



AN ENVIRONMENTAL SURVEY OF THE LOWER CLEARWATER RIVER

Conducted for the Walla Walla District of the
U.S. CORPS OF ENGINEERS

by C. D. Gordon
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**Water Resources Research Institute
University of Idaho
Scenic Rivers Unit
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July 31, 1970**

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I. SUMMARY

The operation of Dworshak Dam, located at the mouth of the North Fork of Idaho's Clearwater River, will result in fluctuations of water level and water quality. At the request of the U. S. Corps of Engineers, a study was made by the Idaho Water Resources Research Institute to assess the potential environmental effects on the lower Clearwater River.

The Clearwater, one of the largest rivers in Idaho, has an average annual runoff of 11,060,000 acre-feet. The average annual runoff of the North Fork is 4,133,000 acre-feet or about 37 percent of the main stem. Thus regulation of flow at Dworshak Dam will affect flow in the main stem from Ahsahka to Lewiston.

The Clearwater Basin has a rich historical heritage, much of which is now being preserved by the newly created Nez Perce National Historical Park. There are 23 separate sites located throughout the Nez Perce country which depict the role of the Nez Perce Indians, Lewis and Clark, the fur trade, the missionaries, gold mining, farming, and logging in the westward expansion of the Nation.

The majority of the study area is covered by two easily distinguishable plant communities. The forested or brushland area contains the doug-fir/ninebark union and a bunchgrass community on the grassy slopes and along the breaks. The riparian (shoreline) vegetation along the river consists primarily of willow, cottonwood, alders, and ash, with ponderosa pine and douglas fir frequently found along the banks. About 1,400 acres of land adjacent to the river are now being farmed on moderate slopes, 1,500 acres of flood-plain type land are being used for hay or melon crops, and 9,600 acres are either forested or grassy lands.

Beaver, mink, muskrat, otter, weasels and racoons utilize the banks of the river. Upland game such as quail, pheasants, and chuckars are present in relatively abundant numbers. Canada geese are present year round and migrating ducks use the river in the spring and fall.

Resident game fish populations consist of substantial numbers of smallmouth bass, and a relatively few rainbow trout, dolly varden, and whitefish. Large rough fish populations of squawfish and suckers occur, as well as a few catfish and carp. Substantial runs of steelhead, averaging about 25,000 fish annually, pass through the lower Clearwater. There is a potential to re-establish chinook salmon runs of approximately 25,000 adult spawners in the river basin.

Fishing effort on the lower Clearwater is primarily for steelhead and smallmouth bass. Bass are the most sought after fish during the summer months and the majority of the fishing is done by bank anglers. Considerable angling effort for steelhead by both bank and boat anglers starts during September and continues through to April.

The use of the Clearwater River for recreation (exclusive of fishing) can be correlated directly to the time of year, water level, water temperature and ambient temperature. During June, July, and August the river is used extensively for

swimming, floating, camping, and picnicking. Major recreation sites, such as automobile access points, boat launching sites, and beach and resort areas were listed and located by river mileage.

The lower Clearwater Basin generally is well served by the Burlington Northern, Union Pacific, and Camas Prairie railroads; U.S. 12, U.S. 95, and Idaho 3 highways; and a number of secondary roads. The principal items of commercial transportation are grain and timber products.

There are 33 establishments doing business along the 35.9 mile reach of the lower Clearwater River. These consisted of eight mobile home trailer courts, eight stores, six granaries, four bars and restaurants, two lumber mills, one railroad, farm machinery sales and repair establishment, a U.S. Army Corps of Engineers Resident Engineers Office for the construction of Dworshak Dam, and several other business sites. It was estimated that the commercial and industrial establishments employed 344 people. About 200,000 tons of grain move through the region and about 70 million board feet of lumber are manufactured in the area. Most of the other businesses provide services and no attempt was made to estimate what their value was or might be.

Approximately 1.82×10^9 gallons of water are withdrawn annually from Clearwater River or river subsurface flow to supply the municipal and industrial needs of Lewiston and four small villages. About 2.9×10^{10} gallons of water are withdrawn annually to supply Potlatch Forests, Inc. at Lewiston, and the Dworshak Fish Hatchery at Ahsahka. Although most of the domestic dwellings in the area are at present small family-type homesteads, there is a trend developing to non-farm type homes and retirement homes.

The aesthetics of the lower Clearwater River were described in some general detail, and a set of slides were developed which indicate the natural fluctuation of the river. These slides are representative of the general scenes observed along the river and they also reflect different seasons and weather conditions. The first slides were taken in early June during the high runoff period and the last slides were taken in September. In addition to the slide series, a narrative description of the area was developed indicating the general physical features of the lower Clearwater River Valley. Four sites were described in detail: (1) from the top of Lewiston Hill (2) from Potlatch Creek to Myrtle, (3) Lenore, and (4) the confluence of the North Fork and the Main Clearwater Rivers.

There are a number archaeological sites along the lower Clearwater River. Six such sites considered to be significant are located between Spalding and Ahsahka. Most of these sites are located close to the river. The total value of these sites is unknown, but it is thought by archaeological experts to be a very rich area.

The potential effects of fluctuations of river level and water quality on fisheries, recreation, vegetation, wildlife, aesthetics, and commercial and industrial establishments were discussed in summary form in Section X.

II. INTRODUCTION

This preliminary survey was conducted at the request of the Walla Walla District of the U. S. Corps of Engineers to inventory the environmental resources of the lower Clearwater River (Plate I) and to assess the potential impact on this environment as a result of the operation of Dworshak Dam. The land and river area surveyed included all of the adjacent shoreline and riparian land to an elevation of about 300 feet on both sides of the river. The actual center line length of the river surveyed was 35.9 miles and the adjacent land area comprised 12,500 acres. Of the land acreage, approximately 85 percent is privately owned and the remaining 15 percent is State or Federal land.

Because of the excellent access afforded by the transportation facilities along this reach of the river, most survey sites were visited using vehicles. However, several boat trips were taken down the entire 35.9 mile stretch of the river for a more detailed examination of the beach areas, scenic views, rapids, and prime fishing sites. Still other important sites were examined on foot.

Short visits were made to the offices of the Idaho Fish and Game Department in Lewiston, the U. S. Soil Conservation Service in Lewiston and Moscow, the Nez Perce National Historical Park, the Nez Perce and Clearwater County Assessors, the Idaho Department of Highways in Lewiston, and the Camas Prairie Railroad in Lewiston. Other pertinent information was obtained through reports, letters, telephone contacts, and personal interviews.

III. OBJECTIVES

The project objectives for this survey, as agreed upon by the U. S. Corps of Engineers and the Water Resources Research Institute of the University of Idaho, are:

1. To inventory the water and related land resources of the lower Clearwater River from the Washington Water Power Company (WWP) Dam at Mile 4.6 to Ahsahka at Mile 40.5.

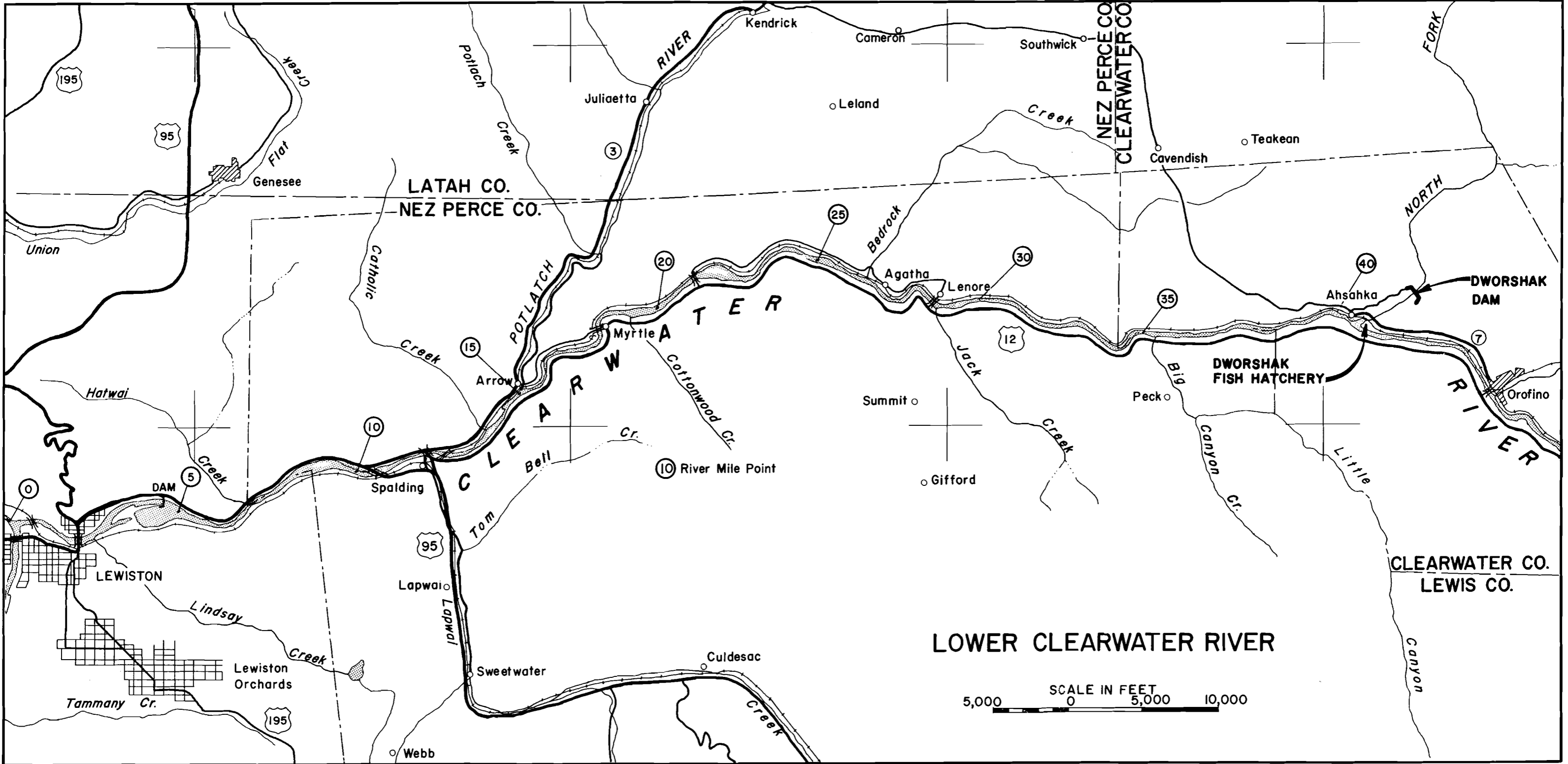
2. To identify major resource use problems in the river area.
3. To catalog aesthetic qualities of the river.
4. To assess the impact of water-level fluctuations and water-quality fluctuations on the environment resulting from the operation of Dworshak Dam at Mile 1.7 of North Fork Clearwater River.

IV. GEOGRAPHY

Clearwater River lies in north-central Idaho and is one of the largest streams in the State. It is a principal tributary of Snake River and also is one of the largest streams in the United States that lies entirely within one state. The stream heads in the rugged Bitterroot Mountains, the crests of which form the boundary between Idaho and Montana. It traverses the complete width of northern Idaho and joins the Snake at Lewiston. The drainage area is about 10,000 square miles and the altitude of the basin ranges from about 8,800 feet in the Bitterroots to 706 feet at Lewiston, with a mean altitude of about 4,300 feet.

The Clearwater Basin is one of the pristine beauty rarely exceeded anywhere else in the Country. The basin contains clear, sparkling streams, the largest stand of white pine in America, and supports the largest elk population in America. The main tributaries of Clearwater River are the North Fork, the South Fork, the Middle Fork, the Lochsa and Selway rivers. The average annual runoff of Clearwater, measured at the gaging station near Spalding, is 11,060,000 acre-feet. The maximum annual runoff of 17,600,000 acre-feet occurred in 1928 and the minimum runoff of 6,212,000 acre-feet occurred in 1944. The maximum flood of record, measured at this same station, was 177,000 cubic feet per second (cfs) on May 29, 1948. A minimum daily flow of 500 cfs occurred on both January 9, 1937 and December 1, 1952.

The average annual runoff of the North Fork, as measured near Ahsahka, is 4,133,000 acre-feet which is about 37 percent of the average annual runoff of the main stem. Thus, regulation of flow in the North



Fork at Dworshak Dam will affect the flow in the main stem from the confluence with the North Fork to the mouth at Lewiston.

The lower Clearwater River (Plate I) is on the margin of the Columbia River Plateau, a large physiographic province that was covered by lava flows in Miocene geologic time. As a result of the Clearwater Embayment, most of the rock which crops out in the area is basalt. However, beginning a few miles above Lenore, the basalt has been eroded away along the river exposing the pre-Cenozoic basement consisting mostly of granitic rocks of the Idaho batholith.

The portion of Clearwater River within the limits of the study area has cut a trench near the axis of the Lewiston geologic syncline. Because of a structural downwarp of the crustal rocks south of the river and downstream from about the vicinity of Lenore, a steep bluff 2,000 feet high known as the Clearwater Escarpment was formed. This escarpment is the most prominent physiographic feature of the lower Clearwater Basin.

Between the WWP Dam and Ahsahka the average width of Clearwater River is about 500 feet, the minimum width is about 300 feet, and the maximum width is about 1,000 feet. Generally, there are relatively narrow beaches on each side of the river and then the banks slope upward at steep angles. Exceptions to this occur where flat or gently sloping lands lie adjacent to the river mainly at the following localities:

1. South side, Mile 8 to Mile 9
2. North side, Mile 9.5 to Mile 11
3. South side, North Lapwai to Mile 12.5
4. South side at Myrtle
5. South side, Mile 20 to Mile 22
6. North side, Mile 22 to Mile 23.5
7. South side, Mile 27.5 to Mile 28.5
8. South side, Mile 34 to Mile 35.5
9. South side, Mile 39.5 to Mile 40.5

The average slope of the lower Clearwater River is about six feet per mile. The velocity of flow ranges from an average of about one foot per second during periods of low discharge (1,500 cfs) to an average of about ten feet per second during periods of high discharge (80,000 cfs).

Rapids are located at the following mile points, although some of these rapids are not evident during periods of high discharge:

10.4	27.0
15.1	30.8
17.3	32.3
21.5	37.1 (Saddlebag Rapids)
24.5	39.1

The principal islands in Clearwater River between the WWP Dam and Ahsahka are as follows:

Hog Island	North side, Mile 8.5 to Mile 9.5
Unnamed Island	North side, Mile 10.5 to Mile 11.0
Unnamed Island	South side, Mile 13.5 to Mile 14.0
Turkey Island	North side, Mile 14.0 to Mile 14.6
Unnamed Island	South side, Mile 17.1 to Mile 17.4
Lower Cottonwood Island	North side, Mile 19.1 to Mile 19.6
Upper Cottonwood Island	North side, Mile 19.5 to Mile 20.3
Fir Island	South side, Mile 21.6 to Mile 22.5
Snells Island	North side, Mile 37.6 to Mile 37.8

Additional natural features of interest along or adjacent to the lower Clearwater River which are not shown on Plate I are:

Gibsons Eddy	Mile 15.8
Deadmans Eddy	Mile 18.0
Myrtle Beach (south shore)	Mile 18.3
Rocky Beach (south shore)	Mile 21.5
Fir Bluff (south bank)	Mile 22.8
Big Eddy	Mile 28.0
Rattlesnake Point (south bank)	Mile 28.5
Harpers Bend	Mile 34.0

The climate of the area encompassing the lower Clearwater River is characterized by relatively warm summers and mild winters. Weather data for stations at Lewiston and at Orofino are shown below:

	<u>Lewiston</u>	<u>Orofino</u>
Mean annual temperature, °F	53.7	51.9
Mean January temperature, °F	33.1	31.0
Mean July temperature, °F	76.2	73.8
Mean annual precipitation, inches	13.24	25.93

Population figures for eight of the largest communities along or adjacent to the lower Clearwater River are listed below. The 1970 Census figure is given for Lewiston. Population figures for the other towns are based on the 1960 Census or on the latest estimates.

Lewiston	25,457
Orofino	3,193
Lapwai	500
Spalding	200
Peck	186
Ahsahka	150
Lenore	30
Myrtle	24

Within the immediate study area, small grade schools are located at Peck and at Lenore.

Except for logging and some mining, commercial developments exist only in the lower portions of the basin. With the exception of the North Fork, where Dworshak Dam is under construction, and the main stem at the WWP Dam, the major streams in the Clearwater Basin are uncontrolled.

V. HISTORY

The historical heritage of the lower Clearwater Basin is inseparably linked with the colorful history of the Pacific Northwest. The first contact with the Nez Perce Indians, whose ancestral home embraced the Clearwater Basin and parts of southeastern Washington and northeastern Oregon, was made by the Lewis and Clark Expedition in 1805. These explorers soon were followed by the fur trade fraternity--the North West Company, the Hudson's Bay Company, and John Jacob Astor's Pacific Fur Company. Following on the heels of the trappers were the missionaries--the Whitmans, Spaldings, Smiths, and others. The fertile soil of the area

beckoned the farmer and soon thousands of pioneers were invading the homeland of the Nez Perces. Treaties were made with the Indians setting aside reservations covering vast areas for their sole occupancy. The first serious trouble with the Indians occurred when gold was discovered on the Nez Perce Reservation. The sanctity of the solemn treaties could not stop the rush of the gold-hungry prospectors. A new treaty reduced the reservation to a fraction of its original size. An attempt on the part of the U. S. Army to force the recalcitrant portion of the Indians onto this reservation resulted in the Nez Perce War of 1877. Although the Indians fought masterfully, the war ended in their defeat and humiliation. Now the intruder and the native live peacefully side by side. Ranching, farming, mining, logging, trade, and industry are familiar parts of the scene (Harris, 1970).

On May 15, 1965, Congress authorized the Secretary of the Interior to designate ". . . various component sites in Federal and non-Federal ownership relating to the early Nez Perce culture, the Lewis and Clark Expedition . . . , the fur trade, missionaries, gold mining, and logging, the Nez Perce War of 1877, and such other sites as he finds will depict the role of the Nez Perce country in the westward expansion of the Nation." As a result, the Nez Perce National Historical Park was formed to be administered by the National Park Service. The new park is the first of its kind in that it does not consist of a single land mass, but is composed of 23 separate sites located throughout the Nez Perce country. Five of the sites are adjacent to the lower Clearwater River between Lewiston and Orofino. Brief descriptions of these sites, adapted from more detailed accounts by Harris (1970), are given in the following paragraphs:

1. Mackenzie's Trading Post. Opposite River Mile 1.5.

In 1811, Donald MacKenzie (sometimes spelled McKenzie), a member of the Wilson Price Hunt overland expedition sent out by the Pacific Fur Company, constructed a small fort-like post on the north bank of the river opposite modern Lewiston. His intention was to establish a fur trade with the Nez Perce Indians. However, these Indians, though friendly, had no knowledge of the fur business nor did they desire to become trappers in the streams which emptied into the rivers. Consequently, Mackenzie's post did not survive a year. Although a failure, it was the

first establishment in Nez Perce country and the small group of men who manned it were the first Caucasian people to settle, however briefly, on Nez Perce land.

2. Coyote's Fishnet. Opposite River Mile 7.5. Nez Perce culture is rich in the folklore of Coyote. He was the all-powerful and omnipotent spirit who oversaw the pursuits of the people, ministered to their needs and wants, and rendered judgment when required. Coyote's Fishnet is one of three park sites dealing with Nez Perce legend and myth. The most popular version of the legend at this site tells of Coyote fishing for Salmon on the river using a huge net. Angered by Black Bear, who accused Coyote of neglecting to go to the buffalo country with his people, he hurled the fishnet far up on the hill on the south side of the river and threw Black Bear up on the north side and turned him to stone. Both the fishnet and Black Bear can be seen where Coyote threw them.
3. Ant and Yellowjacket. Opposite River Mile 10.5. This is another site dealing with Nez Perce folklore. There are several variations of the story in Indian mythology, but all variations follow the general theme of a fight between the leader of the ants and the leader of the yellow-jackets over the use of a certain rock upon which to eat salmon. During the fight, Coyote passes by and orders the two combatants to stop, but to no avail. So Coyote invoked his magic medicine, and just as ant and yellow-jacket were arched together, he turned them to stone. The arched stone is visible on the north side of the river above U. S. 12.
4. Spalding. Opposite River Mile 12.0. Here is the headquarters of the Nez Perce National Historical Park. This 140 acre site is centered on both sides of the mouth of Lapwai Creek and was a favorite Nez Perce camping ground. The site is named after Rev. Henry H. Spalding, who by invitation of the Nez Perces, established a mission in the Lapwai Creek valley in 1836. At first, he, his wife

Eliza, and several helpers, lived and worked at Thunder Hill, two miles south of here, but mosquitoes and lack of Indian interest caused him to move to this location in 1838. Work progressed until trouble with other Indian tribes culminated in the massacre of Dr. and Mrs. Marcus Whitman at the Waiilatpu Mission, 100 miles to the west, in 1847. The Spaldings, fearful of reprisals, abandoned their mission home and went to Oregon. Spalding returned twice to resume his work among the Nez Perce and died here in 1874. He and Eliza are buried in Lapwai Mission Cemetery on these grounds. The Bureau of Indian Affairs moved the Nez Perce Agency from Walla Walla to this location in 1860 where it remained, except for one brief period, until 1904. The village of Spalding contained hotels, stores, saloons, a railroad station, blacksmith shops, and other businesses. The last of these, Watson's General Merchandise store, closed in 1964. The building is within the Park and plans call for its restoration. Other plans call for a large visitor center (museum), offices, a new picnic area, walks, trails, and interpretive facilities.

5. Canoe Camp. Opposite River Mile 40.5. The Canoe Camp site is located on the south side of Clearwater River opposite the mouth of the North Fork. It was here that the members of the westbound Lewis and Clark Expedition decided to leave their horses in the care of the local Nez Perce chief, Twisted Hair, and continue on in canoes. Camp was set up September 26, 1805, and work began on making five canoes from large ponderosa pine trees which were plentiful on the site. The explorers followed the local Indian method of constructing canoes--by burning out the hollow of the logs. Work went slowly as some of the men were weak from stomach disorders contracted on the Weippe Prairie from eating unfamiliar roots and other food after a period of near starvation while crossing the Bitterroot Mountains. On October 6 the canoes were ready and the journey was continued to the Oregon Coast. The horses, which had been procured from Shoshoni Indians near present-day

Salmon, Idaho, were left in the care of Chief Twisted Hair and packsaddles, gunpowder, and musket balls were cached to be recovered on the return trip in the Spring of 1806.

In addition to the museum that will be constructed at headquarters of the Nez Perce National Historical Park, there are presently historical museums at Lewiston (Luna House) and near Arrow (Arrow Museum on the north side of the river opposite River Mile 14.6). The latter museum contains Indian artifacts and pioneer implements.

VI. PRESENT SHORE AND ADJACENT LAND CONDITIONS AND NON-RECREATIONAL USES

Vegetation

The majority of the area surveyed is covered by two easily distinguishable plant communities. The forested or brushland area contains the Pseudotsuga/Physocarpus (douglas-fir/ninebark) union and a Festuca-Agropyron (bunchgrass) community on the grassy slopes and along the breaks. The riparian (shoreline) vegetation along the river consists primarily of wood species of the genera Salix (willow), Populus (cottonwood), Alnus (alders) and Fraxinus (ash). In addition, Pinus ponderosa (ponderosa pine) and Pseudotsuga menziesii (douglas-fir) frequently are found in a stream-side position and on benches where the substrate is coarse and well drained.

Although the riparian vegetation is composed of species adapted to annual fluctuations in streamflow, the extensive disturbance of past highway and railroad construction, as well as continuing right-of-way maintenance and recreational use appear to have checked the growth of vegetation to some degree over the entire portion of the river under consideration.*

A good share of the douglas-fir/ninebark community is dominated by ponderosa pine acting as a seral species on the douglas-fir/ninebark climax site. Most, if not all, of the timberland has been logged or burned over at one time or another and there is very little change for extensive

*Written communication, Dr. Robert A. Hursey, Assistant Professor of Forestry, Humboldt State College, 1970.

logging on the area due to small stem size, steep slopes, limited volume, and the patchwork ownership patterns. Most of the timbered area is not suitable for commercial timber sites due to steep slopes or thin soils, so timber production potential is not great. Logging on this area, however, should not be discounted as a possibility. Because of small ownership patterns, long-range management is often not considered, and timber may be cropped at any time as a ready-cash crop by the owner. If this is the case, chances are that the area will not be planted or reseeded, and the understory will take over with very slow natural replacement of trees taking place.

Because the forested areas generally are in seral condition, they are attractive and the screening effect of the tall brush species makes them valuable to recreation. However, the steep slopes and shallow soil do not present many areas with recreational potential aside from the present river bank areas.

The bunchgrass communities have by and large been invaded by annual bromes, with Bromus tectorum (cheatgrass) being the principal invader. This has severely lowered the protein production value of the area, but has not completely eliminated its value. Cheatgrass is a good producer of forage for a short period in the spring while it is green. The invasion of this area by cheatgrass has been due largely to past overuse of the range, leaving it in a disturbed condition from overgrazing and trampling which cause the small terraces readily visible on the steep slopes. These areas then, are potential good range production areas, but at present are generally in poor condition.

Wildlife

Several species of furbearers utilize the banks of Clearwater River. These include bank beaver, mink, muskrat, otter and weasels. Raccoons utilize the shoreline heavily for food such as crayfish and frogs. Both beavers and otters were observed during the boat trips down the river.

Upland game such as mountain quail, valley quail, pheasants, and chukars are present in relatively abundant numbers. Numerous coveys of quail and pairs of chukars were observed along the shore during the survey.

Canada geese are present year-round and nest in the islands on the lower Clearwater near the pool behind the WWP Dam. The Idaho Fish and Game Department presently has several nesting platforms on the lower

Clearwater islands. Migrating ducks utilize the river for nesting during the spring and small numbers of mallards and mergansers remain all year. Many types of songbirds flourish in the cover adjacent to the river and along the upland breaks.

There is a bird sanctuary along the lower Clearwater River extending from the WWP Dam at Mile 4.6 to the old Spalding bridge at Mile 12.0.

Agriculture

Because of the steep slopes present in the basin area, agriculture is limited to the flood plain along the river and the rolling hills present along portions of the north side.

According to the U. S. Soil Conservation Service, the present flood plain land that is being farmed comprises about 1,500 acres with about 750 acres being actively irrigated. The irrigation potential is approximately 2,000 acres.

Some of the potentially irrigable lands would require an expensive irrigation system and necessitate using high yield crops such as grapes or fruit orchards to be economically feasible.

Wheat is grown on the high benches and moderate slopes of the south side. Melons are grown on both irrigated and non-irrigated lands near the confluence of Potlatch River and Clearwater River.

To summarize, approximately 1,400 acres are now being farmed on moderate slopes, mostly in grain crops, 1,500 acres of flood-plain type land are being used for hay or melon crops, and the remaining 9,600 acres are either forested or grass lands, usually situated on steep slopes.

Transportation

The lower Clearwater Basin generally is well served by railroads, highways, and secondary roads. Plate I shows the railroad and highway networks adjacent to Clearwater River downstream from Orofino. The major transportation facilities are described in the following paragraphs.

The Burlington Northern, the Union Pacific, and the Camas Prairie railroads (the latter being owned jointly by the first two) are involved in the rail service of the Clearwater Basin. The Camas Prairie Railroad originates at Riparia, Washington, extends up the north side of Snake and Clearwater rivers, and crosses over the latter at River Mile 0.6 on a seven-span steel truss bridge into Lewiston. From Lewiston it follows the

Clearwater River to Stites with a principal branch at Spalding which serves Grangeville and the Camas Prairie and with secondary branches to Headquarters, Winchester, and Nezperce. A branch of the Burlington Northern Railroad from Spokane passes through Moscow, Idaho and thence down Little Bear Creek and the Potlatch River Canyon to its entrance into the lower Clearwater Canyon at Arrow.

Only the portion of the main line of Camas Prairie Railroad between Lewiston and Ahsahka is of concern in this study. This railroad is a single track system with a yard at Lewiston and sidings at Potlatch Forests Inc. mill, North Lapwai, Arrow, Agatha, Lenore, Peck Station, and Ahsahka. The line follows the south side of Clearwater River from Lewiston to River Mile 12.4 at which point it crosses on a six-span steel truss bridge to the north bank of the river where it remains until it crosses back to the south bank below Kamiah. The track follows a river grade with a mean slope of about six feet per mile. The roadbed is of standard ballasted cross section which lies about 25 feet above the average water level of the river.

The time table for the Lewiston-Stites subdivision of the railroad shows schedules for four eastbound and four westbound freight trains most of which operate each day of the week except Sunday. One of the eastbound and one of the westbound trains are Burlington Northern freights.

The principal items of commerce transported by the railroad are grain and timber products. Adjacent to the railroad there are three grain elevators at Lenore, one at Cherry Lane, and two at Peck Station with a combined capacity of over 1,000,000 bushels. However, a large percentage of the grain tonnage comes from Camas Prairie and is hauled over the portion of the railroad between Spalding and Lewiston. In the vicinity of the lower Clearwater, there are four sawmills at or near Orofino, and one each at Ahsahka, North Lapwai, Lewiston, and Clarkston with a total production capacity of nearly 1,000,000 board feet of lumber per day. Also, there is a cedar pole company just upstream from the Dworshak National Fish Hatchery at Ahsahka. The total revenue traffic handled by the railroad in 1969 was 766,409 tons.

Railroad officials indicate that very little damage to the roadbed is experienced from flows of Clearwater River during the high runoff period in the spring. Most flood damage results from high flows in the small

tributaries of the river. Profile studies of Clearwater River show that at bank-full capacity, which is almost identical with the stages of the 1948 flood (168,000 cfs below the North Fork near Ahsahka and 177,000 cfs near Lewiston), the Camas Prairie Railroad would be slightly overtopped in the vicinity of river miles 8 and 9 and the water surface would be nearly the same level as the roadbed for about 25 percent of the remainder of the line between Lewiston and Ahsahka. It seems extremely unlikely that any flow regulation at Dworshak Dam, even for a flood comparable to that of 1948, would result in higher stages in the lower river than existed during the flood of 1948. On the contrary, flood-control regulation at Dworshak should materially lessen the flood flows in the lower Clearwater. The railroad grade is well-riprapped in locations vulnerable to flood damage. As a result, flow fluctuations caused by discharge regulation at Dworshak should have little, if any, effect on the railroad between Ahsahka and Lewiston.

In the event that it is deemed advisable to dampen stage fluctuations due to discharge regulation at Dworshak by construction of a re-regulating structure somewhere between Lewiston and Ahsahka, the railroad will have to be relocated. This would create steeper grades for the railroad below the re-regulating structure, but in view of the existing low grades, slightly steeper grades should present no particular problems. The re-regulating structure should be of benefit in providing additional protection to the railroad embankment from high-stage flows. The main objection to the railroad relocation, as well as to the re-regulating structure itself, would be the disruption of the existing environment.

The principal highways in the vicinity of the lower Clearwater River are U. S. 12, U. S. 95 and Idaho 3. U. S. 12 is referred to as the Lewis and Clark Highway, and U. S. 95 is sometimes called the North and South Highway. U. S. 12 enters Lewiston from the west after crossing Snake River on the Interstate Bridge. After passing through Lewiston it crosses Clearwater River to North Lewiston over the Memorial Bridge, a 12-span concrete deck-type structure at River Mile 2.0. From North Lewiston it extends up Clearwater River to Spalding where, at present, it crosses back to the south side of the river on an old two-span steel truss bridge at River Mile 12.0. From Spalding it passes eastward through the study area along the south side of the river. The portion of U. S. 12 from

Lewiston to River Mile 4.6 at the WWP Dam consists of four lanes. The remainder of the highway is of standard two-lane, primary-system cross section.

U. S. 95 enters the lower Clearwater Canyon at Spalding, turns down the south side of Clearwater River to North Lapwai where it crosses to the north side over a nine-span steel plate-girder bridge at River Mile 10.4. The highway continues down the north side of the river, coinciding with U. S. 12 as far as North Lewiston, at which point it leaves the river and climbs the 2,000-foot bluff to the north. Except for the four-lane section between the WWP Dam and North Lewiston, the highway is of standard two-lane, primary-system cross section.

State Highway 3 begins at the junction with U. S. 12 north of Spalding and extends up the north side of Clearwater River to Arrow and thence up the Potlatch River Canyon. The portion from the junction with U. S. 12 to Arrow is of comparatively new construction and conforms with modern two-lane, primary-system standards.

Bids are to be received in 1970 to construct a bridge across Clearwater River at River Mile 14.8 to reroute U. S. 12 to the north side of the river between Spalding and Arrow. This bridge will be similar to the plate-girder highway bridge at River Mile 10.4. The old truss bridge at River Mile 12.0 probably will be removed. No other major highway improvements between Lewiston and Ahsahka have been programmed for the period 1970-1975. The principal highway work in this area for the next few years will be involved with safety construction--pavement overlays, roadbed widening, and the installation of guard rail.

The following table shows 1969 average daily vehicular traffic (ADT) on U. S. 12, U. S. 95, and Idaho 3.

<u>U. S. 12:</u>	ADT
Idaho-Washington state line to Lewiston	
city limits	20,300
North Lewiston junction to North Lapwai	
junction	5,200
North Lapwai junction to Spalding.	2,900
Spalding to Lenore	2,000
Lenore to Clearwater - Nez Perce county line.	1,900
Clearwater - Nez Perce county line to Orofino	
junction	3,700

<u>U. S. 95:</u>	ADT
Lapwai to North Lapwai junction	2,300
North Lapwai junction to North Lewiston junction	5,200
North Lewiston junction to Idaho-Washington state line	3,100
 <u>Idaho 3:</u>	
Spalding junction to Arrow	850

All three of the highways described above follow the river grade and for each highway the minimum height of the roadway above the average water level of the river is about 20 feet. During the flood of May, 1948, U. S. 12 was overtopped in numerous places between Spalding and Orofino which caused extensive damage to the highway. In addition to rebuilding the roadbed in many places, repair work included the placement of large quantities of dumped riprap on slopes which were severely exposed to erosion by the river. As a result of this large amount of protective riprap, the highway receives practically no damage from river flows during high runoff periods. For this reason, as with the railroad, it is concluded that river flow fluctuations caused by discharge regulation at Dworshak dam should have little, if any, effect on highways between Ahsahka and Lewiston.

As with the railroad, construction of a re-regulating structure somewhere between Lewiston and Ahsahka would require relocation of one or more of the highways. This would cause no particular problems in grade or alignment for the highways, but relocations would disrupt the existing environment.

In addition to the streets in Lewiston, East Lewiston, and North Lewiston, which will be protected from flooding by dikes in connection with the Lower Granite navigation project, there are several secondary roads adjacent to Clearwater River between Lewiston and Ahsahka. One of these is the old river road which extends up the north side of the river from a connection to Idaho 3 at Arrow to an old three-span steel truss bridge at Myrtle (River Mile 18.3) where it crosses to the south side of the river to a connection with U. S. 12. A road leaves U. S. 12 at Cherry Lane and crosses to the north side of the river on an old four-span steel

truss bridge (River Mile 21.4) and extends up the river to Lenore, at which point it crosses back to the south side of the river on a four-span steel bridge (River Mile 28.8) to a connection with U. S. 12. A third road extends about a mile down the north side of the river from Ahsahka at which point it leaves the river to climb the steep bluff to the Southwick Prairie.

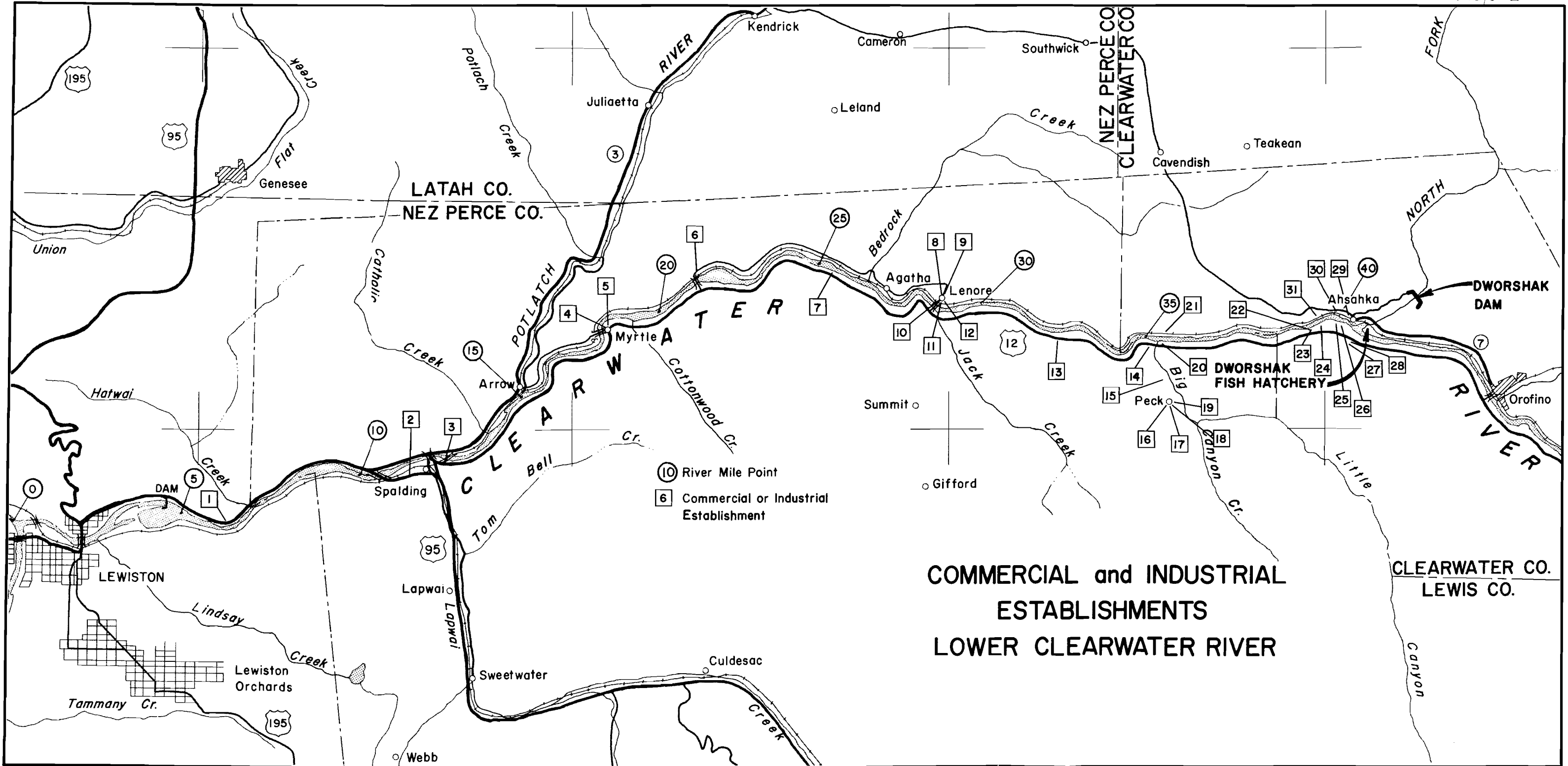
The first two roads described above are generally single track roads which have been graded, drained, and surfaced with gravel for all-weather travel. The road described last is a two-lane, but somewhat narrow, road with a bituminous surfacing. Except for the terminus of the road at Myrtle, all three of the roads lie on the uphill side of the Camas Prairie Railroad. For this reason, they would not be affected by fluctuations of the water surface of Clearwater River.

There is a considerable amount of recreational boating on Clearwater River as described in the sections on recreation. Since the 1920's Potlatch Forests Inc. has each spring floated sawtimber down the North Fork Clearwater River and thence down the main stem of the river to the mill-pond near Lewiston. However, with the construction of Dworshak Dam these long drives will be phased out, at which time there will be no commercial navigation on Clearwater River in the usual sense of the term.

Commercial and industrial establishments

Thirty-three active business establishments were identified and located at 31 sites in the area covered by the survey. Twenty of the businesses are located along U. S. 12. The others are located along U. S. 95, on the north side of the river at the Cherry Lane Bridge, at Lenore, at Peck, and at Ahsahka. There are seven mobile home trailer courts, nine stores and service stations, six granaries, two lumber mills, four restaurants and bars, two motels, one U. S. Army Corps of Engineers residents engineers office, one abandoned sand and gravel company, one new structure to house a farm machinery company, and one mobile home sales lot.

The distances used to locate these businesses were river miles. Each commercial or industrial establishment is listed in order as the river is ascended. The approximate location is indicated on Plate II by a number enclosed in a square; for example 18 . Each establishment in the surveyed area is discussed below:



- [1] The first of two business establishments along the lower river is a new structure being built by the Nez Perce Tractor Co. The building site is at River Mile 6.2 and it is about one-half to two-thirds complete at the time this report is being written. The building is situated on the north side of the river and U. S. 12-95. It is a large building which appears to be a repair shop, a sales room, and an administrative unit. The second business establishment located at Site [1] is the Tiki Club, a night club located at River Mile 7.0 on the north side of U. S. 12-95, and on the east side of Hatwai Creek.
- [2] The business establishment located at Site [2] is the Clearwater Lumber Company located at River Mile 11.0 on the south side of the river and north of U. S. 95. This is a relatively large lumber mill with an annual production of about 35 million board feet.
- [3] The Spalding Rock Hound Shop located just east of the Nez Perce National Park site at Spalding, Idaho is the business establishment located at Site [3]. This shop is located on the south side of the river at River Mile 12.1 and is on the north side of U. S. 12. It specializes in the sale of gem stones and antiques.
- [4] [5] The next two businesses are located at River Mile 18.2 at Myrtle, Idaho. The business establishment located at Site [4] is Jim's Playroom #1, a combination restaurant, bar and store located on the north side of U. S. 12. Business [5] is McKay's Trailer Park which had five trailers in residence when last observed. Located at this site there is also a separate group of five cabins which are rented on an intermittent basis.
- [6] A grain elevator owned by Lewiston Grain Growers, Incorporated, is located on the north side of the river across the Cherry Lane Bridge at River Mile 21.4. This elevator has a capacity of 257,000 bushels of grain, and is situated along the railroad right-of-way.
- [7] A service station, restaurant, and bar called "Pat's Place" is located at River Mile 24.8.
- [8] [9] [10] [11] [12] Five commercial establishments are located at Lenore (River Mile 28.8). These consist of [8], a U. S. Post Office, and

[9] [10] , and [11] , which are all granaries owned by the Lewiston Grain Growers, Incorporated. These granaries have a combined capacity of 478,000 bushels and are located on the north side of the river. Business [12] is Chuck's Pay Less Gas and Groceries service which is located across the river at the junction of the bridge.

[13] Moores Mobile Village is located at River Mile 33. This trailer court has about 8 trailers and is located on the south side of U.S. 12.

[14] The Canyon Inn Restaurant is located at River Mile 35.2 just east of the Peck junction. This establishment is a small restaurant and bar. In addition, hunting and fishing supplies are sold.

[15] [16] [17] [18] [19] The next five commercial businesses listed are located at or near Peck, Idaho. The first of these [15] is a "Union 76" gas and oil distributor located on the west side of the access road to Peck, about 0.8 miles from the junction with U.S. 12. [16] is a small trailer court located across the road from [15] , which has about 3 trailers in residence. [17] is also a trailer court located on the east side of the access road about 1.5 miles from the junction. The Ceramic Studio [18] located about 1.4 miles from the Peck junction, is a small store where pottery is made and sold. The Peck Store and Service Station, and the Peck Post Office [19] are located 1.8 miles from the junction. These two establishments are located across the street from each other.

[20] [21] The next two commercial establishments are grain elevators owned by the Lewiston Grain Growers, Incorporated. These two elevators are located across the river from each other at about River Mile 35.4. The granary on the south side of the river has a capacity of 166,000 bushels and is currently being used. The granary on the north side of the river, which had a capacity of 200,000 bushels, has been abandoned.

[22] [23] [24] Three establishments are located at the west edge of Riverside, Idaho, and are all trailer courts. There are about 60 trailers in these three courts which are located between River Mile 40.0 and 40.3, on the north side of U.S. 12. The

names of these trailer courts are respectively Hidden Village Trailer Court, Clearwater Trailer Court and Cabins, and Vacation Land Mobile Court.

- [25] Lefty's Tackle Shop is located at the Vacation Land Trailer Court. This is a small fishing tackle and bait shop which also sells other miscellaneous supplies.
- [26] The Vacation Land Motel is located at River Mile 40.3 next to the Vacation Land Trailer Court.
- [27] Ideal Homes Trailer Sales is a mobile home sales lot located at River Mile 40.4 on the south side of U. S. 12.
- [28] A Pay Less Service station located at River Mile 40.5, on the south side of U.S. 12.
- [29] U. S. Army Corps of Engineers, Resident Engineers Office is located at River Mile 40.5 at the confluence of the North Fork of the Clearwater River and the Clearwater River. This office is south of the Ahsahka-Southwick Road and west of the North Fork of the Clearwater River.
- [30] The Ahsahka Lumber and Planning Mill, Inc. is located at River Mile 40.4 south of the Ahsahka-Southwick Road. This mill employs 75 people and has an annual output of about 38 million board feet of lumber.
- [31] The Columbia Sand and Gravel Company located at River Mile 40.3 south of the Ahsahka-Southwick Road was the last commercial and industrial establishment surveyed in the report. This facility is no longer in use.

In addition to the businesses reported in this section of the study, the Burlington Northern, Union Pacific, and Camas Prairie railroads operate through this area. The scope of their activities is covered in a preceding section of this report.

In addition to those reported above there are several other small part time businesses. These consist of two fruit stands which sell local produce (in season). One of these is located at Hatwai Creek at River Mile 7.0, and the other is located near Arrow at River Mile 15.5. Also, there are several lots which have 1 to 3 trailers which are rented on an individual basis. Most of these lots are located near Peck and Riverside.

The thirty-three establishments surveyed in this report cover all of the significant business activity along the lower Clearwater River with the exception of the Lewiston, Idaho area. The total employment in the area was estimated to be 344 people (Table 1).

Table 1. Estimated employment data for the lower Clearwater River

Type of business	Number of businesses	Number of employees*		
		Permanent	Temporary	Total
Lumber companies	2	150	----	150
U. S. Army Corps of Engineers	1	102	----	102
Stores, etc.	8	17	----	17
Trailer courts and sales	8	16	----	16
Railroads	1	10	5	15
Farm machinery sales and repairs	1	15	----	15
Restaurants	4	14	----	14
Granaries	6	7	3	10
Motels	<u>2</u>	<u>5</u>	<u>----</u>	<u>5</u>
	33	333	8	344

*Sources: Idaho Employment Department
Lewiston, Idaho;

Clearwater Lumber Co.
Spalding, Idaho;

U.S. Army Corps of Engineers
Resident Engineer's Office, Ahsahka, Idaho.

The largest employers in the area are the lumber companies and the U. S. Army Corps of Engineers. In the case of the Corps of Engineers, this employment is on a short-term basis related to the construction of Dworshak Dam. The employment shown for the farm machinery sales and repairs is estimated on the basis of the number of people expected to work at the Nez Perce Tractor Co. building when it is finished.

The importance of the lower Clearwater River economic activity can also be measured in terms of the commodities produced in the area. The five granaries in the area handle the following agricultural commodities; wheat, barley, oats, peas, Austrian winter peas, Rape seed, grass seed, and clover seed. The total tonnage of grain, peas, and seeds handled by these grain

elevators is about 200,000 tons. Most of these commodities are shipped by rail but trucking accounts for an estimated 28% of the total shipments.

Another important commodity of the locality is finished lumber, and about 70 million board feet of lumber are produced by the two mills operating in the area.

To summarize, the lower Clearwater River has 33 commercial and industrial establishments between the Washington Water Power Dam at River Mile 4.6 and the confluence of the North Fork of the Clearwater River at River Mile 40.5. These businesses employ approximately 344 people. The two lumber mills produce about 70 million board feet of lumber products annually. The five granaries store, clean, and ship about 200,000 tons of grain annually.

It was not possible to estimate the value of the goods and services produced and provided because of the time constraints on this project and the fact that such detailed information was not considered essential to the proposed research project.

Municipal and industrial water

Tables 2 and 3 illustrate the amount of municipal and industrial water withdrawn in the Lewiston-Ahsahka reach of Clearwater River:

Table 2. Municipal water withdrawal along lower Clearwater River

City or village	Population	Annual withdrawal (gallons)	Daily withdrawal per capita (gallons)
Lewiston*	12,500 (1960)	1.80×10^9	394
Spalding**	200	1.09×10^7	150
Myrtle**	24	1.30×10^6	150
Lenore**	30	1.60×10^6	150
Ahsahka**	150	0.82×10^7	150

*Data obtained from Thurston D. Coons, Director of Public Works, Lewiston, Idaho. Water is obtained from Clearwater River.

**Quantities estimated on basis of 150 gallons per capita per day. Water is obtained primarily from wells drawing from Clearwater River's subsurface flow.

Table 3. Industrial water withdrawal along
lower Clearwater River

Company	Location	Annual withdrawal (gallons)
Potlatch Forests, Inc.*	Lewiston	1.3×10^{10}
Dworshak Fish Hatchery*	Ahsahka	1.6×10^{10}

*Almost all of the water diverted from the Clearwater or North Fork is returned to the river.

Farm and retirement homes

At the present time, most of the domestic dwellings in the survey area are small family-type farms. However, there is a trend developing to non-farm type homes and retirement homes. The relatively mild temperatures prevailing in the valley during the winter, the excellent scenic sites, and the ease of access to neighboring communities make the area attractive for development.

Although the potential home sites are attractive from scenic aspects, weather, and access, the shallow soils and steep slopes would require a well-designed and operated soil absorption system or its equivalent to properly dispose of sanitary waste. Any potential home-site developer would either have to install an expensive sanitary system to accommodate any grouping of small acreage sites, or develop large acreage sites with adequate drain fields.

These facts seem to be limiting the dense development of homes in the valley. Because a major part of the scenic value of the valley is the undeveloped, forested, and grassy hillsides, future development on these sites would probably result in degradation of this value.

VII. FISHERIES ASPECTS

The use of Dworshak Dam and reservoir as a hydroelectric peaking facility will result in rapid changes of downstream river levels. The ecological impact of these fluctuations in water level and water quality on resident and anadromous fish populations must be determined to find the optimum relationship between power production and fish habitat.

Two ongoing research projects, financed by the Corps of Engineers, should provide much of the basic information essential to assess the environmental effects of fluctuating water level in the lower Clearwater River. Dr. Michael Falter is heading a study which will describe pre-Dworshak algal and insect communities, their distribution, and provide estimates of production. Idaho Fish and Game Department personnel will monitor changes in water quality and flows and relate these to changes in the abundance of game fish (primarily smallmouth bass and trout), and rough fish.

Resident game fish populations consist of substantial numbers of smallmouth bass (Keating, 1970), and a relatively few rainbow trout, dolly varden, and whitefish. Large rough fish populations of squawfish and suckers occur, as well as a few catfish and carp.

Substantial runs of steelhead, averaging about 25,000 fish from 1959 to 1969, pass through the lower Clearwater. Although inadequate fish passage facilities at the WWP Dam virtually eliminated chinook salmon in the Clearwater, prospects are good that runs can be reestablished. In 1969, over 2,500 chinook entered the Clearwater, as compared to runs ranging from 5 to 136 in the early 1960's. Idaho Fish and Game Department biologists estimate that the entire Clearwater River basin could support approximately 25,000 adult spawners.

A brief review of the literature revealed that, with the exception of a study of smallmouth bass (Keating, 1970) and the two previously mentioned ongoing projects, no fisheries-related research has been conducted on the lower Clearwater River. No attempt was made to conduct an extensive search of the literature for background information pertaining to the potential ecological problems related to river level fluctuations.

The fishing effort on the lower Clearwater is primarily for steelhead and smallmouth bass. Bass are the most sought after fish during the summer months, and the majority of the fishing is done by bank anglers between the WWP Dam and Lenore.* The steelhead season usually starts during September for the summer run, and fishing continues for the spring run through to April. Considerable angling effort by both bank and boat

*"Evaluation of game and rough fish populations below Dworshak Dam and the relationship to changes in water quality". Unpublished progress report by W. Cannon, 1970.

anglers for steelhead occurs along the entire lower river during the fall, winter (weather permitting), and spring.

Steelhead and bass can be caught along the entire lower Clearwater from the bank, by wading, and from boats. Currently, the great majority of fishing is done by residents living within the drainage basin, and by a relatively few non-residents from Montana and Oregon (Gordon, 1970). However, with the demand for sport fisheries in general, and for high quality fisheries in particular, increasing rapidly, it is inevitable that an ever greater number of non-resident anglers (as well as residents) will take advantage of the excellent Clearwater steelhead fishery.

In conjunction with increasing demand, the filling of Little Goose pool and the construction of lower Granite Dam will force anglers accustomed to fishing these stretches of the Snake River to look farther afield for steelhead and salmon angling in a free flowing river. The lower Clearwater is one logical place to satisfy this demand.

VIII. RECREATION AREAS AND USES

The use of the Clearwater River for recreation can be correlated directly to the time of year, water level, water temperature and ambient temperature. During June, July, and August, the river is used extensively for swimming, floating, and smallmouth bass fishing. From the middle of September through the middle of April the steelhead run is on and the river is very heavily used by fishermen. The months of October and November are normally the most productive for steelhead (Keating, 1969). Use of small boats during that time is heavy compared to other periods. People employing guides for steelhead fishing on the lower Clearwater is increasing, especially by non-residents.

Major recreation sites

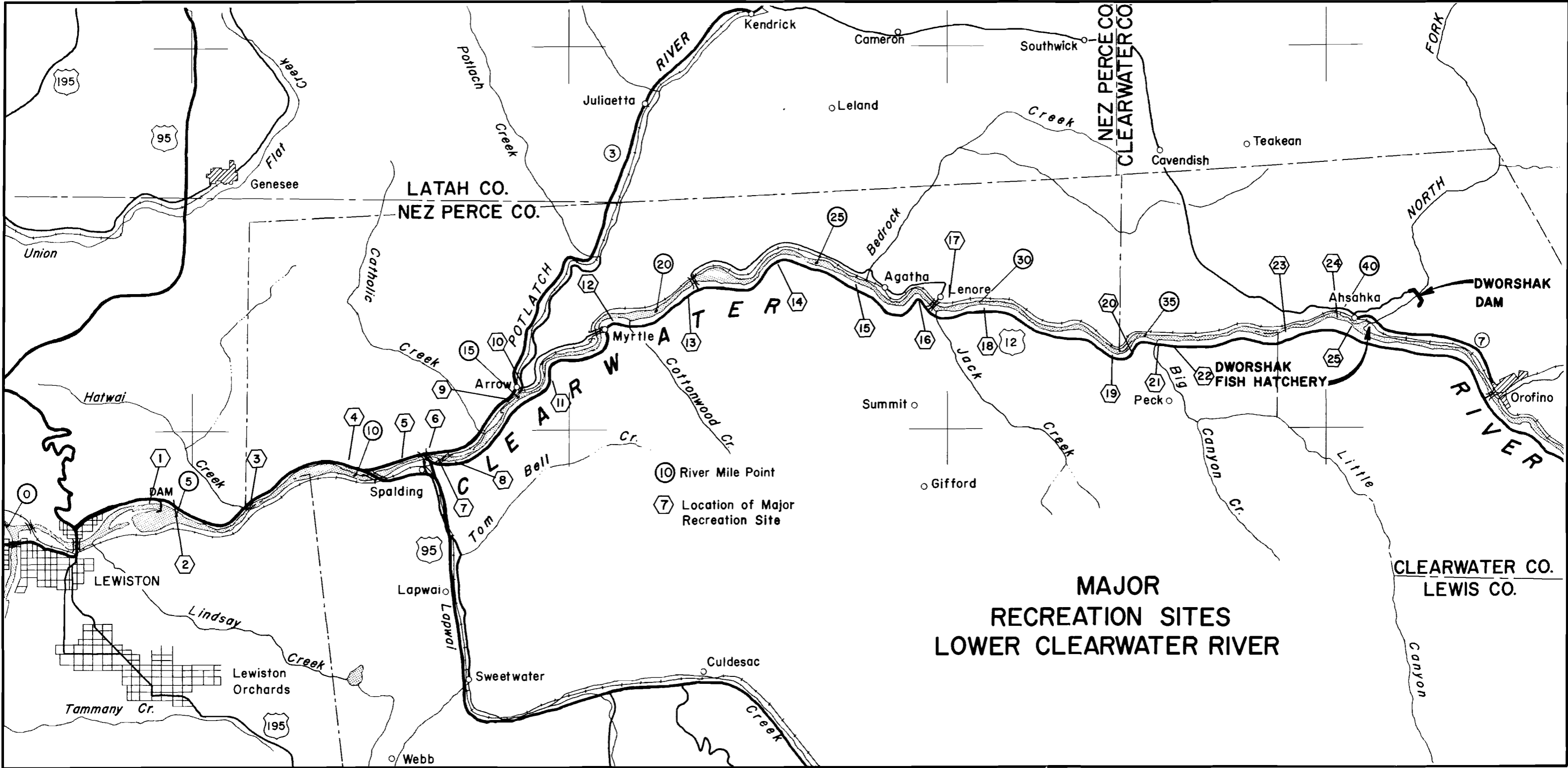
Major automobile access points, boat launching sites and beach areas along the lower Clearwater River are listed and briefly described below. As with the listing of commercial and industrial establishments, river mileage is used to locate the various points of interest. Each site number is enclosed by a hexagon which is followed by the river mile and the letter N

or S denoting whether the site is on the north or south side of the river. The general location of each site is shown on Plate III.

- ① 4.5 N. Access road off of U. S. 12 just below the WWP Dam. This is an unimproved boat-launching area. It is used extensively in the fall by steelhead anglers.
- ② 4.8 N. Unimproved access road off of U. S. 12 used for boat launching during the spring by local residents seeking bullhead catfish.
- ③ 7.1 N. Old access road off of U. S. 12 leading down to the river. Access rights to this area for boat launching facilities are being sought 0.1 miles above Hatwai Creek by the Idaho Fish and Game Department.
- ④ 8.5 N. Old access road off of U. S. 12 below Hog Island. This is an excellent boat launching facility.
- ⑤ 9.8 N. Access off of U. S. 12 used by fishermen who carry their boats approximately 500 feet for launching.
- ⑥ 11.9 N. Access off of U. S. 12 to a small beach area used extensively for steelhead fishing in the fall. Boats are launched by carrying them down the riprap slope to the beach.
- ⑦ 12.0 S. Good access to the river from the Nez Perce National Historical Park. This beach, with excellent picnicking facilities, is used extensively by local residents.
- ⑧ 12.4 S. Access off of U. S. 12 near the railroad bridge. This access area is used mostly in the fall by steelhead fishermen.
- ⑨ 14.5 N. Access from Idaho 3 across the railroad tracks to Turkey Island. The Idaho Fish and Game Department has plans to provide a boat launching facility and eventually a park at this excellent beach area.
- ⑩ 15.2 N. Access from Idaho 3 at Arrow used very extensively by bass fishermen during the spring. The beach is a good recreational area during the summer.
- ⑪ 15.8 S. Access off of U. S. 12 to Little Mrytle Beach at Gibsons Eddy. This site, owned by the Idaho Department of Highways,

is to be acquired by the Idaho Fish and Game Department for a permanent boat launching ramp. It is a popular steelhead and bass fishing area consisting of an excellent beach and gravel bar with good access and parking space for vehicles.

- ⑫ 18.3 S. Myrtle Beach has good access from the old river road or directly off of U. S. 12 at Jim's Playroom Resort. The beach, which is excellent, especially in periods of low water, is used very extensively by both local residents and tourists. It is fair for boat launching. Camping facilities and supplies are available nearby.
- ⑬ 20.5 to 22.0 S. Access is excellent all along this strip of privately-owned land (Kirby brothers) near the Cherry Lane Bridge off of U. S. 12. The Idaho Fish and Game Department is working out a 10-year access right agreement for fishermen. The launching of boats can be made with ease. This stretch of the river probably is used more than any other by steelhead fishermen (Keating, 1969).
- ⑭ 23.9 to 24.5 S. Access is fair off of U. S. 12 to this beach and fishing site. Launching conditions are fair for small boats only.
- ⑮ 26.8 S. Access is fair off of U. S. 12 to this fishing and small beach site.
- ⑯ 27.6 to 28.3 S. Access off of U. S. 12 is excellent at several places along this strip at Big Eddy which is owned by the Idaho Department of Highways. The beach, which is one of the best along the Clearwater, is used extensively in the fall by steelhead fishermen and in the summer by bass fishermen. The site is important for its archaeological value and it presently is being studied and evaluated by Professor Earl H. Swanson and his students from Idaho State University. Future plans include a rest area and picnic facilities at this site.
- ⑰ 28.8 N. Access from Lenore to a small beach and boat-launching area.



- ⑮ 29.9 to 32.1 S. There is fair access off of U. S. 12 to this strip which is used for fishing and for launching small boats.
- ⑯ 34.1 S. There is fair access off of U. S. 12 to this good beach which receives light use for swimming.
- ⑰ 34.3 S. Access off of U. S. 12 to the Kayler Rest Area which is used for picnicking and overnight camping. Although there is an excellent view from here of the Harpers Bend area, there is no beach, and swimming conditions are poor.
- ⑱ 35.3 S. Excellent access off of U. S. 12 at the Peck junction for fishing at the confluence of Big Canyon Creek and Clearwater River. The land is owned by the Nez Perce Indians but at present it is not posted.
- ㉑ 35.5 S. Fair access off of U. S. 12 to this site which could be used for launching small boats.
- ㉒ 35.5 to 39.5 S. Because of newly constructed guardrail and a steep riprapped slope, access off of U. S. 12 to this site is poor. However, this stretch of the river is used heavily by fishermen who sometimes carry small boats down the steep slope to the edge of the water.
- ㉔ 39.5 S. Because the land is privately owned, access off of U. S. 12 to this good beach area, which is used very heavily for swimming by local residents, is limited.
- ㉕ 40.2 S. Excellent access off of U. S. 12 to a gravel beach which is good for launching boats. Swimming conditions at this beach, however, are poor.

Swimming, boating, camping, and picnicking

The swimming season of the lower Clearwater depends very heavily upon the length of time required for the annual spring run-off. In some seasons, the river might not be used until July 1, while in other years the water is warmer and at relatively low-stage by mid-June. In 1969 the actual temperature of the water as recorded by thermographs showed water temperatures varying from 76°F in mid-July to 34°F in November.

During the survey, counts were made of the swimmers, and other people using the beaches at different times. It was found that during early June, when the water level was high, almost no use was made of the small amount of beach area available. As the river level dropped, a definite increase of people using the various beaches along the river was noted. On July 4, there were several hundred people on the beaches, especially at the three or four main beach areas.

The five main beaches are located at Spalding, Arrow, Gibsons Eddy, Myrtle, and Big Eddy. The beach at Big Eddy is especially good and could easily be developed into an outstanding picnicking--swimming area. The Idaho Department of Highways owns 10 acres at Big Eddy and plans to develop this tract into a rest area. It is estimated by the Highway Department that 465 cars per day would use the rest area during the summer season.

The Idaho Fish and Game Department plans to develop four areas for boat launching. Most of these areas also have beaches which are now used by swimmers or could be used by swimmers after development.

At present, there are two overnight camping areas developed. One is at Myrtle Beach and the other is at the Kayler Rest Area. Picnicking facilities are located at the Nez Perce National Historical Park and the Kayler Rest Area. These sites are shown on Plate III.

It should be pointed out that Plate III shows only the major recreational use areas. There are numerous other sites along the river that are used intermittently. In fact, because of the ease of access, the whole stretch of river between Lewiston and Ahsahka is used by fishermen, sightseers, boaters, and, where beaches are available, by swimmers.

During the survey, a considerable number of people on various types of devices were observed floating down the river. The floaters used small boats, canoes, rubber life rafts and inner tubes. According to officials of the Idaho Fish and Game Department, and Idaho Water Resource Board reports (Alden, 1970), the increase in this activity will be considerable based on the tremendous number of people presently floating the rivers in south Idaho. The lower part of Clearwater River has a great potential for this type of activity because of ease of access to the water, scenic qualities, excellent water quality, and lack of dangerous rapids.

The access to the river should remain excellent because the Idaho Department of Highways controls almost all of the land between U. S. 12 and the river shoreline. The only extensive stretch of privately-controlled land lies along the strip between Lenore and the Peck junction.

There has been some water skiing on the WWP pool and upstream from the pool in previous years. This stretch of the river is very calm and potentially could be used to carry a reasonable pressure from water skiers.

Resort areas

In the usual sense of the term, there are no commercial resort areas along the lower Clearwater River. Nez Perce National Historical Park, however, does draw a considerable number of residents and non-residents (approximately 60,000 last year)*. A considerable increase of non-resident visitors is expected as the Park is developed following present plans. Because part of the Park's historical features lie upstream from Spalding, increases of tourists along U. S. 12 (the Lewis and Clark Highway) could be expected.

Some flooding at Spalding has been experienced because of high rates of flow or ice jams that form on the abutments of the bridges in close proximity to the park during severe winters. However, officials of Nez Perce National Historical Park do not believe that water level fluctuations caused by discharge regulation at Dworshak Dam will greatly affect the Park.

IX. AESTHETICS AND SCENIC AREAS

Aesthetics, as defined by Webster's Third New International Dictionary, is a branch of philosophy dealing with beauty and the beautiful, especially with judgments of taste concerning them. The basis for cataloging the aesthetic characteristics of the lower Clearwater River are related to identifying both the scenic and the not-so scenic areas along the river. In addition, a broader view than the river itself is required if one is to describe the aesthetics of this area. The

*Estimate obtained through personal interview with Chief Ranger Earl R. Harris of the Nez Perce National Historical Park.

description includes the river and the surrounding land within view from any given point on the river. For a real appreciation of what is being described, both a visual and a sound sensing are important. In this report, a slide series is included which illustrates the changing views and moods of the area as related to weather and river-level fluctuations. The final judgment as to aesthetic characteristics is a matter for each individual to decide as he looks at the river scene and selects what he likes or does not like about it.

In order to provide a framework to evaluate the aesthetic character of the river, it is necessary to provide some background about the river. The lower Clearwater River valley can be divided into two general areas. The first of these areas extends from the confluence of Clearwater and Snake rivers to about Lenore. In the lower portion of the valley, the impact of the Clearwater Embayment (Chapter IV) is clearly visible. The valley is broad and the approaches to the surrounding ridges are gently sloping. The rock formations visible along the edges of the valley are the lava flows of the Embayment. The soils of the area are loessial deposits (wind-deposited silt) which cover the lava flows. The dominant vegetation is grass which gives the area a prairie-like appearance.

From Lenore upstream to above the confluence of North Fork Clearwater River and Clearwater River, the valley narrows considerably. Outcrops of granitic rocks are visible and some lava flows can still be observed. The vegetation of the area is transitional between grassland and timber for several river miles and then timber becomes dominant.

The dominating features of the river can be observed: (1) from the top of the hill north of Lewiston, (2) in the Arrow to Myrtle area, (3) in the Lenore area, and (4) at the confluence of the North Fork and Clearwater River at Ahashka.

The first vista overlooks the Clearwater valley from the confluence of Clearwater and Snake rivers upstream to the new Spalding bridge area (River Mile 10.4). The river is only visible for 6 of the 10.4 miles of this reach. The view to the east and north is typified by rolling hills having relatively gentle slopes to the tops of the ridges. On the south, the walls of the valley rise somewhat more sharply to an elevation of about 1,200 feet and then broaden out onto the Camas Prairie. The color of these hills varies by season. At the time this survey was undertaken

(July) the dominant colors were various shades of brown, indicating dried grass and summer-fallowed fields, and the yellow colors of ripening grain interspersed with green areas of wheat and grassy areas which had not yet dried out. The contrasting colors were the grays and purple colors of the lava outcrops which occur as stratified levels along the edges of the valley. In the midst of this panorama of color is the river which in color varies from blue to black depending upon whether the sky is clear or cloudy. The man-made features of this scene are the Potlatch Forests Inc. complex, the City of Lewiston, the WWP Dam, the business development along U. S. 12-95 east of North Lewiston, and, in the distance, the new Spalding bridge and the Clearwater Lumber Company plant at North Lapwai.

At Arrow the river scene changes because the valley is narrower and the hills are higher and steeper on the north side of the river. The vegetation also changes as more ponderosa pine and brushy trees are evident in the draws and on the east exposures of the hills. The dark green of the trees is complemented by the dark gray of the extensive areas of lava rock which are visible. The river happens to be constricted in this area. The man-made features which stand out are the railroad truss bridge over Clearwater River, the road truss bridge over Potlatch River, and the old truss bridge over Clearwater River at Myrtle. In addition, there are some old abandoned buildings at Myrtle and several glaring sign boards. The river along this reach has two outstanding beaches, one at Gibsons Eddy, and one at Myrtle. Both of these beaches are quite extensive. The old car bodies that have been dumped into the river below the Myrtle truss bridge are ugly and constitute a hazard to swimmers and people floating the river.

The third scene along the river begins at Lenore and extends to Harpers Bend. At Lenore the river valley begins to get narrower and becomes a canyon about two miles above Lenore. The character of the country side changes considerably from that of the downstream areas. There are extensive stands of ponderosa pine interspersed with douglas fir. The pine occurs on the west and south slopes and the fir on the east and north slopes. Occasional outcrops of granitic rocks are observed upstream from Lenore, and the presence of the lava formations are clearly visible. The colors turn more to the dark greens of the trees and the light greens and browns of the grasses. These colors are offset by the grays and blacks of the rocks showing along the river canyon. The blue or black water creates

a unique setting in this part of the river, a characteristic which prevails upstream to the confluence with the North Fork.

The fourth site is at the confluence of the North Fork and Clearwater River. At this point the scene is dominated by man-made structures and activity: lumber mills, residential developments, mobile home trailer courts, sewage lagoons, small businesses, the Dworshak National Fish Hatchery, and, in the distance, the scar on the mountain above Dworshak Dam. The colors of the natural vegetation still dominate the scene, but the highlights have changed from the natural beauty of the areas to the man-made features.

In a general way, Clearwater River has a natural setting which dominates a person's perception. The roads, bridges, and hardwood along the river blend in reasonably well with the environment. The riprap along the highways and railroads does not significantly detract from the rest of the scene. The natural stones in the river and the riprap blend well and, at a distance, it is difficult to distinguish between the two. Most of the man-made structures are spread out over the area broadly enough so that the unsightly character of some of the older buildings and bright sign boards blends fairly well into the general background. It is only where a number of buildings are located at a particular site, or where buildings with glaring signs advertising their services are spread out for several miles along a highway, that the scene becomes unsightly. In conclusion, the lower Clearwater is a pleasant and beautiful valley.

X. ARCHAEOLOGICAL ASPECTS*

There are many sites at which there is evidence of the presence of prehistoric man in the lower Clearwater Valley. At least six sites have been identified between Spalding and Ahsahka. Most of these sites are found 15 to 35 feet above the mean water level, although some sites are only six to seven feet above the river at the mouths of tributary streams.

Idaho State University (I.S.U.) has located its Archaeological Field School at the Big Eddy Site (River Mile 28.0) for the last three summers.

*Information obtained from Toups (1970) and from personal interviews with Dr. Earl H. Swanson of Idaho State University and Miss Toups.

This site was discovered during a highway salvage archaeological survey in connection with relocation studies for U. S. 12.

According to Dr. Earl H. Swanson, chairman of the Department of Anthropology at I.S.U., who is in charge of the field school at the Big Eddy Site, ice flows have been particularly destructive to the existing sites. These flows tend to erode great chunks of existing river shoreline, especially any peninsula-like shoreline. Also, some of the sites have been degraded by amateur artifact hunters. Dr. Swanson also has found evidence of archaeologically valuable sites on some of the larger islands in the lower Clearwater River.

The present sites have withstood numerous natural fluctuations of Clearwater River. However, a rise of 15 feet from the mean water level would cover approximately 65 percent of the sites and a rise of 35 feet would cover 95 percent of all known sites.

XI. POTENTIAL EFFECTS OF FLUCTUATIONS OF RIVER LEVEL AND WATER QUALITY

In this section an attempt will be made to assess the major effects on the present environment of the lower Clearwater River as a result of the operation of Dworshak Dam. It should be emphasized that, while an attempt will be made to point out areas where further research is needed and areas where potential problems may exist, no recommendations will be made for the actual operation policy for the Dworshak installation.

Table 4 shows average water surface elevations for various flows of Clearwater River at several river mile points between Lewiston and Orofino. Although there is regulation on some of the minor tributaries of the river, the stage values shown in Table 4 represent essentially the flows of Clearwater River under natural conditions.

Table 4. Water-surface elevations for various discharges
of Clearwater River

River Mile	Water-surface elevation in feet above mean sea level				
	2,600 cfs Sep 60	6,000 cfs Feb 60	15,270 cfs Ave. for 46 yrs.	30,000 cfs Apr 59	75,000 cfs May 59
12.0	773.4	775.0	778.0	781.1	787.2
21.0	832.3	833.5	836.2	839.2	844.7
39.3	952.3	953.7	956.6	960.1	968.1
40.9*	967.6	968.9	970.7	972.9	978.0

*Middle Fork Clearwater River

As mentioned in Chapter IV, the flow in North Fork Clearwater River is only slightly more than one-third of the flow in the main stem below Ahsahka. Therefore, the effects on main stem river stages due to regulation of the North Fork at Dworshak Dam will depend largely on the relative discharge of Middle Fork Clearwater River. During the high-discharge period in the spring, regulation at Dworshak will have minimum effect on river stages below Ahsahka. During the remainder of the year when natural flows in the Middle Fork are low, regulation at Dworshak will have maximum effect on river stages below Ahsahka.

Studies indicate that with a discharge of 6,000 cfs at River Mile 39.3, regulation in connection with the initial installation at Dworshak Dam will result in a stage fluctuation of about 1.5 feet at that point. At Spalding this value would attenuate to about 1.2 feet. Under the final installation at Dworshak, as proposed for some indefinite date in the future, the stage fluctuations would be about 4.5 feet and 4.0 feet, respectively, at these locations.

Fisheries

Existing benthic algal and insect populations have become genetically adapted over a long period of time to the existing environmental regime of the river. With increased velocities and sharp temperature fluctuations at critical periods of their life cycles, it is to be expected that numbers, and perhaps abundance, of algal and insect forms would decrease. This

decline in available food organisms could adversely affect the resident game fish populations in the lower Clearwater.

Any significant cooling of river water temperatures during the summer months associated with releases from Dworshak Dam would undoubtedly adversely affect the smallmouth bass fishery. This would be for two primary reasons. First, in terms of total sums of degree days over 10°C , the Clearwater already falls in the low range of suitable smallmouth bass waters (Keating, 1970). Second, as water temperatures decrease from the optimum range of 20.3° to 21.3°C , bass feeding activity also decreases.

Conversely, cooler summer temperatures could enhance a resident trout fishery as the preferred temperature range of trout is considerably lower than for bass. A reduced bass population, however, would not necessarily mean increased trout abundance. The change in the aquatic environment could just as easily benefit rough fish species as trout.

Regulation of lower Clearwater temperatures with Dworshak Reservoir water could enhance conditions for spawning and subsequent egg development of summer and fall chinook. Optimum temperatures for spawning range from 50° to 55°F , and from 40° to 45°F for egg development.

The activities of adult steelhead and salmon, such as migration routes followed and rates of movements, are closely associated with water conditions. These activity patterns are in turn reflected in angler catch per effort. The potential effects of rapid fluctuations in river level and water quality on the ability of fishermen to catch anadromous fish in the lower Clearwater are presently unknown.

Multiple outlets in Dworshak Dam will allow some temperature regulation of releases from the reservoir. If the temperature of released water differed significantly from that of the main Clearwater, thermal blocks to migrating main stem anadromous fish could develop.

Studies have shown that angler catch per unit effort for salmon and steelhead is far less in impoundments as compared to those in free flowing stretches of rivers*. Any re-regulating impoundments on the lower Clearwater would significantly reduce the amount of free flowing river available to anglers and thus could restrict the harvest of otherwise available anadromous fish.

*"Steelhead fishing methods study -- Lake Sacajawea". Prepared for Walla Walla District, U. S. Corps of Engineers by Tri State Steelheaders, Inc., 1970.

A re-regulating impoundment would create a much larger and profoundly different type of aquatic environment with unknown biological, physical and chemical interrelationships. The potential would exist to manage the reservoir for game fish populations, such as bass or trout, provided suitable ecological conditions could be maintained.

An impoundment could also create ideal environmental conditions for predator species, such as squawfish. This possibility should receive serious consideration as Dworshak National Fish Hatchery would be releasing downstream migrants directly into the re-regulating reservoir.

A concentrated effort is being made to reestablish chinook salmon runs in the Clearwater drainage basin. A re-regulating impoundment on the lower Clearwater would inundate potential spawning areas for fall chinook.

Depending upon the design, a re-regulating dam could potentially compound any nitrogen supersaturation problems associated with releases from Dworshak reservoir if spills occurred when migrating fish were in the river.

Recreation

The major factors affecting recreational activities (exclusive of fishing) are water level and water temperature. The extensive swimming activities on the lower Clearwater River are very much dependent upon the amount of exposed beaches. A very important area of concern is the effect of fluctuations on the sand beaches. The high sediment-laden spring run-off normally replenishes the sand on these beaches. After the spring run-off has occurred, the river level generally keeps dropping until the fall rains again replenish the flow. This natural fluctuation takes place relatively slowly except for occasional storm periods. If the operation of Dworshak Dam is such that significant releases of sediment-free water occur in the summer period causing large fluctuations in the river level, there is a potential for sand beach erosion. If this erosion did take place, the desirability for swimming in the lower Clearwater would be reduced.

Another area of impact on swimming is water temperature. The releases from the dam could enhance or degrade the swimming activities. Because the lower Clearwater River does reach a fairly high temperature in July and August, a moderate reduction in this temperature probably would

not affect the swimming activities. However, any reduction in water temperature in June would affect this activity because of the relatively cool natural water temperatures existing at that time. On the other hand, any increase in water temperature in June would enhance swimming activities.

Boating and floating are affected by extreme fluctuations, especially rapid drawdowns. Extreme low water exposes large rocks in the rapids which would make floating more dangerous. Also, extreme drawdowns make boat launching more difficult.

How much water fluctuation the recreational activities could tolerate without serious degradation should be an important area of concern and research.

It also should be re-emphasized that almost all of the non-fishing activities, a substantial portion of the smallmouth bass fishing, the sight-seeing, the touring, etc., take place in the summer months. Any extreme fluctuations during this period would have a considerable effect on these activities.

Vegetation*

Any extreme fluctuations in river level during the summer may result in flooding of riparian vegetation. If the flooding is frequent enough, such as weekly, even vegetation on gravel bars and sand banks will suffer reduced aeration of the rooting medium with consequent loss of vigor and possible death. The most susceptible species are the conifers, and they could be expected to decline within a few years.

If a pool is formed behind a re-regulating dam, there are primarily two associations which will form the shoreline vegetation, the doug-fir/ninebark union and the bunchgrass community. Both of these have been disturbed in the past, but even under the best of conditions, these associations could not withstand water erosion on the steep slopes and shallow soils of the area. If a pool is formed, then the vegetation can be expected to retreat beyond the reach of the water action, both directly and as it causes bank cavitation of the soil.

Wildlife

The bank beaver and muskrat now present in the river would be most affected by an extreme fluctuations in the water levels because

*Written communication, Dr. Robert A. Hursey, Assistant Professor of Forestry, Humboldt State College, 1970.

their burrows are usually constructed to be covered by a normal flow. Any water levels held for a long enough period to kill the willows along the shoreline would reduce food utilized by beaver.

Upland game birds such as mountain quail, valley quail, pheasants, and chukars that choose nesting sites close to the water's edge could be affected by water-level fluctuations if the water flooded the nests. The cover along the banks also is very important to these birds. Evidence shows that the survival and abundance of the majority of the more desirable species of upland game birds are greatly dependent on riparian habitat (Oliver, 1961). Canada geese that nest in the islands of the lower Clearwater also could have their nests flooded.

Aesthetics

River-level fluctuations should not dramatically affect the aesthetic characteristics of the lower Clearwater River. The main impact of the fluctuations would be a changing expanse of water in the river during periods of flow during late summer and fall and winter. If it is necessary to construct a re-regulating structure, the upper portion of the river valley would be impounded and a broad expanse of water will be added to the area. Aesthetically, this could be quite attractive to those who drive through the area depending upon one's point of view. To some, impoundments are not beautiful because of the structure used to impound the waters or other reasons, while to others this is not a crucial consideration. The impact of an impoundment on the river would be more in the area of the quality of recreation and fishing experience than in the area of scenic beauty and aesthetics.

Commercial and industrial establishments

River-level fluctuations will not have any direct effect on most of the business establishments along the lower Clearwater River. If the fluctuations are controlled at levels to maintain and/or enhance the recreation resources of the river, and to minimize the potential damage from high flows, income from increased fishing and recreation pressure may grow. This could be an important factor to the people who live and work along the river particularly to those engaged in recreational services. On the other hand, if fluctuations are a potential hazard to fishermen

and recreationists, a possible impact might be the loss of revenue from recreationists due to the degradation of fishing or recreation in the area.

If impoundment for re-regulation becomes a necessity then the impact on the business community becomes more difficult to predict. Some business establishments will be removed because of the impoundment if it is located on the main stem of Clearwater River. New businesses may or may not be established. The question of what may happen on the downstream portion of the river is also a valid consideration. If reaches of the river suitable for fishing and recreation are reduced by 5 to 10 miles, then the existing downstream establishments may obtain more income from the concentration of the fishing and recreation into a smaller area. This type of result is difficult to estimate because it depends upon whether people are willing to establish new businesses in the area to meet the needs of the sportsmen. The question which has to be answered at this point is: Can the fishery and recreation resources stand the increased pressure and provide the same quality experience that they currently do? This report does not attempt to answer this question.

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