

CHAPTER III

AFFECTED ENVIRONMENT

INTRODUCTION

This chapter discusses resource values that affect or may be affected by recreation use levels. It also displays social and economic conditions.

The Wild and Scenic Snake River runs north from Hells Canyon Dam to the Washington-Oregon border and forms the northern portion of the boundary between Oregon and Idaho. The proposed action will affect the river and onshore resources within the corridor boundary (reference the LAC report in the analysis file). The corridor is generally about a quarter-mile on each side of the high-water mark.

This chapter consists of the following sections:

- Introduction
- River Description
- Description of Outstandingly Remarkable Values
 - Scenic
 - Recreation
 - Geologic
 - Wildlife
 - Fisheries
 - Historic and Prehistoric Cultural Resources
 - Traditional Use, Cultural
 - Vegetation/Botanical
 - Ecological
- Description of Social and Economic Conditions
 - Social Environment
 - Economic Conditions

RIVER DESCRIPTION

The Act establishing the Hells Canyon NRA, designated 67.5 miles of the Snake River as wild

and scenic, classified into the following segments:

WILD RIVER: The 31.5 miles from Hells Canyon Dam to Pittsburg Landing.

SCENIC RIVER: The 36.0 miles from Pittsburg Landing to the northern boundary of the Wallowa-Whitman National Forest

STUDY RIVER: Four miles of river frontage was added to Forest Service ownership and management with the acquisition of property at Cache Creek and has been included in this analysis.

DESCRIPTION OF THE RECREATION OPPORTUNITY SPECTRUM

The Wild and Scenic Rivers Act provides clear direction that river management plans shall be prepared to provide for the protection of river values for which it was designated. Plans need to address resource protection, development of lands and facilities, user capacities, and other management practices necessary or desirable to achieve the purposes of the Act (Section 3(d)(1)(2)).

FSM 2310.3 directs the use of recreation opportunity spectrum (ROS) to establish planning criteria, generate objectives for recreation, evaluate public issues, integrate management concerns, anticipate recreation needs and demands, and coordinate management objectives. It also says to use the ROS system to develop standards and guidelines for proposed recreation resource use and development.

According to FSM 2354.32 management plans must state the ROS classifications featured and procedures for maintaining the ROS over time. FSM 2354.41 says to use ROS classifications as an aid in determining an adequate mix of recre-

ation opportunities to ensure physical and social capabilities of the river environment are protected.

Regional Office guidance refined the national ROS guidelines to be more useful in the application of river planning and management (reference the analysis file).

ROS is based upon managing for a range of recreation experiences. These experiences range from those found in a primitive setting where the influence of humans is minor to an urban setting where experiences are highly influenced by humans. An analysis of the overall trends for the Snake River since designation in 1975 indicates that human activities have either moved the river away from a more primitive or semi-primitive experience normally associated with a wild and scenic river designation or have fluctuated within a middle range (reference analysis file).

The direction these trends have taken can be directly associated with increased levels of use by both motorized and non-motorized rivercraft as well as different management strategies. In order to protect and enhance ORV's found on the Snake River, the objective of a management strategy using ROS as a guideline would be to

make sure overall trends remain focused toward the primitive, semi-primitive end of the spectrum with attributes that accommodate motorized use.

Using these legislated requirements and national and regional policy, the Forest Service planning team developed ROS characteristics for the Wild and Scenic Snake River corridor, as displayed in Tables III-1 and III-2.

Although recommendations coming out of the LAC planning process were based on an opportunity class that identified physical, social, and managerial conditions, the Forest Service planning team chose to use the ROS characteristics developed under the above referenced guidance. These ROS characteristics provide the basis for standard and guideline development of the action Alternatives C through G displayed in Chapter II. They are to be combined with the DFC's displayed in Chapter I to establish specific goals and objectives for the long-term programmatic and project level management that will occur in the river corridor. These ROS characteristics also provide the basis, as key indicators, by which to evaluate the effectiveness of the action alternatives in resolving the significant issues listed in Chapter I.

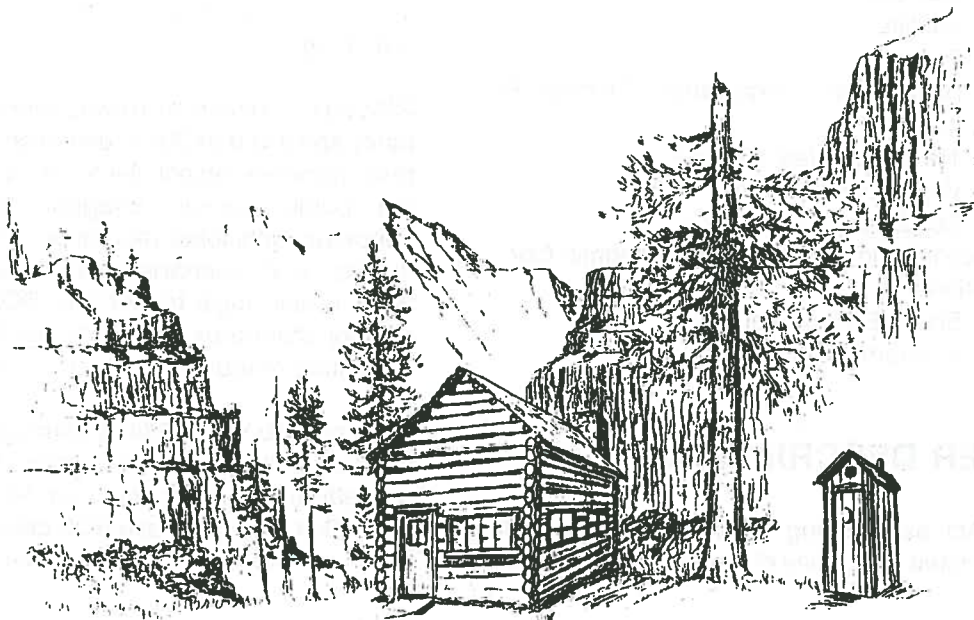


TABLE III-1

RECREATION OPPORTUNITY SPECTRUM CHARACTERISTICS WILD RIVER								
Management Area	Naturalness/Visual Quality	Access	Remoteness	Social Encounters	Visitor Management	Visitor Impact	Facilities	
General Corridor Management Area 8	Largely undisturbed natural environment with little evidence of human development. Manage for preservation visual quality.	Very few access sites developed along the river. Roads are to access points only and do not parallel river. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others. Sense of remoteness.	Few contacts with other users at rapids and access points. Little but some evidence of other users. Small party sizes are managed through limited boats per group. Upland user's may frequent the corridor through established trails.	Self-reliance through application of outdoor skills in an environment that offers a high degree of challenge and risk. No on-site visitor management controls or regulations apparent. On non-motorized trips, visitors participate in navigation of the river and perceive a high degree of challenge and risk.	Natural ecosystems operate freely. Human impact should not be apparent in an area greater than 750 sq. ft. at any campsite. No site hardening, except needed for resource protection. No toilets provided.	No facility development for user comfort. Solid human waste carryout is required. Low impact camping practices are required.	
Hells Canyon Creek Recreation Site Management Area 16	Substantially modified landscape having both manmade and natural features. Evidence of human development is prevalent. Manage for partial retention visual quality.	Developed access is provided with road paralleling a portion of river. Auto use is consistent and may be seen from river. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate evidence of the sights and sounds of others.	Contact with others expected, including frequent interface between river users and shore users.	Challenge and risk are less important. Visitor management controls are visible and expected. Contacts with management personnel are more frequent.	Visitor impacts a major concern. Site hardening may be dominant but in harmony.	Some facility development for protection of the resource and to accommodate visitor comfort. Facilities developed to manage/aid greater number of visitors. Site is developed to provide health/sanitation facilities and recreation convenience. Land based recreation facility development more prevalent.	
Sheep Creek Recreation Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant with moderate evidence of human development. Manage for retention visual quality.	Access is by river or trail only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others. Sense of remoteness.	Little but some evidence of other users. Small party sizes are managed through limited boats per group.	Self-reliance through application of outdoor skills in an environment that offers a moderate degree of challenge and risk. Only a few on-site visitor management controls or regulations are apparent.	Natural ecosystems dominate. Human use obvious but subordinate. Sites may be hardened to accommodate use. Pit toilets are provided.	Minimal facility development primarily for resource protection. Low impact camping practices required.	

TABLE III-1 (cont.)

RECREATION OPPORTUNITY SPECTRUM CHARACTERISTICS WILD RIVER								
Management Area	Naturalness/Visual Quality	Access	Remoteness	Social Encounters	Visitor Management	Visitor Impact	Facilities	
Sand Creek Ranch Headquarters Administrative Site Management Area 16	Largely undisturbed natural environment with little evidence of human development. Manage for preservation visual quality.	Access is by river or trail only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others. Sense of remoteness.	Little but some evidence of other users. Small party sizes are managed through limited boats per group.	Self-reliance through application of outdoor skills in an environment that offers a moderate degree of challenge and risk. No on-site visitor management controls or regulations apparent.	Natural ecosystems operate freely. Human impact should not be apparent in an area greater than 750 sq. ft. at any campsite. No site hardening. No toilets provided.	Minimal facility development primarily for resource protection. Solid human waste carryout required. Low impact camping practices required.	
Temperance Creek Ranch Headquarters Administrative Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant with evidence of human development. Manage for retention visual quality as seen from the river corridor.	Access is by river, trail, aircraft (Big Bar strip) only. Valid motorized and non-motorized watercraft are consistent with management objectives in support of grazing operations.	Low expectation of solitude with moderate evidence of the sights and sounds of others.	Little but some evidence of other recreation users.	Only a few subtle on-site visitor management controls or regulations apparent.	Human use obvious. Sites may be hardened as a result of motorized use. Toilets are provided to accommodate ranching operations only.	Facilities developed for protection of resource and to accommodate ranching operations.	
Salt Creek Administrative Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant with moderate evidence of human development. Manage for retention visual quality.	Access is by river or trail only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others. Sense of remoteness.	Little but some evidence of other users. Small party sizes are managed through limited boats per group.	Self-reliance through application of outdoor skills in an environment that offers a moderate degree of challenge and risk. Only a few on-site visitor management controls or regulations are apparent.	Natural ecosystems dominate. Human use obvious but subordinate. Sites may be hardened to accommodate use. Pit toilets are provided.	Minimal facility development primarily for resource protection. Low impact camping practices required.	
Kirkwood Historic Ranch Recreation Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant with moderate evidence of human development. Manage for retention visual quality.	Access is by river, trail, or Kirkwood road. Kirkwood road is an access point only and does not parallel river. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others.	Moderate use occurs. Contact with others is expected and occasionally continual, some chance of isolation.	Opportunities for challenge in a natural environment but less expectation of risk. A few on-site visitor controls or regulations may be expected. Contacts with management personnel are more frequent.	Natural ecosystems dominate. Human use obvious but subordinate. Sites may be hardened to accommodate use. Toilets are provided.	Rustic facilities developed for protection of the resource and to accommodate visitor use.	

TABLE III-1 (cont.)

RECREATION OPPORTUNITY SPECTRUM CHARACTERISTICS WILD RIVER							
Management Area	Naturalness/Visual Quality	Access	Remoteness	Social Encounters	Visitor Management	Visitor Impact	Facilities
Historic Structures Management Area 8	Alterations to the landscape are subtle. Natural characteristics remain dominant with moderate evidence of human development. Manage for retention visual quality.	Access is by river or trail only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others. Sense of remoteness.	Little but some evidence of other users. Small party sizes are managed through limited boats per group.	Self-reliance through application of outdoor skills in an environment that offers a moderate degree of challenge and risk. Only a few on-site visitor management controls or regulations are apparent.	Natural ecosystems dominate. Human use obvious but subordinate. Sites may be hardened to accommodate use. No toilets provided.	Minimal facility development primarily for resource protection. Solid human waste carryout required. Low impact camping practices required.
Scientific Monitoring Stations	Largely undisturbed natural environment with little evidence of human development. Manage for preservation visual quality.	Very few sites developed along the river unless it is accessible by existing road. Valid motorized and non-motorized watercraft are consistent with management objectives.	Sense of remoteness on-site unless located in administrative or developed recreation site.	Few contacts with other users at rapids and access points. Little but some evidence of other users.	Only a few subtle on-site visitor management controls or regulations are apparent.	Natural ecosystems operate freely. Human impact should not be apparent in an area greater than 750 sq. ft. at any campsite. No site hardening. No toilets provided.	Minimum facility development necessary for collection of scientific data.
Private Lands	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.

TABLE III-2

RECREATION OPPORTUNITY SPECTRUM CHARACTERISTICS SCENIC RIVER

Management Area	Naturalness/Visual Quality	Access	Remoteness	Social Encounters	Visitor Management	Visitor Impact	Facilities
General Corridor Management Area 8	Largely undisturbed natural environment with limited evidence of human development. Manage for retention visual quality.	Very few access sites developed along the river. Roads are to access points only and do not parallel river. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others. Sense of remoteness.	Some contacts with other users at rapids and access points. Some evidence of other users. Small party sizes are managed through limited boats per group. Upland users may frequent the corridor through established trails.	Self-reliance through application of outdoor skills in an environment that offers a moderate degree of challenge and risk. Only a few subtle on-site visitor management controls or regulations are apparent. Outfitter and guides are often used but customers experience a moderate degree of challenge and risk.	Natural ecosystems dominate. Human use obvious but subordinate. Sites may be hardened to accommodate use. No toilets provided.	Minimal facility development primarily for resource protection. Solid human waste carryout is required.
Pittsburg Landing Recreation Site Management Area 16	Substantially modified landscape having both manmade and natural features. Evidence of human development is prevalent. Manage for partial retention visual quality.	Developed access is provided with road paralleling a portion of river. Auto use is consistent and may be seen from river. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate evidence of the sights and sounds of others.	Moderate use occurs. Contact with others is expected and occasionally continual. Some chance for isolation.	Opportunities for challenge in a natural environment but less expectation of risk. A few on-site visitor management controls or regulations may be expected. Contacts with management personnel are more frequent.	Visitor impacts a major concern. Site hardening may be dominant but in harmony. Toilets are provided.	Some facility development for protection of the resource and to accommodate visitor comfort. Facilities developed to manage/aid greater number of visitors. Site is developed to provide health/sanitation facilities and recreation convenience. Land based recreation facility development more prevalent.
Pittsburg Administrative Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant. Moderate evidence of human development. Manage for partial retention visual quality.	Access is by river, trail, or aircraft only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others.	Few contacts with other users. Little but some evidence of other users.	Only a few subtle on-site visitor management controls or regulations are apparent. Contacts with management personnel are more frequent.	Human use obvious but subordinate. Site modified and subtle site hardening provided to minimize impacts and to provide for user convenience. Toilets are provided.	Minimal facility development primarily for resource protection.

TABLE III-2 (cont.)

RECREATION OPPORTUNITY SPECTRUM CHARACTERISTICS SCENIC RIVER							
Management Area	Naturalness/Visual Quality	Access	Remoteness	Social Encounters	Visitor Management	Visitor Impact	Facilities
Tryon Creek Administrative Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant. Moderate evidence of human development. Manage for retention visual quality.	Access by river or trail only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others.	Few contacts with other users. Little but some evidence of other users. Small party sizes managed through limited boats per group.	Self-reliance through application of outdoor skills in an environment that offers a moderate degree of challenge and risk. Only a few subtle on-site visitor management controls or regulations are apparent.	Natural ecosystems dominate. Human use obvious but subordinate. Sites may be hardened to accommodate use. No toilets provided.	Minimal facility development primarily for resource protection.
Copper Creek Recreation Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant. Moderate evidence of human development. Manage for partial retention visual quality.	Access is by river or trail only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others.	Moderate use occurs. Contact with others is expected and occasionally continual. Some chance of isolation.	Opportunities for challenge in a natural environment but less expectation of risk. A few on-site visitor management controls or regulations may be expected. Outfitter and guides are often used but customers experience a moderate degree of challenge and risk.	Natural ecosystems dominate. Human use obvious but subordinate. Sites may be hardened to accommodate motorized use and user convenience. Toilets are provided.	Some facility development for protection of the resource and to accommodate visitor comfort. Facilities developed to manage/aid greater number of visitors. Site is developed to provide health/sanitation facilities and recreation convenience.
Dug Bar Recreation Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant. Moderate evidence of human development. Manage for partial retention visual quality.	Access is by road, river, trail, or aircraft only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others.	Moderate use occurs. Contact with others is expected and occasionally continual. Some chance for isolation.	Opportunities for challenge in a natural environment but less expectation of risk. A few on-site visitor management controls or regulations may be expected. Contacts with management personnel are more frequent.	Human use apparent. Site modified and subtle site hardening provided to minimize impacts and to provide for user convenience. Toilets are provided.	Rustic facilities developed for protection of resource and to accommodate visitor use at portal, trailheads, and administrative facilities.

TABLE III-2 (cont.)

RECREATION OPPORTUNITY SPECTRUM CHARACTERISTICS SCENIC RIVER							
Management Area	Naturalness/Visual Quality	Access	Remoteness	Social Encounters	Visitor Management	Visitor Impact	Facilities
Cache Creek Recreation Site Management Area 16	Alterations to the landscape are subtle. Natural characteristics remain dominant. Moderate evidence of human development. Manage for partial retention visual quality.	Access is by river, trail, or aircraft only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others.	Moderate use occurs. Contact with others is expected and occasionally continual. Some chance for isolation.	Opportunities for challenge in a natural environment but less expectation of risk. A few on-site visitor management controls or regulations may be expected. Contacts with management personnel are more frequent.	Human use apparent. Site modified and subtle site hardening provided to minimize impacts, to provide for user convenience, and accommodate limited motorized use. Toilets are provided.	Rustic facilities developed for protection of the resource and to accommodate visitor use.
Historic Structures Management Area 8	Alterations to the landscape are subtle. Natural characteristics remain dominant. Moderate evidence of human development. Manage for retention visual quality.	Access by river or trail only. Valid motorized and non-motorized watercraft are consistent with management objectives.	Moderate expectation of solitude and some expectation of experiencing isolation from the sights and sounds of others.	Few contacts with other users. Little but some evidence of other users. Small party sizes managed through limited boats per group.	Self-reliance through application of outdoor skills in an environment that offers a moderate degree of challenge and risk. Only a few subtle on-site visitor management controls or regulations are apparent.	Natural ecosystems dominate. Human use obvious but subordinate. Sites may be hardened to accommodate use. No toilets provided.	Minimal facility development primarily for resource protection.
Scientific Monitoring Stations	Largely undisturbed natural environment with little evidence of human development. Manage for retention visual quality.	Very few sites developed along the river unless it is accessible by existing road. Valid motorized and non-motorized watercraft are consistent with management objectives.	Sense of remoteness on-site unless located in administrative or developed recreation site.	Few contacts with other users at rapids and access points. Little but some evidence of other users.	Only a few subtle on-site visitor management controls or regulations apparent.	Natural ecosystems operate freely. Human impact should not be apparent in an area greater than 750 sq. ft. at any campsite. No site hardening. No toilets provided.	Minimum facility development necessary for collection of scientific data.
Private Lands	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.	Manage pursuant to private land use regulations 36 CFR 292 Subpart E.

DESCRIPTION OF OUTSTANDINGLY REMARKABLE VALUES

Because the Snake River was never designated a "study" river, outstandingly remarkable values were not previously identified. It is appropriate to identify them in this document as a means of describing the environment to be affected by various levels of recreation use on the river, and to use them to develop desired future conditions.

The Forest Service planning team has determined the following values of the Snake River to be outstandingly remarkable: scenic, recreational, geologic, wildlife, fisheries, cultural resources (both historic and prehistoric), vegetation/botanical, and ecological. Other values considered are derived from social and economic environments.

Although the determination of value significance is a matter of informed professional judgment and interpretation, this process includes the following steps or verification techniques:

- The use of resource specialists working as an interdisciplinary team;
- Consideration of uniqueness and rarity at a regional and national level;
- Values must be river-related, owing their existence or contributing to the functioning of the river system and its environs;
- The use of qualitative guidelines to help determine significance;
- Verification by other experts in the subject area.

SCENIC

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING

The landscape elements of landform, vegetation, water, color, and related factors result in notable or exemplary visual features and/or attractions within the geographic region. When analyzing scenic values, additional factors such as seasonal variations in vegetation, scale of cultural modifications, and the length of time

negative intrusions are viewed may be considered. Scenery and visual attractions may be highly diverse over the majority of the river or river segment length and not common to other rivers in the geographic region.

EVALUATION OF THE PRESENT SITUATION

The Snake River is one of the largest rivers in the western United States and has long been a major focus of water recreation in the country. Thousands of recreationists come to view this wonderland of diverse landscapes--some from the top of Hells Canyon, and some from the river, to look into its massive ruggedness and the beauty of its expanse.

Where the Snake River runs through Hells Canyon it has carved the deepest river canyon in North America. Steep canyon walls rise from the rushing river. Layers of rock created by the Columbia River basalt flows form the canyon walls. Several small sandy beaches add variety to the rocky shorelines. Small grass- and pine-covered benches appear in the narrow part of the gorge. As the canyon widens, larger benches lie below the steep, upper canyon walls. Ponderosa pine trees grow at mid-elevation providing stringers of texture to thousands of grassy acres. The vast differences in elevation create a tremendous diversity of vegetation and provide habitat for many species of wildlife. Remains of several historic structures and many prehistoric sites also exist in the canyon.

Another attribute of this ORV is related to the natural sounds produced by the river. The size and force of the waterway makes this a value not to be intruded upon. Large volumes of rushing water tumbling over huge boulders, through rapids and along slow stretches create a strong attraction for people.

FINDING

The Wild and Scenic Snake River is recognized nationally for its scenic qualities. The corridor is within a national recreation area and its boundaries are adjacent to designated wilderness on portions of both sides. Grass-shrub and cactus-covered benches with rugged mountains rising

behind them, spectacular rock formations, and the river itself create a beautiful landscape. Great contrasts of landform, vegetation, color, climate, and sound are found. Scenery within view of the Wild and Scenic Snake River is an outstandingly remarkable value.

RECREATION

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING

Recreational opportunities are, or have the potential to be, unique enough to attract visitors from outside of the geographic region. Visitors would be willing to travel long distances to use the river resources for recreational purposes. River-related opportunities could include, but may not be limited to, sightseeing, wildlife observation, photography, hiking, fishing, hunting, and boating.

Interpretive opportunities may be exceptional and attract, or have the potential to attract, visitors from outside the geographic region.

The river may provide, or have the potential to provide, settings for national or regional usage or competitive events.

EVALUATION OF THE PRESENT SITUATION

The Wild and Scenic Snake River offers a blend of motorized and non-motorized boating in a setting that is unique in North America. Recreationists can pursue a variety of activities in a backcountry river environment. Unlike most rivers in a backcountry setting, the Snake River is accessed by different types of watercraft and provides a variety of whitewater challenges. It allows visitors to gain an appreciation and understanding of other users from diverse social backgrounds and with various recreational interests. Recreationists commonly use the river for both motorized and non-motorized recreation during the same river trip.

Class I to V rapids provide a variety of challenges for novice to expert boaters based on their skill level and the type of watercraft (power-

boats, rafts, kayaks, canoes, and dories) used to travel through the canyon. Running world class rapids can be combined with traveling through placid, quiet stretches of river on the same trip. The scenic beauty of the canyon and the challenge and risk associated with whitewater boating attract powerboaters and floatboaters to the river.

The quality of whitewater floating in the canyon surpasses all other similar experiences in the Pacific Northwest. The major class IV and V rapids of the upper canyon provide the largest volume rapids in the western United States outside of the Grand Canyon of the Colorado River. Floatboaters can run a variety of trip lengths, usually one to six days in duration. Down river from Pittsburg Landing, the rapids become less technical and provide an excellent opportunity for less-experienced floatboaters and families with small children to float through a major river canyon. Floatboaters continuing down the Snake River from the Lower Salmon River travel through the two deepest river canyons in North America on a single trip. Many floatboaters take advantage of being able to use motors on the Snake River to assist them in traveling through the quieter stretches of the river where commonly occurring upstream winds make downstream float travel more physically challenging. Recreational demand for a float trip on the Snake River is high. A lottery guarantees fair and equitable opportunities for private floatboaters. Private and commercial demand is regional, national, and international in scope.

This is the premier whitewater powerboating river in the United States and is one of the few areas available for powerboaters to travel in a backcountry setting through major rapids (See Appendix H). Due to its size, volume, and characteristics, the river provides excellent opportunities for new boaters to learn whitewater boating skills and to increase the degree of challenge as they improve these skills and navigate more difficult sections of the river. Powerboaters can also experience backcountry overnight camping. The river creates a unique teaching environment for developing low impact/no trace camping ethics among the recreationists. Unlike other major whitewater rivers

in the northern and western United States, the river provides a year-round powerboating experience and remains generally free of ice during the winter.

The Snake River provides habitat for a diverse and productive mix of warm and cold water fish species. White sturgeon, steelhead, rainbow trout, and small mouth bass allow year-round fishing on a seasonal basis. The catch-and-release policy established for sturgeon emphasizes the importance of maintaining this species for its intrinsic value and sport fishing. Many regional newspaper and magazine articles focus on fishing in the Snake River. A thriving outfitter industry specializes in the fall steelhead fishing season. They also emphasize the abundant variety and size of species available for year-round fishing. Fishing is especially valued by powerboaters, and if the fishing is poor, powerboat use drops proportionately.

Trail users come to the river during the spring and fall seasons because of the favorable canyon/river climate. Steep, narrow trails wind through spectacular scenery accented by the river in a backcountry setting. The corridor also provides access to the adjacent wilderness with its great variety of challenges and experiences.

The designation of the Snake River Trail from Pittsburg Landing to Granite Creek as a national recreation trail indicates the high quality of the experience for trail users. Backpacking and horsepacking within the river corridor provide a wonderful backcountry experience in a remote river location set amidst incredible scenery with outstanding wildlife viewing opportunities. Regional newspaper and magazine articles regularly feature the early springtime trail use.

A variety of interpretive themes exist in the corridor. Large concentrations of prehistoric sites and a colorful history of exploration, mining, and settlement combine to create numerous national historic sites as well as a national historic district.

Herds of deer and elk, a year-round population of Canadian geese, wintering bald eagles, black bears, mountain goats, and many other

mammals and birds create memorable viewing experiences for wildlife watchers. Bighorn sheep can easily be viewed from a number of river locations. Visitors, including the physically-challenged, can travel by boat to view wild flowers, wildlife, and prehistoric sites.

Although big game hunting takes place on the uplands and benches above the river, hunting was not found to be an outstandingly remarkable value within the confines of the corridor. The corridor provides a unique experience for big game and chukar hunters when access to the area is by boat.

Access to the corridor by motor vehicle occurs at the major portals, i.e., Hells Canyon Dam, Pittsburg Landing, Dug Bar. The road in to Kirkwood Historic Ranch is open to those who care to face the challenge. There are roads in to the Cache Creek Administrative Site and Jim Creek, but they are currently closed to public use. Other access opportunities are by aircraft at the backcountry airstrips (Big Bar, Pittsburg Landing, Dug Bar, Salmon Creek), trails, and motorized and non-motorized river craft.

FINDING

Designation as a national recreation area, and as a wild and scenic river, signifies the national importance of recreation values in the corridor. The wide range of available recreation activities, the unique backcountry river setting, and the diversity of users combine to make recreation an outstandingly remarkable value.

GEOLOGIC

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING

The river, or the area within the river corridor, contains an example(s) of a geologic feature, process, or phenomena that is rare, unusual, one-of-a-kind, or unique to the geographic region. The feature(s) may be in an unusually active stage of development, represent a "text-book" example and/or represent a unique or rare combination of geologic features (erosion-

al, volcanic, glacial, and other geologic structures).

EVALUATION OF THE PRESENT SITUATION

From the river to the rim, Hells Canyon provides a geological cross section of over 300 million years of earth history. The canyon walls portray a complex geological history which until very recently was somewhat of a mystery to earth scientists.

This history includes how chains of volcanic islands and blocks of sea floor crust and sediments, originating far out in the Pacific Ocean, were added to the westward moving North American Continental Plate. Some of these blocks were welded to the western edge of the continental plate while others were forced beneath the plate. The dynamics of plate tectonics formed these exotic blocks or terranes into a layered mosaic of rocks as they successively docked against the old continental plate boundary along what is now western Idaho near Rig-gins.

The canyon bottom bears evidence of more recent geological events of a catastrophic nature. These include the Bonneville floods and the eruption of Mount Mazama. The Bonneville floods occurred about 15,000 years ago when water from Lake Bonneville (ancestral Salt Lake) spilled over at American Falls and into the Snake River. This spectacular event increased the volume of the river at least 1,000 times greater than the present spring runoff. This huge outflow of water widened the canyon and left behind massive sand and gravel terraces, such as those at Big Bar and Pittsburg Landing. Some of these terraces are 400 feet above the present flood plain.

Light-colored ash layers from Mount Mazama (Crater Lake) can be seen along the river. This eruption occurred about 6,900 years ago and covered much of the northwest with easily recognized ash layers which conveniently marks time for both geologists and archaeologists.

FINDING

The geological research potential of the river corridor and adjacent canyon walls is significant. The canyon has been the source of numerous graduate research projects, both completed and ongoing. Based on these factors, the geology is an outstandingly remarkable value.

WILDLIFE

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING

Wildlife values may be judged on the relative merits of either wildlife populations, habitat, or Native American cultural use - or a combination of these conditions.

Populations. The river or area within the river corridor contains nationally or regionally important populations of indigenous wildlife species. Of particular significance are species considered to be unique or populations of federal or state listed or candidate threatened, endangered, and sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.

Habitat. The river or area within the river corridor provides exceptionally high quality habitat for wildlife of national or regional significance, or may provide unique habitat or a critical link in habitat conditions for federal or state listed and candidate threatened, endangered, and sensitive species. Contiguous habitat conditions are such that the biological needs of the species are met. Diversity of habitats is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.

EVALUATION OF THE PAST SITUATION

Populations. Archeological surveys along the Snake River in Hells Canyon identified 33 wildlife species associated with late-Holocene Native American camps and houses (Reid et al. 1991). Species not previously recorded include

the Great Basin pocket mouse and fisher. Also of interest is the recording of gray wolf and red fox from this region. Chalfant (1974) reported the principal game species of the Nez Perce Indians was the deer. The most abundant wintering grounds were the Snake River Valley and its tributary canyons. Deer would be driven into the box canyons to be hunted. Elk, black and grizzly bear, mountain sheep, fish, and waterfowl were other principal game species locally hunted.

EVALUATION OF THE PRESENT SITUATION

Populations. The area designated as Hells Canyon NRA supports approximately 360 wildlife species. The Wild and Scenic river corridor supports many of these wildlife species, some of which are regionally or nationally important. A variety of passerines, such as swallows, buntings, and waxwings; elk, deer, black bears, cougar, golden eagles and other raptors, otters, rattlesnakes, chukar and gray partridges are common in the corridor. A population of cliff nesting Canadian geese are present year round. Cliff nesting is rare and is seen in few areas.

Rocky Mountain big horn sheep have been re-established in the Snake River Canyon. A herd of approximately 75 animals range from Hells Canyon Dam to the Washington border. One herd that ranges above Cherry Creek provides especially popular viewing for recreationists on the river. Mountain goats are also present and can be viewed while within the designated wild section.

Federally Listed or Candidates for Listing. A number of less common species found within the corridor are state, Forest Service, or federally listed as endangered, threatened, sensitive or rare.

The vulnerable tailed frog is likely to be found within the cold, fast flowing tributary streams of the Snake River (Nussbaum et al. 1983). Surveys for this species are ongoing. Estimates of populations are not available.

The Snake River is a spring/fall migration corridor for many species of waterfowl. During migration periods, sensitive species such as the common loon, long-billed curlew, or black tern can be seen as individuals or in small numbers (Stephens and Sturts 1991).

Thirty-one birds of prey inhabit the Wallowa-Snake Province and migration or juvenile dispersal may bring individuals of these species into the corridor. Eighteen species can be found during the breeding season or wintering in the corridor. The endangered peregrine falcon nested in the cliffs and bluffs above the Snake River prior to 1950. Since 1987 the Peregrine Fund, Idaho Fish and Game, Oregon Department of Fish and Wildlife, and the USDA Forest Service have cooperated to successfully release 62 young peregrine falcons in the canyon. Although observations have been limited, individuals or pairs have been sighted from the river. The threatened bald eagle winters along the river and can be seen foraging and roosting during the winter months. Estimates of populations within the corridor range from 59 to 138 birds depending on the month, weather, and year (Issacs et al. 1992). The sensitive northern pygmy owl resides year-round on the river. Little is known about this species and population estimates have not been published.

Four species of sensitive woodpeckers can be found in the coniferous stands within the corridor, pileated, Lewis', whiteheaded, and three-toed. Throughout their range, pileated and Lewis' woodpecker populations are declining due to fire suppression, competition, and decreased numbers of large trees. The presence of large trees within the corridor and adjacent wilderness provides habitat for these woodpeckers and the secondary cavity nesters that rely on their excavations. The vulnerable western bluebird is one secondary cavity nester found within the corridor. Sensitive passerines that use the corridor as a migration route include pygmy nuthatches and loggerheaded shrikes. Breeding habitat is present for the sensitive yellow-billed cuckoo though nesting has not yet been confirmed. The sensitive mountain quail is seen within tributary stream riparian areas. Population surveys have not been con-

ducted for this species within the Snake River canyon.

Hibernaculum and maternity colonies of Townsend's big-eared bats are present in the corridor. Monitoring indicates there are an estimated 250-350 big-eared bats in the corridor (Perkins and Schommer 1993). Suitable habitat for the pallid bat exists in ponderosa pine ecotypes (Verts and Carroway 1984) but this species has not been found in the corridor to date.

Historically, gray wolves, grizzly bears, fishers, and lynx inhabited the canyon (Reid et al. 1991). Wolverines have been sighted on both the Oregon and Idaho side of the river (ONHDB). Recent unconfirmed sightings of grizzlies and wolves have been reported from above the Snake River corridor.

Habitat. The area within the Wild and Scenic corridor includes a number of habitat types. They range from rock bluffs and talus slopes, to bunchgrass communities and fingers of Douglas-fir and ponderosa pine that reach down from the canyon rim. Riparian vegetation, including hackberry and other deciduous trees is found in draw bottoms and along stream channels (McKern 1976). Many species of birds use these areas for nesting and feeding. The riparian vegetation provides excellent cover for virtually all wildlife species and is used disproportionately more than any other type of habitat by wildlife (Thomas et al 1979).

Bunchgrass plant communities are no longer present on the bars and benches since the settlement of the Snake River corridor by Euro-Americans. Livestock grazing and farming have resulted in the introduction of non-native grasses, forbs, shrubs and trees. To a lesser extent, fire suppression has altered the vegetation patterns in the corridor. Developed mine shafts have increased the roosting habitat for Townsend's big-eared bats. Human recreation alters habitat in some areas of the corridor. The ruggedness of the steep slopes provides buffers and isolates wildlife from some human activity.

FINDING

The number and diversity of wildlife species that inhabit the wild and scenic corridor of the Snake River establishes its importance as wildlife habitat. The area incorporates significant migration, wintering, and year-round habitat for numerous wildlife species and provides opportunities for human interactions with these creatures. Wildlife and wildlife habitat are outstandingly remarkable values of the Snake River Wild and Scenic corridor.

FISHERIES

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING

Fish values may be judged on the relative merits of either fish populations, habitat, or Native American cultural use - or a combination of these river-related conditions. Consideration shall be given for potential as well as existing values.

Populations. The river is internationally, nationally, or regionally an important producer of resident and/or anadromous fish species. Of particular significance is the presence of wild stocks and/or federal or state listed threatened, endangered, and sensitive species. Diversity of species is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.

Habitat. The river provides or has the potential to provide exceptionally high quality habitat for fish species indigenous to the region. Of particular significance is habitat for wild stocks and/or federal or state listed or candidate threatened, endangered, and sensitive species. Diversity of habitats is an important consideration and could, in itself, lead to a determination of outstandingly remarkable.

EVALUATION OF THE PRESENT SITUATION

Populations. The Snake River supports populations of fish species that are regionally and nationally important. Anadromous fish include

Snake River spring, summer, and fall chinook salmon which are federally listed as threatened, sockeye salmon which are federally listed as endangered, and summer steelhead trout which are listed as sensitive on the Forest Service Pacific Northwest Region sensitive species list. Healthy populations of white sturgeon, which are no longer considered anadromous above Bonneville Dam, exist within the Snake River corridor as separate populations between dams. The Pacific lamprey, a lesser known species is a native anadromous fish with declining populations. Little attention has been directed to the management or research on Snake River stocks. The American shad is an introduced, non-native anadromous fish which has spread rapidly along the Pacific coast. This species is currently establishing a sharply increasing breeding population above Lower Granite Dam within the Snake River system. Reservoirs provide ideal spawning and rearing habitat for shad, and it is likely that current population trends will continue into the foreseeable future.

A conservative estimate of total chinook produced from the Snake River basin prior to 1850, based on the amount of habitat available, was 1.4 million fish (Northwest Power Planning Council, 1986; Corps, 1992a). By the mid-1900s, the historic abundance of Snake River spring and summer chinook had been reduced by 95%. In the past 30 to 40 years the abundance decreased another tenfold. Current populations are 0.5 percent of historic levels (Matthews and Waples, 1991; Corps, 1992a).

Historic fall chinook runs for the Snake River are not known, but were probably a large part of the total chinook run. Estimated average escapement went from 72,000 fish in the years 1938-1949, down to 29,000 fish during the 1950's (Waples et al, 1991; Corps, 1992b). By 1964 to 1968, average counts over Ice Harbor Dam were 13,000 fish. Escapement ranged from 200-400 fish from 1983 to 1989, with a sharp decline to 78 fish in 1990 (Waples et al. 1991; Corps, 1992b).

The historic run size of sockeye salmon from the Snake River was estimated to be 150,000 fish (NPCC, 1986; Corps, 1992b). Sockeye salmon

migrate through the lower Snake River corridor to the mouth of the Salmon River and then move up the Salmon. Much of the original rearing and spawning habitat is inaccessible and potential production has been greatly reduced. The only remaining spawning and rearing area for Snake River sockeye is Redfish Lake, located at the headwaters of the Salmon River in the Stanley Basin, Idaho. Potential production of Redfish Lake has been estimated at 1,500 spawning adults (Chapman et al., 1991; Corps 1991a). The actual returns of sockeye destined for Redfish Lake have been less than 1,000 fish since 1970 and less than 100 since 1981 (Chapman et al, 1991; Corps, 1991a). Escapement averaged less than 20 fish from 1985 to 1988. Only two fish returned in 1989 and none in 1990. In 1991 four sockeye returned to Redfish Lake.

Summer steelhead are also an important anadromous fish species in the Snake River system. Escapement numbers are unknown prior to the construction of the four lower Snake River dams. The total escapement (native and hatchery) is currently estimated at 114,800. Under present hatchery plans, native stock are expected to be used for hatchery supplementation programs. This plan recommends maintaining stock integrity of native fish as much as possible (Herrig, D., 1991).

The Pacific lamprey, a lesser understood anadromous fish species once ranged widely throughout the Columbia/Snake River system. These fish have played an important ecological role in these rivers, although their populations are believed to be in a state of significant decline. Lamprey have also played a significant role in Native American cultures, as the migrating adults were, and to some extent remain an important food source. Lamprey were also used for trade, ceremonial and medicinal purposes. Construction of dams, degradation of water quality and spawning and rearing habitat within the mainstem and tributary streams has led to the decline of their numbers (Broderick, 1993).

White sturgeon, the largest of the anadromous fish in the western Pacific, exist in healthy numbers. This slow-growing species is restricted by the upper and lower dams and generally no

longer migrates above Bonneville Dam (Corps, 1991b). Historic over-fishing by commercial and sport fishermen has led to regulations allowing only a catch and release fishery. The current population is stable.

Other dominant native species include bull trout, northern squawfish, redbside shiner, mountain whitefish, chiselmouth, bridgelip sucker, and largescale sucker, as well as channel catfish and small mouth bass.

Three species of molluscs have been reported in the Snake River. The California floater is a candidate for listing under the Endangered Species Act. The species is a freshwater mussel found in the middle Snake River. The short face lanx and the Columbia pebblesnail are also candidates for listing under the Endangered Species Act (Neitzel and Frest, 1990; Corps, 1992b).

Habitat. The riverine habitat and flows of the Snake River are controlled by Hells Canyon Dam and have changed significantly since settlement. The dam does not provide for fish passage and is a barrier to upstream and downstream migration of fish.

The water quality of the Wild and Scenic Snake River is considered poor, primarily because of irrigation and grazing area nonpoint sources above Hells Canyon Dam. Water is characterized by high loading of nutrients, suspended sediment, and bacteria. Water temperatures are elevated. It is likely that organic residuals from pesticides and herbicides are present. Water quality improves downstream of the confluence with the Salmon River.

The Snake River is an important migration corridor, providing access to several high quality tributaries used by salmon and steelhead, despite the poor quality of the main stem of the river. There are five major spawning and rearing tributaries to the Snake: the Clearwater, Grande Ronde, Salmon, Tucannon, and Imnaha rivers.

Adult spring and summer chinook salmon migrate through the Snake River corridor to the streams where they were hatched, then hold in

deep pools until they spawn in August and September (Chapman et al, 1991; Corps, 1992b). Spring and summer chinook are not known to spawn in the reservoir area of the river.

The current known spawning range of the Snake River fall chinook is limited to approximately 103 miles of the Snake River's main stem (from Hells Canyon Dam to the Lower Granite reservoir) and the lower reaches of its major tributaries including the Imnaha, Grande Ronde, Clearwater, and Tucannon rivers. Some deep-water spawning may occur below the tail-race of the lower Snake River dams (Waples et al, 1991; Corps, 1992a).

A majority of migrating adult sockeye salmon pass through the Snake River corridor to the Salmon River to spawn in Redfish Lake in October (Chapman et al, 1991; Corps, 1992a). Juveniles rear in the lake one to two years before migrating seaward through the Salmon and Snake rivers.

White sturgeon reside in the deep pools with sandy bottoms (Nigro, 1990; Corps, 1992b) and complete their life cycle without migrating to the sea. Juveniles rear in calm water after settling to the deep bottoms as a larval form.

The molluscs previously mentioned, typically prefer relatively unpolluted, cold, and well-oxygenated rivers that have permanent flow and a cobble-boulder substrate (Neitzel and Frest, 1990). Although these conditions are not "typical" throughout the middle reach of the river, these molluscs have been found within the Hells Canyon section of the Snake River.

FINDING

The Snake River supports several stocks of anadromous fish, including spring, summer, and fall chinook salmon, sockeye salmon, and summer steelhead trout, as well as several other resident species of native fish. Spring, summer, and fall chinook are federally listed as threatened, sockeye salmon are federally listed as endangered, and steelhead trout are listed as sensitive on the Forest Service Pacific Northwest Region sensitive species list. The white

sturgeon, a fascinating and unique species, is a resident of the Snake River corridor and has been proposed for protective listing.

These diverse fish stocks are important internationally, nationally, and regionally for their sport fishing, commercial, historic values, and contribution to the river ecology. The Snake River anadromous fisheries are important as producers for high seas commercial fish harvest. Nationally and regionally the Snake River is known for its abundant, unique, and diverse sport fishery.

The protection of the diverse Snake River aquatic resources is important to the continued existence of these important species. Fisheries is an outstandingly remarkable value of the Wild and Scenic Snake River.

HISTORIC AND PREHISTORIC CULTURAL RESOURCES

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING (Historic)

The river or area within the river corridor contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare, unusual or one-of-a-kind in the region. A historic site(s) and/or feature(s) in most cases is 50 years old or older. Of particular significance are sites or features listed in, or are eligible for inclusion in, the National Register of Historic Places.

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING (Prehistoric)

The river or area within the river corridor contains a site(s) where there is evidence of occupation or use by Native Americans. Sites must be rare, one-of-a-kind, have unusual characteristics or exceptional human interest value(s). Sites may have national or regional importance for interpreting prehistory; may be rare and represent an area where a culture or cultural period was first identified and described; may have been used concurrently by two or more cultural groups; or may have been used by cultural

groups for rare or sacred purposes. Of particular significance are sites or features listed or eligible for inclusion in the National Register of Historic Places.

EVALUATION OF THE PRESENT SITUATION

In the preamble of the HCNRA Act (PL 94-199), archaeological and historical cultural resources are afforded premier standing within the structure of the legislation. The wild and scenic river corridor contains one of the richest accumulations of riverine archaeological resources in western North America. This is largely because of the canyon's extreme isolation and the fact that the HCNRA was spared further hydroelectric development.

To date, 711 prehistoric sites and 152 historic sites have been recorded within the canyon (USDA, Forest Service, Cultural Resource Inventory, 1977-1978; Leen, 1990 and 1991). In 1983, a National Register district was established within Hells Canyon. The National Register of Historic Places lists 550 prehistoric and 152 historic sites within the corridor (Torgeson, 1982). The district boundaries correspond to those of the wild and scenic river corridor. The Hells Canyon Archaeological District is one of the largest districts in the National Forest System.

Prehistoric site types represented include 144 pithouse village sites, 368 rock shelters and 199 rock art sites. Historic site types include the remnants of subsistence homesteads, mining sites, shipwrecks, and steamboat landings.

The archaeological research potential of the river corridor alone is unlimited and has been the basis of numerous professional publications, MA theses and PhD. dissertations (Reid, 1991). Archaeological research continues in Hells Canyon today.

FINDING

The historic and prehistoric cultural resources within the wild and scenic river corridor represent an outstandingly remarkable value.

TRADITIONAL USE, CULTURAL

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING (Traditional Use)

The river or area within the river corridor contains regionally unique location(s) of importance to Indian tribes (religious activities, fishing, hunting, and gathering). Locations may have unusual characteristics or exceptional cultural value being integral to continued pursuit of such activities. Locations may have been associated with treaty rights on ceded lands or activities unprotected by treaty on ceded lands to traditional territories outside ceded lands.

EVALUATION OF THE PRESENT SITUATION

Following the forced removal of the Nez Perce Indians from the Hells Canyon area by the U. S. Army in 1877, there has been little if any Native American activity within the canyon. Hells Canyon does lie within the boundaries of the reservation established by the 1855 treaty, but was later excluded when the current Nez Perce reservation was created in 1863.

The traditional use which does exist within the HCNRA tends to focus along the Imnaha River, a Native American fishery, and in upland areas where hunting of big game occurs. There are currently no documented traditional use sites within the wild and scenic river corridor.

FINDING

Traditional use is not an outstandingly remarkable value.

VEGETATION/BOTANICAL

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING

The river or area within the river corridor contains nationally or regionally important populations of indigenous plant species. Of particular significance are species considered to be unique or populations of federally-listed or can-

didate threatened and endangered species. When analyzing vegetation, additional factors such as diversity of species, number of plant communities, and cultural importance of plants may be considered.

EVALUATION OF THE PRESENT SITUATION

Northeast Oregon and adjacent Idaho have a diverse array of plant life. This diversity is due, in part, to the variety of terrain found over relatively short distances and the region's position between the Cascade Range, northern Rocky Mountains and Great Basin. This convergence of species from three geographic provinces results in great diversity as well as a number of endemics (i.e., species found only within a restricted area). The Snake River canyon and its major tributaries have long been of interest to botanists, both professional and amateur. A relatively warm climate as well as the physical barriers to migration has resulted in a very high number of rare or endemic plant species, particularly at the lowest elevations.

This report compiles information derived from a number of documented plant surveys (Johnson 1977, Johnson 1978, Meinke 1978, Moseley 1989, Moseley 1991, Moseley 1992) conducted within the Snake River Canyon as well as the records of the Idaho Conservation Data Center (ICDC), Oregon Natural Heritage Program (ONHP) and U.S. Fish and Wildlife Service. Species on the Northern, Intermountain, and Pacific Northwest Regions' sensitive lists are considered as well as those plants which may be too common to be considered sensitive but nonetheless are restricted to the Snake River canyon and therefore unique.

The following species have been documented to occur within the area covered by this report or are highly suspected of occurring.

FEDERALLY LISTED OR CANDIDATES FOR LISTING

Currently the only plant species found on National Forest System lands in the Northern and Pacific Northwest Regions and federally listed as endangered is MacFarlane's four-o'clock.

Described and classified in 1936, the four-o'clock is named in honor of riverboat pilot Ed MacFarlane who pointed out the showy plant to botanists. The species is restricted to the Snake River canyon and its major tributaries. Of the sixteen colonies known to exist, 50% occur within the corridor. The Forest Service is presently working in cooperation with U. S. Fish and Wildlife, Oregon Department of Agriculture, Idaho Department of Fish and Game, Boise State University, Utah State University and the Plant Conservation Center to locate additional colonies, monitor known sites, and meet the requirements of the recovery plan.

The Snake River goldenweed occurs in the southern portion of the Snake River canyon and its tributaries in Baker and Malheur counties (Oregon) and Washington County (Idaho). Populations of this species are presently known to occur just south of the corridor. Suitable habitat does occur in the southern portion of the wild and scenic river.

Stalk-leaved monkey-flowers are restricted to the Snake River canyon in Wallowa County and adjacent Idaho. Habitat is generally rock cliffs which are wet in the spring and early summer.

The Washington monkey-flower ranges from central Oregon and Washington east to northern Idaho. The two populations occur within the Snake River canyon at an elevation of 4,400 to 4,800 feet. Populations elsewhere are found as low as 2,100 feet; and therefore, the potential exists for this species to occur within the river corridor. Habitat consists of small vernal seeps along fracture zones.

Hazel's prickly-phlox is a local endemic of the Snake and Imnaha river canyons in Oregon and adjacent Idaho. It grows at elevations below 1500 feet.

FOREST SERVICE SENSITIVE SPECIES

The range for the salmon-flowered lomatium is thought to be along the Snake and Clearwater rivers of southeast Washington, northeast Oregon and west-central Idaho (Hitchcock 1973).

At this time salmon-flowered lomatium is assumed to be extirpated from Oregon.

Gold-fern is widely distributed in western North America from Vancouver Island to Baja California and east to southwestern Utah and southwestern New Mexico. In the Pacific Northwest it mainly occurs west of the Cascade crest but is disjunct in southeast Washington and in Idaho County, Idaho. The Idaho population consists of about 25 plants within the river corridor.

Bartonberry, restricted to low elevations within the Snake River canyon, occurs in riparian communities adjacent to small- or medium-sized streams. Substrate is metavolcanic rock or limestone.

Fee's lipfern grows on limestone cliffs and outcrops at elevations below 3,000 feet. It is found in California, Washington, and Idaho as well as Wallowa County, Oregon. It is considered peripheral or disjunct in Oregon and threatened or endangered within the state but more common and stable elsewhere.

Geyer's onion grows on moist ledges associated with mosses at 1,000 to 2,000 feet in elevation. It is found in Idaho and Nevada as well as Wallowa County, Oregon.

The canyon also supports a number of species which are restricted in range but locally common. Included are:

Rollins' desert-parsley, Snake River canyon desert-parsley, Kirtley's nemophila, Snake River phlox, wax current, whorled penstemon, rough stickseed, large-flowered tonella, and Snake River canyon milkvetch.

FINDING

The Snake River canyon contains populations of MacFarlane's four-o'clock, the only plant species listed as endangered by the U. S. Fish and Wildlife Service which occurs on National Forest System Lands in Oregon and Idaho. In addition, four species which are candidates for listing also occur in the canyon. Ten species are considered Forest Service sensitive and a total of

nineteen are either rare or endemic to the canyon. Few locations in the Pacific Northwest, or western North America, equal the Snake River canyon in the concentration and number of rare or endemic plant species. The vegetation/botanical resource of the Wild and Scenic Snake River is an outstandingly remarkable value.

ECOLOGICAL

CRITERIA FOR OUTSTANDINGLY REMARKABLE RATING

While no specific evaluation guidelines have been developed for the ecological resource, an assessment is being provided because its value is consistent with similar river-related values.

EVALUATION OF PRESENT CONDITION

The north-trending Snake River canyon, between the mountainous uplifts of the Seven Devils in Idaho and the Wallowa Mountains in Oregon, provides a deep fissure with specialized plant communities as a result of unique microclimates. The surrounding canyon ridgetops and adjacent plateau are generally at elevations of 3,000 to 5,500 feet. Here vegetation is influenced by a temperate continental climate where warm summers and moderately severe winters prevail. However, at the lower elevations in the canyon lands (800 to 3,000 feet) hot summers provide a drought and mild winters permit the occurrence of plants and plant communities which would otherwise find the overall climate of the region too severe for their growth.

The Snake River corridor is that narrow environmental band which is influenced by the fluvial trough and adjacent uplands where temperatures are moderated. This microenvironment provides for communities of plant species which are found only in the deepest canyon recesses. Examples of these are as follows (Johnson and Simon, 1987):

Snake River greenbush forms communities with bluebunch wheatgrass on steep slopes. Here, underlying fissures in me-

tabasaltic rocks permit the shrubs to acquire needed water for sustaining the plant in an otherwise hot, dry setting.

Netleaf hackberry communities are found on colluvial toeslopes, river bars and along streams with bluebunch wheatgrass at the edge of riparian vegetation zones. Other sites are on hot, dry exposures where the tree can tap available water in outcrop fissures deep below the surface. Often seepage lines on river terraces are defined by hackberry occupation, where moisture is sufficient to maintain the tree.

Sand dropseed communities occur on sandy river terraces and alluvial bars below 2,000 feet elevation. The river and its major tributaries, the Grande Ronde and the Imnaha, directly influence the capability of the corridor to support these communities by providing specialized land forms which are conducive to their growth and maintenance.

White alder occurs as a major riparian community dominant only in the riverine vegetation adjacent to the Snake River and its tributaries. The species is especially prolific on gravel bars and terraces along the larger watercourses of the deep canyons.

Were it not for the deeply dissected canyons of the Snake and its tributaries, the above examples of plant communities would not exist in the landscape of this region. Most of these species are found more predominantly in the warmer latitudes of the western United States. Thus the Snake River corridor provides a unique set of environmental conditions conducive to the northward extension of a more southern flora.

Because Snake River canyon is characterized by a wide range of breeding habitats and microhabitats, and is a migration corridor, diverse populations of animals are permanently or seasonally found here. Although many plant and animal populations are considered healthy, approximately 120 species are documented or listed under the Endangered Species Act, Regional Foresters Sensitive Species Lists (Regions 1,

4, and 6), State Sensitive Species List (Oregon and Idaho), and conservation data centers as species of concern. Many of the declines in these populations are attributed to human activities, primarily outside of the river canyon. Historic range and farming practices have contributed to habitat alterations, most notably non-native plant introductions.

FINDING

Ecologic values inherent in the scenic, geologic, fisheries, and wildlife resources indicate the uniqueness and importance of the river corridor environment. Snake River communities are receiving protection and a special interest designation through the inclusion of certain sites in the Research Natural Area system. Its special environment fosters unusual and specific relationships in the flora and fauna of the corridor and make ecological aspects of the corridor an outstandingly remarkable value.

DESCRIPTION OF SOCIAL AND ECONOMIC CONDITIONS

Changes in levels of recreation use will directly affect the major social and economic characteristics of a broad geographic area. The Hells Canyon National Recreation Area Final Environmental Impact Statement, pages 54-65 and pages 77-78, gives a general description of the main social and cultural characteristics of the area. Pages 65-78 discuss major economic activities. A broader description of the affected areas can be found in the Forest Plan and associated documents (Reference the analysis file).

SOCIAL ENVIRONMENT

The corridor has a rich history of human occupation and use. Native Americans hunted, fished, gathered berries and fruit in the upper reaches of the canyon, and established permanent winter villages along the river.

More recently the corridor has provided access to mining and ranching operations. The use of motorized watercraft on the river started with

steamboats serving the mining industry, and later, homesteaders. Today visitors come for recreational purposes in ever-increasing numbers and occasionally disagree on how access should be attained. Scoping at public meetings revealed opinions on use levels for watercraft ranging from totally unregulated for all users to complete elimination of all water access.

Since implementation of the CMP in 1982, float-boat use during the primary season is limited to five daily overnight launches (three private and two commercial) in the wild river section, with a maximum party size of 30 people in the wild and scenic river sections. There are no launch or party size limits in the secondary season. Private powerboat use is not limited. Commercial powerboat use is limited to a maximum of two permittees who provide services downstream from Hells Canyon Dam. Regulations allow additional commercial powerboat permits to a limited number of qualified applicants for service on the entire river corridor. This number is currently limited based on the number licenses issued by the State of Idaho. (Revised CMP, 1983)

The Snake River is one of the few national wild and scenic rivers where powerboating is a major recreational pursuit. Forest Service reports show motorized river traffic has grown tremendously in the past decade and currently accounts for about two-thirds of the people who visit during the primary season. Powerboat users represent 90% of the total use during the secondary season--primarily for steelhead fishing and big game hunting (Cole, 1989).

Class IV and V rapids draw rafters, kayakers, and canoeists who do not always know they will encounter motorized rivercraft on a river known for its wild and scenic values and remote ruggedness. Forty-three percent of the floatboaters saw "more" or "far more" powerboaters than they expected to see (Visitor Use Study, 1989, page 16). Approximately 90% of the powerboaters responding to the Visitor Use Study (1989, page 7) claimed they did not float in the canyon, and approximately 90% of the floatboaters said they did not powerboat in the canyon during the two-year period prior to a 1988-1989 survey.

However, Forest Service use records indicate some floatboaters do use motors for power to travel through the river's slower sections and work with or hire powerboaters to transport personnel and/or equipment (Cole, 1989).

Some floatboaters complain about engine noise, the size of the powerboats, close and/or numerous encounters, wakes, and speed. Some powerboaters complain about floatboaters' use of inappropriate social behavior, blocking river channels, and blocking launch and take-out ramps (Cole, 1989). About 78% of surveyed visitors felt the presence of powerboats on the river was not a major problem and about 85% felt noise from powerboats was not a major problem (Visitor Use Study, 1989, page 22). Recreationists are generally satisfied with the amount and mix of activity on the river, but also feel a need to regulate use to maintain the quality of the experience.

Camp space is limited. Sediment entrapment behind upstream dams diminishes the natural replenishment of the sand beaches preferred by most campers. Conflicts are becoming more common, especially between groups with different social values, as recreation use in the river corridor increases. Most people favor assignment of campsites, but private powerboaters are not as supportive as other river users; 35% said they would not accept such an action (Visitor Use Study, 1989, page 30).

Limited, confined facilities for launching watercraft can create conflicts if launch parties are not patient and courteous during high use periods. Most people support assigning launch times during the primary season (Visitor Use Study, 1989, page 30).

Aircraft landings are restricted to the Big Bar strip in the wild river, except for certain permitted ranching activities (CMP, page 27). Aircraft use is allowed at Dug Bar, Salmon Bar, and Pittsburg Landing in the scenic section. Aircraft use is infrequent, especially during the primary season. Almost 30% of the river users have no opinion regarding aircraft restrictions (Visitor Use Study, 1989, page 34).

Despite a common concern for the outstandingly remarkable values of the natural resources of the river corridor, social attitudes differ sharply regarding management of these resources. While river users may not agree upon acceptable activities and activity levels, the majority of the people who use the river do agree regulated use is necessary to preserve the qualities that make the corridor special.

ECONOMIC CONDITIONS

Specific topics addressed in this section include a definition of area impacted, area population, general employment characteristics including earnings and per capita personal income, river recreation use including economic impacts of river use by type of recreation and non-recreation use, and Hells Canyon NRA management costs.

A number of communities are economically affected by recreation use on the Wild and Scenic Snake River. Most directly affected are those communities which provide goods and services to recreationists. Boat construction (primarily powerboats) and related support industries (metal stamping and forming, engine manufacturing) are important components of the local economies of the Lewiston-Clarkston area and Grangeville, Idaho. Commercial and private powerboat and float operations generate considerable revenue and direct and indirect employment opportunities in the area.

Recreation-related travel to and from the river generates a significant amount of economic activity for communities on major access routes. Hotels, motels, restaurants, retail trade, gas stations, automotive repair businesses and food stores are affected by recreation use. The trade and service sectors, which these businesses represent, typically account for a significant portion of community and county-wide employment and income. A portion of the revenues generated from commercial use of the river by Forest Service permittees is returned to those counties which have part of their land base in Hells Canyon NRA.

AFFECTED GEOGRAPHICAL AREA

Nez Perce, Idaho, and Adams Counties are the counties in Idaho most directly affected by recreation use. The cities of Lewiston and Clarkston are a major access point and center of river recreation-related businesses. US Route 95 is the major north-south travel corridor providing access to recreation opportunities on the Idaho side of the Snake River. US Route 12 is a major east-west access route to the northern portion of the river corridor. This route provides the most direct access for the Tri-cities area (Richland, Pasco, and Kennewick) and Walla Walla in Washington and north-central Idaho and western Montana. Grangeville has a number of recreation-related businesses. Riggins is the home base of several river guides and outfitters who provide floatcraft and powerboat services. Riggins also has a small powerboat manufacturing and repair shop.

Wallowa County in Oregon contains the towns of Wallowa, Lostine, Enterprise, and Joseph, which are all on Oregon State Route 82, a major access route to the river. The towns of Richland and Halfway lie between Baker City and Oxbow Crossing, which is on the Oregon-Idaho border and leads to Hells Canyon Dam.

Asotin County in Washington contains the city of Clarkston, which has a variety of river recreation-related businesses.

POPULATION

Population growth, primarily through immigration in the short and intermediate terms, may expand the potential user base. Population

growth or decline could significantly affect recreation use levels, not only in counties adjacent to the river but also in outlying areas which have traditionally been a source of river users, such as Spokane, Portland, Missoula, Boise, Orofino, Walla Walla, and the Tri-cities (Pasco, Kennewick, and Richland).

Table III-3 shows a comparison of population trends for potentially impacted counties and states. Nez Perce County has the largest population followed by Asotin, Baker, Idaho, Adams, and Wallowa Counties respectively. From 1980 to 1990, Asotin County had the highest growth rate, increasing by 4.6%. This was substantially below the population growth rate for Washington state (17.8%) during the same time period. All of the counties experienced slower rates of growth than their respective states. While a variety of factors contributed, continued out-migration from rural to urban areas (continuing a decades-long trend), two recessions during the 1980's, more capital intensive and less labor intensive farming and continued technological innovation in natural resource commodity production and manufacturing (requiring fewer but more skilled workers) played a significant role in explaining the discrepancy between state and county growth rates.

Comparatively speaking, county growth rates have been much higher during the period 1990-92. For example, Nez Perce County, which grew by only 1.6% during the 1980's, grew at a 4.9% rate between 1990 and 1992. Wallowa County, which actually lost population during the 1980's (-4.4% growth rate), grew at 2.9% from 1990-92.

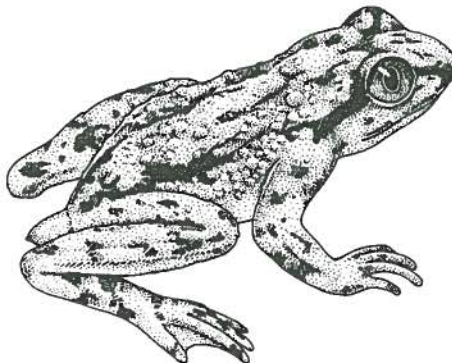


Table III-3. State and County Population, 1980-1992

State/County	1980	1990	Percent Change 1980-90	1992	Percent Change 1990-92
Idaho	943,935	1,006,749	+6.7%	1,067,000	+6.0%
Nez Perce	33,220	33,754	+1.6%	35,402	+4.9%
Idaho	14,769	13,783	-6.7%	14,171	+2.8%
Adams	3,347	3,254	-2.8%	3,436	+5.6%
Washington	4,132,156	4,866,692	+17.8%	5,116,700	+5.1%
Asotin	16,823	17,605	+4.6%	18,000	+2.2%
Oregon	2,633,149	2,847,000	+8.1%	2,979,000	+4.6%
Wallowa	7,273	6,950	-4.4%	7,150	+2.9%
Baker	16,134	15,300	-5.2%	15,800	+3.3%
State Totals	7,709,240	8,720,441	+13.1%	9,162,700	+5.1%
County Totals	91,566	90,663	-1.0%	93,959	+3.6%

Source: Idaho: 1980 population: U.S. Department of Commerce, Bureau of the Census. **County and City Data Book 1988**. GPO, Washington DC, 1988. 1990 and 1992 population: Idaho Department of Employment, Research and Analysis Bureau. 1993. Washington: 1980 population: **County and City Data Book 1988**. 1990 and 1992 population: Washington State Employment Security Department. **Annual Demographic Information**. Service Area X. 1992. Oregon: State of Oregon, Employment Division, Department of Human Resources. **Labor Trends**. East-Central Trends. December 1992, p.5. (Note: all 1992 population figures are preliminary estimates).

Possible factors in this reversal include: (1) significant cost of living differential between the major urban centers on the West coast (Los Angeles-San Diego, San Francisco, Portland and Seattle) and the cities and towns of south-eastern Washington, northeastern Oregon and north central Idaho; and (2) the perceived higher quality of life in rural areas in terms of affordable housing, good climate, comparatively low crime rates, and proximity to outdoor recreation areas (State of Oregon, 1992a,b; State of Idaho, 1993).

Changes in the type and magnitude of river recreation use may affect the demand for recreation-related goods and services. This in turn may affect employment levels and related earnings and personal income in areas with recreation-dependent businesses.

EMPLOYMENT

Table III-4 shows county employment by major sector categories. Across counties, manufacturing jobs accounted for 23% of total wage and salary employment; non-manufacturing jobs accounted for 77%. The service sector at 23% and the government sector at 25% were the two sectors with the largest percentage of total employees. Figure III-1 compares counties with respect to major job categories. For example, the importance of manufacturing to the respective county economies can be seen by comparing the bottom segment of the bar for each county. Manufacturing represents a comparatively higher proportion of total jobs for Adams County than the other counties. The government sector represents a higher proportion of jobs in Wallowa, Adams, and Idaho Counties than other counties.

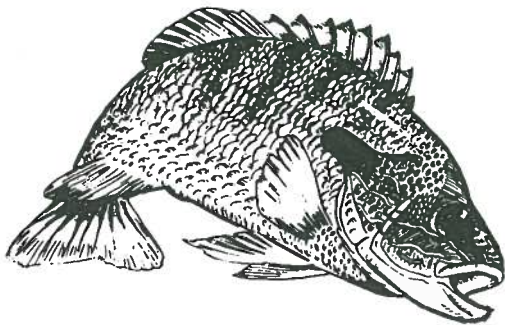
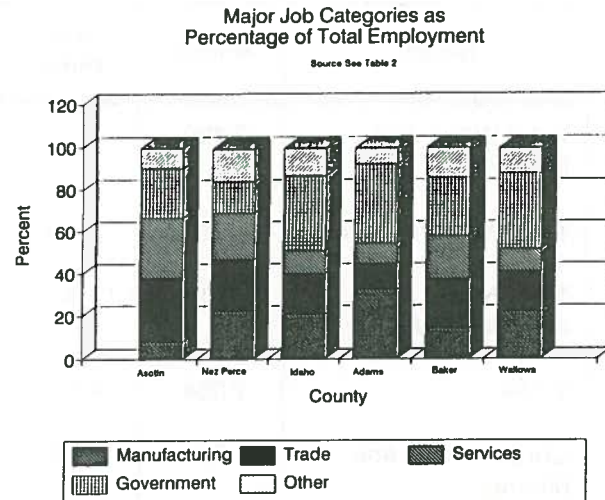


Figure III-1



EARNINGS

The following earnings information was obtained from the Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, 1992.

Asotin County. Total employment earnings in Asotin County increased at an average annual growth rate of 6.5% from 1980 to 1990. The gross increase from 1980-to 1990 was 88.1%. In 1990, the largest sectors in terms of employment earnings were: (1) services, which accounted for 27.4% of total earnings; (2) state and local government, 15.8%; and (3) retail trade, 14.7%. Of all industries that accounted for at least 5% of total earnings, the fastest growing sector was retail trade, which increased at an average annual rate of 8.2%. The slowest growing sector

Table III-4. County Employment by Major Categories¹

Sector	County Average²					
	Asotin	Nez Perce	Adams	Idaho	Baker	Wallowa
Total Wage and Salary³	3,490	17,114	911	3,909	4,720	2,293
Total Manufacturing	271	3,808	295	811	660	503
Total Non-manufacturing	3,218	13,307	616	3,098	4,067	1,787
Trade	1,054	4,247	115	764	1,113	447
Construction and Mining	261	649	0	204	170	90
Transportation and Public Utilities	60	940	31	158	280	90
Finance, Insurance, Real Estate	116	944	28	764	230	93
Services	991	3,860	88	429	963	247
Government	838	2,607	344	1,400	1,313	823

¹ Sources: Asotin County: Employment and Payrolls in Washington State by County and Industry. 1989, 1990, 1991 editions. Washington State Employment Security Department; Nez Perce, Adams, Idaho Counties: Basic Economic Data for Idaho 1991, 1990, 1985-90 editions. State of Idaho Department of Employment; Baker and Wallowa Counties: State of Oregon, Employment Division, Department of Human Resources. Area Office, La Grande, OR.

² 1989-91 for Asotin County; 1989-91 for Nez Perce, Idaho and Adams Counties; 1990-92 for Baker and Wallowa Counties.

³ Non-agricultural wage and salary employment only.

was farming, which grew at an average annual rate of 5.4% (Regional Economic Information System, Bureau Of Economic Analysis, U.S. Department of Commerce, 1992).

Nez Perce County. Total employment earnings in Nez Perce County increased at an average annual growth rate of 5.0% between 1980-1990. The gross increase from 1980 to 1990 was 62.8%. In 1990, the largest sectors in terms of employment earnings were: (1) services, accounting for 21.1% of total earnings; (2) non-durable goods manufacturing, 17.2%; and (3) durable goods manufacturing, 13.1%. The fastest growing industry from 1980 to 1990 was services, which grew at an average annual rate of 8.2%. The slowest growing sector was durable goods manufacturing which increased at an average annual rate of 0.3% during the same time period.

Idaho County. Total employment earnings in Idaho County increased at an average annual rate of 4.3% between 1980 and 1990. The gross increase during the period was 52.2%. The largest industries in 1990 in terms of employment earnings were: (1) durable goods manufacturing, which accounted for 22.2% of earnings; (2) farming, 17.0%; and services, 13.4%. The transportation and public utilities sector was the fastest growing industry among those accounting for at least 5% of employment earnings. It increased 8.2%. The slowest growing sector was durable goods manufacturing, which increased 0.8% during the same time period.

Adams County. Total employment earnings in Adams County increased at an average annual rate of 4.1% from 1980 to 1990. The gross increase from 1980 to 1990 was 48.9%. In 1990, the largest industries in terms of employment earnings were: (1) durable goods manufacturing, 40%; (2) federal civilian government, 12.6%; and (3) farming, 12.5%. The fastest growing sector was services, increasing at an average annual rate of 10%. Durable goods manufacturing was the slowest growing sector, increasing at an average annual rate of 5%.

Wallowa County. Total employment earnings in Wallowa County increased at an average annu-

al rate of 5.8% from 1980 to 1990. The gross increase from 1980 to 1990 was 75.2%. The largest employment earnings sectors in 1990 were: (1) farming, 27.3%; (2) durable goods manufacturing, 20%; (3) and state and local government, 12.4%. The fastest growing sector in 1990 was federal civilian government, which grew at an average annual rate of 12.5% during 1980-90. The slowest growing sector was retail trade, which grew at an average annual rate of 2.5% during 1980-90.

Baker County. Total employment earnings in Baker County increased 53.8% from 1980 to 1990. The average annual growth rate was 4.4%. In terms of employment earnings, the largest sectors were: (1) services, 17.5%; (2) Farming, 16.3%; (3) state and local government, 12.7%; and (4) durable goods manufacturing, 12.3%. The fastest growing sector was services, which increased at an average annual rate of 6.8%. The slowest growing sector was retail trade, which grew at an annual rate of 3.4%.

PER CAPITA PERSONAL INCOME

Changes in personal income may affect the demand for river recreation, which in turn may affect river recreation-dependent businesses. Table III-5 shows a comparison of per capita personal income across counties (information obtained from Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce, 1992). For the counties as a whole, per capita personal income increased 66.8% from 1980 to 1990. Adjusting for inflation, per capita income increased 7.8% during the same time period. It is interesting to note that during the same time period, national consumer debt (not including housing mortgages) rose by 126.8% or 42.6% when adjusted for inflation to 1990 dollars (Economic Report of the President, February 1992, Table B-73, p. 384.). To the extent that consumer debt characteristics in the impact area are similar to national trends, it is apparent

Table III-5. Per Capita Personal Income, 1980-90

County	1980	1990	Percent Increase (nominal dollars)	Percent Increase, adjusted for inflation (1990 \$)
Asotin	\$9,235	\$15,422	67.0%	8.0%
Nez Perce	\$9,425	\$16,268	72.6%	8.6%
Idaho	\$7,849	\$13,510	72.1%	8.3%
Adams	\$8,894	\$14,680	65.1%	3.8%
Wallowa	\$9,653	\$17,461	80.9%	13.8%
Baker	\$8,975	\$14,670	63.5%	2.8%
County Average	\$9,005	\$15,335	70.3%	7.1%

Source: Asotin, Nez Perce, Idaho and Adams Counties: Regional Economic Information System. U.S. Dept. of Commerce, Bureau of the Census. 1992; Wallowa and Baker Counties: State of Oregon, Employment Division, Department of Human Resources. La Grande Area Office, La Grande, OR.

that at least a part of the motivation behind the rapid increase in debt is to offset the relatively small gains in income during the 1980's. If real increases in income are slow throughout the 1990's and people are willing to continue carrying high levels of debt, the effect of changes in personal income on area recreation use may be minimal. If people decide to lower their household debt levels and real personal income growth is similar to the 1980's, both the magnitude and type of recreation use in Hells Canyon NRA may be affected, other things remaining constant.

RIVER RECREATION USE

In-river recreation uses up to the late 1970's are discussed in the Hells Canyon National Recreation Area Final Environmental Impact Statement, pages 82-96. Besides boating, other recreational uses such as hiking, camping, fishing, wildlife viewing and bird watching are enjoyed by visitors.

The use of data from 1982 to 1991 allows for the consideration of fluctuations in various factors which may affect river use (water levels, fish populations, weather, and economic recessions or expansions) over a ten year period.

Figure III-2 shows the total annual number of people using the river for powerboating and floating, both commercially and privately, during the regulated season. Since 1984, powerboat and float use of the river has increased substantially. The number of floatboaters has been fairly constant since 1986, showing a 9.1% increase between 1986 and 1991. This compares with an overall increase of 80.5% between 1982 and 1991. Powerboat use has increased much faster than float use in terms of annual number of users. Between 1986 and 1991, powerboat use has increased 100.7%. From 1982 to 1991, the increase was 136.2% (Snake River Visitor Use Report. 1986, 1988-91, 1989-1992).

Figure III-2

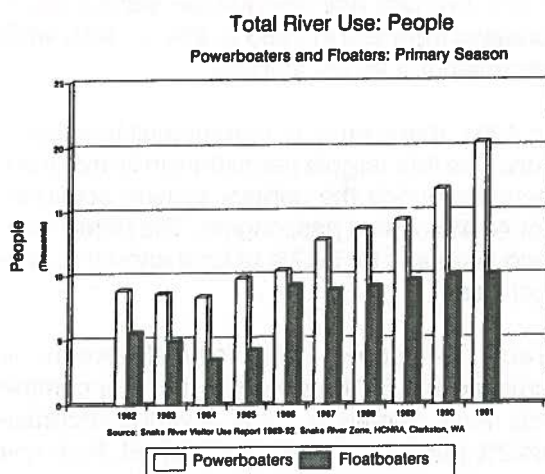
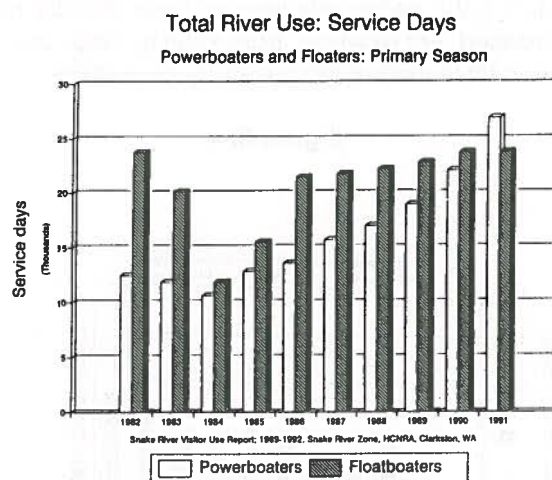


Figure III-3 shows total river use during the primary season in terms of service days for both commercial and private powerboaters and floatboaters. A service day is defined as one person spending one day on the river (Snake River Visitor Use Report, 1986, page 1). Service days for both powerboaters and floatboaters have shown a steady increase since 1984. Service days for float users showed a rapid increase from 1985 to 1986 and then a more moderate rate of increase from 1986 to 1991. The increase from 1985 to 1986 was 40.0% compared with an increase of 10.7% from 1986 to 1991. Powerboat user service days showed an increase of 158.5% between 1984 and 1991 (Snake River Visitor Use Report, 1986, 1988-91, 1989-1992).

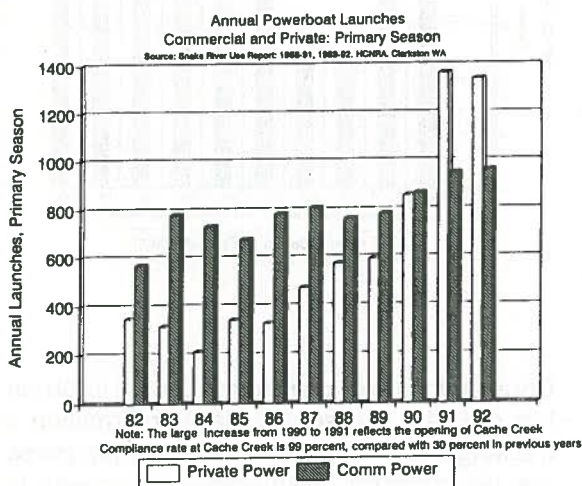
Figure III-3



Considering river use in terms of both total number of users and service days, information on the length of time spent on the river per person can be estimated. With respect to powerboaters, the average length of time spent on the river (in terms of service days) has been relatively constant from 1982 to 1991. From 1982 to 1991, the highest average service days per person was 1.4 (1982, 1983 and 1990), the lowest 1.2 (1987 and 1988). This has not been the case for floatboaters, however. In 1982, the average service day per person was 4.3. This average steadily declined until 1988 when it reached 2.4. It has since remained constant up to 1991. Figure III-4 shows annual commercial and private powerboat launches for the primary season from 1982 to 1992. Private powerboat launches were fairly constant from 1982 to 1986, with the exception of 1984. Private launches increased rapidly from 1986 to 1988, and then decreased from 1988 to 1990. The large increase from 1990 to 1991 is primarily the result of the staffing of the Cache Creek administrative site during the primary season.

Commercial launches have been fairly constant from 1982 to 1990. From 1990 to 1992, commercial powerboat launches increased by 29%. Since 1985, commercial powerboat launches during the secondary season have steadily increased. For example, from 1986 to 1992, commercial launches increased by over 200%.

Figure III-4



Recreation-related river use generates substantial revenue for commercial operators of powerboat and float tours. Commercial operators are required to obtain permits from the Forest Service at a cost of 3% of total annual gross revenue (HCNRA, Clarkston, WA). Tables III-6 and III-7 show revenue and use data for commercial powerboat and float operators, respectively.

In 1991, there were 19 commercial powerboat permittees. Four permittees accounted for over 75% of commercial powerboat passengers during the primary season. In 1991, the primary season accounted for 72.8% of total annual commercial powerboat passengers.

Table III-6 shows nominal (unadjusted for inflation) revenue increased steadily from 1985 to 1991 for commercial powerboat operators. Gross nominal revenue increased 196.3% from 1985 to 1991. Adjusting for inflation (1992 dol-

lars), the increase was 138.7%. This represents an average annual real increase (from 1985 figures) of 23.1\$. Average real revenue per passenger increased from \$68 in 1985 to \$84 in 1991. Average real revenue per service day increased from \$59 in 1985 to \$74 in 1991, which represents a 25.4% increase.

In 1991, there were 17 commercial float operators. The four largest permittees in terms of passengers during the primary season accounted for 45.4% of total passengers. The primary season accounts for 88.7% of total annual passenger use.

Table III-7 shows that nominal revenue increased 103.8% from 1985 to 1991 for commercial float operators. Real revenue increased 64.2% during the same time period. Real revenue per trip has been decreasing since 1985 because average passengers per trip has been declining steadily. In 1985, passengers per trip averaged 12.3; in 1991 the average was 7.9. However, real revenue per passenger and service day has increased from 1985 to 1991. Real revenue per passenger has increased from \$303 in 1985 to \$391 in 1991, a 29% increase. Real revenue per service day has also increased. In 1985, revenue per service day was \$113. In 1991, revenue was \$127, an increase of 12.4%.

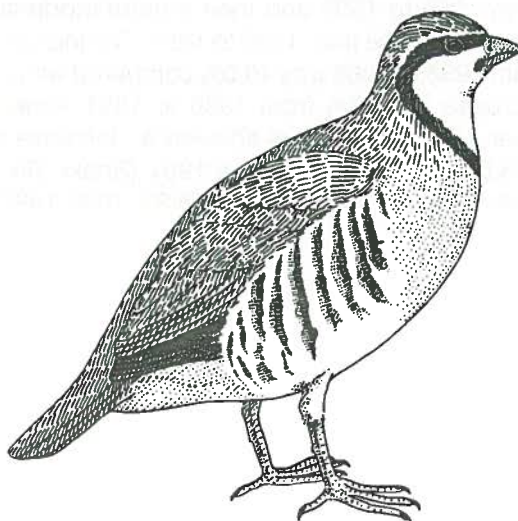


Table III-6. Gross Revenue from FS Permittee Commercial Powerboat Use

Year	Nominal \$	1992 \$	Passengers	1992\$/ Passenger	Service Days	1992\$/ Service Day
1985	539,329	687,644	10,082	\$68	11,568	\$59
1986	651,894	807,044	11,149	\$72	13,158	\$61
1987	920,693	1,107,594	13,404	\$82	15,590	\$71
1988	970,118	1,125,337	15,716	\$72	18,091	\$62
1989	1,182,819	1,314,112	16,184	\$81	19,442	\$68
1990	1,522,235	1,624,225	20,287	\$80	23,936	\$68
1991	1,598,133	1,641,283	19,497	\$84	22,169	\$74

Source: Snake River Visitor Use Report: 1986, 1987, 1988-1991. Snake River Zone, Hells Canyon National Recreation Area, Clarkston, WA.

Table III-7. Gross Revenue from FS Permittee Commercial Float Use, 1985-1991

Year	Nominal \$	1992 \$	Trips	1992\$/ Trip	Pas- sen- gers	Passen- gers/ Trip	1992\$/ Passen- ger	Service Days	1992\$/ Service Day
1985	394,448	502,921	135	3,725	1,660	12.3	303	4,463	113
1986	453,819	561,828	132	4,256	1,325	10.0	424	5,138	109
1987	521,190	626,992	166	3,777	1,579	9.5	397	5,592	112
1988	582,787	676,033	188	3,596	1,758	9.4	385	6,122	110
1989	714,158	793,430	206	3,852	1,921	9.3	413	6,709	118
1990	677,055	722,418	250	2,890	1,896	7.6	381	6,002	120
1991	804,072	825,782	267	3,092	2,113	7.9	391	6,524	127

Source: Snake River Visitor Use Report, 1986, 1987, 1988-91. Snake River Zone, Hells Canyon National Recreation Area, Clarkston, WA.

RIVER CORRIDOR MANAGEMENT COSTS

Administrative and management costs for the river corridor for fiscal year 1993 is \$456,360. These costs are the actual funds necessary to implement current management direction for the river corridor, and may not be reflective of actual expenditures or budget allocation levels (Mike Cole, personal communication).

