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Hunting Associated with the Hells Canyon Complex and the Hells Canyon National Recreation Area

David W. Claycomb
Environmental Technician

Marshall Brown
Recreation Resource Analyst

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ABSTRACT

The Hells Canyon Recreation Area (HCRA), the study area for recreation resources, extends from the upper portion of Brownlee Reservoir through the Hells Canyon National Recreation Area (HCNRA) and encompasses approximately 170 miles of river in both Idaho and Oregon.

Idaho Power Company (IPC) has compiled all available hunting information from the managing wildlife agencies. The goal of this information collection effort was to determine the following:

- Number of hunters
- Number of animals harvested
- Hunter success rates
- Any trends in hunter numbers, animal harvest numbers, and success rates

To do this, IPC reviewed the annual harvest reports provided by the two agencies primarily responsible for wildlife management in the study area: the Idaho Department of Fish and Game (IDFG) and the Oregon Department of Fish and Wildlife (ODFW). The harvest reports also included population counts, controlled permit allocations, and seasonal hunting regulation changes.

Information for the years previous to 1990 is difficult to assess because of changes in seasons, unit boundaries, and collection methods for harvest and population estimates.

Hunting pressure and activity in the HCRA has generally remained steady over the past decade, though statewide hunting pressure in both Idaho and Oregon has declined over that period. Oftentimes, annual changes in hunting pressure and activity directly reflect the number of permits that managing wildlife agencies make available.

The two most heavily hunted big game species in the HCRA are deer and elk. These two combined species account for roughly 95% of all big game hunting that occurs there. Deer-hunting pressure in Idaho has steadily increased in all of the units except 13 and 18. Deer-hunting pressure on the Oregon side of the HCRA has steadily increased in all of the units except Beulah. While deer-hunting pressure on the Oregon side of the HCRA has increased in all units except Beulah, elk-hunting pressure has decreased during that same time period in all units except Beulah.

Controlled hunts for big game are used to manage most of the hunt units adjacent to the HCRA. These controlled hunts, as much as anything else, dictate the amount of hunting pressure the HCRA receives for big game each year. Several factors influence the number of tags available for each species in each unit, such as the total harvest for the previous year, mortality through disease, and severity of winter conditions.

Hunting pressure in the HCRA is difficult to assess using the current harvest reports for the area. Most harvest data for the study period failed to include some key factors necessary to fully

analyze hunting pressure. These overlooked factors include the redundancies of hunters pursuing multiple species during the same hunting trip and hunter days afield.

This report does not cover the various types of bird hunting because of a lack of data for the area's hunt units. This lack of data makes it difficult to accurately depict overall hunting pressure, considering the many opportunities that the HCRA offers for upland bird hunters.

1. INTRODUCTION

The study area for recreation resources, also called the Hells Canyon Recreation Area (HCRA) is situated between Idaho and Oregon. Its focal point is the Snake River, which is a major tributary to the Columbia River. In the HCRA, the Snake River flows generally northward and constitutes a large portion of the Oregon–Idaho border. The Hells Canyon Complex (HCC), owned and operated by Idaho Power Company (IPC) (Figure 1), is located on the Snake River in the southern portion of Hells Canyon and comprises three impoundments: Brownlee, Oxbow, and Hells Canyon reservoirs. The free-flowing stretch of the Snake River (from below Hells Canyon Dam to the Oregon–Washington border) lies within the Hells Canyon National Recreation Area (HCNRA) and is also included in the study area. The border between Washington and Oregon is within a mile of the northernmost portion of the HCNRA.

On August 4, 1955, IPC obtained a 50-year license from the Federal Power Commission (now the Federal Energy Regulatory Commission or FERC) to build and operate the Hells Canyon Complex (identified by FERC as the Hells Canyon Project No. 1971). During July 2003, IPC must submit an application to FERC to relicense the HCC.

As part of the license renewal process, FERC requires applicants to consult with concerned agencies and entities. This consultation helps applicants identify recreation-related issues and information needs, which assist them in developing protection, mitigation, and enhancement proposals for the license application. IPC and concerned agencies and entities formed the Recreation and Aesthetics Resource Work Group (RARWG). The group's members cooperatively developed study plans to gather the recreational-use and aesthetics information required by FERC and to address recreation- and aesthetics-related issues that the group had identified. IPC submitted the resultant study plans to FERC as part of a formal consultation package for relicensing the Hells Canyon Complex (IPC 1997). This package proposed thirteen recreation-related studies to be conducted within or pertaining to the HCRA, an area that includes the reservoirs associated with the three HCC dams plus downstream Snake River-related areas within the HCNRA.

The specific areas of concern for hunting pressure consist of seven hunt units in Oregon and six in Idaho. Five of Oregon's seven units are directly adjacent to the Snake River or the three reservoirs, and the other two are within a few miles of the Snake River or the three reservoirs. All of Idaho's six hunt units border the Snake River or one of the three reservoirs (Figure 2).

The Hells Canyon Wilderness in Oregon and the Seven Devils Mountains in Idaho make access to the unimpounded portion of the Snake River below Hells Canyon Dam very difficult. The same rough terrain that limits access makes this area a natural attraction for hunters in search of trophy big game animals. While the hunt units upriver from Hells Canyon Dam have more access than those located below the dam, access is still somewhat limited by rough terrain.

Big game species are relatively diverse in the Hells Canyon Complex, with nine species present for at least part of the year. Big game species hunted in the area include black bear (*Ursus americanus*), mountain lion (*Felis concolor*), white-tailed deer (*Odocoileus virginianus*), mule

deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus elaphus nelsoni*), Rocky Mountain bighorn sheep (*Ovis canadensis*), and mountain goats (*Oreamnos americanus*). Although pronghorn antelope (*Antilocapra americana*) and shiras moose (*Alces alces shirasi*) can also be found in a few of the hunt units, overall harvest is insignificant (or in some cases, nonexistent). Harvest data for these two species are not considered in this report.

The area is also home to large populations of chukar partridge (*Alectoris chukar*) and gray partridge (*Perdix perdix*), more commonly referred to as chukars and huns, respectively. Forest grouse, including blue grouse (*Dendragapus obscuras*), ruffed grouse (*Bonasa umbellus*), and spruce grouse (*Dendragapus canadensis*), are also hunted in the HCRA. The HCRA has increasing populations of Merriam's wild turkeys (*Meleagris gallopavo merriami*). California quail are hunted on a limited basis in the study area as well. Waterfowl hunting is primarily reserved for Brownlee, Oxbow, and Hells Canyon reservoirs, since there is no legal hunting season for waterfowl on or within a mile of the Snake River in the HCNRA below Hells Canyon Dam.

As mentioned earlier, IPC conducted several recreation-related surveys from 1994 through 2000. While hunters were not specifically targeted during these efforts, hunters were included with all other recreationists who were observed, counted, and interviewed. Hunter-related results are reported from the following survey efforts:

- HCC reservoir surveys, which included several years of roving count-and-interview recreational-use and creel surveys, on-site contacts, and follow-up mail surveys
- HCNRA surveys, which included on-site contacts and follow-up mail surveys

1.1. Managing Agencies

Wildlife in the HCRA is primarily managed by the Idaho Department of Fish and Game (IDFG) and Oregon Department of Fish and Wildlife (ODFW). But other organizations assist with various endeavors, such as habitat improvement and transplant efforts. Nonprofit organizations, such as the Foundation for North American Wild Sheep, Rocky Mountain Elk Foundation, and Mule Deer Foundation also offer assistance. The U.S. Fish and Wildlife Service (USFWS) also plays a role in managing the area's wildlife.

1.1.1. Idaho Department of Fish and Game

The Idaho Territorial Legislature established the first fish and game laws in 1864. Though the laws called for closed hunting seasons from February until July, they did not provide funding or resources for enforcement. The IDFG was established in 1899. A state game warden was placed in charge, with deputies working for the warden in almost every county.

Today, the state is divided into seven regions, each having its own office. These offices are located in Coeur d'Alene, Lewiston, Nampa, Jerome, Pocatello, Idaho Falls, and Salmon. IDFG headquarter offices are located in Boise, and the various bureaus' offices (Enforcement, Information and Education, Engineering, Natural Resources Policy, Fisheries, Wildlife, Information Technology, and Administration) are centralized there as well.

The Idaho Fish and Game Commission, created in 1938, is responsible for supervising the IDFG. The governor appoints seven commissioners from various regions in the state. These commissioners must be confirmed by the Idaho State Senate. Commissioners may not hold any other political office while serving their 4-year terms. By law, commissioners must meet at least four times each year, but regulation complexities in recent years have made additional meetings necessary.

1.1.2. Oregon Department of Fish and Game

The ODFW consists of a commission, the director (appointed by the commission), and a statewide staff of 800 permanent employees. ODFW headquarters are in Portland, with regional offices in Clackamas, Roseburg, Bend, and La Grande. Twenty district offices are also strategically located statewide. The department operates a variety of facilities that are designed to enhance fish and wildlife resources, including 34 fish hatcheries, numerous wildlife areas, public shooting grounds, hunting and fishing access sites, and several research stations.

As in Idaho, Oregon's governor appoints seven members to serve 4-year terms on the ODFW commission. The commission must include one commissioner from each congressional district—one from east of the Cascades and one from the west. The commission to direct the ODFW was formed on July 1, 1975, when the formerly separate fish and wildlife commissions merged.

Commissioners formulate general state programs and policies concerning management and conservation of fish and wildlife resources. They also establish seasons, methods, and bag limits for recreational and commercial take.

1.2. Hunting Areas

We were primarily interested in six hunt units in Idaho and seven in Oregon. All of the units are directly adjacent to or within a few miles of the HCNRA or the three reservoirs that comprise the HCC (Figure 2). These boundaries are for big game (such as deer and elk) harvest and management and not upland bird harvest or waterfowl management. Upland bird and waterfowl harvest regulations are available through licensed fish and game vendors and IDFG or ODFW offices.

1.2.1. Idaho Game Management Units and Boundary Descriptions

Unit 11—This unit comprises portions of Nez Perce, Lewis, and Idaho counties. Beginning at the mouth of the Clearwater River, the boundary proceeds upstream to the U.S. Highway 95 (U.S. 95) bridge near Spalding. It then continues southeast on U.S. 95 to the Graves Creek Road at Cottonwood, south on Graves Creek Road to the Salmon River, and then downstream to the Snake River and the mouth of the Clearwater River (the point of beginning).

Unit 13—This unit contains portions of Idaho County bounded by the Snake River on the west, the Salmon River on the east and north, and the White Bird–Pittsburg Landing Road on the south.

Unit 18—This unit encompasses portions of Idaho and Adams counties within the following boundaries. Beginning at Riggins, the boundary proceeds up the Little Salmon River to Rapid River and then up Rapid River to and including the Shingle Creek drainage to the Snake River divide. The boundary continues along the divide to Purgatory Saddle at the head of Granite Creek, down Granite Creek to the Snake River, downstream to Pittsburg Landing, and then east on the Pittsburg Landing–White Bird Road to the Salmon River, returning upstream to Riggins (the point of beginning).

Unit 22—This unit includes portions of Idaho, Adams, and Washington counties within the following boundaries. Beginning at the mouth of Granite Creek on the Snake River, the boundary proceeds up Granite Creek to Purgatory Saddle located on the watershed divide between Rapid River and Snake River. The boundary continues south along the divide to Lick Creek Lookout and then along the watershed divide between Boulder Creek and the Weiser River to the watershed divide between Mud Creek and the Weiser River. Continuing south along the divide to U.S. 95, the boundary line moves southwest on U.S. 95 to Cambridge, northwest on State Highway 71 to Brownlee Dam, and then down the Snake River to Granite Creek (the point of beginning).

Unit 31—This unit comprises portions of Washington County within the following boundaries. Beginning at Brownlee Dam on the Snake River, the boundary continues southeast on State Highway 71 to U.S. 95, southwest on U.S. 95 to the Snake River at Weiser, and then down the Snake River to Brownlee Dam (the point of beginning).

Unit 32—This unit includes portions of Adams, Boise, Gem, Payette, Valley, and Washington counties within the following boundaries. Beginning at Banks, the boundary proceeds down State Highway 55 to Floating Feather Road, west on Floating Feather Road to State Highway 16, and then north on State Highway 16 to State Highway 52. Continuing north on State Highway 52 to the Payette River, the boundary proceeds downstream (excluding the Payette River islands) to the Snake River, downstream to Weiser, and then northeast on U.S. 95 to the Emmett–Council Road in Indian Valley. From that point, the boundary line continues south on the Emmett–Council Road to the Sheep Creek Road, where it follows Sheep Creek Road eastward to the Squaw Creek Road. The line continues south on the Squaw Creek Road to Ola, northeast on the Ola–Smiths Ferry Road to High Valley, and then south on the High Valley–Dry Buck Road to Banks (the point of beginning).

1.2.2. Oregon Game Management Units and Boundary Descriptions

The following descriptions of Oregon game management units are based on hunting maps available from the Burns and Vale districts of the Bureau of Land Management (BLM), Malheur and Wallowa-Whitman National Forests, and ODFW.

Beulah—Public lands comprise 57% of this unit. Beginning at Vale, the unit's boundary proceeds southwest on U.S. Highway 20 (U.S. 20) to Drewsey–Prairie City Road near Drewsey and then northwest on Drewsey–Prairie City Road and Fire Road (FR) 1663 to FR 14 near Antelope Mountain. The boundary continues northwest on FR 14 to Summit Prairie, north on County Road 62 to U.S. Highway 26 (U.S. 26), east on U.S. 26 to Ironside, and then east on Malheur Reservoir Road to Interstate 84 (I-84). The boundary continues southeast on I-84 to

Birch Creek near Farewell Bend, east on Birch Creek to the Snake River, southeast along the Snake River to Nyssa, and then north and west on U.S. 20 to Vale (the point of beginning).

Chesnimus—Public lands comprise 48% of this unit. Beginning at Joseph, the unit's boundary proceeds north on Oregon State Highway 82 to Crow Creek Road, north on Crow Creek Road to Chesnimus Creek, and then northwest along Chesnimus Creek to Joseph Creek. The boundary continues northeast along Joseph Creek to the Oregon–Washington state line and then east and southeast along the state line to the Snake River. Continuing southeast along the Snake River to the mouth of the Imnaha River, the boundary proceeds southwest along the Imnaha River to the town of Imnaha and then southwest on Sheep Creek Road to Joseph (the point of beginning).

Imnaha—Public lands comprise 75% of this unit. Beginning at Joseph, the unit's boundary proceeds northeast on the Imnaha Highway to Imnaha and then south and west along the Imnaha River and South Fork of the Imnaha River to Hawkins Pass. The boundary continues north on West Fork Trail to Wallowa Lake and then north on State Highway 82 to Joseph (the point of beginning).

Keating—Public lands comprise 58% of this unit. Beginning at North Powder, the unit's boundary proceeds northeast and southeast along the Powder River to State Highway 203, northeast on State Highway 203 to Medical Springs, and then southeast and northeast on Big Creek Road 67 to Lick Creek. The boundary continues north on Lick Creek Road 6750 to FR 6750300, east on FR 6750300 to FR 6730310, and then east on FR 6730310 to FR 6730. Continuing north on FR 6730 to FR 77, the line proceeds eastward on FR 77 to Flagstaff Butte Road 7700582 and then east on FR 7700582 to Flagstaff Butte. From the butte, the boundary continues northward on the divide between the Catherine Creek and Eagle Creek drainages to Granite Butte, east on the summit of Eagle Mountain to Blue Creek Trail north of Cornucopia, and then south on Blue Creek Trail to Pine Creek. The boundary follows Pine Creek south and east to State Highway 86, southwest on State Highway 86 to Old Richland–Halfway Highway (Sag Road), and then south on Sag Road to the Powder River arm of Brownlee Reservoir. Continuing west on the Powder River to State Highway 86, the boundary continues westward along State Highway 86 to I-84 and then north on I-84 to North Powder (the point of beginning).

Lookout Mountain—Public lands comprise 36% of this unit. Beginning at the junction of I-84 and State Highway 86 northeast of Baker, the unit's boundary proceeds east on State Highway 86 to the Powder River near Goose Creek and then east along the Powder River to the Snake River. The boundary then follows the Snake River southwest to Birch Creek at Farewell Bend, continues west along Birch Creek to I-84, and then northwest on I-84 to State Highway 86 (the point of beginning).

Pine Creek—Public lands comprise 75% of this unit. Beginning at Cornucopia, the unit's boundary proceeds north on Blue Creek trail to the summit of Eagle Mountain, west and north along the summit to Hawkins Pass, and then east and north along the South Fork of the Imnaha River and the Imnaha River to Dry Creek. The boundary continues southeast along Dry Creek and northeast along North Fork Dry Creek to Summit Road and then north and northeast on Summit Road to Thirty-two Point Creek. Continuing east along Thirty-two Point Creek to the Snake River, the line moves south along the Snake River to the mouth of Powder River and then west along the Powder River arm of Brownlee Reservoir to Sag Road.

Moving north on Sag Road to State Highway 86, the boundary continues northeast on State Highway 86 to Pine Creek and then northwest along Pine Creek to Cornucopia (the point of beginning).

Snake River—Public lands comprise 93% of this unit. Beginning at the confluence of the Imnaha and Snake rivers, the boundary proceeds southeast along the Snake River to Thirty-two Point Creek, southwest along Thirty-two Point Creek to Summit Road, and then southwest and northwest on Summit Road to North Fork Dry Creek. The line continues southwest along North Fork Dry Creek and northwest along Dry Creek to Imnaha River and then north along the Imnaha River to the Snake River (the point of beginning).

1.3. Hunting Methods

Both the IDFG and ODFW recognize various legitimate methods of hunting. Hunting by these methods includes archery hunts, controlled hunts, black-powder hunts, and general season rifle hunts. Controlled hunts are limited-entry hunts with less hunting pressure than general-season hunts. As a result, controlled-hunt harvest rates are typically higher than rates for other types of hunts, and a higher percentage of trophy animals are harvested because the reduced hunting pressure gives more animals time to reach maturity. Controlled hunt tags or permits are granted by lottery, with a fixed number of hunters drawn who can then purchase tags for the controlled hunt. Hunters who draw a tag for a certain species in Idaho and Oregon may not hunt that species in any other type of hunt that year.

Archery and black-powder hunts limit the ranges at which hunters can effectively harvest animals. Typically, these types of hunts have lower success rates than controlled or general-season hunts. To help offset the limitations of these short-range weapon hunts, IDFG and ODFW generally set these seasons either early in the hunting season or later in the year. Hunters allowed to hunt early in the season with short-range weapons find animals less wary than they are during the general-season hunt when more hunters are afield. The late-season hunt offers a different advantage. Foul weather during the late season causes animals that would normally be spread over a wide area to group together. Deer and elk are especially prone to such grouping.

General-season hunts are available for anyone who possesses a hunting license and purchases a tag or permit. Hunters can use the weapons of their choice. As a result, hunting pressure is often much higher than during controlled hunts or short-range weapon hunts.

2. STUDY AREA

The extent of the HCRA, the study area for recreation resources, was determined by the RARWG, made up of representatives from IPC and various federal, state, and local agencies and interest groups. The HCRA covers a 166.9-mile reach of the Snake River. This reach extends from approximately 8 miles downstream of the bridge near Weiser, Idaho, at the FERC project boundary near the crossing of an overhead powerline (river mile [RM] 343) downstream to the northern boundary of the HCNRA (RM 176.1) (Figure 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 (along Oxbow Reservoir). The elevation of the Snake River near Weiser is about 2,090 feet mean sea level (msl), descending to about 910 feet msl at the confluence of the Salmon River, about 59 miles downstream of Hells Canyon Dam. Below Oxbow Dam, the river enters a narrow, steep-sided chasm measuring up to 5,500 feet deep. From the confluence with the Grande Ronde River, located 6 miles 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 feet.

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 3).

Brownlee Reservoir Reach—The Brownlee Reservoir reach of the Snake River is 58.4 miles 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 feet 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 miles 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 multichannel wetlands (RM 9.0).

Oxbow Reservoir Reach—The Oxbow Reservoir reach is 12 miles 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 miles 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 feet. 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 miles below Oxbow Dam to Hells Canyon Dam (RM 247.6), has a maximum depth approaching 200 feet. The unique design of Oxbow Powerhouse and Oxbow Dam leaves a 2.5-mile stretch of the original river channel between Oxbow Dam and the outflow of the powerhouse with a minimum flow of 100 cubic feet 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 miles 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 surrounded at the upstream end by nearly vertical cliff faces. At the mouth of Granite Creek, approximately 7 miles below Hells Canyon Dam, the river elevation is 1,480 feet and the canyon depth is 7,913 feet. 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 Epoch and probably cut the gorge to its present level during the Pleistocene. During the Pleistocene, glacial meltwater provided abundant runoff for down-cutting, while regional uplifting created weak points in the 2,000- to 3,000-feet-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 feet msl) range from −9 °C in January to 13 °C in July. By contrast, mean temperatures below 1,000 m (3,281 feet 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 HCRA, especially in the southern region of the study area. For example, big sagebrush (*Artemisia tridentata*) is a dominant species in the southern sector of the study area, 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 of the 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 miles of any portion of the study area is Boise, Idaho, about 60 miles from the upstream end of Brownlee Reservoir (Figure 4). 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-mile radius of some portion of Hells Canyon include 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 (Figure 4). Federal agencies, such as the BLM and U.S. Forest Service (USFS), are responsible for managing the majority of public lands 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 IDFG and 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 USFWS.

Several special management areas also exist in the Hells Canyon area and are directly administered by the USFS. These include the Eagle Cap Wilderness in Oregon, the Hells Canyon Wilderness in Idaho and Oregon, the HCNRA in Idaho and Oregon, the Wild and Scenic Imnaha River in Oregon, the Seven Devils Scenic Area in Idaho, and the Wild and Scenic Snake River 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 miles. The following description does not include several access roads that may appear on some maps but are either private ranch roads or, in the case of some USFS roads, in such poor condition that motorized travel is not advisable. All access roads and locations in the following description can be found in Figures 4 and 5.

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 miles 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 miles before joining I-84 at RM 338. I-84 (which crosses southern Idaho and then proceeds northwest to the Columbia River

and Portland, Oregon) runs parallel to the upper end of Brownlee Reservoir for 3 miles (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-mile 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 miles 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-mile reach between 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 Reservoir 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 State Highway 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

State Highway 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 miles, the last 11 miles parallel to Oxbow Reservoir, before crossing the river immediately below Brownlee Dam. Across the bridge at Copperfield, the Brownlee–Oxbow Road ends at State Highway 86. State Highway 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 miles 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 miles to the north. Dug Bar Road, a relatively rough road of gravel and dirt, 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 miles. Aside from hiking, access to the Snake River at this end of the HCNRA is by boat. At Heller Bar, just north of the mouth of the Grande Ronde River (RM 168.7), the BLM operates a landing—a boat ramp and parking facility on Snake River Road—about 8 miles north of the HCNRA's northern boundary and 20 miles south of Asotin. Additionally, in the 25-mile 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 miles to Rock Creek (RM 320). Changing from pavement to gravel, the road runs north 22 miles, parallel to Brownlee Reservoir. The northern 10 miles 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 miles, no roads access Brownlee Reservoir. Rock Creek Road, a gravel and dirt road, runs from Weiser through more than 20 miles of ranch land before reaching Brownlee Reservoir at Trail Creek. From there, it runs parallel to Brownlee Reservoir for 4.5 miles 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 miles. Between Brownlee Creek and just downstream of Brownlee Dam, a distance of about 4 miles, Idaho State Highway 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 State Highway 71 bridge (just below Brownlee Dam) to Oxbow Dam, a distance of about 11 miles, there is no road access to Oxbow Reservoir on the Idaho side. Beginning just below Oxbow Dam, Hells Canyon Road—which joins State Highway 86 by bridge at RM 270—runs parallel to Hells Canyon Reservoir for about 23 miles northward before crossing Hells Canyon Dam. It ends about 1 mile 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 miles 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 miles, no maintained roads access the Snake River. At Pittsburg Landing, a well-maintained, 17-mile-long gravel road runs east-west across the ridge from 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 miles. Access in this 76-mile 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. Recreational Sites and Amenities

Recreational-use sites discussed in this section are shown in Figure 6.

2.9.1. Recreational Sites and Amenities Associated with HCC Reservoirs

2.9.1.1. IPC Sites and Amenities

IPC provides and regulates its parks and other recreational facilities in accordance with Section 10(a) of the Federal Power Act. Consistent with applicable laws, rules, and regulations, reasonable fees are charged for use of the park facilities at Brownlee, Oxbow, and Hells Canyon projects.

IPC Parks

All four IPC parks have full-time, on-site maintenance personnel. Rules and regulations, as well as informational, historical, and interpretive signs, are posted at various locations throughout the parks and the HCC. Public telephones are available at all four parks. The parks are open year-round, with limited amenities and reduced rates available during the off-season. The off-season runs from November 1 through March 30. For more detailed information about IPC's park facilities, see Moore and Brown (2001).

***Woodhead Park*—**Woodhead Park (RM 287.3) is located adjacent to Idaho State Highway 71, on the Idaho side of Brownlee Reservoir, approximately 24 miles west of Cambridge, Idaho, and 4 miles south of Brownlee Dam. 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 State Highway 71 increased park acreage so that the park now has 65 acres of turf, shade trees, and naturally landscaped areas. Woodhead Park has 124 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 feet msl (reservoir "full pool" is 2,077 feet msl). The original one-lane boat ramp allows reservoir access during maximum drawdowns (1,976 feet msl).

***McCormick Park*—**Constructed in 1958, this park is located on the Idaho side of Oxbow Reservoir, approximately 1 mile downstream of Brownlee Dam. McCormick Park (RM 283.3) is a day- and night-use recreation facility with the following amenities: 9 acres of turf, shade trees, restroom facilities with showers, 34 recreational vehicle (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.

***Copperfield Park*—**Originally constructed in 1965 and subsequently remodeled in 1989, Copperfield Park (RM 269.5) is located on the Oregon side of Hells Canyon Reservoir just 3 miles downstream of Oxbow Dam and adjacent to the intersection of Idaho State Highway 71, Oregon State Highway 86, and Hells Canyon Road. The park has 12 acres of turf, paved roads, terraced landscaping, and numerous trees throughout. 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. Nearby is Copperfield Boat Launch, described below.

***Hells Canyon Park*—**Hells Canyon Park (RM 263.5) is located on the Idaho side of Hells Canyon Reservoir adjacent to Hells Canyon Road and about 9 miles downstream of Oxbow Dam. 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.

IPC Non-Park Recreational Facilities

IPC operates and maintains several less-developed recreational sites and owns many impromptu, or undeveloped, sites that are open to recreational use. Impromptu campsites are also referred to as dispersed campsites.

***Carters Landing*—**Located adjacent to the Brownlee–Oxbow Road on the Oregon side of Oxbow Reservoir approximately 4 miles downstream of Brownlee Dam, Carters Landing (RM 280.5) occupies approximately 1.7 acres. Facilities include several impromptu campsites, a composting toilet, picnic tables, garbage receptacles, and an unimproved boat launch. IPC charges nominal fees for use of this site.

***Copperfield Boat Launch*—**Constructed in 1994, the Copperfield Boat Launch (RM 269.1) is located on the Oregon side of Hells Canyon Reservoir, approximately 1 mile downstream of Copperfield Park on Homestead Road. Amenities include a two-lane concrete boat ramp, boat docks, parking, garbage receptacles, and seasonal toilets.

***Impromptu Areas*—**In addition to those sites listed here, IPC owns a number of areas adjacent to project waters that are used for impromptu day-use sites and campsites. Some have portable toilets, garbage pickup, and unimproved boat launching areas. For more detailed information about IPC nonpark recreational facilities, see Hall and Bird (2001).

2.9.1.2. USFS Sites and Amenities

The USFS currently does not manage any highly developed recreation facilities in the study area associated with Brownlee, Oxbow, or Hells Canyon reservoirs. However, the agency manages much of the land in the study area surrounding Hells Canyon Reservoir and upstream of Hells Canyon Dam, as well as several trails and sites either adjacent to or associated with the HCC reservoirs.

Idaho and Oregon Sites

***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 downstream of Big Bar on Hells Canyon Road, about 15 miles north of Oxbow Dam. 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 manages this 38-acre terraced area (RM 255.7) located on the Idaho side of Hells Canyon Reservoir, 16.5 miles downstream of Oxbow Dam and adjacent to Hells Canyon Road. Amenities include vault toilets, interpretive signs, two unimproved gravel boat ramps, and one dock. Camping is allowed at various locations throughout this site.

***Black Point*—**Black Point (RM 252.2) is a scenic overlook pullout 20 miles north (downstream) of Oxbow Dam on Hells Canyon Road. Situated about 1,200 feet above and immediately adjacent to Hells Canyon Reservoir, this pullout accommodates large vehicles and displays interpretive signs.

***Eagle Bar*—**Eagle Bar (RM 249.5) is a 3-acre site on the Idaho side of Hells Canyon Reservoir, approximately 7.5 miles downstream of Big Bar. During construction of the Hells Canyon Dam, IPC used this site for trailer offices, tool shops, and a first-aid station. The USFS manages this site for dispersed day and camping use.

***Deep Creek Access Trail Pullout*—**A parking area with a vault toilet provides a pullout for recreationists who use the Deep Creek Access Trail. This site is located immediately upstream of Hells Canyon Dam, adjacent to Hells Canyon Road.

***Impromptu Areas*—**Many impromptu campsites and sportsman access areas exist along Brownlee, Oxbow, and Hells Canyon reservoirs on lands managed by various state and federal agencies, including the USFS.

Over 50 miles 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.

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 miles 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 and 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 Visitors Center. It is maintained by the USFS for 1 mile downstream to Stud Creek.

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 miles from the trailhead.

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

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

Deep Creek Trail (#219)—This 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 Trail connects Sheep Rock and Deep Creek via the Copper Creek drainage.

Deep Creek Stairway Trail (#218)—A steep stairway from Hells Canyon Dam, this trail provides fishing access to the mouth of Deep Creek.

2.9.1.3. BLM Sites and Amenities

Oasis Site—On the Oregon side of Brownlee Reservoir, the Oasis site (RM 340) is located adjacent to U.S. Highway 30 (U.S. 30). Amenities include a boat ramp, gravel parking lot, and vault toilet. Some impromptu campsites can occur here. In 1997, the BLM and IPC cooperatively added a vault toilet and graded the parking lot.

Steck Park—On the Idaho side of Brownlee Reservoir, this day- and night-use site (RM 327.9) is adjacent to Olds Ferry Road. 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-feet 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 326.7) is adjacent to the Snake River Road, just downstream of the mouth of the Burnt River. This is a day- and night-use facility. Originally, the lands on which the park was constructed were donated by IPC to the BLM for recreational development. 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. 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.

Oxbow Boat Launch—A day-use-only site, Oxbow Boat Launch (RM 275.8) is located on a narrow strip of land adjacent to the Brownlee–Oxbow Road on the Oregon side of Oxbow Reservoir, approximately 10 miles downstream of Brownlee Dam. Amenities include garbage pickup, a gravel boat ramp, dock, composting toilet, and parking area. BLM owns this site, and IPC maintains it.

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.

2.9.1.4. Sites and Amenities Managed by State Agencies

Within the study area, the only recreation area that is managed by a state agency is Farewell Bend State Park (RM 333.5), which is managed by the Oregon Department of Parks and Recreation (ODPR). This site is a day-use and overnight camping facility located adjacent to Huntington Highway near I-84. 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.

2.9.1.5. County Sites and Amenities

Hewitt and Holcomb parks, managed by Baker County, are the only recreation areas within the study area that are owned and operated by a county. These adjacent parks are located on the northern side of the Powder River arm of Brownlee Reservoir at the end of Sullivan Road (RM 7.5), near Richland. These two parks provide day-use and camping facilities. 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 a parking area. Facilities include restrooms, RV sites with electrical and water hookups, picnic tables, a playground, a fish-cleaning station, boat ramps, and numerous docks. In 1996, IPC extended the length of the main boat ramp by 100 feet at Hewitt Park, extending boat launching from 2,048.5 to 2,036.5 feet msl during low-water periods.

2.9.1.6. Privately Owned Sites and Amenities

***Oasis Campground*—**On the Oregon side of upper Brownlee Reservoir, Oasis Campground (RM 340) is a privately owned facility. It lies between the BLM Oasis Site and the Snake River RV Park; all three of these sites are adjacent to the Olds Ferry–Ontario Highway (U.S. 30), approximately 10 miles downstream of Weiser. Oasis Campground has 23 RV sites with electrical, water, and sewer hookups, as well as a restroom with showers. Bait and tackle are sold on site.

***Snake River RV Park*—**This privately owned 25-acre campground is adjacent to Oasis Campground. It has 10 campsites with electrical, water, and sewer hookups and 10 sites with only electrical hookups and water. Other amenities include a restroom with showers, a laundromat, a fish-cleaning station, and a paved boat ramp.

***Mountain Man Resort and Marina*—**Mountain Man Resort (RM 310.5) is a privately owned facility on the Idaho side of Brownlee Reservoir, located 32 miles northwest of Weiser. It is part of a 38,000-acre ranch that is accessible via county-maintained Rock Creek Road. Before 1997, lodge amenities included accommodation for up to 34 people, a meeting room, and meals. Primitive camping facilities and teepees were available for overnight use for a fee. 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*—**Little Deacon Creek (RM 310.5) is a privately owned site encompassing approximately 5 acres. It provides a primitive boat ramp, a dock, and some graveled pads for RV parking. This site also provides access by boat from the Oregon side of the river to Mountain Man Lodge.

2.9.2. Recreational Sites and Amenities Below Hells Canyon Dam Associated with the HCNRA

2.9.2.1. USFS Recreational Sites and Amenities

USFS Administrative Sites

The USFS manages four administrative sites within the HCNRA. These include maintenance facilities, historic areas, and recreational sites.

Hells Canyon Creek Recreation Site (and Hells Canyon Visitors Center)—Built at the Hells Canyon Creek Recreation Site in 1995, the Hells Canyon Visitors Center (RM 246.8) is located on the Oregon side of the Snake River about 1 mile north (downstream) of Hells Canyon Dam, at the northern end of Hells Canyon Road. This recreation site is the launch site for most float trips on the Snake River through Hells Canyon. The launch site also offers commercial and private jet boat access to the upper end of the HCNRA. Amenities include a pay phone, vault toilets, covered picnic shelters, a concrete boat launch, a float boat launch, and a docking system for commercial jet boats. The modern rock-and-glass Visitors Center is staffed seven days a week from Memorial Day weekend through September 15. IPC provides one full-time employee from May through September.

Kirkwood Historic Ranch and Associated Campsites—The Kirkwood Historic Ranch site (RM 221.5) is located on the Idaho side of the Snake River, about 27 miles north of Hells Canyon Dam. Open all year, this historic ranch, museum, and interpretive site portrays early pioneer life in the canyon. Volunteers staff this site during the high-use season. Toilets are available. A satellite telephone is on site for emergencies and reporting fires. Three campsites 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 miles north of Hells Canyon Dam. 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.

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 miles north of Hells Canyon Dam and 43 miles south of Lewiston. 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, a toilet, and tables.

USFS Special-Use Permit Sites within the HCNRA

***Sheep Creek*—**Sheep Creek (RM 229.5) is a privately operated site located on the Idaho side of the Snake River, about 18 miles north (downstream) of Hells Canyon Dam. This site contains an old, refurbished farmhouse and offers overnight accommodation with meals. Mike and Jodee Luther manage it, under a USFS special-use permit.

***Temperance Creek Ranch*—**Temperance Creek Ranch (RM 223.8) is on the Oregon side of the Snake River about 24 miles north of Hells Canyon Dam. 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.

***Copper Creek*—**Copper Creek Resort (RM 205) is on the Oregon side of the Snake River, about 43 miles north of Hells Canyon Dam. Operated by Beamers (a guide and outfitting service) under a special-use permit, this site offers cabins and all-you-can-eat meals.

Other USFS Sites and Trails

***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, a very popular angling spot. Deep Creek is 0.1 mile downstream of and about 350 feet below the top of Hells Canyon Dam and marks the beginning of the access trail. The trail is very steep, traversing almost vertical canyon walls. A series of metal stairways, landings, railings, and natural surfaces provides access for anglers and other outdoor enthusiasts to the Idaho side of the Snake River below Hells Canyon Dam. A parking area with a vault toilet is located immediately adjacent to Hells Canyon Dam and Hells Canyon Road.

***Stud Creek Trail*—**The Stud Creek Trail begins at the Hells Canyon Visitors Center (at the Hells Canyon Creek Recreation Area) and extends downstream along the Oregon side of the river for about 1 mile to Stud Creek (RM 246).

***Snake River National Recreation Trail*—**This 25-mile trail runs parallel to the Snake River in Idaho. It begins at Granite Creek (RM 239.6), about 8 miles north (downstream) of Hells Canyon Dam, and ends at the Pittsburg Administrative Site. Sections of the trail are sometimes flooded.

***Dug Bar Site*—**Dug Bar (RM 197) is on the Oregon side of the Snake River about 50 miles north of Hells Canyon Dam. 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.

***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).

2.9.2.2. Privately Owned Recreation Sites and Amenities

***Kirby Creek Lodge*—**Kirby Creek Lodge (RM 218.9) is located approximately 80 miles upstream of Lewiston and 26 miles downstream of Hells Canyon Dam. Mike and Jodee Luther

own and operate both Snake River Adventures and Kirby Creek Lodge. The lodge has a grassy lawn, 8 guest rooms, 2 shared bathrooms with showers, and 1 shared living room. Family-style dining is provided.

Garden Creek Preserve (also known as Deer Head Rapids, China Gardens, Madden Ranch, and Butch and Deb's)—Owned by The Nature Conservancy (TNC), this preserve (RM 176.0) is located just north of the HCNRA boundary, approximately 37 miles south of Lewiston, on what was once a working ranch. The lodge, now leased from TNC by River Quest Excursions, is a large home that was built in the 1920s. 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.

2.9.2.3. BLM Recreation Sites and Amenities

Heller Bar—Just north of the mouth of the Grande Ronde River, the landing at Heller Bar is about 8 miles north of the HCNRA's northern boundary and 20 miles south of Asotin. This BLM site has a boat ramp and a parking facility on Snake River Road. Although Heller Bar is not within or adjacent to the HCNRA, it provides significant access for boaters accessing the HCNRA through the Cache Creek Portal.

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, the deepest canyon in North America, is 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.

When the complex was built, its main purpose was generating power. 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 cooperate 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 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 the Bonneville Power Administration.

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).

4. METHODS

4.1. Collecting Information from Non-IPC Sources

From November 2000 through April 2001, IPC personnel thoroughly searched the library of the Environmental Affairs Department of IPC for relevant information. Additionally, IPC requested relatively recent hunting-related information from IDFG sources and the ODFW library. Information relating to the scope of this study was copied for later use.

IPC personnel spent six months corresponding with wildlife biologists and managers while collecting information from IDFG, ODFW, and other sources. Communication methods included e-mails, phone conversations, faxes, and regular post. IPC also contracted with Inez Hopkins to assist in obtaining relevant materials. Aside from ascertaining what types of information were available, Hopkins traveled once to Oregon to review and copy material for the report. (For 13 years, Hopkins was a librarian for the IDFG. For the past six years, she has worked as a self-employed research librarian. IPC has contracted with Hopkins a number of times to work on previous technical reports.)

4.1.1. Using the IPC Library

We organized all documents and information sources collected during this study into the IPC reference library using the database software ProCite 5. This software makes bibliographic entries, source lists, and subject indexes quickly available. Keywords, author names, or resource titles can be used to quickly search the database.

4.1.2. Compiling Relevant Information

We categorized all information by state, unit, species type, year, number of hunters, animals harvested, and success rates. Then we assembled this information in tables and (where applicable) graphs. We collected background information on animals' life spans and noxious weed invasion from the respective state harvest reports. This information helped us understand the various factors affecting hunting pressure within the HCRA.

4.2. IPC Recreational-Use Surveys

The following section provides a general description of IPC's survey efforts. For more detail, see IPC's recreational use reports (Brown 2002a,b).

4.2.1. HCC Reservoir Surveys

***On-site Roving Surveys*—**During 1994 through 1998, and 2000, IPC conducted on-site recreational use and creel surveys using methods modified from Malvestuto et al. (1978), Malvestuto (1983), and Hoenig et al. (1993). Survey efforts continued from May 1, 1994, through October 31, 1998. During 2000, surveys were conducted from May 1 through October 31. At randomly selected times and locations, survey clerks conducted on-site recreationist counts and interviews. Survey clerks recorded the number and location of hunters in the immediate reservoir area. Additionally, they interviewed hunters who were accessible. This report includes estimated hours of hunting use by location and any hunting-related comments obtained during interviews.

Mail surveys—During 2000, in addition to the on-site roving survey, IPC conducted a follow-up mail survey with recreationists who had responded to on-site surveys. This report includes general, open-ended comments that relate to hunting, as well as responses to the three hunting-specific questions:

> Have you ever hunted in the Brownlee Reservoir area anywhere between the reservoir and the canyon rim?
>
> Please list the types of hunting you have engaged in within the Brownlee Reservoir area, how many times you hunted during the last two years, and whether you did this type of hunting in the river corridor or upland area. (In the chart below, river corridor means within 0.25 mile of the Snake River.)

Type of Hunting	Number of Trips in 1998–1999	River Corridor (RC) or Upland (Circle one)	State (Circle one)
	_____Trips	RC Upland Both	OR ID Both
	_____Trips	RC Upland Both	OR ID Both
	_____Trips	RC Upland Both	OR ID Both
	_____Trips	RC Upland Both	OR ID Both

> We are interested in finding out how you feel about hunting in general and access to hunting within the areas around Brownlee Reservoir (rim-to-rim river valley). Please provide any comments you have concerning these subjects.

4.2.2. HCNRA Survey

During 1999, IPC conducted on-site and follow-up mail surveys in the HCNRA. Recreationists who listed hunting as an expected activity during the on-site portion of the effort were mailed hunting-related questions in addition to the general recreation survey (Appendix A). This report includes responses to these questions as well as any general hunting-related comments from respondents.

To help us analyze the data, we coded the responses from mail-back or on-site surveys into seven distinct categories. Then we further divided the responses within those categories into two to nine different codes (Table 1).

5. RESULTS

Over the last decade, hunting license sales have decreased nationally, as well as in Idaho and Oregon. But over the same period, the hunt units of interest (in terms of hunting pressure) have generally remained the same. According to the USFWS, the number of people participating in hunting nationally has dropped from 14.1 million in 1991 to 14 million in 1996. In Idaho, hunter numbers dropped from approximately 250,000 in 1992 to 230,000 in 1999. The number of Oregon hunters has dropped from 320,000 to 290,000 (USFWS 1997). This reduction is even more significant considering that, during that 7-year period, the populations of both states increased.

Bird hunting constitutes a large portion of overall hunting pressure in the HCRA. But information from Idaho and Oregon wildlife agencies is limited because those agencies have not collected bird harvest data every year nor have they analyzed their bird harvest information by unit. For example, until 1996 IDFG used phone surveys as the primary method to collect statewide harvest data for upland birds. Since that time, IDFG has discontinued the phone surveys. ODFW collects data on a sectional basis from the state's six different areas for upland game bird management. Because the HCRA is such a distinctive geographic area, IDFG's limited harvest data and ODFW's regional harvest data were not collected.

5.1. Deer

The white-tailed deer subspecies living in the area is commonly referred to as the Idaho white-tailed (*O. v. ochrourus*). The highest densities of these deer occur in the northern hunt units, primarily the Chesnimus and Snake River units in Oregon and units 11, 13, and 18 in Idaho.

Mule deer are native to most portions of the HCRA. Life spans for mule deer females (does) and males (bucks) differ greatly. Does can live 15 years or more, while bucks typically survive less than 9 years. This discrepancy can be attributed to several factors. High stress levels during the breeding season leave bucks less ready for the often harsh winter. Hunting season is another reason for bucks' shorter life spans. To ensure species survivability, hunting seasons are generally established to take a greater ratio of bucks than does.

During the summer, deer can typically be found in the higher elevations because they follow the melting snows and forage on the more nutrient-rich vegetation. Winter snows typically push the deer herds to lower elevations where they can find enough food to survive.

5.1.1. Idaho Deer

Information about Idaho deer and related statistics was gathered from many sources, which include IDFG 1992a, 1993a, 1994a, 1995a, 1997a, 1998a, and 1999a.

In 1973, the IDFG began managing white-tailed and mule deer separately in the regions of the HCRA. Before 1973, both species fell under the general heading of "deer" for management purposes, with no distinction between the two for harvest limitations. As white-tailed deer and elk numbers expanded in the northernmost portions of the HCRA, numbers of mule deer began to decline, perhaps because of competition from the other ungulates. As a result of this decline, the numbers of mule deer harvested, which peaked from the 1930s through the 1960s, have dropped to the lower levels we see today.

Generally, the IDFG counts deer twice annually by aircraft, horses, vehicles, or foot. Both Idaho and Oregon set their annual hunting regulations based on the number of animals observed and the harvest data for the previous year. However, in recent years, budget constraints in Idaho have limited flights for wildlife biologists. Therefore, the states rely heavily on harvest data from check stations, phone surveys, and in the case of Idaho, mandatory report cards from successful hunters.

IDFG's current management objectives (MOs) for mule deer in Units 11, 13, and 18 include the following:

- Increase mule deer numbers by restricting antlerless opportunity until better population information is available and a threshold is established.
- Maintain at least a 30% harvest rate of mule deer having 4 or more points (the number of points refers to the total number of points per side of an animal's antlers).

IDFG's current MOs for mule deer in units 22, 31, and 32 include the following:

- Maintain at least a 30% harvest rate of bucks having 4 or more points.
- Maintain buck to doe ratios from herd composition surveys above the statewide minimum of 15 bucks to 100 does.
- Restrict antlerless harvest when trend area deer populations are below threshold levels of 3,700 deer in unit 22 and 3,400 in unit 31.
- Encourage liberal antlerless harvest when deer numbers exceed threshold levels of 3,700 deer in unit 22 and 3,400 in unit 31.

From 1990 to 1999, four of Idaho's six units (11, 22, 31, and 32) saw increases in hunter numbers as well as the number of animals harvested. Only units 13 and 18 saw decreases in the respective categories during that time (Table 2 and Figure 7).

Unit 32 saw the greatest increase during that 10-year period. In 1990, unit 32 had 2,011 hunters pursuing deer. In 1999, that number more than doubled to 4,523. The number of animals harvested in unit 32 also increased from 645 in 1990 to 1,779 in 1999. Success rates for unit 32 varied yearly. Hunters in 1992 had the highest success rate (46%) in that 9-year span, while 1994 hunters had the lowest (19%).

Annually, unit 31 has varied the most for mule deer hunters. In 1990, unit 31 had 1,530 mule deer hunters. That number dropped to 739 in 1993, but then increased steadily to a high of 1,787 in 1999. Success rates also varied considerably in unit 31 during that period.

Conversely, unit 18's hunter numbers dropped from 1,148 in 1990 to 466 in 1999, and harvest numbers dropped from 740 in 1990 to 235 in 1999. All of Idaho's units have only controlled hunts for mule deer. So these discrepancies are primarily attributable to the number of controlled-hunt permits the IDFG offers. Indirectly, habitat loss, overharvest in previous years, and various other factors have led IDFG to reduce the annual number of mule deer permits.

5.1.2. Oregon Deer

Information about Oregon deer and related statistics was gathered from several sources, which include ODFW 1990, 1991, 1992a, 1993a, 1994, 1995, 1996, 1997, 1999, 2000, and 2001.

Like IDFG, ODFW generally counts deer twice annually by aircraft, horses, vehicles, or foot. These counts typically occur in March or April and then again in November or December.

In 1992, Oregon's ODFW commission set total population MOs (which are considered maximums) for each unit. In addition, they set postseason MOs for buck ratios. The commission uses the following three strategies, based on buck ratios, to determine tag numbers:

- Units that are managed to provide maximum hunter recreation (and generally have historically high recruitment and herd productivity) have a minimum buck ratio MO of 12 bucks to 100 does postseason. About 60% of the buck harvest in these units will be yearlings. Seventeen of 48 management units fall in this category.
- To provide a better chance of "bagging" an older-age class buck under somewhat less-crowded conditions, 24 units are managed for a minimum postseason buck ratio of 15 bucks to 100 does. Fewer tags are available in these units, but harvest will typically include 40 to 60% older bucks.
- Quality hunting experience under uncrowded conditions is possible in the seven units with buck ratio MOs of 25 bucks to 100 does. Hunting conditions will generally be uncrowded, and most harvest should be of mature bucks.

After the hunting season ends, ODFW uses phone surveys to collect harvest data. Portions of the licensed hunters are contacted, and then projections are made from information that hunters provide.

The number of deer hunters in the seven units of concern on the Oregon side of the HCRA has decreased from 8,374 hunters in 1990 to 6,772 in 2000. The difference in number of hunters

before 2000 appears in Table 3 and Figure 8. Lookout Mountain has seen the greatest increase in deer hunting pressure over the last 10 years. In 1990, there were only 134 deer hunters in the unit. That unit's hunter numbers steadily increased to 425 in 2000. The overall decline in deer hunter numbers on the Oregon side of the HCRA is largely attributable to the decline of hunters in the Beulah unit. In 1990, the Beulah unit had 5,194 deer hunters, but that number has steadily declined over the last 10 years to 2,780 in 2000. Overall success rate for Oregon deer hunters in the HCRA has also decreased from 50% in 1990 to 48% in 2000.

5.2. Elk

In the deer family, elk are second only to moose in size. Originally plains animals, elk were hunted to near extinction in the early to mid 1900s. Elk are more commonly found in steep and timbered country today, and their numbers have rebounded—primarily because of regulated hunting seasons. Maximum life expectancy for females (cows) is usually 15 years and roughly half that for males (bulls). Rocky Mountain elk can be found throughout the hunt units in the HCRA. MOs for elk numbers vary by unit, and seasonal harvest goals may vary yearly because of diverse factors, which include predation, fires, harvest success rates, and disease.

The elk breeding period ranges from early September through mid October, but most breeding activity occurs during the last two weeks of September. Mature bulls (3.5 years or older) typically do most of the breeding. The energy these older bulls expend in collecting and guarding their harems often leaves them less suited to survive the winter, resulting in high mortality rates among this segment.

Elk hunting is big business in the western states. Elk hunting activities provide $30 million and $40 million annually to Idaho and Oregon's respective economies (Unsworth 1991). Early in the last century, mining camps throughout the area harvested so many elk that by the late 1930s, transplant efforts to supplement sagging herd populations became necessary.

Invasions by noxious weeds, such as yellow starthistle (*Centaurea solstitialis*) and whitetop (*Cardaria draba*), have severely threatened winter habitat among hunt units in the HCRA.

5.2.1. Idaho Elk

Information about Idaho elk and related statistics was gathered from several sources, which include IDFG 1990a, 1992b, 1993b, 1994b, 1995b, 1996a, 1998b, and 1999b.

The seasonal harvest in Idaho's units has varied by year and unit. Throughout units adjacent to the HCRA, controlled hunts occur to some degree. Unit 32 has both controlled and general hunts within its boundaries during the hunting season. Idaho's remaining units in the HCRA (11, 13, 18, 22, and 31) have controlled hunts only. However, this was not always the case.

All hunts have been controlled in unit 11 since 1970, in unit 13 since 1982, in unit 18 since 1979, in unit 22 since 1971, and in unit 31 since 1976. The number of controlled hunt permits for each unit has varied yearly, depending on previous year harvest results, weather conditions, and IDFG's biannual herd counts.

In recent years, 11 and 13 are the only units that have seen a reduction in the number of available permits. In 1994, unit 11's number of permits was reduced from 150 to 100, where it remains today. Unit 13 currently offers 75 controlled hunt permits, whereas it once offered as many as 275 (in 1997).

Of all the units providing elk hunting opportunities on the Idaho side of the HCRA, unit 18 has probably seen the greatest annual fluctuations of controlled-hunt tags. In 1979, unit 18 offered a scant 25 controlled-hunt permits to hunters. That number climbed to a high of 450 for 1985 and 1986. Since then, unit 18 has been reduced to 195, where it has remained for the last two years.

Idaho MOs for elk in units 11, 13, and 18 include the following:

- Maintain a total population of plus or minus 1,950 cows and 525 bulls.
- In unit 11, maintain plus or minus 325 adult bulls at ratios of 25 to 29 bulls to 100 cows.
- In unit 13, maintain a ratio of 18 to 24 bulls to 100 cows.
- In unit 18, maintain a ratio of 30 to 34 bulls to 100 cows.

Current indications show that across these three units, numbers of cow elk are increasing (+12.7% per year), numbers of bull elk are increasing (+7.4% per year), while bull to cow ratio is declining (–5% per year), and calf recruitment is stable.

Idaho MOs for elk in the HCC units of 22 and 32 include the following:

- Reduce cow elk populations for the entire management zone (22, 32, and 32a) to plus or minus 2,700 cow elk, most of which will occur in units 22 and 32.
- Maintain a postseason bull population of plus or minus 550, including plus or minus 315 adult bulls.

About 60% of unit 22 and 20% of unit 32 are publicly owned and managed. Private land makes up the western portion of unit 32 and the Weiser River valley portion of unit 22.

Idaho MOs for elk in unit 31 include the following:

- Maintain a population of plus or minus 700 cow and 140 bull elk, including plus or minus 75 adult bulls.
- Increase general hunting opportunity with year-to-year changes in archery (A) tag availability. (For the 2001 season, an A tag for either sex was available.)

Well into the late 1960s, liberal seasons for the hunting of either sex kept overall populations low. From 1968 until 1976, unit 31 was closed so that transient populations could rebuild the herd to more sustainable levels. Since the mid 1980s, elk populations in this unit have performed well.

Hunters have met with varied results throughout the six units comprising Idaho's portion of the HCRA. Generally speaking, the number of animals harvested and number of hunters have remained steady from 1990 to 1999 (Table 4 and Figure 9).

Unit 22 has seen the greatest increase in the number of hunters as well as the number of animals harvested during that 10-year span. In 1990, there were 1,929 hunters pursuing elk in unit 22. That number dropped to a 10-year low of 1,417 in 1995, but steadily increased to a high of 2,579 hunters in 1999. The number of animals harvested in unit 22 has remained relatively steady from 1990 to 1999, but harvest rates have declined in recent years. From a high of 34% success in 1992, hunters' success dropped to a low of 19% in 1999.

Although unit 11 offers the fewest elk permits in Idaho's portion of the HCRA, it has seen the greatest decrease in hunting pressure. In 1990, there were 150 hunters pursuing elk in unit 11, but that number dropped to a low of 48 in 1995 and then rebounded to 95 the following year, remaining steady (plus or minus three hunters) until 1999. Success rates have generally remained around 50% with a couple of notable exceptions. In 1990, hunters averaged 75% success, but in 1994 they only had 35% success. However, these facts help explain why IDFG dropped the number of permits in unit 11 for the following year.

Another noteworthy occurrence on Idaho's side of the HCRA was 1994's 100% success rate for unit 31 elk hunters. The unit's highest success rate for any of the other nine years was 53% in 1991. In 1998 and 1999, success rates for unit 31 dropped to 18 and 17%, respectively.

5.2.2. Oregon Elk

Information about Oregon elk and related statistics was gathered from several sources, which include ODFW 1991; 1992a,b; 1993a; 1994; 1995; 1996; 1997; 1999; 2000; and 2001.

Currently, four of the six units in Oregon's portion of the HCRA are managed on a controlled hunt only basis for elk (ODFW 2001). These units include Lookout Mountain, Beulah, Chesnimus, and Snake River. The remaining two, Pine Creek and Keating, offer a late-season general hunt for spike-antlered bulls only. This format was set using the MOs outlined in the 1992 *Oregon Elk Management Plan* (ODFW 1992b).

In addition to these seasons, the management plan outlined minimum bull to cow ratios and overall population benchmarks. These ratios and benchmarks are managed, in part, by the three-tiered system derived from statewide meetings between ODFW, sportsmen's groups, individual hunters, and various concerned parties. The ratios and benchmarks appear below.

Hunt Unit	Ratios of Bulls to Cows	Population Benchmarks
Chesnimus	10 to 100	3,500
Snake River	15 to 100	3,800
Pine Creek	15 to 100	400
Keating	10 to 100	400
Lookout Mountain	10 to 100	100
Beulah	15 to 100	1,000

Additionally, ODFW outlined several objectives regarding hunter management in the elk management plan. The objectives, associated with issues derived from the meetings, appear below:

- To maintain 1990 levels of hunter recreation in all units, as a minimum.
- To raise or maintain postseason bull ratios at MO.
- To achieve bull ratio MOs while maintaining recreational hunter day MOs.
- To increase bull age structure and reduce the illegal kill of bulls while maintaining recreational MOs.
- To provide opportunity to hunt elk with a variety of weapon types.
- To increase and maintain bulls to cow ratios at MO levels.
- To evaluate the effects of human disturbance on elk reproduction success from archery elk hunting and rifle deer hunting during the rut.
- To distribute elk hunting opportunity equitably among archery and rifle hunters.
- To decrease unsportsmanlike conduct among hunters, especially those participating in high-profile hunting opportunities.
- To explicitly state the ODFW's opposition to illegal acts, such as "party hunting" and "road hunting." A strong policy statement in opposition to such behavior may help obtain stronger rulings against such behavior within the judicial system.

With the exception of the Beulah unit, elk hunting pressure (from 1990 to 2000) has declined in all of the units on the Oregon side of the HCRA. Some degree of fluctuation occurred by year and by unit, but generally the number of elk hunters has steadily declined. The year 1993 was an exception, however, since the number of elk hunters actually increased in all of the units (Table 5 and Figure 10).

The Snake River unit has seen the greatest overall decline in elk hunter numbers, dropping from 1,793 in 1990 to 503 in 2000. Accordingly, harvest numbers have dropped significantly from 1990 to 2000 in the Snake River unit. Before 1997, the lowest elk harvest was 476 (in 1996). That number decreased to 180 elk harvested in 1997, 91 in 1998, 148 in 1999, and 124 in 2000. This reduction is due primarily to the decrease in tags that ODFW made available. (The Snake River unit has a controlled-hunt only tag for elk, and the number of available tags was cut from 1,363 in 1996 to 791 in 1997.)

As mentioned earlier, the Beulah unit has seen a steady increase in hunter numbers for the last 10 years. In 1990, there were 2,359 hunters in this unit, but that number has steadily increased each year to a high of 3,650 in 1999. Harvest rates have varied during that same time. The year 1992 saw the highest harvest in the Beulah unit from 1990 to 2000, with hunters taking 854 animals. Conversely, the next year was the lowest harvest rate during the 10-year span: only 509 animals were taken. Predictably, 1992's hunters in the Beulah unit had the highest success rate, with 34% taking an animal home. The year 1999 offered hunters the lowest chances of success during the 10-year period, with only a 19% success rate.

5.3. Black Bears

Largely considered predators and nuisances, black bears were once harvested for bounty. Today, black bears are considered a game animal and managed as such. Various harvest restrictions have been implemented.

Black bears typically hibernate 8 to 10 months of the year and are found in a wide variety of habitats. Population densities are generally higher in northern Idaho and western Oregon where the area is more densely forested. Like other animals, black bears can often benefit from forest disturbances, such as forest fires and logging. The initial types of vegetation that typically inhabit an area after forest fires and logging are conducive to a black bear's diet in the spring. Black bears are omnivores, although most biologists estimate the proportion of vegetation is much higher than that of meat in their diets.

Black bears adapt well to their environment. In years during which less forage is available, litters are often smaller than in years with a normal amount of forage. Generally, however, litter size is somewhere between one and three. The cubs stay with their mothers just over a year, and then they are left to fend for themselves. Hunting laws in both Idaho and Oregon specifically prohibit harvesting females who still have their cubs with them.

Although most are completely black in color, black bears have a wide range of color phases. Cinnamon-colored bears are sometimes mistaken for grizzly bears (*U. arctos*), and this misidentification may partly account for grizzly bear sightings throughout Idaho and eastern Oregon. The two bears can be differentiated by overall size and the pronounced hump between the front shoulders of grizzlies, a feature that is absent on black bears.

Because of the black bear's reticent nature, wildlife managers have a difficult time taking an accurate census. State law mandates that Idaho hunters who harvest a black bear must have their animals checked by an IDFG employee within 10 days for population studies. ODFW uses a voluntary check-in program for hunters who harvest a black bear in Oregon. Compliance for Oregon's voluntary program traditionally averages somewhere between 20 and 40% of those animals harvested in the state. In both states, teeth are pulled from the bear and growth rings counted to determine the age of the bear.

5.3.1. Idaho Black Bears

Information about Idaho black bears and related statistics was gathered from several sources, which include IDFG 1990b, 1992c, 1993c, 1994c, 1997b, 1999c, and 2001a.

Unlike deer and elk, which have traditionally been managed by unit, black bear habitat and populations in Idaho are divided into five management areas. Four of these five areas are then further subdivided into data analysis units (DAU). The fifth area is primarily southern Idaho, where black bears and their habitat are limited. These units are a compilation of several adjacent hunt units with similar ecosystem habitat. In our study, we found that the differing areas for management made it difficult for us to look at just the units of interest in the HCRA.

During the past planning cycle (1992–1997), Idaho's black bear tag sales have increased slightly for resident hunters and decreased for nonresident hunters. At least part of the increase observed for resident hunters can be attributed to increased sales of the Sportsman's Package (a license that includes tags for most Idaho big game species) and deer, elk, and bear licenses. The decrease in nonresident black bear tag sales (75% since 1987) is probably associated with increased costs for those black bear tags ($40.50 in 1987 and $226.50 in 1998). The sale of baiting permits ($1.50) was initiated in 1993. Sales of these permits increased from 1,195 to 1,349 in 1995 and then declined to about 1,200 in 1998. The sale of hound hunter permits has increased from 988 in 1993 to 1,257 in 1998 (IDFG 1999b).

The DAUs set forth by IDFG do not specifically address the hunt units adjacent to the HCC, but as mentioned previously, they partly encompass these areas. Current management goals derived from the latest (1999–2010) Idaho black bear management plan and a history of recent hunting results appear below:

- DAU 1E, which consists of units 8, 11, 11a, and 13, is currently being managed to maintain heavy harvest targets of less than 25% of male bears ages 5 and older and greater than 40% of females in the total harvest. Total harvest for this area has risen slightly from 36 animals in 1993 to 66 in 1997 (Table 6 and Figure 11).
- DAU 1F, which consists of units 14, 15, 16, and 18, is currently being managed to maintain the heavy harvest targets of less than 25% of male bears ages 5 and older and greater than 40% of females in the total harvest. Total harvest for this area has risen slightly from 45 animals in 1993 to 95 in 1998 (Table 6 and Figure 11).
- DAU 1H, which consists of hunt units 22, 31, 32, and 32A, is currently being managed as a controlled-hunt only area because of its popularity for bear hunting. Baiting and hound hunting restrictions will continue in this area. DAU 1H will be managed to maintain the light harvest targets of greater than 35% of male bears ages 5 and older and less than 30% of females in the total harvest. Total harvest has risen from 35 bears in 1983 to a recorded high of 83 in 1989 and then back down to 52 in 1997.

5.3.2. Oregon Black Bears

Information about Oregon black bears and related statistics was gathered from several sources, which include ODFW 1991; 1992a; 1993a,b; 1994; 1995; 1996; 1997; 1999; 2000; and 2001.

As in Idaho, the highest rate of mortality for black bears occurring in Oregon is hunting related. But overall, the annual season harvest has been less than 6% of the total estimated population. The annual variation in hunter numbers was affected by establishing a sales deadline of bear tags in 1978 and changing the sales deadline in 1991 from approximately October 1 (before buck deer season) to late August (before general bear season). These actions reduced tag sales and also reduced the number of black bear hunters in the field. By forcing Oregon hunters to purchase their tags earlier in the year, the number of hunters who purchased a bear tag "incidentally" (at the last minute before a hunt primarily for deer or elk) was reduced. Subsequently, the number of bear tags purchased was also reduced. Tied to increased controlled hunting of deer and elk over the last five years, hunting regulations now require anyone hunting bear with a muzzle-loading or center-fire rifle during certain deer or elk seasons to possess a valid elk tag or permit or a

controlled deer permit. This requirement for deer and elk hunters who may harvest a black bear incidentally has probably contributed to reduced bear harvest rates (ODFW 1993b).

Although the statewide number of bear hunters in the field may have decreased since the ODFW regulation changes, the number of bear hunters on the Oregon side of the HCRA has steadily increased. From 1992 to 2000, the number of hunters in the seven units of concern more than doubled (Table 7 and Figure 12). Harvest rates have remained relatively stable over that time period.

The Beulah unit has seen the greatest increase in percentage and actual number of hunters from 1992 to 2000. In 1992, there were 175 black bear hunters afield in the Beulah unit. That number generally increased to a high of 516 in 2000. The only exception was 1993 when the number dropped to 98 hunters. Harvest numbers have varied considerably during that time, with 1996 and 1997 having the highest number of black bears taken (24 during both years). The lowest success rate was 0% in 1992. Success rates have remained relatively stable and low since 1992. The highest success rate for the Beulah unit was 1995, with 16% of hunters harvesting black bears. These low success rates for the Beulah unit are fairly typical for all black bear hunters in Oregon since the statewide average is somewhere around 10%. These low harvest rates are due primarily to bears' reclusive nature and relatively low numbers. These rates are probably also lower because, unlike most western states, ODFW does not allow bear hunters to use dogs.

The one exception to low harvest rates for black bear hunters on the Oregon side of the HCRA was 1993 in the Lookout Mountain unit. That year, 50% of those hunting were successful. This result seems significant until the overall number of hunters in the unit is examined. During that year, only 10 people hunted black bears in that unit.

Before 1992, ODFW did not track the annual black bear harvest by unit. Consequently, information pertaining to the HCRA is not available until that year.

5.4. Mountain Goats

Mountain goats are native to the steep mountains of both Idaho and Oregon. In the HCRA, these hardy animals are found almost exclusively in high country bordering the free-flowing stretch of the Snake River below Hells Canyon Dam. Mountain goat populations have varied in this region over the years. Their relatively low numbers limit harvest: currently only two hunt units (Idaho's unit 18 and a small portion of unit 22) offer any harvest tags in the HCRA. Since 1966, mountain goats in unit 22 have been managed exclusively by controlled hunts (IDFG 2000a).

Adult mountain goats can weigh anywhere from 150 to 300 pounds. Their coat is white wool, and their chins have beards of longer white hair. Both males and females have horns, which sweep backward and attain lengths of 10 to 12 inches. A mountain goat's most distinctive asset from other ungulates is its hooves, which are soft and sensitive on the pads and allow them to climb and feed in areas not frequented by the region's other big game species. Mountain goats' diet consists of lichen, mosses, alpine grasses, and shrubs. The goats also use mineral licks extensively throughout the year.

One of the mountain goat's adaptations to its harsh environment involves focusing more energy on survival than on reproduction. Their relatively slow reproductive rates dictate that wildlife managers set conservative annual harvest goals. Both Idaho and Oregon have received transplants during the last decade from Washington State's Olympic National Park.

Another factor influencing their low population is accidental death from falling, which occurs among mountain goats more often than with any other big game species in the HCRA. Eagles are also known to knock younger mountain goats off cliffs.

5.4.1. Idaho Mountain Goats

Information about Idaho mountain goat hunting and related statistics was gathered from several sources, which include IDFG 1990c, 1992d, 1993d, 1994d, 1995c, 1996b, 1997c, 1998c, 1999d, and 2000a.

The 1991 to 1995 *Mountain Goat Management Plan* is the most recently published management plan from the IDFG. According to that plan, hunting opportunities in the HCRA will remain limited until mountain goat populations can be augmented through transplant efforts or natural recruitment. Specifically, only unit 18 was recommended for hunting seasons during 1991 through 1995.

The mountain goat population in unit 22 is contiguous with the unit 18 populations. In recent years, unit 22's population has been increasing as mountain goats pioneer out from unit 18. In 1997, mountain goat hunt unit 18 was expanded southward to include unit 22's Brush Creek drainage (IDFG 2000a).

Over the last 10 years, hunting pressure for mountain goats in the HCRA has remained steady since the number of permits has remained constant for Idaho's unit 18. From 1990 through 1999, the number of hunters per year was 5, harvest numbers ranged from 3 to 5, and success rates ranged from a low of 60% in 1992 to 100% in 1993 and 1997 through 1999.

5.4.2. Oregon Mountain Goats

Although transient mountain goats are seen on the Oregon side of the HCNRA, Oregon offers no hunting opportunities for them there. Only two hunts are offered anywhere in the state. ODFW is reviewing possible sites for transplant efforts, which include areas in Oregon adjacent to the HCNRA.

5.5. Bighorn Sheep

Bighorn sheep were once abundant throughout the HCRA. But as settlers moved into the area, bighorn sheep were exposed to disease spread through domestic sheep. In addition, because of changes in land use and overhunting, their numbers began to decline. Bighorn sheep were extirpated in Oregon by the mid 1940s (ODFW 1992b). Today, both Idaho and Oregon have

relatively healthy populations of bighorn sheep, and wildlife managers are attempting transplant efforts in the areas within the HCRA suited for repopulation.

Bighorns spend most of their time in social units throughout the year. Except for the fall breeding season, the males (rams) can usually be found in bachelor groups in areas separate from the females (ewes) and young (lambs). Males establish a social hierarchy through butting their heads, the sounds of which can often be heard for miles. The breeding season, which takes place from late October through early December and reaches a peak in November, brings the separate groups together. The social hierarchy established up to the breeding season dictates which dominant males will breed the ewes that year.

Because bighorns rely heavily on their eyesight to evade both humans and other predators, they prefer open areas that provide high visibility. During the heat of the day, however, they sometimes seek shelter from the heat in overhanging cliffs and any available vegetative cover. Grasses, forbs, and shrubs sustain the bighorn sheep.

In modern times, just as in the days of early settlement, bighorn sheep are especially susceptible to diseases introduced through domestic sheep. An outbreak of pasteurella in 1996 on the Oregon–Washington border, apparently transmitted by domestic sheep in the area, severely depleted herds in that portion of the HCRA. A cooperative effort between Idaho, Oregon, and Washington personnel resulted in the capture of 72 bighorn sheep, which were taken to the IDFG Wildlife Health Laboratory in Caldwell, Idaho. All but 8 of the sheep transplanted eventually died. The last grazing permit for domestic sheep in the Wallowa–Whitman National Forest was removed in 1996. This action should help prevent similar outbreaks for the area.

5.5.1. Idaho Bighorn Sheep

Information about Idaho bighorn sheep and related statistics was gathered from several sources, which include IDFG 1991a, 1992e, 1993e, 1994e, 1995d, 1996c, 1997d, 1998d, and 2000b.

For the 2001 bighorn hunting season, unit 11 was the only hunt unit on the Idaho side of the HCRA offering a tag. Unit 11 is the northernmost hunt unit on the Idaho side. During the mid 1990s, several record-book animals were either found or harvested in unit 11, a result that increased hunter interest in the area. Before 1995, unit 11 annually had two tags available to hunters. But a strong likelihood existed that the hunter who won the bighorn lottery tag (a controlled-hunt tag that allows the owner to hunt in any bighorn hunt unit) would hunt in this area. For that reason, IDFG officials reduced the number of available tags to one for the 1995 and 1996 season. Then from 1997 through 2000, unit 11 offered no controlled-hunt tags (Table 8).

The IDFG, the North American Foundation for Wild Sheep, and various federal agencies have recently focused on improving the bighorn sheep habitat in unit 13. In 1998, a conservation group acquired approximately 110 acres of the Snake River corridor in unit 13 (Ragtown Bar) for transfer to the USFS. Additionally, the BLM acquired a conservation easement on several thousand acres in unit 13 in the Salmon River drainage (IDFG 2000b).

Recently, unit 13 has benefited from transplant efforts. On February 13, 1999, 6 bighorn sheep (3 ewes and 3 rams) from the Cadomin mine in Hinton, Alberta, Canada, were released into the Big Canyon Creek area. This release supplemented the population (12 ewes and 4 rams) transplanted from Spences Bridge, British Columbia, in 1997. These transplant efforts have renewed monitoring efforts of bighorns in the area. The most recent count for the population in the summer of 2000 was 45 bighorn sheep (21 ewes, 16 lambs, 6 sublegal rams, and 2 legal rams) (IDFG 2000b).

The last known native bighorn sheep in unit 18 was observed in 1932 (IDFG 2000b). Bighorn sheep transplants in unit 18 occurred during 1975 to 1976 and in 1979 from herds in the Salmon River area, as well as in 1990 from herds from Whiskey Mountain in Wyoming. Because of these transplants, bighorn hunting was reintroduced there in 1984. In subsequent years, permit and harvest levels were reduced and the odds of drawing a controlled-hunt permit varied considerably. Hunter success appeared to decline in the late 1980s and early 1990s concurrent with the bighorn population decline. Hunter success averaged 70% from 1984 through 1987 and 40% from 1988 through 1992. The unit was closed to bighorn sheep hunting in 1993 and has remained closed since.

5.5.2. Oregon Bighorn Sheep

Information about Oregon bighorn sheep and related statistics was gathered from several sources, which include ODFW 1991; 1992a,b; 1993a; 1994; 1995; 1996; 1997; 1999; 2000; and 2001.

Northeastern Oregon's 10 Rocky Mountain bighorn herds were estimated at about 700 animals in 1998. Controlled hunting for rams is authorized in 4 of those 10 herds.

Since the first season in 1965, the number of hunts and tags authorized for those hunts has generally increased. A statewide high of 61 permits was authorized in 1991. Through 1991, a total of 765 tagholders took 591 rams for an overall hunter success of 77% in Oregon (ODFW 1992b).

In the past, statewide harvest has rarely exceeded 15% of the total estimated ram population and less than 5% of the total population (including ewes and lambs). Modeling of bighorn populations will allow biologists to more accurately predict ram numbers and may allow for increased hunting opportunity on specific herd ranges in the future (ODFW 1992b).

Over the last 10 years, the Snake River unit has afforded bighorn sheep hunters the best opportunity to harvest an animal in the HCRA (Figure 13). In 1990, only three tags were available to hunters, but that number increased to a high of seven in 1994 and has since remained at six. In 1991 and 1992, the hunt units of Wenaha, Sled Springs, and Chesnimus were combined to offer two tags annually. In 1993, that hunt was changed to include Chesnimus and Sled Springs only, one tag being offered annually from 1993 to 1995 (Table 9).

According to 2001 regulations, four different hunts are offered in connection with the HCRA. Unit 59 (Snake River) offers two separate hunts with three tags for each hunt (559 A1 and

559 A2). Unit 62 (Pine Creek) offers one tag annually. A new tag for hunt number 564 in unit 64 (Lookout Mountain) makes one tag available.

5.6. Mountain Lions

Mountain lions are one of the most widely distributed predators of North America. They are also commonly called cougars, puma, panthers, and catamount. Regardless of their moniker, mountain lion populations are difficult to assess because of the animal's reclusive nature. Both Idaho and Oregon require hunters to bring harvested mountain lions to state wildlife officials so that age and sex classifications can be better studied.

Mountain lions are very territorial animals. Adult mountain lion ranges vary, but males typically occupy a larger area (up to 150 square miles) than females (up to 100 square miles). Male mountain lions' territories often overlap females' territories, but they seldom overlap territories of other males.

Mountain lions' food sources include deer, elk, porcupines, and various other animals indigenous to the area. On average, mountain lions usually kill a deer or elk (their primary food sources) every 7 to 10 days.

5.6.1. Idaho Mountain Lions

Information about Idaho mountain lions and related statistics was gathered from several sources, which include IDFG 1990d, 1991b, 1992f, 1993f, 1994f, 1995e, 1997e, 1998e, 1999e, and 2001b.

Before 1972, mountain lions were hunted in Idaho without harvest restrictions. But from 1964 to 1973, extensive research in Idaho's Frank Church River of No Return Wilderness provided new information about mountain lions. In July 1972, IDFG reclassified mountain lions as a big game species (IDFG 1991b). Some units were subsequently closed to hunting, while the rest of Idaho's units limited harvest to one animal per hunter per year. Since 1973, a mandatory check of harvested mountain lions has been instituted, and a mountain lion tag has been required since 1975 (IDFG 1991b).

Currently, all hunt units on the Idaho side of the HCRA offer mountain lion tags (IDFG 2001c). Units 11, 13, and 18 offer seasons from September 15 through March 31, 2002, with no quota restrictions for any of the units. Hunting season for units 22, 31, and 32 runs from August 30 through March 31, 2002. Unit 22 has a quota of six females, after which only male mountain lions may be harvested. Units 31 and 32 have a quota of seven females, after which only males may be harvested.

In 1989, IDFG made the Sportsman's Package available to hunters. This package is an all-inclusive set of hunting permits. By purchasing the tags as a package, hunters' paid less for each tag. This change in the way tags were sold greatly increased the number of mountain lion hunters afield. IDFG officials estimate the number of hunters pursuing mountain lions exclusively has

remained relatively stable, however, and the increase in mountain lion tags sold annually is more a reflection of the Sportsman's Package than anything.

A breakdown of the number of hunters by unit is not available. IDFG has no record of which units have mountain lion hunters, so success rates are not obtainable. However, the number of mountain lions actually harvested in each of the Idaho units is available. The annual number of animals harvested is relatively low. From 1990 to 2000, the highest number of mountain lions harvested in any unit for any year is 18, taken in unit 22 in 1997. Overall, mountain lion hunters in unit 18 have taken more animals than hunters in any other unit on the Idaho side of the HCRA, with a total of 102 animals harvested from 1990 to 2000 (Table 10). Unit 32 has had the fewest animals harvested during that 10-year period, with a high of five animals taken in 2000 and none in 1994.

5.6.2. Oregon Mountain Lions

Information about Oregon mountain lions and related statistics was gathered from several sources, which include ODFW 1991; 1992a; 1993a,c; 1994; 1995; 1996; 1997; 1999; 2000; and 2001.

Until as late as 1961, mountain lions were hunted for bounty throughout Oregon. In 1967, ODFW classified them as a game species, subject to hunting seasons and limits (ODFW 1993c). In 1973, the department predicted that, without protection, mountain lions would be extirpated from the entire state. However, mountain lions were not extirpated. Several factors have benefited these animals in the last 30 years, including the repeal on the bounty season, their classification as a game animal, and tightly regulated hunting seasons (ODFW 1993c).

Oregon conducted controlled-hunt seasons from 1970 until 1994, when hunting mountain lions with hounds was banned. The 1994 ban on hunting mountain lions with dogs also ended an era of relatively high harvest rates. During that time, ODFW estimated the annual growth rate for mountain lions at 4 to 5%. Since the hound-hunting ban in 1994, annual growth rates have increased to 8 to 12%. Oregon's most recent surveys, however, show that recruitment has dropped to prehound-hunting levels.

Oregon's 2001 regulations divide the mountain lion populations into six statewide zones. The Chesnimus, Snake River, Pine Creek, Imnaha, Keating, and Lookout Mountain units are in Zone E (Blue Mountains section), while the Beulah unit falls into Zone F (Southeast Oregon section). Zone E has a 96-animal quota, while Zone F has a 60-animal quota. (The total statewide quota for mountain lions is 400.)

Before 1995, the seasons and unit boundaries for mountain lion hunters in Oregon varied a great deal. With the ban on hound hunting taking effect in 1995, the unit boundaries became consistent with those of most other big game species in Oregon. ODFW has no immediate plans to repeal the hound-hunting ban. And because of the discrepancies in the units up to 1994, only the data from 1995 until present were recorded (Table 11 and Figure 14).

To address increasing levels of livestock damage in eastern Oregon, ODFW authorized year-round seasons in 1997 (ODFW 1999). This regulation change helps explain the large increase in

the number of hunters on the Oregon side of the HCRA the following year. The total number of mountain lion hunters in all of the units of concern increased from 97 in 1997 to 988 in 1998.

The Beulah unit is the most heavily hunted unit on the Oregon side of the HCRA, with 317 hunters having pursued mountain lions in 2000 (Figure 14). Previous years also reflect heavier hunting, with the numbers in each unit being slightly lower. Compared with other big game animals hunted in the HCRA, the number of mountain lions harvested is extremely low for two reasons: 1) mountain lions (similar to black bears) are reclusive and 2) ODFW does not allow hunters to use hounds to pursue mountain lions. The year 1998 had the highest number (5) of animals harvested in the Beulah unit. Overall, the Keating unit has had the most animals harvested, with 15 animals harvested between 1995 and 2000 and a high of 8 in 1999.

The highest success rate for any one year by mountain lion hunters was 33% in the Chesnimus unit in 1995. However, there were only six hunters in that unit that year.

5.7. IPC Surveys

5.7.1. HCC On-Site Surveys for the Reservoirs

Estimated hours of hunting—IPC surveys were conducted during and reported for two distinct periods each year. The warm season included May 1 through October 31; the cold season included November 1 through April 30 (Figure 15).

Additionally, hours of hunting were calculated for each of six distinct zones within the HCC (Figure 16).

Zone 1—The lower boundary of Zone 1 is the Hells Canyon Visitors Center below Hells Canyon Dam. The upper boundary of this zone is right below Copper Creek on Hells Canyon Reservoir (at the end of Homestead Road). The boundaries are RM 247 and 260 (Figure 17).

Zone 2—Zone 2 is the area from the upstream end of Zone 1 to the south side of the mouth of Brownlee Creek on Brownlee Reservoir. The boundaries are RM 260 and 288.4 (Figure 17).

Zone 3—Zone 3 is the area from the upstream end of Zone 2 to just north of Swedes Landing (BLM) site. The boundaries are RM 288.4 and 303.7 (Figure 17).

Zone 4—Zone 4 is the area associated with the Powder River from its confluence with the Snake River upstream to the upper end of the reservoir pool. The boundaries are RM 0 and 9 on the Powder River (Figure 17).

Zone 5—Zone 5 is the area from the upstream end of Zone 3 to the upper side of the railroad bridge across Brownlee Reservoir at the mouth of the Burnt River. The boundaries are RM 303.7 and 328 (Figure 17).

Zone 6—Zone 6 is the area from the upstream end of Zone 5 to the transmission lines crossing Brownlee Reservoir just upstream of Porter Island. The boundaries are RM 328 and 343 (Figure 17).

Estimates of overall hours of hunting effort associated with the river corridor were relatively low for each year. Seasonal estimates varied from a low of 1,647 hours during the warm season of 1997 to a high of 4,877 hours during the cold season of 1995. The estimated hours of hunting effort by season and zone varied considerably. Zones 5 and 6, at the upper end of Brownlee Reservoir, appeared to yield the most effort during years when both seasons were sampled.

Hunting-related general comments—"Liked the chukar hunting" was the most frequently given response (from four respondents) among the hunting-related survey comments. Generally, the respondents replied that they enjoyed the hunting in some form or another. Overall, only 15 responses in the General Comments section of the survey pertained to hunting (Table 12).

5.7.2. HCC Mail Survey for the Reservoirs

IPC conducted 6,697 on-site interviews. Of these, 4,905 agreed to participate in a follow-up mail survey. After sharing randomly selected names and addresses with researchers conducting a study of aesthetic resources in the HCC and subtracting inaccurate addresses, IPC mailed 4,233 follow-up surveys and received 2,921 responses. Of these, 392 survey respondents reported having hunted in the reservoir areas, and 286 answered at least some of the hunting-related questions. The majority (216) of these were interviewed at Brownlee Reservoir, 139 were interviewed at Hells Canyon Reservoir, and 37 were interviewed at Oxbow Reservoir (Table 12).

Type of hunting reported—Mail survey respondents reported 16 types of hunting. Three types given—birds, upland birds, and waterfowl—consist of more than one target type. Chukar was the type mentioned most often (35%). Probably most of the 12% who mentioned birds and the 1% who mentioned upland birds targeted chukars. Combining those with chukars results in 48%, which is probably a reasonable indication of the relative importance of chukar hunting in the area. Twenty-seven percent of the respondents mentioned deer and 9% mentioned elk. Other types of hunting mentioned more than once included bear, dove, grouse, partridge, pheasant, quail, and turkey (Table 13).

Location of hunting by type—The breakdown by state and hunting type was similar to the overall list. Apparent differences included bear hunting, associated most often with hunting in Oregon, and all of the turkey hunting mentioned occurred in Idaho (Table 14). Chukar hunting was reported most often associated with the river corridor, while deer hunters reported hunting most often in both the river corridor and upland areas. Elk were most often sought in the upland areas or both area types (Table 15).

Number of days hunted by type—To calculate the average numbers of days hunted, types with fewer than five responses were eliminated, and all bird hunting except turkey was combined into one category. Hunters who reported targeting bear hunted the most days in the HCC area, an average of 15 days. The lowest number of days hunted was reported for elk (1.5 days) (Table 16).

Solicited hunting comments—As part of the mail survey, respondents were asked to provide general comments regarding hunting in the HCC. Regardless of the particular reservoir from which comments were collected, the five following comments (in descending order) were most frequently mentioned (Table 17).

- Good hunting
- Access is good
- Unrelated comment
- More access needed/wanted
- Pro-hunting

Within each of the seven categories, the following seven corresponding comments appeared the most often (Table 18).

- Access—Access is good
- Agency—Managing agencies (positive)
- General Area—Pro-hunting
- Hunting Quality—Good hunting
- Hunting Regulations—Too few or unfair tags
- IPC Operations—Reservoir fluctuations (negative)
- Miscellaneous—Unrelated comment

Responses from the mail surveys were also analyzed by reservoir. From reservoir to reservoir, there was very little deviation among the most frequently made comments. For each of the three reservoirs, access, good hunting, and unrelated comments were most frequently listed (Table 19).

5.7.3. HCNRA Mail Survey

During the on-site portion of this effort, IPC personnel contacted 2,773 recreationists in the HCNRA. After eliminating people who did not want to be contacted by mail and those who gave fake or incomplete addresses, IPC mailed 2,325 surveys to recreationists and received 1,524 responses. Among these responses, 73 who indicated they would be hunting were mailed the hunting survey, and 44 people returned the hunting-related questions.

Licenses—When asked about the type of license they possessed while hunting in the HCNRA, 26 of the 44 respondents said they had Idaho hunting licenses and 9 said they had Oregon licenses. No respondents indicated having either both licenses or none. A complete breakdown of the responses appears in Table 21.

Types of weapons—When asked what types of weapons they used while hunting in the HCNRA, the largest group (30) listed shotguns only; the second largest group reported using a center-fire rifle. A complete breakdown of the responses appears in Table 22.

Number of days hunting during trip—The majority (33) reported hunting for three days or less. Eight respondents reported staying more than five days (Table 23).

Where respondents hunted within the Snake River corridor—When asked where they hunted within the Snake River corridor, the largest number (20) reported hunting within 2 miles of the river. Nine reported hunting more than 2 miles from the river (Table 24).

Reach of the Snake River hunted—When asked in which of seven reaches of the Snake River they hunted, 14 of the 44 respondents did not respond (Table 25). The river reach mentioned most often was Rush Creek to Kirkwood Ranch (18 responses), followed by Kirkwood Ranch to Pittsburg Landing (14 responses). One other reach was mentioned more than 10 times—Wild Sheep Rapids to Rush Creek Rapids (11) (Table 25).

State hunted and target—Thirty hunters mentioned chukar as a target. The next most popular target was mule deer, mentioned by 10 hunters. Six hunters mentioned elk. Other targets respondents mentioned were white-tailed deer, quail, grouse, bear, and [mountain] lion (Table 26).

Type of hunt and success by target

Elk—All respondents who reported elk as a target species were hunting out of the Pittsburg Landing portal. During 32 days of hunting by six hunters, two elk were harvested (Table 27).

Mule Deer—Mule deer hunters were reported from all three major portals within the HCNRA—Cache Creek Ranch, Hells Canyon Creek, and Pittsburg Landing. During 22 days of hunting, eight respondents harvested two mule deer (Table 28).

White-tailed deer—Only one hunter reported targeting white-tailed deer. This hunter launched at Cache Creek Ranch, hunted one day, but did not harvest a deer.

Bear—One bear hunter responded from Hells Canyon Creek portal. This respondent hunted for three days but did not harvest a bear. Two Pittsburg Landing bear hunters reported hunting for a total of nine days, and each reported harvesting a bear (Table 29).

Mountain lion—One Cache Creek Ranch hunter reported hunting lion for one day with no success.

Grouse—Three grouse hunters reported launching at Hells Canyon Creek, hunting a total of 11 days, and harvesting a total of seven birds (Table 30).

Chukar—Chukar hunters from all three major portals within the HCNRA responded. Thirty hunters reported hunting a total of 54 days and harvesting 163 birds (Table 31).

Quail—Two hunters reported targeting quail. One quail hunter launched at Cache Creek Ranch, hunted for one day, but did not harvest any quail. The other quail hunter launched at Pittsburg Landing, hunted for three days, but also did not harvest any quail.

Hungarian partridge—Partridge hunters from both Cache Creek Ranch and Pittsburg Landing portals responded. Six partridge hunters who entered the HCNRA through Cache Creek Ranch portal reported hunting for partridge a total of seven days and harvested a total of five birds. Five Pittsburg Landing hunters reported hunting for a total of 12 days and harvesting a total of 32 birds (Table 32).

Waterfowl—There were no waterfowl hunters among the respondents**.**

Bighorn sheep or mountain goats seen during trip—Eighteen respondents spotted bighorn sheep, while six reported seeing mountain goats. Twenty respondents reported seeing neither species.

Importance of seeing bighorn sheep or mountain goats—Thirty respondents considered seeing bighorn sheep or mountain goats either somewhat (22 responses) or very (8 responses) important. Twelve respondents were neutral on the subject, none considered it unimportant, and one respondent was not sure.

The HCNRA as a favorite place to hunt—Twenty of the 44 respondents considered the HCNRA or surrounding areas their favorite place to hunt.

Percentage of hunting time in HCNRA—Thirteen respondents reported spending 10% or less of their annual hunting effort in the HCNRA. Fourteen respondents reported more than 10% but less than 51% of their hunting effort in the HCNRA. Nine respondents spent over 50% of their hunting time in the HCNRA. The highest percentage reported was 90 by one respondent.

6. DISCUSSION AND SUMMARY

The two most heavily hunted species in the HCRA are deer and elk. Together, these two species account for roughly 95% of all big game hunted in the HCRA. So the amount of hunting pressure on deer and elk for the most part defines hunting pressure for big game in the area.

Deer-hunting pressure in Idaho has steadily increased in all of the units except 13 and 18. Because all of the units have controlled hunts, the declining pressure in these two units relates to the reduced number of permits IDFG has allocated to them in recent years. The reduced number of permits is probably related to the loss of critical winter feed caused by the invasion of noxious weeds, which has further depressed deer populations in those units.

Deer-hunting pressure on the Oregon side of the HCRA has steadily increased in all of the units except Beulah, which is a controlled-hunt unit, so the number of permits available through ODFW dictates pressure. The significance of the decline in deer-hunting pressure in the Beulah unit is that this unit has more people hunting within its boundaries than in any of the other Oregon units. In 1990, the Beulah unit alone had more deer hunters (5,194) than the rest of the units on the Oregon side of the HCRA combined. By 2000, however, the number of deer hunters in the Beulah unit was reduced by almost half (2,780).

While deer-hunting pressure on the Oregon side of the HCRA has increased in all units except the Beulah unit, elk-hunting pressure has decreased during that time in all units except the Beulah unit. Since elk permits are also allocated on a controlled-hunt basis, this reduction in pressure is also associated with the number of permits available through ODFW. The increased number of elk permits allocated to the Beulah unit might have something to do with the decline in the number of deer permits over that period, since the two species compete for similar types of food to sustain themselves through the harsh winters.

Hunting pressure in the HCRA is difficult to assess using the current harvest reports for the area. Most harvest data for the study period did not consider a couple of key factors necessary to fully analyze hunting pressure: the redundancies of hunters seeking multiple species during the same hunting trip and the number of hunter days afield. In recent years, both IDFG and ODFW have implemented computerized license systems (point-of-sale machines). These systems help wildlife managers from both agencies gather and analyze data that had previously been unavailable. It should be noted that hunter days (the number of days spent pursuing the various species) was listed for some species in some years. But the inconsistencies among years and species made these data difficult to study and long-term trends almost impossible to identify.

For similar reasons, this report also does not consider the various types of bird hunting. The lack of data in the hunt units of interest makes it difficult to depict overall hunting pressure accurately, especially since the HCRA offers hunters of upland game bird many opportunities. Hunters for chukars and huns use this area heavily, especially the Cecil D. Andrus Wildlife Management Area on the Idaho side of Brownlee Reservoir. The free-flowing section of the Snake River below Hells Canyon Dam also receives some degree of hunting pressure from people combining fishing and hunting trips there.

Whether in Idaho or Oregon, most of the hunt units adjacent to the HCRA are managed with controlled hunts for big game. Controlled hunts, as much as anything else, dictate the amount of hunting pressure the HCRA receives for big game each year. The number of available tags for each species in each unit depends on several factors, including total harvest for the previous year, mortality through disease, and severity of winter conditions.

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Table 1. Seven categories of comments (from HCC on-site and mail-back surveys) and corresponding code descriptions.

CATEGORY	CODE	DESCRIPTION
Access	1	Rugged or steep
	2	More access needed or wanted
	3	Private land access—positive
	4	Private land access—negative
	5	Access is good
	6	Access is bad
	7	Keep open
	8	Too much access
	9	Ownership signage needed
Hunting quality	11	Good hunting
	12	Good hunting—birds
	13	Used to be better
	14	Hunting—negative
	15	Big game—negative
	16	Big game—positive
	17	Hunt birds—negative
	109	General hunting
IPC Operations	21	Reservoirs fluctuations—negative
	22	Parks fee too high—while hunting
General Area	31	General area—positive
	32	Anti-hunting
	33	Pro-hunting
	41	General negative
	42	Anti-ATV, dirt bike, motorized
	71	Crowded
	72	Not crowded
Agency	52	Managing agencies—positive
	53	Managing agencies—negative
Hunting Regulation Management	110	Season lengths
	111	Don't change
	112	Food plots
	113	License and tag too high
	114	Too few tags or unfair tag
Miscellaneous	91	Will hunt in future
	101	Cows or livestock—negative
	115	Unrelated comment
	116	Don't know what they are talking about
	117	Unsafe activity

Table 2. Hunter, harvest, and success rate data for each Idaho deer hunt unit from 1990 to 2000.

Idaho Deer Hunt Units		11	13	18	22	31	32
Hunters	1990	980	741	1148	1336	1530	2011
	1991	1394	479	945	2179	1443	2530
	1992	854	407	537	1767	911	1640
	1993	1146	586	858	1539	739	2218
	1994	1291	470	857	1698	774	2470
	1995	970	509	742	1896	1005	2701
	1996	1519	854	735	1489	820	2181
	1997	1674	1060	1373	2241	1493	3533
	1998	1456	572	547	2642	1531	3767
	1999	1219	486	466	3954	1787	4523
	2000						
Harvest	1990	385	324	740	551	377	645
	1991	419	280	564	973	520	799
	1992	259	270	277	829	269	759
	1993	554	359	414	396	260	563
	1994	878	271	372	465	123	473
	1995	543	255	408	548	235	562
	1996	712	615	357	491	375	672
	1997	690	387	341	550	640	1216
	1998	717	275	280	942	669	1455
	1999	547	244	235	1565	810	1779
	2000	504	285	260	653	553	1010
Success Rate	1990	39%	44%	64%	41%	25%	32%
	1991	30%	58%	60%	45%	36%	32%
	1992	30%	66%	52%	47%	29%	46%
	1993	48%	61%	48%	26%	35%	25%
	1994	68%	58%	43%	27%	16%	19%
	1995	56%	50%	55%	29%	23%	21%
	1996	47%	72%	49%	33%	46%	31%
	1997	41%	37%	25%	25%	43%	34%
	1998	49%	48%	51%	36%	44%	39%
	1999	45%	50%	51%	40%	45%	39%
	2000						

Table 3. Hunter, harvest, and success rate data for each Oregon deer hunt unit from 1990 to 2000.

Oregon Deer Hunt Units		Imnaha	Keating	Pine Creek	Lookout Mountain	Snake River	Chesnimus	Beulah
Hunters	1990	1175	650	219	134	256	746	5194
	1991	1141	1024	256	225	360	667	3772
	1992	1100	765	413	315	400	848	3757
	1993	908	465	382	233	452	794	1564
	1994	979	282	319	248	293	822	1250
	1995	1060	503	393	357	328	874	1439
	1996	965	834	617	504	409	739	1889
	1997	866	1140	591	594	355	703	2209
	1998	850	893	622	504	316	655	2761
	1999	822	1222	686	554	419	804	2778
	2000	771	1216	562	425	354	664	2780
Harvest	1990	446	361	112	92	120	334	2296
	1991	495	626	133	169	154	448	2053
	1992	460	522	254	186	178	427	2054
	1993	252	150	112	74	153	323	436
	1994	494	140	134	147	169	547	589
	1995	415	272	174	187	154	393	686
	1996	351	371	256	312	142	262	1011
	1997	405	666	265	354	159	321	1287
	1998	376	541	239	301	152	369	1610
	1999	298	623	325	378	191	461	1596
	2000	338	508	194	237	168	357	1527
Success Rate	1990	38%	56%	51%	69%	47%	45%	44%
	1991	43%	61%	52%	75%	43%	67%	54%
	1992	42%	68%	62%	59%	45%	50%	55%
	1993	28%	32%	29%	32%	34%	41%	28%
	1994	50%	50%	42%	59%	58%	67%	47%
	1995	39%	54%	44%	52%	47%	45%	48%
	1996	36%	44%	41%	62%	35%	35%	54%
	1997	47%	58%	45%	60%	45%	46%	58%
	1998	44%	61%	38%	60%	48%	56%	58%
	1999	34%	51%	47%	68%	46%	57%	57%
	2000	44%	42%	35%	56%	47%	54%	55%

Table 4. Hunter, harvest, and success rate data for each Idaho elk hunt unit from 1990 to 2000.

Idaho Elk Hunt Units		11	13	18	22	31	32
Hunters	1990	150	200	250	1929	600	1181
	1991	150	200	250	1890	700	1496
	1992	150	250	250	1852	499	1599
	1993	150	250	250	1949	752	2054
	1994	100	250	250	1836	256	2031
	1995	48	182	240	1417	665	2100
	1996	95	257	226	2234	644	2452
	1997	95	260	240	2190	471	2169
	1998	98	247	227	2434	704	1557
	1999	94	249	227	2579	543	1440
	2000						
Harvest	1990	113	120	78	551	305	332
	1991	57	90	73	489	368	283
	1992	75	165	63	632	199	588
	1993	76	139	60	460	294	611
	1994	35	124	95	460	256	498
	1995	25	104	69	268	235	370
	1996	52	114	66	614	224	399
	1997	44	122	69	520	169	363
	1998	50	68	65	477	126	278
	1999	51	88	75	493	92	242
	2000	91	138	117	684	134	339
Success Rate	1990	75%	60%	31%	29%	51%	28%
	1991	38%	45%	29%	26%	53%	19%
	1992	50%	66%	25%	34%	40%	37%
	1993	51%	56%	24%	24%	39%	30%
	1994	35%	50%	41%	25%	100%	24%
	1995	52%	57%	29%	19%	35%	18%
	1996	55%	44%	29%	27%	35%	16%
	1997	46%	47%	29%	24%	36%	17%
	1998	51%	28%	29%	20%	18%	18%
	1999	55%	35%	33%	19%	17%	17%
	2000						

Table 5. Hunter, harvest, and success rate data for each Oregon elk hunt unit from 1990 to 2000.

Oregon Elk Hunt Units		Imnaha	Keating	Pine Creek	Lookout Mountain	Snake River	Chesnimus	Beulah
Hunters	1990	1462	972	1445	686	1793	1890	2359
	1991	1162	980	1476	403	1784	1843	2337
	1992	1396	984	1456	436	1836	1792	2490
	1993	1603	1062	1588	591	1926	2068	2525
	1994	1492	1064	1007	499	1924	1925	2758
	1995	1917	1196	1314	754	1909	1769	2795
	1996	1461	697	1255	475	1363	1479	3109
	1997	1069	762	959	476	791	1102	3379
	1998	1254	591	759	454	460	979	3406
	1999	745	463	928	403	626	1037	3650
	2000	839	428	802	384	503	894	3182
Harvest	1990	326	290	355	155	495	690	620
	1991	307	342	408	142	605	562	597
	1992	313	366	436	61	522	616	854
	1993	320	202	227	137	585	776	509
	1994	542	334	204	141	627	450	837
	1995	359	232	211	232	600	662	632
	1996	227	105	178	194	476	305	782
	1997	140	125	153	154	180	289	853
	1998	221	81	124	90	91	178	836
	1999	101	81	122	114	148	220	691
	2000	138	97	79	83	124	200	674
Success Rate	1990	22%	30%	25%	23%	28%	37%	26%
	1991	26%	35%	28%	35%	34%	30%	26%
	1992	22%	37%	30%	14%	28%	34%	34%
	1993	20%	19%	14%	23%	30%	38%	20%
	1994	30%	31%	20%	28%	33%	23%	30%
	1995	19%	19%	16%	31%	31%	37%	23%
	1996	16%	15%	14%	41%	35%	21%	25%
	1997	13%	16%	16%	32%	23%	26%	25%
	1998	18%	14%	16%	20%	20%	18%	25%
	1999	14%	17%	13%	28%	24%	21%	19%
	2000	16%	23%	10%	22%	25%	22%	21%

Table 6. Bear harvest data for Idaho by data analysis units (DAU) from 1990 to 2000.

Unit and Year	Spring	Fall	Total
DAU 1E			
1990	27	30	57
1991	23	31	54
1992	23	25	48
1993	18	18	36
1994	20	36	56
1995	23	35	58
1996	24	42	66
1997	21	45	66
1998	28	50	78
1999	34	57	91
2000	34	53	87
DAU 1H			
1990	17	42	59
1991	22	33	55
1992	26	39	65
1993	8	15	23
1994	11	13	24
1995	8	21	29
1996	17	15	32
1997	21	31	52
1998	33	36	69
1999	24	29	53
2000	36	33	69
DAU 1F			
1990	28	26	54
1991	44	31	75
1992	39	27	65
1993	12	33	45
1994	12	26	38
1995	11	35	46
1996	25	55	80
1997	30	53	83
1998	29	66	95
1999	27	35	62
2000	20	29	49

Table 7. Hunter, harvest, and success rate data for each Oregon bear hunt unit from 1992 to 2000.

Oregon Bear Hunt Unit		Imnaha	Keating	Pine Creek	Lookout Mountain	Snake River	Chesnimus	Beulah
Hunters	1992	111	21	124	30	188	90	175
	1993	147	69	206	10	176	88	98
	1994	192	69	167	25	197	93	177
	1995	159	0	94	35	362	159	124
	1996	261	127	301	48	365	174	167
	1997	202	110	254	59	288	228	305
	1998	255	145	305	102	285	258	356
	1999	276	190	272	114	280	353	523
	2000	298	182	275	129	223	348	516
Harvest	1992	4	0	13	0	13	0	0
	1993	24	0	15	5	10	5	5
	1994	25	5	20	0	20	10	10
	1995	20	0	15	5	50	10	20
	1996	16	8	24	0	16	8	24
	1997	32	8	25	0	8	25	24
	1998	24	4	32	0	4	0	16
	1999	4	24	16	12	16	20	16
	2000	16	20	4	16	12	15	8
Success Rate	1992	4%	0%	10%	0%	7%	0%	0%
	1993	16%	0%	7%	50%	6%	6%	5%
	1994	13%	7%	12%	0%	10%	11%	6%
	1995	13%	0%	16%	14%	14%	6%	16%
	1996	6%	6%	8%	0%	4%	5%	14%
	1997	16%	7%	10%	0%	3%	11%	8%
	1998	9%	3%	10%	0%	1%	0%	4%
	1999	1%	13%	6%	11%	6%	6%	3%
	2000	5%	11%	1%	12%	5%	4%	2%

Table 8. Hunter, harvest, and success rate history for Idaho bighorn sheep Unit 11 (1991−2000) and Unit 18 (1984−2000).

Unit 11 Bighorn Sheep Harvest History			
Year	**Hunters**	**Harvest**	**Success Rate**
1991	Season closed		
1992	Season closed		
1993	3[1]	2	67%
1994	3	3	100%
1995	1	0	0%
1996	2[1]	2	100%
1997	Season closed		
1998	Season closed		
1999	1	1	100%
2000	Season closed		

[1] In 1993, only two tags were issued for unit 11 specifically, yet 3 hunters appear in the table. The extra hunter was a lottery hunt winner. Although the lottery hunt winner could hunt in any of Idaho's units, the hunter chose to hunt in unit 11. The same explanation applies to the extra hunter in 1996, when only one tag was issued in unit 11.

Unit 18 Bighorn Sheep Harvest History			
Year	**Hunters**	**Harvest**	**Success Rates**
1984	4	3	75%
1985	2	2	100%
1986	2	1	50%
1987	2	1	50%
1988	2	1	50%
1989	2	1	50%
1990	2	0	0%
1991	2	0	0%
1992	2	2	100%
1993	Season closed		
1994	Season closed		
1995	Season closed		
1996	Season closed		
1997	Season closed		
1998	Season closed		
1999	Season closed		
2000	Season closed		

Table 9. Hunter, harvest, and success data for each Oregon bighorn sheep hunt unit from 1990 to 2000.

Oregon Bighorn Sheep Hunt Units		Snake River	Sled Springs/Chesnimus (SLD/CHES)	Wenaha/SLD/CHES
Hunters	1990	3	*	*
	1991	4	*	2
	1992	5	*	2
	1993	5	1	*
	1994**	7	1	*
	1995**	6	1	*
	1996	6	*	*
	1997	6	*	*
	1998	6	*	*
	1999	6	*	*
	2000	6	*	*
Harvest	1990	3	*	*
	1991	4	*	2
	1992	4	*	2
	1993	5	1	*
	1994**	7	1	*
	1995**	5	1	*
	1996	6	*	*
	1997	5	*	*
	1998	4	*	*
	1999	6	*	*
	2000	6	*	*
Success Rate	1990	100%	*	*
	1991	100%	*	100%
	1992	80%	*	100%
	1993	100%	100%	*
	1994	100%	100%	*
	1995	83%	100%	*
	1996	100%	*	*
	1997	83%	*	*
	1998	67%	*	*
	1999	100%	*	*
	2000	100%	*	*

* Indicates that there was not a hunt available to hunters
** In 1994 and 1995, one of the tags for the Snake River Unit was an auction tag, which enabled the tag holder to hunt any unit he/she wished.

Table 10. Idaho mountain lion harvest in each hunt unit from 1990 to 2000. The numbers of hunters and success rates are not available.

Idaho Mountain Lion Hunt Units		11	13	18	22	31	32
Harvest	1990	7	8	4	1	5	1
	1991	5	2	5	2	2	1
	1992	8	6	4	7	3	1
	1993	8	10	10	1	5	1
	1994	5	4	13	8	1	0
	1995	14	10	8	16	4	1
	1996	14	9	9	14	1	3
	1997	11	8	13	18	5	2
	1998	3	4	11	6	11	4
	1999	4	4	8	6	7	2
	2000	10	7	17	6	10	5

Table 11. Hunter, harvest, and success rate data for each Oregon mountain lion hunt unit from 1995 to 2000.

Oregon Mountain Lion Hunt Units		Imnaha	Keating	Pine Creek	Lookout Mountain	Snake River	Chesnimus	Beulah
Hunters	1995	7	7	0	2	26	6	8
	1996	7	5	8	2	15	13	17
	1997	7	7	14	12	21	24	12
	1998	120	70	140	90	160	110	298
	1999	157	94	134	70	104	193	291
	2000	179	142	222	75	204	167	317
Harvest	1995	0	1	0	0	1	2	0
	1996	0	0	1	0	1	0	0
	1997	1	0	0	1	0	1	0
	1998	4	3	3	3	0	1	5
	1999	0	8	4	6	0	2	1
	2000	1	3	0	2	1	1	4
Success Rate	1995	0%	14%	0%	0%	4%	33%	0%
	1996	0%	0%	12%	0%	7%	0%	0%
	1997	14%	0%	0%	8%	0%	4%	0%
	1998	3%	4%	2%	3%	0%	1%	2%
	1999	0%	9%	3%	9%	0%	1%	1%
	2000	1%	2%	0%	3%	1%	1%	1%

Table 12. Hunting-related responses from general comments of the on-site surveys.

Category	Number of Responses	Comment
Hunting Quality	1	Good place to hunt.
	1	This area has the most fantastic hunting I've ever seen in the U.S.
	1	Good hunting usually.
	1	I like the hunting.
	1	Hunting is excellent.
	4	Like the chukar hunting.
	1	Need more chukars in reservoir area.
	1	Wish there were more birds to hunt here.
	1	More grouse.
Hunting Regulation Management	1	Too many cows and elk in unit 23.
	1	Need to side issue more deer tags.
	1	Should make the Lookout Mountain area into a big buck trophy area.

Table 13. Number of mail survey respondents who reported whether they hunted the reservoir areas and listed by the reservoir at which the initial on-site interview was conducted.

Location of On-Site Interview	Hunted Reservoir Areas?	Number of Responses
Brownlee	No	1309
	Yes	216
Hells Canyon	No	871
	Yes	139
Oxbow	No	347
	Yes	37

Table 14. Types of hunting within the HCC reservoir areas reported by respondents to the mail survey.

Type	Count	Percentage
Antelope	1	0.2
Bear	19	4.4
Birds	53	12.4
Chukar	150	35.1
Cougar	1	0.2
Coyote	1	0.2
Deer	115	26.9
Dove	2	0.5
Elk	39	9.1
Grouse	13	3.0
Partridge	9	2.1
Pheasant	5	1.2
Quail	9	2.1
Turkey	6	1.4
Upland birds	3	0.7
Waterfowl	1	0.2

Table 15. Types of hunting, by state, within the HCC reservoir areas mentioned by respondents to the mail survey.

State	Type	Count	Percentage
Both	Birds	5	21.7
	Chukar	15	65.2
	Deer	3	13.0
Idaho	Bear	2	1.3
	Birds	10	6.4
	Chukar	61	39.1
	Deer	53	34.0
	Dove	1	0.6
	Elk	11	7.1
	Grouse	6	3.8
	Partridge	5	3.2
	Pheasant	1	0.6
	Turkey	5	3.2
	Upland birds	1	0.6
Oregon	Antelope	1	0.5
	Bear	15	7.3
	Birds	31	15.1
	Chukar	62	30.2
	Cougar	1	0.5
	Coyote	1	0.5
	Deer	45	22.0
	Dove	1	0.5
	Elk	24	11.7
	Grouse	6	2.9
	Partridge	4	2.0
	Pheasant	3	1.5
	Quail	8	3.9
	Upland birds	2	1.0
	Waterfowl	1	0.5

Table 16. Types of hunting, by area (river corridor, upland, or both), within the HCC reservoir areas mentioned by respondents to the mail survey.

Area	Type	Count	Percentage
Both	Antelope	1	1.3
	Bear	5	6.6
	Birds	3	3.9
	Chukar	18	23.7
	Cougar	1	1.3
	Coyote	1	1.3
	Deer	21	27.6
	Elk	8	10.5
	Grouse	4	5.3
	Partridge	4	5.3
	Pheasant	3	3.9
	Quail	4	5.3
	Turkey	1	1.3
	Upland birds	2	2.6
River Corridor	Bear	1	2.0
	Birds	4	8.0
	Chukar	25	50.0
	Deer	15	30.0
	Dove	1	2.0
	Elk	1	2.0
	Partridge	1	2.0
	Quail	1	2.0
	Waterfowl	1	2.0
Upland	Birds	3	8.1
	Chukar	4	10.8
	Deer	13	35.1
	Elk	9	24.3
	Grouse	6	16.2
	Pheasant	1	2.7
	Turkey	1	2.7

Table 17. Mean number of days hunted by type, as reported by respondents to the mail survey during 2000.

Type of Hunting	Mean Number of Days Reported
Bear	15.400000
Birds	5.379913
Deer	3.504587
Elk	1.545455
Turkey	2.600000

Table 18. Hunting comments from the mail-back survey, arranged by overall count.

Category	Code	Comments	Count
Hunting quality	11	Good hunting	79
Access	5	Access is good	74
Miscellaneous	115	Unrelated comment	70
Access	2	More access needed or wanted	32
General area	33	Pro-hunting	31
Hunting quality	12	Good hunting—birds	27
Access	1	Rugged or steep	22
Access	7	Keep open	22
General area	31	General area—positive	22
IPC operations	21	Reservoir fluctuations—negative	12
Miscellaneous	116	Don't know what they are talking about	12
Access	4	Private land access—negative	11
General area	71	Crowding	11
Access	6	Access is bad	9
General area	32	Anti-hunting	9
Miscellaneous	91	Will hunt in future	8
Hunting quality	15	Big game—negative	6
Miscellaneous	117	Unsafe activity	6
Hunting regulation	114	Too few or unfair tags	5
Hunting quality	13	Used to be better	5
Access	3	Private land access—positive	4
Access	9	Ownership signage needed	3
General area	42	Anti-ATV, dirt bike, or motorized	3
Hunting quality	16	Big game—positive	3
Access	8	Too much access	2
Agency	52	Managing agencies—positive	2
General area	72	Not crowded	2
Hunting regulation	111	Don't change	2
Hunting quality	14	Hunting—negative	2
Hunting quality	17	Hunt birds—negative	2
Hunting quality	109	General hunting	2
Miscellaneous	101	Cows or livestock—negative	2
Agency	53	Managing agencies—negative	1
General area	41	General negative	1
Hunting regulation	110	Season lengths	1
Hunting regulation	112	Food plots	1
Hunting regulation	113	License and tag too high	1
IPC operations	22	Parks fee too high—while hunting	1

Table 19. Hunting comments from the mail-back survey, arranged by category count.

Category	Code	Comments	Count
Access	5	Access is good	74
	2	More access needed or wanted	32
	1	Rugged or steep	22
	7	Keep open	22
	4	Private land access—negative	11
	6	Access is bad	9
	3	Private land access—positive	4
	9	Ownership signage needed	3
	8	Too much access	2
Agency	52	Managing agencies—positive	2
	53	Managing agencies—negative	1
General area	33	Pro-hunting	31
	31	General area—positive	22
	71	Crowding	11
	32	Anti-hunting	9
	42	Anti-ATV, dirt bike, or motorized	3
	72	Not crowded	2
	41	General negative	1
Hunting quality	11	Good hunting	79
	12	Good hunting—birds	27
	15	Big game—negative	6
	13	Used to be better	5
	16	Big game—positive	3
	14	Hunting—negative	2
	17	Hunt birds—negative	2
	109	General hunting	2
Hunting regulation	114	Too few or unfair tags	5
	111	Don't change	2
	110	Season lengths	1
	112	Food plots	1
	113	License and tag too high	1
IPC operations	21	Reservoir fluctuations—negative	12
	22	Parks fee too high—while hunting	1
Miscellaneous	115	Unrelated comment	70
	116	Don't know what they are talking about	12
	91	Will hunt in future	8
	117	Unsafe activity	6
	101	Cows or livestock—negative	2

Table 20. Hunting comments from the mail-back survey, arranged by reservoir count.

Reservoir	Category	Code	Description	Count
Brownlee	Access	5	Access is good	40
		2	More access needed or wanted	21
		1	Rugged or steep	15
		4	Private land access—negative	9
		7	Keep open	8
		6	Access is bad	6
		3	Private land access—positive	4
		9	Ownership signage needed	3
		8	Too much access	2
	Agency	52	Managing agencies—positive	2
	General Area	31	General area—positive	12
		33	Pro-hunting	10
		32	Anti-hunting	6
		71	Crowding	6
		41	General negative	1
		42	Anti-ATV, dirt bike, or motorized	1
		72	Not crowded	1
	Hunting quality	11	Good hunting	43
		12	Good hunting—birds	16
		15	Big game—negative	4
		13	Used to be better	2
		17	Hunt birds—negative	2
		14	Hunting—negative	1
		16	Big game—positive	1
	Hunting regulation	111	Don't change	2
		114	Too few or unfair tags	2
		112	Food plots	1
		113	License and tag too high	1
	IPC Operations	21	Reservoir fluctuations—negative	12
		22	Parks fee too high—while hunting	1
	Miscellaneous	115	Unrelated comment	35
		116	Don't know what they are talking about	6
		91	Will hunt in future	4
		117	Unsafe activity	4
		101	Cows or livestock—negative	1
Hells Canyon	Access	5	Access is good	20
		2	More access needed or wanted	11
		7	Keep open	11

Table 20. (Cont.)

Reservoir	Category	Code	Description	Count
		1	Rugged or steep	7
		4	Private land access—negative	2
		6	Access is bad	2
	General Area	33	Pro-hunting	18
		31	General area—positive	10
		71	Crowding	5
		32	Anti-hunting	2
		72	Not crowded	1
	Hunting quality	11	Good hunting	25
		12	Good hunting—birds	8
		13	Used to be better	3
		15	Big game—negative	2
		109	General hunting	2
		14	Hunting—negative	1
		16	Big game—positive	1
	Hunting Regulation	114	Too few or unfair tags	2
		110	Season lengths	1
	Miscellaneous	115	Unrelated comment	26
		91	Will hunt in future	3
		116	Don't know what they are talking about	3
		117	Unsafe activity	2
		101	Cows or livestock—negative	1
Oxbow	Access	5	Access is good	14
		7	Keep open	3
		6	Access is bad	1
	General Area	33	Pro-hunting	3
		42	Anti-ATV, dirt bike, or motorized	2
		32	Anti-hunting	1
	Hunting quality	11	Good hunting	11
		12	Good hunting—birds	3
		16	Big game—positive	1
	Hunting Regulation	114	Too few or unfair tags	1
	Miscellaneous	115	Unrelated comment	9
		116	Don't know what they are talking about	3
		91	Will hunt in future	1

Table 21. Count of responses, by category, from mail survey recipients when asked about the type of hunting license they possessed while hunting in the HCNRA (from the 1999 mail survey).

Idaho Resident	Idaho Nonresident	Oregon Resident	Oregon Nonresident	Annual License	Short-term License	Count
						2*
				X		1
		X				7
		X		X		2
	X					4
	X			X		2
X						21
X				X		5

* This number represents the number of people who didn't specify the type of hunting license they possessed.

Table 22. Count of responses, by category, from HCNRA mail survey recipients when asked about the type weapon they used while hunting in the HCNRA (from the 1999 mail survey).

Bow	Center-fire Rifle	Muzzleloader	Rimfire Rifle	Shotgun	Count
				X	30
	X				9
	X			X	2
X	X				3

Table 23. Number of days during which respondents actually hunted while in the HCNRA (from the 1999 mail survey).

Number of days	Number of respondents
1	13
2	11
3	9
4	3
5	0
6	3
7	1
8	3
9	1

Table 24. Where hunters reported hunting within the Snake River corridor (from the 1999 mail survey).

Area Hunted in Relation to Snake River				
Bank	**One-fourth Mile**	**Two miles**	**More than Two Miles**	**Count**
				7*
			X	5
		X		11
		X	X	1
X				12
X		X		5
X		X	X	3

* This number represents the number of people who didn't specify where they were hunting in relation to the Snake River corridor.

Table 25. Reaches of the Snake River in which respondents reported hunting (from the 1999 mail survey).

Snake River Reach							
Hells Canyon Dam to Wild Sheep Rapids	**Wild Sheep Rapids to Rush Creek Rapids**	**Rush Creek Rapids to Kirkwood Ranch**	**Kirkwood Ranch to Pittsburg Landing**	**Pittsburg Landing to Salmon River Confluence**	**Salmon River Confluence to Cache Creek**	**Salmon River Upstream of Confluence**	**Count**
							14*
						X	2
					X		2
					X	X	2
			X				3
		X					3
		X	X				5
		X	X		X	X	1
	X						1
	X	X					3
	X	X	X				2
X							1
X	X						1
X	X	X					1
X	X	X	X				3

* This number represents the number of people who didn't specify which reach of the Snake River in which they hunted.

Table 26. State hunted and target species as reported by respondents to the mail survey in the HCNRA during 1999.

State Hunted and Target											
ID	OR	WA	Elk	Mule Deer	White-Tailed Deer	Chukar	Quail	Dove	Partridge	Other	Count
											1*
		X		X	X						1
	X					X					2
	X			X						Grouse	2
	X			X						Grouse	1
	X			X						Bear	2
	X		X								2
	X		X	X						Bear	2
X										Lion	1
X									X		1
X						X					16
X						X			X		9
X						X	X		X		2
X				X							2
X			X								1
X			X			X					1

* This hunter didn't specify a species target.

Table 27. Type of hunt, days hunted, and number of elk harvested by hunters who launched from Pittsburg Landing (from IPC's 1999 mail survey in the HCNRA).

Type of Hunt	Days Hunted	Elk Harvested	Number of Hunters
Controlled	3	0	1
	6	1	1
	8	1	1
General	7	0	1
	8	0	2

Table 28. Launch location, type of hunt, days hunted, and number of mule deer harvested by hunters who responded to IPC's 1999 mail survey in the HCNRA.

Launch Location	Type of Hunt	Days Hunted	Mule Deer Harvested	Number of Hunters
Cache Creek Ranch	Controlled	2	0	1
	General	1	0	1
Hells Canyon Creek	Controlled	1	1	1
	General	6	1	2
Pittsburg Landing	Controlled	4	0	1
	General	8	0	2

Table 29. Launch location, days hunted, and number of bear harvested by hunters who responded to IPC's 1999 mail survey in the HCNRA.

Launch Location	Days Hunted	Number of Bear Harvested	Number of Hunters
Hells Canyon Creek	3	0	1
Pittsburg Landing	1	1	1
	8	1	1

Table 30. Days hunted and number of grouse harvested by hunters who launched from Hells Canyon Creek (from IPC's 1999 mail survey in the HCNRA).

Days Hunted	Number of Grouse Harvested	Number of Hunters
1	2	1
9	5	1
1	0	1

Table 31. Launch location, days hunted, and number of chukar harvested by hunters who responded to IPC's 1999 mail survey in the HCNRA.

Launch Location	Days Hunted	Number of Chukar Harvested	Number of Hunters
Cache Creek Ranch	1	10	1
	1	0	3
	1	5	1
	2	5	1
	3	15	1
	1	0	1
	1	8	1
	2	4	1
	2	12	1
Hells Canyon Creek	3	1	1
	2	0	1
	2	4	1
	3	8	1
Pittsburg Landing	1	2	1
	1	1	1
	1	4	2
	2	9	1
	2	10	1
	3	0	2
	3	6	1
	3	8	1
	3	12	1
	3	16	1
	4	15	1
	2	0	1
	2	8	1

Table 32. Launch location, days hunted, and number of Hungarian partridge harvested by hunters who responded to IPC's 1999 mail survey in the HCNRA.

Launch Location	Days Hunted	Number of Chukar Harvested	Number of Hunters
Cache Creek Ranch	1	2	1
	1	0	1
	1	1	1
	2	0	1
	1	0	1
	1	2	1
Pittsburg Landing	2	5	1
	2	16	1
	3	3	1
	4	3	1
	1	5	1

Walla Walla
WASHINGTON
129
95
13
Salmon River
Grangeville
11
Snake River
14
3
204
Imnaha River
Imnaha
IDAHO
82
Enterprise
Riggins
Hells Canyon
National Recreation Area
La Grande
OREGON
Hells Canyon Dam
95
New Meadows
203
86
Oxbow Dam
McCall
Halfway
71
86
Baker
Powder River
Richland
Brownlee Dam
Council
71
245
Cambridge
84
Cascade
Midvale
95
55
Huntington
26
Weiser
201
Payette
Ontario
Fruitland
20
201
21
Caldwell
Meridian
Boise

Vicinity Map

Features Legend

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

IDAHO POWER
An IDACORP Company

Hells Canyon Hydroelectric Project - FERC No. 1971

Tech. Report E.5-12 Figure 1

Location of Idaho Power Company's Hells Canyon Hydroelectric Complex and the adjoining Hells Canyon National Recreation Area

0 4 8 16 24 32 Miles

Scale = 1:891,407

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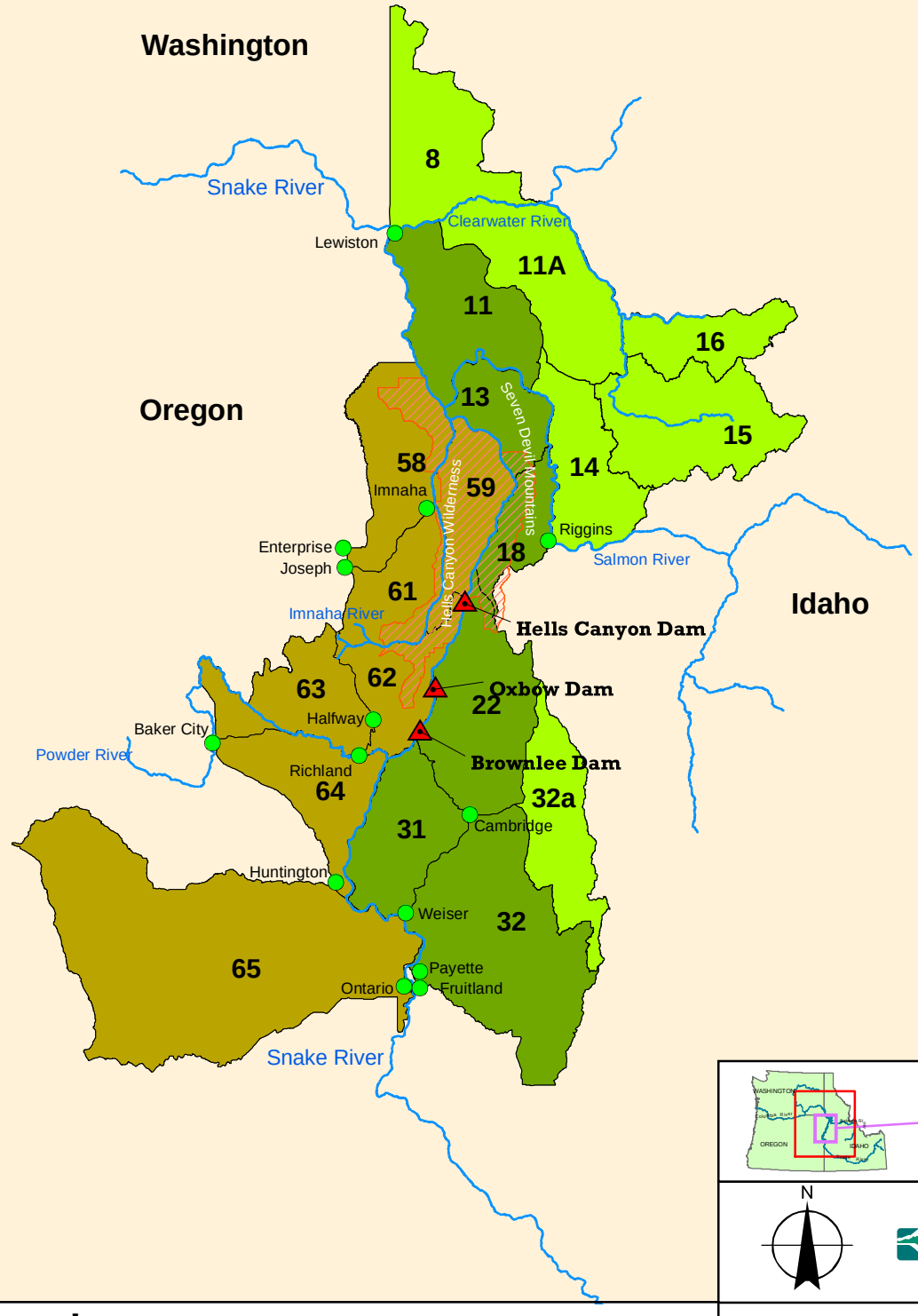
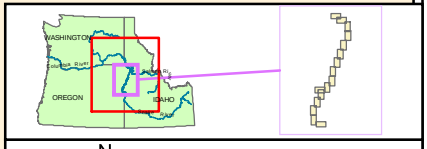
Filename:

Figure 2
E. 5-12





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IDAHO POWER
An IDACORP Company

Legend

CITIES
DAMS
RIVERS
HCNRA
ID
OR
ID DAU's

Hells Canyon Project - FERC No. 1971
Tech. Report E.5-12 Figure 2
Hunt Units in Idaho and Oregon

Scale 1:2,369,553

0 10 20 40 60
Miles

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Salmon River

Snake River

Imnaha River

Powder River

Grangeville

Imnaha

Enterprise

Riggins

Hells Canyon Dam

Oxbow Dam

Brownlee Dam

New Meadows

McCall

Halfway

Baker

Richland

Council

Cambridge

Cascade

Midvale

Huntington

Weiser

175 180 185 190 195 200 205 210 215 220 225 230 235 240 245 250 255 260 265 270 275 280 285 290 300 305 310 315 320 325 330 335 340 345 350 355

3 82 95 86 71 84 26 201 55

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 and Reservoirs

Vicinity Map

IDAHO POWER
An IDACORP Company

Hells Canyon Hydroelectric Project - FERC No. 1971

Tech. Report E.5-12 Figure 3

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

0 3 6 12 18 24 Miles

Scale = 1:595,779

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WHITMAN
CLEARWATER
WALLA WALLA
COLUMBIA
GARFIELD
ASOTIN
NEZ PERCE
LEWIS
Walla Walla
Clarkston
Lewiston
Asotin
Salmon River
Grangeville
Snake River
UMATILLA
IDAHO
WALLOWA
Imnaha River
Imnaha
Enterprise
Riggins
Hells Canyon
National Recreation Area
La Grande
UNION
Hells Canyon Dam
Oxbow Dam
Brownlee Dam
New Meadows
McCall
ADAMS
Halfway
Powder River
Richland
Baker
Council
BAKER
VALLEY
Cambridge
Cascade
Midvale
WASHINGTON
Huntington
Weiser
GRANT
Payette
Ontario
Fruitland
PAYETTE
MALHEUR
GEM
BOISE
HARNEY
CANYON
ADA
Meridian
Boise
OWYHEE
EL

IDAHO POWER
An IDACORP Company

Features Legend

- Interstate Highway
- Principal Highway
- Major Road
- Minor Road
- Rivers
- Counties
- Lakes and Reservoirs

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

Hells Canyon Hydroelectric Project - FERC No. 1971

Tech. Report E.5-12 Figure 4

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

0 4.5 9 18 27 36 Miles

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WHITMAN
CLEARWATER
GARFIELD
COLUMBIA
ASOTIN
NEZ PERCE
LEWIS
WALLA WALLA
UMATILLA
WALLOWA
UNION
BAKER
ADAMS
IDAHO
VALLEY
WASHINGTON
GEM
BOISE
PAYETTE
MALHEUR

Clarkston
Lewiston
Asotin
Grangeville
Enterprise
Imnaha
Riggins
New Meadows
McCall
Halfway
Baker
Richland
Council
Cambridge
Midvale
Huntington
Weiser
Cascade

12
95
129
13
14
3
204
82
203
86
71
245
84
26
201
55

Salmon River
Snake River
Imnaha River
Powder River

Cache Creek
Dug Bar
Pittsburg Landing
Hells Canyon Dam
Oxbow Dam
Brownlee Dam

Vicinity Map

Features Legend

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

IDAHO POWER
An IDACORP Company

Hells Canyon Hydroelectric Project - FERC No. 1971

Tech. Report E.5-12 Figure 5

Unroaded areas of the Snake River corridor within Idaho Power Company's Hells Canyon Hydroelectric Complex and Hells Canyon National Recreation Area

0 3.75 7.5 15 22.5 30 Miles

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WHITMAN
CLEARWATER
LEWIS
NEZ PERCE
GARFIELD
COLUMBIA
ASOTIN
WALLA WALLA
UMATILLA
WALLOWA
UNION
BAKER
ADAMS
IDAHO
VALLEY
WASHINGTON
MALHEUR
GEM
BOISE
PAYETTE

Clarkston
Lewiston
Asotin
Heller Bar
China Garden
Cache Creek Ranch
Salmon River
Grangeville
Dug Bar
Copper Creek Resort
Pittsburg Administrative Site
Kirby Creek Lodge
Kirkwood Historic Ranch
Imnaha River
Imnaha
Temperance Creek Ranch
Sheep Creek
Enterprise
Snake River
Riggins
Hells Canyon Visitor Center
Deep Creek Access
Hells Canyon Dam
Eagle Bar
Black Point
Big Bar
Eckels Creek Site
Hells Canyon Park
Copperfield Boat Launch
Copperfield Park
Oxbow Boat Launch
Oxbow Dam
New Meadows
McCall
Carters Landing
Halfway
Brownlee Dam
OX Ranch
McCormick Park
Woodhead Park
Powder River
Baker
Richland
Holcomb Park
Hewitt Park
Council
Swedes Landing
Cambridge
Little Deacon Creek
Mountain Man Resort and Marina
Cascade
Midvale
Spring Recreation Site
Steck Recreation Site
Huntington
Farewell Bend State Park
Weiser
Oasis Campground
Snake River RV Park

12
95
13
14
3
204
82
129
86
71
203
84
55
26
201
245

Vicinity Map

IDAHO POWER
An IDACORP Company

Features Legend

- Interstate Highway
- Principal Highway
- Major Road
- Minor Road
- Rivers
- Hells Canyon Complex Dams
- Lakes and Reservoirs
- Counties

Site Administration

- Idaho Power Company
- USFS Special Use Permit
- USFS
- Private
- BLM
- Oregon

N

0 3.75 7.5 15 22.5 30 Miles

Hells Canyon Hydroelectric Project - FERC No. 1971

Tech. Report E.5-12 Figure 6

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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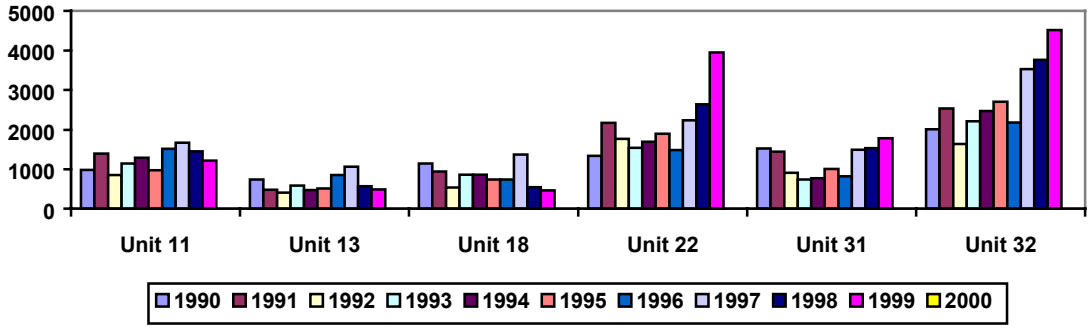
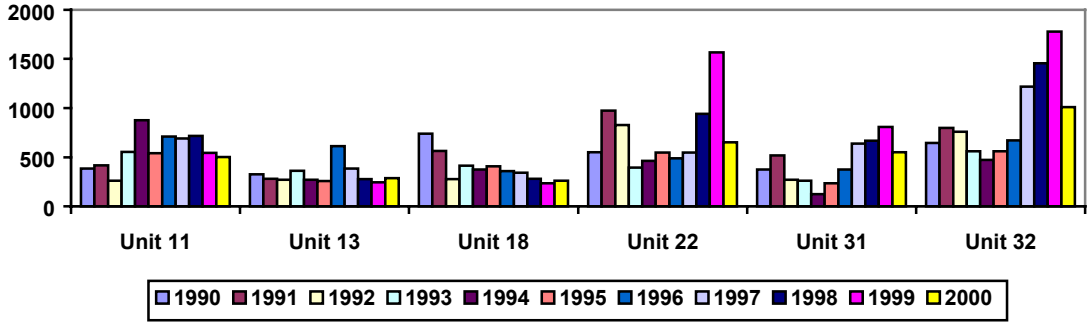
Deer Hunters in Idaho's HCRA Hunt Units



Deer Harvested in Idaho's HCRA Hunt Units



Success Rates for Deer Hunters in Idaho's HCRA Hunt Units

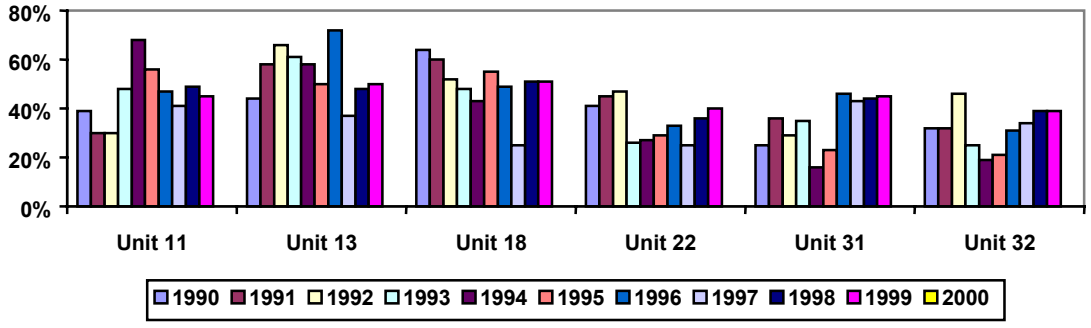
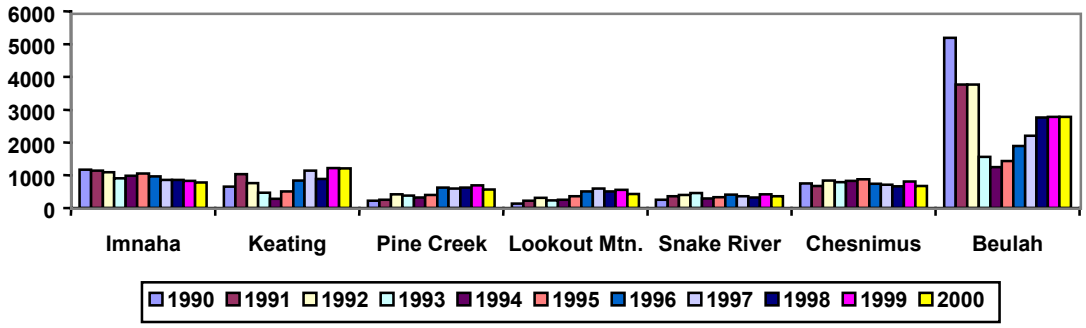
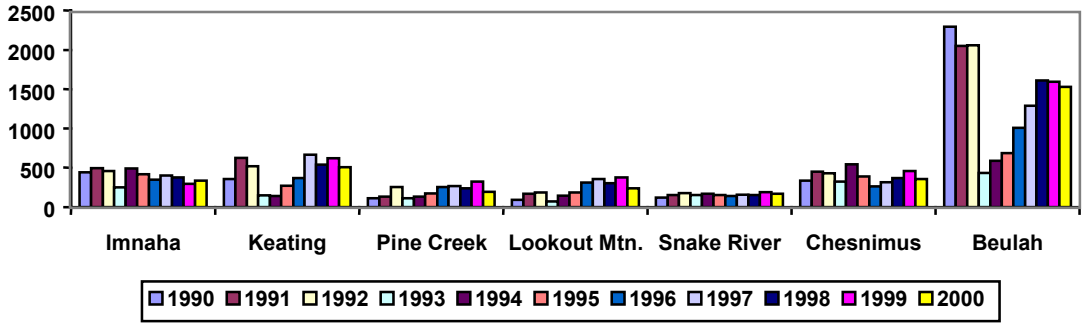


Figure 7. Number of deer hunters, animals harvested, and success rates by year for each Idaho hunt unit in the HCRA.

Deer Hunters in Oregon's HCRA Hunt Units



Deer Harvested in Oregon's HCRA Hunt Units



Success Rates for Deer Hunters in Oregon's HCRA Hunt Units

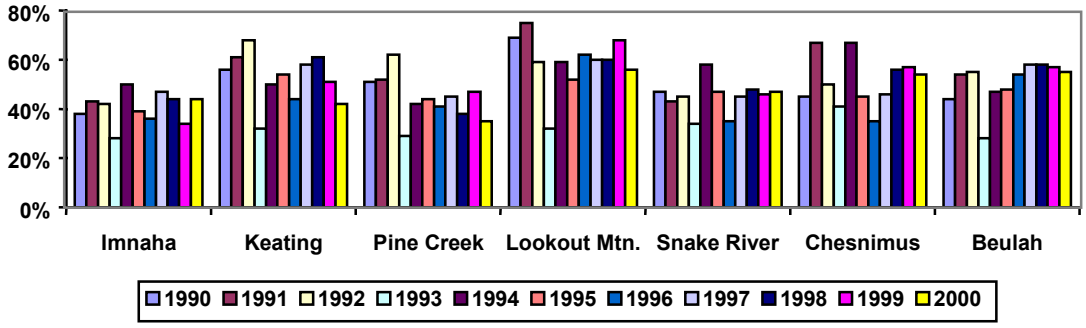
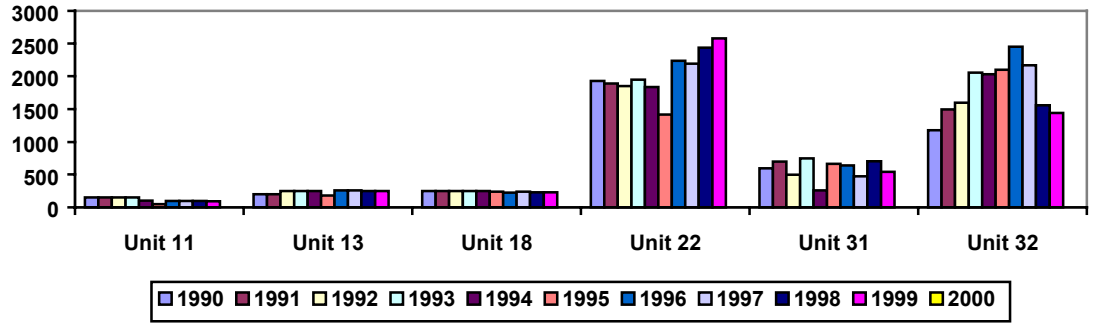
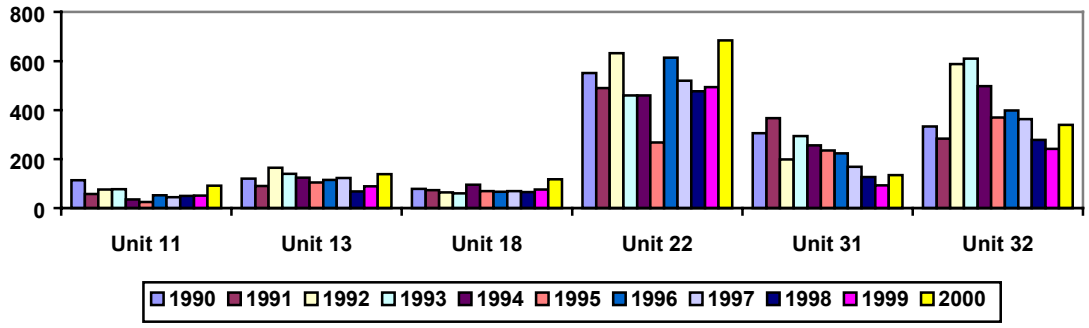


Figure 8. Number of deer hunters, animals harvested, and success rates by year for each Oregon hunt unit in the HCRA.

Elk Hunters in Idaho's HCRA Hunt Units



Elk Harvested in Idaho's HCRA Hunt Units



Success Rates for Elk Hunters in Idaho's HCRA Hunt Units

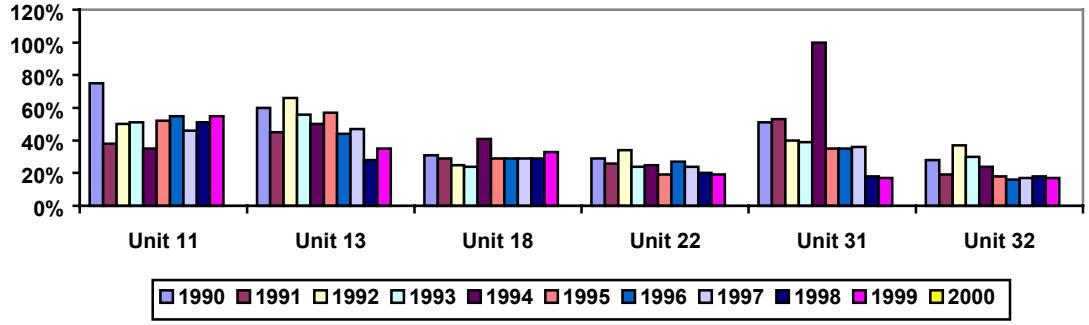
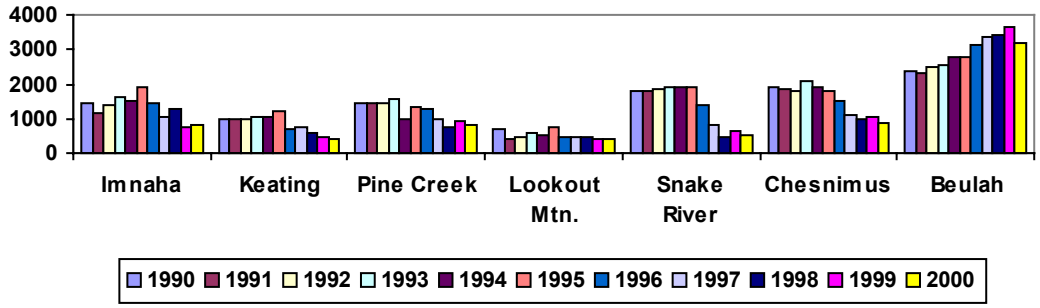
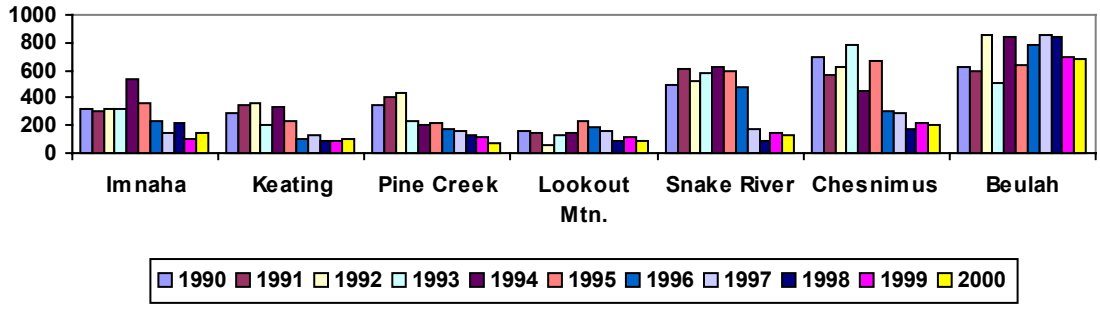


Figure 9. Number of elk hunters, animals harvested, and success rates by year for each Idaho hunt unit in the HCRA.

Elk Hunters in Oregon's HCRA Hunt Units



Elk Harvested in Oregon's HCRA Hunt Units



Success Rates for Elk Hunters in Oregon's HCRA Hunt Units

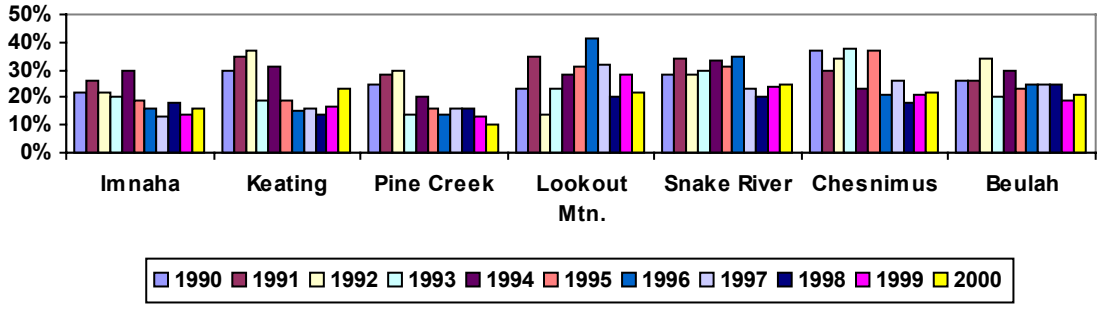
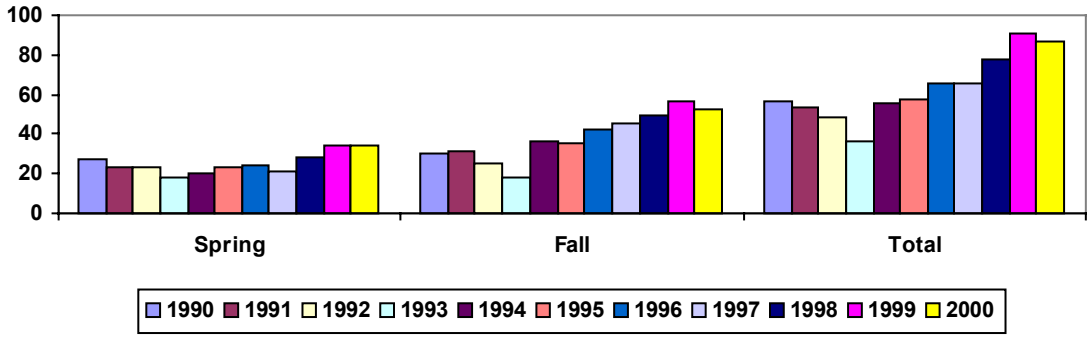
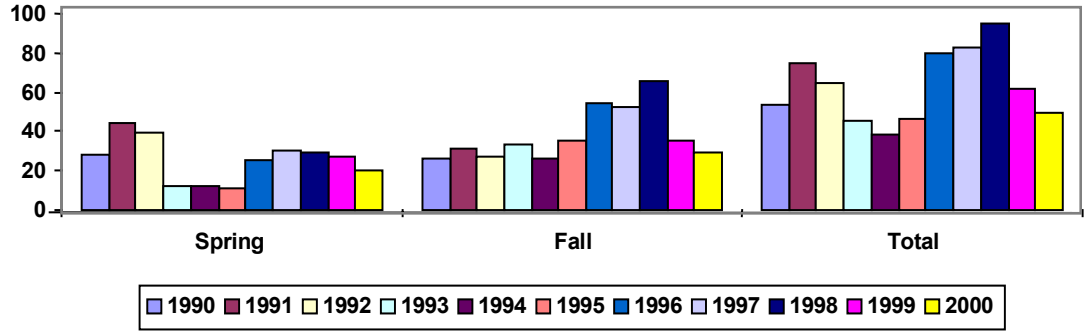


Figure 10. Number of elk hunters, animals harvested, and success rates by year for each Oregon hunt unit in the HCRA.

Bears Harvested in Idaho's Data Analysis Unit 1E in the HCRA



Bears Harvested in Idaho's Data Analysis Unit 1F in the HCRA



Bears Harvested in Idaho's Data Analysis Unit 1H in the HCRA

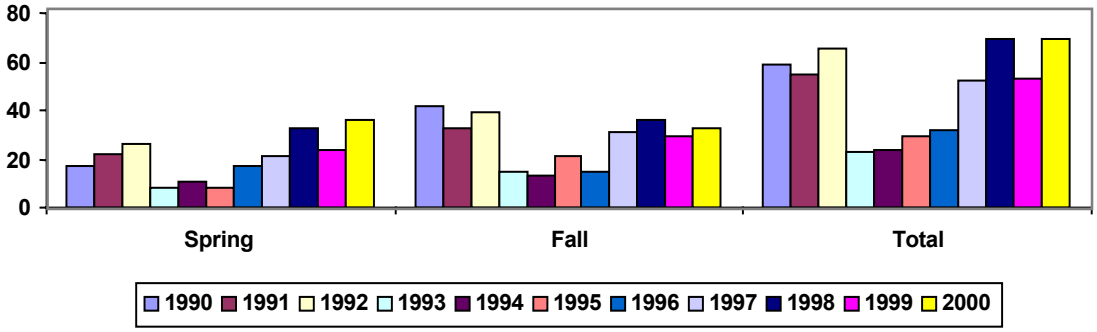
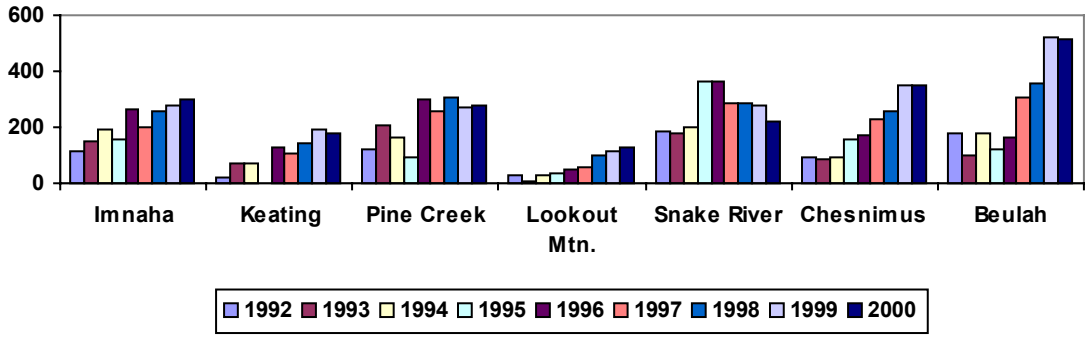
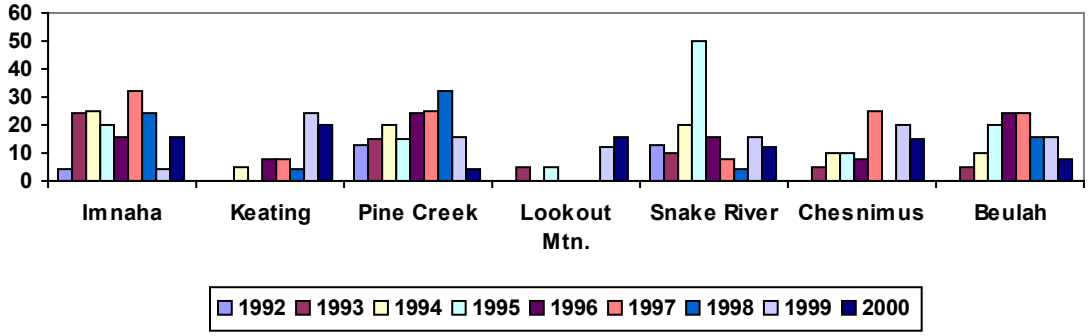


Figure 11. Idaho bear harvest statistics by season and year for each data analysis unit (DAU) in the HCRA.

Bear Hunters in Oregon's HCRA Hunt Units



Bear Harvested in Oregon's HCRA Hunt Units



Success Rates for Bear Hunters in Oregon's HCRA Hunt Units

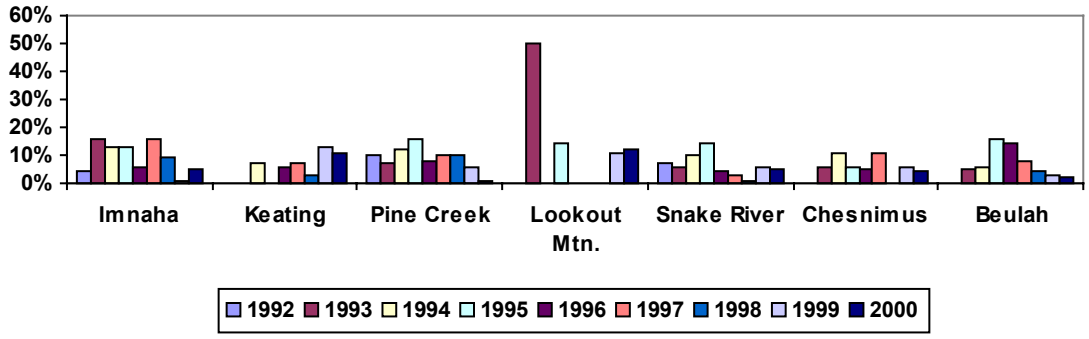
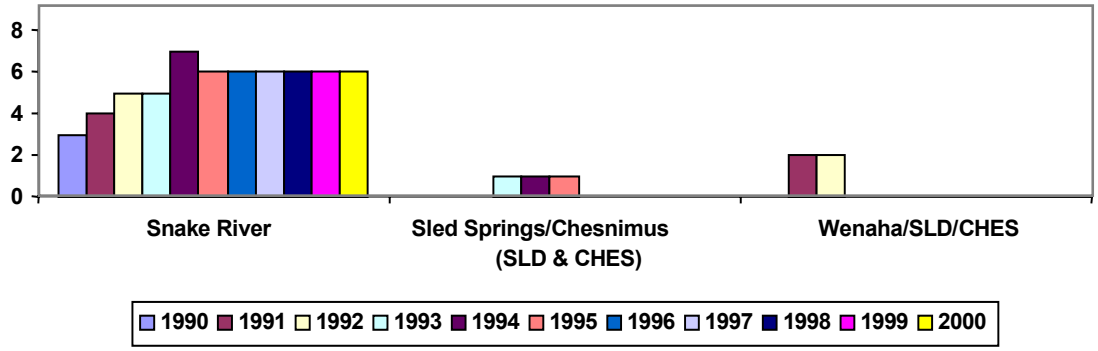
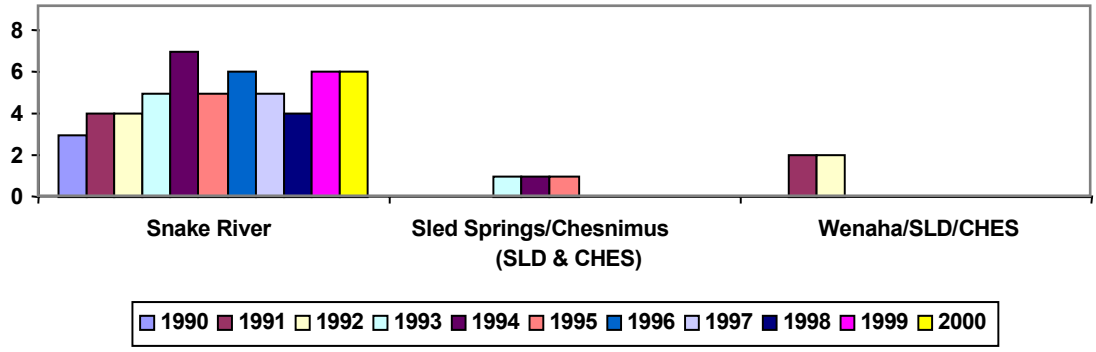


Figure 12. Bear hunter numbers, harvest numbers, and success rates for each Oregon hunt unit in the HCRA.

Bighorn Sheep Hunters in Oregon's HCRA Hunt Units



Bighorn Sheep Harvested in Oregon's HCRA Hunt Units



Success Rates for Bighorn Sheep Hunters in Oregon's HCRA Hunt Units

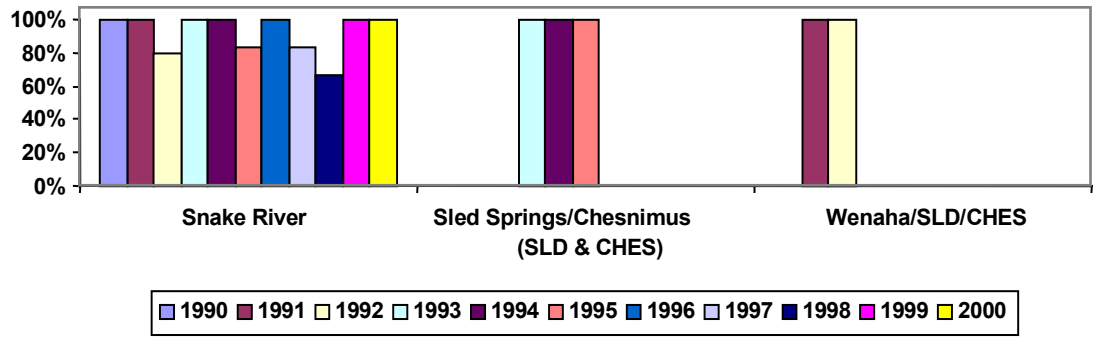
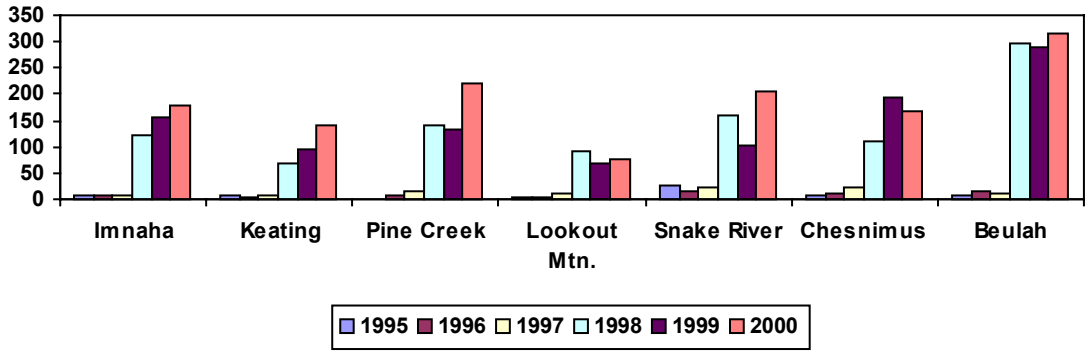
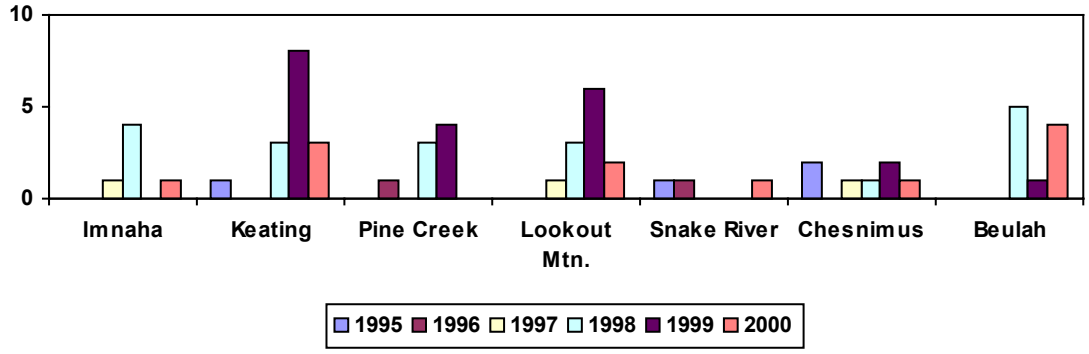


Figure 13. Number of bighorn sheep hunters, number of sheep harvested, and success rates by year for each Oregon hunt unit in the HCRA.

Mountain Lion Hunters in Oregon's HCRA Hunt Units



Mountain Lions Harvested in Oregon's HCRA Hunt Units



Success Rates for Mountain Lion Hunters in Oregon's HCRA Hunt Units

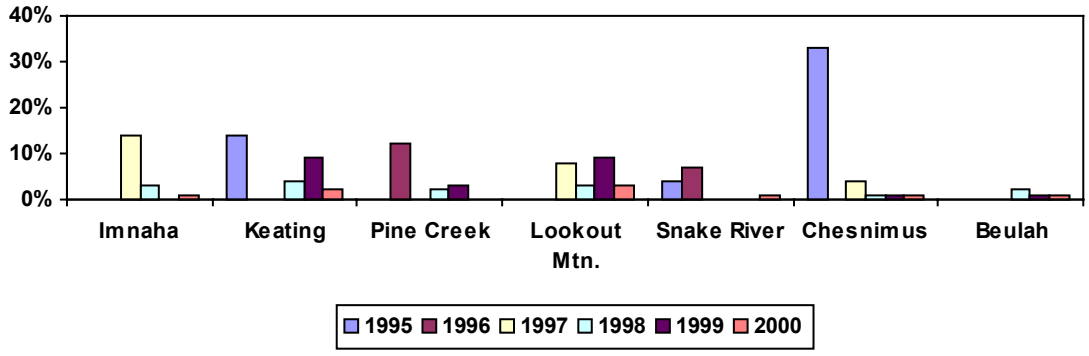


Figure 14. Number of mountain lion hunters, animals harvested, and success rates by year for each Oregon hunt unit in the HCRA.

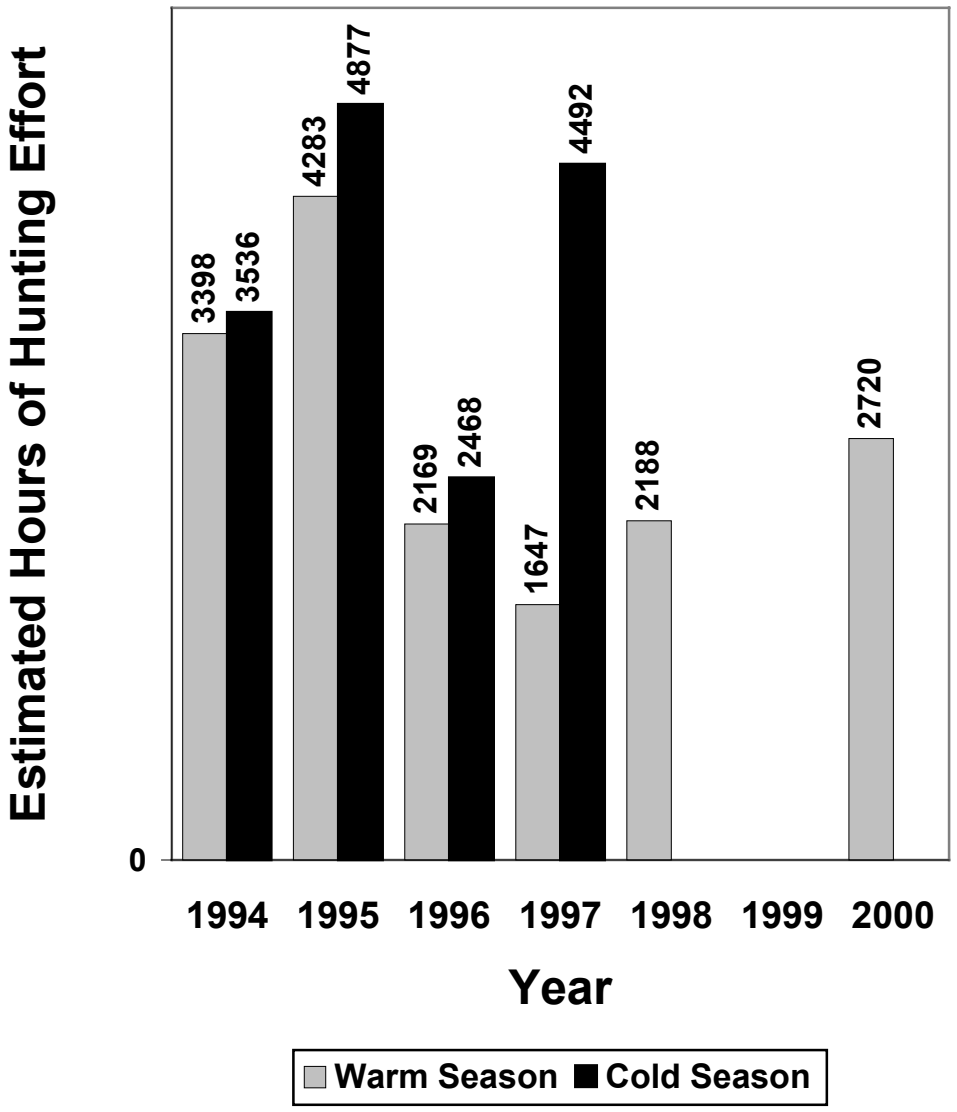


Figure 15. Estimated hours of hunting effort, by season, in the immediate Snake River corridor of the Hells Canyon Complex, from IPC roving recreational-use surveys. No data were collected in 1999.

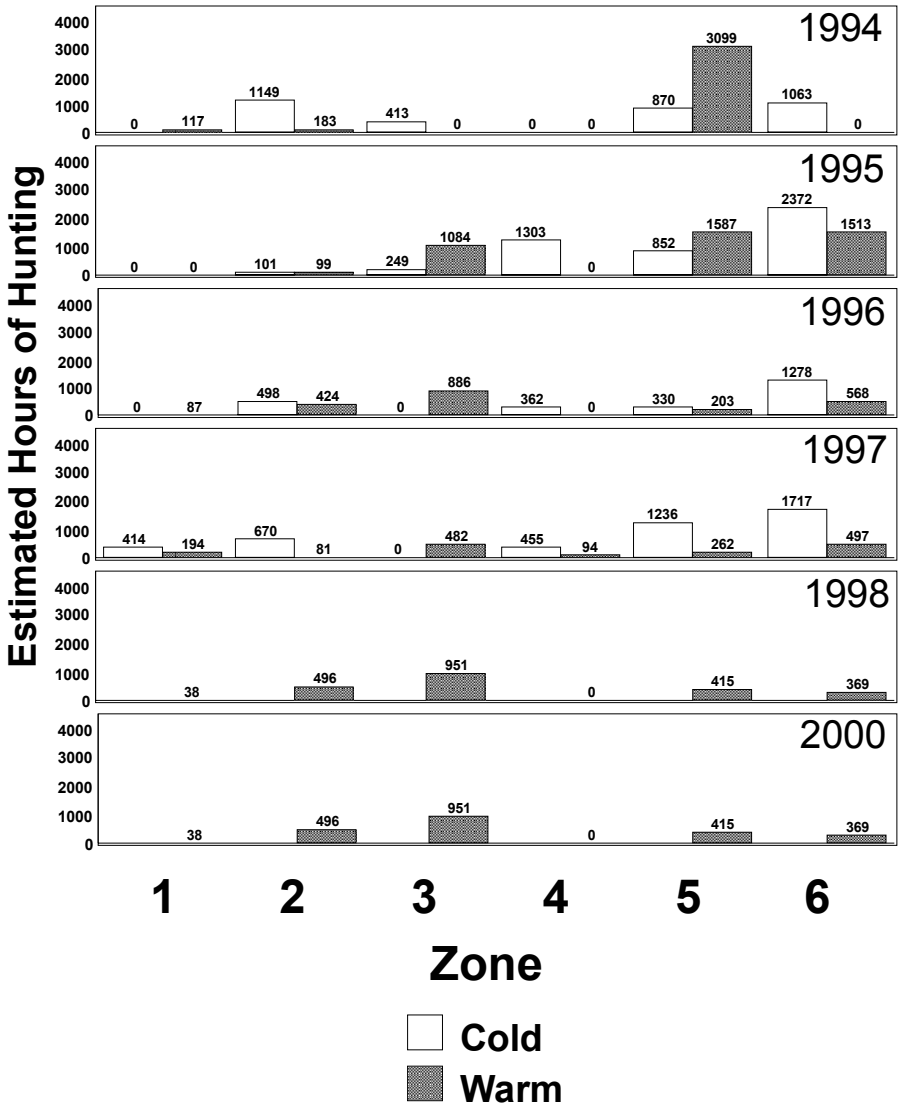


Figure 16. Estimated hours of hunting effort, by year, season, and zone, in the immediate Snake River corridor of the Hells Canyon Complex, from IPC roving recreational-use surveys. No data were collected in 1999.

Hells Canyon Dam

Subzone HT

Zone 1

Subzone HC

Subzone HC

Subzone OT

Oxbow Dam

Zone 2

Subzone OX

Brownlee Dam

Subzone BR

Zone 4

Zone 3

Zone 5

Zone 6

WALLOWA

UNION

IDAHO

ADAMS

WASHINGTON

MALHEUR

BAKER

Halfway

Richland

Durkee

Cambridge

Midvale

Huntington

Farewell Bend

Weiser

Powder River

Snake River

Weiser River

71

84

95

Features Legend

- Highway
- Primary
- Secondary
- Light Duty
- Rivers and Streams
- County Boundaries
- Urban Areas
- Management Zones
- Lakes and Reservoirs
- Developed Recreation Site

Vicinity Map

IDAHO POWER
An IDACORP Company

Hells Canyon Hydroelectric Project - FERC No. 1971

Tech. Report E.5-12 Figure 17

Management zones and subzones in Idaho Power Company's Hells Canyon Hydroelectric Complex

0 1.5 3 6 9 12 Miles

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Appendix A. 1999 Hells Canyon National Recreation Area Visitor Survey, Section H, Questions 1–14

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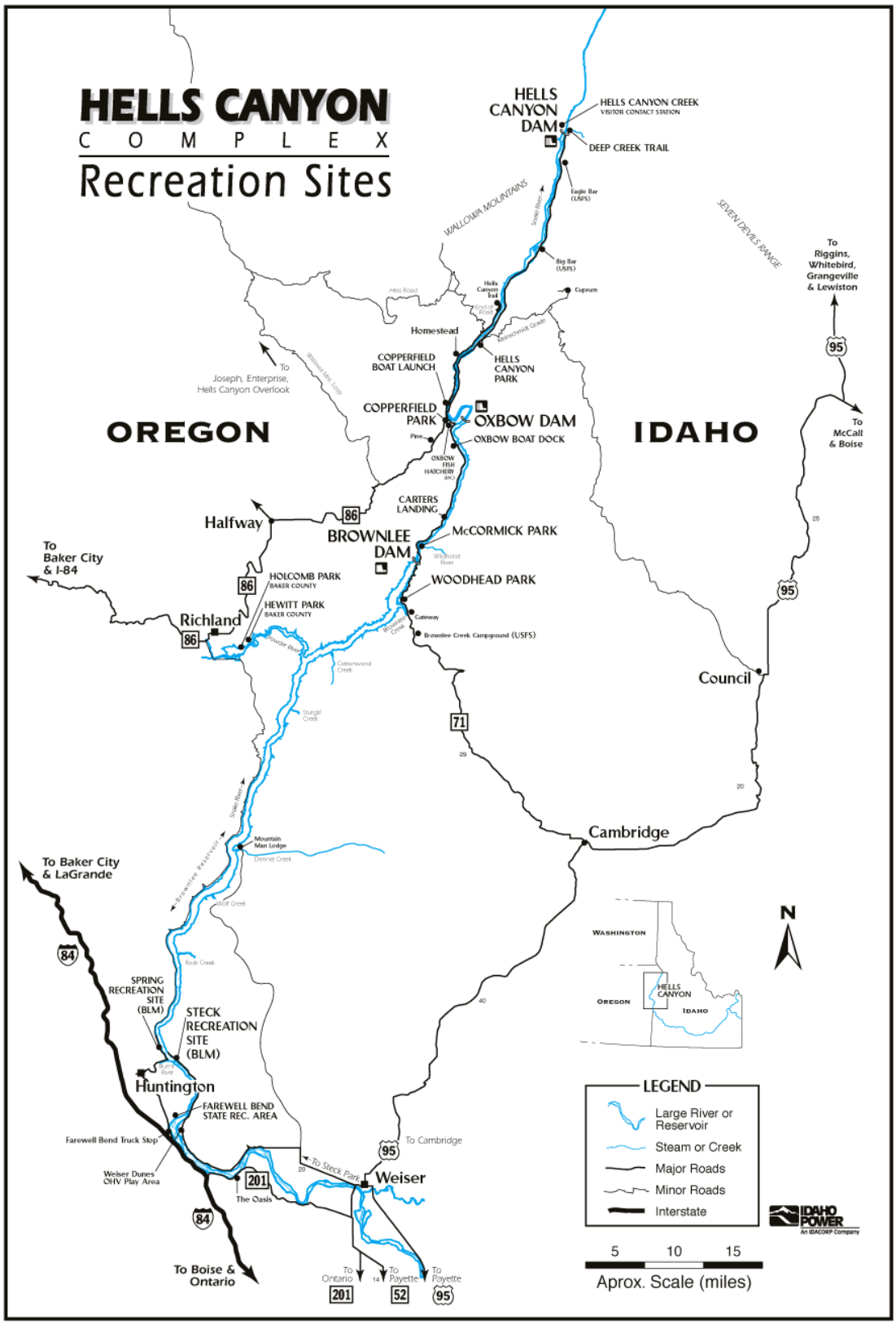
Hells Canyon Area Recreation Survey

Idaho Power is studying recreation at Brownlee, Oxbow, and Hells Canyon Reservoirs. As a recreationist to this area, you have knowledge about the recreational opportunities that are important to you; this survey is designed to collect that knowledge.

Please try to answer all the questions in the survey. Keep in mind we are surveying people with a range of experiences, so some of the questions may seem difficult to answer based on what you know about the area.

If you were not visiting the Hells Canyon Area at the place and date specified in the enclosed letter, please check here ❑ and mail this survey back in the envelope provided…


HELLS CANYON
COMPLEX
Recreation Sites
HELLS CANYON DAM
HELLS CANYON CREEK VISITOR CONTACT STATION
DEEP CREEK TRAIL
WALLOWA MOUNTAINS
SEVEN DEVILS RANGE
To Riggins, Whitebird, Grangeville & Lewiston
95
To McCall & Boise
Homestead
COPPERFIELD BOAT LAUNCH
HELLS CANYON PARK
To Joseph, Enterprise, Hells Canyon Overlook
COPPERFIELD PARK
OXBOW DAM
OXBOW BOAT DOCK
OREGON
IDAHO
CARTERS LANDING
86
Halfway
BROWNLEE DAM
McCORMICK PARK
WOODHEAD PARK
To Baker City & I-84
HOLCOMB PARK BAKER COUNTY
HEWITT PARK BAKER COUNTY
Richland
Brownlee Creek Campground (USFS)
Council
71
Cambridge
To Baker City & LaGrande
84
SPRING RECREATION SITE (BLM)
STECK RECREATION SITE (BLM)
Huntington
FAREWELL BEND STATE REC. AREA
Farewell Bend Truck Stop
Weiser Dunes OHV Play Area
201
The Oasis
To Cambridge
To Steck Park
Weiser
To Boise & Ontario
To Ontario
To Payette
To Payette
52
WASHINGTON
OREGON
IDAHO
HELLS CANYON
N
LEGEND
Large River or Reservoir
Steam or Creek
Major Roads
Minor Roads
Interstate
IDAHO POWER
An IDACORP Company
5 10 15
Aprox. Scale (miles)

A. Questions About Your Trip to the Hells Canyon Area.

In the following questions, "this trip" refers to the recent trip when you were interviewed in the Hells Canyon Area at Brownlee, Oxbow, or Hells Canyon Reservoir (see map on opposite page).

1. Please check all of the following places you visited in the **Hells Canyon Area** on **this trip.** Then check all the places you consider primary destinations. *(Refer to map if necessary. Check all that apply in each column.)*

Locations	**Check if you visited the location on this trip**	**Check if the location was a primary destination**
Hells Canyon Reservoir (from Hells Canyon Dam upstream to Oxbow Dam)	☐	☐
Oxbow Reservoir (from Oxbow Dam upstream to Brownlee Dam)	☐	☐
Brownlee Reservoir (from Brownlee Dam upstream to The Oasis)	☐	☐
Snake River below Hells Canyon Dam	☐	☐
Trails between the reservoir corridor and canyon rim on the Oregon side of the reservoir.	☐	☐
Trails between the reservoir corridor and canyon rim on the Idaho side of the reservoir.	☐	☐

2. We would like to know all the roads you used to access the **Hells Canyon Area** on **this trip**? Using the enclosed green marker, please draw in your travel route on the map on the opposite page.

B. Questions about your trip to Brownlee Reservoir.

The following questions refer only to your visit to Brownlee Reservoir, even though you may have visited other reservoirs in the Hells Canyon Area on this trip.

1. Have you been to **Brownlee Reservoir** before this trip? *(Check one.)*
☐ No **SKIP TO QUESTION 4.**
☐ Yes

2. Please estimate the year when you first visited **Brownlee Reservoir**.
_____

3. Since your first visit, please estimate the total number of times you have visited **Brownlee Reservoir**.
_____ Times

4. How many total days did you spend at **Brownlee Reservoir on this trip**? *(Count part of a day as 1 day.)*
_____ Days

5. How does **Brownlee Reservoir** compare to other reservoir areas you use?

I like Brownlee Reservoir…(Check one)

- ☐ More than any other reservoir areas I use.
- ☐ More than most other reservoir areas I use.
- ☐ About the same as other reservoir areas I use.
- ☐ Less than most other reservoir areas I use.
- ☐ Less than any other reservoir areas I use.
- ☐ I'm not sure.

6. If you had the opportunity, would you take a trip to **Brownlee Reservoir** again? *(Check one)*

- ☐ Definitely yes.
- ☐ Probably yes.
- ☐ Probably not.
- ☐ Definitely not.
- ☐ I'm not sure.

7. If you would not return to **Brownlee Reservoir**, what would keep you from returning? (Check all that apply)

- ☐ Travel distance too great.
- ☐ Facilities were not adequate.
- ☐ Too many people in the area.
- ☐ Cost associated with the trip is too high.
- ☐ Not an interesting enough area to visit again.
- ☐ Reservoir level fluctuations.
- ☐ Conflicts with other people in the area.
- ☐ There are other places I want to visit.
- ☐ Other (explain):

  _____

- ☐ I'm not sure.

C. Questions About Recreational Places at Brownlee Reservoir.

The following questions refer only to your visit to Brownlee Reservoir, even though you may have visited other reservoirs in the Hells Canyon Area on this trip (see map).

1. Please check the places you visited during **this trip to Brownlee Reservoir.** Then rate the overall quality of those places compared to similar places you have visited.

(Check all that apply and circle a number or NS for each place)

Brownlee Reservoir Places	Check if you visited on this trip	Rate the quality of the place (Poor ◄——► Excellent)					Not Sure
A. Snake River RV Park (next to Oasis)	☐	1	2	3	4	5	NS
B. Oasis Campground (private fee site)	☐	1	2	3	4	5	NS
C. Weiser Dunes on Steck Park Road	☐	1	2	3	4	5	NS
D. Farewell Bend State Recreation Area	☐	1	2	3	4	5	NS
E. Steck Recreation Site	☐	1	2	3	4	5	NS
F. Spring Recreation Site	☐	1	2	3	4	5	NS
G. Hewitt/Holcomb Park	☐	1	2	3	4	5	NS
H. Woodhead Park	☐	1	2	3	4	5	NS
I. Brownlee Dam/Power Plant	☐	1	2	3	4	5	NS
J. Parking or pull-off camp areas along reservoir	☐	1	2	3	4	5	NS
K. Other (explain)_____	☐	1	2	3	4	5	NS
L. Other (explain)_____	☐	1	2	3	4	5	NS

2. Do you have additional comments about any recreational places at **Brownlee Reservoir**?

_____

_____

3. We would like to know how you feel about the recreational facilities and services at **Brownlee Reservoir**. For each of the following, please tell us whether you think that presently there is the right amount, too much, or if more is needed. *(Check one answer for each type of facility/service)*

****Important: Please keep in mind that some improvements will require user fees.**

Recreational Facilities/Services	Right Amount	Too Much	Need More	Not Sure
A. Visitor information, signs, and displays	☐	☐	☐	☐
B. Programs (sports, arts/crafts, fireside talks, etc)	☐	☐	☐	☐
C. Developed campgrounds with RV hookups	☐	☐	☐	☐
D. Primitive camping areas	☐	☐	☐	☐
E. Boat-in gas station/marina	☐	☐	☐	☐
F. Shower facilities	☐	☐	☐	☐
G. Toilet facilities	☐	☐	☐	☐
H. Dumpsters/trash cans	☐	☐	☐	☐
I. Picnicking facilities	☐	☐	☐	☐
J. Docks	☐	☐	☐	☐
L. Swimming areas	☐	☐	☐	☐
M. Vehicle parking at existing boat ramps	☐	☐	☐	☐
N. Vehicle pull-off areas for day use activities	☐	☐	☐	☐
O. Hiking trails	☐	☐	☐	☐
P. Biking/off road vehicle trails	☐	☐	☐	☐
Q. Place to buy food and other supplies	☐	☐	☐	☐
R. Fish cleaning stations	☐	☐	☐	☐
S. Paved roads	☐	☐	☐	☐
T. Other (describe):_____ _____	☐	☐	☐	☐
V. Other (describe):_____ _____	☐	☐	☐	☐

D. Questions About <u>Developed Campgrounds</u> on Brownlee Reservoir.

For the following questions, the term “developed campground” refers to areas that have features such as user fees, defined campsites, RV hookups, potable water, restrooms, maintained landscaping, and paved areas.

1. Which of the following statements best describes your use of developed campgrounds? *(Check one)*

☐ Camping in a developed campground is the only type of camping I do.
☐ When I go camping, I sometimes camp in a developed campground.
☐ I used to camp in developed campgrounds, but I don’t anymore.
☐ I have never camped in a developed campground.

***If you have <u>never</u> camped in a developed campground, skip to Question 1 at the top of the next page.*

2. How important are each of the following features for a **developed campground at Brownlee Reservoir**? *(Circle one number for each feature)*

Developed Campground Features	I don't consider it when choosing a site	It's nice to have if available	It's important for a high quality experience	It's absolutely necessary	I'm not sure
A. electrical hookup in site	1	2	3	4	5
B. water hookup in site	1	2	3	4	5
C. sewage hookup in site	1	2	3	4	5
D. screening from other campers	1	2	3	4	5
E. sewage dump station	1	2	3	4	5
F. toilet close to site	1	2	3	4	5
G. fish cleaning station	1	2	3	4	5
H. shower facilities	1	2	3	4	5
I. maintained grassy areas	1	2	3	4	5
J. playground equipment/play areas	1	2	3	4	5
K. boat launching facility	1	2	3	4	5
L. docks for mooring boats	1	2	3	4	5
M. shade trees	1	2	3	4	5
N. swimming area	1	2	3	4	5
O. group camping facilities	1	2	3	4	5
P. campsite reservations	1	2	3	4	5
Q. paved road to campground	1	2	3	4	5
R. lighting at night for security	1	2	3	4	5
S. 24 hr campground attendants/hosts	1	2	3	4	5
T. scenic view	1	2	3	4	5
U. close to the reservoir	1	2	3	4	5
V. close to trails	1	2	3	4	5
W. close to fishing access	1	2	3	4	5
X. other (describe):_____	1	2	3	4	5
Y. other (describe):_____	1	2	3	4	5

3. From the list above, what are the <u>3 most important features</u> for camping in **developed campgrounds at Brownlee Reservoir**? *(Write three letters from the list above)*

The most important features are 1)_____ 2)_____ 3)_____

E. Questions About Primitive Camping at Brownlee Reservoir.

For the following questions, the term "primitive" describes an area having little or no development. Features may include a vault or pit toilet, but no RV hookups, restrooms, or paved areas.

1. Which of the following statements best describes your use of primitive campsites? *(Check one)*

- ☐ Primitive camping is the only type of camping I do.
- ☐ When I go camping, I sometimes do primitive camping.
- ☐ I used to do primitive camping, but I don't anymore.
- ☐ I have never done primitive camping.

***If you have never done primitive camping, skip to Question 4 at the top of the next page.*

2. How important are each of the following features for **primitive camping at Brownlee Reservoir**? *(Circle one number for each feature)*

Primitive Campsite Features	don't consider when choosing a site	It's nice to have if available	It's important for a high quality experience	It's absolutely necessary	I'm not sure
A. out of sight of others	1	2	3	4	5
B. out of sound of others	1	2	3	4	5
C. scenic view	1	2	3	4	5
D. outhouse/portable toilet	1	2	3	4	5
E. limit on number of campsites per area	1	2	3	4	5
F. trash receptacle	1	2	3	4	5
G. close to the reservoir	1	2	3	4	5
H. close to stream, creek, or spring	1	2	3	4	5
I. no litter from prior use	1	2	3	4	5
J. picnic table	1	2	3	4	5
K. maintained access road to site	1	2	3	4	5
L. no evidence of livestock	1	2	3	4	5
M. close to trails	1	2	3	4	5
N. close to fishing access	1	2	3	4	5
O. trees or rocks for shade	1	2	3	4	5
P. little or no weeds	1	2	3	4	5
Q. clearly defined campsites	1	2	3	4	5
R. good boat landing area	1	2	3	4	5
S. docks	1	2	3	4	5
T. flat area for camping	1	2	3	4	5
U. no problems from water level change	1	2	3	4	5
V. no use fees	1	2	3	4	5
W. other (describe):_____	1	2	3	4	5
X. other (describe):_____	1	2	3	4	5

3. From the list above, what are the 3 most important features for **primitive camping at Brownlee Reservoir**? *(Write three letters from the list above)*

The most important features are 1)_____ 2)_____ 3)_____

4. Please describe any problems you have experienced at campsites you used on **Brownlee Reservoir.**

_____

_____

F. Questions about Crowding and Conflicts at Brownlee Reservoir.

1. Overall, how crowded did you feel during **this trip to Brownlee Reservoir**? *(Circle one number)*

1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
NOT AT ALL CROWDED		SLIGHTLY CROWDED		MODERATELY CROWDED				EXTREMELY CROWDED

2. How would you rate the overall acceptability of the number of people you encountered on **this trip to Brownlee*?*** *(Check one)*

☐ TOTALLY ACCEPTABLE ☐ SOMEWHAT ACCEPTABLE ☐ NEUTRAL ☐ SOMEWHAT UNACCEPTABLE ☐ TOTALLY UNACCEPTABLE ☐ NOT SURE

****If you did not feel crowded, skip to Question 6 at the top of the next page.**

3. If you felt the reservoir was at all crowded during **this trip to Brownlee**, could you tell us the <u>one place</u> where you felt most crowded?

_____

4. Please check any of the following items that describe what you felt or did about crowding at that one place. *(Check all that apply)*

☐ I ignored the situation.

☐ I became dissatisfied with my experience.

☐ I enjoyed the crowds and the social atmosphere.

☐ I tolerated the crowds, even though I was unhappy with the situation.

☐ I became frustrated with other users.

☐ I changed the way I thought about the area, deciding it was a higher use setting.

☐ I went to another part of the reservoir where it was less crowded.

☐ I complained to a person in charge.

☐ I left Brownlee Reservoir earlier than planned.

☐ Other (explain:)_____

5. What are you likely to do in response to crowding at that place on **Brownlee** for future trips?*(Check all that apply)*

- ☐ Go at a different time of day.
- ☐ Go at a different part of the week.
- ☐ Go at a different time of year.
- ☐ Go to a different part of the reservoir.
- ☐ Go to a different reservoir.
- ☐ Never return to Brownlee again.
- ☐ Continue taking trips to Brownlee as I have in the past.
- ☐ Other (explain:)_____

6. We would like to know if you had a problem with encounters with other individuals or groups while visiting **Brownlee Reservoir**. *(Check one answer for each encounter listed below)*

ENCOUNTERS WITH:	**DID NOT ENCOUNTER**	**DID ENCOUNTER AND IT WAS:** Not a Problem	Minor Problem	Major Problem
a) Power boaters	☐	☐	☐	☐
b) Jet skiers (personal watercraft users)	☐	☐	☐	☐
c) Repeated contact with the same group	☐	☐	☐	☐
d) Loud or rowdy people	☐	☐	☐	☐
e) Other people at the boat launch	☐	☐	☐	☐
f) People fishing from shore	☐	☐	☐	☐
g) Camp host or fee collector	☐	☐	☐	☐
h) Large groups of people	☐	☐	☐	☐
i) People taking items from your campsite	☐	☐	☐	☐
j) People swimming near boat launch	☐	☐	☐	☐
k) Other people camping too close to you	☐	☐	☐	☐
l) People carrying or using firearms	☐	☐	☐	☐
Other (describe): _____ _____	☐	☐	☐	☐

G. Questions About Brownlee Reservoir Levels.

1. Did you or someone in your group obtain reservoir level information before you left on your trip?*(Check one)*

- ☐ No **SKIP TO QUESTION 3.**
- ☐ Not sure **SKIP TO QUESTION 3.**
- ☐ Yes

2. What sources did you or someone in your group use to obtain reservoir level information? *(Check all that apply)*

- ☐ Idaho Power toll-free recreation hotline
- ☐ Idaho Power internet site
- ☐ Newspapers
- ☐ Other (describe):_____
- ☐ Not sure

3. Did reservoir levels affect your decision to come to **Brownlee Reservoir** on this trip? (*Check one*)

- ☐ No. I don't pay attention to reservoir levels when planning trips.
- ☐ No. I planned to come no matter what the reservoir levels were.
- ☐ Somewhat. Reservoir levels were one of the factors I considered.
- ☐ Yes. Reservoir levels were a major factor I considered.

4. Did reservoir levels affect the overall quality of your recreational experience at **Brownlee Reservoir**? (Check one)

- ☐ No.
- ☐ Yes, they had a negative effect.
- ☐ *Yes, they had a positive effect.*
- ☐ I'm not sure.

5. Given the reservoir level you had during **this trip to Brownlee Reservoir**, how would you rate the acceptability of those levels for the activities you participated in during your trip? *(Check one)*

- ☐ Totally acceptable
- ☐ Somewhat acceptable
- ☐ Neutral
- ☐ Somewhat unacceptable
- ☐ Totally unacceptable
- ☐ Not sure

6. For each of the items below, check if water levels in **Brownlee Reservoir** affected this trip. For items you check, indicate if there was a problem. (*Check all that apply and circle a number for each activity. Leave blank if you did not participate in the activity on this trip)*

Did reservoir levels affect…	**Check if reservoir levels affected this**	**Reservoir levels <u>did</u> affect this and it was…**		
		Not a Problem	A Minor Problem	A Major Problem
Facility/Site Use				
Mooring your boat at camps or other stopping places.	☐	1	2	3
Ability to use certain launch facilities.	☐	1	2	3
Access				
Your access to camping areas.	☐	1	2	3
Your access to trails.	☐	1	2	3
Your access to fishing areas.	☐	1	2	3
Timing of Use				
The time of the day you went boating.	☐	1	2	3
The time of the day you went fishing.	☐	1	2	3
Overall Quality				
The overall quality of your fishing.	☐	1	2	3
The scenic beauty of the area.	☐	1	2	3
The overall quality of your trip in general.	☐	1	2	3
Other (explain):_____ _____	☐	1	2	3

7. Please check any of the following items that describe what you felt or did about the reservoir levels on your trip to **Brownlee**. *(Check all that apply)*

☐ I ignored the situation.

☐ I became dissatisfied with my experience.

☐ I enjoyed the water levels that I experienced.

☐ I tolerated the water levels, even though I was unhappy with the situation.

☐ I became frustrated about the reservoir levels.

☐ I changed the way I thought about the water levels, deciding it offered a different type of experience.

☐ I complained to a person in charge.

☐ I left Brownlee Reservoir earlier than planned.

☐ I left Brownlee Reservoir and went to another reservoir.

☐ Other (explain:)_____

8. What are you likely to do in response to reservoir levels on **Brownlee** for future trips? *(Check all that apply)*

- ☐ Go at a different time of year.
- ☐ Go to a different part of the reservoir.
- ☐ Go to a different reservoir.
- ☐ Check reservoir levels before coming to the area.
- ☐ Never return to Brownlee again.
- ☐ Continue taking trips to Brownlee as I have in the past.
- ☐ Other (explain:)_____

The following table summarizes changes in **Brownlee Reservoir** levels during the summer months of **1998 and 1999** in vertical feet below full pool. Full pool is the highest possible reservoir level.

	MINIMUM AND MAXIMUM FEET BELOW FULL POOL			
	1999		**1998**	
Month	**Min.**	**Max.**	**Min.**	**Max.**
April	72	88	4	14
May	36	87	0	4
June	1	36	0	2
July	1	25	0	25
August	26	32	26	35
September	31	38	35	57

9. Based on your experience, what is the minimum reservoir level necessary for you to come to **Brownlee**?

_____ Feet below full pool or ☐ **Check if not sure**

10. What is the minimum reservoir level that provides quality conditions for your trips to **Brownlee**?

_____ Feet below full pool or ☐ **Check if not sure**

11. What is the ideal or best reservoir level for your trips to **Brownlee**?

_____ Feet below full pool or ☐ **Check if not sure**

12. Managing **Brownlee Reservoir** levels may involve trade-offs between different types of recreation opportunities or between recreation and other resources (such as fish, power generation, or flood control). The following questions ask about some of these tradeoffs. *(Circle one number or not sure for each statement)*

If there is a choice…	Strongly Disagree	Slightly Disagree	Neutral	Slightly Agree	Strongly Agree	Not Sure
A. …I prefer managing reservoir levels to help protect salmon, even if it causes the reservoir to be drawn down during certain times of the year.	1	2	3	4	5	NS
B. …I prefer managing reservoir levels to help control floods, even if it causes the reservoir to be drawn down during certain times of the year.	1	2	3	4	5	NS
C. …I prefer managing reservoir levels to maximize power generation, even if it causes reservoir levels to fluctuate throughout the day.	1	2	3	4	5	NS
D. …I prefer managing reservoir levels for resident fish, even if it may negatively affect salmon runs downstream of the projects.	1	2	3	4	5	NS

H. Questions about Fishing and Hunting at Brownlee Reservoir.

1. Fishing success in **Brownlee Reservoir** appears to have varied considerably during the last several years. If you fish during your trips to the area, please tell us about any change you have noticed in **your** fishing success.

_____

_____

_____

2. If you noticed changes to your fishing success at **Brownlee Reservoir**, describe what you felt or did about this change.

_____

_____

_____

3. What are you likely to do in response to changes in fishing at **Brownlee** for future trips?

_____

_____

_____

4. Have you ever hunted in the **Brownlee Reservoir** area anywhere between the reservoir and the canyon rim?

☐ No **SKIP TO QUESTION 1 ON THE NEXT PAGE.**
☐ Yes

5. Please list the types of hunting you have engaged in within the **Brownlee Reservoir** area, how many times you hunted during the last **two years**, and whether you did this type of hunting in the river corridor or upland area.

In the chart below, River Corridor means within one-fourth mile of the Snake River.

Type of Hunting	Number of Trips in 1998-1999	River Corridor (RC) or Upland (Circle one)	State (Circle one)
	_____Trips	RC Upland Both	OR ID Both
	_____Trips	RC Upland Both	OR ID Both
	_____Trips	RC Upland Both	OR ID Both
	_____Trips	RC Upland Both	OR ID Both

6. We are interested in finding out how **you** feel about hunting in general and access to hunting within the areas around **Brownlee Reservoir (rim-to-rim river valley)**. Please provide any comments you have concerning these subjects.

_____

_____

_____

I. Questions about You.

*This information will be used to describe groups of people we surveyed and **will never** be associated with your name.*

1. When you were at the reservoir, we asked you what time you planned to leave the area. In order to better estimate time spent at various activities, we would like to know when you actually left the area during **this trip**.

Date_____ **Time** ___:___ (☐ *AM* or ☐ *PM)* and (☐ M*ountain Time* or ☐ P*acific Time)*

2. What activities did you, personally, do on **this trip** to **Brownlee Reservoir**? *(Check all that apply)*

☐ Fishing	☐ Photography	☐ Wildlife viewing	☐ Hunting
☐ Camping	☐ Picnicking	☐ Sightseeing	☐ Other _____
☐ Power boating	☐ Hiking trails	☐ Visiting cultural/historic sites	☐ Other _____
☐ Swimming	☐ Taking walks	☐ Packing stock animals	☐ Other _____

3. Which of these information sources did you use to help you decide to visit **Brownlee Reservoir**? *(Check all that apply)*

☐ Magazines/ newspapers	☐ Travel agents	☐ Information from state agencies
☐ Forest Service	☐ Books and river guides	☐ Idaho Power Company
☐ Television or radio	☐ Outfitters	☐ Internet
☐ AAA information	☐ Previous experience	☐ Other_____
☐ Friends or relatives	☐ Chamber of Commerce	☐ Other_____

4. Are you ☐ Male or ☐ Female?

5. What is your age? _____

6. Is the address printed on the envelope your current place of residence? *(Check one)*

☐ YES **SKIP TO QUESTION 8.**

☐ NO

7. If not, what is your correct place of residence? *(So we can notify you if you win the drawing)*

ADDRESS_____

CITY _____ STATE _____ ZIP_____

8. Do you have any additional comments about your visit to the HELLS CANYON AREA?

_____

_____

_____

_____

_____

Thank you for completing the survey.
Please fold and place it in the self-addressed, stamped envelope and mail it back to us.

Upon receiving your competed survey, we will enter you in a drawing for 10-$100 cash prizes and a grand prize of a $1,000 gift certificate to Cabela's (an outdoor recreation gear catalog).