health and restore and enhance wildlife habitat.

Density management treatments can also reduce crown recession, and provide a release of understory vegetation and increased potential for new tree and shrub understory regeneration (*Oliver and Larson, 1996)*

Alternative C: Under this Alternative, all potential Commercial and Restoration thinning opportunities would be pursued in the DDR as directed in the Salem RMP.

All potential habitat restoration, water quality restoration and fuels reduction opportunities would be considered in the Congressional Reserve (CR). This does not include projects for timber production, but stewardship or service contracts that may include the removal of trees or brush from an area.

Adverse impacts to forest stand health would be reduced with the emphasis on thinning and reducing stand density and promoting forest health under this alternative.

Alternative D (Preferred Alternative): Under this Alternative, potential Commercial and Restoration thinning opportunities would be pursued in the DDR as described in Alternative B. Adverse impacts to forest stand health would be reduced with the emphasis on thinning and reducing stand density and promoting forest health under this alternative.

Under the proposed alternative, many of the dense, even-aged, overstocked conifer stands throughout DDR and CR lands would be considered for treatment. In the CR, this does not include projects for timber production, but stewardship or service contracts that may include the removal of trees or brush from an area.

Potential benefits and impacts from these restoration treatments under this alternative include, but are not limited to:

- Reduction in stocking of dense stands to increase overall forest stand health.
- Decrease the potential for wildfire spread.
- Restore and enhance wildlife habitat.
- Restore and enhance riparian areas and water quality.
- Maintain, restore and/or enhance the scenic qualities of the area.

Cumulative Effects to Vegetation:

There is a potential for cumulative effects to vegetation on stands that would be proposed for vegetation management actions. Timber harvest on private lands adjacent to these parcels could result in blowdown along the common property lines. These effects would be analyzed in more detail during project specific NEPA analysis.

4.12 Fire Hazard and Risk /Rural Interface

General Assumptions Common to All Action Alternatives:

- Fire risk is expected to increase within the planning area as populations increase within the surrounding communities.

- Fuel treatments are expected to increase in direct proportion to an increase in population and recreational use.

- Proposed fuel treatments will vary according to Land Use Allocation.

- The Northwest Oregon Fire Management Plan provides guidance for Salem BLM fire management and the Clackamas County Community Wildfire Protection Plan (CWPP) provides a consolidated reference documenting wildfire hazards, prevention and response efforts and resource-sharing information for all participating local, state and federal agencies.

Alternative A Continuation of Existing Management (No Action Alternative): Under this alternative fires would continue to be suppressed aggressively in the wildland urban interface within all land use allocations under the existing contract with Oregon Department of Forestry (ODF).

Newly acquired lands near private residences would be assessed for fuel treatment needs. Private landowners with concerns for fuel treatments on adjoining BLM lands would be partnered with for potential projects.

In the short term and long term unregulated recreational use would continue to be a concern on BLM lands during higher fire danger. The increased use of motorized equipment is a higher concern especially near property boundaries. Increased recreational use of fires along the river or non-motorized trails could increase the potential risk of a large fire occurring since access to the fire start may be limited.

Alternative B: Overall effects to wildfire risk would increase due to the increase of human recreational use. Trail construction and facilities development would increase the potential for fire starts around these areas. The development of designated trails may reduce further user-created trails which could reduce the acres at risk.

In the long term (more than 10 years), restoration activities such as density management and thinning with subsequent fuel treatments, especially near private property boundaries would decrease the potential fire risk. The development of older forest structure with multiple canopies and development of understory and ground cover vegetation increases the risk of a large stand-replacing fire occurring. This is one of the fire regimes of the area and these stands will either be consumed in a large fire under dry, windy conditions or the understory will burn in more moist conditions.

Alternative C: Because of the increased number of recreational sites and vegetation treatment projects there would be additional fuel hazard reduction treatments across the landscape to decrease the fire risk associated with the increased recreational use and other projects. The fire risk will be increased because the number of visitors will increase. If the number of fire starts increases over the long term, then the need for a shaded fuel break along the southern edge of the Little Sandy Watershed would be evaluated to reduce the risk of fire exiting or entering the Bullrun Watershed.

Overall effects to fire risk and the rural interface would be higher under this alternative than compared to alternatives A, B, and D. Recreational use and vegetation treatments would increase the potential for more fire starts.

Alternative D (Preferred Alternative): Alternative D would have aspects of both Alternatives B and C; potential fire risk and rural interface issues would be less than Alternative C, but more than would occur under Alternative B. Under all of the action Alternatives, a planned increase in designated trails and facilities would increase the potential for fire starts even with the fuel treatments during project implementation.

Restoration actions implemented under this alternative with associated fuels treatments would reduce the risk of fire starts.

Cumulative Effects to Fire Hazard/Rural Interface: Cumulative effects of proposed recreation development (trails and facilities) would be moderate due to the fact that more people will be visiting the area which increases the risk of fire, but most areas would be accessible for fire suppression. Proposed restoration projects have the opportunity to decrease the potential with thinning and fuels treatment.

The one unknown cumulative effect would be the impact of any climate warming. If the average annual temperature increases, the potential for fires would increase without an subsequent increase in precipitation. Additional outreach would be needed to increase fire risk awareness.

4.13 Compliance with the Aquatic Conservation Strategy

ACS Component	*Project Consistency*
Component 1 - Riparian Reserves	Restoration projects within Riparian Reserves would improve habitat conditions. Ground disturbing projects within Riparian Reserves will have project design features reducing the actions' effect on Riparian Reserves.
Component 2 - Key Watershed	The projects are located within the Sandy and Salmon River watersheds, which are designated key watersheds.
Component 3 - Watershed Analysis	The Salmon River Watershed Analysis, December 1995. Upper Sandy Watershed Analysis 1997 Sandy Watershed Analysis, 2007
Component 4 - Watershed Restoration	All alternatives have restoration projects that will contribute to watershed restoration.

Table 9 - Compliance with Components of the Aquatic Conservation Strategy

Cascades Resource Area Staff will review individual projects against the ACS objectives at the project or site scale during the project specific NEPA analysis. The no action alternative does not retard or prevent the attainment of any of the nine ACS objectives because this alternative would maintain current conditions. The action alternatives do not retard or prevent the attainment of any of the nine ACS objectives for the following reasons (See *Table 10*).

Table 10 - Compliance with the Nine ACS Objectives

ACS Objectives	*Remarks*
1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 1.*	**All Alternatives:** Restoration projects would promote connectivity between landscape features by improving habitat connectivity within Riparian Reserves. Other vegetation management projects are not expected to change connectivity patterns within the watershed.
2. Maintain and restore spatial and temporal connectivity within and between watersheds. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 2.*	**All Alternatives:** Long term connectivity of terrestrial watershed features would be improved by enhancing conditions for stand structure development. In time, the RRs would improve in functioning as refugia for late successional, aquatic and riparian associated and dependent species. Both terrestrial and aquatic connectivity would be maintained, and over the long-term, as RRs develop late successional characteristics, lateral, longitudinal and drainage connectivity would be restored.

ACS Objectives	*Remarks*
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 3.*	**All Alternatives:** All alternatives would maintain current conditions with regard to the physical integrity of the aquatic system because the project would not alter the physical integrity of the Sandy River.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 4.*	**No Action Alternative:** It is assumed that the current condition of the water quality would be maintained. **Action Alternatives:** Stream Protection Zones (SPZs) in the Riparian Reserve LUA (RR) would be maintained. The proposed trails are primarily on ridge top or upper-slope locations with few hydrologic connections or proximity to streams or riparian areas. Overall, these action alternatives would be unlikely to have any measurable effect on stream temperatures, pH, or dissolved oxygen. Sediment transport and turbidity in the affected watersheds is likely to increase over the short term as a direct result of trail construction. Sediment increases would not be visible beyond 800 meters downstream from trail/stream intersections and would not be expected to affect fish, aquatic species or habitat, or human uses. Over the long-term (beyond 3-5 years), current conditions and trends in turbidity and sediment yield would likely be maintained under the action alternatives.
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 5.*	**All Alternatives:** The No Action Alternative and the Proposed Action would maintain current conditions with regard to the sediment regime of the Sandy River. Short-term localized increases in stream sediment can be expected following trail construction, but BMPs and mitigation measures would be implemented to limit acceleration of sediment delivery to streams. As a result, it is unlikely that this proposal would lead to a measurable change in sediment regime, including increases in sediment delivery to streams, stream turbidity, or the alteration of stream substrate composition or sediment transport regime. No sediment is expected from ephemeral stream crossings after one season.
6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 6.*	**All Alternatives:** The No Action Alternative and the Proposed Action would maintain current conditions with regard to in-stream flows.

ACS Objectives	*Remarks*
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands. *All three Action Alternatives and the No Action Alternative do not retard or prevent the attainment of ACS objective 7.*	**All Alternatives:** The No Action Alternative and the Proposed Action would maintain current conditions with regard to floodplain duration.
8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability. *The Proposed Action and the No Action Alternative do not retard or prevent the attainment of ACS objective 8.*	**All Alternatives:** Species composition and structural diversity of plant communities would remain as they currently exist because the project will not require trees to be removed and only minimal amounts of understory vegetation will be impacted.
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate and vertebrate riparian-dependent species. *The Proposed Action and the No Action Alternative do not retard or prevent the attainment of ACS objective 9.*	**No Action Alternative:** Habitat for invertebrate and vertebrate riparian dependent species would be maintained. **Action Alternatives:** The project would not alter the distribution of native plant, invertebrate or vertebrate riparian-dependent populations. See Aquatic Resources Section

4.14 Comparison of Alternatives with regard to Decision Criteria/Factors

Decision Criteria/Factor (Section 1.2.2)	*Alternative A (No Action – Current Management)*	*Alternative B*	*Alternative C*	*Alternative D (Preferred Alternative)*
Restores ecosystems on acquired lands	**Partially fulfills:** A comprehensive restoration strategy would not be created. Current restoration projects would continue.	**Partially fulfills:** This proposed restoration strategy would maximize the conservation of natural resources, while improving land health and identify conservation or habitat enhancement projects with as little impact to the land as possible	**Fulfills:** The proposed restoration strategies for Alternatives C and D would identify and prioritize projects with the intent of improving scenic qualities, water quality and wildlife habitat. Restoration treatments would balance activities such as fuels reduction, non-native invasive species removal, and young sapling and density management thinning.	
Provides a balance of meeting recreation needs while retaining the resource values recognized by special legislation and other planning efforts.	**Does not fulfill:** The potential impacts of unmanaged future recreation demand would not be addressed within the planning area. No new recreational opportunities would be provided.	**Does not fulfill:** Undeveloped recreational opportunities would be provided within the planning area. Proposed facility/trail development is not expected to meet the future demands for recreation within the planning area. Unregulated/unauthorized forms of recreational use (establishment of social trails, unmanaged overnight use etc.) could result in impacts to basin-wide resources.	**Fulfills:** Developed recreational opportunities would be provided within the planning area. Amount of proposed trail miles, carrying capacity for developed recreation zones, and planned amenities for recreation facilities would provide adequate opportunities while minimizing impacts to basin wide resources.	**Fulfills:** The balance of developed and undeveloped opportunities would lead to the greatest level of resource protection while minimizing the footprint needed to provide public recreational access**.**

Decision Criteria/Factor (Section 1.2.2)	*Alternative A (No Action – Current Management)*	*Alternative B*	*Alternative C*	*Alternative D (Preferred Alternative)*
Ensures balanced approach to resource management, resulting in the least conflict between uses	**Does not fulfill:** A comprehensive strategy for restoring acquired lands and providing complementary recreational access would not be developed, resulting in the potential for resource damage and unregulated public uses within the basin.	**Partially fulfills:** Action alternatives B and C have varying levels of proposed management actions for providing comprehensive restoration strategies while simultaneously providing enhanced recreation access (trails and facility). Both alternatives partially fulfill this decision criterion with a varying emphasis on the level (undeveloped and developed) of proposed recreation opportunities.		**Fulfills:** Provides a balanced approach to resource management through the establishment of a comprehensive restoration strategy, while providing complementary recreation access so as to not impact the resources on which these activities depend.
Addresses rural interface issues	**Does not fulfill:** Lack of adequate recreation opportunities would lead to an increase in private property trespass, dumping and vandalism. Increased fuel loads and the lack of a comprehensive fire management plan would result in a greater fire risk in the wildland urban interface.	**Fulfills:** Appropriate levels of recreation development (facility and trails), and an increase management presence would lead to a decrease in private property trespass, dumping, and vandalism. Appropriate fire management planning would reduce the potential fire risk in the wildland urban interface.		
Meets the goals and objectives established through ongoing community partnerships and interagency planning efforts.	**Partially fulfills:** Recommendations for the implementation of priority restoration and recreation projects would not occur at the same level when compared with Alternatives B, C and D.	**Fulfills:** Recommendations for priority restoration projects would be implemented as funding and staff time is available. Restoration projects would be consistent with ongoing efforts identified throughout the basin. Proposed recreation development (facility and trail) would be provided consist with interagency opportunities identified within the basin.		

Decision Criteria/Factor (Section 1.2.2)	*Alternative A (No Action – Current Management)*	*Alternative B*	*Alternative C*	*Alternative D (Preferred Alternative)*
Provides an appropriate mechanism for evaluating proposed lands and realty projects including communication towers, utility line and rights-of-way applications	**Partially fulfills:** Rights-of-Way (ROW), utility line, and communication tower proposals would be reviewed and approved on a case by case basis and would be subject to constraints to protect sensitive resource values, and address issues identified in the current Resource Management Plan. No additional management guidelines would be developed to address visual resources.	**Fulfills:** Discretionary Lands and realty proposals would be subject to design features that would mitigate potential impacts to visual resources within the planning area.		
Meets Aquatic Conservation Strategy Objectives	**Fulfills:** Neither the Proposed Action nor the no Action Alternatives would prevent the attainment of any of the nine Aquatic Conservation Strategy Objectives (table 9). However, under The No Action Alternative, unauthorized recreational uses within riparian reserves would continue to degrade the conditions to which they contribute (e.g., soil erosion, sedimentation, bank erosion, compaction of riparian surface soils, conduit for the spread of noxious species, etc.). Under the Action Alternatives, restoration actions would be assisting in the restoration of riparian areas and riparian functional condition.			

Table 11 - Comparison of Alternative by Decision Criteria/Factors (EA section 1.2.2)