

Appendix A

MINAM WILD AND SCENIC RIVER

EXISTING CONDITION

1.1. Purpose of this Chapter

To describe the character and resources of the Wild and Scenic River corridor at the time of designation. The current conditions, as well as existing trends, are described to acquaint people with the river corridor and provide a basis from which to assess the consequences of the various management alternatives.

1.2 Regional Setting

The Minam River, is located in Wallowa and Union Counties in northeast Oregon, southwest of the town of Wallowa. The river flows from a glacial cirque above 7,700 feet, through the intensely glaciated, steep, rugged Wallowa Mountains, and then through a basalt canyon to its confluence with the Wallowa River at 2,537 feet. Within the Wild and Scenic River corridor, the Minam River ranges from 7,703 to 2,880 feet elevation.

The river begins at Blue and Minam Lakes high on the slopes of the Wallowa Mountains in the Eagle Cap Wilderness. Minam Lake is remarkable in that it serves as the source of two Wild and Scenic Rivers. The Lostine River flows out of the lake to the north and the Minam River begins from springs below the lake and flows south. After 2 miles the Minam turns west for 2 miles, and then northeasterly for 46 miles to the Wallowa River at the town of Minam. The Wallowa is a tributary of the Grande Ronde River, which in turn flows into the Snake River, Columbia River, and then to the Pacific Ocean. The Minam watershed contains 232 square miles.

The entire Minam River, from its headwaters to its confluence with the Wallowa River at the town of Minam, was designated as a State Scenic Waterway in 1970 with passage of the Scenic Waterway Initiative (ORS 390.825(4)). The Scenic Waterway System includes free-flowing waterways considered to possess one or more "outstanding scenic, fish, wildlife, geological, botanic, historic, archaeological, and outdoor recreation values of present and future benefit to the public" (ORS 390.805). The lower 8 miles was classified as as an Accessible Natural Area and the upper 41.9 miles classified as a Natural River Area. The Minam is one of the six original state scenic waterways and the beginning of a three river state scenic waterway that stretches for over 100 miles.

The upper 41.9 mile segment of the Minam River was designated as a Wild and Scenic River by the Omnibus Oregon Wild and Scenic Rivers Act of 1988. The designated segment begins at Minam Lake and ends 41.9 miles downstream at the Wallowa-Whitman National Forest/Eagle Cap Wilderness boundary near Meads Flat at Section 4, T.1S., R.41E., W.M. The entire upper 41.9 miles lies within the Eagle Cap Wilderness Area and has been designated as a "Wild River" under the Wild and Scenic Rivers Act.

The Minam River drainage is bordered by the drainages of the Lostine River on the east, the Imnaha River and Eagle Creek on the southeast and south, by the Powder River on the southwest, and by the Grande Ronde and Wallowa Rivers on the west and north. All drainages bordering the Minam River contain National Wild and Scenic Rivers.

Major tributaries of the Minam include the North and Little Minam Rivers and Murphy and Trout Creeks. Oregon State Highway 82 follows the lower 3 miles of the river (downstream from the designated 41.9 mile segment).

1.3 Climate

The climate area in the general area is characterized by a short growing season and little or no summer precipitation. Annual precipitation within the river corridor varies significantly with elevation. Lower elevations receive approximately 21 inches of precipitation per year, while upper elevations exceed 60 inches of precipitation per year, much of it falling as winter snow.

Persistence of the snow pack varies primarily with elevation, generally melting within a few days of falling in lower areas and rarely maintaining a winter-long snow pack. At higher elevations, snow persists in patches through June and early July. A snowmelt hydrography typifies the streamflow with peak flows occurring from April to early June.

The summer months are typically dry with less than 15 percent of the of the annual precipitation falling during July, August, and September. The rain that usually occurs during the summer is the result of local thunderstorms. On any given day, air temperature variation is primarily a function of elevation. Summer temperatures near 90° F are not unusual in the lower canyon reaches, while winter lows may reach well below zero. At higher elevations, summer temperatures fluctuate widely with hot days and cold nights. Summer highs reach the mid-70s at 5,000 feet and the mid-60s at 7,000 feet. At higher elevations, frost can occur almost any night of the year. Winter temperatures remain low for long periods and considerable snow accumulates.

1.4 History

The Minam River drainage falls within lands ceded by Nez Perce Tribe. Evidence from prehistoric sites indicate Native Americans used the area for an undetermined period of time. Written and recorded historic sources likewise report the use of the Minam River drainage by Native Americans primarily for summer camping, fishing, hunting, and food gathering purposes. received regular use as dispersed summer camps. The river corridor was periodically and seasonally visited by other cultural groups, including the Confederated Tribes of the Umatilla Indian Reservation (Cayuse, Umatilla, Walla Walla) and possibly to a lesser extent by Northern Paiutes and Shoshone-Bannocks.

The name Minam is derived from the Indian "E-mi-ne-mah", which means "valley of the roots", giving us a hint of the importance this river drainage held for Native Americans. Surveys on National Forest land completed to date in the river corridor have identified only a few prehistoric sites; however, the potential for discovering significant sites is considered high.

A number of Native American tribes visited the Minam River drainage during historic times, and still travel to the area to hunt, fish, camp, and gather, continuing the traditions established prior to the coming of Euro-Americans.

Euro-American settlers followed the early day trappers and explorers and settled in the Wallowa Valley around 1870. A few homesteads were later established in the Minam River corridor. Visitors may see the rare remnants of old trapper and miner cabins along the river. Observant visitors may also notice the fairly subtle traces of the historic logging that occurred from 1918-1924. All that is visible today are stumps and small clearings, the splash dam site (approximately 6 miles above Red's Horse Ranch), and logging camp sites. The operation of a splash dam on the Minam River is considered to be unique in the area, and it is the only splash dam site documented in the Wallowa Mountains. All that is readily visible at the splash dam site today is the clearing the backwater covered.

The Land Ranch, one of three homesteads established on the Minam River, near the mouth of the Little Minam, was homesteaded about 1886. Little remains at the site except a few buildings and rusting farm implements. Red's Horse Ranch was occupied as early as 1880 by a trapper, later by horse and cattle

ranchers. Despite some modern additions and improvements, Red's Horse Ranch still retains an overall rustic character. The third homestead, Minam River Lodge, was established around 1890.

Early maps of the Minam River record the presence of a number of Forest Service guard stations. Only one guard station exists today and continues to be used as an administrative site. Remnants of old telephone lines are occasionally seen along the river, relics of the historic administration of the area.

Until the late 1940s the designated river corridor and vicinity were heavily grazed. Recreation use of the area has changed from the peak dude ranch days of the 1950s and early 1960s mainly to hunting by small groups or individuals operating independently from the dude ranches.

Past use of the river corridor by man can be seen in the structures and facilities at the ranches and airstrips. To a lesser degree, the logging, grazing, and related uses in the early part of the century are also evident.

Red's Horse Ranch, was acquired by the Forest Service in August, 1994, as a part of the Clearwater Land Exchange. Red's contains a lodge, bridge, airstrip, and over 30 buildings. Since the acquisition, a preliminary cultural resource inventory has been completed by the Forest Service which indicates that 17 buildings and/or features are potentially eligible for inclusion in the National Register of Historic Places (including the adjacent Forest Service Millard Cabin administrative site). In addition, 9 buildings and/or features are contributory toward a National Historic District. Preliminary findings indicate that Red's Horse Ranch and the adjacent Millard cabin are perhaps eligible as a National Historic District. The historic building complex is notable for its collection of log structures, which together provide an insight into the evolution of log architecture over a period of approximately 100 years. Of particular interest are the log joinery techniques reflected by the various buildings. Red's Horse Ranch is also notable for the celebrities who frequented the site. Among them are actor Burt Lancaster and Chief Justice, William O. Douglas who visited the area on a regular basis, staying for several weeks during the summer, on an annual basis for 15-20 years.

Red's Horse Ranch is well known to communities within Wallowa and Union Counties and possesses both local and regional historical significance.

In the light of these new findings, the Resource Assessment was reviewed for the Minam Wild and Scenic River corridor to reconsider whether the historic resource should be an Outstandingly Remarkable value.

The review found that although Red's Horse Ranch and the adjacent Millard Cabin are probably eligible to the National Register of Historic Places, the historic values are not river related; thus, the historic complex does not in and of itself warrant a Historic Outstandingly Remarkable value classification for the entire 41.4 mile designated Minam River corridor.

The finding is based on the following:

The River corridor is 41.4 miles long and contains 12,953 acres, of which Red's only accounts for 80 acres. One historic set of buildings in the corridor does not warrant a Historic Outstandingly Remarkable Value finding for the entire corridor-which is generally lacking in historic values.

When Red's was privately owned, the majority of visitors arrived by plane or packed or hiked in from trailheads outside the river corridor-rather than along it. The primary attraction was the lodge, its remote wilderness setting, its architecture, social atmosphere, and hunting opportunities- rather than the river or its fisheries.

Although Red's had a number of important visitors for several weeks on an annual basis, this was not felt to be rare or unusual in the Region.

1.5 Landownership

The 1/2 mile wide river corridor encompasses approximately 12,953 acres within the Eagle Cap Wilderness on the Wallowa-Whitman National Forest, of which, 12,610 acres are National Forest System lands managed by the USDA Forest Service and 343 acres are privately owned. The 343 acres of private ownership consists of three tracts of private in-holdings. The northernmost 160.5 acre tract (part of a larger 640 acre tract-T. 1S, R. 41E, Sec. 16) is owned by Boise Cascade. The middle 60 acres tract (T. 2S, R. 41E, Sec. 23) by Carol Higgins, and ownership of the southern 122.5 acre tract (part of a 127.5 acre tract) is owned by the Minam Lodge Inc. (T. 2S, R. 41E, Sec. 25 and 36). The 80 acre tract containing Red's Horse Ranch (T. 2S, R. 41E, Sec. 36) was recently acquired by the Forest Service in a land exchange. The agency is now developing an Environmental Assessment that will address the structures, uses, and improvements on the tract.

The operation of Minam Lodge includes seasonal hunting and year-round tourist lodging, a grassed air strip, a 5 to 10 acre hay field, and a horse pasture. The Higgins tract includes a family-owned cabin used for recreational hunting, fishing and lodging. The land owned by Boise Cascade has never been logged. In the Minam drainage, the Forest Service is in the final stages of another land exchange that will acquire all of the Boise Cascade parcel (including 160.5 acres in the river corridor).

Individual landowners are responsible for the management and protection of soil, riparian, and other natural resources. Ongoing maintenance of facilities at Minam Lodge have resulted in stream stabilization and flood control projects.

The Forest Practices Act of Oregon governs timber harvest activities on private land. Each landowner is required to submit a harvest management plan for review before proceeding with timber harvest activities. State water quality standards, county zoning regulations for land use, and protection of wetlands applies to activities on private land.

The private land within the river corridor lies within the Minam River Scenic Waterway administered by the Oregon State Parks and Recreation Department. Under the Oregon State Scenic Waterways classification of "Natural River Area" the river and related adjacent lands are to be preserved in an essentially primitive condition. According to State law, within the Minam River Scenic Waterway (1/4 mile each side of the high water mark), "...no new structures or improvements, other than those erected or made, after notification and Commission approval, in connection with the existing uses by Red's Horse Ranch and Minam River Lodge, or those needed for public recreation or for resource protection will be permitted." If agreement cannot be made with the State after one year of negotiation however, any new structure or improvement may be added.

The Oregon Department of Forestry, the Oregon Department of Fish and Wildlife, and the Soil and Water Conservation Service also work with private landowners to improve management techniques and to provide technical assistance.

**CHART A-1
LANDOWNERSHIP**

LANDOWNER	ACRES	PERCENT
USDA Forest Service	12,610	97
Private	343	3
Total	12,953	100

Wallowa and Union Counties have a comprehensive land management plan covering all lands in the counties. In addition, a joint Wallowa County/Nez Perce Tribe Salmon Recovery Plan (August 1993) addresses land uses and resource management in the county. The river corridor is zoned by both counties as timber/grazing. The policy of the counties is to maintain these lands for farm and forest use, and to actively discourage residential development and land partitions that result in parcels too small for economic farm and forest use. New structures on farm and forest land are allowed, as long as they are in conjunction with the existing use.

State ownership to the beds of navigable waterbodies was granted to Oregon in 1859 as an incidence of statehood and is an inherent attribute of State sovereignty protected by the U.S. Constitution. The beds of non-navigable waterbodies remained in the ownership of the United States or its grantees. The navigability of Minam River has not been established. Currently, both the State and Federal government, and in some cases private property owners, claim ownership on most rivers' bed and banks within Oregon. While the long term resolution of the navigability issue is not the subject of this river plan, the future management implications are obvious. Therefore, while there may be disagreement on ownership, it is vitally important that there be agreement on the management philosophy for the designated Wild and Scenic River section of Minam River.

Under state law, the Division of State Lands (DSL) is responsible for the management of the beds and banks of navigable waterbodies (ORS 274.005 - 274.590). DSL is the administrative arm of the State Land Board (the Board), composed of the Governor, Secretary of State, and State Treasurer. Under constitutional and statutory guidelines, the Board is responsible for managing the assets of the Common School Fund. These assets include the beds and banks of Oregon's navigable waterways and are to be managed for the greatest benefit of the people of this state, consistent with the conservation of this resource under sound techniques of land management. Protection of public trust values of navigation, fisheries, and public recreation are of paramount importance, too.

The original Federal test for determining navigability was established in The Daniel Ball case over 100 years ago. This U.S. Supreme Court case clarified spellrivers "are navigable in fact when they are used, or susceptible of being used, in their ordinary condition, as highways of commerce..." Interpreting this requirement, subsequent court decisions have ruled that a waterbody is navigable if it is capable of use as a public highway for transporting goods or for travel. The Federal test for navigability and court determination has not been made for Minam River.

The DSL has notified us that do to the history of splash dam construction and log drives, the State of Oregon claims navigability of the Minam River, from its mouth to State Rivermile 30, about 1.5 miles downstream from Big Burn. Although this has not been tested in court, the State is thus claiming ownership of the bed and banks of the Minam River between the low water marks to State Rivermile 30. The position of the Forest Service is that navigability is a judicial finding and must be made by a Federal Court. The Forest Service considers rivers non-navigable until proven otherwise.

The DSL also administers the State's Removal-Fill Law which protects Oregon's waterways from uncontrolled alteration. The law requires a permit for fill or removal of any material within a State Scenic Waterway. The permit-review process involves coordination with the natural resource and land use agencies from the local through the Federal levels.

As with any jointly managed resource, jurisdiction is not as important as care for the resource. The DSL and the Forest Service will continue to work together to assure that the public trust and the purpose of the Wild and Scenic Rivers Act are met.

1.6 American Indian Treaties

The entire river corridor is within the lands that were ceded to the United States Government, through a ratified treaty, by the Nez Perce Tribe. The river corridor does not include any reservation lands. Under the provisions of the 1855 Treaty, members of the Nez Perce Tribe retain specific rights and privileges on lands ceded by past treaties. These treaties entitle them to hunt, gather roots and berries, and pasture stock on nonclaimed (Federal) lands within the river corridor. In addition, these treaties entitle members of the Nez Perce Tribe to fish at all usual and accustomed fishing sites. The Nez Perce Tribe continues to use the area for hunting, fishing, and other traditional practices at usual and accustomed places. The Nez Perce Tribe actively pursues protection of cultural and sacred sites, which include burials, and other treaty rights. Their rights to believe, express, and exercise their traditional religions (including having access to sites, use, and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites) are also protected by law.

Members of the Confederated Tribes of the Umatilla Indian Reservation have treaty interests in fisheries that depend upon habitat within the river corridor, and have a high interest in a variety of sites within the river corridor.

1.7 Grazing

Until the late 1940s the designated river corridor and vicinity were heavily grazed by sheep and cattle. Domestic livestock grazing began in the late 1800s when settlers of the valleys and canyons grazed large sheep herds in portions of the watershed. The higher elevations were used for summer range while the lower portions, where mild winter conditions prevailed, were used for domestic livestock winter feeding grounds.

Past heavy sheep grazing has resulted in some plant community alterations in the watershed. Many of the green fescue (*Festuca viridula*) communities have been replaced by species such as cone flower (*Rudbeckia occidentalis*), and annual bromes with remnant stands of green fescue.

Past cattle grazing has resulted in some streambank disturbances, soil compaction, and a reduction in the amount and variety of upland and streamside vegetation. The effects of grazing are particularly evident around water sources such as springs, seeps, and some creeks. Domestic livestock grazing has decreased significantly since the early 1900s.

Two grazing allotments occur in the Minam River Watershed, the Standley-Huckleberry, and the Minam River allotments. Both are currently vacant and have been so for 10 and 20 years respectively. There are no plans to open them up for grazing at this time.

The only grazing in the river corridor is associated with horses on several small pastures on private lands within the river corridor, a small pasture at the Millard Cabin Guard Station, and with horses used by recreationists, hunters, outfitters and guides, on the National Forest.

1.8 Residences, Cabins, and Recreational Services

There are several structures within the river corridor. On the National Forest, the 80 acre Red's Horse Ranch tract includes a 3,000 foot grass airstrip, lodge, barn, corrals, a 4 acre fishing pond, a 2 acre fishing pond, horsepasture, bridge, a 5 to 10 acre hay field, and about 30 cabins and outbuildings. Other National Forest System lands also contain three small cabins (one is used administratively as a Guard Station) on the old Land Ranch tract near the confluence of the Minam and Little Minam Rivers, the Millard Cabin Guard Station near Red's Horse Ranch, a cistern and water source for Red's Horse Ranch, a water source and water line for the Minam Lodge, small portions of the Minam Lodge airstrip, and some of the outbuildings and corrals associated with the private lodges.

On private lands there are many improvements. The Higgins tract includes a family-owned cabin used for recreational hunting, fishing and lodging. The Minam Lodge tract includes a lodge, several cabins and outbuildings, a 5 to 10 acre hayfield, horsepasture, and a 2,500 foot grass airstrip. There are also the remains of several historic sawmill sites on or near Red's Horse Ranch and the Minam Lodge tracts. The northernmost tract owned by Boise Cascade has no improvements.

Red's Horse Ranch was recently acquired by the National Forest in a land exchange, operated as private dude ranch for over 60 years, offering meals and lodging, horsepacking, and guided seasonal hunting trips to the general public. The Minam Lodge also offers similar services, but to a lesser extent-mostly for corporate business clients. No decision has been made on how Red's Horse Ranch will be managed by the Forest Service.

1.9 Timber

Forests cover about 83 percent of the National Forest System lands and most of the private lands in the river corridor. The entire river corridor lies within the Eagle Cap Wilderness and all National Forest System lands within the area are withdrawn from timber harvest. Recent harvest on the private lands has been limited to a few dead trees for firewood.

Although the entire river corridor lies within a federally designated Wilderness, harvesting has occurred in the past. From 1918 to 1924, much of the larger-size pine and fir trees were harvested from the valley bottom of the Minam River three miles upstream from the mouth of Murphy Creek to the mouth of Wallowa Creek. Over 1,000 acres were harvested yielding over 16 million board feet of timber. Logs were skidded to the river channel with horses during the winter. A splash dam was built approximately a mile and a quarter upstream from the mouth of Whoopee Creek. Logs were then flushed downstream during June of each year by the rising water released from behind the dam. The dam was removed in 1947 because it blocked fish migration.

Little timber harvesting occurred in the decades that followed due to inaccessibility caused by the steep mountainous terrain. Limited timber harvest occurred along an 8-mile corridor near the crest of the Minam drainage (more than a mile west of the river corridor) in the 1950s.

1.10 Transportation

There are no roads in the river corridor. State Highway 86 parallels 3 miles of the Minam River 5 miles downstream from the wild and scenic river corridor boundary. A private road at one time provided access to the northern river corridor boundary, but a bridge washout has limited access to foot or horse travel from State Highway 86, other trailheads, or by air to the two private airstrips.

In the period before 1984 when the Lower Minam area was added to the Eagle Cap Wilderness, tractors were commonly taken along the Minam River from the Forest boundary to Red's Horse Ranch and the Minam

Lodge. Several portions of the route had to be constructed to reach a suitable grade. Some evidence of the route and the cut banks are still noticeable in the area.

Motorized use still occurs on private lands within the river corridor. Airplanes, all-terrain vehicle, and tractors sometime distracts from the recreational solitude on public land.

1.11 Scenery

High in the middle of the Eagle Cap Wilderness lies Blue Lake and Minam Lake, headwaters of the Minam River. Blue Lake, nestled at 7,703 feet in a glacial cirque, and Minam Lake at 7,370 feet, form the headwaters of the Minam River.

The south end of Minam Lake was dammed in 1917 to deflect the outflow north into the Lostine River. The artificial modification enlarged what was a small natural lake, creating a reservoir to provide irrigation for agricultural lands in the Wallowa Valley. The earthen dams are fairly subtle visually, and the lake and surrounding area retain a predominately natural appearance. Although the river is very small when it leaves Minam Lake, it gains in volume quickly from numerous substantial tributaries, and within a short distance is a well-established and attractive mountain stream.

Both lakes are surrounded by rugged 9,000 foot plus granitic peaks and ridges. At an elevation just below treeline, the rigors of a subalpine environment are visible in the stunted and windswept forms of the trees. Small stands of Engelmann spruce, subalpine fir, and whitebark pine are scattered around the basin, punctuated by numerous open rock and talus slopes. High elevation wet meadows dotted with summer wildflowers rim the lakes.

The river enters a thick forest as it descends from the lakes and within a few short miles emerges into Big Minam Meadows. From this large meadow, visitors have unrestrained views of the rugged, glacially-carved landscape. Craggy peaks and barren sawtooth ridges loom thousands of feet above the valley floor. Streams cascade from numerous hanging valleys and cirque basins carved into the surrounding ridges. The natural mosaic of vegetation creates dramatic patterns and textures against the backdrop of light granites.

Panoramic views are the rule in the upper reaches of the drainage, as the river makes a broad sweeping arc through the center of the range, flowing first southeast, then west, and ultimately northwest. Meadows carpet the drainage bottoms and open slopes. Scattered clumps of subalpine fir and spruce encroach into the meadows, and stringers reach up the steep slopes of surrounding ridges. Shrub-dominated communities grow on the geologically unstable slopes where frequent wash outs, debris slides, and avalanches hinder tree establishment. These deciduous shrubs and forbs provide a show of changing colors through the seasons.

As the river rounds the bend and heads northwest for the remainder of its journey through the mountains, montane forests of mixed species become more prevalent. Englemann spruce, ponderosa pine, larch, Douglas-fir, and lodgepole pine generally carpet the lower half of the valley, with stringers growing higher up the ridges. Meadow openings become smaller, generally limited to the river bottom and frequent snow chutes. Quaking Aspen, black cottonwood, and alder grow on stream banks and rim meadows. Views of the surrounding mountains, otherwise obscured by the forest canopy, are seen from the frequent small openings.

The Minam River loses elevation rapidly in the upper reaches (headwaters to Elk Creek), in a series of rapids, pools, and short falls. Precipitous tributaries join the mainstem every half mile or so, adding volume to the river. The crystal clear pools, falls, deeply incised gorges, and wood debris dams of the mainstem contribute to the visual interest of the area.

Mixed conifer forests become even more dominant and meadows more infrequent in the middle portion of the Minam River drainage (Elk Creek to Red's Horse Ranch). Distant views are generally obscured by the

forest canopy. Other attractions provide visual interest, such as the colorful seasonal accents of the deciduous trees and flowering shrubs and forbs, and the swift and wide river itself.

The character of the Minam River canyon changes dramatically near Red's Horse Ranch, where the westernmost edge of the granitic Idaho batholith is located. The river leaves the complex geology and granitic peaks of the central range behind here, and enters the basalt dominated plateau lands more typical of the surrounding region. Over the years, the river has cut through layers of stacked basalts, creating a deep canyon with steep slopes. Rock cliffs, dikes, caves, and mineralized outcrops provide visual interest to the canyon. The depth of the canyon reaches 2,500 feet from rim to floor, and width varies from 2-1/2 to 6 miles.

Forest and steppe vegetation typical of the surrounding basalt plateaus create strong visual patterns in the lower Minam River canyon. North-slope stringer forests of ponderosa pine, larch, and Douglas-fir contrast with south-slope grasslands. Numerous flats along the river support park-like stands of old-growth ponderosa pine. Well developed cottonwood stands are found along the river bottom. A variety of deciduous trees, shrubs, and wildflowers provide interesting visual accents throughout the seasons.

Evidence of human-caused change is minimal in the Minam River drainage. Only a few visible remnants of early trapping, mining, homesteading, and horse-logging still exist in the river corridor. These include a few rustic log cabins, buildings and dilapidated farm equipment, stumps and logging camp clearings.

A few private parcels are located in the Minam River drainage. The rustic lodge and cabins found at Red's Horse Ranch and the Minam Lodge are reminiscent of turn-of-the-century Oregon architecture. Modern improvements on this property and other adjacent properties, include fences, gates, airstrips, several ponds, corrals, hay barns, and a bridge crossing the Minam River. These improvements are visible for approximately a mile along the river. Developments on other small private parcels located in the lower portion of the Minam are minimal and rustic, and generally cannot be seen from the river or trail.

Other cultural modifications that visitors will notice in their travels include constructed trails, directional signs, several log bridges spanning the river, and numerous visitor-established campsites. The Minam River Trail follows an abandoned road bed several miles below Red's Horse Ranch. The road is slowly reverting back to a trail-like appearance.

The area possesses a great deal of diversity in landform, water, color, and vegetation. The variety in the landscape is dramatic and memorable, from the steep glaciated landscape of the upper drainage, to the heavily forested u-shaped valley in the middle portion, and finally to the deeply dissected basalt canyonlands of the lower canyon. The crystal clear river provides constant interest throughout the river corridor, linking the disparate portions of the drainage together in a common theme. Part of the visual uniqueness of the Minam River drainage is that the entire drainage, for its whole length from rim to rim, is wilderness, and presents a vestige of primitive America.

1.12 Recreation

The entire designated portion of the Minam River flows through the western half of the Eagle Cap Wilderness. The lower end of the canyon reaches the lowest elevations in the Wilderness, providing a longer use season than is typical for this largely high mountain area.

Recreationists begin visiting the Minam River canyon in early spring, and use continues through the fall hunting seasons. Visitors travel to the area primarily to hunt, camp, horsepack, backpack, fish, and view wildlife. Many people come in pursuit of a wilderness experience, practice primitive skills, or just to "get away" from the pressures of daily life.

The entire designated river corridor lies within a Semi-Primitive Wilderness Resource Spectrum. The area is characterized by an essentially unmodified natural environment. Concentration of users is low, but there is often evidence of other users. The area is managed in a way that minimum on-site controls and restrictions may be present but are subtle. Facilities are only provided for the protection of wilderness values rather than for visitor comfort or convenience. There are moderate opportunities for exploring and experiencing isolation (from the sights and sounds of people); independence; closeness to nature; and tranquility and self-reliance through the application of no trace and primitive skills in a natural environment that offers moderate to high degree of challenge and risk.

The Minam River drainage can be reached from several major trailheads located around the perimeter of the Wilderness, providing ample opportunities for trail access. The Minam River Trail (FDT #1673) parallels the river for its entire designated length. This major trail connects to a system of trails that provide access to a large portion of the Wilderness. Other trails that access the river corridor include: Forest Service Trails 1649, 1685, 1672, 1901, 1908, 1655, 1919, 1675, 1905, 1676, 1922, 1944, 1661, 1670, and 1673A. The most popular are the Horse Ranch Trail (FDT #1908) from the Moss Springs Campground, 7.5 miles to Red's Horse Ranch; the Minam Lake Trail (FDT #1670) from Forest Development Road #8210, 6 miles up the Lostine drainage to Minam Lake; and the North Catherine Trail (FDR #1905) from the North Fork Catherine Creek Campground, 13.8 miles to the Minam River. Despite the number of system trails, many opportunities for cross-country travel still exist for adventurous visitors.

Trail maintenance on these trails and 7 trail bridges is performed on an annual basis. Maintenance activities included removing brush, limbs, logs, and loose rock; repairing fords, water bars, and drainage dips; reconstructing tread; and correcting other trail deficiencies. Trail conditions are monitored yearly to determine if special repair projects are needed to rectify drainage problems. Annual maintenance is performed from May through September.

While hiking and backpacking account for a significant amount of use in the Eagle Cap Wilderness, the Minam River drainage is visited by a higher percentage of horse parties. The river corridor provides good forage, water, and campsites for horse parties, and is a good area for long horsepack trips April through November. Hikers and backpackers occasionally travel through the upper portion of the Minam River drainage, usually to complete loop trips in the surrounding high country. The lower Minam is visited less frequently by those travelling on foot, due to difficult access, longer distances, frequent stream fords, and high summertime temperatures. There have been several drownings and near drownings on the lower Minam River when hikers or horseback riders attempted to cross the Minam River or some of its tributaries during spring high water. The Forest Service maintains trail bridges to help provide for visitor safety and resource protection but cannot guarantee safety under all spring runoff conditions.

Except for the elk hunting seasons when use is high in the river corridor, the Minam River generally receives a moderate amount of use. The majority of visitors are from the surrounding region, although some visitors come great distances to recreate in the Minam River drainage.

The Minam River drainage is popular for its high quality, remote hunting experience, and is known regionally as a trophy elk area. The elk hunting seasons are the most popular hunts. Most desirable camps are occupied during this time of year and encounters with other parties on the river trail are frequent.

Minam River is considered to be fair-to-good trout fishing downstream from Red's Horse Ranch, while the upstream portions within the Eagle Cap Wilderness are considerably better. Fishing is fairly light.

The Minam River below Red's Horse Ranch is occasionally floated by adventurous and skilled boaters. The remote access, short duration of high flows, lack of high difficulty class rapids (above Class III), potential for large woody debris and other natural hazards, has limited significant interest in the Minam River for floatboating.

Winter sports are not generally pursued in the Minam River drainage. Snowfall is fairly light in the lower Minam canyon. A minor amount of cross-country skiing and snowshoeing occurs in the upper portion of the Minam River. However, the steep canyon walls, and heavy winter snows create a serious avalanche hazard during the winter months in the higher Wallowa Mountains. These activities should be pursued by those with knowledge in recognizing the natural hazards.

The Minam River Lodge operates as a privately-owned dude ranch, offering meals and lodging, horsepacking, and guided trips. Several other commercial outfitters provide horsepacking and guiding services in the Minam River drainage and surrounding country under special use permit from the Forest Service.

Outfitter/guides are permitted to operate in the Eagle Cap Wilderness to transport clients to backcountry camps and to provide guiding services for clients seeking opportunities such as sightseeing, photography, skiing, fishing, and hunting. From late June to late September, camp locations are uncontrolled, and outfitter/guides are free to operate throughout the Eagle Cap Wilderness including the Minam drainage. Permits have been issued for 13 outfitter/guides to operate during this period. The means by which clients or their gear are transported is specified on these permits: 9 permits authorize horse or mule transport, 2 permits authorize llama transport, and 2 permits authorize backpacking.

Camp locations are controlled during the hunting seasons (from early October to late November). Three permittees are authorized to outfit and guide in the Minam River watershed during this controlled period; and these permits authorize horse or mule transport. Camps are located in or directly adjacent to designated Wilderness and are subject to regulations for the Eagle Cap Wilderness. Camping and stock care techniques are emphasized during permit administration to minimize human impacts on the land.

In order to manage for recreation activities, two administrative facilities are situated in the Minam River Watershed, the Land Ranch in T. 2S, R. 41E, Section 10 and Millard Cabin in T. 2S, R. 42E, Section 31. The Land Ranch consists of three buildings located on one acre. However, only one building is maintained as a guard station. The Millard Cabin consists of one building situated within one acre of fenced ground. These facilities are used for occasional overnight stays when Forest Service crews are working within the area. Building maintenance is also occasional. Season of use is from July to October.

A special use permits exist for portions of the airstrip at the Minam River Lodge (T. 2S, R. 41E, Section 25). The majority of the airstrip is on private land, with a minor portion on the National Forest. The special use permit expires on December 31, 1996.

Dispersed use and recreational livestock use has grown over the past few years in the river corridor. This growth in activity and use has had minor impacts on riparian areas, vegetation, water quality, soils, and the quality of the wilderness experience in the area.

1.13 Geology and Minerals

The Minam River originates in the heart of the Wallowa Mountains, which exhibit a complex geologic history which includes marine sedimentation, faulting and uplifting, volcanism, glaciation, and erosion. The topography consists of steep mountains over 9,000 feet in elevation to slightly sloped, broad valley floors.

The granitic Wallowa batholith, intruded into marine sedimentary rocks, dominates the upper Minam drainage. Granitic diorite is the predominant rock type. Typically this rock type is granular and massive. Associated with the Wallowa batholith are metamorphosed greenstones and tuffs, sedimentary limestones, shales, and sandstones. These rock types vary in structure, crystallization, and hardness.

Widespread volcanism occurred 15-30 million years ago, which resulted in the formation of basalt plateaus surrounding the Wallowa Mountains uplift up to 2,000 feet thick. These Miocene Columbia River basalts once

covered all or most of the Wallowa Mountains area prior to periods of faulting and uplifts, glaciation, and erosion. The basalt plateau geology typical of the surrounding region becomes dominant near Red's Horse Ranch, where the outer edge of the granitic batholith occurs. Below Red's Horse Ranch the river cuts through stacked layers of columnar basalt lava flows, red scoria, some lighter-colored andesite, and interbeds of sedimentary rocks, sometimes containing narrow coal seams. Feeder dikes from some of the local eruptions can be seen exposed in the older rocks and in the glacially carved granites in the upper drainage, and volcanic rock remnants form basalt caps on some of the surrounding higher peaks such as Brown Mountain and Sturgill Peak. Other interesting features include spires, caves, water spout scars, arches, and talus formations fairly typical of basalt landscapes. Basalt rocks surround the Wallowa Mountains where the outer edge of the granitic batholith occurs. The entire river downstream from the Minam Lodge is located in this bedrock formation.

The Wallowa Mountains were glaciated at least three times and perhaps as many as seven times between 11,000 and 500,000 years ago. The numerous cirque lakes, sharp ridges, striated rock surfaces, and jagged peaks in the upper Minam River drainage were created by the sculpting of valley glaciers flowing out from a central point near Eagle Cap Mountain. Glaciers carved the valley, which is steep and nearly V-shaped in the upper drainage, gradually becoming typically U-shaped with a wide, flat valley floor in the middle and lower portions.

Moderate to deep glacial and fluvial deposits are found as moraines and in layers on the floor and walls of the lower reaches of the Minam River valley, its tributaries, and associated alluvial fans and terraces. These deposits consist of granitic, basalt, metamorphic and sedimentary rock debris of gravel, sand, silt, and clay.

As is common throughout the Wallowa Mountains, much of the drainage is geologically unstable, particularly in the upper portion of the drainage. Periods of freezing and thawing make rock slides of varying size a common occurrence throughout the drainage. Flash floods, wash outs, and debris slides are frequent on the steep canyon walls. Heavy winter snows create avalanches which also contribute to the scouring of slopes.

All of the area within the Eagle Cap Wilderness has been withdrawn from new mineral entry. Numerous hardrock prospects for silver, gold, copper, molybdenum, and tungsten existed in the southwestern portion of the watershed (several miles outside the river corridor). The workings were limited to shallow excavations, trenches, and short adits. Access was always an obstacle to miners in this area, and none of the prospects have been active since the 1930s. No active mines currently exist on National Forest in the watershed.

1.14 Fisheries and Water

Hydrology

Modifications at Minam Lake may have altered slightly the natural flow regime of the Minam River. In 1917, a 14 foot earthen dam was constructed across Minam Lake's outlet on the south end, deflecting the outflow to the north, down the Lostine River. The artificial modification enlarged what was a small natural lake. This lake reservoir was created to provide irrigation for agricultural lands in the Wallowa Valley, as well as to provide some water for domestic use. A small amount of water flows from Minam Lake into the Minam River. Within a short distance, however, the river gains volume from Blue Lake and numerous tributaries and becomes well established.

The remainder of the river system, which drains approximately 232 square miles of the Eagle Cap Wilderness, is undeveloped. From Blue Lake at 7,703 feet and Minam Lake at 7373 feet, the Minam River drops to 2880 feet at the National Forest boundary, losing a total of 4823 feet in 41.9 miles. The river descends at an average gradient of 634 feet per mile in the upper 2 miles (14 percent), then begins to slow to a more moderate gradient of 113 feet per mile (2 percent) for 25 miles, then 48 feet per mile (1 percent) for the remaining 15 miles to the lower end of the river corridor boundary.

Interesting stream features are abundant throughout the drainage, including rapids, short falls, plunge pools, narrow incised gorges, islands, and large debris dams. Due primarily to the area's Wilderness designation where natural processes are uncontrolled, natural hydrologic features are near pristine in the upper half of the river. Riparian vegetation is intact, and has been only minimally impacted by recreationists. Frequent log jams and continual additions of large woody debris contribute to the dynamic equilibrium of the river.

Side channels occur within the meadows in the middle reaches of the river. Cobble is the dominant substrate with gravel and small boulders less dominant. The overall sinuosity of the Minam River is low and is characterized by a semi-confined channel and moderate to steep gradients.

The operation of the splash dam between Threemile Creek and Garwood Creek on the Minam River between 1918 and 1924 altered the natural hydrologic features of the lower half of the river. Some natural obstructions were removed to facilitate the log drives. Unconstrained ecosystem processes have contributed to the recovery of the riparian systems and dynamic equilibrium of the river over the past 70 years.

Water Quality

The Minam River runs swift and clear during normal flows. As is typical for a snowmelt-fed stream, natural runoff patterns are seasonal. Peak runoff occurs in spring, generally April to June. Runoff recedes to low flows by late summer, and increases again in late fall in response to the fall rains. Ice damming and significant ice flows are common occurrences in late winter and spring. Evidence of flash flood events can be observed following severe summer thunderstorms.

Due to the high elevation of the upper drainage, water temperatures remain cold well into the summer months. Water quality is excellent. Water yield and water quality in the Minam River is considered higher than most other streams in the Grande Ronde Basin. Dissolved oxygen levels are high and suspended sediment concentrations low during normal flows.

Water discharge for the Minam River has been monitored continuously by the US Geological Survey (USGS) from 1912 to 1914, and 1965 to present (gauging station 13331500). The station is located .3 mile upstream from the mouth of the Minam River, and 8 miles downstream from the Minam Wild and Scenic River corridor boundary. The average river discharge through the 1992 Water Year was 450 cfs. The lowest flow on record is 10 cfs on December 6, 1972 and again on January 10, 1973. The maximum discharge occurred on June 16, 1974 and measured 6,260 cfs (USGS Water Data Report 90-118, 1990). The average monthly mean, maximum, and minimum flows for the Minam River at the town of Minam from 1912 to 1992 are located in the following table (See Chart A-2).

CHART A-2

GRANDE RONDE RIVER BASIN

13331500 MINAM RIVER AT MINAM, OR
(Hydrologic bench-mark station)

LOCATION.--Lat 45°37'12", long 117°43'32", in SW 1/4 SW 1/4 sec.29, T.2 N., R.41 E., Wallowa County, Hydrologic Unit 17060105, on left bank 2.3 mi downstream from Squaw Creek, 0.3 mi west of Minam, and at mile 0.3.

DRAINAGE AREA.--240 mi², approximately.

WATER-DISCHARGE RECORDS

PERIOD OF RECORD.--June 1912 to March 1914, September 1965 to current year. Monthly discharge only for some periods, published in WSP 1317.

GAGE.--Water-stage recorder. Datum of gage is 2,540.48 ft above National Geodetic Vertical Datum of 1929. June 1912 to March 1914, nonrecording gage at approximately same site at different datum.

REMARKS.--Water-discharge records good except for estimated daily discharges, which are poor. No regulation. Minam Lake, capacity 440 acre-ft, has stored and diverted flow from Minam River since 1917 for irrigation in Lostine River basin.

AVERAGE DISCHARGE.--28 years, 450 ft³/s, 25.46 in/yr, 326,000 acre-ft/yr.

EXTREMES FOR PERIOD OF RECORD.--Maximum discharge, 6,260 ft³/s June 16, 1974, gage height, 6.89 ft; maximum gage height, 7.3 ft May 28, 1913, datum then in use; minimum discharge, 10 ft³/s Dec. 6, 1972, Jan. 10, 1973, result of freezeup.

EXTREMES FOR CURRENT YEAR.--Peak discharges greater than base discharge of 1,450 ft³/s and maximum (*):

Date	Time	Discharge (ft ³ /s)	Gage height (ft)	Date	Time	Discharge (ft ³ /s)	Gage height (ft)
May 8	0130	*1,670	*3.22	No other peak greater than base discharge.			
Minimum discharge, 36 ft ³ /s Oct. 30, 31, Nov. 3.							

DISCHARGE, CUBIC FEET PER SECOND, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992 DAILY MEAN VALUES

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	61	76	184	115	200	357	243	889	811	382	120	68
2	59	64	193	160	202	351	274	801	867	329	117	67
3	59	49	185	149	187	328	337	805	832	304	113	65
4	59	78	181	175	173	326	363	888	708	279	109	66
5	59	131	182	144	171	306	340	1010	623	265	106	80
6	59	252	255	134	170	294	318	1170	548	268	104	73
7	58	134	493	115	163	292	288	1380	514	274	102	68
8	57	115	383	854	155	286	275	1510	504	245	100	67
9	57	144	307	864	148	267	314	1250	516	225	98	72
10	57	125	268	869	144	255	383	1030	540	216	95	69
11	56	110	230	896	143	252	373	903	514	208	91	65
12	54	162	239	880	140	255	412	802	546	208	88	63
13	54	258	215	885	143	270	482	718	574	194	85	64
14	54	174	191	894	142	287	491	718	457	183	82	61
15	54	141	175	884	143	308	468	779	412	173	81	61
16	54	119	224	894	146	323	475	821	407	167	88	61
17	53	150	287	8100	140	315	625	860	387	160	87	62
18	53	141	358	860	137	285	665	972	366	154	90	59
19	54	133	290	860	148	265	649	1080	360	150	82	57
20	55	145	194	852	261	251	639	1160	379	166	77	57
21	55	144	165	858	434	245	629	962	391	208	76	57
22	58	127	231	868	479	240	573	860	387	176	86	57
23	64	81	202	8120	428	238	509	840	376	195	116	55
24	64	149	183	123	379	237	465	907	362	191	93	75
25	68	181	184	107	359	235	444	1000	341	169	84	140
26	71	246	216	97	350	242	480	1240	442	156	79	110
27	72	238	245	105	344	239	566	1150	425	149	75	92
28	67	222	232	169	348	227	629	991	347	141	73	84
29	65	207	199	184	351	221	805	881	479	135	71	79
30	50	181	156	187	---	219	1030	841	390	129	69	76
31	58	---	144	191	---	223	---	801	---	124	68	---
TOTAL	1818	4477	7191	3393	6728	8439	14544	30019	14805	6323	2805	2130
MEAN	58.6	149	232	109	232	272	485	968	493	204	90.5	71.0
MAX	72	258	493	191	479	357	1030	1510	867	382	120	140
MIN	50	49	144	52	137	219	243	718	341	124	68	55
AC-FT	3610	8880	14268	6730	13340	16740	28850	59540	29370	12540	5560	4220
CFSM	.24	.62	.97	.46	.97	1.13	2.02	4.03	2.06	.85	.38	.30
IN.	.28	.69	1.11	.53	1.04	1.31	2.25	4.65	2.29	.98	.43	.33

e Estimated

STATISTICS OF MONTHLY MEAN DATA FOR WATER YEARS 1912 - 1992, BY WATER YEAR (WY)

	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
MEAN	96.9	149	181	204	243	310	526	1263	1597	625	154	98.9	173	493	604	412	567	697	888	2016	3125	1392	276	179	1969	1974	1978	1969	1986	1986	1913	1971	1974	1975	1912	1978	38.1	57.7	62.4	59.6	56.9	66.7	235	484	493	125	72.6	45.9	1988	1988	1979	1977	1977	1977	1967	1977	1992	1977	1966	1987																					

SUMMARY STATISTICS

	FOR 1991 CALENDAR YEAR		FOR 1992 WATER YEAR		WATER YEARS 1912 - 1992	
ANNUAL TOTAL	146998		102672			
ANNUAL MEAN	403		281		450	
HIGHEST ANNUAL MEAN					713	
LOWEST ANNUAL MEAN					189	
HIGHEST DAILY MEAN	2560		1510		5160	
LOWEST DAILY MEAN	49		49		11	
ANNUAL SEVEN-DAY MINIMUM	54		54		15	
ANNUAL RUNOFF (AC-FT)	291600		203600		326100	
ANNUAL RUNOFF (CFSM)	1.68		1.17		1.88	
ANNUAL RUNOFF (INCHES)	22.78		15.91		25.48	
10 PERCENT EXCEEDS	1240		711		1280	
50 PERCENT EXCEEDS	230		184		197	
90 PERCENT EXCEEDS	66		61		72	

CHART A-3

13331500 MINAM RIVER AT MINAM, OR--Continued

WATER-QUALITY RECORDS

PERIOD OF RECORD.--Water years 1966 to current year.

PERIOD OF DAILY RECORD.--

WATER TEMPERATURE: October 1965 to September 1985.

REMARKS.--Radiochemistry data collected, but not available at time of publication. Some samples were analyzed by different methods and may have data with different levels of detection.

WATER-QUALITY DATA

DATE	TIME	DIS-CHARGE, INST. CUBIC FEET PER SECOND	SPE-CIFIC CON-DUCT-ANCE (US/CM)	PH WATER WHOLE FIELD (STAND-ARD UNITS)	TEMPER-ATURE WATER (DEG C)	TUR-BID-ITY (NTU)	OXYGEN, DIS-SOLVED (MG/L)	OXYGEN, (PER-CENT SATUR-ATION)	COLI-FORM, FECAL, 0.7 UM-MF (COLS./ 100 ML)	STREP-TOCOCCI, KF AGAR (COLS. PER 100 ML)	HARD-NESS, TOTAL (MG/L AS CaCO3)
DEC 1991											
02...	1310	196	57	7.8	3.0	2.6	12.6	101	K8	47	22
FEB 1992											
20...	1325	270	56	7.3	4.5	6.2	11.0	94	K15	67	22
JUN											
09...	1300	519	29	7.5	16.0	0.5	9.8	109	K6	K10	10
SEP											
11...	1200	66	58	8.1	15.5	0.6	9.2	102	K3	20	22

DATE	CALCIUM, DIS-SOLVED (MG/L AS Ca)	MAGNE-SIUM, DIS-SOLVED (MG/L AS Mg)	SODIUM, DIS-SOLVED (MG/L AS Na)	SODIUM PERCENT	SODIUM AD-SORP-TION RATIO	POTAS-SIUM, DIS-SOLVED (MG/L AS K)	ALKA-LINITY, DIS IT (MG/L AS CaCO3)	BICAR-BONATE, DIS IT (MG/L AS HCO3)	CAR-BONATE, DIS IT (MG/L AS CO3)	SULFATE, DIS-SOLVED (MG/L AS SO4)	CHLO-RIDE, DIS-SOLVED (MG/L AS Cl)
DEC 1991											
02...	6.1	1.6	2.4	18	0.2	1.1	27	33	0	1.1	1.3
FEB 1992											
20...	6.3	1.5	2.4	18	0.2	1.1	23	28	0	0.8	0.9
JUN											
09...	3.2	0.55	1.3	20	0.2	0.7	15	18	0	0.5	0.6
SEP											
11...	6.4	1.4	5.2	33	0.5	1.3	31	38	0	0.9	1.3

DATE	FLUO-RIDE, DIS-SOLVED (MG/L AS F)	SILICA, DIS-SOLVED (MG/L AS SiO2)	SOLIDS, RESIDUE AT 180 DEG. C (MG/L)	SOLIDS, SUM OF CONSTI-TUENTS, DIS-SOLVED (MG/L)	SOLIDS, DIS-SOLVED (TONS PER AC-FT)	SOLIDS, DIS-SOLVED (TONS PER DAY)	NITRO-GEN, AMMONIA DIS-SOLVED (MG/L AS N)	NITRO-GEN, AMMONIA TOTAL (MG/L AS N)	NITRO-GEN, NITRITE TOTAL (MG/L AS N)	NITRO-GEN, NITRATE DIS-SOLVED (MG/L AS N)
DEC 1991										
02...	0.1	20	49	51	0.07	25.9	0.01	0.02	0.02	<0.01
FEB 1992										
20...	<0.1	21	40	48	0.05	29.2	0.02	0.02	<0.01	<0.01
JUN										
09...	<0.1	9.8	20	26	0.03	28.0	0.02	0.03	<0.01	<0.01
SEP										
11...	<0.1	15	47	50	0.06	8.38	0.02	<0.01	<0.01	<0.01

DATE	NITRO-GEN, AM-MONIA + ORGANIC TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 TOTAL (MG/L AS N)	NITRO-GEN, NO2+NO3 DIS-SOLVED (MG/L AS N)	PHOS-PHORUS, TOTAL (MG/L AS P)	PHOS-PHORUS, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHO, DIS-SOLVED (MG/L AS P)	PHOS-PHORUS, ORTHO, TOTAL (MG/L AS P)	ALUM-INUM, DIS-SOLVED (UG/L AS AL)	BARIUM, DIS-SOLVED (UG/L AS BA)	COBALT, DIS-SOLVED (UG/L AS CO)
DEC 1991										
02...	<0.2	0.073	0.082	0.01	<0.01	0.01	0.01	180	4	<3
FEB 1992										
20...	<0.2	<0.050	<0.050	0.06	0.02	0.01	0.02	350	3	<3
JUN										
09...	<0.2	<0.050	<0.050	0.04	<0.01	<0.01	0.02	10	2	<3
SEP										
11...	<0.2	<0.050	<0.050	<0.01	<0.01	<0.01	<0.01	20	4	<3

DATE	IRON, DIS-SOLVED (UG/L AS FE)	LITHIUM, DIS-SOLVED (UG/L AS LI)	MANGA-NESE, DIS-SOLVED (UG/L AS MN)	MOLYB-DENUM, DIS-SOLVED (UG/L AS MO)	NICKEL, DIS-SOLVED (UG/L AS NI)	SELE-NIUM, DIS-SOLVED (UG/L AS SE)	SILVER, DIS-SOLVED (UG/L AS AG)	STRON-TIUM, DIS-SOLVED (UG/L AS SR)	URANIUM NATURAL DIS-SOLVED (UG/L AS U)	URANIUM NATURAL 2 SIGMA WATER, DIS-SOLVED (UG/L)
DEC 1991										
02...	74	<4	2	<10	<1	<1	<1	23	--	--
FEB 1992										
20...	100	<4	1	<10	1	<1	<1	23	--	--
JUN										
09...	7	<4	<1	<10	<1	<1	<1	12	0.17	<1
SEP										
11...	6	<4	<1	<10	<1	<1	<1	25	0.28	<1

DATE	VANA-DIUM, DIS-SOLVED (UG/L AS V)	SEDI-MENT, SUS-PENDED (MG/L)	SEDI-MENT, DIS-CHARGE, SUS-PENDED (T/DAY)	GROSS ALPHA, DIS-SOLVED (UG/L AS U-NAT)	GROSS ALPHA, SUSP. TOTAL (UG/L AS U-NAT)	GROSS BETA, DIS-SOLVED (PCI/L AS CS-137)	GROSS BETA, DIS-SOLVED (PCI/L AS SR/YT-90)	GROSS BETA, SUSP. TOTAL (PCI/L AS CS-137)	GROSS BETA, SUSP. TOTAL (PCI/L AS SR/YT-90)	RADIUM 226, DIS-SOLVED, RADON METHOD (PCI/L)
DEC 1991										
02...	<6	1	0.53	--	--	--	--	--	--	--
FEB 1992										
20...	<6	5	3.6	--	--	--	--	--	--	--
JUN										
09...	<6	3	4.2	<0.6	<0.6	0.7	0.7	<0.6	<0.6	0.03
SEP										
11...	<6	2	0.36	<0.6	<0.6	1.5	1.4	0.6	<0.6	0.03

K - Results based on colony count outside acceptable range (non-ideal colony count).

In addition to water discharge data, this station has also monitored over 60 items of water quality data since 1966. These include ph, dissolved oxygen, fecal coliform, fecal streptococci, turbidity, and over 50 radiochemistry tests on various chemical elements and compounds such as nitrogen, potassium, iron, sodium, bicarbonate, and radium. Due to the excellent water quality in the drainage and the amount of the drainage in wilderness, the area and the collected data serve as a control to monitor other watersheds in the area. A summary of the data collected is shown in Chart A-3.

To protect aquatic life in the stream, Oregon Department of Fish and Wildlife filed for minimum instream water rights on the Minam River on May 9, 1961, Certificate Number 59815. The recommended minimum streamflow for aquatic life in the Minam River is 100 cfs for all months of the year.

Section 7 Analysis for Spring/Summer Chinook Salmon

A Section 7 analysis of the Minam River under the Endangered Species Act was completed for spring/summer chinook salmon in the Minam drainage in April 1994. Seven factors have been identified that influence and may limit existing chinook habitat: sediment, temperature, shade/canopy cover, large woody material (LWM), streamflows, pools, and bank stability. These can also be applied to other fish species within the designated river corridor. Past stream survey data was analyzed and new data taken. The conclusion of the analysis is that **EXISTING CONDITIONS** of these limiting factors **ARE RATED GOOD** within chinook habitat of the Minam River watershed and are not limiting production of present chinook population levels. For the analysis the river was divided into the following 9 reaches. Reaches 3-9 are located within the designated river corridor. Reaches 1 and 2 are below the designated corridor so their data was not listed.

Reach	Description	River Miles
1	Mouth to Gunderson Creek (surveyed by ODFW)	0.0-5.0
2	Gunderson Creek to FS boundary (surveyed by ODFW)	5.0-9.2
3	Forest Service Boundary to Murphy Creek	9.2-12.9
4	Murphy Creek to Little Minam River	12.9-17.8
5	Little Minam River to Chaparral Creek	17.8-24.5
6	Chaparral Creek to North Minam River	24.5-31.0
7	North Minam River to Rock Creek	31.0-34.3
8	Rock Creek to Elk Creek	34.3-39.6
9	Elk Creek to Trail Creek	39.6-44.4
10	Trail Creek to Minam Lake	44.4-50.0

The following is a list of those 7 limiting factors relating to water quality within the Minam River Wild and Scenic River corridor:

a. SEDIMENT

Habitat Condition/Trend: Embeddedness is used as a measure of fine sediment (sands, silts, and clays greater than 0.2 cm or 0.08 in). Embeddedness is measured by estimating the amount of sediment covering or partially encasing cobble in the streambed. If cobble is not present, gravel embeddedness is measured.

Minam River Embeddedness (Percent)			
Reach	River Mile	Existing Condition (percent)	Proposed DFC
3	9.2-12.9	35	Existing Condition
4	12.9-17.8	33	Existing Condition
5	17.8-24.5	26	Existing Condition
6	24.5-31.0	22	Existing Condition
7	31.0-34.3	38	Existing Condition
8	34.3-39.6	41	Existing Condition
9	39.6-44.4	49	Existing Condition

The average embeddedness for reaches 3-9 was 32 percent; the average for only riffle habitats was 34 percent. The major factors contributing to high cobble embeddedness appear to be steep landforms, granitic rock, and a history of glaciation. Embeddedness data has not been collected yet for the Little Minam and North Minam Rivers.

Embeddedness measurements taken on the Minam River indicate that sediment levels within the watershed are not limiting current spawning habitat. Reiser and Bjornn (1979) found that fine sediment in excess of 20-25 percent can affect survival to emerging alevins. All reaches of the Minam River are above 20-25 percent embeddedness (except reach 6, which averaged 22 percent embeddedness). Sediment levels within these reaches are not limiting the production of present population levels.

Sediment levels in the watershed are not limiting current rearing habitat. Reiser and Bjornn (1979) recommend measuring the fine sediments in riffles as an index for the "sediment health" of the stream for rearing fish. Embeddedness exceeding five percent may affect chinook salmon. Embeddedness exceeding 35 percent could decrease fish density by half (Bjornn and Reiser 1991). Current production of chinook in the watershed does not produce fish densities that are high enough to be limited by the cobble embeddedness documented in reaches 3-9 of the Minam River.

b. TEMPERATURE

Habitat Condition/Trend: All temperatures reported for the Minam River, Little Minam River, and North Minam River were taken with standard thermometers placed on the streambottom. No thermograph data is available for the Minam River Watershed.

Minam River Watershed Stream Temperatures (Fahrenheit)					
Reach	River Mile	Existing Condition (High Temp)	Date of High Temperature	Temperature Range†	Proposed DFC
Minam 3	9.2-12.9	68° F	8/02/91	55-68° F	Exist. Cond.
Minam 4	12.9-17.8	66° F	8/04/91	52-66° F	Exist. Cond.
Minam 5	17.8-24.5	66° F	8/16/91	54-66° F	Exist. Cond.
Minam 6	24.5-31.0	64° F	8/20/91	48-64° F	Exist. Cond.
Minam 7	31.0-34.3	52° F	9/11/91	44-52° F	Exist. Cond.
Minam 8	34.3-39.6	53° F	9/12/91	44-53° F	Exist. Cond.
Minam 9	39.6-44.4	49° F	9/14/91	40-48° F	Exist. Cond.
Little Minam @ mouth	0.0	63° F	8/15/91	N/A	Exist. Cond.
North Minam @ mouth	0.0	54° F	9/04/91	N/A	Exist. Cond.

Minam River: The average water temperature during the USFS stream survey of July 25-September 24, 1991 for the Minam River in reaches 3-9 was 56° F. The range of temperatures was 40-68° F.

The Oregon Fish Commission (Sayre 1962) recorded a spot temperature at the confluence with the Willowa River on August 19, 1950 of 70° F at 1200 hours. They documented that on the Minam River in the 1950s, water temperatures generally did not exceed 65° F in the principal spawning areas, and 70° F near the mouth.

From August 22-26, 1961, the Oregon Fish Commission (Sayre 1962) conducted a stream survey on the Minam River. They recorded spot temperature readings ranging from a high of 73° F in reach 5 at 1500 hours on August 22, to a low of 54° F in reach 8 at 0810 hours on August 26. The 73° F figure is the highest temperature ever recorded for the Minam River. The average temperature recorded during the 1961 survey period was 62° F.

Little Minam River: USFS stream survey recorded 63° F at 1500 hours on August 15, 1991 at the mouth of the Little Minam River by a hand-held thermometer. Thompson and Haas (1960) reported a range of spot temperature measurements (from Oregon Fish Commission data) taken in the 1950s of 39 F on September 5, 1956 at 8:45 am, to 58 F on August 28, 1959 at 1330 hours. The low reading was taken at the falls at 4.5 miles above the mouth, and the high reading was taken at the mouth.

North Minam River: The USFS stream survey recorded 54° F at 1530 hours on September 4, 1991 at the mouth of the North Minam River by a hand-held thermometer.

It is unlikely that chinook spawning activity in the watershed is restricted by high water temperatures. Most chinook should enter the streams between mid-June and late July. Mid-June is usually a time of high snowmelt run-off and accompanying low water temperatures, with July being a time of tapering flow volume. The entire period should allow temperatures and flows conducive to adult migration.

The limited data taken during the stream surveys suggest that high water temperatures are not limiting juvenile chinook rearing in the Minam River Watershed. Year-long temperature and fish movement information is necessary to thoroughly assess the effect of high and low temperatures on chinook rearing in the watershed.

c. STREAM SHADE/CANOPY COVER

Habitat Condition/Trend: Stream shade and canopy cover are measured with a variety of methods, such as densimeters, percent open sky (used in ODFW survey methodology), and percent shade estimates.

Minam River Stream Shade/Canopy Cover (Percent)			
Reach	River Miles	Existing Condition	Proposed DFC
3-4	9.2-17.8	0-19% shade	Existing condition
5-9	17.8-44.4	20-30% shade	Existing condition

For reaches 3-9, stream shade was ocularly estimated by walking the channel and obtaining a percentage estimate for each reach; percentages were 0-19 for reaches 3 and 4, and 20-30 percent for the remaining reaches (see table above).

The low percentages of stream shade found on the mainstem Minam River in reaches 3-9 likely do not have a significant effect on water temperature. Rather, temperature is more likely controlled by elevational, aspect, snowpack, and groundwater influences. The Little Minam and North Minam Rivers are much more likely to be influenced by stream shade/canopy cover because of their more narrow channel widths, but surveys of this constituent have yet to be performed on these streams. All these stretches are in Wilderness, and temperature regimes are very likely a result of the natural potential of the ecosystem.

d. LARGE WOODY MATERIAL

Habitat Condition/Trend: Large woody material (LWM) is classified into three size classes: (1) Brush - 6 to 12 inches diameter by 20 feet or greater in length, (2) Small - 12 to 20 inches diameter by 20 feet or greater in length, (3) Large - 20 inches diameter or greater by 35 feet or greater in length (Region 6 Stream Survey [USFS 1993]).

For all size classes combined, LWM ranged from a high of 137.5 pieces/mile in reach 9, to a low of 49.4 pieces/mile in reach 6. The average for reaches 3-9 was 87.5 pieces/mile. Large woody material tends to be stored almost exclusively at the upstream ends of islands and at sharp bends in the channel, leaving long sections of the Minam River with little or no woody material. Very little evidence of riparian vegetation disturbance by human activities was detected in the designated river corridor.

Low to moderate amounts of LWM occur in the spawning and rearing habitat of the mainstem Minam, but these low amounts are not limiting the present population level.

Minam River Large Woody Material (Pieces Per Mile)					
Reach	River Mile	Large Size Class (pieces per mile)		All Size Classes (pieces per mile)	
		Existing Condition	Proposed DFC	Existing Condition	Proposed DFC
3	9.2-12.9)	5	Exist. Cond.	82	Exist. Cond.
4	12.9-17.8	11	Exist. Cond.	76	Exist. Cond.
5	17.8-24.5	6	Exist. Cond.	76	Exist. Cond.
6	24.5-31.0	3	Exist. Cond.	49	Exist. Cond.
7	31.0-34.3	6	Exist. Cond.	61	Exist. Cond.
8	34.3-39.6	13	Exist. Cond.	130	Exist. Cond.
9	39.6-44.4	16	Exist. Cond.	137	Exist. Cond.

e. STREAMFLOWS

Habitat Condition/Trend: A USGS gauging station has been in operation at the mouth of the Minam since 1912. See chart 2-1 for annual flow data.

A period of decreasing flows is typical in late June and July, with base flow usually being reached in mid to late August. The stream survey and review of activities found no disturbances capable of causing hydrograph advances or high streamflow peaking. It appears that streamflow dynamics for the Minam, Little Minam, and North Minam are entirely naturally regulated and at their DFC, which would be expected due to the watershed being almost entirely in Wilderness.

Due to the location of the designated corridor in the Eagle Cap Wilderness, streamflows are achieving their natural potential, a condition with which chinook of both subwatersheds have evolved. For this reason, streamflows are not likely to be limiting spawning and rearing habitat.

f. POOLS

Habitat Condition/Trend: Pool habitat is quantified during stream survey operations, and is calculated as a percentage of total reach area.

Minam River Pool Habitat (Pools per mile)			
Reach	River Miles	Existing Condition	Proposed DFC
3	9.2-12.9	0.3	Existing Condition
4	12.9-17.8	1.0	Existing Condition
5	17.8-24.5	3.6	Existing Condition
6	24.5-31.0	4.5	Existing Condition
7	31.0-34.3	5.4	Existing Condition
8	34.3-39.6	5.7	Existing Condition
9	39.6-44.4)	6.1	Existing Condition

Existing pool area in the Little Minam, North Minam, and mainstem Minam above the former splash dam site represent total potential natural levels. All of these streams flow primarily within the Eagle Cap Wilderness, and no human activities are occurring that could alter pool habitat.

A former splash dam operation in reach 6 apparently had an effect on channel morphology. The Oregon Fish Commission reported that splash dam logging scoured and flattened the streambed from 0.0 to 20.0 miles (Sayre 1962). This appears to have most noticeably effected reaches 1-4, which have a very low amount of pool habitat. However, reach 5 and the portion of reach 6 below the splash dam site have similar amounts of pool area compared to the portion of reach 4 above the former dam site. Channel and floodplain information from reach 5 and reach 6 below the dam site suggest that this section was not as susceptible to damage from splash dam releases, possibly causing reaches 1-4 to act as zones of deposition for material released from the splash dam or scouring action. However, 70 years have elapsed since splash dam operations were discontinued, and fluvial processes may have reorganized channel morphology to nearly a pre-splash dam condition. Floods in 1974 and 1964 may also be responsible for the present condition of these reaches.

The percent pool area of the Minam River above the former splash dam site appears to represent the total potential natural level. This is very likely true for the Little Minam and North Minam Rivers, but intensive habitat surveys have not been performed on these streams to date.

Pool numbers in reaches 3-9 range from a low of 0.3 pools/mile in reach 3, to a high of 6.1 pools/mile in reach 9. Pool numbers and area are low within spawning habitat of the Minam River. The present frequency and amount of pool habitat in spawning areas is not likely to limit the production of present population levels of chinook in the Minam River.

The current number of pools, and pool frequency and area do not appear to be limiting production of present population levels of rearing chinook. Pocketwater offers a significant amount of resting and foraging habitat in the mainstem Minam, but to what extent is not known because this habitat type is not quantified in the standard Forest Service Region 6 methodology.

g. BANK STABILITY

Habitat Condition/Trend: Streambank stability (percentage of the length of both banks that are stable) was measured by stream survey personnel for the entire length of the Minam River from the beginning of reach 3 to the headwater source.

Minam River Streambank Stability (Percent)			
Reach	River Mile	Existing Condition	Proposed DFC
3	9.2-12.9	87	Existing Condition
4	12.9-17.8	80	Existing Condition
5	17.8-24.5	70	Existing Condition
6	24.5-31.0	83	Existing Condition
7	31.0-34.3	91	Existing Condition
8	34.3-39.6	63	Existing Condition
9	39.6-44.4	89	Existing Condition

The survey indicated that bank stability averaged 80 percent for reaches 3-9 combined (USFS unpublished data). Bank stability ranged from 63 percent in reach 8 to 89 in reach 9.

The stream survey found approximately nine localized areas of eroding bank at trail crossings and dispersed camp sites. These sites are having no significant effect on the overall river. The streambank ground cover percentages for reaches 3-9 ranged from 51 to 75 percent for each reach respectively.

Streambank stability is at its natural potential for almost the entire length of the Minam River on National Forest System Lands (reaches 3-9), and is not limiting present population levels.

Water Rights

The earthen dam constructed across Minam Lake's southern outlet diverts most of the natural outflow to the north, down the Lostine River. The most recent special use permit for the dam was re-issued on October 20, 1966, with no expiration date. Irrigation is the primary use for the diverted water. This alteration nearly eliminates natural outflow to the Minam River. However, contributions from numerous seeps and springs, Blue Lake, and other unaltered systems allow the river to regain year-round natural flow levels within a very short distance from Minam Lake.

With the exception of the dam at the outlet of Minam Lake, there are no water rights or diversions on the

Minam River (Forest Service, Minam River Stream Survey Report, February 1992).

Fish Populations

The Minam River and many of its major tributaries support native wild populations of spring/summer chinook salmon, summer steelhead, bull trout, rainbow trout, and introduced brook trout. Mountain whitefish, squawfish, suckers, and sculpin are present in scattered populations in the river. Freshwater mussels and crayfish are also present. All but brook trout are native to the area.

The Minam River supported several anadromous fish runs historically, including spring chinook, fall chinook, and coho salmon. Coho and fall chinook are no longer present in the Minam River. Spring chinook return to spawn in the Minam River, but are very limited in numbers. The river is currently managed by the Oregon Department of Fish and Wildlife (ODFW) as a wild stock stream, and the long-term objectives are to maintain native stocks of wild spring chinook and summer steelhead. Mainstem passage problems at downstream dams and harvest are considered to be the major limiting factors to production of wild stocks.

Fish populations within the Minam River Wild and Scenic River corridor are a critical component of the Grande Ronde River subbasin fishery which is of cultural importance to the Nez Perce Tribe. The river corridor is within ceded lands of the Nez Perce Tribe. Rights to tribal subsistence fisheries for the Nez Perce Tribe is secured by treaties. The domestic importance of these and other northwest anadromous fish populations is demonstrated by existing

fisheries management and/or restoration agreements. These agreements include the Columbia River Fish Management Plan, the Pacific Salmon Treaty, the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program, the Lower Snake River Fish and Wildlife Compensation Program, and a growing list of other programs.

Salmon and steelhead runs in the Minam River have declined precipitously in the last 100 years. Coho, sockeye, and spring/summer chinook salmon are native to the Grande Ronde River subbasin, which was historically an important producer of salmon. The Minam River was a very productive stream within the Grande Ronde subbasin producing all these anadromous species except sockeye salmon. Pre-historic and early historic run sizes are unknown, but it is estimated that 12,200 spring/summer chinook salmon, 5,000 coho salmon, and 12,000 sockeye salmon entered the subbasin, annually, prior to the Snake River dams (Upper Grande Ronde Plan 1992). Sockeye salmon and coho salmon are now extinct in the Grande Ronde drainage. Current spring/summer chinook salmon run sizes in the Grande Ronde River subbasin have been drastically reduced. The estimated run size for the subbasin in 1993 was 1,783 spring/summer chinook salmon. In 1993, Minam River watershed had an estimated run size of 266 fish (ODFW 1993).

Chinook Salmon

On May 22, 1992 the National Marine Fisheries Service (NMFS) listed Snake River spring/summer and fall chinook salmon (*Oncorhynchus tshawytscha*) as threatened species under the Endangered Species Act (P.L. 93-205). Since then the status has been changed to endangered. A procedure for complying with Section 7 consultation requirements of the Act was jointly developed by NMFS and Forest Service personnel from Regions 1, 4, and 6 in June of 1992 and agreed upon in February of 1993. The Forest Service completed the biological assessment for the Minam River in April 1994.

Critical habitat for Snake River spring/summer and fall chinook salmon was designated on January 27, 1994. Approximately 49.9 miles of designated critical habitat occurs in the mainstem Minam River, and portions of the Little Minam River and North Minam River within the wild and scenic river corridor. Existing spring/summer chinook habitat occurs in the

Minam River (44.4 miles), Little Minam River (5.0 miles), and North Minam River (0.5 mile).

Currently, a total of 28.0 miles of **spawning habitat** exists in the Minam River Watershed. Spring/summer chinook salmon spawn in the Minam River from the confluence with Lobo Creek to Trail Creek (RM 16.4 to 44.4), and in the Little Minam from the confluence with the Minam River to about 5 miles upstream (RM 0.0 to 5.0). These spawning areas are based on a Region 6 Stream Survey on the Minam River 1992, and on areas monitored by Oregon Department of Fish and Wildlife (ODFW) each year during redd counts and fish distribution and population surveys. ODFW has conducted spawning ground counts on the Minam River for spring/summer chinook salmon in 1949, 1953-1959, and from 1961 to the present.

A total of 49.9 miles of **rearing habitat** exists in the Minam River Watershed. Rearing habitat for spring/summer chinook salmon occurs in the Minam River from the confluence with the Wallowa River to Trail Creek (RM 0.0 to 44.4), in the Little Minam from the confluence with the Minam River to about 5 miles upstream (RM 0.0 to 5.0), and in the North Minam from the confluence with the Minam River to approximately 0.5 miles upstream (RM 0.0 to 0.5). These areas are based on snorkel counts, population surveys, and habitat surveys conducted by ODFW and the Forest Service.

Historically, spawning and rearing habitat for fall chinook salmon occurred in the Minam River from the confluence with the Wallowa River to upstream of Eagle Creek, RM 0.0 to approximately RM 13.8 (Thompson & Haas 1960).

Historically, spring/summer chinook occupied the same areas as they currently occupy today. Fall chinook may have historically occupied the Minam River 13.8 miles upstream from its confluence with the Wallowa River, but they currently do not occupy this river segment.

The trends of chinook populations within Minam River Watershed can be estimated from redd counts in ODFW index areas. From 1964 to 1973, an average of 128 redds were counted within ODFW index areas in the Minam River. From 1974 to 1976, redd counts dropped to an average of 51 redds. From 1979 to 1993, redd counts fell to an average of 40 redds. These numbers indicate a downward popu-

lation trend to a current low population of chinook within the Minam River Watershed.

The adult spring/summer chinook salmon leave the Pacific Ocean and enter the Columbia River from February through May. They proceed up the Columbia, Snake, and Grande Ronde rivers until reaching the Minam River Watershed in June and July. They generally spawn from mid-August through mid-September. Egg/alevin incubation and emergence from gravels occurs from August through February. After emerging, juvenile fish typically remain in fresh water for one year before migrating to the ocean from March through June. Adults will typically return to the spawning grounds after two to four years in the ocean.

The *Smolt Capability Model* for anadromous spring/summer chinook salmon in the Minam River Watershed considers nine reaches on the Minam River (reaches 1-2 are below the designated corridor and 3-9 are in the designated corridor) one reach on Little Minam River, and one reach on North Minam River. Existing habitat in these stream reaches is capable of naturally producing 95,493 spring/summer chinook salmon smolts. Historical fall chinook smolt potential for the Minam River considers three reaches on the Minam River (RM 0.0 to 13.8).

Existing habitat in these stream reaches is potentially capable of naturally producing 393,092 fall chinook salmon smolts; currently there are no fall chinook salmon in the Minam River. There are no planned habitat restorations in these reaches which are likely to affect potential smolt production capability. Therefore, the maximum potential smolt capability is also 393,092 fall chinook salmon smolts. The grand total for spring/summer chinook salmon and potential fall chinook salmon smolt capability (existing and maximum potential) is 487,724 for the Minam River Watershed.

Coho Salmon

Historically, the Grande Ronde River was the major production area for coho salmon in the Snake River Basin. Past records indicate that Coho salmon spawned in the Minam River, but there are no current records of their presence. Coho salmon have been considered extinct within the Grande Ronde River Basin since 1986.

Sockeye Salmon

Although sockeye salmon occurred within the Wallowa River portion of the Grande Ronde River Basin until 1917, there were no records of their presence in the Minam River. Thompson and Haas (1960) reported that it is doubtful that blueback salmon (sockeye) runs ever existed in the Minam River.

Steelhead

The river corridor provides an important travel route, spawning, and rearing habitat for summer steelhead. The Minam River is being managed by Oregon Department of Fish and Wildlife (ODFW) for wild steelhead (*Oncorhynchus mykiss*) production.

Steelhead are currently listed on the Region 6 Regional Forester's Sensitive Species list. The designated stretch of Minam River, in effect, serves as excellent spawning habitat. It is intended that these wild runs will help sustain the lower Grande Ronde and Snake River fisheries.

Bull Trout

Fair to good bull trout populations have been resident in the Minam River since historical times. Bull trout populations had a wide distribution in Oregon, but many populations are now extinct or near extinction. Bull trout (*Salvelinus confluentus*) are listed by the US Fish and Wildlife Service (USFWS) as Category 2 (candidate threatened and endangered). Bull trout also appear on the State of Oregon sensitive species list and on the Region 6 Regional Forester's sensitive species list.

Resident Game Fish

The Minam River is also currently managed for a wild rainbow trout fishery, but brook trout have been stocked in the upper lakes as early as 1945 and have migrated into the upper stream reaches. It is likely that some hybridization has occurred between bull trout and brook trout such as in the Lostine River, but to what extent is unknown. Golden trout were also stocked many years ago in some of the lakes drained by the North Minam, populations persisted for many years in a few lakes, but has since disappeared.

Habitat

The Minam River Watershed, most of which occurs in the Eagle Cap Wilderness, has habitat which has remained relatively unaltered, but declines in escapement have equaled or exceeded those in many other streams in the subbasin.

The populations of summer steelhead and spring/summer chinook salmon in the Minam River currently have a low number of individuals available to maintain their viability as a naturally reproducing populations. ODFW considers populations approaching or less than 300 breeding adults to be in need of corrective strategies to bring the population into compliance with the *Wild Fish Management Policy* (Chilcote et al 1992).

The Minam is a moderate to high-gradient stream with less pool area than the low gradient rivers found further downstream in the Grande Ronde basin. Habitat variety is good, with adequate amounts of deep pools, riffles, and shallow, slow stretches of the river. This provides spawning, rearing, and holding habitat for anadromous fish, native trout, and introduced brook trout. The major tributaries in the drainage also provide spawning habitat for anadromous fish, and spring/summer chinook are found in the lower reaches of the larger tributaries. The splash damming that occurred early in the century resulted in some alteration to the river channel. Some clearing of obstructions was done in the lower 20 miles of the river channel to facilitate the log drives. The activity altered streambank vegetation, scoured and redistributed natural sediments and gravels of the river bed. Restoration to a more natural state of dynamic equilibrium has been occurring since the splash dam structure was abandoned and removed.

Recent activities which could potentially impact fish habitat have been fairly limited within the wilderness. Riparian vegetation is mostly intact along the river banks, except for areas of minor disturbance due to recreational use and the development of trails, bridges, and river fords. Grazing allotments in the Minam River drainage have been inactive since 1985; however, heavy elk and deer winter use in the lower canyon has had some effect on range conditions. Ice damming and ice flows are significant natural processes that also continually impact riparian vegetation, particularly in the lower reaches of the river.

Water temperatures remain cold well into the summer months. Water quality is considered excellent. Dissolved oxygen levels are typically high, and suspended sediment concentrations are low except during high runoff periods. Water yield and water quality in the Minam River is considered to be higher than most other streams in the Grande Ronde Basin. The low water temperatures make the Minam an important contributor to the survival of high value fish, now and in the future.

In general, fish habitat is in very good condition. There is some minor potential for improvement of habitat conditions through improved trail maintenance, relocation of trails located in sensitive riparian areas, and improved management of recreational use in riparian areas.

The Oregon Rivers Information System database (ORIS) rates the "fish value" of the Minam River as "outstanding" due to the presence of native and anadromous fish. The lower half of the Little Minam River also supports native and anadromous fish, and is also rated "outstanding." Other major tributaries to the Minam were rated "average" for "fish values," including the upper Little Minam, North Minam River, and Elk Creek.

No fisheries or watershed habitat improvements are ongoing or have occurred in the past on National Forest in the Minam River Watershed.

1.15 Wildlife

Populations

Many species of wildlife typical to the region inhabit the area, and wildlife populations are diverse and thought to be generally stable. Large mammals inhabiting the area include Rocky Mountain elk, mule deer, black bear, and cougar. Other furbearers are found here as well, including bobcat, beaver, coyote, fisher, marten, mink, muskrat, otter, raccoon, and red fox, as well as numerous other small mammals, reptiles, amphibians, and insects. A variety of birds can be found along the Minam River, including bald and golden eagles, raptors, pileated and other woodpeckers, great horned owls, blue and spruce grouse, and many species of song birds.

Although comprehensive inventories have not been completed to determine which state or federal listed

or candidate species are actually inhabiting the area, several listed species have been documented in the river corridor. Peregrine falcon (USFWS listed endangered) sightings have been reported in the drainage, and American bald eagles (USFWS listed threatened) winter as far upstream as Red's Horse Ranch. The Wallowa black rosy finch (Regional Forester listed sensitive) are summertime visitors in the upper drainage, and also winter in the lower drainage.

The Minam River area is utilized by a part of a Rocky Mountain elk herd that is estimated to contain some 2,400 animals. The drainage is known as offering a quality primitive hunting experience. The lower Minam serves as a migration corridor during the winter, and the lower slopes provide important winter range for this species, as well as mule deer.

Habitat

Wildlife habitat within the Minam River drainage is varied, ranging from high elevation subalpine meadows and forests to low elevation ponderosa pine forests and grasslands. Riparian communities are well developed, and cottonwood and old-growth grand fir stands are particularly notable. The diversity of vegetation, number of natural edges utilized by many big game and non-game wildlife species, minimal human-caused disturbance, and remoteness of the area contribute to the high quality of wildlife habitat found in the drainage. The expanse of designated wilderness provides habitat for species which require a large area for their survival.

As mentioned above in the Populations discussion above, comprehensive inventories have not yet been conducted to determine which state or federal listed or candidate species inhabit the area. However, suitable habitat for several species exists. Peregrine falcon sightings have been reported in the drainage, and American bald eagles use the lower corridor as winter range. The Wallowa gray crowned rosy finch and black rosy finch are summertime visitors in the upper drainage, and also winter over in the lower drainage. Historically, osprey nested along the river. The area is within the historical range of the wolverine, lynx, fisher, grizzly bear, wolf, and Rocky Mountain bighorn sheep. There is a remote possibility that the wolverine and lynx may still range into the area.

Rocky Mountain bighorn sheep are indigenous to the Eagle Cap Wilderness. The species used Big and Little Sheep Ridges and Backbone Ridge as winter habitat until the 1930's. Remnants of the native population were last observed around 1940 in the vicinity of Blue Lake. Since then, efforts to reintroduce bighorns to the Wallowa Mountains have been met with varied success. Twelve bighorns were planted in the Big Sheep Ridge area. The herd now numbers 40 animals, and although they drifted east to Goat Mountain, a small number of animals are reported to be utilizing the east ridges and upper tributaries of the Minam River.

The Minam River area is considered a premiere reservoir for big-game species. In particular, it is known for providing excellent habitat for cougar. Solitude, along with the food availability make the lower Minam very important habitat for this species. ODFW biologists feel that the lower Minam population was responsible for the resurgence of the cougar population in northeastern Oregon.

the river corridor provides high value summer and winter range for Rocky Mountain elk, and mule deer. The higher elevations of the drainage provide summer range, while slopes of the lower corridor serves as winter range. The river bottom is also occasionally used as a migration corridor and feeding area in severe winter weather.

Some changes in natural wildlife habitat conditions have occurred due to a variety of historic activities, livestock grazing, and current recreational uses. Natural rehabilitation has taken place in most cases. The suppression of wildfires has also altered the natural mosaic of wildlife habitat to some extent. However, wildlife habitat is in overall good condition.

Wildlife habitat projects in the Minam River Watershed include monitoring for various species of birds and wildlife habitat surveys and inventories for Endangered and Threatened species.

1.16 Vegetation (Natural Ecosystems)

Plant communities represented in the Minam River corridor range from subalpine meadows and forests to low elevation ponderosa pine forests and steppe grassland communities. The diversity of communities and plant species is high, as is typical of many of the major drainages of the Wallowa Mountains.

The highest elevations in the river corridor occur near treeline. Here, forests of subalpine fir and whitebark pine are interspersed with meadows and grasslands. Other dominant species of this zone are alpine sagebrush, sandwort, fleecflower, needlegrass, lupine, elk sedge, paintbrush, yarrow, and mosses.

Progressing downstream and leaving the true subalpine zone behind, montane forests of mixed conifer species are predominate. Major tree species include subalpine fir, Engelmann spruce, Douglas-fir, lodgepole pine, grand fir and larch. Grouse huckleberry, big huckleberry, pinegrass, and heartleaf arnica are frequent understory species. Several good examples of grand fir old-growth communities are found here. Pacific yew is an understory component of several of the mid- to high-elevation mixed-conifer forest communities. Overstocking, coupled with consecutive years of drought, have predisposed the grand fir and Douglas-fir dominated forests to insect and disease infestation. Incidence of moderate to heavy spruce budworm and mistletoe damage are common within the dense stands.

Below 5,000 feet, forest and steppe vegetation more typical of the surrounding basalt plateaus dominates the lower Minam River canyon. Ponderosa pine and Douglas-fir forest communities typically cover the north-slopes and the flat river bottom. Steppe-like grasslands of Idaho fescue, sandberg bluegrass, wyeth buckwheat, and bluebunch wheatgrass are primarily found on the south-slopes. Curl leaf mountain mahogany, snowberry, ocean-spray, spiraea and elk sedge are major understory and shrubland community species. These types may be characterized as late seral to climax stage, depending on the site.

"True old growth" stand conditions, in which the pioneer seral species (ponderosa pine, western larch and Douglas-fir) are completely replaced by younger tolerant trees (grand fir and subalpine fir), are being approached rapidly on a large percentage of forests within the watershed. Subalpine fir is replacing Douglas-fir in the understory composition at the higher elevations and grand fir is replacing it at lower elevations.

Riparian areas are generally intact throughout the river corridor, with only minor impacts due to recreational use. Wet meadows species include grasses,

sedges, rushes, and forbs such as buttercup, aster, cinquefoil, arnica, false hellebore, coneflower, waterleaf, camas, and onions. Well-established stands of alder, black cottonwood, and various willow species grow in riparian areas in the lower half of the drainage. Just outside this zone, but still providing shade for the stream are ponderosa pine, Douglas-fir, with ninebark, black hawthorn, and serviceberry understories.

Natural forces have primarily shaped the patterns and diversity of plant communities in this drainage. Avalanches, landslides, and lightning-caused fires have created openings and replaced stands, adding diversity to the landscape. The drainage is relatively unaltered by humans, and still presents an overall natural appearance. There has been some effect on the natural succession and mosaic of plant communities in the drainage due to the successful suppression of wildfires. In the lower elevations, where there is more continuous forest cover, fuel build-up and changes in plant composition and stand structure are noticeable. Forest insects and disease common to the Snake River/Wallowa Mountain province are found in the drainage.

While the Wallowa Mountains are generally recognized for having a significant number of indigenous and rare plants, to date only three species which appear on the Region Six sensitive plant list have been discovered growing in the Minam River corridor. *Lycopodium annotinum* (stiff club-moss) grows in high elevation spruce bogs and seeps. *Ribes oxycanthoides* spp *irriguum* (gooseberry) grows on wooded open hillsides of the lower Minam River drainage. Surveys conducted over the past several field seasons have found that these two species are more widespread in the region than previously thought, and they are both currently being considered for removal from sensitive species lists. *Botrychium pinnatum* (pinnate grape fern) grows in grassy fields with lodgepole.

The river corridor has not been extensively surveyed for the presence of unique plants, therefore it is unknown whether other federal or state listed or candidate threatened, endangered, or sensitive species are found within the river corridor.

Historical activities within the canyon have had some effects on the natural vegetation of the river corridor. Horse logging during the period from 1918 to 1924 on 1,000 acres within the drainage. The

subsequent splash damming and log drives of the Minam River also altered riparian vegetation on the river banks. Today, most of the logged areas have naturally reforested and riparian vegetation has re-established. In fact, most visitors are probably not aware that activities of this type occurred in the Minam River corridor because the area has recovered for the most part.

The lower drainage was heavily grazed by cattle and sheep from the 1880's through the 1940's. Allotments within the Minam River have not been stocked since 1985. Range conditions were showing steady improvement. Heavy elk and deer winter use in the lower canyon has had a noticeable impact on range conditions over the past several years.

The condition of the riparian vegetation along the Minam River is fair to good (based on stream shade, large woody material, vegetation types, and percent ground cover). A Stream Survey completed on the Minam River by the Forest Service in 1984 divided the stream into 10 reaches. Reaches 3-10 are located in the Eagle Cap Wilderness and in general are in good condition. Reaches 1-6 have been influenced by a splash dam and associated logging activities which were located in reach 6 of the Minam River in the early 1900s. Riparian vegetation, stream shade/canopy cover, large woody material, and percent ground cover were directly influenced by this activity. The downstream reaches (1-5) were indirectly influenced by this activity (i.e. lower large woody debris levels, scouring/widening of stream channel, and lower pools in this section). Education and incentive programs should improve riparian conditions along private property. Reaches influenced by past logging activities and the splash dam should be in an upward trend for recovery.

1.17 Fire

Since 1970, 135 wildfires have occurred in the Minam River Watershed as a result of lightning strikes (124 fires) and human activities (11 fires). Most of these were low-intensity fires, generally less than one acre in size. The total number of acres on National Forest System lands in the watershed burned by wildfire since 1970 is 2,081 acres (not including fires that burned less than 100 acres).

Six wildfires over 100 acres are documented as occurring in the watershed since 1970. In general, these were low-intensity fires, with minimal acres of moderate to high intensity burns. One of the fires was a low-intensity grass fire that burned 162 acres in 1986 on Mead Flat. The Greenlake Fire (1987) and Little Minam Fire (1985) were the largest, with 951 and 814 acres burned, respectively. The Lowry Fire (1986) burned 143 acres. Approximately 11 acres of the Squaw Butte Fire (1987) burned in the Minam River Watershed, with the remaining 775 acres falling outside the watershed. Minimal information exists for another fire that occurred in 1917 near Eagle Creek.

Wildfire suppression in the Minam River Watershed has occurred since the early 1900s. Minimal-impact suppression tactics have been increasingly employed over the years as managers became more aware of the need to minimize the impacts of suppression activities on watershed and other resources.

A prescribed natural fire program for the Eagle Cap Wilderness was implemented in 1982 and temporarily suspended in 1988 until a national review team evaluated the use of such programs. The program was reinstated with an updated implementation plan in July 1992. Since its re-implementation, no lightning-caused ignitions that could be managed as prescribed natural fires have occurred in the Eagle Cap Wilderness. The project area (Eagle Cap Wilderness) occurs in several Section 7 Watersheds: Wallowa River, Sheep Creek, Imnaha River, Lostine River, and Minam River.

Wildfire suppression and fuel reduction activities continue to occur throughout the National Forest in the watershed. Initial attack of wildfires either by ground force or by air support are the major fire suppression activities that take place in an emergency fire situation. Fisheries Zone personnel are involved as resource advisors as necessary during fire suppression activities.

1.18 Socio-Economics

The Wild and Scenic River corridor flows through Wallowa and Union Counties are about an hour drive and a 10 mile hike from the county seats. The combined populations of the counties is approximately 31,000 people. Because the area has had

only limited success in attracting diversified employment opportunities, the population has shown very little change for the last five decades.

The two counties are sparsely populated and rural in character encompassing 3,322,000 acres (6.0 people per square mile). Automobile travel times from the nearest metropolitan areas, Boise, Idaho; Lewiston, Idaho; and Spokane, Washington, are 4 to 5 hours. Brief winter road closures occur in most years. Mass transit is limited to bus service. In Union county, La Grande has a population of 11,776 and is the largest city. Enterprise has a population of 1,905 people and is Wallowa County's largest city.

Major employment comes from county, State, and Federal agencies, trade, lumber and wood products manufacturing, agriculture, and recreation service industries. Servicing the needs of the growing population of retirees is an emerging sector of the local economies. Per capita income is below the State average and unemployment rates are typically above the State average. There is a marked ambivalence toward growth in the area. People want gainful employment for themselves and for their families, but are uncertain of the benefits of an increasing population.

Many people in the two-county area rely upon the wood products and agricultural industries for their livelihood. The reliance upon these two sectors of the local economy has its roots in the settlement of the area by Euro-Americans. Thus, reliance upon the wood products and agricultural industries has social as well as economic significance.

Jobs currently supported by the river corridor are not characteristic of the broader county area. It is estimated that the river corridor currently supports almost 10 recreation related jobs.

1.19 Soils

Soil types found in the river corridor include residual, ash, mixed, and glacial/fluviol soils. Because of a complex geologic history, soils are variable with surface textures ranging from very fine to very coarse, with the soil rock fragment by content ranging from less than 5 to greater than 35 percent. Soils below the subalpine zone and located on the basalt flows are generally deeper on north and east slopes (capable of supporting conifer stands) and more shal-

low on south and west facing slopes (capable of supporting mainly grasslands). In localized areas throughout the watershed, bedrock is exposed through the overlying soil cover in randomly sized outcrops, or as steep glaciated valley walls.

Soil erodibility depends on rock type from which soils are derived, soil properties, soil depth, contrasting soil horizons, depth to restrictive features, vegetative cover, slope, and aspect. The hazard of both soil erosion (loss of soil by surface run-off) and mass movement (movement of subsurface soils) are rated when evaluating soil erodibility.

The upper reaches of the watershed have a high potential for soil erosion. Periods of freezing and thawing make rock slides of varying sizes a common occurrence throughout the drainage. Flash floods, debris torrents, avalanches, and debris slides are common. Heavy winter snows create snow avalanches which also contribute to the scouring of slopes.

Soils located on steep, high-elevation mountain slopes are generally granitic and limestone derived, recently formed, very stoney to extremely stoney and bouldery, medium to coarse textured, residual soils. Associated with these residual soils are steep rock outcrops, bouldery talus fields, and colluvium. Potential soil erosion hazard rating for these soils is moderate to high due to the steepness of slopes. Mass movement hazard rating for these soils is moderate to high because of the steepness of slopes, predominant granite and marine sediment mineralogy, and low soil matrix cohesion. Mass movement in the form of sloughing and gully erosion is common for these soil types.

Soils located on lower elevation mountain sideslopes and some mountain toe slopes, and basalt flows are predominately derived from volcanic ash and loess deposits, mixed with basalt derived residual soils. These soils tend to be shallow to moderately deep, well drained, fine to coarse-textured silt loam, over clayey skeletal subsoils. Rock fragment by content ranges from 0 to greater than 35 percent. Occurrence and depth tends to be greater on north and east slopes, gently sloping ridge tops, and minor swales. Soil depth tends to be shallower, and rock content and outcrop occurrence tends to be higher on south and west slopes, and steep slopes. Surface soil erosion hazard is variable, ranging from low to high, and depends on the associated land-

form, predominant soil component, and percent slope.

Soils with a high volcanic ash content are highly productive, but have higher soil erosion hazard ratings than other soil types in the watershed because of their low bulk density and high detachability. Surface soil erosion hazard for ash, or ash mixed soils is rated as slight to moderate for slopes less than 30 percent and moderate to severe for slopes greater than 30 percent.

Mass movement hazard rating for residual, loess, ash, and mixed soils is low for slopes less than 30 percent and moderate for slopes greater than 30 percent.

Glacial and fluvial soils are generally associated with the valley floor, walls, and alluvial fans and terraces of the lower reaches of the Minam River and its tributaries, high mountain cirques, lake basins, and some toe slopes. These are young, moderately deep to deep, well-drained sandy loam, skeletal sandy loam to stoney sandy loam, fine to coarse textured soils with mixed mineralogy, and low soil matrix cohesion properties. Potential soil erosion hazard rating for glacial soils is slight for slopes less than 15 percent, slight to moderate for slopes from 15 to 30 percent, moderate for slopes from 30 to 65 percent, and severe for slopes greater than 65 percent (Kinsel 1993).

1.20 Land Use Controls

There are a wide variety of local, State, and Federal programs that have either an indirect or direct effect upon land uses within the river corridor. The most significant programs, as well as those that have generated discussion during the scoping process, are discussed in this section.

Union and Wallowa County Zoning. Wallowa and Union Counties have a comprehensive land management plan covering all lands in the counties. In addition, a joint Wallowa County/Nez Perce Tribe Salmon Recovery Plan (August 1993) addresses land uses and resource management in the county. The river corridor is zoned by both counties as timber/grazing. The policy of the counties is to maintain these lands for farm and forest use, and to actively discourage residential development and land partitions that result in parcels too small for

economic farm and forest use. New structures on farm and forest land are allowed, as long as they are in conjunction with the existing use.

Oregon Department of Fish and Wildlife. The Oregon Department of Fish and Wildlife (ODFW) is charged with maintaining optimum numbers of indigenous fish and wildlife and to ensure that no species are threatened with extinction (They co-manage fish and coordinate wildlife management with the Nez Perce Tribe). The Department is also responsible for developing and administering fish and wildlife regulations. The ODFW has undertaken an aggressive program to restore riparian habitat on Department lands and has actively sought and encouraged other agencies and private landowners to follow their lead. ODFW routinely monitors the Minam River angling effort and harvest, as well as hunter effort and harvest.

Advisory Committee on Historic Preservation. The Oregon Advisory Committee on Historic Preservation consists of nine members recognized professionally in the fields of history, architectural history, architecture, archaeology and/or other disciplines. One member represents the public at large and one represents Native Americans. The members are appointed by the Governor.

The Committee is charged with reviewing nominations to the National Register of Historic Places within Oregon and recommending approved nominations to the State Historic Preservation Office pursuant to the National Historic Preservation Act of 1966. The committee also reviews Statewide Plans for Historic Preservation.

Oregon Department of Forestry. The Department of Forestry, authorized by ORS 526.008 and established in 1911, is under the direction of the state forester, who is appointed by the Board of Forestry. The statutes direct the forester to act on all matters pertaining to forestry in the protection of forest lands and the conservation of forest resources.

These activities involve all phases of forestry, including responsibility for the protection from fire on private and State forests; the detection and control of harmful forest insect pests and forest tree diseases on state and private lands; the rehabilitation and management of state-owned forest lands; and operation of tree forest nurseries. The department also

administers the Oregon Forest Practices Act, Log Patrol and Log Brand Acts, Small Tract Optional Tax Law, forest land classification, forestry assistance to Oregon's 25,000 non-industrial private woodland owners, and forest resource planning.

Oregon Department of Environmental Quality. Under a memorandum of understanding, the Oregon Department of Environmental Quality and Federal agencies work together to meet implementation requirements of the Clean Water Act (P.L. 92-500), as amended. The Federal Fish and Wildlife Coordination Act of 1958 requires wildlife conservation be given equal consideration and be coordinated with other features of water developments.

Oregon Department of Agriculture. The Oregon State Department of Agriculture cooperates with local soil and water conservation districts to establish mutual goals in coordinating range and watershed management practices and to gather and share natural resources information that has proven beneficial for use on public and private lands. Cooperation with appropriate weed control districts also occurs as needed to deal with infestations of noxious weeds.

Oregon State Land Board. The Division of State Lands is the administrative arm of the State Land Board (composed of the Governor, Secretary of State, and State Treasurer). Under constitutional and statutory guidelines, the Board is responsible for managing the assets of the Common School Fund as well as for administering the Oregon Removal-Fill Law. These assets include the beds and banks of Oregon's navigable waterways and are to be managed for the "greatest benefit for the people of this State, consistent with the conserva-

tion of this resource under sound techniques of land management."

The Division of State Lands also administers the State's removal-fill law, which protects Oregon's waterways from uncontrolled alteration. The law requires a permit for fill or removal of more than 50 cubic yards of material within the State's streams and rivers. The permit-review process involves coordination with the natural-resource and land-use agencies from the local through the Federal levels.

Oregon Water Resources Department. The Department administers State laws and policies relating to the diversion and appropriation of surface and ground water, establishes instream water rights for recreation, protection of fish and wildlife, to reduce pollution, and determines critical groundwater areas.

Endangered Species Act. The U.S. Fish and Wildlife Service and the National Marine Fisheries Service administer the Endangered Species Act of 1973 (as amended). Government agencies and private landowners may find their range of management strategies limited by the Act when it is determined that a threatened or endangered species, or its critical habitat, may be affected by a proposed management action.

Pacific Northwest Electric Power Planning and Conservation Act. The Bonneville Power Administration (BPA) through authorization by the Pacific Northwest Electric Power Planning and Conservation Act (P.L. 96-501), is involved in stabilization and improvement of anadromous fish habitat, including riparian zones. The BPA accomplishes its conservation strategies through grants provided to a broad range of natural resource agencies.