

Ground Water

Less than 100 acres, all located in the lower basin, are irrigated with ground water as the sole source of water. Using the IDWR volumetric standard of four acre-feet per acre per irrigation season as a guide for estimating volume of use, the total maximum of diversion is about 400 acre-feet of water. Five hundred fifty-five additional acres are irrigated using ground water supplemental source (Idaho Department of Water Resources 1998). The term “supplemental source” means that there are other sources of water for these acres, and the ground water is used only as a supplement or back-up to the primary source. Diversion volume for supplemental use in the Little Salmon River basin ranges from a high of four acre-feet per acre, to zero, if the supplemental source is not used during an irrigation season. Supplemental use may add as many as 2,220 acre-feet to the 400 acre-feet diverted for sole source ground water rights (Idaho Department of Water Resources 1998). These volume estimates do not include any half-acre parcels that may be irrigated in conjunction with a domestic use.

4.2.4 Stock Water

Most of the water provided for livestock consumption in the Little Salmon River basin comes from surface water. Table 4 shows the estimated number of livestock in

the Little Salmon River basin. In federal management areas, estimates are based on the number of grazing permits issued. In privately owned areas of irrigated pasture, local experts provided estimates.

Standard water use, as defined by the IDWR, is 12 gallons of water per day for range cattle and horses, and two gallons per day for sheep. Total stock water use was estimated by multiplying the number of gallons typically used in a day by an estimate of days of livestock water use. Total annual livestock water use in the basin is estimated at 18 million gallons, or about 56 acre-feet. The estimates do not allow for evaporation and any additional water required other than that which is directly consumed, or for the same animals that pasture in more than one management area.

Up until recently, Idaho water law did not allow diversion of stock water from live streams to watering troughs unless the landowner held a permitted water right. This law was a disincentive for livestock owners who wanted to develop off-stream water facilities for water quality and stream protection purposes. A law recently passed now allows diversion of in-stream stock water to troughs without the previously required water right. Refer to *Idaho Code § 42-113* for other requirements related to off-stream livestock water facilities.

Table 4. Estimated numbers of livestock by land management/ownership (Sources: 1. Kwader, J., 2. Daly, L., 3. Lake, L., 4. Grinde, P., 5. Dryden, D.).

Land Ownership	Cattle	Sheep	Horses	Grazing Period
Boise Cascade ¹	1,277	*		June-October
Bureau of Land Management ²	710	8,000 1,070	1	May-October July
U.S. Forest Service (Nez Perce National Forest) ³	355			June-October
U.S. Forest Service (Payette Forest) ⁴	2,125	4,000	100-200	July-mid October
Other Private Land ⁵	9,000			June-September

* Included in cattle numbers.

4.2.5 Domestic, Commercial, Municipal, and Industrial

This section describes the amount and sources of water in the basin for domestic, commercial, municipal, and industrial uses. One exception is commercial water, where no amount is described because of its minimal use for that purpose. In general, domestic is defined as single family use, commercial is defined as non-manufacturing businesses, municipal is defined as in *Idaho Code § 42-202B(2)* as “municipal provider,” and industrial is defined as manufacturing industries.

Domestic

Domestic use is defined in *Idaho Code § 42-111*. For the purposes of this analysis, domestic use will be considered one home; with irrigation limited to 1/2 acre and total use not exceed 13,000 gallons per day.

According to IDWR records, there are approximately 100 domestic users of surface water in the basin. About 40 percent of the use is from springs located on or near the users’ property. If each user were to divert 13,000 gallons per day, daily use would total 1.3 million gallons (about four acre-feet.) Actual use is undoubtedly a much lower amount because the use of surface water for domestic purposes is usually seasonal; there may be no use other than lawn and garden irrigation. Domestic use from surface water is scattered throughout the basin, but several users may be concentrated on the same spring or small stream. This may result in localized supply conflicts that are not indicative of basin-wide water supplies.

Because withdrawals from domestic wells are not typically measured, actual domestic ground water use is difficult to calculate with certainty. Based on U.S. Bureau of the Census data (2000), approximately half of the homes in the basin are not served by a municipal system. Assuming each of these homes diverts 13,000 gallons a day, daily withdrawals from the basin would total 6.5 million gallons (about 20 acre-feet). Actual use is probably lower, as it is rare for a user to divert 18 gallons a minute (0.04 cubic feet per second) for 12 hours each day, every day

(13,000 gallons per day, as allowed by Idaho law.) No map of well locations is provided in this document because the locations have not been recorded consistently before 1984, and since 1984, locations were only generally located.

Commercial

Surface Water

For surface water, one commercial swimming pool uses hot springs for its pools and to heat the buildings. For ground water, several small businesses in the basin that are not served by municipal systems rely on small wells. These uses are minimal.

Municipal

Surface Water

Surface water is used for several community systems in the basin. The Pollock Water Users system serves 11 residences from a spring that is a tributary to Hat Creek. Three of these residences have their own wells in addition to the community system. Other multiple home uses of surface water are restricted to non-culinary uses. Subdivisions located on Thrush Creek and Boulder Creek have water right permits to divert water from those creeks for external use.

The city of Riggins’ original municipal system diverted water from Squaw Creek into an open ditch/wooden flume system. Residents not on the flume would bring buckets to a cistern located near the town’s hotel (Manser and Wilson 1983). While Squaw Creek diversion is no longer used for culinary water needs, it still supplies irrigation water (as does the Little Salmon River) to city residents and businesses.

Ground Water

Most of the municipal systems in the basin use ground water. The most significant municipal providers are the city of New Meadows, located in the upper basin, and the city of Riggins, located at the mouth of the Little Salmon River. Municipal use may include some irrigation (lawns and gardens), commercial, and industrial uses, along with

uses inside domestic dwellings, as well as hook-ups outside of the city limits. For instance, in 1997 New Meadows identified 11 commercial users on the municipal system, and provided service to customers outside of the city limits (Idaho Department of Commerce 1997).

The city of New Meadows has recently completed an upgrade of its water delivery system. The Idaho Water Resource Board has been a financial partner with the city in the design and construction improvements, providing \$5,000 grants in both 1995 and 1997. The current upgrade replaced dead-end lines in the delivery system with a closed loop system, replaced a well, resurfaced the system's storage tank, and repaired the pump on the city's second well.

The city of New Meadows has filed a claim in the Snake River Basin Adjudication for 2.0 cubic feet per second (900 gallons per minute). The claim is based on a license issued by the IDWR for 1.3 cubic feet per second (585 gallons per minute). The discrepancy between the claim filed in the SRBA and the previously issued water right license will be resolved during the adjudication process.

The other principal municipality in the basin is the city of Riggins. The city has maintained its municipal delivery system since it was purchased from a special service district in the 1970s and has recently completed an upgrade of the system. The city of Riggins filed a statutory water right claim for 0.71 cubic feet per second (approximately 320 gallons per minute). The IDWR did not investigate statutory claims, and the actual beneficial use of the water right has not been verified. The city filed a claim on the same water right in the SRBA for 0.89 cubic feet per second (approximately 400 gallons per minute). The discrepancy between these two claims will be resolved in the SRBA process.

Other municipal systems using ground water include one multiple-family system serving five mobile homes and a 27-space RV park, and another facility of 17 mobile homes and

two cabins. The first system has a water right license for 9.4 acre-feet per year, and the second system has not yet been measured by the IDWR.

Industrial

There is one water right for industrial use in the basin. It is for a milling operation near Riggins, and is licensed for 41.3 acre-feet per year.

4.2.6 Water Quality

Idaho's primary water quality protection responsibilities lie within the Department of Environmental Quality (DEQ). The DEQ works to implement federal and state water quality standards, including the regulation of pollutants that are discharged to the state's waters. The IDWR also has water quality responsibilities as they relate to water quantity. Comprehensive state water plans such as this document are generally coordinated with DEQ's water quality protection efforts.

Water Quality Limited Water Bodies

In 1994, the U.S. Environmental Protection Agency (EPA), under the authority of Section 303(d) of the federal Clean Water Act, listed the Idaho waters with water quality problems. These water quality limited designations require that the State of Idaho develop Total Maximum Daily Load (TMDL) standards for these waters. A TMDL is the sum of all contributions for a given constituent pollutant allowable in a specific waterway each day, plus some seasonal variations and a margin of safety. The TMDLs must be at or below the level established for the waterway's designated uses. For instance, the Little Salmon River is currently designated as supporting salmonid spawning, coldwater biota, domestic and agricultural water supplies, and recreation. The TMDLs become the basis for plans to restore the water quality to a level that supports its designated uses. TMDLs are to be established for the Little Salmon River basin by the end of 2004.

The proposed 1998 303(d) list for Idaho recommended the Little Salmon River be

listed only below Round Valley Creek. However, in April of 2000, the EPA amended Idaho's 303(d) list and the upper Little Salmon River segment (upstream from Round Valley Creek) was added back to the list. The EPA sought the listing because available data indicated exceedence of the temperature standard in that stream segment (Shepard 2000).

The eight water quality limited water bodies in the basin that are not currently meeting applicable water quality standards for specific designated beneficial uses—the basin's 303(d) streams—are identified in Table 5 (Zaroban 1993). Two reaches, Squaw Creek and the Little Salmon River, were included by the EPA because studies exist indicating there is a water quality problem, but the contaminants and sources have not yet been established (Essig 1998). Several water bodies have listed unknown contaminants or sediment listed as the pollutants. A stream is listed for unknown contaminants when beneficial use reconnaissance monitoring indicates possible impairment of aquatic species. All listed streams are considered low in priority for development of TMDLs, indicating that the designated uses may not be fully supported, but that risks to human health, aquatic life, recreation, economic, or aesthetics of the water body are minimal.

Special Resource Waters and Outstanding Resource Waters

The Little Salmon River and the Rapid River are designated as "Special Resource

Waters." Special Resource Waters are specific water bodies identified by the DEQ as needing intensive protection to preserve either outstanding or unique characteristics, or to maintain a designated beneficial use. One of the purposes of Special Resource Waters is to prevent degradation from point source pollution, such as municipal or industrial pollutants. New discharge sources are allowed only if water quality of the receiving water remains unchanged. No "Outstanding Resource Waters" designations have been approved by Idaho legislators.

Surface Water Quality Studies

In 1979, the DEQ reported on the water quality of the upper Little Salmon River basin, with an emphasis on the impacts of the New Meadows wastewater treatment facility (Wroten and Clark 1979). The 1979 study concluded the following for the mainstem Little Salmon River:

- wastewater treatment lagoon discharge from the city of New Meadows did not violate fecal coliform standards;
- animal waste was the primary source of bacteria in the river; and
- dissolved oxygen, pH, temperature, turbidity, and bacteria measurements downstream from the wastewater lagoon were not affected.

Table 5. Water quality limited water bodies (303(d) listing (U.S. Environmental Protection Agency 1996)).

Waterway	Pollutant	Priority
Big Creek	nutrients, sediment, temperature	low
Elk Creek	sediment	low
Indian Creek	sediment	low
Squaw Creek	contaminant(s) unknown	low
Shingle Creek	sediment	low
Little Salmon River:		
Round Valley Creek to Salmon River	temperature, unknown	low
Headwaters to Round Valley Creek	temperature	low
Brundage Reservoir	temperature	low

Between 1980 and 1983, the DEQ and Boise State University assessed the water quality of the upper Little Salmon River and some tributaries near New Meadows (Edmondson 1985). The study concluded that:

- the fecal coliform bacteria standard was exceeded during both high and low flows;
- turbidity in the Little Salmon River increases with increased runoff because of streambank erosion;
- activities with the greatest likelihood of impacting water quality in the New Meadows area were the wastewater treatment facility, hot spring discharges, and livestock;
- nitrate and nitrite nitrogen and total phosphorus did not consistently exceed recommended levels during sampling period even with the presence of livestock; and
- water quality was similar to other streams in mountainous areas where livestock are present.

Water quality testing has been done on the Little Salmon River, the Rapid River, and Fourmile and Sixmile Creeks by the U.S. Geological Survey, U.S. Forest Service, EPA, and DEQ. The results of these tests are summarized below.

- **Temperature** (seasonal) at some locations in the Little Salmon River and Fourmile and Sixmile Creeks, may temporarily exceed the standard (22°C maximum daily temperature, 19°C maximum daily average) for coldwater biota, but the mean values remain within the accepted standard. In 1994, the Bureau of Land Management measured temperatures on the Little Salmon River at several locations and found water temperatures often exceeded 18°C in July and August. Temperatures measured during July and August in Rapid River, where water temperature is typically lower than the mainstem, often exceeded 15°C, but never exceeded

18°C, even during the summer of 1994, which was the hottest and driest on record (U.S. Forest Service 1995).

- **Suspended sediment:** during early spring runoff in March and April, the Little Salmon River runs turbid and is a major contributor of suspended sediment to the Salmon River (U.S. Forest Service 1995). Throughout the summer months, turbidity improves in the Little Salmon River from Hazard Creek to the mouth. There have been several flooding events over the last few decades (1974, 1976, and 1997) that have contributed large amounts of mud and debris to the Little Salmon River. Seasonally and periodically, even before recent human activity modified the watershed, the Little Salmon River experienced high suspended sediment loads from natural erosion and mass movements. Generally, the Rapid River runs very clear (U.S. Forest Service 1995). The total sediment yield (suspended and bedload sediment) between 1986 to 1993 averaged 3,093 tons per year (Gloss 1995). The high during that period was estimated at 11,565 tons for 1993, the majority of which was from natural causes (U.S. Forest Service 1995).
- **Fecal coliform bacteria** counts are consistently high in Sixmile and Fourmile Creeks, and occasionally, the Little Salmon River downstream from New Meadows exceeds the standard.
- **Nutrients:** nitrate and nitrite nitrogen in excess of the 0.3 mg/l standard have been detected only at the mouth of the Little Salmon River at Riggins. While individual counts may occasionally exceed the standard, the mean value remains low. Total phosphorus exceeds the EPA recommended criteria (0.10 mg/l), on the Little Salmon River below New Meadows and on Fourmile and Sixmile Creeks.

Ground Water Quality Studies

The IDWR's Statewide Ambient Ground Water Quality Monitoring Program

measures water quality in wells throughout the state. No serious ground water quality concerns have been found in the Little Salmon River basin (Crockett 1998). The water in the basin is naturally soft with low dissolved solids. Iron and manganese were elevated in several wells, which can cause plumbing problems and/or aesthetic concerns, particularly laundry staining. Radon was tested at six sites, with results as high as 1500 picocuries per liter. The standard for radon is still under review, but it deals with the contribution of radon in the water to airborne radon. Idaho health districts recommend that all households in Idaho test for airborne radon.

Nitrates were slightly elevated at two sites (samples ranged from 2.4 to 4.0 mg/l). Anything above 2.0 mg/l is considered elevated (Crockett 1995); ten mg/l is the maximum contamination level allowed for public water supplies. Pesticides or volatile organic compounds have not been detected. At one site, three colonies of fecal coliform bacteria were detected. One colony is considered the maximum contamination level.

Critical Tributaries for Maintenance or Improvement of Water Quality for Salmonids

As reported below by various authors, certain specific tributaries in the Little Salmon River basin have been identified as being important for salmonid production (Anderson, D. 1998; Apperson 1998; Janssen 1998; U.S. Forest Service 1995).

- **Rapid River** is the most important tributary in the basin for bull trout production in addition to the production of other salmonid species. Water temperatures are always below the salmonid maximum (22°C maximum daily temperature, 19°C maximum daily average) in Rapid River, and its contribution of cold water to the Little Salmon River is critical to significantly mitigating adverse temperature conditions below their confluence. Development and grazing have affected riparian areas in localized areas along

the lowest reach of Rapid River.

- **Boulder Creek** has been impacted by stream alterations including, removal of large wood from the floodplain and hardening of the streambanks. These alterations are believed to have led to decreased production of chinook salmon, steelhead trout, bull trout, and Westslope cutthroat trout in the creek.
- **Hazard/Hard Creeks complex** provides a sustained contribution of cold water that supports downstream salmonid habitat.

4.2.7 Hydropower

Two elements are needed to create hydroelectric power: flowing water and elevation drop. Steep gradients throughout the Little Salmon River basin and available instream flows provide the ideal physical environment for hydroelectric power generation. Although hydroelectric power generation does not produce pollutants or wastes, construction impacts and changes to the natural hydrologic regime can effect fish, wildlife, and vegetation resources. Due to numerous regulatory and financial hurdles, few if any new hydropower projects are expected to succeed in the basin. While there are no specific state licensing requirements for hydropower projects, all hydropower projects must have a water right issued by the IDWR. Consequently, there are no projects with water rights issued by IDWR that may be exempt from FERC licensing.

All non-federal hydropower projects that are connected to the power grid or are located on public lands or reservations must be authorized by the Federal Energy Regulatory Commission (FERC). Federally built or operated hydropower projects are authorized by public law (Congress). In the mid-1980's arduous attempts were made to obtain FERC authorization on several projects in the Little Salmon River area. All but a few of these projects were abandoned largely because of sedimentation concerns in the anadromous fishery basin.

Existing Hydropower Projects

There are two existing projects that have received water right licenses from IDWR and licenses from FERC. Together, they have an installed capacity of 2.544 megawatts and produce an average of 6,980 megawatt hours annually (Figure 22). Three additional projects have received permits from IDWR. These projects either are completed or are nearing completion. None of these projects require FERC licenses, as the use of the power is limited to the owners' properties.

Four older hydropower projects that have received licenses from IDWR or decreed rights from a court have not filed claims in the Snake River Basin Adjudication. Since the owners of these projects have not sought protection of their rights through the SRBA, it is assumed that these projects are no longer functional.

4.2.8 Navigation

There is no water navigation involving items of commerce in the Little Salmon River basin. The average annual discharge of the Little Salmon River, 570,000 acre-feet, is less than seven percent of the average annual flow of the main Salmon River below Riggins (Brennan et al. 1996). In turn, the discharge volume and flow of the Little Salmon River contributes an average of 1.5 percent of the total volume and flow of the Snake River near Lewiston, with monthly variability from 0.83 to 2.2 percent, contributing little to the navigability of the Snake River downstream of Lewiston (Ondrechen 1999, U.S. Geologic Survey 1999).

4.2.9 Floods and Landslides

There are few flood and related landslide management or control practices found in the Little Salmon River basin. Exceptions to this are structures installed by state and local highway departments and private individuals for road and river bank protection, and the presence of basic flood insurance program activities.

For the most recent update regarding Little Salmon River Basin flooding and landslide issues, please refer to the attached supplement, the *Little Salmon River Comprehensive State Water Plan-Part B: Supplement—Flood and Landslide Management Information*.

4.3 Water Resource Development

4.3.1 Surface Water

Introduction

The consumptive use of surface water in the Little Salmon River basin is mainly for irrigation purposes. Based on diversion rates, irrigation uses approximately 52 percent of the volume of surface water available in the upper end of the basin, including Round Valley Creek. Downstream diversions divert about 3 percent of the volume available in that portion of the basin. Overall, about 20 percent of the volume of water produced during the irrigation season is diverted for consumptive use.

Several factors limit the development potential of the surface water in the Little Salmon River basin. These include administrative actions by IDWR (a moratorium order); the importance of the basin's fisheries; a lack of land in the basin suitable for irrigation; a lack of sites for reservoir storage facilities; and an isolated geographic location that limits commercial or industrial development. Each of these factors is described in detail below.

Salmon and Clearwater River Basins Amended Moratorium Order

In 1993, the director of the IDWR, under the authority of *Idaho Code § 42-1805*, issued an *Amended Moratorium Order for the Salmon and Clearwater River Basins* (Appendix F). The Little Salmon River is a tributary of the Salmon River and comes under the management umbrella of the Order. New developments of surface water are heavily

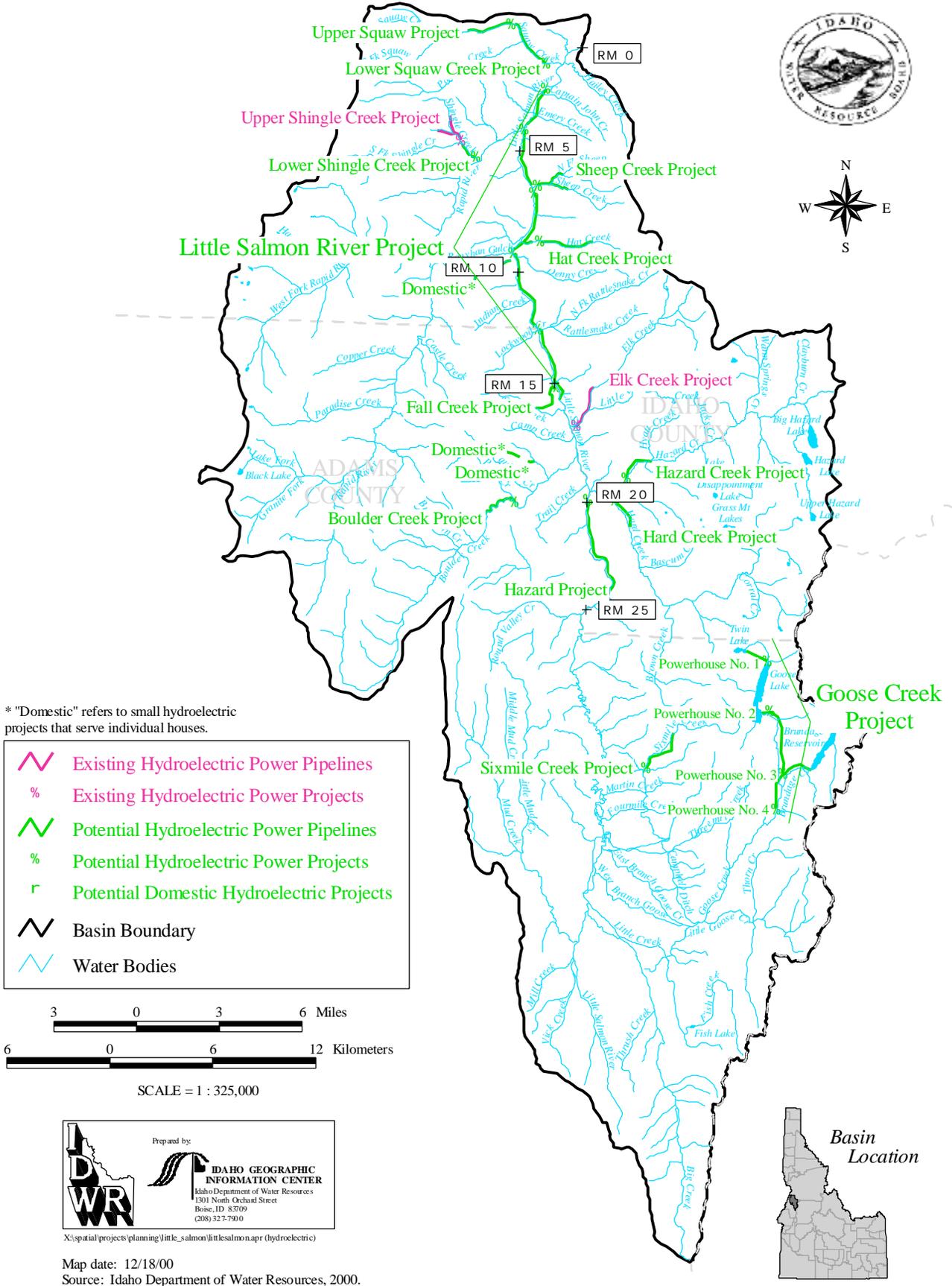


Figure 22. Hydroelectric power development in the Little Salmon River basin: potential and existing.

restricted. The moratorium does not apply to domestic use of surface water, ground water, and non-consumptive uses. Insignificant consumptive uses are reviewed on a case by case basis. Applications for other consumptive uses of the basin's surface water will not be considered until the Director either lifts or changes the restrictions of the Order, although applications may be submitted in order to establish a priority date.

Fisheries

Three fish species listed under the Endangered Species Act spend part of their life in the Little Salmon River basin. Some waterways in the basin provide viable fisheries, however, several waterbodies are water quality limited and are on the state's 303(d) list. Development of additional irrigation water diversions will be constrained by concerns over these listed species.

Development of Additional Irrigated Lands

The Idaho Water Resource Board published a series of reports in 1969, summarized in a state-wide document in 1970, that identified the potentially irrigable lands in the state. Lands were categorized by their physical capabilities for irrigated agriculture. Three land classes were delineated: Class 1 lands have little or no limitations for irrigated agriculture; Class 2 lands are moderately limited for irrigated agriculture because of development problems such as stone removal, land smoothing, or drainage; and Class 3 lands have severe limitations for irrigated agriculture (Idaho Water Resource Board 1970).

In the upper end of the Little Salmon River basin (in Adams County), only small acreages were identified as possible new sites for irrigation. These sites are located along the riparian area of Mud Creek and in other very small parcels (Idaho Water Resource Board 1969). All are identified as Class 2 lands. No Class 1 lands were identified anywhere in the basin (Idaho Water Resource Board 1970).

Storage

The *Idaho State Water Plan*, Part A, identifies 17 potential reservoir sites in the state. None of these sites are in the Little Salmon River basin. As explained in other sections of this plan, neither additional storage facilities nor increasing capacities at existing facilities are feasible options in the Little Salmon River basin.

Geographic Isolation

The Little Salmon River basin is bracketed by rugged terrain, including Hell's Canyon, one of the deepest river canyons in North America (second only to King's Canyon in California). Surface transportation systems in and out of the basin are limited. Residents of the basin rely on the road corridors that are located in sometimes steep and hilly terrain, in an environment where snow, rain, and landslides are common experiences. This environment provides considerable challenges for extensive commercial or industrial development in the basin.

The Interior Columbia Basin Ecosystem Management Project, in its review of economic and social conditions in its study area, categorized both New Meadows and Riggins as "isolated communities" (Interior Columbia Basin Ecosystem Management Project 1998). The study attempted to identify communities where residents cannot reasonably access the economic and social benefits offered by larger cities because of distance or difficult traveling conditions. These benefits include access to air and surface transportation, educational opportunities, cultural amenities, higher order goods and services (such as medical services), and job opportunities.

Other Water Use Opportunities

Surface Water

There are many "non-consumptive" uses of water in the Little Salmon River basin. Non-consumptive uses result in no water loss from the system (except for evaporation or transpiration losses).

Fisheries

One non-consumptive water use with great potential for meeting the state's interests is the maintenance of the basin's fisheries. Three fish species in the Little Salmon River basin are protected by the Endangered Species Act. Members of Indian tribes and local economies depend on healthy fisheries in order to maintain traditions and cultures, enhance economic wealth, and maintain stable communities. Flows to maintain the basin's fisheries have not been quantified, although claims in the SRBA have been filed by various parties.

The Idaho Water Resource Board is the only entity given the authority by the state to file application for and hold water rights for minimum stream flows. The Board does not currently hold any minimum stream flow rights in the Little Salmon River basin, although the Board may submit applications for these types of rights as a result of this *Plan*.

The IDWR's *Amended Moratorium Order for the Salmon and Clearwater River Basins* does not apply to applications for non-consumptive uses of water or for ground water. However, given the presence of three endangered fish species, non-consumptive uses that may significantly reduce flows in a portion of a stream or impact the physical structure of a stream system must be carefully evaluated to determine if it is in the public's best interests.

Hydropower

Seventeen hydropower projects that require FERC licensing have been proposed, but not built, in the Little Salmon River basin. After accounting for overlapping proposals and proposals with multiple powerplant sites, there are 20 identified potential hydropower sites that could produce an estimated 213,695 megawatt hours of electricity annually.

In addition to these 20 projects, three other applications for hydropower generation are on file with the Idaho IDWR. These proposals either do not require FERC

licensing, or have not yet initiated the licensing process.

A summary of potential projects is shown in Table 6 and also on Figure 22. Unless otherwise stated, all data about potential projects is from FERC licensing information on file at the IDWR.

A preliminary feasibility analysis was conducted for each site to determine its Benefit/Cost ratio. A feasible project (i.e., benefits greater than costs) will have a ratio greater than one, while a non-feasible project (benefits less than costs) will have a ratio of less than one. To determine feasibility, a 30-year project life was assumed. It was also assumed that the entire construction cost would be financed at 7.5 % for 50 years. A power sales cost of 51.71 mills per kwh was used, and it was assumed that the power sales cost would rise with the general inflation rate. Construction costs and annual operations and maintenance costs were estimated by the U.S. Army Corps of Engineers as part of the Pacific Northwest Hydropower Database and Analysis System, and corrected to mid-2000 price levels. Capitol costs, engineering, licensing fees, and administration costs are included in this analysis (added to analysis by IDWR)(Patton 2000). The three projects permitted by the IDWR, but not required to obtain FERC licenses, are not included.

Goose Creek No. 4 is the only project that is identified as a potentially feasible undertaking. Given the additional costs associated with building and maintaining the project, Goose Creek No. 4 is unlikely to proceed (Patton 2000).

4.3.2 Ground Water

Ground water in the Little Salmon River basin is recharged mostly by the surface water systems and somewhat by precipitation (see *Water Supply* section in this chapter). Ground water levels tend to fluctuate with stream flows, although there may be some lag time in the ground water aquifer's response to changing surface water flows. Alluvial materials yield water at shallow depths, but yields tend to be low

(two to 15 gallons per minute). Wells drilled into the underlying basalts have yielded more water, but development to deeper systems has been limited, making realistic predictions of ground water supply there very difficult (Bendixsen 2000).

Irrigation

Some areas of the basin may have ground water supplies that would support irrigation. However, based on previous studies by the

Idaho Water Resource Board, most of the land in the basin that supports irrigated agriculture has already been developed for that purpose. In addition, the IDWR has not generally supported changing the source of irrigation water from a surface water source to ground water. Development of ground water for irrigation, other than for lawn and garden use, will be minimal for these reasons.

Table 6. Potential hydroelectric power development.

Powerplant Site	Installed Capacity (MW)¹	Average Annual Generation (MWH)²	Total First Cost (2000)	Total Annual Cost	Benefit-Cost Ratio
Boulder Creek	2.02	5,970	\$26,270,282	\$2,363,475	0.13
Fall Creek	0.90	2,600	\$2,609,435	\$225,131	0.60
Goose Creek No. 1	0.49	1,986	\$3,602,365	\$405,789	0.25
Goose Creek No. 2	0.25	1,013	\$2,257,776	\$181,362	0.29
Goose Creek No. 3	0.55	2,229	\$6,223,668	\$518,363	0.22
Goose Creek No. 4	3.70	14,993	\$8,349,858	\$729,436	1.06
Hard Creek	1.31	4,200	\$6,825,589	\$578,899	0.38
Hazard Creek	2.47	8,500	\$9,541,416	\$834,838	0.53
Little Salmon No. 1	6.83	35,365	\$26,776,637	\$2,338,715	0.78
Little Salmon No. 2	6.09	31,534	\$27,790,388	\$2,387,131	0.68
Little Salmon No. 3	6.96	36,038	\$26,892,399	\$2,347,640	0.79
Little Salmon No. 4	6.38	33,035	\$25,668,361	\$2,235,272	0.76
Little Salmon No. 5	3.19	16,518	\$21,169,256	\$1,760,196	0.49
Lower Hat Creek	1.29	2,753	\$3,365,670	\$51,080	0.19
Lower Squaw Creek	0.64	2,702	\$3,642,757	\$303,016	0.46
Upper Squaw Creek	0.61	2,600	\$5,007,333	\$410,009	0.33
Rattlesnake Creek	1.48	4,539	\$5,930,931	\$508,582	0.46
Sheep Creek	0.86	2,393	\$4,807,665	\$427,927	0.29
Lower Shingle Creek	0.62	1,127	\$3,150,768	\$267,909	0.22
Sixmile Creek	2.10	3,600	\$9,531,214	\$742,887	0.25

¹MW=Megawatts

²MWH=Megawatt hours

Municipal

Population projections forecast an increase of 0.14 percent to 10.8 percent for the counties in the Little Salmon River basin in the next decade. Recent system efficiency upgrades have been designed to meet increases in demand of 2.5 percent per year, which would meet the demands of projected population increases. Other uses of the municipal systems (commercial and/or industrial) may require increased use of the ground water supply.

Development of housing subdivisions outside of the municipal water providers may lead to increased use of ground water. It is difficult to anticipate whether subdivisions will use one community well, or if each homeowner will drill their own well. Each well represents a conduit for contaminants, both between aquifers and from the surface into aquifers. Community wells are more efficient, but require water right permits and regular water quality testing. Single family homes do not have permit or testing requirements.

Consequently, single home systems may dominate the development of ground water, regardless of the inefficiencies and aquifer protection concerns.

4.4 Other Resources

4.4.1 Fish and Wildlife

Fish

The Idaho Department of Fish and Game is responsible for the state's management of fisheries resources. Idaho Department of Fish and Game shares management responsibility with Idaho's Indian Tribes and the federal government. Idaho Department of Fish and Game's *Fisheries Management Plan 1996-2000* (Idaho Department of Fish and Game 1996) sets out statewide fisheries management objectives, including those for the Little Salmon River basin. The management plan identifies the Little Salmon River drainage, from its mouth upstream to, and including, Hazard Creek, as habitat for spring chinook salmon,

steelhead, rainbow trout, cutthroat trout, bull trout, brook trout, mountain whitefish, and

nongame species. The Rapid River is singled out as extremely important to Idaho's anadromous fish. This drainage provides essential, high quality spawning and rearing habitat for bull trout, salmon, and steelhead. It also is an important source of clean, cold water. Water temperatures within Rapid River never exceeded 18°C during the summer of 1994, considered an extremely hot and dry summer (U.S. Forest Service 1995). The July and August average daily water temperatures within Rapid River were 11.3°C and 12.9°C respectively. Temperatures below 18°C are considered acceptable for maintaining coldwater biota. The Rapid River's low temperatures help to decrease water temperatures downstream in the Little Salmon.

The Rapid River Fish Hatchery, which spawns and rears spring chinook, relies on cold, clean water from the Rapid River for successful operation. Anadromous fish management emphasizes hatchery production to provide spring chinook for harvest as the first priority. The Rapid River Hatchery has also supplied eggs for a number of programs outside the drainage (Idaho Department of Fish and Game 1996).

Fish passage for resident and anadromous fish on the Little Salmon River above its confluence with Round Valley Creek is blocked by a series of steep gradient falls. "The Falls" are a series of sharp cascades located at the point where the Little Salmon River becomes constricted as it enters the canyon section of the drainage, just downstream of the mouth of Round Valley Creek. The Northwest Power Planning Council's Fish and Wildlife Program has targeted The Falls for removal. Given the current paucity of suitable habitat upstream of The Falls, the Idaho Department of Fish and Game does not, at this time, support removal of the barrier (Idaho Department of Fish and Game 1996).

Fish Lake Reservoir lies on a headwater tributary to the Little Salmon River southeast of the town of New Meadows. The Idaho Department of Fish and Game owns the dam and most of the reservoir at Fish Lake. Idaho Department of Fish and Game manages a broodstock of westslope cutthroat trout for egg-taking purposes, producing between 200,000 to 300,000 eggs annually. Westslope cutthroat trout are considered a sensitive species and were petitioned for listing under the Endangered Species Act in 1997. After review of the petition, the U.S. Fish and Wildlife Service did not feel that a listing was warranted (U. S. Fish and Wildlife Service 2000a).

In 1996, the four Columbia Basin treaty tribes (Nez Perce, Umatilla, Warm Springs, and Yakama) along with the Columbia River Inter-Tribal Fish Commission, developed a fish restoration plan, the *Wy-Kan-Ush-Mi Wa-Kish-Wit* (Spirit of the Salmon). The document lists the Tribes' recommendations to restore all anadromous fish stocks above Bonneville Dam. There are 11 institutional recommendations, 13 technical recommendations, and watershed or subbasin-specific recommendations. Eight recommendations are specific to the Salmon River basin, of which the Little Salmon is tributary. The recommendations address the legal limitations of diversions of water rights, protection of the physical integrity of stream and riparian systems, the development and enforcement of water quality standards, and new broodstock programs. The plan goes on to describe specific actions that are recommended to assist in the implementation of the recommendations (Columbia River Inter-Tribal Fish Commission 1995).

Fish production is limited by high summer water temperatures, particularly in the upper basin (U.S. Forest Service 1995). Riparian vegetation can be an important factor in controlling stream temperature. Riparian vegetation is also important in controlling streambank vegetation and plays an important role as large woody debris is incorporated into the channel.

Riparian vegetation along the Little Salmon River has been impacted by several factors including development for housing, livestock grazing, and road construction. Several federal and state agencies, including the Idaho Department of Fish and Game, Idaho Soil Conservation Commission, U.S. Bureau of Land Management, U.S. Dept. of Agriculture - Natural Resources Conservation Service, and U.S. Fish and Wildlife Service, as well as Boise Cascade Corporation, are actively involved in establishing riparian rehabilitation partnerships with private landowners. For instance, the Meadow Creek subdivision excluded livestock several years ago in an effort to improve the riparian habitat (Kwader 1998).

Fish Species Listed Under the Federal Endangered Species Act

Chinook Salmon (*Oncorhynchus tshawytsch*)

The Snake River spring/summer chinook was listed as a threatened species under the federal Endangered Species Act in 1992. The Little Salmon River and some tributaries provide travelways, spawning, and rearing habitat for the chinook. The majority of quality habitat is associated with the larger tributaries, such as Rapid River, and Boulder, Hazard, and Hard Creeks. Spring/summer chinook salmon historically used habitat throughout the entire basin, but road construction in the early 1900s altered the mainstream, creating a cascades barrier that blocked fish passage to the upper basin at river mile 21.0 (U.S. Bureau of Land Management 1993). Consequently, the barrier has been considered for removal in the Northwest Power Planning Council's Fish and Wildlife Program, but not until the fish habitat has been improved in the upper basin (Idaho Department of Fish and Game 1996).

The Little Salmon River provides limited spawning habitat because of the large size substrate, but the river does provide summer and winter rearing habitat (U.S. Bureau of Land Management 1993). The most important habitat in the basin is found in the

Rapid River and Boulder Creek (U.S. Bureau of Land Management 1994). Juvenile and adult chinook salmon use the Rapid River as a refuge from high summer mainstream temperatures (U.S. Forest Service 1995). The cold, clean waters of the Rapid River also help to lower water temperatures and improve fish habitat in the lower Little Salmon River (Anderson, D. 1998).

Boulder Creek flows into the Little Salmon River at river mile 17.7, and second, to the Rapid River, provides the most accessible salmon habitat. Lower in the basin, Hazard and Hard Creeks, tributaries to the Little Salmon River, also provide suitable chinook spawning and rearing habitat. Natural barriers beyond 0.6 miles on Hard Creek and 2.5 miles on Hazard Creek restrict chinook passage. Potential but limited rearing habitat is found in the lower portions of several smaller tributaries, including Squaw, Sheep, Denny, Hat, Lockwood, Rattlesnake, Elk, and Trail Creeks (U.S. Bureau of Land Management 1993, 1994).

Current salmon populations are artificially supplemented with fish from the Rapid River Hatchery. The numbers of returning spring/summer chinook to the Rapid River Hatchery from 1984-1994 indicate a declining population trend. A regulated harvest exists for hatchery adult spring chinook on the Little Salmon River up to the mouth of the Rapid River. The season length is established by the Idaho Department of Fish and Game. This sport fishery was closed completely between 1979 to 1984. The Nez Perce Tribe cooperates on many fisheries management decisions.

Steelhead Trout (*Onchorhynchus mykiss*)

Steelhead trout were listed as threatened under the Endangered Species Act in 1997. The Idaho Department of Fish and Game has been involved in a steelhead natural production monitoring project in the Little Salmon River basin since 1984 (Apperson 1998). Idaho Department of Fish and Game manages the steelhead in the basin as though there are only hatchery populations remaining (Byrne 1998). Rapid River has

the only truly wild population in the basin, but populations are declining. In addition to Rapid River, the Idaho Department of Fish and Game monitoring sites are located on Little Salmon River, Boulder Creek, and Hazard Creek.

Bull Trout (*Salvelinus confluentus*)

The bull trout was listed as threatened under the Endangered Species Act in 1998. The Idaho Department of Fish and Game and the U.S. Forest Service have found bull trout in the Little Salmon River, Rapid River, and Boulder Creek (Elle 1998). In the spring, the migrant adults move into the Little Salmon River and then to the Rapid River as water temperatures reach 7-8° C. In September and October they reverse their travel along the same routes. Adults do not overwinter in the Little Salmon River basin. Bull trout use the Little Salmon River only as a migratory corridor in and out of the basin.

Wildlife

Wildlife habitats located in the Little Salmon River basin are shown on Figure 23. These habitats have been identified in studies by various government agencies and observations of the residents and visitors to the basin.

Big Game

Most of the large game mammal populations in the Little Salmon River basin, including mule deer, elk, black bear, and mountain lion, are stable or expanding (Rohlman 1998). After dramatically increasing in number in the late 1980s, mule deer are recovering from a harsh 1992-1993 winter. Elk were introduced from Yellowstone National Park to the New Meadows area in the 1930s. Elk populations remained suppressed until the 1970s when regulations changed to permit only bulls to be harvested. Whitetail deer populations are either stable or increasing (Kinner 1998). According to Idaho Department of Fish and Game, prime elk habitat has been eliminated by development and sloughing of hillsides (from roading) into the stream near Pollock, resulting in the displacement of approximately 300 elk.

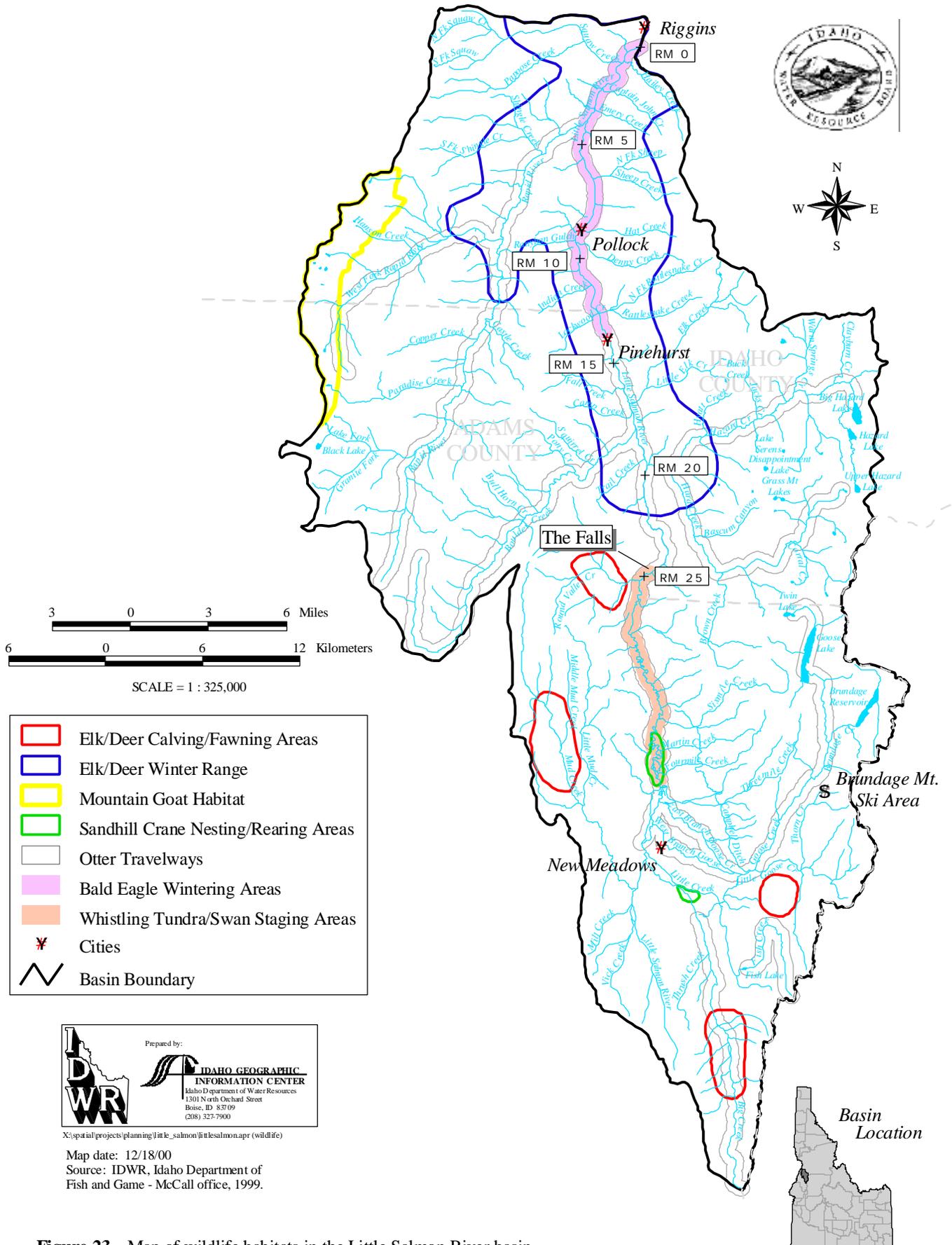


Figure 23. Map of wildlife habitats in the Little Salmon River basin.

Birds and Mammals Listed Under the Endangered Species Act

Bald Eagle (*Haliaeetus leucocephalus*)

Bald Eagles are currently listed as threatened. Originally listed as endangered on March 11, 1967, they were downlisted to threatened on July 12, 1995. On July 6, 1999, the U.S. Fish and Wildlife Service proposed delisting the bald eagle because available data suggests that the species has recovered to population levels necessary to maintain a viable population (U.S. Fish and Wildlife Service 2000b).

Bald eagles have wintered along the Little Salmon River, but U.S. Forest Service surveys have not yielded any wintering birds on the Little Salmon River since 1993 (Bonn 1998). No summer nesting locations have been recorded in the basin (Rohlman 1998).

Canada Lynx (*Lynx canadensis*)

This species is listed as threatened, effective April 24, 2000. The U.S. Forest Service is currently in consultation with the U.S. Fish and Wildlife Service about the possible effects on the Canada Lynx of the Goose Creek Watershed Projects (Brandel 2000).

Gray Wolf (*Canis lupus*)

The Idaho population of gray wolves was listed on November 22, 1994, as an "Experimental Population – non-essential." On July 13, 2000, the U.S. Fish and Wildlife Service published a proposal to reclassify populations of gray wolf. Under this change, Idaho's population would retain Experimental Population designation, and would be a part of the Western Distinct Population Segment, subject to rules specific to that Distinct Population Segment. Comments on this proposal are due by November 13, 2000 (U.S. Fish and Wildlife Service 2000b).

Since being introduced into Idaho's backcountry, the gray wolf makes infrequent visits to the Little Salmon River basin. The species is not a resident, and the basin is not

in the proposed wolf recovery area (Rohlman 1998).

Northern Idaho Ground Squirrel (*Spermophilus brunneus brunneus*)

Found only in Adams and Valley counties, Idaho, this animal was listed as threatened effective May 5, 2000. Remaining populations are threatened by the invasion of conifers into meadows. Fire suppression, recreational hunting, land development, and dense regrowth of conifers after logging has significantly reduced ground squirrel habitat over the last forty years, and has reduced travelways and created isolated populations (U.S. Fish and Wildlife Service 2000b).

Additional Sensitive Species

The Little Salmon River basin is home to many species not on the U.S. Fish and Wildlife Service threatened or endangered list, but whose populations may be at risk. These species include:

- **Mammals:** fisher, wolverine, and Townsend's big-eared bat
- **Birds:** pygmy nuthatch, northern goshawk, great gray owl, black-backed woodpecker, white-headed woodpecker, three-toed woodpecker, Lewis woodpecker, mountain quail, flammulated owl
- **Amphibians:** Columbia spotted frog, giant salamander
- **Fish:** westslope cutthroat trout, Pacific lamprey, redband trout
- **Invertebrates:** Columbia pebblesnail
- **Plants:** puzzling halimolobos, Borsch's stonecrop, rock stonecrop, shortface lanx, small northern bog-orchid, swamp onion, Hazel's prickly phlox, Idaho subalpine maidenhair fern, Lyall's phacelia, green-band mariposa lily, broad-fruit mariposa lily

Little is known about the distribution and abundance of most of these species in the basin. However, it is known that the white-headed woodpecker, flammulated owl, and

northern goshawk numbers are declining in the basin due to the loss of the large ponderosa pine trees and their associated ecosystems (Rohlman 1998).

4.4.2 Recreation

Federal, state, and local entities manage lands and facilities that provide recreation opportunities in the Little Salmon River basin. Based on land area, the primary recreation provider is the U.S. Forest Service. The Idaho Department of Fish and Game is the next largest provider, followed by the U.S. Bureau of Land Management, Adams County, and some private enterprises. It is difficult to quantify total recreation use because of the different measurement methods used by different organizations. There is also considerable dispersed use (use outside developed facilities).

Many debates have been given lately to making economic comparisons between logging, mining, ranching, recreational-based employment, and inputs to the local economy. However, a lack of information precludes any conclusive observations from being made in this plan. Nevertheless, some studies warrant mention and are found below. In general, and extrapolating from a study published last year for Valley County, Idaho (a county adjacent to the Little Salmon River basin with some similarities), four recreation jobs are worth one sawmill job in terms of economic impact on a community (Guaderama et al. 2000).

Fishing

The Little Salmon River basin offers a diverse combination of angling opportunities. Chinook and steelhead fishing, available on only a few waterways in the state, are both available in this basin. Only 16 lakes or reservoirs are managed for trophy or quality trout in Idaho and two of them are located in the Little Salmon River basin: Brundage Reservoir and Lake Serene.

Studies have been conducted that directly or indirectly measure how much value is created by steelhead and salmon fishing in and surrounding the Little Salmon River

basin. Appendix G presents these studies as well as estimated economic values for other sectors in the basin (see Table G-1).

Chinook Salmon

The Rapid River supplies major tribal ceremonial and subsistence opportunities for chinook salmon for members of the Nez Perce Tribe. In addition, chinook salmon sport fishing occurs in the spring and early summer. The fishing season usually begins in May, and had been open through July. Angler effort is greatest on weekends, comprising about 50% of the season angler effort between 1986 and 1997.

Spring chinook salmon returning to the Rapid River hatchery provide sport fishing opportunities on the Little Salmon River. From 1978 to 1990, the area provided the only opportunity to harvest chinook salmon in Idaho (Hassemer 1991). Returning hatchery chinook were not adequate to allow sport angling in 1989, 1991, or 1994 through 1996. Fishing in May 2001 has proven to be one of the best years on record for sport fisherman.

The Idaho Department of Fish and Game tracks chinook angling activity in the basin. The number of angler hours as well as the length of the season and open reaches have varied over the years. Length of season as well as angler hours must be considered when attempting to discern trends. Most years have experienced an increase in angler hours since 1986, with 1998 having the highest increase (78%).

Steelhead and Trout

Steelhead fishing on the Little Salmon River is unique because no specialized equipment is necessary. The small size of the river and easy access via U.S. Highway 95 allow for bank fishing, unlike steelhead fishing on the Clearwater or Snake rivers, where motorized boats are required (Anderson, B. 1998).

The Rapid River, a large tributary in the lower basin, is managed as a wild trout fishery with a two fish limit. Angling pressure is minimal (Lowell 1999). The Rapid River is the only tributary in the

Salmon River basin open during steelhead season (Idaho Department of Fish and Game 1996). The season has fall and spring runs with most angling activity occurring in the fall. According to the Idaho Department of Fish and Game, angler hours increased about 34 percent between 1992 and 1998.

Lake Fishing

With 42 alpine lakes, lake fishing opportunities are abundant in the Little Salmon River basin. Brundage Reservoir is managed for quality rainbow trout fishing experiences. Fish Lake contains a broodstock of westslope cutthroat trout, and is a major source of eggs for the state (Anderson, D. 1998). Many of the other lakes are stocked with westslope cutthroat. Lake Serene is a trophy fishery. Goose and Hazard lakes receive the most use (Anderson, B. 1998).

Boating

River boating in the Little Salmon River basin is generally limited to the spring when adequate flows are available. Table 7 lists river and stream reaches where float boating occurs. No estimates of boating activity are available, but boating activity is increasing, particularly with kayakers (Grussing 1999).

Boating on lakes and reservoirs in the basin is generally associated with fishing. Hazard Lake allows only non-motorized boating. Although the Little Salmon River basin is only a part of the two counties, Adams and Idaho counties contain 4.5 percent of the boatable surface acres in the state (Murphy 1996). Approximately 1.6 percent of registered boaters identified Adams or Idaho county as their primary use area (Hiatt 1999). Boater registration increased about 24 percent in Adams County between 1988 and 1998, and remained level in Idaho County for the same period.

Rapid River Wild and Scenic River

The Rapid River is a tributary of the Little Salmon River located in the lower basin. The portion of the Rapid River that runs through public land was designated as a Wild and Scenic River as a part of the legislation (*Public Law § 94-1990*) that created the Hells Canyon National Recreation Area in 1975. The designation is to preserve the river's remarkable water quality values. Most of the watershed is managed as a roadless area providing primitive non-motorized recreation opportunities.

Table 7. River and stream float boating (Sources: Amaral 1990; Moore and McClaran 1989; McClaran 1999).

Put In-Take Out	Flow Range (cubic feet per second)	Class/Skill level	Season
Little Salmon River			
Zims Hot Springs to Smokey Boulder Rd		I / Beginner	Spring
Below 3 rd waterfall to Hazard Creek	1,000 – 2,500	V- V+ / Expert	Spring
Hazard Creek to Riggins	500 – 1,000	III+ / Advanced	April - June
	1,000 – 3,000	IV (V-Amphitheater Hole)	
	>3,000	IV+ (V- Amphitheater Hole)	
Hazard Creek			
Hard Creek to Little Salmon confluence	500 – 1,000	III – IV/Advanced	May-June
Hard Creek			
Headwaters to Hazard Creek confluence	200	IV	May

The area attracts recreationists regionally from Idaho and Washington states. The trail paralleling the Rapid River is one of three access sites into the Hells Canyon National Recreation Area. Trail use has a long season, usually from late March to Thanksgiving. Spring arrives in the lower Little Salmon River basin in March, allowing early hiking access. Use drops off as the summer heat intensifies, then picks up again in the fall. The trail receives high use by hunters from mid-October to mid-December. Approximately 90 percent of the hunters access the area by horseback. A large number of non-resident hunters use the area, predominately from Washington. Use is intermittent with the majority of use occurring around weekends (Anderson, B. 1998; Lowell 1999).

The Idaho Department of Fish and Game manages a fish hatchery on the lower Rapid River (outside of the national forest boundary) for the Idaho Power Company. Visitation is estimated at 5,000 to 10,000 visits a year. Visitation is highest during trapping activities from mid-June to early July, and spawning times in late August to early September (Lowell 1999).

Hunting

The Little Salmon River basin is located in the Idaho Department of Fish and Game's Hunting Unit 23. The department estimates that deer hunter effort has doubled between 1994 and 1998. Elk hunter days have grown each year, increasing about 69 percent over the same five-year period. Success rates (total number of elk or deer harvested/total number of hunters) have ranged from 16 percent to 25 percent over this same period. Nonresident hunters made up about 13 percent of deer hunters and 18 percent of elk hunters in Hunting Unit 23 in 1995 (Kuck 1995).

Recreational Dredge Mining

Recreational dredges are those with nozzle diameters of five inches or less, and equipment rated at 15 horsepower or less (*Idaho Code § 42-3803(a)*).

The entire Little Salmon River basin is closed to recreational dredging under the one-stop permit. Individuals can apply for a Stream Channel Alteration Permit from the IDWR for stream reaches not designated as state protected rivers within the basin. However, the IDWR has indicated that applications will not be reviewed until the applicant has received an incidental take permit or other approval from the National Marine Fisheries Service or the U.S. Fish and Wildlife Service (IDWR 2000b).

Camping

The majority of campgrounds in the Little Salmon River basin are adjacent or in close proximity to waterways (Figure 24). The majority of campsites are operated by the U.S. Forest Service, with one site managed by Adams County. Dispersed camping (areas lacking facilities or services) occurs throughout the basin on public lands.

Winter Sports

The Little Salmon River basin offers a number of winter activity opportunities from snowshoeing to snowmobiling. There are two developed ski areas, both of which offer a variety of types of snow skiing. The larger of the two, Brundage Mountain, reported approximately 100,778 skier visits during the 1997-1998 ski season (Naylor 1999), up from 97,328 estimated visitors during the 1994-1995 season. The U.S. Forest Service has constructed a new parking lot for snowmobiles in the Goose Creek drainage in the southeastern portion of the basin, on the side of Brundage Mountain. This parking lot eases access to Snowmobile Area 43A (Goose, Hard, and Hazard Creek drainages).

4.4.3 Timber

As of the writing of this plan, only one saw mill still existed in the region, but it lies just outside of the Little Salmon River basin near its southwest boundary, at Tamarack. A mill owned by the Boise Cascade Corporation in Cascade, just to the south of the basin, closed in May 2001. Because logging and manufacturing of wood products have provided one of the primary economic

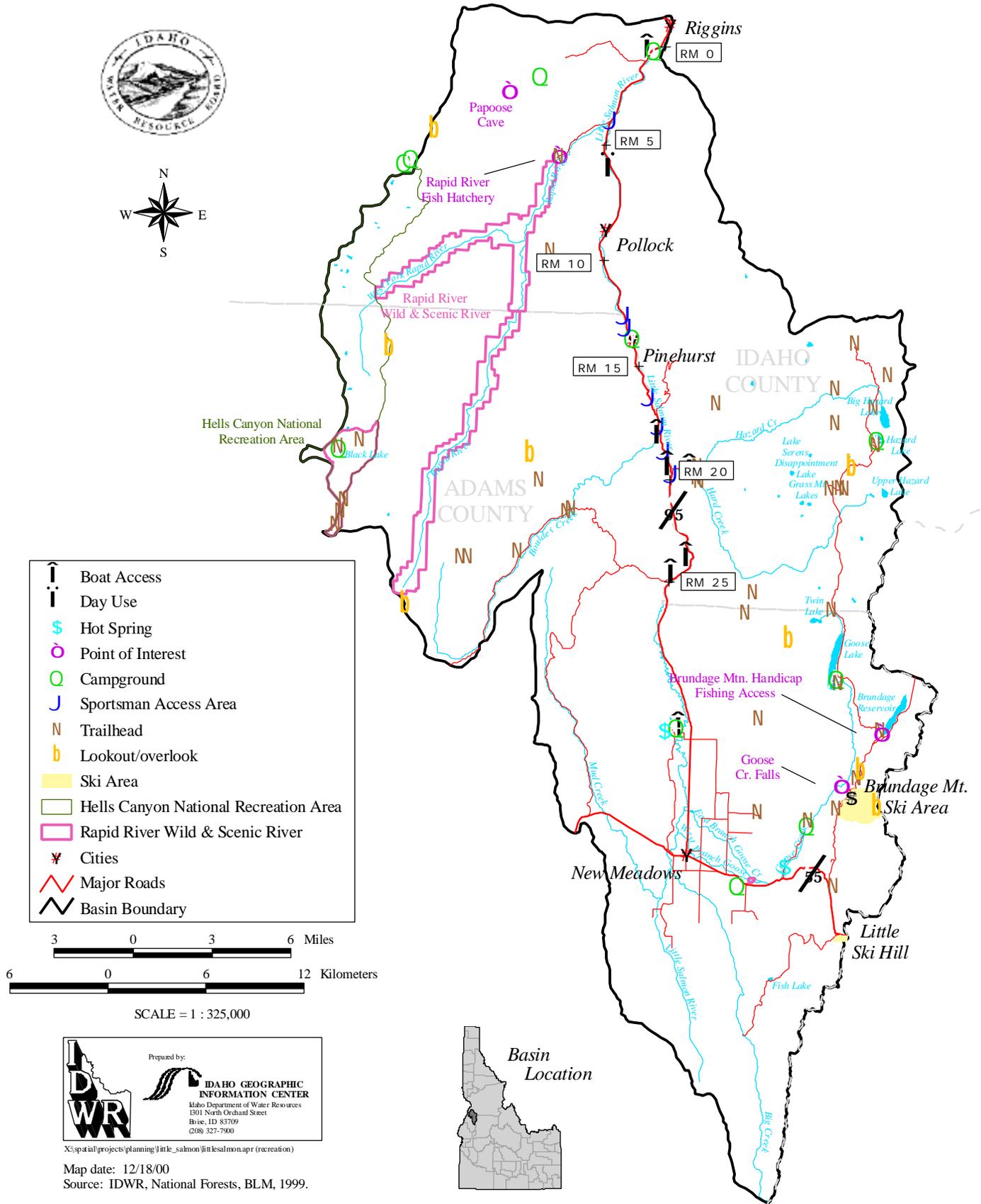


Figure 24. Map of recreation-related facilities or special features in the Little Salmon River basin.

foundations to the Little Salmon River basin, mill closures will force logging-job reductions and related satellite industry layoffs. Disagreements between local residents and federal officials over forest fire suppression policies and logging access has further worried the residents in the Little Salmon River basin.

Commercial logging has occurred in the basin since the railroad lines were built in the early part of the 20th century. The heaviest logging occurred from the 1920s through the 1940s. Nearly all the marketable timber was logged during that period (Kwader 1999).

Several small mills existed in the basin, and Boise Payette Lumber Company (subsequently Boise Cascade) moved to New Meadows in 1940 (New Meadows 1995). The logs or lumber were shipped by rail mainly to Emmett, via Council and Payette, with a smaller volume going to Cascade. In the 1930s, cat skidding and truck hauling became common for moving to the railroad, but most tracks in the basin had been removed by 1946. With most of the easily accessible merchantable timber removed, lumbering was done by individual contractors, who preferred to haul by truck, eliminating the industry's reliance on rail. Harvesting on federal lands today relies increasingly on methods such as cable, skyline, and helicopter. This is not necessarily true on private lands.

The Lower Little Salmon River Biological Assessment analysis area, which included the drainages of the lower Little Salmon River, Rapid River, and Squaw Creek, covers 43,653 acres of Nez Perce National Forest land (Russell and King 1995). Timber harvests were conducted on 2,569 of these acres between 1971-1994. Since 1994, there has been very little logging activity in the Nez Perce National Forest (Paradiso 1999). Between 1994 and 1998, the Payette National Forest conducted sales and logged eight tracts on public lands in the basin, which sold for about \$1.5 million. They are anticipating more sales as noted in Table 8.

The Idaho Department of Lands is responsible for approximately 13,410 acres of mixed timber and rangeland in the basin. About 7,500 of those acres are commercial forests; best described as mixed coniferous forest (Keafer 2001). See Table 9 and Appendix G for more details.

Of Boise Cascade's 48,000 acres in the basin, 45,000 acres are suitable for harvest, and have been logged up to three times (Appendix G). The company still conducts commercial thinning activities in the basin (Kwader 1999). For more information on timber, refer to Appendix G.

4.4.4 Mining

The majority of past mining activity in the Little Salmon River basin was in the Seven Devils Mountains and Hells Canyon National Recreation Area. Historically, surface mines were found sprinkled throughout the Little Salmon River basin (Nichols 2000). There are some talc deposits in the New Meadows area, located on private property, and one known inactive talc mine near the Rapid River. There are copper deposits in the Seven Devils Mountains, and gold was taken out of Rapid River. Rocky Flat, now a housing subdivision near Little Ski Hill in the southeast portion of the basin, was the sight of a placer mining operation. That activity came to a halt by the 1930s (Gillerman 2000).

There is very little current mining activity in the Little Salmon River basin. However, there are several sand and gravel operations near Pollock (Nichols 2000), and there is an active gemstone placer operation on a tributary to Little Goose Creek, located in the southeast portion of the basin (Gillerman 2000).

Mineral potential in the basin is primarily in the Rapid River drainage, but that potential is low relative to the rest of the state. There are a number of patented claims in the Rapid River-Hells Canyon complex. The Seven Devils area's mining potential is limited by the protection associated with its inclusion

Table 8. Payette National Forest timber sales (Source: Alexander 1999 and Demetriades 2001).

Year	Sale Name	Total Volume (mbf) ¹	Total Value (\$)
1994	Brundage Parking Lot Extension	111	50,427
1994	Brundage ROW	116	47,600
1995	Big Doug Salvage	54	4,002
1996	Thorne 21 Salvage	1,543	508,004
1996	The Haz Salvage	4,109	39,659
1996	Twin Duck Salvage	2,125	90,473
1996	Cooked Goose Salvage	547	38,974
1998	Four Mile	4,409	770,000
1999	Brown's Creek	2,400	130,544
2001	Bare Rock (Goose Creek)	7,500	1,125,000
2000	Second Chance (Goose II)	4,600	541,453
2002	Lockwood	10,000	²
2003	Partridge-Kelly LA	5,000	²
2004	Boulder Helicopter	10,000	²
Totals		57,014	3,346,136

¹Million board feet²Not yet determined**Table 9.** Idaho Department of Lands timber sales (Source: McManus 1999).

Year	Acres	Sale Name	Volume (MBF) ¹	Condition
1988	980	Little Mud Creek	3,165	Completed
1994	690	Big Creek	3,125	Completed
1997	274	Hailey Shorts	2,980	Completed
1998	380	Bally Mountain	5,000	Active
1998	520	Pinehurting	2,925	Proposed
2000	240	Indian Mountain	3,235	Completed
2002	640	Tepee Springs	2,500	Proposed
2003	1,150	Rattlesnake Creek	4,000	Proposed
Totals		4,874	26,930	

¹Million board feet

in the Hells Canyon National Recreation Area. There has been some limited diamond and other gemstone exploration in the southeast portion of the basin, near Brundage Mountain (Gillerman 2000).

The entire Little Salmon River basin was closed to recreational dredge mining. All proposals for dredge mining must submit a

joint application for permit to the IDWR and the U.S. Army Corps of Engineers.

Applications will not be reviewed unless the applicant has received an Incidental Take permit or other approval from the National Marine Fisheries Service or the U.S. Fish and Wildlife Service (Idaho Department of Water Resources 2000b).