



A Review of Past Recreation Issues and Use in the Hells Canyon Complex and the Hells Canyon National Recreation Area

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ABSTRACT

The Snake River Corridor from the upper end of Brownlee Reservoir through the Hells Canyon National Recreation Area (HCNRA) includes 169.9 miles (mi) of river and the Hells Canyon Complex (HCC), a series of three dams operated by Idaho Power Company (IPC). Recreational use within the corridor appears to have increased dramatically during the last two decades. In addition, patterns of access and recreational use appear to be changing. The land within this corridor is owned or controlled by numerous private and governmental entities. While IPC and other managing entities have had reason to collect information within this river corridor concerning specific portions of the Hells Canyon Recreation Area (HCRA), no comprehensive recreational use or impact data have been collected. IPC proposed a literature review in collaboration with attendees of the Recreation Work Group and other concerned entities, including public meetings held to discuss relicensing of the HCC Hydroelectric Project. IPC then conducted a literature review of available data to best describe past recreational use and issues associated with the HCRA. The goal of this study was to collect, organize, and report available information from the past through the present to describe recreational use and issues associated with the Hells Canyon area. The objectives were to summarize 1) the availability of recreation facilities, 2) recreation management, 3) past recreational use, and 4) past recreation issues in the HCRA.

Methods included identifying contacts and information sources, obtaining data from sources, storing and cataloging data, and writing a summary report. During 1998, IPC staff collected, organized, and stored information. Report outlines were developed and revisions were made as data became available. This final report contains information relating to recreation before and after the HCC dams were constructed; however, information on pre-dam conditions is limited.

1. INTRODUCTION

Hells Canyon is situated in west-central Idaho and northeastern Oregon (approximately river mile [RM] 351 to 188). The Snake River, a major tributary to the Columbia River, is the focal point of Hells Canyon. Its generally northward flow forms part of the boundary between Idaho and Oregon. Idaho Power Company's (IPC) Hells Canyon Complex (HCC) is located on the Snake River in the southern portion of Hells Canyon where it forms three reservoirs: Brownlee, Oxbow, and Hells Canyon. The Snake River is unimpounded in the reach below Hells Canyon Dam, although flows may be controlled by the three-dam complex. Brownlee Dam is the uppermost development of the three dams, originally completed in 1958. Oxbow Dam is the middle development and was originally completed in 1961. Hells Canyon Dam is the lowermost development and originally completed in 1967.

The Snake River Corridor from the upper end of Brownlee Reservoir through the Hells Canyon National Recreation Area (HCNRA) includes 169.9 miles (mi) of impounded and free-flowing Snake River. Recreational use within the corridor is extensive and includes a multitude of opportunities. Fishing, powerboating, and camping are the most common activities in the reservoir areas. Float boating is also a popular activity, occurring mainly in the free-flowing reach below Hells Canyon Dam. Many recreational facilities are available throughout the Hells Canyon area, providing a variety of amenities for public use. Public land surrounds much of the Snake River throughout this area, providing abundant camping and hunting opportunities.

Population centers located within a 100-mi radius of some portion of Hells Canyon include Boise, Cambridge, Council, Fruitland, Grangeville, Lewiston, Nampa, Payette, Riggins, and Weiser on the Idaho side, and Baker City, Enterprise, Halfway, Huntington, La Grande, Ontario, and Richland on the Oregon side.

Recreational use in the Hells Canyon area has reportedly increased dramatically during the last two decades. Additionally, patterns of access and recreational use appear to be changing. The land within this river corridor is owned and controlled by numerous private and governmental entities. While IPC and other managing entities have had reason to collect information concerning specific portions of the Hells Canyon area, comprehensive documentation of past and present recreation-related information has not been available. A literature review was initiated to help IPC better understand the changes occurring in recreational use. Such understanding will be a critical step to creating a management plan for future recreation use within the Hells Canyon Project Area.

IPC investigated governmental, private, and IPC documentation about recreation in the Hells Canyon area. Information relating to recreation before and after the dams were constructed was collected and reviewed to document conditions associated with facilities, issues, management, and use. The goals of this study included 1) strengthening IPC's and the Recreation and Aesthetic Resources Work Group's knowledge of available information to avoid duplication of study efforts and 2) providing background information to entities involved in the relicensing process for the development of protection, mitigation, and enhancement (PM&E) measures.

2. STUDY AREA

The extent of the Hells Canyon Recreation Area (HCRA), the study area for recreation resources, was determined by the Recreation and Aesthetic Resources Work Group, made up of representatives from IPC and various federal, state, and local agencies and interest groups. The HCRA study area covers a 169.9-mi reach of the Snake River. This reach extends from approximately 8 mi downstream of the bridge near Weiser, Idaho, at the project boundary (designated by the Federal Energy Regulatory Commission [FERC]) near the crossing of an overhead powerline (RM 343) downstream to the northern boundary of the Hells Canyon National Recreation Area (HCNRA) (RM 176.1). Additionally, the study area includes the reach of the Powder River that is considered part of Brownlee Reservoir, from RM 0 upstream to RM 9. The majority of IPC's recreation-related study efforts have focused on the immediate Snake River corridor; however, the study area differs among the various recreation studies. Some studies are confined to portions of the HCRA, while others extend to or beyond the canyon rim.

Hells Canyon is one of the most rugged river gorges in the continental United States. Canyon depth ranges from nearly level with the surrounding land (at the upstream end of the study area) to 3,000 feet (ft) (along Oxbow Reservoir). The elevation of the Snake River near Weiser is about 2,090 ft mean sea level (msl), descending to about 910 ft msl at the confluence of the Salmon River, about 59 mi downstream of Hells Canyon Dam. Below Oxbow Dam, the river enters a narrow, steep-sided chasm measuring up to 5,500 ft deep. From the confluence with the Grande Ronde River, located 6 mi upstream of the northern end of the HCNRA, the Snake River flows into a lava-flow basin and through a much shallower canyon to Lewiston, Idaho.

Throughout the canyon reach of the HCRA, topography is generally steep and broken, with slopes often dominated by rock outcrops and talus. At the deepest points of the canyon, the walls rise almost vertically. Canyon walls are deeply dissected by numerous side canyons formed by tributaries of the Snake River. The Seven Devils Mountains to the east and the Wallowa Mountains to the west form the upper reaches of the canyon walls. These mountains form a series of jagged peaks reaching nearly 10,000 ft.

2.1. Distinct River Reaches

The study area contains four distinct reaches: the three IPC reservoirs and the unimpounded Snake River within the HCNRA (Figure 1a–e).

Brownlee Reservoir Reach—The Brownlee Reservoir Reach of the Snake River is 58.4 mi long, extending from the FERC project boundary near the crossing of an overhead powerline (RM 343) to Brownlee Dam (RM 284.6). The lower two-thirds of Brownlee Reservoir is steep-sided, with a maximum depth approaching 300 ft near the dam. Shoreline slopes ranging from 20 to 30% are most common. The Powder River reach of Brownlee Reservoir begins at the confluence with the Snake River (RM 0) and extends upstream approximately 9 mi through a relatively narrow, moderately steep canyon (with slopes of 20 to 30%) to the Powder River Pool,

where the surrounding terrain abruptly changes to a relatively flat agricultural area. This shallow pool area ends in multi-channel wetlands (RM 9.0).

Oxbow Reservoir Reach—The Oxbow Reservoir Reach is 12 mi long and extends from immediately downstream of Brownlee Dam to the Oxbow Dam (RM 272.5). From the tailrace of Brownlee Dam to the mouth of Wildhorse River (1.1 mi downstream of Brownlee Dam on the Idaho side of the Snake River), the Snake River is a high-velocity narrow channel. Oxbow Reservoir is relatively narrow and shallow, with maximum depths approaching 100 ft. Shorelines are primarily basalt outcrops and talus, except for alluvial fans created by small tributaries. The area surrounding Oxbow Reservoir is of moderate to steep topography (20 to 75% slopes).

Hells Canyon Reservoir Reach—The Hells Canyon Reservoir Reach, extending from 24.9 mi below Oxbow Dam to Hells Canyon Dam (RM 247.6), has a maximum depth approaching 200 ft. The unique design of Oxbow Powerhouse and Oxbow Dam leaves a 2.5-mi stretch of the original river channel between Oxbow Dam and the outflow of the powerhouse with a minimum flow of 100 cubic ft per second (cfs). This channel and flow creates a backwater area that is relatively shallow and slow. Reservoir shorelines, especially in the lower half of the reservoir, are generally very steep.

The HCNRA Reach—The HCNRA Reach of the study area begins at Hells Canyon Dam and extends north 71.4 mi to the northern boundary of the HCNRA, just north of the Cache Creek Administrative Site (USFS) (RM 176.1). The Snake River in this reach is a high-gradient river (1.8 meters/kilometer [m/km]) with diverse aquatic habitat, including numerous large rapids, shallow riffles, and deep pools. This unimpounded reach of Hells Canyon is considered the deepest gorge in North America and is surrounded at the upstream end by nearly vertical cliff faces. At the mouth of Granite Creek, approximately 7 mi below Hells Canyon Dam, the river elevation is 1,480 ft and the canyon depth is 7,913 ft. The canyon becomes somewhat wider near Johnson Bar (RM 230), with moderate to steep topography continuing to the northern boundary of the HCNRA.

2.2. Land Features and Geology

Hells Canyon consists of a series of folded and faulted metamorphosed sediments and volcanics overlain unconformably by nearly horizontal flows of Columbia River basalt. This basalt group covered much of eastern Washington, northern Oregon, and adjacent parts of Idaho (Bush and Seward 1992). The older rocks in the series are Permian to Jurassic in age and represent at least two episodes of island arc volcanism and adjacent marine sedimentation, similar to that found today in the Aleutian Islands west of Alaska. These rock units represent old island arc chains that were sequentially “welded” to the west coast of North America during the late Paleozoic and early to mid-Mesozoic eras by subduction of a tectonic plate beneath the North American Continental tectonic plate (Asherin and Claar 1976, USFS 1994).

In more recent geologic time, Hells Canyon was formed by the Snake River eroding the Blue Mountains in Oregon and the Seven Devils Mountains in Idaho (USDE 1985). The Snake River has existed since the Pliocene era and probably cut the gorge to its present level during the

Pleistocene era. During the Pleistocene era, glacial meltwater provided abundant runoff for down-cutting, while regional uplifting created weak points in the 2,000- to 3,000-ft-thick basalt plateau that overlaid the Blue and Seven Devils mountains. Resulting erosion formed the current drainage pattern that established the Snake River (USDE 1985). Northeast-trending, high-angle fault patterns characterize the Snake River fault system that runs throughout the study area (Fitzgerald 1982). Rock types other than basalt are also present within the study area. Extensive limestone outcrops, as well as local granite outcrops, are found in some tributary drainage areas.

2.3. Soils

The soils throughout Hells Canyon are derived primarily from Columbia River basalt, and, in most areas, are covered with a thin mantle of residual soils from weathered native rock. Isolated areas contain deposits of windblown silt. Unconsolidated materials include river sands and gravel deposited during the Bonneville floods 15,000 years ago, ash-loess from the Mount Mazama eruption 6,900 years ago, and colluvium and talus deposited more recently. Soil cover declines northward through Hells Canyon. Near Hells Canyon Dam (RM 247.6), most rock faces are nearly vertical with little soil cover (USFS 1994).

Most soil complexes are well drained and vary from very shallow to moderately deep. Loams are the dominant textural class and vary from very stony to silty, often with a clay subsoil component (NRCS 1995).

2.4. Climate

From late fall to early spring, the climate of west-central Idaho and eastern Oregon is typically influenced by cool, moist Pacific maritime air. Periodically this westerly flow is interrupted by outbreaks of cold, dry continental air from the north, which is normally blocked by mountain ranges to the east. During the summer, a Pacific high-pressure system dominates weather patterns, resulting in minimal precipitation and more continental climatic conditions overall (Ross and Savage 1967). The climate of Hells Canyon, located in the high desert region, is significantly influenced by the rain shadow of the Cascade Mountains to the west.

Average annual precipitation is lowest at the southern end of the study area, near Weiser (286 millimeters [mm] [11.3 inches]), increases northward toward Richland, Oregon (298 mm [11.7 inches]), peaks around Brownlee Dam (445 mm [17.5 inches]), and declines toward Lewiston (326 mm [12.8 inches]). The average annual precipitation ranges from about 380 to 500 mm (15 to 20 inches), depending on elevation. Nearly 45% of the average annual precipitation at Brownlee Dam falls from November through January; this pattern strongly contrasts with the 9% average recorded for July through September. Thus, most precipitation occurs in spring and winter (Tisdale et al. 1969, Tisdale 1986, Johnson and Simon 1987), and little or no precipitation falls during the hottest months of summer. Average annual evapotranspiration is estimated at 1,300 mm (51.2 inches).

Mean annual temperatures are similar among the four weather stations. Generally, the climate tends to become drier and warmer downstream of Brownlee Dam. Climatological information from Brownlee Dam is probably characteristic of the central section of the study area. The canyon bottom area is dry, with seasonal temperatures ranging from lows of about -5°C in January to highs of about 35°C in July. Temperatures from mid-November through mid-April are normally below freezing. As a rule, winters in the canyons are mild, while summers on the canyon floor are hot. Mean temperatures above elevation 2,000 m (6,562 ft msl) range from -9°C in January to 13°C in July. By contrast, mean temperatures below 1,000 m (3,281 ft msl) range from 0°C in January to between 28 and 33°C in July (Johnson and Simon 1987).

2.5. Vegetation

Three primary ecological factors—topography, soils, and climate—determine the types of vegetation growing along the canyon slopes of the middle Snake River. Climate exerts the strongest influence on the development of plant life. The relatively mild winters below the canyon rim have allowed the development of disjunct species. For example, hackberry (*Celtis reticulata*), most often found in the southwestern states, also commonly grows in the middle and lower Snake River areas (Tisdale 1979, DeBolt 1992).

Within the context of regional climate, topography strongly influences the development and distribution of vegetation (Tisdale et al. 1969; Tisdale 1979, 1986). The topographical complexity of Hells Canyon has produced a mosaic of vegetation types (Tisdale 1979, BPA 1984, BLM 1987). Grassland, shrubland, riparian, and coniferous forest communities exist in close proximity. Interfingering of grassland and forest, for example, occurs at a number of sites throughout the canyon because of variations in aspect (Tisdale 1979).

Wetland and Riparian Communities—Emergent wetland communities are composed mostly of common cattail (*Typha latifolia*), narrowleaf cattail (*Typha angustifolia*), American bulrush (*Scirpus americanus*), and common spikerush (*Eleocharis palustris*). Willows are sparse, and various forbs grow on the shoreline side of the stands (Asherin and Claar 1976). A narrow band of diverse riparian communities follows the course of the Snake River and its many tributaries. Predominant tree species in riparian areas include white alder (*Alnus rhombifolia*), water birch (*Betula occidentalis*), and black cottonwood (*Populus trichocarpa*). Predominant shrub species in riparian areas include syringa (*Philadelphus lewisii*), netleaf hackberry, chokecherry (*Prunus virginiana*), black hawthorn (*Crataegus douglasii*), and poison ivy (*Toxicodendron radicans*).

Although coniferous forest communities are generally restricted to the higher elevations of steep canyon slopes, they do extend down to the river at certain locations. For example, a ponderosa pine (*Pinus ponderosa*)/bluebunch wheatgrass (*Pseudoroegneria spicata*) type extends to the river on north-facing slopes at sites around the main bodies of Oxbow and Hells Canyon reservoirs (Asherin and Claar 1976, BPA 1984). A ponderosa pine/hackberry type may also extend down to the river in this area.

Herbaceous-Dominated Vegetation Types—The dry climate and typically stony, shallow soils of the canyon have favored the development of grassland steppe communities at the lower and middle elevations (Tisdale 1979, 1986). Commonly occurring grass species in the study area

include bunchgrasses, such as bluebunch wheatgrass, Sandberg bluegrass (*Poa secunda*), and Idaho fescue (*Festuca idahoensis*) (Garrison et al. 1977, BPA 1984, Tisdale 1986, Franklin and Dyrness 1988). Sand dropseed (*Sporobolus cryptandrus*) and red threeawn (*Aristida longiseta*) are also common and, at times, dominant (BPA 1984, Tisdale 1986).

Shrub-Dominated Vegetation Types—Shrub species comprise a large segment of the canyon's overall vegetation composition. Shrub-steppe vegetation types occur at mid-elevations in the study area, especially in the southern region of the study area. For example, big sagebrush (*Artemisia tridentata*) is a dominant species in the southern region, particularly around Brownlee Reservoir (BPA 1984). Commonly occurring shrubs include big sagebrush (*Artemisia tridentata*), antelope bitterbrush (*Purshia tridentata*), hackberry, serviceberry (*Amelanchier alnifolia*), and bitter cherry (*Prunus emarginata*) (BPA 1984, Tisdale 1986). Other species of sagebrush are also present, including low sagebrush (*Artemisia arbuscula*), stiff sagebrush (*Artemisia rigida*), and silver sagebrush (*Artemisia cana*) (Tisdale and Hironaka 1981, Franklin and Dyrness 1988). For the most part, sagebrush stands are limited to the area around Brownlee Reservoir. In these stands, the herbaceous layer is dominated by Sandberg bluegrass, with a variety of forbs also occurring.

Stands of hackberry may be found throughout the study area, either on lower slopes with rocky residual/colluvial soil or on alluvial terraces with sandy soil (Tisdale 1986). In these stands, hackberry is often mixed with a number of other shrub and tree species, including antelope bitterbrush, blue elderberry (*Sambucus cerulea*), and ponderosa pine (BPA 1984). The herbaceous layer is most often dominated by bluebunch wheatgrass, with cheatgrass (*Bromus tectorum*) and sand dropseed dominant in those areas that have been heavily disturbed by the grazing and trampling of cattle.

Tree-Dominated Vegetation Types—The predominant forest community in the study area is a ponderosa pine/bluebunch wheatgrass plant association. This association typically occurs as a savanna of ponderosa pine trees distributed over a grassland steppe that is dominated by bluebunch wheatgrass. Shrubs are almost completely absent, except for sparsely distributed, drought-resistant species such as antelope bitterbrush and serviceberry (Garrison et al. 1977, Johnson and Simon 1987). Hackberry dominates the shrub layer in moderate density. Poison ivy is also abundant (Asherin and Claar 1976).

Cover Types—Twenty-six cover types—for vegetation, natural features, and land use—were identified along the Snake River in the study area used for many resource studies, an area which included the HCRA (Holmstead 2001). The most abundant upland vegetation cover type was *Grassland* (35.5% of the total area), followed by *Shrub Savanna* (21.0%) and *Shrubland* (6.6%). Tree-dominated upland vegetation cover types were infrequent in the study area. The most abundant riparian vegetation cover type was *Shore & Bottomland Wetland* (1.8%), followed closely by *Scrub-Shrub Wetland* (1.7%). The most abundant natural-feature cover types were *Lotic* (moving water, 16.1%) and *Cliff/Talus Slope* (5.6%), while *Agriculture* was the most abundant land-use cover type (5.0%).

2.6. Population Centers

The only major population center within 100 mi of any portion of the study area is Boise, Idaho, about 60 mi from the upstream end of Brownlee Reservoir. The majority of the other cities and towns in the vicinity of the study area have populations of less than 10,000. People living within this vicinity contribute the majority of the recreational use occurring within the study area (Shelby and Whittaker 2001, Whittaker and Shelby 2002). Population centers within a 100-mi radius of some portion of Hells Canyon include, but are not limited to, Boise (population 185,787), Meridian (34,919), Nampa (51,867), Caldwell (25,967), Fruitland (3,805), Payette (7,054), Weiser (5,343), Midvale (176), Cambridge (360), Council (816), Riggins (443), Grangeville (3,228), Lewiston (30,904), and New Meadows (533), on the Idaho side. Population centers in Oregon include Baker City (9,860), Enterprise (1,895), Halfway (337), Huntington (515), La Grande (12,327), Ontario (10,985), and Richland (147). Washington population centers near the study area include Clarkston (7,337) and Asotin (1,095) (U.S. Census Bureau 2001).

2.7. Political Boundaries and Land Management

The HCC occurs within and across the political boundaries of Idaho, Adams, and Washington counties in Idaho, and Wallowa, Baker City, and Malheur counties in Oregon.

Federal agencies, such as the Bureau of Land Management (BLM) and U.S. Forest Service (USFS), are responsible for managing the majority of public land in Hells Canyon. These areas fall within the jurisdictional boundaries of the Wallowa-Whitman National Forest in Oregon, the Payette and Nez Perce National Forests in Idaho, the Four Rivers Field Office (FO) of the Lower Snake River District of the BLM in Idaho, the Cottonwood FO of the Upper Columbia-Salmon Clearwater District of the BLM in Idaho, and the Baker and Malheur FOs of the Vale District of the BLM in Oregon. The Idaho Department of Fish and Game (IDFG) and Oregon Department of Fish and Wildlife (ODFW) are directly responsible for wildlife population and habitat management. These agencies also administer several areas within Hells Canyon that have been set aside specifically for wildlife habitat, including the Cecil D. Andrus Wildlife Management Area in Idaho. Other state and federal government agencies with natural resource jurisdiction in the greater project area include the Idaho Department of Lands, National Marine Fisheries Service, Bureau of Indian Affairs, and U.S. Fish and Wildlife Service.

Several special management areas also exist in the Hells Canyon area and are directly administered by the USFS. These include the Wild and Scenic Imnaha River in Oregon, the Wild and Scenic Snake River in Idaho and Oregon, the Seven Devils Scenic Area in Idaho, the Eagle Cap Wilderness in Oregon, the Hells Canyon Wilderness in Idaho and Oregon, and the HCNRA in Idaho and Oregon.

2.8. Road Access

Road access to the Snake River varies considerably within the study area. At one extreme, roads running parallel and immediately adjacent to the reservoirs provide relatively easy access in some areas. At the other extreme are extensive reaches with no road access, the longest stretch

being 76 mi. The following description does not include several access roads that may appear on some maps but are either private ranch roads or, as in the case of some USFS roads, in such poor condition that motorized travel is not advisable.

2.8.1. Road Access to the Oregon Side of the Study Area

2.8.1.1. Road Access to Upper Brownlee Reservoir

The uppermost 3 mi of Brownlee Reservoir on the Oregon side of the study area (RM 343–340) are accessible only through private property. Olds Ferry–Ontario Highway (State Highway 201) from Weiser runs parallel to the Snake River for 2 mi before joining Interstate 84 (I-84) at RM 338. I-84 (which crosses southern Idaho, then proceeds northwest to the Columbia River and Portland, Oregon) runs parallel to the upper end of Brownlee Reservoir for 3 mi (RM 338–335) before turning west, away from the river, at Farewell Bend, Oregon. From Farewell Bend, Huntington Highway goes to Huntington, Oregon. From Huntington, the Snake River Road leads to Brownlee Reservoir at the confluence of the Burnt River. On the Oregon side of Brownlee Reservoir, a 4-mi reach beginning at Farewell Bend and ending at the confluence with the Burnt River (RM 334–328) is not readily accessible by road. The Snake River Road—for most of its length a well-maintained gravel road—runs parallel to the Oregon side of Brownlee Reservoir from the mouth of the Burnt River to a point 24 mi downstream. The Snake River Road then leaves the river (RM 304) and cuts across the ridge to Richland, at the upper end of the Powder River arm of Brownlee Reservoir.

2.8.1.2. Road Access to the Powder River Arm and the Lower End of Brownlee Reservoir

The majority of the Powder River arm of Brownlee Reservoir is inaccessible by road. There is no road access to the Snake River for the 19.4-mi reach between the Snake River Road and Brownlee Dam. The Snake River Road, described above, runs parallel to the southern side of the upper pool area of Brownlee Dam for a short distance, but access in this area is through private land. Sullivan Lane (out of nearby Richland) ends at Hewitt and Holcomb parks at the northeastern end of the pool area (RM 7.5). Sag Road, which starts at Oregon Highway 86 (Oregon 86) near Halfway, Oregon, ends at the north shore of the Powder River arm (RM 3.6). Sag Road crosses private land and requires a gate key for access.

2.8.1.3. Road Access to Oxbow and Hells Canyon Reservoirs

Oregon 86 continues through Halfway and ends at Copperfield, Oregon (RM 269.5), immediately below Oxbow Dam. From Copperfield, three roads provide access to the reservoirs. The Oxbow–Brownlee Road begins at Copperfield and runs south for about 12 mi, the last miles parallel to Oxbow Reservoir, before crossing the river immediately below Brownlee Dam. Across the bridge at Copperfield, the Brownlee–Oxbow Road ends at Oregon 86. Oregon 86 connects to the Hells Canyon Road, which leads to Hells Canyon Dam. The third route takes Homestead Road, which is gravel. It begins at Copperfield, runs parallel to Hells Canyon Reservoir for 9 mi north, and ends at Copper Creek (RM 260.7), a BLM recreation site.

2.8.1.4. Road Access to the HCNRA

Downstream of Copper Creek, there is no road access to Hells Canyon Reservoir or the Snake River until Dug Bar (RM 197), 64 mi to the north. Dug Bar Road, a relatively rough gravel and dirt road, runs north from Imnaha, Oregon, and ends at the USFS Dug Bar access site on the Snake River. Farther north, no additional roads access the reservoir between Dug Bar and Heller Bar (RM 168.4) in Washington, a distance of 28.6 mi. Aside from hiking, access to the Snake River at this end of the HCNRA is by boat. Just north of the mouth of the Grande Ronde River (RM 168.7), the BLM operates Heller Bar Landing, a boat ramp and parking facility on Snake River Road, about 8 mi north of the northern boundary of the HCNRA and 20 mi south of Asotin. Additionally, in the 25-mi stretch downstream of Heller Bar to Clarkston, Washington, several smaller private and public boat ramps provide river access.

2.8.2. Road Access to the Idaho Side of the Study Area

2.8.2.1. Road Access to Upper Brownlee Reservoir

The upper end of Brownlee Reservoir on the Idaho side can be reached using Olds Ferry Road, which runs from Weiser northward for 31 mi to Rock Creek (RM 320). Changing from pavement to gravel, the road runs north 22 mi, parallel to Brownlee Reservoir. The northern 10 mi become progressively more difficult to traverse because of erosion, slides, and private access. Between Rock Creek and Trail Creek (RM 315), a distance of about 5 mi, no roads access Brownlee Reservoir. Rock Creek Road, a gravel and dirt road, runs from Weiser through more than 20 mi of ranch land before reaching Brownlee Reservoir at Trail Creek. From there, it runs parallel to Brownlee Reservoir for 4.5 mi before ending at Mountain Man Lodge (RM 310.5).

2.8.2.2. Road Access to Lower Brownlee Reservoir

No maintained public roads provide access to Brownlee Reservoir between Mountain Man Lodge and Brownlee Creek (RM 288), a distance of about 23 mi. Between Brownlee Creek and just downstream of Brownlee Dam, a distance of about 4 mi, Idaho Highway 71 (Idaho 71) from Cambridge runs parallel to the Brownlee Reservoir and tailrace, before crossing the river into Oregon. The IDFG also maintains a road between Brownlee and Cottonwood creeks through the Cecil D. Andrus Wildlife Management Area. This road is used primarily by hunters in the fall and early winter.

2.8.2.3. Road Access to Oxbow and Hells Canyon Reservoirs

From the Idaho 71 bridge (just below Brownlee Dam) to Oxbow Dam, a distance of about 11 mi, there is no road access to Oxbow Reservoir on the Idaho side. Beginning just below Oxbow Dam, Hells Canyon Road—which joins Oregon 86 by bridge at RM 270—runs parallel to Hells Canyon Reservoir for about 23 mi northward before crossing Hells Canyon Dam. It ends about 1 mi below Hells Canyon Dam on the Oregon side at the USFS Hells Canyon Visitors Center (at the Hells Canyon Creek Recreation Site). The Kleinschmidt Grade (RM 263.5), a steep, rocky road that joins USFS roads to New Meadows, Idaho, ends at Hells Canyon Road, about 6 mi north of Oxbow Dam.

2.8.2.4. Road Access to the HCNRA

Between Hells Canyon Dam and the Pittsburg Landing Administrative Site (RM 215), a distance of about 33 mi, no maintained roads access the Snake River. At Pittsburg Landing, a well-maintained, 17-mi-long gravel road runs east-west across the ridge from U.S. Highway 95 (U.S. 95) and ends at the Snake River. North of Pittsburg Landing, no maintained roads access the Snake River until Lewiston, a distance of about 76 mi. Access in this 76-mi area is limited to unimproved and private roads. In and around Lewiston, numerous public and private boat ramps provide access to the Snake River.

2.9. Area Trails

Over 50 mi of hiking trails are accessible along Hells Canyon Reservoir. These trails are located along both the Idaho and Oregon sides of the river. Maintenance of these trails varies.

2.9.1. Oregon Trails

Hells Canyon Trail (#1890)—Hells Canyon Trail begins on the Oregon side of Hells Canyon Reservoir at Copper Creek Trailhead, located at the northern end of the Homestead Road. Approximately 2 mi downstream, the Hells Canyon Trail connects with trail #1884 at Spring Creek. The trail is currently maintained by the USFS and is in a designated Wilderness area.

Bench Trail (#1884)—Bench Trail connects Spring Creek to Squaw Creek.

McGraw Trail (#1879)—McGraw Trail is a loop trail that goes to McGraw Creek Ridge, then continues north to connect with Bench Trail.

Thirty-two Point Trail (#1789)—Thirty-two Point Trail connects Squaw Creek to USFS Road 3965.

Stud Creek Trail (#1781)—Stud Creek Trail is located below Hells Canyon Dam at the Hells Canyon Visitors Center. It is maintained by the USFS for 1 mi downstream to Stud Creek.

2.9.2. Idaho Trails

Eckels Creek Trail (#223)—Eckels Creek Trail connects with the Midslope Contour Trail and continues up Eckels Creek to Lynes Saddle Trailhead on USFS Road 111, near Cuprum, Idaho.

Allison Creek Trail (#514)—Allison Creek Trail connects with the Midslope Contour Trail, 2 mi from the trailhead.

Kinney Creek Trail (#221)—This trail connects with the Midslope Contour Trail 2, mi from the trailhead.

Midslope Contour Trail (#222)—Midslope Contour Trail connects with Kinney, Allison, and Eckels creeks.

Deep Creek Trail (#219)—Deep Creek Trail extends from Eagle Bar to Deep Creek.

Haley Ridge Trail (#220)—Haley Ridge Trail connects with Deep Creek Trail and continues to Sheep Rock Overlook.

Copper Creek Trail (#320)—Copper Creek connects Sheep Rock to Deep Creek via the Copper Creek drainage.

Deep Creek Stairway Trail (#218)—Deep Creek Trail is a steep stairway from Hells Canyon Dam that provides fishing access to the mouth of Deep Creek.

Snake River National Recreation Trail—This 25-mi trail runs parallel to the Snake River in Idaho. It begins at Granite Creek (RM 239.5), about 8 mi north (downstream) of Hells Canyon Dam, and ends at the Pittsburg Administrative Site.

3. PROJECT HISTORY AND OPERATIONS

3.1. Project History

In 1908, the Idaho–Oregon Light and Power Company constructed the first hydroelectric plant in the project reach. That company, which was IPC’s predecessor, built the plant at the oxbow of the Snake River. The project comprised a wing dam on the oxbow’s east side that employed 22 feet of fall around the oxbow and diverted water through a tunnel to a power plant on the west side of the oxbow.

The wing dam, which was intermittently damaged by high flows, was expanded between 1915 and 1922. Then in 1947, IPC submitted a preliminary license application in which the company proposed to expand the Oxbow Project. On December 15, 1950, the company submitted the final application for licensing the project.

In Exhibit Q of the 1950 license application, IPC indicated its intention to develop this reach of the Snake River by following the Oxbow Project with a series of four other dams on the river: the Hells Canyon, Brownlee, Sturgill, and Bayhorse Rapids projects. After extensive hearings and interventions, the Federal Power Commission issued a license on August 4, 1955, that approved construction of the current three-dam complex.

In November 1955, access and site preparation work began for Brownlee Dam. In January 1956, a diversion tunnel, through which the river would be redirected while work on Brownlee Dam continued, was started. On May 9, 1958, Brownlee Dam was completed and the reservoir began filling. The first generating unit at the Brownlee Project began operating on August 27, 1958. The last generator installed at the HCC, Brownlee Unit 5, went into service on March 31, 1980.

Project benchmarks include the following dates:

August 4, 1955	License was granted for the Hells Canyon Complex.
November 1955	Construction on Brownlee Dam began.
December 11, 1957	Excavation for Oxbow Dam began.
May 9, 1958	Brownlee Dam was completed, and the reservoir began filling.
March 12, 1961	Oxbow Dam was completed, and the reservoir began filling.
July 27, 1961	Construction of the road to Hells Canyon Dam began.
August 27, 1964	Excavation for Hells Canyon Dam began.
October 10, 1967	Hells Canyon Dam was completed, and the reservoir began filling.

3.2. Operational Overview

Hells Canyon, on the Oregon–Idaho border, is the deepest canyon in North America and home to IPC’s largest hydroelectric generating complex, the HCC. The HCC includes the Brownlee, Oxbow, and Hells Canyon dams, reservoirs, and power plants. Operations of the three projects of the complex are closely coordinated to generate electricity and to serve many other public purposes.

Currently, over 400,000 customers rely on IPC’s hydro and thermal generation system for power. The HCC is an integral part of IPC’s generation system. Its winter and summer operations are particularly important because energy needs are highest during those seasons. In wintertime, customers need extra electricity for lighting and heating. During the summer, they need extra electricity for air conditioning and irrigation pumping.

IPC operates the complex to comply with the FERC license, as well as to accommodate other concerns, such as recreational use, environmental conditions and voluntary arrangements. Among these arrangements are the 1980 *Hells Canyon Settlement Agreement*, the fall chinook recovery plan adopted in 1991, and between 1995 and 2001, the cooperative arrangement that IPC had with federal interests in implementing portions of the Federal Columbia River Power System (FCRPS) biological opinion flow augmentation, which is intended to avoid jeopardy of the FCRPS operations below the HCC.

Brownlee Reservoir is the only one of the three HCC facilities—and IPC’s only project—with significant storage. It has 101 vertical feet of active storage capacity, which equals approximately 1 million acre-feet of water. On the other hand, Oxbow and Hells Canyon reservoirs have significantly smaller active storage capacities—approximately 0.5 and 1.0% of Brownlee Reservoir’s volume, respectively.

Brownlee Dam's hydraulic capacity is also the largest of the three projects. Its powerhouse capacity is approximately 35,000 cfs, while the Oxbow and Hells Canyon powerhouses have hydraulic capacities of 28,000 and 30,500 cfs, respectively.

Target elevations for Brownlee Reservoir define the flow of water through the HCC. However, when flows exceed powerhouse capacity for any of the projects, water is released over the spillways at those projects. When flows through the HCC are below hydraulic capacity, all three projects operate closely together to re-regulate flows through the Oxbow and Hells Canyon projects so that they remain within the 1-foot per hour ramp rate requirement (measured at Johnson Bar below Hells Canyon Dam) and meet daily peak load demands.

In addition to maintaining the ramp rate, IPC maintains minimum flow rates in the Snake River downstream of Hells Canyon Dam. These minimum flow rates are for navigation purposes and IPC's compliance with article 43 of the existing license. Neither the Brownlee Project nor the Oxbow Project has a minimum flow requirement below its powerhouse. However, because of the Oxbow Project's unique configuration, a flow of 100 cfs is maintained through the bypassed reach of the Snake River below the dam (a segment called the Oxbow Bypass).

3.3. Seasonal Operations of Brownlee Reservoir

Brownlee Reservoir is a multiple-use, year-round resource for the Northwest. Although its primary purpose is providing a stable power source, Brownlee Reservoir is also used for flood control, fish and wildlife mitigation, and recreation.

Brownlee Dam is one of several Northwest dams that cooperates to provide springtime flood control on the lower Columbia River and, between 1995 and 2001, to regulate flow in the lower Snake River. For flood control, IPC operates the reservoir cooperatively with the U.S. Army Corps of Engineers (COE) North Pacific Division, according to article 42 of the existing license.

After flood-control requirements have been met in early summer, the reservoir is refilled to meet peak summer electricity demands and provide suitable habitat for spawning bass and crappie. The full reservoir also offers optimal recreational opportunities through the Fourth of July holiday.

As part of the flow augmentation reasonable and prudent alternative (RPA) implemented by the 1995 and 2000 FCRPS biological opinions, the Bureau of Reclamation (BOR) periodically releases water from BOR storage reservoirs in the upper Snake River to assist with the migration of anadromous fish past the lower Snake River FCRPS projects. From 1995 through the summer of 2001, IPC cooperated with the BOR and other federal interests in these flow augmentation efforts by shaping (or prereleasing) water from Brownlee Reservoir (and later refilling the drafted reservoir space with water released by the BOR from the upper Snake River reservoirs) and by occasionally contributing water to flow augmentation efforts. To facilitate IPC's cooperation with the flow augmentation RPA, in 1996 the Bonneville Power Administration (BPA) entered into an energy exchange agreement with IPC. The agreement reimbursed IPC for any energy losses it incurred as a result of the company's participation through an energy exchange mechanism. The agreement expired in April 2001 and has not been renewed by BPA.

Later in the fall, Brownlee Reservoir's releases are managed to maintain constant flows below Hells Canyon Dam. These flow requirements, which are based on the fall chinook recovery plan that IPC adopted in 1991, as well as the minimum flow required by article 43, help ensure sufficient water levels to protect even the shallowest spawning nests, or redds.

After fall chinook spawn, IPC attempts to have a full reservoir by the first week of December to meet winter peak demands.

4. METHODS

IPC investigated governmental, private, and IPC documentation relating to recreation in the Hells Canyon area. IPC staff collected and reviewed information about recreation before and after dam construction to document conditions associated with facilities, issues, management, and use.

4.1. Collection of Sources

4.1.1. IPC

In February 1998, IPC staff made a thorough search of company information sources located in the document repository, the company library, and the legal and environmental affairs department libraries. Information relating to the scope of this study was summarized, copied, and stored. All collected documents and information sources were assigned numbers, entered into a bibliographic database using ProCite 5® software, and stored in a reference library.

4.1.2. Other Entities

Individuals associated with agencies and interested private parties were the largest sources of information used in this report. Possible information sources were identified during the planning phase of this study, and individuals were contacted by phone during spring 1998.

Communication with our contacts continued until fall 1998. Most data, such as reports and other documents, were acquired by mail. On one occasion, IPC staff members traveled to Clarkston, Washington, and Enterprise and Baker City, Oregon, to look through information stored at various USFS offices.

4.1.3. Other Sources

Some information contained in this technical report was found at libraries and bookstores in Boise. Library and bookstore searches were done in person and via the Internet. IPC purchased relevant documents.

4.2. Storage of Recreational-Use Information

All documents and information sources collected during this study were organized into a reference library using the database software ProCite 5®, which allows quick access to bibliographies, source lists, and subject indexes. The database can be easily searched using keywords, authors, or titles. The library is located in IPC's recreation section.

4.3. Use of Information for Report Preparation

Preparation of the draft results section of this report began in February 1998. The first report draft was completed in April 1998.

5. RESULTS

5.1. Pre-impoundment Conditions

The pre-impoundment era, for the purpose of this report, is defined as the period from 1900 to 1958. Available resources contain information about recreational facilities such as towns, roads, ferries, and recreation areas and developments that existed prior to the construction of the Brownlee, Oxbow, and Hells Canyon dams. Reports from land management agencies describe the types of management and provide recreational use numbers and descriptions of use, such as fishing and hunting, occurring in the area during the pre-impoundment period. Recreational issues that were identified and addressed during this era include commercial and private fishing, navigation, streamflow, land management, and archaeological/cultural preservation.

5.1.1. Recreational Use

Historically, the Shoshone people occupied the lands along the upper and middle reaches of the Snake River. Other Native American tribes and early trappers referred to the Shoshones as the Snakes, possibly because the Shoshones painted snakeheads on sticks to terrify their enemies or used a zigzag movement of the hand to identify their tribe. The river acquired this tribal name. Until the 1930s, the Snake River in Hells Canyon was considered a "working river." Explorers passed through in the early 1800s, followed by miners and stockmen (Carrey et al. 1979). In the first decade of the 1900s, people attempted to settle the area, but this task proved to be difficult, and few communities were successful. The small settlement of Homestead (Figure 2) was the only one that remained after this first wave of immigration. Early written sources reveal that residents of Hells Canyon boated and fished as part of their daily routines for survival. Some may argue that such boating and fishing cannot be considered recreation. However, no studies were conducted at that time to determine how many people used the area strictly for recreational purposes. Remaining written documentation helps us understand boating and fishing activities occurring before the dams were built.

5.1.1.1. History of Recreational Boating

The primary recreational activity during the pre-impoundment era was boating. Historians of the Hells Canyon area have documented pre-impoundment boating. The following is a brief summary (mainly based on Carrey et al. 1979) of recorded boating activities in the HCC and HCNRA before construction of the dams.

In 1865, Captain Thomas Stump piloted a 110-foot steamer named the *Colonel Wright* on a trip up the Snake River from Lewiston about 100 mi to Rush Creek, where he was forced to turn around. It took eight days to ascend those 100 mi of river and only five hours to travel back. Captain Stump demonstrated that navigating the Snake River to serve any industry purposes was not practical and probably not possible.

In 1869, the Oregon Steam Navigation Company sent a crew to bring the steamboat *Shoshone* down through Hells Canyon from where it was tied near Farewell Bend. An experienced river pilot by the name of Captain Smith took the *Shoshone* down the Snake River about 90 mi to Steamboat Creek just above Copper Ledge Falls (an 18-foot drop, all in rapids). He decided it would be impossible to run the boat through these rapids without suffering severe damages, and the *Shoshone* stayed tied there for over a year until March 1870, when Captain Sebastian Miller and Engineer Dan Buchanan were sent to bring it down through Hells Canyon or wreck it in the attempt. On April 19, 1870, they began the journey down the Snake River. After experiencing many crashes and making repairs, on April 27 they tied the *Shoshone* at the docks in Lewiston in badly demolished condition.

E. G. MacFarlane in 1912 started regular mail, freight, and passenger service out of Lewiston in a 70-foot twin-engine boat called the *Prospector*. On several unscheduled trips, MacFarlane tried to run the river upstream of his mail route but could never make it through Granite Creek Rapids. In fall 1914, low water allowed MacFarlane and the COE to improve the river channel by using explosives. The COE had appropriated \$25,000 for this prospect at the persistence of the Lewiston Commercial Club.

In 1925, Amos Burg and John Mullins launched a two-man, canvas-covered wooden canoe named *Song o' the Winds* at Homestead and ran the Hells Canyon Rapids. This trip is said to be the first canoe trip through the canyon. Burg later repeated the Hells Canyon run three more times in canoe and rubber rafts.

In 1938, Kyle McGrady, a garage mechanic from Lewiston, mortgaged his home and purchased a boat called *The Idaho*, built by Press Brewrink and Ed MacFarlane in 1922 to haul household goods, groceries, salt blocks, mail, and whatever their customers needed. McGrady converted this 58-foot boat from gas power to a twin-engine diesel motor with three rudders. The ship averaged 7 mi per hour upstream, quite impressive for its time. McGrady's River Transportation Service had the mail contract from Lewiston to Johnson Bar, about 350 people along a 99-mi river route. In 1942, the tourist fare for a round trip was \$5.00, excluding food and bedroll. Five years later the fare had risen to \$17.50. In 1946 at Sand Creek, McGrady built his own tourist lodge, which could accommodate up to 50 guests. In 1950, McGrady sold half his interest in the river business to the Tidewater Barge Lines, and then finally left the river after the Tidewater Barge Lines lost the mail contract and his son lost his life to the river.

On April 14, 1939, Buzz Holmstrom, Earl Hamilton, Clarence Bean, Willis Johnson, and Edith Clegg embarked on a trip from the Columbia River upstream through Hells Canyon, in two 14-foot spruce boats with oars and a 10-horsepower motor. They made the trip to Kinney Creek in 18 days with only three portages.

In summer 1939, Robert J. Wood, postmaster of Weiser, and five friends launched an 18-foot, wooden boat near Homestead. They traveled as far as Granite Creek before capsizing. The boat was eventually drug to shore by a swimmer.

John Only and Kyle McGrady, piloting two boats, took a party of four down the Snake River in July 1940. Two of the passengers were reporters for the *Lewiston Tribune*. The group portaged the worst rapids on the upper end (currently Hells Canyon Reservoir) but still lost one of their boats in another rapid. Clarence Moore, one of the *Tribune* reporters, wrote:

Seaworthy as our boat was it could not stand being pushed upward on one side and sucked down on another. It flipped over so quickly that I was still in a sitting position when I tumbled out, headfirst and bottom up. An undercurrent caught the three of us...and swept us under the river. It must have been more than fifteen feet deep because my ears ached from the pressure for about six hours. I recall the changing current turning me about in the water in slow motion as some amazing stories report that men do in mythical space ships, and all the time I was wondering if I was apt to hit any rocks.

In fall 1941, Dayton Thomas, John Miliron, and John West took four engineers from the COE in three wooden McKenzie drift-boats through the canyon to survey power sites. Because of the expensive equipment on board, they portaged nine rapids to avoid mishap.

During 1946, Norman Nevills led a party of 14 people in four wooden boats. Four of the passengers became known as the first women to float through Hells Canyon. The group shot 10,000 ft of movie film on their excursion. Nevills was the first outfitter known to run resort trips through the canyon. One boatman was thrown from his boat, but was successfully rescued.

Also in 1946, Amos Burg captained a party of three in two rubber boats and a wooden boat they purchased for additional support from a ferryman for \$15. The party consisted of a doctor from Utah, the Vice President of McCormack Steamship Company out of San Francisco, and Alexander Paterson of Seattle. The group made it through the first two rapids successfully, but damaged the wooden craft running Thirty-two Point Creek (Sawpit Rapid). They stuffed the leaking hull with socks and towels and continued their journey down the river. The party stopped to fish at Steamboat Creek and noted that “it was found thick with trout.”

In 1948, Emil Anderson made a solo trip from Robinette to Lewiston in a 12-foot rubber craft. On the second day, he flipped his boat, losing almost all he had, including his shoes (Carrey et al. 1979).

The 1950s marked the beginning of the commercial whitewater business (Carrey et al. 1979). Blaine Stubblefield of Weiser is largely credited with being the first to provide passenger tours in

Hells Canyon. He used a 31-foot, twin-propeller boat called *Chief Joseph* at first, then upgraded to several 33-foot bridge pontoons with 25-horsepower outboards (Carrey et al. 1979). By the 1950s, commercial whitewater businesses ran motorized passenger trips through Hells Canyon, but how many trips is unknown.

In 1960, insurance salesman Floyd Harvey became a commercial jet boat operator. He said he started boating for pleasure and invested in the business to help another fellow. He figured that he could use the excursion business to entertain some of his customers and friends and potentially make some profit. After the first year, Harvey became sole owner of the business, and in his words “became a little more intrigued with it [the Snake River].” He leased a small piece of land from the USFS at Willow Bar, set up a tent camp, and began spending nearly all his time on the river.

Before 1960, Harvey had little concern over dam controversy. However, he soon became interested in the proposed High Mountain Sheep and Nez Perce dams. His concern was less with the chance that the dams would hurt the fish or his jet boat business than with the possibility that they would hurt the canyon itself. Floyd Harvey began speaking out publicly. He wrote letters, started a newsletter to push for preservation among his customers, and began taking lots of people up the river, anyone who might be persuaded to help him save the canyon. From his and others’ perseverance, the Hells Canyon Preservation Council (HCPC) was formed in 1967. While the HCPC was drafting the National River Bill, Harvey took influential people, writers, conservationists, entertainers, and politicians, anyone who might be able to sway others’ opinions toward preservation, up the canyon on his jet boat for free. He said that he wasn’t necessarily for popularizing the canyon, but felt that taking people up the canyon was one of his only recourses: “You end up destroying a resource with too many people rather than let the power companies gobble it up with a piece of concrete in the middle of it.” He continued arranging trips and extending invitations, and in 1969 he was able to get Arthur Godfrey, a U.S. radio and television entertainer widely popular in the 1940s and ‘50s, to come and look at the canyon. Godfrey was so moved by the beauty of Hells Canyon, he wrote a letter to Secretary of Interior Walter Hickel, urging him to throw the weight of the Interior Department behind the preservation movement. In May 1970, 35 people arrived for a trip up the Snake River with Floyd Harvey, including Walter Hickel and personnel from the Associated Press, the United Press, and CBS. The trip was a great success, and the preservationists continued to take celebrities and others into the canyon (Ashworth 1977).

5.1.1.2. Early Recreational Fishing

Fish were a useful source of food for canyon homesteaders, but various sources indicate that catching fish was also a popular recreational pursuit (Carrey et al. 1979). Alex Warnock, one of the early canyon homesteaders, related this fishing story to a friend in 1893:

I have caught scads of small sturgeon up to 250 pounds by using a hook and line and baiting with eels. My ambition is to catch a whopper, but I never have landed one. I tried bait fishing with a hook fashioned out of the steel of a hayrack tooth, a two-pound chunk of beef with a barbed wire leader and a half-inch rope for line but I never could get the big ones to

bite. I made myself a strong four-pronged spear, mounted it on a peeled pole handle and attached 40 feet of one-half inch rope to the handle.

He was obsessed with catching a big sturgeon and tried many times using a variety of methods until he almost drowned in his efforts (Carrey et al. 1979).

Bonnie Sterling Mishler, widow of the Kirkwood bunkhouse builder Dick Sterling, recalled fishing on the Snake River for relaxation during the 1950s. She reported catching 50 to 100 sturgeon, 16 to 17 inches long, in just a few hours (pers. comm., September 3, 1998). Often wondering whether she and her husband were catching the same fish over and over, they decided to clip a fin on each fish before releasing it, but they never caught a fish with a clipped fin.

5.1.2. Recreational Management

Nearly all the Snake River and lower Imnaha River lands came under USFS jurisdiction on March 1, 1907 (USFS 1965). At that time, the rough draft of an inter-regional recreation area development and management plan was completed for the proposal for the High Mountain Sheep Project. The plan recognized the proposed dam as a complete part of the recreation complex. By the late 1950s, the BLM also had a presence in the study area, but any additional management plans or studies that may have been done cannot be found at this time.

By 1961, the USFS lands in the area were jointly managed by the Wallowa-Whitman, Payette, and Nez Perce National Forests (USFS 1961). In 1962, the Secretary of Agriculture established the Hells Canyon–Seven Devils Scenic Area. At that time, some of the land was privately owned, but the ratio of private land to public land is unknown.

In 1965, a study was conducted to determine the impact of constructing the proposed High Mountain Sheep Project, to be federally owned, 1 mi above the mouth of the Salmon River, approximately 60 mi below the present location of Hells Canyon Dam. A long-term recreation management plan resulting from this study forecasted increased recreational use on surrounding National Forest land upon completion of the dam (USFS 1965). Comparisons were made with existing reservoirs and recreation attractions in similar areas such as Shasta Lake in northern California and FDR Lake in Washington. Preliminary estimates suggested that within five years after dam completion, the Snake River area would attract approximately 950,000 visitor-days of use, assuming that sufficient access roads were constructed. Table 2 lists a summary of the forecasted recreational area.

5.1.3. Towns in Hells Canyon

Recorded information from government agencies about early recreation in the HCC is lacking; however, many books have been written about the history of the towns and lifestyles of those who lived there (Carrey et al. 1979, Bailey 1984, Palmer 1991, Stacy 1991, Tucker 1993, Davidson-Peterson Associates, Inc. 1995).

Homestead, OR—One of the first established communities in Hells Canyon was the town of Homestead, Oregon (Figure 2) (Tucker 1993). A mining town, Homestead began supplying local

miners with goods and services around 1898. At its peak, a railroad shuttled supplies in and out of the town via Robinette and Huntington. The population of the town peaked at 300 in 1927. About this time, the mining industry began to slow. When the railroad began providing service only as far as Robinette, Homestead nearly died. A few residents remained, however, and began marketing the town as a portal to the canyon, a place where travelers and recreationists could purchase supplies. Most notably, Dan Cole opened a service station and became a guide for whitewater boating and fishing. Details about Cole's business, such as number of visitors and frequencies of trips, are unknown.

Copperfield, OR—Shortly after the formation of Homestead, a much different community formed nearby. The town of Copperfield was a supplies center for copper mine prospectors from about 1900 to 1914 (Figure 2) (Tucker 1993). A rough and lawless town, Copperfield was formally incorporated in 1913. Baker County proved ineffectual in bringing law and order to the place, so in 1914 Oregon governor Oswald West had the town shut down. Whether or not any recreational use occurred in and around Copperfield during the mining era is unknown.

Robinette, OR—Robinette was located between the towns of Huntington and Homestead and served as a railroad shipping point for the nearby communities of Eagle Valley and Pine Valley (Figure 2) (Tucker 1993). Gold ore from the Cornucopia mines, timber, livestock, and dairy and fruit products were the main items shipped until the 1920s, when the ore ran out. The lower portion of railroad track was removed in 1936. In 1959, Brownlee Reservoir inundated Robinette. Later, a road replaced portions of the railroad track.

5.1.4. Access Roads and Ferries

In addition to nearby towns and communities that provided goods and services for the people living in the Hells Canyon area, a series of dirt access roads and ferries crossing the river allowed people to move from the canyon to larger communities in Idaho and Oregon. Historical records identify where these roads and ferry crossings were located and how long they were in operation. Many of the ferries were not operating by the time of dam construction.

Unnamed Ferry at Robinette—A cable ferry operated at Robinette until the 1940s, ferrying goods and people across the river to Sturgill Bar (Figure 2) (Carrey et al. 1979).

Brownlee Ferry—Beginning in 1861, Brownlee Ferry facilitated moving materials and merchandise from Umatilla Landing and Walla Walla to the Salmon River Mines (Figure 2). The ferry crossed the Snake River near the present Brownlee Dam site. The construction of a road near the Brownlee Ferry crossing boosted the economies of nearby Cambridge, Idaho, and Pine and Halfway, Oregon.

Ballard Ferry, Ballard Landing, and Ballard Bridge—Ballard Ferry, Ballard Landing, and Ballard Bridge were located on what is now Hells Canyon Reservoir (Figure 2). The ferry operated from about 1900 to 1927 and primarily aided in moving ore to Baker City. Also, the ferry crossed the river again at the Brownlee Ferry site to ship materials to Boise, Idaho. In 1927, Ballard Bridge was built to facilitate movement across the Snake River. Removed in 1967 because of high water-level dangers, it was replaced by the current bridge below Oxbow.

Kleinschmidt Road—Built in 1891 by Albert Kleinschmidt, this steep and winding road was constructed to service mines in the Seven Devils Mountains (Figure 2). Ore was hauled down to the Ballard Ferry site and shipped upstream to Huntington and other locations. The road still exists today in its dirt and gravel state and allows travel to Cuprum and beyond.

Eagle Bar Road—A dirt road allowed access beyond Ballard Landing downstream as far as Copper Creek, formerly Copper Ledge Falls (now known as Deep Creek), approximately 3 mi downstream of Eagle Bar (Figure 2). Morrison Knudsen improved the road in 1926 for the Butler Ore Company (Carrey et al. 1979). Although considered narrow and steep, the road was still used frequently by cars (Tucker 1993). IPC replaced this road with a paved road beginning in 1962 to facilitate construction of Hells Canyon Dam. Pre-impoundment photographs taken below Oxbow Dam are archived at IPC and provide good documentation of the access road along the river past Steamboat Creek, just upstream of the Hells Canyon Dam site.

Ferry at Pittsburg Landing—Mike Thomason operated a ferry at Pittsburg Landing from the early 1900s until 1918 (Figure 2). During the pioneer days, the ferry's appearance here was convenient for travelers because the nearest ferry was Ballard, on what is now Hells Canyon Reservoir. From this point, in 1912, E. G. MacFarlane used a 70-foot, twin-engine boat called the *Prospector* to run mail, freight, and passengers up the Snake River to Granite Rapids. Total numbers of visitors and trips he took during this time are unknown. A report by the COE points out that a great deal of the use on the Snake River above the Salmon River confluence was attributable directly to the mail boat that carried passengers upstream (USFS 1965).

5.1.5. Recreational Areas

Developed recreational access areas, such as parks, were few in number before construction of the dams and were managed by both government agencies and private individuals. Some of these included airstrips and lodging. Undeveloped areas, primitive in nature and often consisting only of a road pullout, were managed both publicly and privately.

With the exception of two reports published in 1961 and 1965 (USFS 1961, 1965), Wallowa-Whitman National Forest does not have any documents containing information about recreational access areas in existence prior to the completion of the HCC (Myrna Evans, pers. comm., June 1998). Some maps from that era depicting developed and undeveloped areas managed by the Payette National Forest may still exist, but have not yet been located (Jim Arp, pers. comm., July 1998). The following descriptions of areas within the HCC give a picture of the type of recreational access available during the pre-impoundment period.

Spring Creek—This site was located on the Oregon side of the river, on what is now Hells Canyon Reservoir (Figure 2). Known as a favorite wintering place for mule deer, the Spring Creek drainage had a permanent supply of water from a spring a short way up the creek from its mouth. Interesting geological formations located at Spring Creek made this drainage a landmark for people traveling by foot and by plane (Tucker 1993).

Big Bar—At the mouth of Allison Creek on the Idaho shore of what is now Hells Canyon Reservoir, Big Bar was once the home of a small landing field for airplanes used by private parties (Figure 2). The airstrip was inundated when Hells Canyon Dam was completed.

Archaeological studies in 1963 performed by natural history museum staff of Idaho State University, in agreement with the Smithsonian Institute and River Basins Surveys, revealed that the earliest occupancy of this site occurred about 1600 AD. It is thought that hunters of the Plateau Culture used the area to take advantage of its Rocky Mountain sheep, mule deer, pronghorn antelope, and salmon. White men settled the bar in the 1890s and farmed it for fruit and vegetables to sell in the mining camps. The terraces are remainders of the trailer camps built there during construction of Hells Canyon Dam (Tucker 1993).

Eagle Bar—Before construction of Hells Canyon Dam, Eagle Bar was famous for being a great place to fish for sturgeon (Figure 2). Eagle Bar was located toward the end of the Butler Ore Company road, and dispersed camping was available there (Tucker 1993).

Copper Creek—Named for the color of the water in the creek because of the tailing pile at the McDougal Mine located a few miles up the drainage, this site was home to Joe McKinney (Figure 2). It was recorded that McKinney kept a stopping place for travelers at this point (Tucker 1993).

Johnson Bar—This site, located below Hells Canyon Dam near Sheep Creek Rapids, marked the end of the mail route for the canyon (Figure 2). An airplane landing strip on this bar was considered to be rather dangerous to use. A U.S Geological Survey water level gauge on the bank across from Johnson Bar automatically transmits flow information to Lewiston (Tucker 1993).

Yreka Creek—The Yreka Creek area, located just below Sheep Creek Rapids on the Oregon side of the river, was historically used for camping (Figure 2). There was a nearby spring and a good landing place for boats (Tucker 1993).

Sand Creek—Sand Creek is just downstream of Yreka Creek on the Oregon side of the river. Kyle McGrady, who ran the Snake River mail route during the 1940s, built a lodge at the mouth of this creek on land leased from the USFS. From 1946 to 1950, McGrady carried passengers up the Snake River for overnight trips and accommodated as many as 50 people at once in the lodge at Sand Creek (Figure 2). He sold the lodge to a company that eventually lost the special-use permit. In 1962, the USFS burned the building and cleaned the grounds.

Pine Creek—Located next to the site of present-day Copperfield Park, Pine Creek was known for its great summertime salmon runs (Figure 2). Because of this valuable resource, the right to use Pine Creek was often a source of conflict between the Nez Perce, Shoshone, and Bannock tribes (Tucker 1993).

Federal Sites—The 1961 management plan for the Hells Canyon–Seven Devils Scenic Area, created by the Wallowa-Whitman, Payette, and Nez Perce National Forests, indicates that at that time there were no completed recreational developments on the Wallowa-Whitman and Payette National Forest portions of the area (USFS 1961). Though the report mentions primitive facilities, they are not listed. The Nez Perce National Forest portion of the area contained one developed seven-unit campground at Seven Devils Lake. According to the management plan, there was an increasing need for recreational facilities and improved access both by road and trail in the area (USFS 1961).

Despite high public use—an estimated 10,000 recreationists per year—the USFS had no improved campgrounds along the lower Snake and Imnaha rivers because most accessible sites were privately owned (USFS 1961). A long-range plan for development included three access sites on the Idaho side, four entrance roads on the Oregon side that would connect with a road down the Imnaha/Snake divide, and horse and foot trails leading into the back country. Fifty-five campgrounds and picnic sites and 22 observation points were to be established. Under the USFS development program, the scenic area would need to accommodate an estimated 80,000 recreationists per year.

5.1.6. Issues

Fishing, recreation facilities, navigation, streamflow, and flood control were all issues of concern before construction of the HCC dams. Most of these issues were addressed during the process of obtaining licenses for dams and constructing dam-related facilities.

5.1.6.1. Dam-Building Issues

In 1905, Idaho-Oregon Light and Power Company worked toward the purchase of a power site at Oxbow. In late 1906, the company established water rights to 8,000 cfs, and one month later received dam authorization for a federal power site withdrawal. In 1909, the power company's diversion tunnel was completed, but much less electricity was produced than anticipated, and the company went bankrupt. When five hydroelectric companies were consolidated as one, their property and systems became part of the IPC and were developed as a combined system.

In the late 1940s, fierce competition ensued over use of the river's hydroelectric potential. IPC still had 10 years remaining on its federal site withdrawal certificate received in 1906 for the Oxbow Project from the preceding company, and in 1947, IPC filed with the Federal Power Commission (FPC) to further develop the Oxbow site. However, several federal government agencies and private entities were creating proposals to build dams at other sites, including Hells Canyon Creek. The Truman administration backed the federal dam proposal, and legislation was introduced in both houses of Congress authorizing construction of a single federally owned dam. However, when Eisenhower was elected President in 1952, a policy favoring power development by private utilities went into effect.

The application for Oxbow Dam (Project No. 1971) was filed on December 15, 1950, and license applications for Brownlee (Project No. 2133) and Hells Canyon (Project No. 2132) dams were filed May 15, 1953. Filings and amendments supplemented all three applications. At that time, the FPC examiner recommended that a license be issued to IPC for construction of Brownlee Dam, but two months later the full FPC board overruled the decision in favor of the three-dam complex. On August 4, 1955, IPC was issued a 50-year license under Section 4(e) for one complete project, designated as Project No. 1971. The license was issued after an exhaustive investigation of over 20,000 pages of testimony and over 400 exhibits shown at local, regional, and national public hearings over the course of more than a year. The hearings addressed fish, navigation, flood control, streamflow, and recreational management and access issues (IPC 1997).

5.1.6.2. Fishing-Related Issues

Fishing was an important issue from both an economic and a recreational standpoint (Davidson-Peterson Associates, Inc. 1995). The Northwest economy relied heavily on the commercial fishing industry during the early part of the 20th century when commercial salmon fishing was popularized. By 1880, canned salmon ranked second only to lumber in economic importance to the area. During this period, nine commercial fishing businesses operated out of Weiser. By 1866, commercial canneries processed more than 270,000 pounds of salmon per year, more than a sustainable fishery could support. By 1883, canneries along the Columbia–Snake River system produced more than 50,000,000 pounds of salmon per year. In the 1870s, concerned about growing harvests, Oregon developed a fish hatchery system to replenish the fish population. These programs grew steadily, and by the 1930s, several hatcheries were operating in the Northwest.

At the same time that the hatchery system was being established, several local governments passed laws regulating salmon and steelhead fishing (Petersen 1995). Regulatory legislation was enacted in Washington state in 1890. Despite the regulations and apparent restraint of the commercial fishing industry, salmon and steelhead populations continued to decline. Fish losses were blamed on the commercial fishing industry, resulting in additional restrictions being imposed, although some commercial fishermen felt that the reduction in fish populations had more to do with an increased number of impoundments and other sources of habitat loss on the river system. By the time of the Second World War, approximately 300 dams had been built in the Columbia Basin, ranging in size from small diversion structures to major storage projects. By 1936, the federal government began to recognize that its dams may be harmful to fish and wildlife and began legislating regulations to amend the problem (Petersen 1995). In the 1940s, the U.S. Department of the Interior (USDI) proposed a 10-year moratorium on dam construction to allow biologists time to study the best methods to aid migrating fish. However, the USDI backed down from this proposal, stating that if power needs proved essential, the “salmon run must if necessary be sacrificed” (Petersen 1995).

Recreational fishing also negatively impacted anadromous fish populations (Petersen 1995). In the 1890s, Idaho residents began to notice serious declines in the sockeye salmon runs. Hundreds of people “hunted” the sockeye with nets and traps because the fish generally wouldn’t bite a hook. Unconcerned with protecting fish species, sportsmen pressured the Idaho Department of Fish and Game (IDFG) to provide better game fishing. The 1910 construction of the Sunbeam Dam caused the sockeye populations in and around Redfish Lake to decline. In 1934, IDFG blew up a portion of the dam to restore a free-flowing river. By this time so many exotic fish had been introduced that the original gene pool of the Snake River sockeye had been altered.

5.1.6.3. Navigation, Streamflow, and Flood Control Issues

Water has been the prime means for transporting freight between cities and nations since the early days of each. This view is illustrated by the fact that 96 of the 107 U.S. cities having populations greater than 100,000 are located on either a coastline or a navigable waterway. Only 11 cities in this country with a population over 100,000 do not have direct access to some form of water transportation (Petersen and Reed 1994). In 1824, the federal government became involved with a series of congressional acts aimed at improving navigation for the barging industry in the Northwest. The COE cleared and dredged the lower Columbia River and in the

1880s began constructing jetties at the river's mouth. However, channel improvements on the Columbia River still did not meet the needs of industry, and steamboat operators continued to have a difficult time competing with the railroads. It was clear that until the COE improved navigation on the lower Snake River, a port at Lewiston would not be practical. The creation of slack water was the most effective method of improving navigation in the system; therefore, the federal government, local residents, shippers, and a variety of private advocacy groups supported dam construction.

The waterways of the middle and upper Snake River region were never utilized to any extent for movement of people or goods because of their hazardous conditions. In 1866, prior to the railroad's presence in southwestern Idaho, the 136-foot steamboat *Shoshone* was built on the Snake River at the mouth of the Boise River. It made trips between Olds Ferry at Farewell Bend to Swan Falls upstream, a distance of about 120 mi. The venture proved unprofitable, and in 1869 or 1870 the steamer was taken downstream through Hells Canyon to the lower Columbia River.

Early mining in the Seven Devils/Hells Canyon Reach of the Snake River below Oxbow and around Homestead, Oregon, and Cuprum, Idaho, influenced attempts to navigate the river upstream to Huntington, a distance of about 65 mi, to connect with the railroad. A federal project to improve this stretch of the Snake River by removing rocks and placing ringbolts and posts was adopted in 1892. The project was abandoned in 1896 after \$40,500 was spent. House Document 127, 56th Congress, 2nd Session, dated December 6, 1900, states that "The Government spent a considerable sum of money from 1891 to 1896 in improving Snake River in the vicinity of Huntington. This was of no avail, however, as the only boat ever built for this section of the river, the NORMA, gave up trying to run after the difficulties of navigation."

During the past century, many studies were made for improving navigation of the Snake River from below Hells Canyon Dam to the mouth of the Columbia River. In 1866, the initial study was made for dredging at selected locations. Congress adopted no formal projects for the Snake River before 1902, although considerable funds were spent for intermittent open channel work. Upriver of Lewiston, authorizations were for removal of boulders and rock points. Between 1902 and 1935, continuous channel improvements took place in 91 river miles to Johnson Bar. In 1902, from Lewiston to Pittsburg Landing, a 77-mi stretch of river was designated for rock and reef removal to secure a navigable channel. In 1935, removal of boulders and rocks at 11 shallow sandbank areas occurred for 14 mi from Pittsburg Landing upriver to Johnson Bar.

Records of waterborne traffic on the Snake River indicate a wide variation in movement, depending upon activities in Idaho. People were an important commodity being transported in the early days, but records are scarce concerning them. It's estimated that in 1864, 36,000 people traveled to and from the Idaho gold fields by steamer. From 1920 to 1935, passenger travel ranged between 350 and 2,000 people per year. Records of "tonnage" transported on the Snake River ranged from 65,975 tons in 1869 to 53 tons in 1950 (Petersen and Reed 1994).

President Theodore Roosevelt believed in the cause of inland navigation, but also advocated maximum multipurpose development of the nation's rivers. His administration supported using

rivers for navigation, irrigation, domestic water supply, and power production. Until this time, the COE believed the primary purpose of rivers was navigation (Petersen 1995).

A COE report on the Columbia River and its tributaries, prepared in 1948 as House Document No. 531, contains results of a comprehensive basin-wide study of multiple water utilization resources for navigation, flood control, irrigation, power, and other purposes (IPC n.d.). Because of this study, the FPC was convinced that the projected Brownlee Reservoir, with storage capabilities of 1,000,000 acre-ft, would be consistent with the flood control plan on the lower Columbia River. Therefore, Brownlee Dam's license required that it be operated under the direction of the COE for the purpose of flood control (IPC n.d.).

The minimum flow requirement for the river channel in Hells Canyon was an important issue at the time of licensing. The BOR proposed a single dam with minimum flows of 1,500 to 2,000 cfs, for maximum water storage, whereas IPC proposed a three-dam complex with a minimum flow of 5,000 cfs. The latter was eventually ordered in the license (IPC n.d.).

5.1.6.4. Archaeological Issues

Before 1965, no intensive archaeological investigations had been conducted along the Snake River Canyon below the Hells Canyon Dam site. However, an increasing amount of artifact theft was recorded. It was noted that the archaeological potential of the project area would be significant and many historical sites would be inundated along the Snake River. The U.S. Department of Agriculture (USDA) recommended that an educational institution of each state concerned use a qualified and reputable archaeological department to investigate each perimeter of the Snake River (USFS 1965).

5.1.6.5. Management Issues

In March 1965, the USDA released an analysis of effects for the proposed High Mountain Sheep Dam and Reservoir on resources and management of the Nez Perce, Payette, and Wallowa-Whitman National Forests (USFS 1965). Issues and concerns prior to the building of the proposed High Mountain Sheep Dam covered a number of elements. The area of major concern was the immediate drainage around the proposed reservoir site. At that time Hells Canyon Dam was not yet constructed, and much of the study information in the USDA report contained data up to the area of Homestead, Oregon.

The problems associated with the recreation development of the Hells Canyon area identified in the USDA study were limited access, private ownership of land, lack of botanical sources, lack of water sources, fire danger, lack of transportation routes, and limited navigation. The following recommendations were made to address these problems:

1. Improve access—New road construction would need to be designed to avoid the already compounding erosion problems.
2. Improve transportation—A limited transportation system existed. A proposed system was needed for allowing access to dispersed recreation sites.

3. Improve navigation—Navigational work would be needed to facilitate anticipated boat travel in the upper canyon areas.
4. Acquire land—Land would have to be purchased from private owners for the development of all types of recreation facilities.
5. Obtain water sources—Pure water was unavailable at over half the sites inventoried. Few sites were found where sufficient plant growth existed for development, even with adequate water supply.
6. Plant vegetation—Trees and ground cover would be required for all low-level developed recreation sites. Shady refuges would be needed to accommodate recreationists unaccustomed to long hours of high temperatures.
7. Limit fire danger—A plan would need to be developed to advise recreationists of potential fire danger. Camping and picnic sites would have to be fireproofed and surrounded by firebreaks.

5.2. Post-Impoundment Conditions

During the 1950s and 1960s the HCC was completed. Other impoundments were also planned for the area. Pacific Northwest Power Company (PNPC), consisting of four private firms, proposed to construct a high dam at one site. Washington Public Power Supply System sought to build a higher dam a short distance from the aforementioned site. The COE and BOR each proposed a series of dams between Lower Granite and Hells Canyon dams. In 1964, the FPC granted permission to the PNPC to construct the High Mountain Sheep Dam. Public utilities and conservation groups opposed and appealed this plan until the U.S. Supreme Court overruled the commission in 1967, ordering it to consider public development and asking it to give further consideration to the area's natural qualities as well as its potential for production of hydroelectric power. By this time, the USDI and various environmental groups strongly opposed any development in the area. In 1968, Idaho Senators Church and Jordan proposed a 10-year moratorium on any further dam building between Hells Canyon Dam and Asotin, creating years of lengthy hearings by the U.S. Senate. In 1975, Public Law 94-199 was signed, designating the Hells Canyon National Recreation Area (HCNRA) and protecting that portion of the Snake River from Hells Canyon Dam to the Oregon/Washington state line under provisions of the Wild and Scenic Rivers Act. The designation insured that this portion of the Snake River would be preserved in its free-flowing condition. In 1988, legislation was signed prohibiting the FERC from licensing any dams along the Snake River from Asotin to the HCNRA boundary, ending further development in the area by the federal government.

In the postwar 1950s, outdoor recreation demands began to change. Nationwide, recreation use climbed rapidly from the 1960s to mid-1970s and has grown since, though at a slower rate (Flather and Cordell 1995, Zinser 1995). This trend was attributed to increased leisure time, income, and mobility (The President's Commission on Americans Outdoors 1987). Other factors now thought to increase demand for outdoor recreation include geographic features—such as location, climate, landforms, and water—as well as population, technology, and land ownership

(Zinser 1995). In the Northwest, these demand factors account for above-average growth in outdoor recreation. This area encompasses a wide variety of landforms, water, and climates. Federal ownership of large percentages of land also promotes outdoor recreation: in Utah, 64% of land is federally owned; in Idaho, 63%; Oregon, 52%; and Washington, 29% (Zinser 1995). In addition, increased birth rates and immigration are boosting the population (IPC 1996). Idaho is predicted to grow at a rate twice that of the rest of the country. The state's expected rate of population growth through 2025 could be the sixth largest in the nation (U.S. Census Bureau n.d.). Oregon and Washington show similar growth trends.

Outdoor recreation in the HCC and HCNRA has reflected trends in the rest of the country. In 1967, completion of the third and last of IPC's HCC dams, Hells Canyon Dam, changed the recreational opportunities available. The Hells Canyon area evolved from a remote, difficult-to-access river area used primarily by homesteaders and miners to a major recreation area for boaters, anglers, campers, and sightseers enjoying both river and reservoir experiences. During the post-impoundment years (1960s to the present), many recreation-related use studies were conducted by various agencies and groups both statewide and specific to the Hells Canyon area. These studies focused on numbers of visitors, types of use, visitor profiles, and visitor attitudes and opinions. Recreational issues during this time were focused mainly on anadromous fish, navigation, streamflow, and competing uses for the Snake River. Changes also occurred in the type, number, and management of recreational lands and facilities. When the HCNRA came into existence, many acres of private land were converted to the public domain.

5.2.1. Land Designation and Management Changes

Congress created the National Wild and Scenic Rivers System in 1968 to ensure the protection and continuation of free-flowing waterways. A 67.5-mi reach of the Snake River within the HCNRA is divided into two distinct classifications: *wild*, the 31.5 mi from Hells Canyon Dam downstream (north) to Pittsburg Landing; and *scenic*, the 36 mi from Pittsburg Landing downstream to RM 180.2. Today an additional 4.2 mi of river from RM 180.2 downstream to the HCNRA boundary at the Oregon–Washington line is recommended for scenic designation.

The Wild and Scenic Snake River corridor extends approximately 0.25 mi beyond the high-water mark on each shore and, in places, abuts the Hells Canyon Wilderness. Congress designated the Hells Canyon Wilderness to protect the wild character of the area. To safeguard that character, some activities—using motorized equipment or mechanized vehicles and building structures—are not allowed. Exceptions have been made to allow for quick response to emergencies and for administration of the area. Despite the river corridor's proximity to the Hells Canyon Wilderness, the corridor itself is not considered wilderness. Developed campsites, artificial structures, and some motorized equipment can be found in the river corridor. Permits are required for all boating on the Wild and Scenic Snake River during the primary season (Memorial Day weekend through September 10). Self-issue permits are required for noncommercial boating the remainder of the year (USFS 1994).

In April 1992, the Hells Canyon Scenic Byway, a series of interconnected travel routes to and through the HCNRA on the Wallowa-Whitman National Forest, was added to the National Forest Scenic Byway System. The Scenic Byway is a cooperative venture between the

U.S. Forest Service (USFS) and Oregon Department of Transportation. The series of routes include State Highway 82 from Baker City over the Wallowa Mountains to Enterprise and La Grande, the road to the Hells Canyon Overlook, the Hat Point Road, and the Imnaha River Road. National recognition has been given to this series of routes because of outstanding scenery and recreational, historical, educational, and cultural significance.

On December 31, 1975, Congress established the HCNRA in west-central Idaho and northeastern Oregon to ensure that the natural beauty and historic archaeological values of the area be preserved for this and future generations. The HCNRA was also established to enhance recreation opportunities and public enjoyment of the area, which is generally undeveloped and remote, with only a few campgrounds and maintained roads. The HCNRA's 652,488 acres straddle Hells Canyon of the Snake River, from the peaks of Idaho's Seven Devils Mountains on the east to Oregon's rim-rock and mountain slopes on the west.

Hells Canyon Wilderness, in parts of Oregon and Idaho, was designated in 1975 with the establishment of the HCNRA. Additional acres were added as part of the Oregon Wilderness Act of 1984. Approximately one-third of the HCNRA is designated as wilderness. The HCNRA contains portions of three national forests (Payette, Nez Perce, and Wallowa-Whitman) and is administered by the Wallowa-Whitman National Forest.

The process of developing a comprehensive plan for river recreation began in earnest in 1988 when the USFS decided to evaluate and revise the existing recreation management plan for the Wild and Scenic Snake River. During the 1980s, recreation visitation in the HCNRA dramatically increased, rising from 1979 through 1991 by more than 147% during the primary use season (USFS 1994). It is USFS policy to examine use trends periodically and make management adjustments to reflect indications of changing social values, use patterns, resource conditions, laws, and regulations. The USFS determined that the increase in use was affecting the recreation experience being provided. Concern for maintaining the Hells Canyon resource and reducing visitor conflicts spurred a new planning effort, resulting in a draft recommendation in 1992 (LAC 1991).

As part of this planning process, the University of Idaho, Department of Wildland Management, conducted a visitor study to describe the people who use the Snake River in the HCNRA for recreation, to determine how people use the river, and to identify visitors' management preferences and perceptions of the river. The study emphasized float and powerboat users, but also included participants in land-based river activities (see Section 5.2.4.5.) (Krumpe et al. 1989).

In 1994, the USFS completed a Final Environmental Impact Statement (FEIS) for the HCNRA. All amendments to the HCNRA's comprehensive management plan (CMP) must be accompanied by an Environmental Impact Statement, and all CMPs must be taken into account in the Wallowa-Whitman National Forest's Forest Plan. Based on the analysis contained in the FEIS, the Forest Supervisor was to decide whether to implement a proposed action developed through a Limits of Acceptable Change (LAC) planning process, or to implement one of six alternative actions (USFS 1994). The proposed and alternative actions involved varying levels of restrictions on overnight and day use of the HCNRA and on the use of private and commercial powerboats, float boats, personal watercraft, and aircraft. On September 11, 1996, the Forest

Supervisor decided to implement Alternative C (different from that proposed by the LAC Task Force), with modifications. A 45-day appeal period followed this decision, which was scheduled for implementation beginning in the 1997 primary use season. After a period of appeals and litigation, full implementation of the plan began in 1998, with the last two components, a window for nonmotorized boat use in the wild section of the river and a jet boat reservation system in the scenic section, to take effect in 2000. The FEIS and CMP have since been revised to new drafts. At this time, the USFS expects the planning process to continue into early 2002. When the process is completed, a Final EIS and Record of Decision (ROD) will be published, (USFS 2002) and a 45-day public appeal period will begin. In addition, government-to-government consultation with the Nez Perce Tribe is currently underway to fulfill tribal treaty rights and trust responsibility obligations. The USFS is also in the process of consulting with the U.S. Fish and Wildlife and the National Marine Fisheries Service to meet the intent of the Endangered Species Act.

In 1995, the Wallowa-Whitman National Forest and IPC developed a written Memorandum of Understanding (MOU). The MOU states that “This agreement will establish a framework upon which local USFS officials and IPC officials may cooperatively exchange biological survey information, and recreational/visitor use data that now exists and will be collected in the upcoming years.”

5.2.2. Recreational Facilities

To meet future HCC recreation management goals successfully, IPC and other land management agencies need a detailed inventory and analysis of current developed and dispersed recreation sites and facilities. Such information can be used to document changes in sites over time due to recreational use. The information in this section and Section 5.2.3. was obtained during IPC’s inventory and analysis of recreation sites located in the HCC. The database and draft of this report were distributed in early 2000.

Many recreational facilities are currently available in the HCC and HCNRA. Much of the recreational development in the HCC took place following construction of the dams (Murray 1960). The IPC; federal, state, and local government agencies; and other private parties own facilities. Existing facilities range from developed sites with amenities—such as toilets, boating facilities, and picnic areas—to dispersed sites that have been kept fairly primitive. Currently, there are 18 access facilities in the HCC. Ten of these facilities offer camping and have a variety of amenities located within the HCC. Of these, four are owned by IPC, two by the BLM, one by the state of Oregon, one by Baker County, and the remaining two by private entities. The remaining eight are undeveloped (also called impromptu or dispersed) camping areas adjacent to project waters. Twelve of the recreation facilities are located on the Oregon shore of the project area, and six are located on the Idaho shore. Sites within and close to the HCC (Figure 3), whether they are fully developed access or camping facilities, are listed and described in this report.

5.2.2.1. IPC Facilities

All IPC parks have full-time maintenance personnel, and fees are assessed for overnight camping. Park rules and regulations are posted in all parks. Public telephones are available at all

facilities. Informational, historical, and interpretive signs are present at various locations throughout the parks and the HCRA. The parks are open year-round with limited amenities and reduced rates available during the off-season. The official park season runs from March 1 through September 31. The park facilities are provided and regulated in accordance with Section 10(a) of the Federal Power Act. Consistent with applicant laws, rules, and regulations, reasonable fees are charged for use of the park facilities at Brownlee, Oxbow, and Hells Canyon projects. For more detailed information about IPC's park facilities, see Moore and Brown 2001. Several developed camping facilities within the study area are owned by IPC or by state, federal, county, or private entities and provide electrical hookups, water, bathrooms, and shower facilities for a fee (Figure 3). Other camping facilities provide a more primitive experience, having only vault toilets and/or a public water source. A wide array of dispersed campsites also exists within the study area.

Woodhead Park—This park (RM 288) is located adjacent to Idaho 71, on the Idaho side of Brownlee Reservoir, approximately 24 mi west of Cambridge, Idaho, and 4 mi south of Brownlee Dam (Figure 3). Originally constructed in 1959, Woodhead Park underwent a remodel and expansion that was completed in spring 1995 to enhance camping, parking, and boating facilities. A realignment of Idaho 71 increased park acreage, now 65 acres of turf, shade trees, and naturally landscaped areas. Woodhead Park has 124 recreational vehicle (RV) sites, with electricity, water, picnic tables, and fire rings. Fifteen walk-in tent sites are equipped with water, picnic tables, and fire rings. Within large day-use areas, two large picnic areas with shelters accommodate group gatherings. Additionally, Woodhead Park has the following amenities: three restrooms, two comfort stations with showers, a wastewater treatment lagoon, a fish-cleaning station, interpretive and information displays, a trail system, paved roads, a boat trailer parking area, and a four-lane and a single-lane boat ramp, both with docking systems. The new four-lane boat ramp was extended in spring 1996 to allow reservoir access down to 2,022 ft msl (reservoir “full pool” is 2,077 ft msl). The original one-lane boat ramp allows reservoir access during maximum drawdowns (1,976 ft msl).

McCormick Park—Constructed in 1958, this park is located on the Idaho side of Oxbow Reservoir, approximately 1 mi downstream of Brownlee Dam (Figure 3). McCormick Park (RM 284) is a day- and night-use recreation facility with the following amenities: 9 acres of turf, shade trees, restroom facilities with showers, 34 RV sites with electrical and water hookups, numerous tent spaces, picnic tables, fire pits, and a sanitary dump station for RVs. In addition, a concrete boat ramp, boat ramp parking, and docks are adjacent to the park.

Carters Landing—Located adjacent to the Brownlee–Oxbow Road on the Oregon side of Oxbow Reservoir approximately 4 mi downstream of Brownlee Dam, Carters Landing (RM 281) occupies approximately 1.7 acres (Figure 3). Facilities include several impromptu campsites, a composting toilet, picnic tables, garbage receptacles, and an unimproved boat launch. The land is owned by BLM and managed by IPC. IPC charges nominal fees for use of this site.

Oxbow Boat Launch—A day-use-only site, Oxbow Boat Launch (RM 276) is located on a narrow strip of land adjacent to the Brownlee–Oxbow Road on the Oregon side of Oxbow Reservoir and approximately 10 mi downstream of Brownlee Dam (Figure 3). Amenities include a gravel boat ramp, a dock, composting toilet, garbage pickup, and parking. The land is owned by BLM and maintained by IPC.

Copperfield Park—Originally constructed in 1965 and subsequently remodeled in 1989, Copperfield Park (RM 270) is located on the Oregon side of Hells Canyon Reservoir just 3 mi downstream of Oxbow Dam and adjacent to the intersection of Idaho 71, Oregon 86, and Hells Canyon Road (Figure 3). The park has 12 acres of turf, paved roads, terraced landscaping, and numerous trees. Sixty-two RV sites have electricity, water, fire pits, and picnic tables. The park also has 10 camping sites for tents, with nearby picnic tables and barbecue stands. Restroom facilities with showers, a sanitary dump station, and additional vehicle parking are also available. Copperfield Boat Launch is nearby.

Copperfield Boat Launch—Constructed in 1994, the Copperfield Boat Launch (RM 269) is located on the Oregon side of Hells Canyon Reservoir, approximately 1 mi downstream of Copperfield Park on Homestead Road (Figure 3). Amenities include a two-lane concrete boat ramp, boat docks, parking, garbage receptacles, and seasonal toilets.

Hells Canyon Park—Hells Canyon Park (RM 264) is located on the Idaho side of Hells Canyon Reservoir adjacent to Hells Canyon Road and about 9 mi downstream of Oxbow Dam (Figure 3). The park's 15 acres are landscaped with turf and mature shade trees, and a paved road runs through the park. Amenities include restroom facilities with showers, an RV dump station, 24 RV sites with electrical and water hookups, picnic tables, and barbecue stands. Numerous tent sites with picnic tables are available in a turf area that has large trees and copious shade. A large day-use area within the park has parking, picnic tables, shade trees, and a swimming area. An adjacent boat ramp area provides parking for vehicles and boat trailers, four electric pedestals for recharging boat batteries, a concrete boat ramp, and boat docks.

Impromptu Areas—In addition to the developed parks, IPC maintains a number of impromptu camping and access areas adjacent to project waters and within the project boundary. Available at some of these areas are portable toilets, garbage pickup, and unimproved boat-launching facilities. For more detailed information about IPC non-park recreational facilities, see Hall and Bird 2001.

5.2.2.2. USFS Facilities

The USFS currently does not own or operate any recreation facilities in the study area surrounding Brownlee or Oxbow reservoirs; however, much of the land in the study area surrounding the Hells Canyon Reservoir and below the Hells Canyon Dam is USFS land. All the USFS recreation facilities above Hells Canyon Dam are limited to dispersed campsites. As for the area below the dam, in 1970 the USFS reported that there were no recreation facilities between Hells Canyon Dam and Wild Sheep Rapids, except two public toilets at the Hells Canyon Dam launch site and at Hells Creek (USFS 1970). The USFS currently operates and maintains five developed sites below the dam and over 100 primitive campsites in the HCNRA from Hells Canyon Dam to Cache Creek Ranch (USFS 1994).

Hells Canyon Trail and Associated Campsites—Hells Canyon Trail (#1890) begins on the Oregon side of Hells Canyon Reservoir at Copper Creek Trailhead, which is located at the northern terminus of Homestead Road, and continues approximately 2 mi downstream, where it junctions with trail #1884 at Spring Creek (Figure 3). Portions of this trail were inundated when Hells Canyon Dam construction was completed in 1967. IPC rebuilt the trail on the Oregon side

of Hells Canyon Reservoir. It is now referred to as the Hells Canyon Trail and is currently maintained by the USFS. The area also received Congressional designation as “Wilderness,” and developed campsites along the trail have been removed.

Eckels Creek—Eckels Creek (RM 256.8) is a small area used for impromptu day-use sites and campsites located on the Idaho side of Hells Canyon Reservoir, just upstream of Big Bar on Hells Canyon Road, about 15 mi north of Oxbow Dam (Figure 3). While it offers no amenities, this site is one of the most popular of the small sites for dispersed camping associated with the reservoirs. Shade, good bank fishing access, and privacy are available at this site.

Big Bar—The USFS owns this 38-acre terraced area (RM 256.2) on the Idaho side of Hells Canyon Reservoir, 16.5 mi downstream of Oxbow Dam (Figure 3). Limited facilities include vault toilets, interpretive signs, two unimproved boat ramps, and one dock. Impromptu campsites occur at various locations throughout this site. The USFS (Payette National Forest) is currently evaluating future recreational enhancements for Big Bar.

Black Point—Black Point (RM 252.7) is a scenic overlook pullout 20 mi north (downstream) of Oxbow Dam on Hells Canyon Road (Figure 3). Situated about 1,200 ft above and immediately adjacent to Hells Canyon Reservoir, this pullout accommodates large vehicles and displays interpretive signs.

Eagle Bar—This 2.82-acre site (RM 249.5) is located approximately 7 mi downstream of Big Bar on the Idaho side of Hells Canyon Reservoir (Figure 3). Morrison Knudsen constructed a road to Eagle Bar from Ballard’s Landing in 1926 for the Butler Ore Company. The road is now under water, but was built to give access to a copper prospect, called the Red Ledge Mine, about 5 mi above the end of the road on the forks of Deep Creek.

Deep Creek Access Trail—In 1989 the USFS, IDFG, and IPC cooperatively participated in a project to construct and improve the trail from Hells Canyon Dam to Deep Creek (Figure 3). The trail provides access via a series of metal stairways, landings, railing, and natural surfaces to the Idaho side of the Snake River below Hells Canyon Dam for anglers and other outdoor enthusiasts. The USFS maintains a vault toilet located by the parking area immediately adjacent to Hells Canyon Dam and the Hells Canyon road.

Hells Canyon Creek Recreation Site and Hells Canyon Visitors Center—The major portion of this site (RM 247) is located on the rock spoil that resulted from Hells Canyon Dam construction (Figure 3). It is located in the HCNRA, outside the project boundary and approximately 0.5 mi below Hells Canyon Dam on the Oregon side of the Snake River. The USFS manages the site, staffing it seven days per week from Memorial Day weekend through September 15th. The site is the major launch for float trips on the Snake River through Hells Canyon, and scenic jet boat trips downriver are also offered from this location. Included at this site are vault toilets and covered picnic shelters. Between 1992 and 1995, boat-launching facilities and the USFS’s 1,200-ft² Hells Canyon Visitors Center were constructed. IPC has worked cooperatively with the USFS and other entities to improve these boat-launching facilities. In 1999, IPC and the USFS developed an MOU to establish a general framework of cooperation for operating and maintaining the launch site and visitor-information facility. IPC provides a full-time employee at this site during the regulated-use season from May through September. The Stud Creek Trail

traverses the Oregon shore from this site for about 1 mi downstream. Overnight camping and river access are available from this trail.

Snake River National Recreation Trail—This 25-mi trail parallels the Snake River in Idaho (Figure 3). It begins at Granite Creek (RM 239.5, accessed by boat from Hells Canyon Dam) and ends at Pittsburg Landing. Sections of the trail may be flooded during high water.

Sheep Creek Cabin—Sheep Creek Cabin (RM 229.5) is located between Johnson Bar above Temperance Creek (Figure 3), about 18 mi north (downstream) of Hells Canyon Dam. A USFS administrative site, it is under a special-use permit to Mike and Jodee Luther, who offer overnight accommodations with meals.

Temperance Creek Ranch—Temperance Creek Ranch (RM 224) is on the Oregon side of the Snake River about 24 mi north of Hells Canyon Dam (Figure 3). The USFS purchased these holdings in 1975. Butch and Karen Brown currently operate this site as a base for outfitted hunting trips, under a special-use permit.

Kirkwood Historic Ranch and Associated Campsites—The Kirkwood Historic Ranch site (RM 221) is located on the Idaho side of the Snake River, about 27 mi north of Hells Canyon Dam (Figure 3). Open all year, this historic ranch, museum, and interpretive site details early pioneer life in the canyon. Access is by river or by off-road vehicle trail. Toilets are available but not drinking water. A satellite phone is available for reporting fires and emergencies. Three camping sites that can accommodate large groups are within easy walking distance of Kirkwood Historic Ranch and provide shade, toilets, and tables.

Pittsburg Administrative Site and Associated Campsites—On the Idaho side of the Snake River, the Pittsburg Administrative Site (RM 215) is located about 33 mi north of Hells Canyon Dam (Figure 3). This site provides road access to the Snake River. It is the main exit portal for float boat trips originating at the Hells Canyon Creek Recreation Site and a launching site for jet boats using this section of the Snake River. The administrative site does not have campsites; however, the adjacent Pittsburg Landing campground provides road access, a boat launch ramp and a float boat apron, some shade, drinking water, toilets, and picnic tables. A satellite telephone is available for reporting fires and emergencies. Directly across the river, the USFS operates a maintenance and housing facility, which is not open to public use.

Dug Bar Site—Dug Bar (RM 198) is on the Oregon side of the Snake River about 50 mi north of Hells Canyon Dam (Figure 3). A USFS road from Imnaha provides vehicle access to the Snake River. A boat ramp, vault toilet, and several campsites are located at this site.

Cache Creek Ranch Administrative Site—On the Oregon side of the Snake River, the Cache Creek Ranch Administrative Site (RM 177) is located about 71 mi north of Hells Canyon Dam and 43 mi south of Lewiston (Figure 3). It is the only entry portal at the northern end of the HCNRA. Permits, maps, and other information are available at this day-use-only site. Amenities include shade, water, toilets, and tables.

Designated Campsites—The USFS has identified more than 100 distinct camping areas within the HCNRA. These sites are scattered throughout the Snake River corridor. For details about these and other sites, see Hall and Bird 2001.

5.2.2.3. BLM Facilities

The BLM does not own or operate any recreation facilities in the study area surrounding the HCNRA. However, much of the land surrounding Brownlee, Oxbow and Hells Canyon reservoirs falls under BLM jurisdiction. Currently, the BLM operates four recreation sites on Brownlee Reservoir and owns one boat launch.

Oasis Site—On the Oregon side of upper Brownlee Reservoir, the Oasis site (RM 340) is located adjacent to U.S. Highway 30 (U.S. 30) (Figure 3). Amenities include a boat ramp, a gravel parking lot, and a vault toilet. Some impromptu campsites can occur here. In fall 1996, the BLM removed the concrete from the boat ramp and replaced it with gravel. A vault toilet was added and the parking area graded in 1997 as part of a joint effort between the BLM and IPC.

Steck Recreation Site—On the Idaho side of Brownlee Reservoir, this day- and night-use site (near RM 327) is adjacent to Olds Ferry Road (Figure 3). Although the land is owned by the IDFG, the BLM has a perpetual management easement for site operation. The area is landscaped with turf and shade trees. Amenities include vault toilets, drinking water, picnic tables, a covered picnic area, camping sites, a fish-cleaning station, a boat ramp, and docks. With assistance from the IDFG and acquisition of adjacent land, the BLM constructed an additional boat ramp in 1990 just downstream of the park. In 1995 and 1996, the BLM improved the structure of 7 individual campsites, adding fire rings, picnic tables, and barbecue grills. Six new vault toilets were also added. In 1998, the existing downstream boat ramp was extended to provide access during low-water conditions (2,055-ft level). In 1999, the BLM finished a 4-year renovation project that expanded the camping capacity and improved the overall quality of the facilities. The older, shaded area has 16 RV sites and 5 tent sites. The newer, upper area has 29 RV sites, including 4 group sites. All sites have grills, campfire rings, and picnic tables. Potable water is available, but there are no RV hookups or showers.

Spring Recreation Site—On the Oregon side of Brownlee Reservoir, Spring Recreation Site (RM 327) is adjacent to the Snake River Road, just downstream of the mouth of the Burnt River (Figure 3). Access to this day- and night-use facility is via a paved road from Huntington and a gravel road from Richland. Originally, the lands on which the park was constructed were donated by IPC to the BLM for recreational development. The Huntington–Lime Boat Club initially developed the boat ramp and picnic area (Murray 1960). Minimal shade is provided. The facility has vault toilets, multiple campsites, drinking water, a fish-cleaning station, a boat ramp with docks, and a large boat and trailer parking area. A BLM firefighting crew is stationed adjacent to this site.

Swedes Landing—On the Oregon side of Brownlee Reservoir, Swedes Landing (near RM 304) is adjacent to the Snake River Road (Figure 3). George Stover of Weiser originally maintained this site. In 1958, a boat club from Baker City built wooden docks, anchor stays, and dry toilets (Murray 1960). Swedes Landing covers approximately 3 acres, providing impromptu campsites, vault toilets, and an unimproved boat ramp area. In a cooperative effort with IPC, the BLM installed an additional vault toilet in 1997 and added gravel to the existing parking area and boat ramp.

Impromptu Areas—In addition to those sites previously described, BLM manages several areas adjacent to the HCC that are used for impromptu day-use sites and campsites. Some areas

provide garbage pickup, vault or portable toilets, and unimproved boat-launching areas. For detailed information about these and other BLM recreational facilities, see Hall and Bird 2001.

5.2.2.4. Oregon State and County Park Facilities

Farewell Bend State Park—This day-use and overnight camping facility (RM 334) is the only state park located within the HCC study area and is owned and operated by the State of Oregon (Figure 3). It is located near the Farewell Bend turnoff from Interstate 84, adjacent to Brownlee Reservoir. Originally, the lands on which the park was constructed were donated by IPC to the State of Oregon for recreational development. The park covers 73 acres and is extensively landscaped with turf, shrubs, and shade trees. Amenities include 93 RV sites with electrical and water hookups, 45 primitive sites with paved areas and a common water source (but no electrical hookups), and 4 walk-in sites for tent camping. Since 1995, ODPR has added two covered wagons, two primitive cabins, teepees, and an amphitheater for interpretive programs. Additional amenities include restrooms with showers and a washroom, electrical hookups, water hookups, picnic tables, barbecue pits, interpretive and information panels, a fishing access trail and pier, a fish-cleaning station, a boat ramp with docks, and boat and trailer parking. A fee is assessed for day use and overnight camping.

Hewitt and Holcomb Parks—These parks are day/night-use recreation facilities (RM 7.5) on the Powder River arm of Brownlee Reservoir near Richland (Figure 3). They are owned and operated by Baker County and are the only county-run facilities in the HCRA. Originally, the lands on which the parks were constructed were donated by IPC to a local sportsman's club, which later donated the land to Baker County for recreational development. The park is landscaped with turf, shade trees, a paved road, and parking area. Amenities include restroom facilities, RV camp sites with electrical and water hookups, showers, picnic tables, a playground, a fish-cleaning station, boat ramps, and numerous docks. In 1996, IPC extended the main boat ramp by 100 ft at Hewitt Park, from elevation 2,048.5 to 2,036.5 ft msl, to aid boaters in launching during low-water levels. A fee is imposed for overnight camping.

5.2.2.5. Private Facilities

There are many recreation facilities offering a variety of amenities along the Snake River on both sides of Brownlee and Oxbow reservoirs and in the HCNRA.

Snake River RV Park—This 25-acre campground (RM 340) is adjacent to Oasis Campground (Figure 3). The campground contains 10 campsites with electrical, water, and sewer hookups; 10 sites with electric hookups and water only; a restroom facility with showers; and a laundromat, fish cleaning station, and a paved boat ramp.

Oasis Campground—On the Oregon side of Brownlee Reservoir, Oasis Campground (RM 340) is located between and adjacent to the BLM Oasis site and the Snake River RV Park, adjacent to the Olds Ferry–Ontario Highway (U.S. 30) and approximately 10 mi downstream of Weiser (Figure 3). Oasis Campground has 23 RV sites with electrical, water, and sewer hookups and a restroom with showers. Bait and tackle are sold on site.

Mountain Man Resort and Marina—Mountain Man Resort (RM 310) is on the Idaho side of Brownlee Reservoir, 32 mi northwest of Weiser (Figure 3). It is part of a 38,000-acre ranch,

accessible via county-maintained Rock Creek Road. Before 1997, lodge amenities included accommodations for up to 34 people, meals, and a meeting room. For a fee, primitive camping facilities and teepees were available for overnight use. Guided hunting and fishing were offered on a private shooting preserve. A marina adjacent to the lodge provided boat mooring, boat rentals, fuel, bait, tackle, fishing licenses, and groceries. Since 1997, Mountain Man Lodge has not been open to the public.

Little Deacon Creek—This approximately 5-acre site (RM 310) provides a primitive boat ramp, a dock, and some graveled pads for RV parking (Figure 3). This site is also used as an access from the Oregon side of the river to Mountain Man Resort.

OX Ranch—OX Ranch (RM 284) is adjacent to McCormick Park on the Idaho side of Oxbow Reservoir, just downstream of Brownlee Dam (Figure 3). Access to OX Ranch is via McCormick Park Road.

Kirby Creek Lodge—This lodge (RM 219) is located approximately 80 mi upstream of Lewiston and 26 mi downstream of Hells Canyon Dam (Figure 3). Mike and Jodee Luther, who own and operate Snake River Adventures, also run Kirby Creek Lodge, via a special-use permit from the USFS. The lodge has a grassy lawn, 8 guest rooms, 2 shared bathrooms with shower, and 1 shared living room; family-style dining is provided.

Copper Creek Resort—On the Oregon side of the river, this resort (RM 205) is approximately 65 mi upstream of Lewiston (Figure 3). Owned and operated by Beamer's Landing, Inc. (a guide and outfitting service) under a special-use permit, Copper Creek offers several cabins with beds, bathrooms with showers, cabin decks overlooking the river, and a boat dock. Meals are available.

Garden Creek Preserve (The Nature Conservancy)—Formerly known as The Madden Ranch, this site (RM 176) is located just north of the HCNRA boundary, approximately 37 mi south of Lewiston, on what was once a working ranch (Figure 3). Built in the 1920s, the lodge is a large home leased from The Nature Conservancy by River Quest Excursions. The house overlooks the Snake River and is surrounded by an orchard. Garden Creek runs past the orchard and supplies the property with its own hydroelectric power. There are 4 guest rooms with beds and 2 shared bathrooms. Meals are served family-style.

In addition, many private recreational facilities provide various amenities in the vicinity of the HCRA. Listed below are a few within the area.

Farewell Bend Motor Inn Complex—Approximately 0.5 mi upstream of Farewell Bend State Park, this complex includes a motel, gas station, café, and truck repair facility. It is located next to I-84 off Exit #353.

Wayne's Motel—This small motel is located in Huntington and provides lodging for visitors using the Brownlee Reservoir area.

Hells Canyon Sportsman's RV Park and cabins—This RV park is located approximately 2 mi southwest of Oxbow along Oregon 86. Rental cabins and laundry facilities are also available.

Richland Motel—Located in Richland, this motel provides lodging for those wanting more amenities than the camping facilities at the county’s Hewitt and Holcomb parks.

Gateway Store and Motel—This facility has a café/store, small motel, and RV storage. Gateway is located along Idaho 71, approximately 4.5 mi southwest of Brownlee Reservoir. Bait, tackle, groceries, fishing licenses, gasoline, and propane are sold on site.

5.2.3. Maintenance of Recreation Facilities

Maintenance, improvement, and expansion of recreational facilities in the HCC and HCNRA have been accomplished by the cooperation of government agencies, IPC, and other private parties. IPC has invested in its own facilities, as well as those owned by federal and state agencies and counties. Investments in HCC and HCNRA recreation facilities have also been made by private parties and managing agencies such as the BLM and USFS. In addition to facility improvements already made, more improvements are planned.

5.2.3.1. IPC Contributions to Recreation Facilities in the HCC and HCNRA

IPC Contributions to IPC-owned Facilities

Over the life of the license, IPC has invested heavily to enhance and improve recreational opportunities at company-owned facilities associated with the HCC (IPC 1997). Improvements to and costs for the company’s sites are summarized in Table 3.

IPC Contributions to Non-IPC Facilities in the HCC

Working cooperatively with managing agencies and private parties, IPC has invested in the development of non-IPC facilities. These investments are summarized in Table 4.

5.2.3.2. Contributions Made By Other Entities to Recreational Facilities in the HCC

Contributions to the HCC by the BLM

The BLM has made many improvements to their recreational facilities over the last 10 years. Table 5 is a summary of the latest improvements to BLM sites and their costs.

Contributions to the HCC by the USFS

The USFS has made many improvements to their recreation facilities along Hells Canyon Reservoir and the HCNRA. IPC was unable to gather information relating to road upkeep and administrative costs for these areas; however, Table 6 itemizes improvement costs since 1991 (Gay Ernst, pers. comm., December 14, 1998).

Contributions to the HCC by the Oregon Department of Parks and Recreation

Oregon Department of Parks and Recreation (ODPR) has made many improvements to Farewell Bend State Park, located on Brownlee Reservoir. Table 7 itemizes improvements and their costs to the park in the last five years. Cost estimates are based on documentation at the park office and may not be entirely accurate (Chris Magallenes, ODPR, pers. comm., June 1998).

Contributions to the HCC by Private Parties

IPC was largely unable to inventory the improvements and associated costs made to facilities owned by private parties. During our investigation, however, we were given information about improvements made to the Snake River RV Park. During 1997, the owner added 10 more camping sites and a fish-cleaning station (Glenn Fleming, pers. comm., September 1998). The addition of dog runs and a day-use area are planned for the future, but cost estimates are not available.

Planned Improvements to the HCC by the Oregon State Marine Board

The 1995 *Vessel Waste Disposal Plan* prepared by the Oregon State Marine Board (OSMB) identified the need for four waste-collection facilities on Brownlee Reservoir (Obern 1995). These included pump-out/dump stations at Hewitt Park and Farewell Bend State Park, and floating restrooms at Powder River and South Reservoir. Cost estimates ranged from \$70,000 to \$75,000 per facility. According to Dave Obern, facilities manager for OSMB, none of these projects had been completed as of 1998 (Dave Obern, pers. comm., August 13, 1998). However, five years of funding may be available for needed enhancement within the HCC through a grant-in-aid program recently reauthorized through Congress (Wayne Shuyler, pers. comm., July 14, 1998).

5.2.4. Surveys about Recreation

For this study, IPC collected post-impoundment recreation studies. Some of these were based on surveys generalized for the entire state and others were specific to locations within the Hells Canyon area. Statewide studies included information on recreational profiles, user needs and expectations, participation in recreational activities, and recreation trends. Please note that the definitions for terms quantifying recreational use, such as *visitor use* and *recreational-user days*, vary per study and report, and even within a study or report, and usually resulted in expanded numbers based on statistical sampling. (In this section, such terms are italicized upon first use.) To understand how these terms are defined for any study, please consult the appropriate report.

5.2.4.1. Statewide Recreational Surveys

Idaho Department of Parks and Recreation (IDPR) is authorized by law to develop a statewide comprehensive outdoor recreation and tourism plan through Idaho Code 67-4223 (f) (IDPR 1997). Known in its present form as *Idaho Statewide Comprehensive Outdoor Recreation and Tourism Planning* (SCORTP), this plan provides a “contemporary assessment of outdoor recreation and tourism in Idaho” and discusses how public, private, and independent entities,

within the state's social, economic, and natural resources constraints, will meet these needs. The 1998 SCORTP contains detailed information, broken down by regions and counties, about the impact of tourism expenditures and recreation dollars on local communities. It profiles resident and nonresident recreationists in Idaho, including demographics, user opinions, types of use, and distribution of use across the state. The report also includes information about Idaho outfitters and guides (IDPR 1998). Approximately 374 small Idaho businesses comprise the outfitter-and-guide industry, which grossed \$22,000,000 in 1994. Information specific to HCC and HCNRA is not included in this report.

ODPR produces a SCORTP approximately every five years. The continuous planning process provides a conceptual framework for Oregon's recreational future. More general than the Idaho counterpart, the *Oregon Outdoor Recreation Plan 1994–1999* offers information about statewide recreational use for local and dispersed areas and provides a recreation implementation program for the state with a focus on local communities (ODPR 1994, IAC 1995). ODPR also conducted visitor surveys (Cindy Vergari, ODPR, pers. comm., 1998), but neither the data, nor the dates of the surveys, were available for reporting.

The OSMB performs triennial statewide boating studies to determine use patterns and opinions of Oregon boaters (OSMB 1996). These studies include responses from owners of registered boats (motorized watercraft and sailboats equal to or exceeding 12 ft in length) in Oregon.

Washington's latest version of the SCORTP is known as the *Outdoor Recreation and Habitat Assessment and Policy Plan 1995–2001* (IAC 1996). This plan meets state law requiring the Interagency Committee for Outdoor Recreation (IAC) to prepare and update a strategic plan to acquire, renovate, and develop recreational resources and to conserve and preserve open space. In accordance with the plan, IAC conducts statewide and regional research on public demand and future trends for outdoor recreation. Studies have indicated that participation in many recreational activities in Washington are growing at a faster rate than general population growth, with participation in walking, bicycling, field sports, golfing, and camping growing the most.

5.2.4.2. Recreational-Use Surveys Conducted in the HCNRA

According to a USFS 1961 management plan for the Hells Canyon–Seven Devils Scenic Area, an estimated 10,000 visitors accessed the area in 1960. At this time, recreational-use pressure was increasing in the area, and populations of nearby towns and cities were growing. The problems of managing for crowds and minimizing impacts to the natural features of the canyon were increasing. To help plan for the future, managing agencies began to monitor amounts and types of recreation and develop management plans in the Hells Canyon area. According to the 1961 USFS management plan for the area, road improvements and developed campgrounds were planned to accommodate increasing numbers of users. Adequate sanitation facilities and drinking water were planned at new developments to protect public health and safety (USFS 1961).

In 1965, the USFS analyzed the possible effects of the proposed High Mountain Sheep Dam and Reservoir on Snake River resources. The resulting impact report identifies “major problems” with the condition and amount of recreational facilities within the canyon in 1965, and in view of the recreational impact the High Mountain Sheep Project would have on the area, the conditions were considered inadequate. Solutions included building new roads, acquiring homesteads from

private owners for campground development, planting trees and shrubs for cover, supplying potable water at sites, and fireproofing sites. According to the report, the Wallowa-Whitman National Forest reported 19,000 *visitor-days* of use in the Imnaha/Dug Bar area and Hat Point Overlook in 1963. Access was by vehicle and by commercial and private boat. The number of *hunter-use days* in 1963 was estimated at 1,938. The numbers of private businesses using the area were also given in this report. Eight commercial packers worked on the Oregon side. Five outfitters—two from Lewiston and three from the Salmon River area—worked on the Idaho side. Three commercial boat operators, two from Lewiston and one from Homestead, operated on the Snake River and maintained “semi-permanent” overnight camps within the canyon. The locations of these camps were not reported, but the Wallowa-Whitman National Forest is cited in the report as saying that these operators served 750 people in 1963 (USFS 1965).

In 1969, IDFG conducted a study on recreational use in the Wild and Scenic Snake River area and the HCNRA (Anderson et al. 1970). The purpose of the study was to learn how many people were recreating in this area and would therefore be affected by construction of the proposed High Mountain Sheep Dam. Data was gathered at four access points: Cache Creek, Hells Canyon Dam, the Imnaha River access road, and the Pittsburg Landing road. The report does not account for recreationists entering the area from the rim area or by aircraft, float boats, or trails (except at Hells Canyon Dam and the Imnaha River). Methods of data collection varied at each site. Methods included a combination of direct and indirect observations and on-site interviews. Recreational use for the entire area was estimated at 4,495 *man-days* for the year.

At the Imnaha River site, recreational use was estimated by a stratified statistical sampling program of interviews from road access into the area. Six hundred fourteen individuals were interviewed in 33 days and asked how many people they saw while recreating. From this data, recreational use was estimated at 9,678 man-days per year. At the Pittsburg Landing site, estimates of recreational use were made by counts from a traffic recorder located near Pittsburg Saddle and maintained from April 24 to October 6, 1969. Random interviews of recreationists to determine party size, recreational activity, and trip length were done in April, May, and October 1969. A total of 9,643 man-days of recreational use for this site was estimated by multiplying the total number of recreationists by the average length of stay. In total, recreational use for the High Mountain Sheep Dam Impact Area in 1969 was estimated at 44,240 man-days.

The USFS’s 1970 *Multiple Use Survey Report: Hells Canyon, Snake River* analyzes the interrelationships of uses and resources in Hells Canyon in the area between Hells Canyon Dam and Wild Sheep Rapids (USFS 1970). This report states that 16,300 *visitor days* occurred in that area in 1969, and 21,600 in 1970. The numbers of float trips increased from 2,380 visitor days in 1970 to 4,500 in 1971. (The dates are correct; though the report is dated 1970, it also contains results for 1971). The report indicates that the 1970 figures were derived from the use of a traffic counter, but no further methods are described, and no other studies cited. This report also summarizes recreation activities and patterns of use in 1970 (USFS 1970). Three outfitters were licensed from Oregon to run charter trips down the river to Wild Sheep Rapids for fishing and sightseeing. One outfitter used a large raft to run five-day float trips to the Grande Ronde River. Kayaks and wet-suited body surfers were also observed on the river. Overnight use at the Hells Canyon Creek Recreation Site by hunters and fishermen caused various sanitation

problems, so the USFS prohibited overnight camping at this site. According to the report, because of “inadequate use statistics before 1970, no projections of use increase” could be made.

In 1975, a follow-up to the previously mentioned 1969 IDFG study was conducted. According to the author of the resulting report, *Comparison of Recreational Use at Cache Creek on the Middle Snake River 1969 and 1974* (Witty 1975), the sampling of the four sites in 1969 had been significantly more frequent on weekends and holidays, Fridays, afternoons, and months of high use. Because of that study’s bias toward high-use times, use had been overestimated. The purpose of the follow-up study was to repeat the 1969 study for comparison, but travel restrictions limited the study to the Cache Creek site. Recreationists accessing the river by boat at the Cache Creek check station were stopped, interviewed, and asked to complete a mail-in survey. A complex recompilation of the 1969 study’s numbers was done to reduce the high-use time bias. The author of the 1975 study concluded that approximately 12,909 *recreational-use days* occurred at the Cache Creek site in 1969 (compared with 18,755 *man-days* according to the 1970 report). The 1974 data indicated that 19,897 recreational-use days occurred at the Cache Creek site that year. Only the latter figure includes float boat parties. Results from the 1974 mail-in questionnaire indicated that seeing wildlife and being in an undeveloped area contributed most to respondents’ recreational experience. Main activities were identified as boating, hiking, fishing, and hunting. Because of sampling techniques and a low response rate, results from the mail-in questionnaire were reported to be representative of recreationists who were slightly more educated and cooperative than others.

In a 1978 report, *Recreation Use Statistics: Hells Canyon National Recreation Area*, the USFS attempted to document 1977 recreational-use information for the entire HCNRA, including the Seven Devils area. The study presented use statistics—at Hells Canyon launch, in the Seven Devils Wilderness area, and on the Snake River from Hells Canyon Dam to Wild Sheep Rapids—and totaled the Snake River corridor use. Methods for collecting data from each of these areas varied (USFS 1978a). Recreational use numbers for the HCNRA were compiled through the Recreation Information System. Recreational use for the Seven Devils area was collected from self-registration stations maintained at Windy Saddle, Seven Devils Guard Station, Goat Pass, and Black Lake. Total *user days* for this area from July 4 to September 6, 1976, were estimated at 400. Total user days in 1977 were 3,366. Snake River float trip use data were estimated using permits issued at Hells Canyon Dam launch site. A total of 12,208 user days was reported in 1977. The USFS and BLM collected powerboat use data on the Snake River for 1977 through a survey of jet boat use. Data about commercial jet boat use from Hells Canyon Dam to Wild Sheep Rapids were collected from special-use permits issued by the USFS. Total use for this segment of the Snake River was 1,582 in 1977. Total reported use for the HCNRA and Seven Devils for 1977 was 419,600 *visitor days*.

Three USFS reports—from 1980, 1982, and 1984—all entitled *Annual Use Reports for Hells Canyon Dam*, report visitor use in the Wild and Scenic Snake River area. Using counts of launches from this site, the reports estimate how many users accessed the Wild and Scenic Snake River from this point. Each report summarizes recreational use figures and issues relevant to that year’s recreation. The reports include totals of private and commercial launches, trips and people per float trip outfitter, and use figures categorized by types of users. Information about count frequency and methods is not included. In 1980, total visits to the area were down by 3% from 1979, with August being the busiest month. Commercial float boat and powerboat use

decreased by 13% and 24%, respectively. Private powerboat use decreased by 44% from 1979. Reportedly, water levels and fish resources contributed to the decline in use of this site (Wilmarth 1980). In 1982, powerboat use decreased by 38% from 1981, and commercial float boat use decreased by 25%. Floater use shifted to smaller, noncommercial trips (Wilmarth 1982). In 1984, high water (an average of 70,000 cfs in May and 50,000–60,000 cfs in June) caused float-boat and powerboat use to be well below average for those months. Boating use approached normal by the middle of July, when flows declined (Wilmarth 1984).

The USFS also compiles annual Snake River use reports that document float boat and powerboat use, both private and commercial, in the Wild and Scenic Snake River. Figures in these reports are derived from self-issue permits, USFS special-use permits, and permits issued to launch at Hells Canyon. In 1983, guided raft trips declined by 30% from 1982, while numbers of noncommercial rafter were at an all-time high—1,006 total (Kiser 1983). From 1986 to 1988, *total river use* in the primary season (late May through mid-September) increased by 1,000 to 2,000 people per year. The ratio of commercial powerboaters to private powerboaters was 11,851 to 1,740 in 1988, private floaters out-numbering commercial floaters by only a few hundred each year (Cole and Rawhouser 1986). From 1987 to 1989, total river use in the primary season continued to increase by 1,000 to 2,000 people per year. Commercial businesses continued to dominate powerboating use, and use among commercial floaters increased steadily, out-numbering private floaters by about 100 in 1989 (Cole and Hill [1989]). From 1988 to 1991, total river use in the primary season continued to rise, with marked increases from 23,994 in 1989 to 30,779 in 1991. During this time, commercial powerboating remained stable, but private powerboating nearly doubled in total use. Commercial and private float boating remained stable (Cole et al. [1991], [1995]).

The OSMB performs triennial statewide boating studies to determine use patterns and opinions of Oregon boaters (OSMB 1996). These studies include responses from owners of registered boats (motorized watercraft and sailboats equal to or exceeding 12 ft in length) in Oregon. The latest report of these studies, *Oregon Recreational Boating Survey 1996*, includes use and activity numbers for registered Oregon boaters accessing the HCNRA and Wild and Scenic Snake River. Total *boater use* in this survey is reported on a statewide basis as well as by county, water body, and watershed. The survey sample was selected from the 187,416 boats properly registered in Oregon as of 1994; 6,415 registered boats, or 3.5% of the eligible boats, comprised the sample, which was stratified by county. A total of 4,621 boaters responded, a response rate of 72%. Survey questions required boaters to reflect on the one-year period from October 1, 1994, through September 30, 1995. Boater use on the Snake River in Wallowa County, which borders the entire length of the HCNRA from Hells Canyon Dam to Cache Creek, was reported to be 3,029 in 1995. Fishing, water skiing, and cruising were the primary activities in which boaters participated. Trend data show that boater use in this area during 1978, 1985, 1987, 1990, and 1993 were 1,047; 2,167; 1,568; 1,608; and 5,474; respectively. Fishing remained the most popular activity by a wide margin, except in 1978, when water-skiing ranked highest. It should be noted that these results include a large portion of Hells Canyon Reservoir and do not reflect results obtained only from HCNRA boaters.

5.2.4.3. Recreational-Use Surveys Conducted in the Reservoir Areas of Hells Canyon

In 1971, IDFG completed a study on angler use and fish harvest at Brownlee Reservoir and included other recreational use in the study area in the resulting report, *Lake and Reservoir Investigations* (Goodnight 1971). The creel study took place from February 27 to November 19, 1971, and covered the entire Brownlee Reservoir, except the area between Sturgill and Dennett creeks. The study area was divided into two sections: the upper section from the headwaters of Brownlee Reservoir to Dennett Creek and the lower section from Sturgill Creek to the dam, including the Powder River. The census period was divided into 19 two-week intervals; during each interval, one Saturday, one Sunday, and two weekdays were sampled in each of the two study area sections. The sample day included four instantaneous counts. Recreational users other than fisherman in each count included those using Steck Recreation Site, Farewell Bend State Park, Hewitt Park, and Woodhead Park. While anglers expended 15,955 *angler days* in the study area, other recreational use was estimated to be 25,927 *recreational-user days*. Activities included swimming, boating, water-skiing, camping, hunting, picnicking, and sightseeing. Peak use occurred over Memorial Day, Fourth of July, and Labor Day weekends.

IPC has kept various records of recreational use in the HCC from 1970 through 2000. Early studies were simple vehicle counts (from observation and also installed vehicle counters) in the area and inventories of private, state, and federal park visitor totals (Smith 1970). In 1971, a recreational-use survey was conducted to collect required FERC Form 80 information and to analyze the difference in recreational use between the reservoir and the free-flowing river (Ryan and Smith 1971). During the study period July 1 to October 31, 1971, sites at Pittsburg Landing, Imnaha–Dug Bar, and the confluence of the Snake and Salmon rivers were monitored daily for recreational use. Vehicle counters at Hells Canyon Dam access road; Farewell Bend State Park; Oasis site; and Woodhead, McCormick, Copperfield, and Hells Canyon parks recorded data for these locations. Results indicated that 18,857 people accessed the free-flowing portion of the Snake River between Hells Canyon Dam and the confluence of the Snake and Salmon rivers and that 265,261 people accessed the reservoir portions of the Snake River.

In 1972, IPC began keeping records of use at all major parks at both licensed and unlicensed projects to complete the FERC Form 80 and to keep “abreast of the demand use of all major IPC parks” (Ryan 1972). Table 8 shows the numbers of visitors that were recorded at IPC parks in the HCC in 1972:

The *Oregon Recreational Boating Survey 1996* describes use and activity numbers on Brownlee, Oxbow, and Hells Canyon reservoirs, identified by water-body and launch site, as well as county and watershed. Results for 1996 were compared with results from previous years to identify trends. On Brownlee, Oxbow, and Hells Canyon reservoirs, *total use days* by boats registered in Oregon were 26,533; 3,089; and 1,753; respectively. At these reservoirs, primary activities included fishing, water-skiing, jet boat skiing (not present on Hells Canyon Reservoir), and cruising. There were no occurrences of sailing in these surveys. Fishing was the most frequent activity, having over 70% participation on each reservoir. The three most widely used launch sites on Brownlee Reservoir were Hewitt Park’s Day-Use Area, Spring Recreation Site, and Farewell Bend State Park, with use days at 11,156, 3,606, and 3,280, respectively. The most-

used launch on Hells Canyon Reservoir was Big Bar (located on the Idaho shore), having 1,011 use days during the study period. Trend data suggest that use by boats registered in Oregon on Brownlee Reservoir dropped drastically between 1978 and 1985 (OSMB 1996). Since 1987, total use by boats registered in Oregon has increased from 12,239 use days in 1987 to 35,241 in 1993. Trend data for Oxbow Reservoir shows that total use days by boats registered in Oregon has increased from 2,176 in 1993 to 3,089 in 1995. Trend data was not included for Hells Canyon Reservoir.

There have not been many studies specific to recreational use at individual campgrounds in the Hells Canyon Reservoir area; however, managing agencies record total use numbers annually. ODPR has records of day use and overnight use at Farewell Bend State Park for the years 1970 to 1997. These records show little change in *day-use numbers* (205,312 in 1970 and 244,254 in 1996), but a marked increase in overnight use over the 27-year period. Overnight use increased steadily from 15,418 in 1970 to 32,534 in 1996 (Cindy Vergari, ODPR, pers. comm., April 23, 1998).

BLM has records of recreational use at its Oasis site dating back to 1994, when BLM took over the management of this site from ODFW (BLM n.d.). Use data each year was based on “best professional estimate, based on occasional on-site observations throughout the given year.” Data does not differentiate between day use and overnight use. According to this data, recreational use at this site has decreased from 1,000 *visitor days* in 1994 to 500 visitor days in 1997.

Recreational use is also recorded at the BLM-managed Steck Recreation Site. The methods of data collection at this site were not included in the informational packet provided by the BLM (BLM n.d.). The number of campground visits was recorded as 16,722 in 1994; 25,600 in 1995; 23,040 in 1996; and 6,000 in 1997 (BLM n.d.).

5.2.4.4. Fishing and Hunting Studies

The previously mentioned IDFG report, *Lake and Reservoir Investigations*, provides information on fishing and hunting for Brownlee Reservoir (Goodnight 1971). The creel study took place from February 27 to November 19, 1971. Results indicated that in 1971, anglers expended 15,955 *angler days* in the study area. Bank anglers dominated the upper section and favored fishing for channel catfish. Boat anglers dominated the lower section and favored fishing for smallmouth bass and black crappie. Seasonal distribution of angling pressure was erratic, but maximum pressure occurred over Labor Day weekend on both the upper and lower sections. Peak use occurred over Memorial Day, Fourth of July, and Labor Day weekends. Ninety-five percent of recreational use occurring after September 19 (5,500 hours) was reportedly hunting related. Peak use by hunters was between October 6 and October 19, a period that included opening weekend for pheasant season in Oregon and opening weekends for chukar, deer, and waterfowl seasons in both Idaho and Oregon.

A statewide survey of fishing harvest, with economic analysis of Idaho sport fisheries, was published in 1970 (Gordon 1970). The survey period was from March 1, 1968, to February 28, 1969. A mail-in questionnaire was sent to 8,815 of the 312,850 individuals licensed to fish in the state during the study period; 3,974 usable questionnaires were returned to IDFG. Total *angler days* in 1968 were estimated to be 2,939,000.

In 1989, IDFG published a report called *Idaho Anglers: A Survey of Opinions and Preferences* (Reid 1989). Randomly selected from the 421,727 people who bought Idaho fishing licenses in 1987, participants were mailed a questionnaire. From the 28,950 individuals sampled by mail (7%), 5,252 questionnaires were returned to IDFG as undeliverable, and 8,599 usable questionnaires were filled out and returned to IDFG. Nonrespondents were sent one reminder letter. Radio and TV public service announcements served as further reminders. A sub-sample of nonrespondents was called for a telephone survey in an effort to measure statistical bias from nonrespondents. Little to no bias was reported from nonrespondents. Demographic data from this survey indicated that the average Idaho angler had not changed much since the first survey of this kind in 1968; the average angler was between 30 and 40 years old, male, and a resident of Idaho. The numbers of juvenile anglers appeared to be declining. The report provides a comprehensive summary of angler opinion and preferences in 1987. A total of 4,491,482 *angler days* were reported. The Snake River was identified as the most fished body of water in the state that year. Brownlee Reservoir was reported to be the fifth most fished body of water by anglers residing in Region 3, which contains both Brownlee Reservoir and the Boise River. The majority of anglers preferred fishing for coldwater species and preferred fishing at streams and rivers. However, one-half of the actual fishing effort in 1987 was spent on lakes and reservoirs. Angler preferences indicated that more management was needed for coldwater fisheries, but “no change” was needed on warmwater fisheries, except improvement of access for both bank and boat users.

A lowland lakes and reservoirs investigation by IDFG in 1989 included a creel study on Brownlee Reservoir (Mabbott and Holubetz 1990). The creel survey was conducted from February 1, 1989, to January 31, 1990, and the study area was divided into nine sections to facilitate instantaneous counts. In each of thirteen 28-day intervals, four weekdays and four weekend days were sampled. Two to three counts were done on each sampling day. Although anglers were contacted on a total of 104 days during the study, counts were only done on 57 of the days. An estimated 851,749 *angler hours* were expended during the study period: 748,942 in the summer period and 102,807 in the winter period. Trout was the preferred target species of anglers in winter; crappie, in summer. Recommendations from this study included making annual counts to determine angler pressure and continuing to monitor effects of trout stocking and angler use every two to three years.

5.2.4.5. Recreational User Profiles and Recommendations

Creating management plans for reservoirs, free-flowing rivers, and wilderness areas requires the input of the general public. Many studies have aimed to develop visitor profiles from demographic information, use characteristics, and user opinions.

A 1978 USFS study sought to assess public opinion on management of the Snake River. A questionnaire was developed to ask about elements contributing to recreation experience and several management options (USFS 1978b):

- The level of recreation experience that should be provided in the Snake River corridor
- The allocation of use between and within the private and commercial sectors

- The effort that should be taken to reduce impacts on the river environment
- Measures that should be taken to improve safety for river users
- Ways of managing cultural resources
- Treatment of grazing in the river corridor

The questionnaire was mailed in August to 380 people who had volunteered their names and addresses at the launch site. Eighty forms were returned. Of the 80 respondents, 10% were local, 21% lived in the region, and 31% resided outside the Oregon/Washington/Idaho area. Respondents were evenly divided by activity groups: 24% were private floaters, 23% were commercial floaters, 19% were commercial jet boaters, and 19% were hikers. No private jet boaters responded to the survey. The majority of respondents (43%) favored having a primitive river experience and tended to be open to compromises such as river zoning and where portions of the river would be considered primitive, while others were not. Respondents from local areas tended to support a full-range river experience, while respondents from outside the Oregon/Washington/Idaho area supported primitive experience. In general, all respondents supported equal permit allocation between commercial and private sectors. Ninety percent of respondents favored limiting party size of groups traveling together in the river corridor. All respondents favored improving river-use safety, but most rejected the options of additional safety patrols, emergency telephones, and designation of safe swimming sites. All respondents favored some preservation of cultural sites in the Snake River corridor. Finally, 72% of respondents favored continued grazing, but they were decidedly split on how to manage grazing in the area. Twenty-three percent of respondents indicated that grazing should be eliminated in the river corridor.

The University of Idaho report entitled the *Hells Canyon Visitor Profile and Recreation Use Study* presents data about floaters and powerboaters who used the Snake River and HCNRA. Between April 15, 1988, and April 14, 1989, researchers collected data regarding respondents' activities, management preferences, and perceptions of the river (Krumpe et al. 1989). Respondents were divided into four sub-populations for analysis purposes: private powerboaters, commercial powerboat passengers, private floaters, and commercial float passengers. The sample was stratified by regulated and unregulated seasons. The regulated season was defined as May 27, 1988, to September 15, 1989, and the unregulated season was defined as all other times during the study. Both mail-in questionnaire and on-site contact were used to gather data for the visitor profile.

For the study, self-issue permits for private powerboaters were required for the regulated and unregulated seasons. These permits were modified to collect the names and addresses of the trip leader and one randomly selected passenger in each party, who were later mailed visitor questionnaires. For the on-site contacts, research assistants spent approximately 90 days, split equally between seasons, interviewing visitors at the primary access points of Hells Canyon Creek Recreation site, Pittsburg Landing, Dug Bar, the lower Salmon River, the Grande Ronde/Heller Bar area, and the Hells Gate area. Everyone in small groups was interviewed, and for large groups, research assistants interviewed the trip leader and two randomly selected passengers. The number of surveys mailed to visitors was 1,927; and 1,492 of these were filled

out and returned, for a response rate of 77%. Out of the 1,492 questionnaires received, 1,360 were encoded for computer analysis and comprised the final data.

Based on permit and questionnaire results, a Snake River and HCNRA visitor profile was established. Of the 1,927 people contacted, 77% were from Idaho, Washington, and Oregon; and 23% were from other areas. Of the 1,360 respondents, 57% had rafted in the area, 41% had used powerboats, and 2% participated in other recreational activities. About 75% of the respondents were male, and 25% were female. Age of respondents ranged from 16 to 83, but 66% were between 30 and 49, 19% were over 50, and 15% were under 30. Nearly 47% of respondents had attended college, 30% had attended graduate school, and 23% had an elementary or secondary education. The four different sub-populations were analyzed, but they often did not differ in their perceptions of the Snake River and HCNRA. All groups valued the scenery, excitement, natural splendor, and historical/cultural attractions. Issues of concern for all groups included litter, fluctuating water levels, and noise levels. All agreed that there was a need for moderated development of outhouses, dumpsites, and human waste disposal facilities to protect the health of the area. Respondents favored a variety of options for managing the river, but stressed that regulations should apply equally to all river users. Overall, visitors to the area were satisfied with their experience.

A report prepared for the USFS called *HCNRA: Public Opinion Polls* categorizes public opinions on various issues surrounding the current management of the HCNRA. Respondents fell into three groups: people who had expressed an interest in the HCNRA, resident adults in the “rim communities” surrounding the HCNRA, and resident adults in the regional cities surrounding the HCNRA, such as Portland, Seattle, Spokane, the Tri-Cities, Boise, and Missoula (Eiselein 1994). The study design included three distinct opinion polls, each aimed at one of the above groups. A mail survey targeted people who had expressed an interest in participating in the HCNRA review process and was distributed to 760 people; 440 usable surveys were returned. Two telephone surveys, targeting rim communities and regional cities, were conducted from June 11 to 14, 1994. Phone numbers were obtained by using computer-generated random numbers, so unlisted numbers and new telephone listings could be included in the sample. The number of complete interviews in the rim communities was proportional to the number of telephone households within each community. The same could not be said for the survey of regional cities, so data was statistically weighted to reflect proportional sampling. Both telephone surveys suggested that people of ages 55 to 64 and people in high-income households were more likely to have visited the HCNRA. Respondents to the mail survey were more likely to have visited the HCNRA within the 12 months preceding the survey. In all three surveys, women and people of ages 18 to 34 were more likely to know nothing about the HCNRA. Respondents to all three surveys indicated that main activities while visiting the HCNRA were sightseeing, river use (float boating and powerboating), and fishing. They also indicated that the important features of the HCNRA were its natural setting, scenic values, and fishing. Respondents were asked to state the human activities that were the most and the least compatible with their idea of “best stewardship” of the HCNRA. The most frequent answers are listed as follows:

Most Compatible	Least Compatible
Nonmotorized recreation	Motorized recreation
Rafting and boating	Livestock grazing
Recreation in undeveloped areas	Timber management
Timber management	Commercial development
Hiking and backpacking	Motorized/off-road vehicle use

Respondents for all three surveys felt that the amount of nonmotorized, developed, and undeveloped access to recreational opportunities was satisfactory. Of the telephone survey respondents, 75% felt that the amount of motorized access to recreational opportunities was satisfactory; the mail survey respondents were divided, with 41% satisfied and 41% indicating that there was too much motorized access. Respondents to all three surveys indicated visitors to the HCNRA had above-average satisfaction levels.

A report entitled *Common Goals Divided Communities* summarizes a 1994 study to quantify differences between opinions of local interests and those of environmental groups on management trends in the region (Brick et al. 1995). Researchers conducted a mail-in survey in the five counties surrounding the HCNRA: Union, Baker, and Wallowa counties in Oregon and Nez Perce and Idaho counties in Idaho. Survey results were based on a simple random sample of 1,250 registered voters; surveys were mailed to 250 randomly selected, registered voters in each county during February and March 1994. Results reflect only this registered voter group, which the authors felt were the most likely to influence policy decisions on issues covered in the survey. In Union, Baker, and Wallowa counties, the response rate averaged 53%. In Idaho and Nez Perce counties, the response rate was 50% and 47%, respectively. Surveys were encoded to insure confidentiality of all information.

The survey was divided into five sections. In the first two sections, respondents were asked to choose between two opposing statements and to indicate the degree of their agreement by circling a number scale. In the third section, respondents indicated their degree of trust in various public and private institutions, rated the importance of various factors to the local quality of life, and indicated preferences concerning additions to the local economy. In the fourth section, respondents were asked to express their preferences about issues concerning management of the HCNRA, including new tourist developments, roads, motorized recreation, and commercial logging and livestock activities. A fifth section collected demographic data, including age, gender, education, employment, occupation, income, length of residence, and political orientation.

Eighty-one percent of survey respondents agreed that the natural, undeveloped character of the land is a big part of what makes a quality place to live. Nearly 70% agreed that the community should preserve its natural resources to benefit future generations. When asked to choose between using “nature” to produce consumer goods and preserving nature for its own beauty, respondents had varying opinions, with 53% preferring use and 33% preferring preservation. A majority of 57% favored protecting the region’s environment; over 34%, sacrificing the environment for jobs. Only 27% of respondents indicated land-use laws should be eliminated, while 67% believed that they help prevent unwanted development on private lands. Similarly,

67% agreed private land development should be restricted, even if it harms some individual landowners, while 25% preferred no restriction. Fifty-eight percent believed that private land is better managed than public land; 21% had no preference. Regarding local versus federal management of national forests, 78% of respondents said that people living near the forests should have the most input in management, while 18% believed that the American people should have some input and 4% had no preference. Thirty-six percent believed that the ordinary citizen is powerless in the process to influence management of public lands, while 60% thought that they can shape some change. Over 60% of residents agreed that the economy is too dependent on forest products and livestock grazing, while 31% were more focused on those products and uses.

Local residents were divided about changes in public land management, with 39% emphasizing habitat use and 48% emphasizing commodity use. The survey revealed community attitudes toward tourism: 55% of local respondents promoted it and 35% preferred less. Fifty percent of local residents believed they would not benefit from increased tourism, while 47% believed they would. Most respondents preferred to see the area remain as it is, though respondents hoping for a change in management priorities clearly expressed a preference for more backcountry trails (55%), more solitude (21%), and less motorized recreation (33%). A majority (58%) preferred existing roads to unpaved roads, with only 24% preferring more roads. Most respondents (62%) preferred existing tourist facilities, and 29% preferred fewer facilities. Sixty percent preferred existing livestock grazing conditions, while 17% preferred more; 30% of respondents preferred more commercial logging, while 49% preferred existing conditions.

Also in 1994, Washington State University conducted a study for the USFS; the resulting report was entitled *Wild and Scenic Snake River Hells Canyon National Recreation Area Visitor Perception Survey* (Larson and Udd 1995). Using a direct contact approach, researchers collected data on the perceptions of visitors to the Wild and Scenic Snake River. The study was also a pilot to evaluate the most efficient and feasible manner to collect experimental outcome data at different locations along the Wild and Scenic Snake River. Four survey zones were established. From upstream to downstream these were 1) the dock area at Cache Creek; 2) the boat launch and the picnic area at Pittsburg Landing; 3) the lawn and picnic table area by the Jordan home, as well as the lower landing at Kirkwood Ranch; and 4) the Hells Canyon Visitors Center (at the Hells Canyon Creek Recreation Site). A staff member, the project manager, sampled visitors on the wild stretch of the river, away from the above locations. Sampling was to occur twice a day for 15 minutes from May 31 to September 15, 1994. During that time, the surveyor would survey anyone entering the sampling zone. Questionnaires would be voluntarily completed. However, numerous logistical problems in the river corridor, Pittsburg Landing, and Kirkwood Ranch led to an adapted sampling plan for these sites, wherein staff members sampled the river corridor and other sites as time allowed. A total of 627 surveys were collected, but “poor record keeping” made calculation of an exact response rate impossible. Based on experience and observation, the survey manager conservatively estimated the response rate to be 85%. Survey results indicated that river users often noted differences between pre-trip expectations and trip experience, especially regarding types of facilities at campsites, amount of motorized use, and noise in the evenings. In general, survey respondents considered the HCNRA to be relatively primitive in its facilities.

The Hells Canyon Limits of Acceptable Change (LAC) Planning Task Force published a 1991 report entitled *Recommended Limits of Acceptable Change Recreation Management Plan for the*

Snake River (LAC 1991). The LAC Planning Task Force's goal was to define the desired resource conditions for the HCNRA and to develop a planning process to ensure that these conditions were achieved and maintained. Using results of the previously mentioned *Hells Canyon Visitor Profile and Recreation Use* study (Krumpe et al. 1989) and also public task force discussion, the task force recommended three primary conditions: "(1) provide river education and etiquette, (2) maintain the Hells Canyon recreation experience, and (3) perpetuate the area's natural and cultural resources." For each of these topics, the task force listed sub-topics and outlined specific goals, objectives, indicators, standards, and management actions.

5.2.4.6. Flow-Related Studies

In 1974, the Pacific Northwest River Basins Commission published a report, *Anatomy of a River*, which involved more than 30 state and federal agencies and private entities (Bayha and Koski 1974). This report (under the auspices of the Commission's Comprehensive Coordinated Joint Study and coordinated and edited by Keith Bayha, Bureau of Sport Fisheries and Wildlife, and Charles Koski, National Marine Fisheries Service) contains the results of a research project comprised of multiple studies, which monitored various effects of flows in the Snake River corridor. The studies addressed the issues of water quality, water volume, whitewater boating, wildlife and aquatic habitat, navigation, and general recreation. The research project took place from March 20 to 25, 1973. Five controlled flows, each held stable for 24 hours, were studied: 18,000; 12,000; 7,700; 5,000; and 27,000 cfs.

One of the studies mentioned in *Anatomy of a River* determined the effect of each flow level on the catchability of fish (Brusven et al. 1974). About 54 *man-hours* of fishing were volunteered, as time permitted, during the study period. No significant difference was found in the catchability of trout at the different water levels. However, more suckers and carp were captured at high flows, and more squawfish and bass were captured at low flows. No conclusions were drawn from the study due to limited amounts of data.

Another study summarized in *Anatomy of a River* investigated the effect of different flows on outdoor recreation activities such as powerboating, swimming, wading, water play, picnicking, and camping, as well as on aesthetics (USDI 1974). Observations at the five water-flow levels took place at seven points: below the Snake River/Grande Ronde River confluence, 0.25 mi below the Snake River/Salmon River confluence, China Bar, Dug Bar, Pittsburg Landing, Sand Creek, and Johnson Bar. Observed effects of flows on pool and riffle area, exposed beach, channel width, visual and sound quality, and navigation conditions were recorded. Flows were then categorized based on their recreation potential. The study's authors concluded that all flow levels observed were *acceptable* for the recreation activities considered. The 5,000 cfs flow was considered the minimum acceptable flow for powerboating because that activity is unsafe below those flow levels. Although boating is the most practical mode of transportation on this river stretch, that minimum flow limits the opportunities for recreationists to participate in other activities. The research project's coordinators identified shortcomings in the study related to duration, timing, and methodologies. First, except for powerboating, neither the minimum nor maximum acceptable flow for the activities was reached during the study period. Second, not all sites observed were desirable recreation sites. Third, the number of sites observed was not sufficient to produce a complete picture of recreational conditions. Researchers determined that additional studies should be conducted to make up for these recognized shortcomings.

Another study reported in *Anatomy of a River* examined the effect of changing water levels on whitewater boating in a controlled flow study in Hells Canyon (Welsh and Crouch 1974). Two kayakers and a six-man raft floated the Snake River from Sheep Creek Rapids to Granite Creek Rapids at 27,000 cfs, and from Hells Canyon Dam to Sheep Creek at 12,000; 7,700; and 5,000 cfs. The team evaluated the level of boating difficulty using the international six-grade system (1–6). Results indicated that whitewater boating was optimized at 12,000 cfs. A higher flow tended to “smooth out” the rapids, and lower flows tended to require more paddling through slack water.

5.2.5. Recreational Issues

There are many recreational issues in the HCC and HCNRA that are currently being addressed by IPC, other private parties, and managing agencies. Some of the more contentious issues include fish and fishing, streamflows and water allocation, sediment transport, and archaeological and cultural preservation. Although other concerns may be foremost in discussions of fish issues, streamflows, water allocation, and cultural preservation, the impacts to recreational activities and users overlap.

5.2.5.1. Fish Issues

As indicated by license article 35, IPC is obligated to mitigate for anadromous fish loss associated with construction of the HCC (Project No. 1971). In the 1960s, a task force of representatives from each of the state and federal fish and wildlife agencies in the Pacific Northwest formed to develop plans for handling the anadromous fisheries in the Hells Canyon Reach of the Snake River. The resulting studies called for experimental facilities for both the upstream and downstream passage of anadromous fish around the three dams to allow access to natural spawning and rearing areas. As recommended by these studies, IPC has developed an extensive fish hatchery program.

As indicated earlier in this study, the fishing emphasis in the 1950s and 1960s was on improving game fishing. During this time period, sport anglers, unconcerned with protecting fish species, pressured IDFG to provide better game fishing (Petersen 1995). Therefore, in the 1960s, poisonous taxophene was dumped into Idaho’s high lakes and streams to kill the remaining salmon over a period of one to two years. To insure the fate of the remaining sockeye, all entrances to the lakes were blocked to prevent spawning. Once the sockeye were destroyed, officials restocked the lakes with various trout species (Petersen 1995).

In the interim, public opinion changed toward conserving and preserving fish resources. Some people argued that any fish capable of surviving a 1,800-mi journey roundtrip to the ocean deserves protection. In 1976, the Pacific Northwest Regional Commission produced an investigative report of the Columbia River fisheries, including an analysis of detrimental human impacts on fish habitat (Petersen 1995). Inappropriate farming methods, pollutants, soil erosion, dredging, increased sedimentation, timber cutting, dams, and a multitude of human errors were scrutinized as causes for the fishery degradation. Public support of economic profits from hydroelectric and barging industries created by the dams on the Columbia–Snake River system outweighed any opposition by conservation groups at the time.

In 1988, fishery agencies cooperated in a Fish Passage Center and implemented a water budget for increasing Snake River flows at a time that fish were believed to be most benefited by increased flows. The target minimum was 85,000 cfs at Lower Granite Dam. Fishery agencies believed that increased flows would wash 80% of the smolts through the reservoirs and past the dams in April and May. The Northwest Power Planning Council estimated that survival rates would double with improved passage facilities and increased flows. Increased Snake River flows would also increase Idaho's power generation, but state officials were adamant about keeping Idaho's water in Idaho and opposed use of Snake River storage for anadromous fish. Resource consultant Ed Chaney called the state's view "self-destructive." In Chaney's opinion, a lower Snake River drawdown appeared the only reasonable option if the salmon were to survive. After considerable debate, the Fish Passage Center in 1988 obtained 300,000 acre-ft of Snake River water from Dworshak and Brownlee dams (Petersen 1995).

5.2.5.2. Minimum Streamflow Issues

The need for minimum flows is recognized and provided for in IPC's license for the HCC. The flow provisions are as follows: combined flows of 13,000 cfs for the Snake and Salmon rivers be maintained at Lime Point, a minimum flow of 5,000 cfs be maintained from Hells Canyon Dam to the mouth of the Salmon River, a limitation in the maximum hourly flow variation be set, and sudden changes be restricted (IPC 1997). Since the time of licensing when minimum flow restrictions were set, there has been ongoing debate over flow effects on boat navigation. Some recreational boaters felt that the minimum flows were not adequate for boating the river below Hells Canyon Dam.

Reported in 1969, COE studies examined the effect of flows on navigation and determined that a minimum flow of 5,000 cfs, when combined with the flows from the Salmon River, provides the 13,000 cfs necessary for navigation at Lime Point (COE 1969). The COE also determined that prior to construction of the HCC, "minimum flows generally experienced have been about 5,000 cfs" (IPC n.d.). The COE studies also considered 5,000 cfs to be adequate for the limited navigation on the river between Johnson Bar and the Salmon River (COE 1969). Recreational boaters, however, continued to be unsatisfied with the minimum flow, and in 1988, IPC and the COE, both regulators of the region's waters and wetlands and providers of water-related recreation, reached a new agreement. A minimum flow was set at least 6,500 cfs when 13,000 cfs could not be met at Lime Point without drafting Brownlee Reservoir. This minimum flow has been in effect since that time, except during extremely low-water years (IPC 1997).

In Idaho, the District-level offices of the COE are responsible for regulatory functions governing activities affecting the region's waters and wetlands; permits to work in wetlands and waters are administered by the District's field offices in Coeur d'Alene, Boise, and Idaho Falls. The COE is one of the leading providers of water-related recreation access in the country. The Walla Walla District has more than 7.5 million visitors a year to its seven lakes and recreational areas. Outdoor recreational opportunities include boating, fishing, hunting, camping, fish viewing, swimming, walking, and more.

5.2.5.3. Sediment Transport and Sandbar Degradation Issues

The issues of sediment transport and sandbar depletion in river reaches below dams have been topics of concern in recent years. From a recreational perspective, the main concern is loss of beaches for camping and day-use activities. Few studies document change in beaches or determine impacts of sediment change or the causes of change in the HCNRA.

A 1991 report attempts to identify the role of the HCC in the erosion of sandbars in the HCNRA. Flooding was identified as one source of sediment transport that could contribute to sandbar rejuvenation (Grams and Schmidt 1991). Historically, pre-dam floods through Hells Canyon in May and June reached peaks of 75,000 to 95,000 cfs every few years. Floods of 74,000 cfs or more have occurred at least five times since completion of Hells Canyon Dam (Collier et al. 1996). Grams and Schmidt concluded that the HCC has not changed the magnitude of peak flows in the canyon. However, because the dams prevent sediment transport, only clear-water flows are released from the HCC. The authors also found that sandbars increased in the canyon during the pre-impoundment era and decreased in the post-impoundment era. Most of the erosion occurred between 1970 and 1977, when three clear-water floods occurred. Decreased rates of erosion were attributed to the decreasing availability of erodible material in the canyon (Grams and Schmidt 1991).

5.2.5.4. Archaeological Issues

Concern for minimizing recreational impacts to and providing for the preservation of archaeological and cultural sites in the HCNRA for educational purposes has been an issue both before and after completion of the HCC. IPC's license for the HCC mandates that these sites be handled in a specific way (IPC 1997):

If any previously unrecorded archeological or historic sites are discovered during the course of construction or development of any project works or other facilities at the project, construction activity in the vicinity shall be halted, a qualified archeologist shall be consulted to determine the significance of the sites, and the Licensee shall consult with the State Historic Preservation Officer (SHPO) to develop a mitigation plan for the protection of significant archeological or historic resources. If the licensee and the SHPO cannot agree on the amount of money to be expended on archeological or historic work related to the project, the Commission reserves the right to require the Licensee to conduct, at its own expense, any such work found necessary.

The fact sheet for the Archeological Resource Protection Act (ARPA) for the HCNRA's Wild and Scenic River corridor discloses the total amount and type of prehistoric sites within the river corridor and how many have been affected by theft. Three cases of prosecution for artifact theft were recorded between 1978 and 1987 (Bruce Womack, USFS, pers. comm., November 2, 1998).

Several parties have inventoried and monitored archaeological and historical sites to better manage and prevent theft and vandalism. According to SHPO records, there are 12-recorded

sites between Hells Canyon and Oxbow dams and 438 recorded sites between Hells Canyon Dam and the confluence of the Snake and Salmon rivers. One hundred fifty-four historic and 384 prehistoric sites in the first 68 mi below Hells Canyon Dam have been incorporated into the Hells Canyon Archaeological District, which extends about 13 mi below the confluence of the Snake and Salmon rivers (IPC 1997). Studies of rock art below Hells Canyon Dam have recorded 177 sites in 71 mi below the dam (Reid and Jaehnig 1991).

IPC cooperated with the USFS and the University of Idaho to conduct an archaeological field school at the Camp Creek archeological sites. This effort resulted in the recovery of important cultural resources, a successful information program presented to recreationists floating the Snake River below Hells Canyon Dam, and a technical report (IPC 1997).

A four-year inventory of archaeological sites and conditions in the HCNRA was initiated by IPC and begun in 1998 (Chatters and Reid 1998). The first three years of the study will concentrate on surveying the canyon bottom and documenting archaeological properties and their condition. An analysis, report, and presentation of the data will be completed in the last year of the study. A progress report on this study, available in late 1998, included some information about the impact of recreation on archaeological sites in the HCNRA. According to the report, recreational impacts on these sites are slight, consisting mainly of trampling and compacting ground, clearing stones for tent sites, and building fires. Two sites showed severe damage from recreationists. The Camp Creek Site was severely dug up (more than 30 cm) by horses, which had been tied to a tree. At Copper Creek Lodge, a custodian cut into a riverbank with a front loader in an attempt to improve the boat landing. The bank is now very vulnerable to erosion in the spring. Only 15 sites showed evidence of active looting, but only one appeared to have been looted in the last five years. During the survey, researchers noted traces of tent clearings, fire rings, privy pits, picnic tables, lodges, and trampled areas. This data can be used to quantify intensity of recreational use. Evidence showed that sites below Kirkwood Bar receive more recreational activity than do upstream locations.

6. CONCLUSION

Recreational use of the HCRA has been documented by state and federal agencies and IPC over the last 50 years. The majority of the information reported has been limited to qualitative review. Information collected in this literature review will help IPC and appropriate agencies avoid duplication of study efforts; provide background information to entities involved in the relicensing process for the development of protection, mitigation, and enhancement (PM&E) measures; and provide background information for all other recreation studies in the HCRA.

7. ACKNOWLEDGMENTS

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Table 1. Significant dates at the Hells Canyon Complex.

Date	Event
August 4, 1955	License was granted for the HCC
November 1955	Construction on Brownlee Dam began
December 11, 1957	Excavation for Oxbow Dam began
May 9, 1958	Brownlee Dam was completed, and the reservoir began filling
March 12, 1961	Oxbow Dam was completed, and the reservoir began filling
July 27, 1961	Construction of the road to Hells Canyon Dam began
August 27, 1964	Excavation for Hells Canyon Dam began
October 10, 1967	Hells Canyon Dam was completed, and the reservoir began filling

Table 2. Recreational use forecasts for USFS lands adjacent to the High Mountain Sheep Impact Area (USFS 1965).

Activity	Boat Users	Land Access Only	Total
Camping	80,000	220,000	300,000
Picnicking	20,000	80,000	100,000
Sightseeing	50,000	450,000	500,000
Other	10,000	40,000	50,000
Total Annual	160,000	790,000	950,000

Table 3. IPC contributions to IPC-owned facilities.

Year	Improvement	Costs
1989	Reconstruction of Copperfield Park	\$2,000,000
1994	Construction of a boat ramp facility at Copperfield Park	\$100,000 (approximately)
1994	Reconstruction of Woodhead Park	\$7,500,000
1995	Installation of a new RV dump station at Hells Canyon Park	\$118,000
1995	Addition of a boat ramp at Woodhead Park	\$82,000
Total		\$9,800,000

Table 4. IPC contributions to non-IPC facilities in the HCC.

Year		Improvement	Costs
1986-1987	Hewitt Park	Shoreline stabilization and walkway Boat ramp extension Concrete steps to docks Asphalt surface for RV parking	\$69,670
1986	Spring Recreation Site	Addition of a single-phase power line	\$23,016
1989	Deep Creek Trail	Trail enhancement	\$31,000
1990	Steck Recreation Site	Power line extension	\$20,000
1992	Hells Canyon Creek Recreation Site	Improvement of boat-launching facilities	\$20,000
1996	Big Bar	Enhancement to vault toilets and roads; erosion control measures	\$5,000
1996-1997	Impromptu sites, BLM	Donation for vault toilets, parking improvement, and signage	\$30,000
1996-1997	Hewitt Park	An additional extension to boat ramp	\$35,000
1987-1996	Farewell Bend State Park	Boat ramp extension (\$58,000) New restrooms (\$25,000) ADA-accessible fishing pier and footpath (\$6,343) Interpretive signage (\$2,463) Boat ramp/dock improvements (\$2,000)	\$93,806
Total			\$327,492

Table 5. Contributions to the HCC by the BLM.

Year	Site	Improvement	Costs
Early 1990s	Spring Recreation	Reconstruction	\$1,000,000
1996–1997	Oasis site	Removal of the concrete boat ramp, addition of a vault toilet, grading of parking lot	\$12,542
1997	Conner Creek	Installation of a handicapped restroom and signs	\$250
1997	Swedes Landing	Installation of vault toilets, a gravel parking area, and a boat ramp	\$14,220
1997	Westfall	Installation of a restroom (signs and gravel will be added in the future)	\$10,250
1995–1998	Steck Recreation Site	Improvements to camping, day-use, and boating facilities (continued expansion and installation of a group camping area are scheduled for 1999)	\$559,000
—to date	Ashby Creek	Installation of gravel (future date)	\$250
—to date	Copper Creek	Installation of gravel and parking barriers	\$250
Total			\$1,596,762

Table 6. Contributions to the HCC by the USFS.

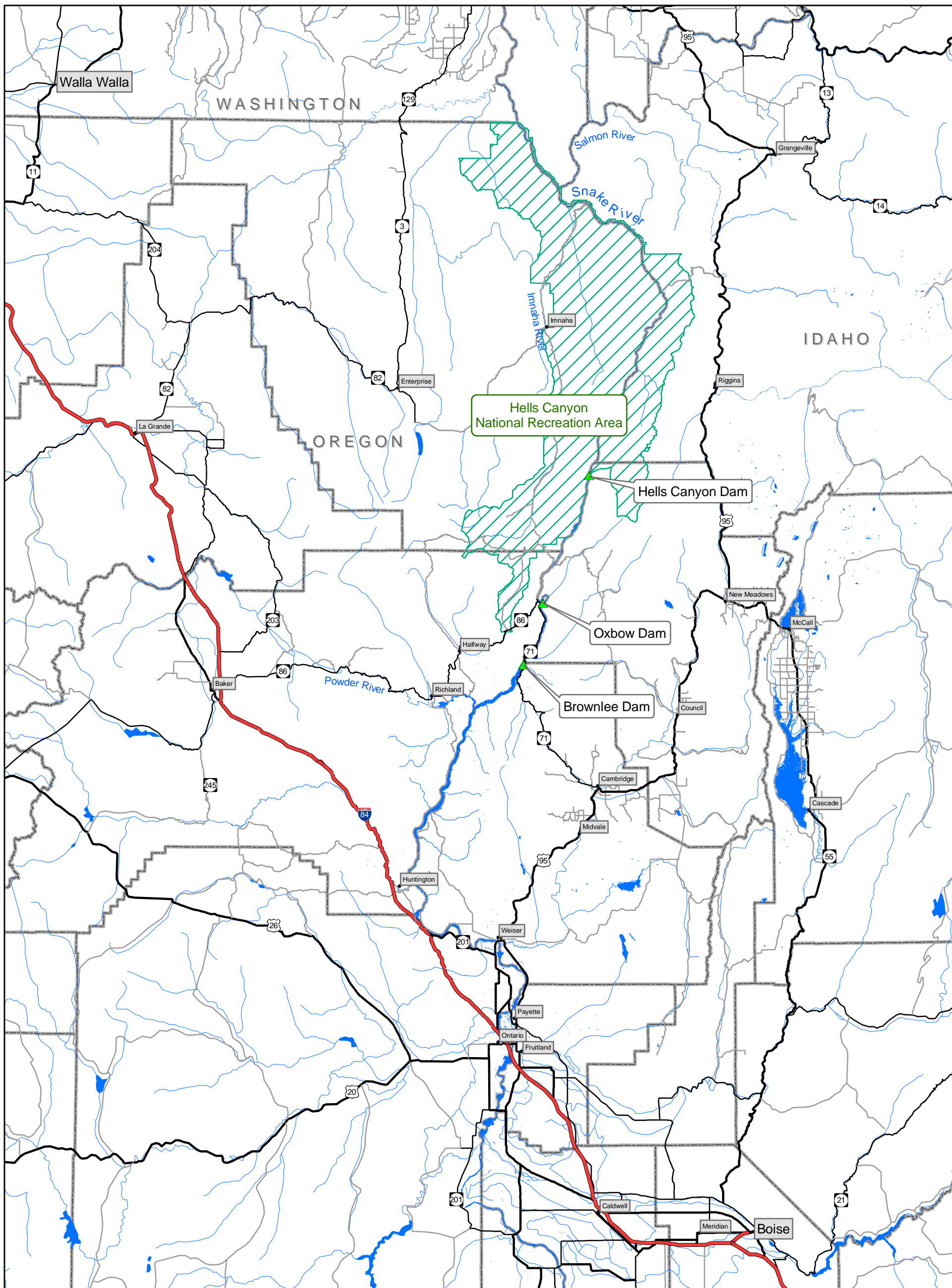
Site	Costs
Hells Canyon Creek Recreation Site	\$2,026,000
Big Bar	\$10,000
Pittsburg Landing	\$741,000
Dug Bar	\$214,000
Trails/Gravel	\$100,000
Total	\$3,091,000

Table 7. Contributions to the HCC by the ODPR.

Improvement	Costs
Teepees	\$10,000
Camper wagons	\$18,000
Cabins	\$20,000
"B" loop campground expansion	\$510,000
"B" loop landscaping	\$14,000
Boat ramp improvements	\$64,000
Recreation equipment	\$3,300
Day-use restroom replacement	\$40,000
River safety fence	\$15,000
Primitive area paving	\$10,000
Total	\$704,300

Table 8. Number of people recorded at IPC parks in 1972.

Location	Number of Visitors
Woodhead Park	17,391
McCormick Park	24,571
Copperfield Park	52,885
Hells Canyon Park	30,291
Total	125,138

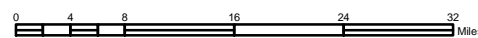


Features Legend

- Primary Route
- Secondary Route
- Major Road
- Minor Road
- County
- Rivers
- Lakes
- ▲ Hells Canyon Complex Dams

Hells Canyon Hydroelectric Project - FERC No. 1971
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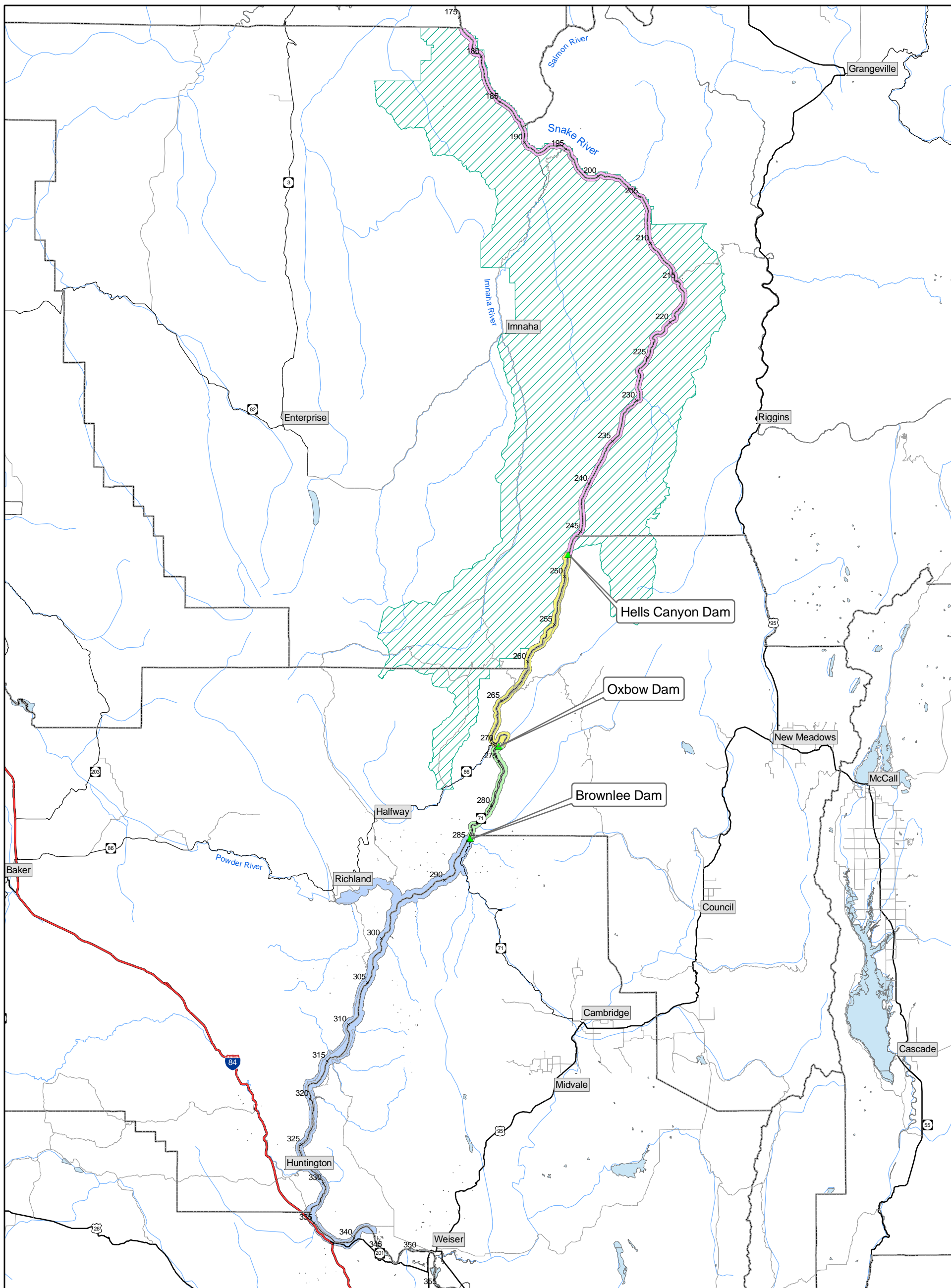
**Location of Idaho Power Company's
Hells Canyon Hydroelectric Complex
and the adjoining Hells Canyon
National Recreation Area**



Scale = 1:889,814



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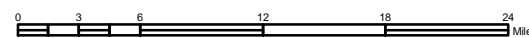
Features Legend

- Primary Route
- Secondary Route
- Major Road
- Minor Road
- County
- ~ Rivers
- Brownlee Reservoir Reach
- Oxbow Reservoir Reach
- Hells Canyon Reservoir Reach
- HCNRA Reach
- ▨ Hells Canyon National Recreation Area
- Lakes

Hells Canyon Hydroelectric Project - FERC No. 1971

Tech. Report E.5-1 Figure 1b

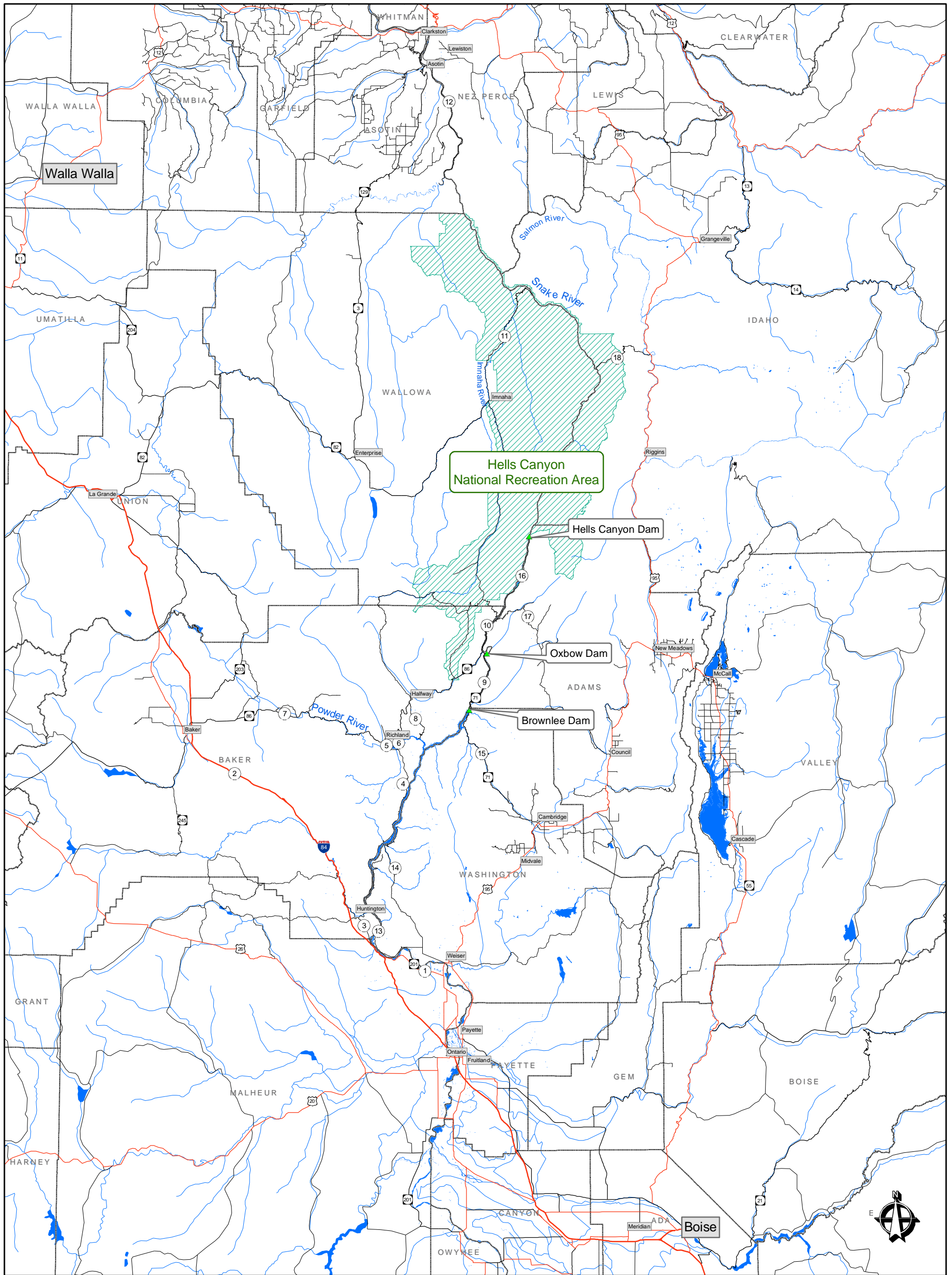
Four distinct reaches of the Snake River within Idaho Power Company's recreational use study area



Scale = 1:594,378



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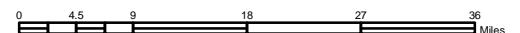


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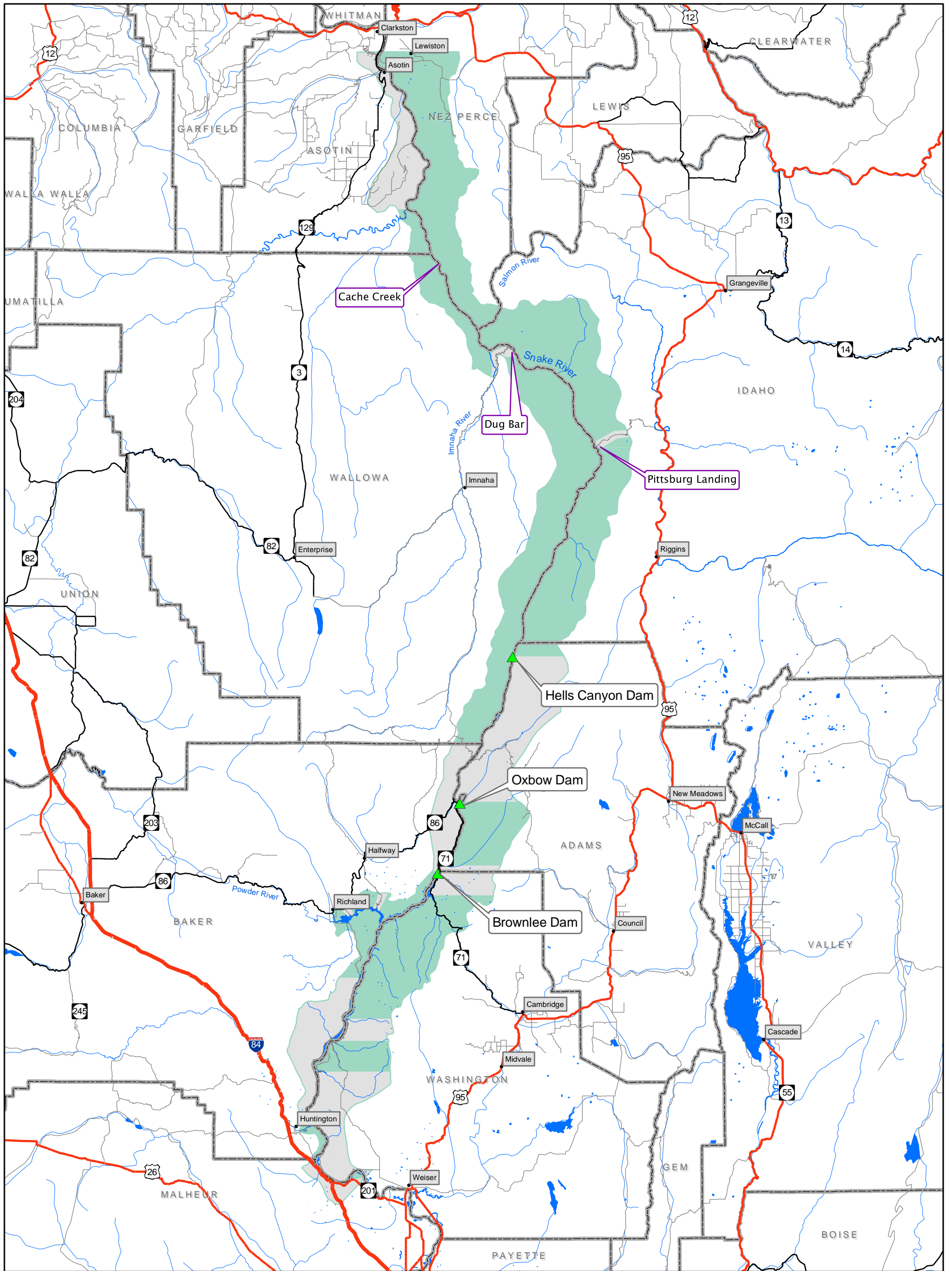
- | | | |
|--|------------------------------|--------------------------|
|  Interstate Highway | ① Olds Ferry-Ontario Highway | ⑩ Homestead Road |
|  Principal Highway | ② Interstate 84 | ⑪ Dug Bar Road |
|  Major Road | ③ Huntington Highway | ⑫ Snake River Road (WA) |
|  Minor Road | ④ Snake River Road (OR) | ⑬ Olds Ferry Road |
|  Rivers | ⑤ Powder River Arm | ⑭ Rock Creek Road |
|  Counties | ⑥ Sullivan Road | ⑮ State Highway 71 |
|  Lakes | ⑦ State Highway 86 | ⑯ Hells Canyon Road |
| | ⑧ Sag Road | ⑰ Kleinschmidt Road |
| | ⑨ Oxbow-Brownlee Road | ⑱ Pittsburg Landing Road |

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Tech. Report E.5.-1 Figure 1c

State and county boundaries, area communities, and access roads associated with Idaho Power Company's Hells Canyon Hydroelectric Complex and the Hells Canyon National Recreation Area



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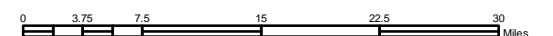


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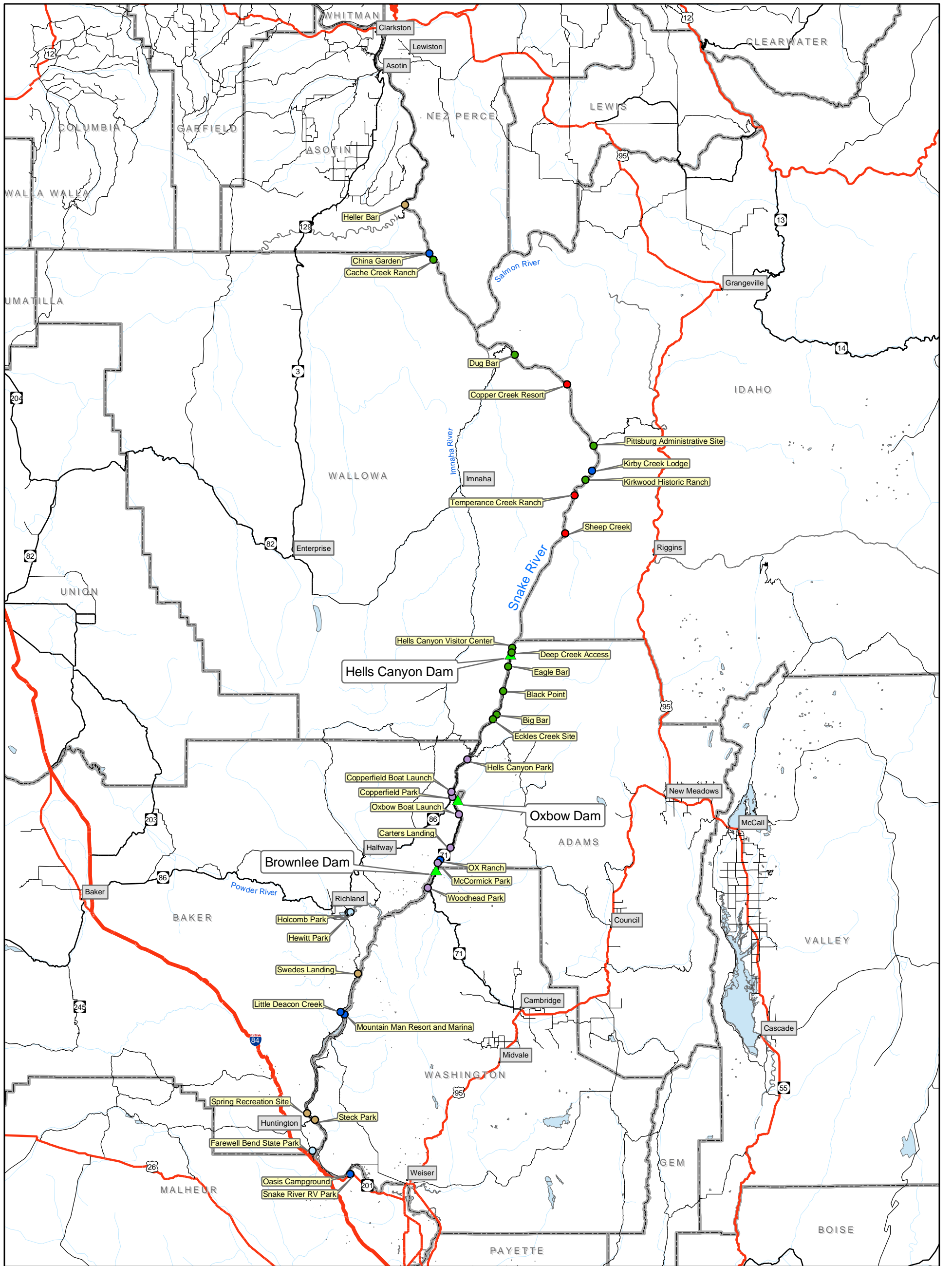
- Interstate Highway
- Principal Highway
- Major Road
- Minor Road
- Rivers
- Counties
- Lakes
- Roaded
- Unroaded



Hells Canyon Hydroelectric Project - FERC No. 1971
 Tech. Report E.5.-1 Figure 1d
**Unroaded areas of the Snake River corridor
 within Idaho Power Company's Hells Canyon
 Hydroelectric Complex and Hells Canyon
 National Recreation Area**



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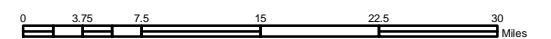


Features Legend

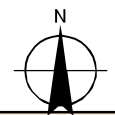
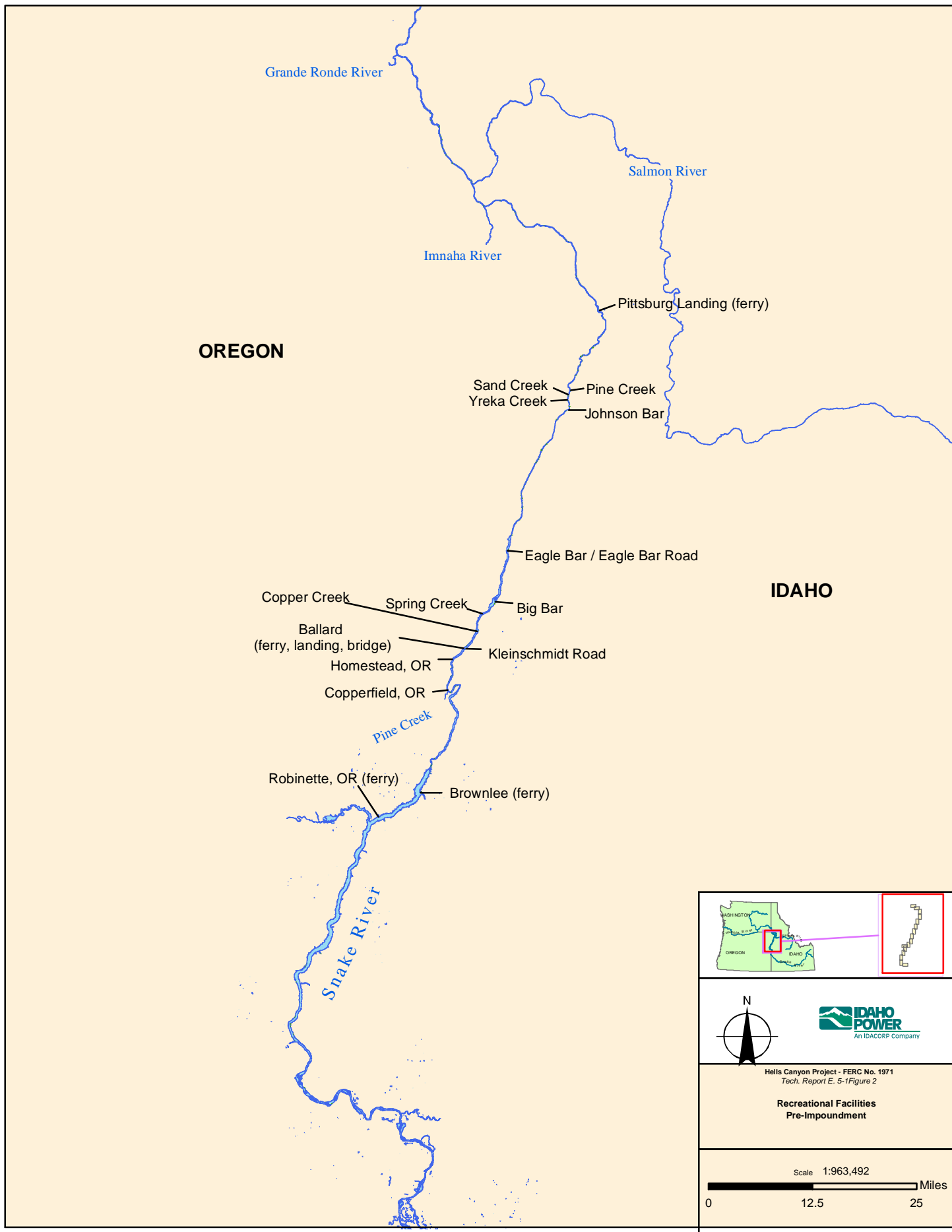
- Interstate Highway
- Principal Highway
- Major Road
- Minor Road
- Rivers
- ▲ Hells Canyon Complex Dams
- Counties
- Lakes
- Site Administration**
- Idaho Power Company
- USFS Special Use Permit
- USFS
- Private
- BLM
- Oregon



Hells Canyon Hydroelectric Project - FERC No. 1971
 Tech. Report E.5.-1 Figure 1e
Some significant recreation sites associated with Idaho Power Company's Hells Canyon Hydroelectric Complex and the Hells Canyon National Recreation Area

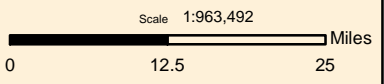


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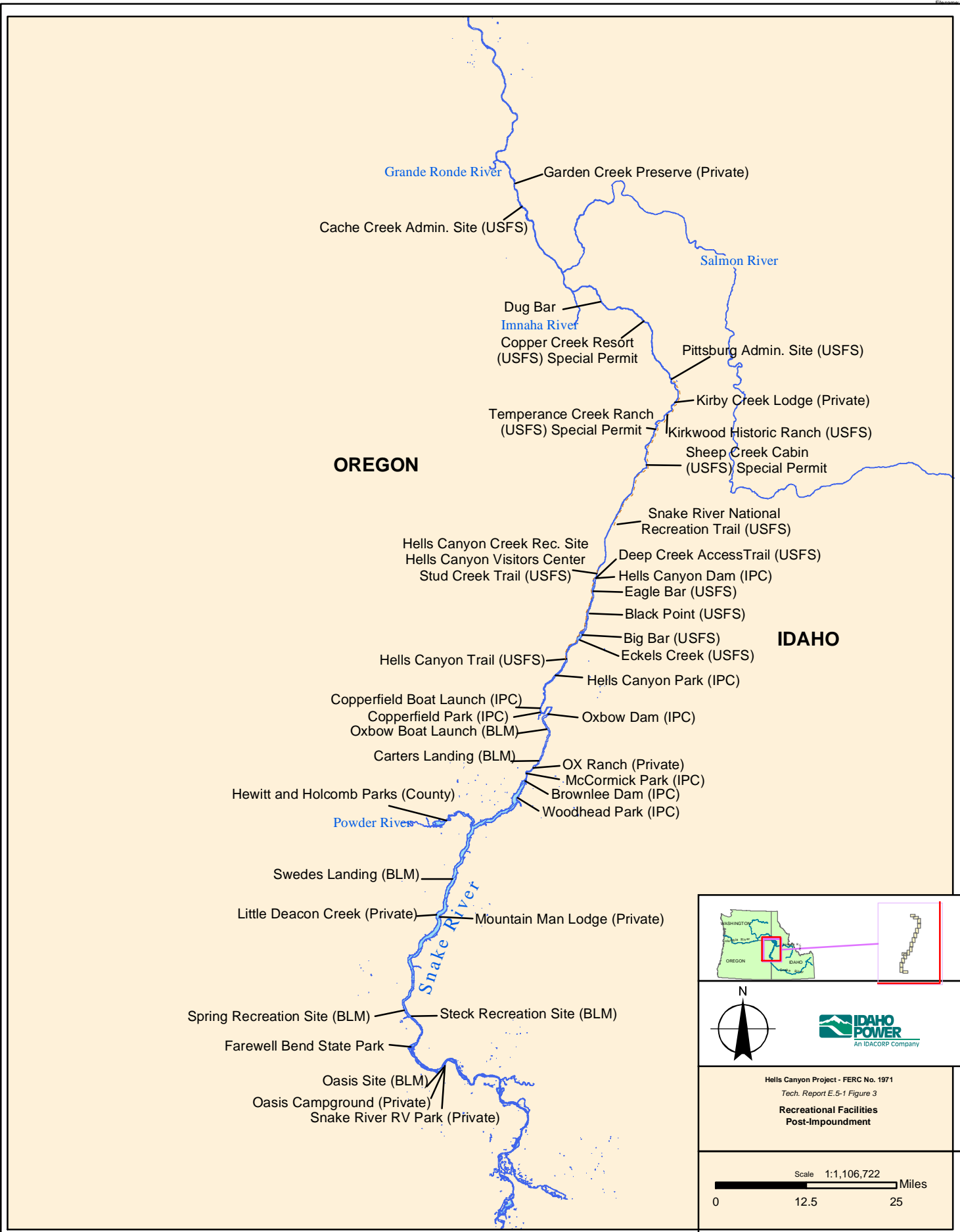


Hells Canyon Project - FERC No. 1971
Tech. Report E. 5-1 Figure 2

**Recreational Facilities
Pre-Impoundment**



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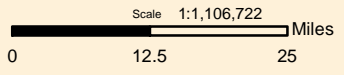
OREGON

IDAHO



Hells Canyon Project - FERC No. 1971
 Tech. Report E.5-1 Figure 3

**Recreational Facilities
 Post-Impoundment**



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