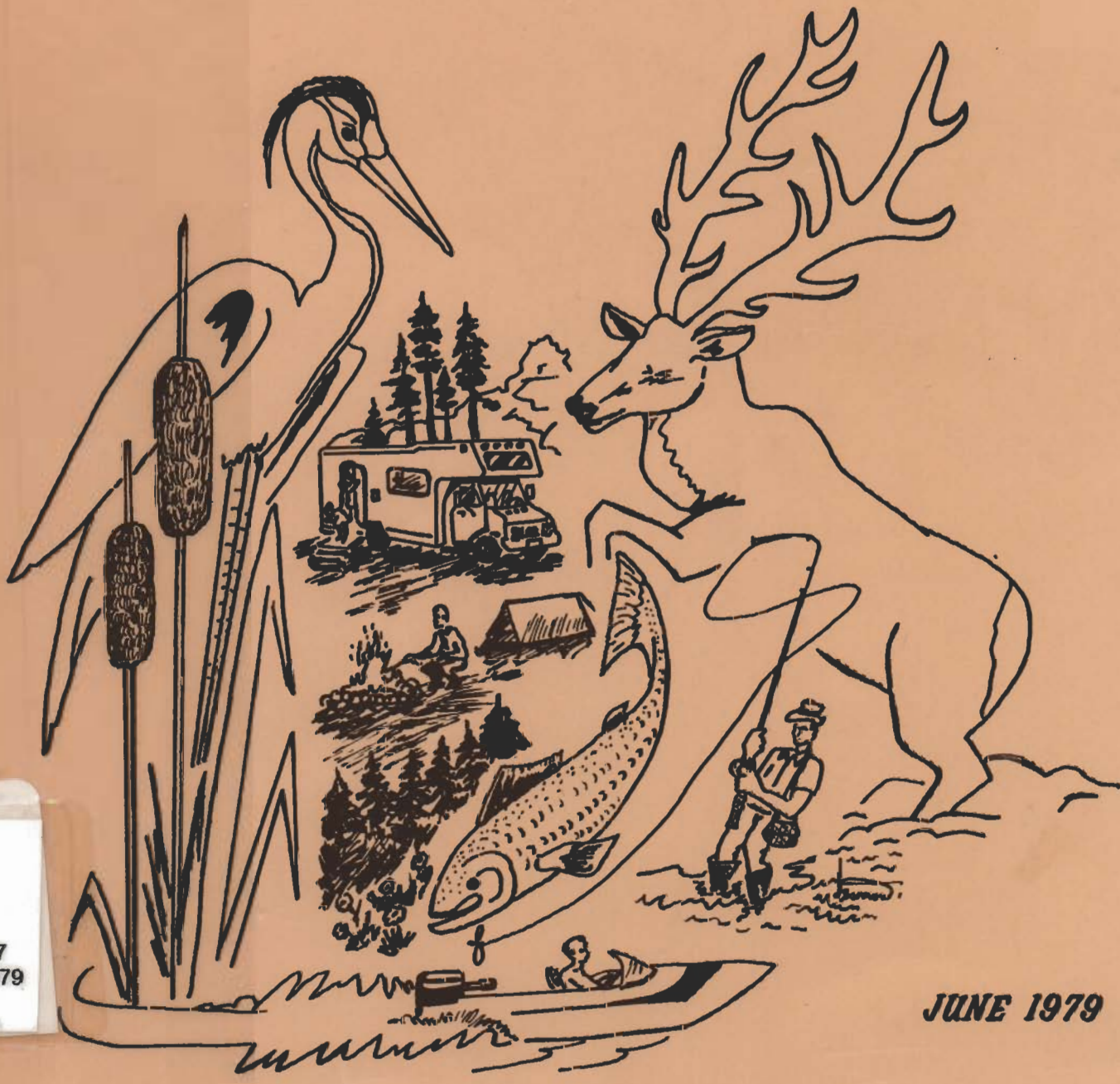
LOWER MONUMENTAL MASTER PLAN

RECREATION/RESOURCE MANAGEMENT APPENDICES



JUNE 1979

LOWER MONUMENTAL RECREATION/RESOURCE MANAGEMENT

APPENDICES

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PREPARED BY

United States Army
Corps of Engineers
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Walla Walla District
RECREATION-RESOURCE MANAGEMENT BRANCH

JUNE 1979

APPENDIX A

PROJECT RESOURCES MANAGEMENT PLAN

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APPENDIX A: PROJECT RESOURCES MANAGEMENT

SECTION 1 - INTRODUCTION

Information pertinent to the authorization of the Lower Monumental Project is contained in SECTION 1.01 of the LOWER MONUMENTAL MASTER PLAN dated May 1975. These appendices are prepared by the Resource Management Branch of the Walla Walla District of the U.S. Army Corps of Engineers in accordance with the requirements of ER 1130-2-400 dated 28 May 1971. The purpose of these appendices is to provide procedural and technical guidelines for the proper management of project resources and to outline procedures for the implementation of the policies and proposals set forth in the LOWER MONUMENTAL MASTER PLAN. They are intended to serve as a guide for personnel dealing with recreation and resource management activities which will both encourage and provide for sustained public use of project resources and be consistent with aesthetic and ecological values.

SECTION 2 - ORGANIZATION AND STAFFING

2.01 Introduction.

The Lower Monumental Project is the second in a series of four water resource development projects on the lower Snake River in Washington administered by the Walla Walla District Office. The first is Ice Harbor Lock and Dam located at Snake River Mile 9.7 followed by Lower Monumental, Little Goose, and Lower Granite at Snake River Mile 41.6, 70.3, and 107.5, respectively.

Because of the size and proximity of these four projects, the administrative responsibilities are split between the Ice Harbor-Lower Monumental Project Office and the Granite-Goose Project Office. The boundary between these two project offices is the Joso Bridge at River Mile 58.7 which splits the Lower Monumental Project into two parts. The downstream section of the project between Lower Monumental Dam and the Joso Bridge is managed by the Ice Harbor - Lower Monumental Project Office located at Ice Harbor Dam. This office is also responsible for the Ice Harbor Project and the McNary Project above Wallula. The upper section of the project, east of the Joso Bridge is managed by the Granite-Goose Project Office located at Lower Granite Dam. This office is also responsible for the Little Goose and Lower Granite Projects.

2.02 Ice Harbor - Lower Monumental Project Office.

The organization of this project office, which is responsible for the management of the Lower Monumental Project below the Joso Bridge, is shown in TABLE 2.1. The Project Engineer is in charge of the project office and is directly responsible to the Chief of Operations Division in the District Office. His responsibilities include the operation and maintenance of the dam and appurtenant structures and the management of the land and resources within the project boundaries. His staff is divided into four sections, one of which is the Resource Management Section, headed by the Resource Manager.

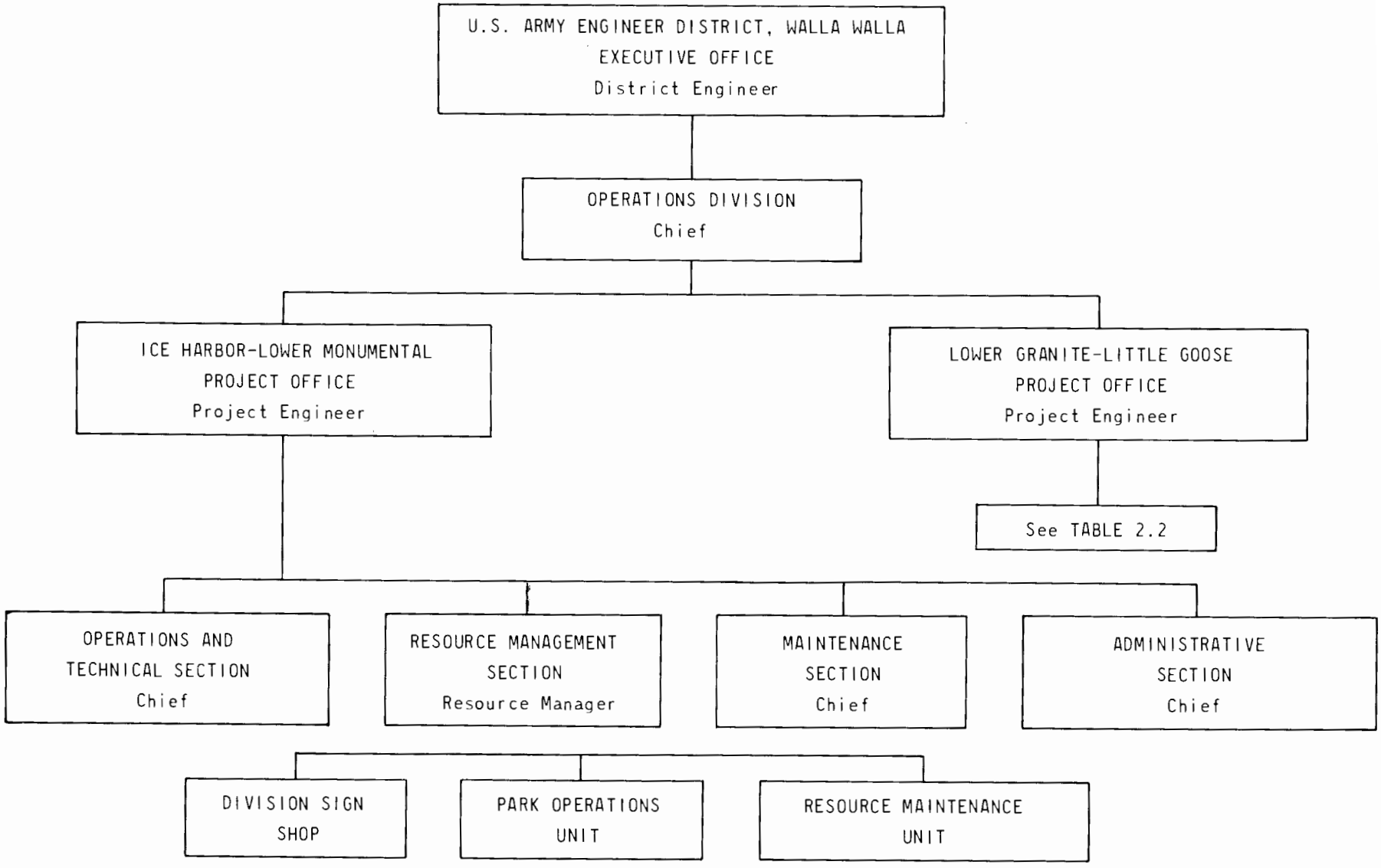
The Resource Management Section is headed by the Resource Manager and divided into three separate units, each with its own staff.

a. Division Sign Shop.

This unit, which is located in the Pasco Maintenance Shop on the McNary Project, constructs most of

TABLE 2.1

ORGANIZATION CHART FOR ICE HARBOR-LOWER MONUMENTAL PROJECT OFFICE



the permanent and temporary project signs for the North Pacific Division cf the Corps. The Resource Manager at the Ice Harbor - Lower Monumental Project, operating under the Project Engineer, is responsible for the overall operation of this facility. His duties include the following: establishing and maintaining a high level of quality and production within the shop; establishing procedures for handling sign requisitions; maintaining records; developing cost data; and maintaining an adequate stock of parts, materials, and equipment necessary for sign production.

The Sign Shop supervisor, operating under the Resource Manager, will be responsible for the production of the signs and the daily operation of the shop. He is assisted by a full-time carpenter with additional assistance provided by personnel from the Maintenance Section or the Resource Maintenance Unit, or by temporary employees, as the workload requires.

b. Park Operations Unit.

This unit, under the supervision of the Resource Manager, is primarily responsible for the management of project recreation facilities. Staffing in this branch includes two Park Managers and one Resource Ranger, Grounds Maintenance Workers, as well as temporary Laborers and Park Technicians. In addition to their responsibilities in park management, the Resource Rangers also provide assistance to the Resource Manager in the management of project resources which include surveillance of project lands to detect encroachments and violations of laws, regulations, and leases, easements, licenses, and permits; administration of contracts; preparation of visitation reports; supervision of grounds maintenance crew; and coordination of the development and management of wildlife areas.

c. Resource Maintenance Unit.

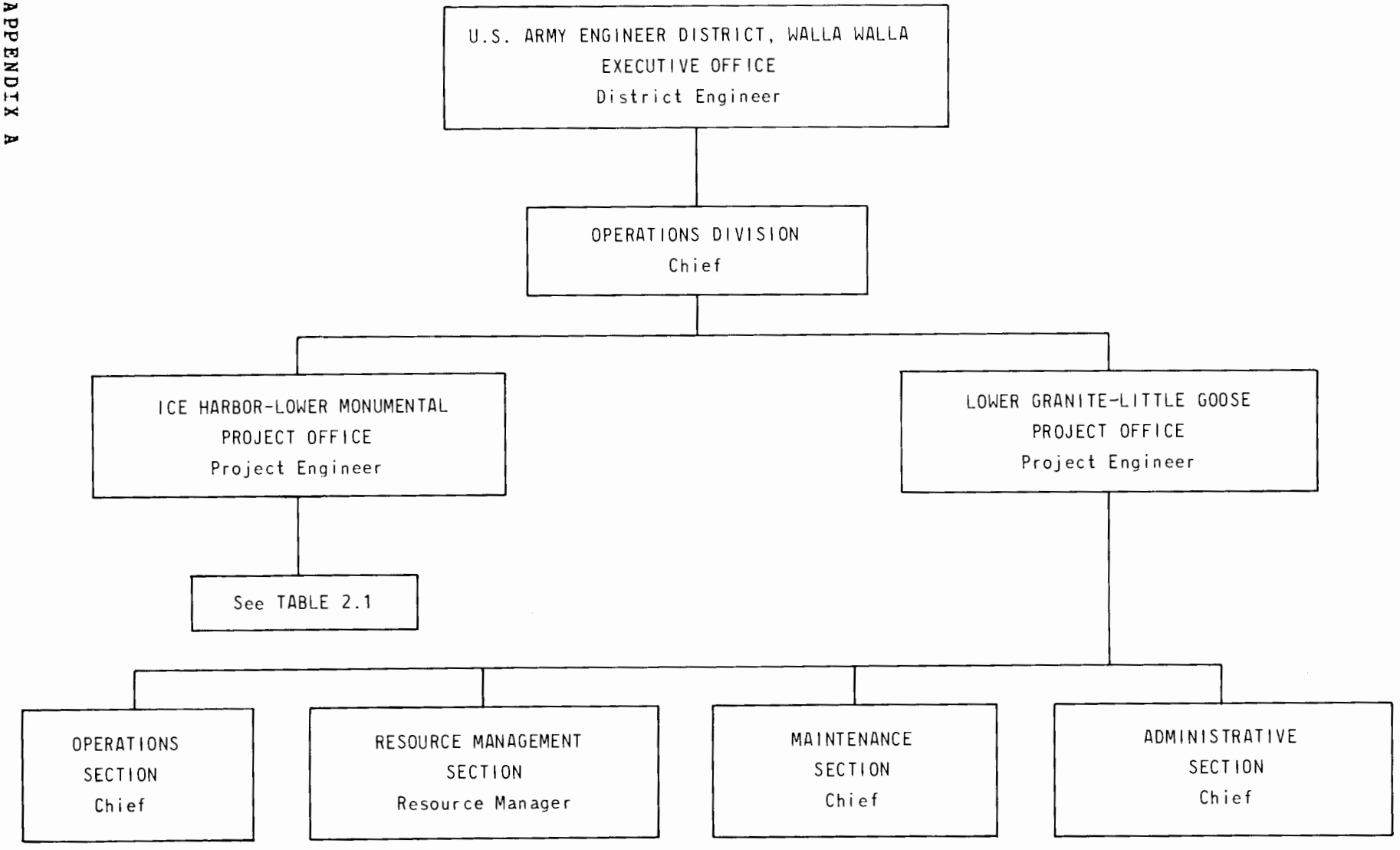
This unit, under the supervision of the Resource Manager, is responsible for the maintenance and operation cf all project equipment, facilities, buildings, vehicles, and utilities except for elements of the dams, locks, powerhouses, and fish passage and handling facilities. It is also responsible for the operation and maintenance of the pumping plant and levee system on the McNary Project in the Tri-Cities area. Staffing in this unit includes a Maintenance Foreman, Working Leader, Engineer Equipment Operators, a Heavy Mobile Equipment Mechanic, Water Pump Repairman, Maintenance Workers, Carpenters, and temporary Laborers.

2.03 Lower Granite - Little Goose Project Office.

The organization of this project office, which is responsible for the management of the Lower Monumental Project above the Joso Bridge, is shown in TABLE 2.2. The Project Engineer is in charge of the project office and is directly responsible to the Chief of Operations Division in the District Office. His responsibilities include the operation and maintenance of the dam and appurtenant structures and the management of the land and resources within the project boundaries. His staff is divided into four sections, one of which is the Resource Management Section, headed by the Resource Manager. Staffing in the Resource Management Section includes a Resource Manager, Assistant Resource Manager, Resource Ranger, Clerk - Typist, Maintenance Foreman, Crane Operator, Maintenancemen, Grounds Maintenance Workers, as well as temporary Park Technicians and Laborers.

The Resource Manager, with the assistance of the Assistant Resource Manager and Resource Ranger, is responsible for all aspects of the management of project resources which include the operation and maintenance of the pumping plants and levee system on the Lower Granite Project in the vicinity of Lewiston, Idaho and Clarkston, Washington; management of recreation facilities; surveillance of project land to detect encroachments and violations of laws, regulations, and leases, easements, licenses, and permits; administration of contracts; supervision of maintenance crew; and coordination of the development and management of wildlife areas. The Maintenancemen, under the supervision of the Maintenance Foreman, are responsible for the operation and maintenance of the pumping plants and levee system on the Lower Granite Project. The Grounds Maintenance Workers are responsible for general maintenance throughout the project area. One of these workers, currently assigned to Little Goose Dam, is responsible for the upper half of the Lower Monumental Project as well as the lower half of the Little Goose Project. The Clerk - Typist handles all clerical duties for the Resource Management Section.

TABLE 2.2 ORGANIZATION CHART FOR LOWER GRANITE-LITTLE GOOSE PROJECT OFFICE



The Crane Operator, Maintenancemen, Grounds Maintenance Workers, and the Laborer, under supervision of the Maintenance Foreman, are responsible for the operation and maintenance of all project equipment, vehicles, facilities, buildings, and utilities except for elements of the dams, locks, powerhouses, and fish passage and handling facilities.

2.04 Future Personnel Requirements.

Staffing described in this section appears adequate to satisfy management responsibilities at the Lower Monumental Project from FY 1980 through FY 1984.

SECTION 3 - LAND ALLOCATION

The lands acquired by the U.S. Army Corps of Engineers for the construction of the Lower Monumental Project contain a wealth of natural resources. The land and water resources provide opportunities for a wide variety of public uses as well as habitat for many species of fish and wildlife. The allocation of project lands is described in detail in SECTION 8 of the LOWER MONUMENTAL MASTER PLAN. Major land-use classifications provide land for project structures, recreation, fish and wildlife management, natural areas, public port terminals, and industrial development. The allocation of project lands is exhibited in Plate 5 in the LOWER MONUMENTAL MASTER PLAN; specific acreage figures are included in this section in TABLE 3.1.

TABLE 3.1 ALLOCATION OF PROJECT LAND

ALLOCATION CATEGORY			Acres
PROJECT OPERATION:			906.3
Project Structures		562.7	
Lock and Dam North	105.0		
Devils Bench	7.5		
Lock and Dam South	429.0		
Texas Rapids	8.0		
RM 69.2 South	13.2		
Public Port Terminals		45.0	
Lyons Ferry	12.3		
RM 61 South	32.7		
Industrial Use & Access		298.6	
Lyons Ferry	151.6		
RM 60-62 South	147.0		
RECREATION			1758.1
Recreation Lands		612.4	
Palouse Arm	552.8		
Texas Rapids	59.6		
Operations: Recreation-- Intensive Use		556.9	
Devils Bench	51.6		
Ayer	169.5		
Lyons Ferry	115.5		
Lyons Ferry Marina	134.3		
Riparia	32.1		
Texas Rapids	53.9		

TABLE 3.1 ALLOCATICN OF PROJECT LAND (Cont'd)

Operations: Recreation-- Low Density Use		588.8	
Devils Bench	105.0		
RM 42-50 South	284.3		
Ayer	83.6		
RM 67.5-69 South	115.9		
WILDLIFE			3428.0
Operations: Wildlife Management--Intensive		2180.2	
RM 47-53 North	763.6		
RM 53-54.8 South	81.9		
RM 54.6-56 North	271.4		
Riparia Area	332.2		
RM 56-58.8 South	552.4		
Tucannon River Area	178.7		
Operations: Wildlife Management--Moderate		1247.8	
RM 42.2-57 North	396.3		
RM 53.1-54.6 North	126.7		
RM 55-56 South	15.5		
RM 56.1-57.6 North	114.7		
RM 59 South	44.5		
RM 61.7-66.8 North	286.3		
Tucannon River Area	60.8		
RM 63 66 South	146.5		
RM 68-69.5 North	56.5		
NATURAL			1056.4
Operations: Natural Area		1056.4	
Palouse Canyon Area	1056.4		
TOTAL			7148.8

SECTION 4 - LAND MANAGEMENT

4.01 Project Structures Areas.

The LOWER MONUMENTAL MASTER PLAN has allocated 562.7 acres for the operation and maintenance of project structures and the care and management of the project. Most of this acreage is located around Lower Monumental Lock and Dam on both the north and south shores of the river and is occupied by project structures or used for the daily operation of the lock, dam, and powerhouse. Presently, much of this land around the dam is being used by the powerhouse contractor for storage and construction purposes. However, approximately five acres is developed and managed for public recreation. There is both a picnic area and a visitor center on the north shore below the dam and a visitor area and dam overlook on the south shore. They will be discussed in SECTION 5.

Eight acres of project structures land is reserved on the south shore of the river opposite Alkali Flat Creek for the excavation and loading of gravel and riprap material for the project. Thirteen acres on the south shore at River Mile 69 is reserved for the daily operation of Little Goose Lock, Dam, and Powerhouse. The remaining seven acres is located on the north shore of the river adjacent to Devil's Bench Recreation Area and serves as an out-of-sight storage area.

Management of project structures areas requires relatively low expenditures of time and effort. With the exception of the recreation facilities around Lower Monumental Lock and Dam, management requirements are restricted to routine inspection to detect and control any noxious weed, erosion, or health and safety problems. Efforts should be made to preserve, restore, or establish native vegetation whenever possible.

4.02 Recreation Areas.

Development of project lands for recreation was authorized by Section 4 of the Flood Control Act of 1944. Present recreation facilities include six areas allocated specifically for recreation use as well as the area at the Lower Monumental Lock and Dam which is allocated for project structures (Section 4.01). Plates 7-14 in the LOWER MONUMENTAL MASTER PLAN provide maps of each of the recreation areas. A detailed inventory of facilities at each recreation area is contained in the RECREATION

FACILITIES GUIDE (U.S. Army Corps of Engineers, Walla Walla District, January 1979).

4.03 Fish and Wildlife Management Areas.

Under provisions of Section 3 of the Fish and Wildlife Coordination Act of 1958 (P.L. 85-624), selected areas of project lands were reserved for development and management of the fish and wildlife resources on the project. Approximately one-half of the total project acreage is allocated for these purposes. There are two sites selected for intensive management and seven sites where moderate management practices are planned. The management of these areas is covered in APPENDIX D.

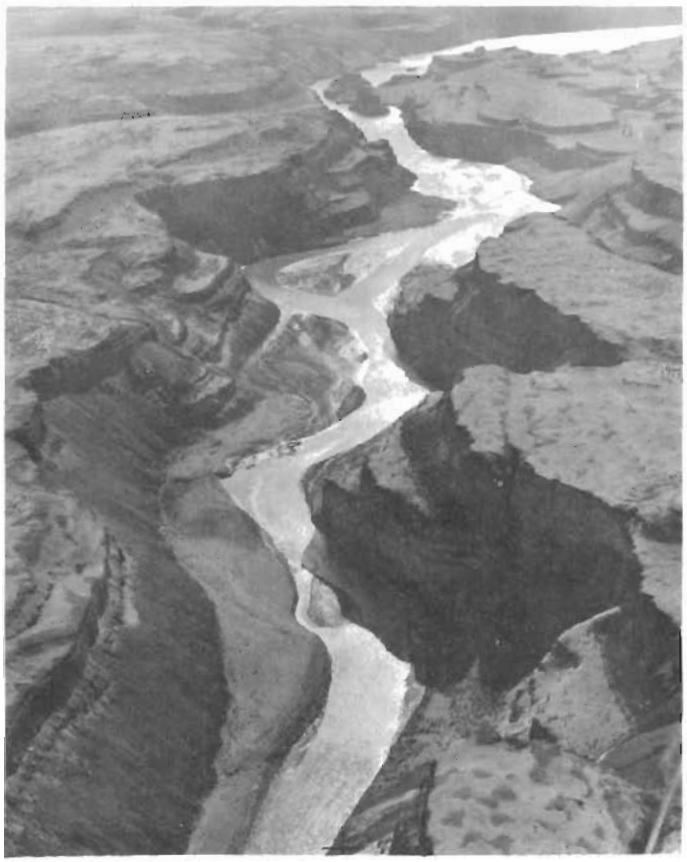


Figure 4.1 - Palouse Canyon Natural Area.

4.04 Natural Areas.

On the Lower Monumental Project, 1,609.2 acres along the Palouse River Canyon are allocated as a natural area in order to protect the nesting habitat of prairie falcons and preserve the dramatic natural features of the canyon. Included in this natural area is Marmes Rockshelter - one of the most important archaeologic sites in America. The oldest human remains yet dated with certainty in the Western Hemisphere were removed from this rockshelter.

An extensive dike was constructed around the site in an effort to prevent the waters of the lake from inundating the site. Unfortunately, due to subsurface geologic features in the area, this effort was unsuccessful and all but the top few feet of the rockshelter are now underwater.

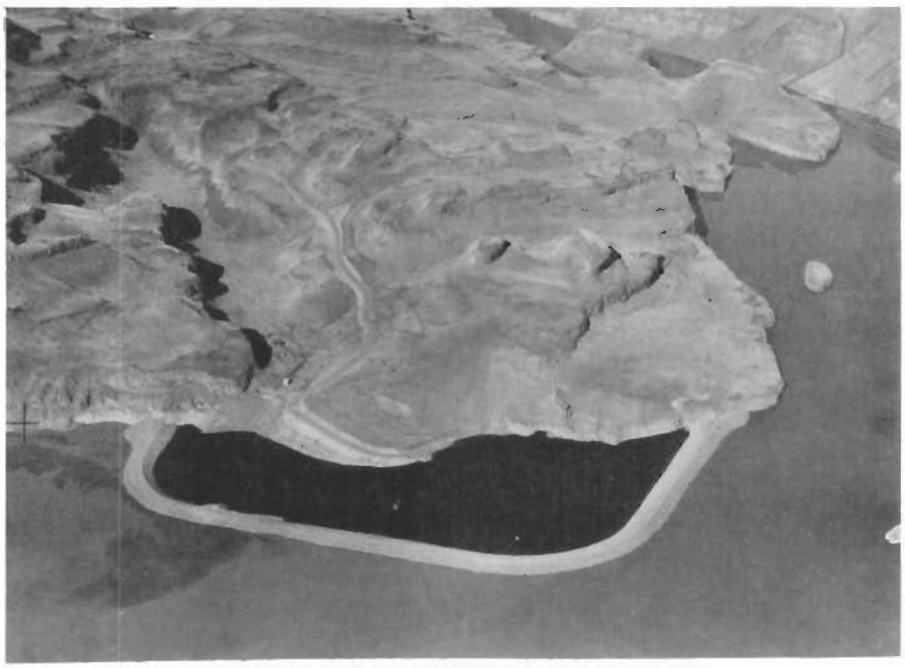


Figure 4.2 - Site of Marmes Rockshelter.

Marmes Rockshelter is listed on the Department of Interior's National Register of Historic Places as a National Historic Landmark. In addition, a three-square-mile portion of the Palouse Canyon is listed on the Washington State Register of Historic Places.

This site is accessible by foot over a primitive, unmaintained trail originating from Lyons Ferry State Park, and by boat. A boat tie-up dock was constructed along the dike for boaters and fishermen, and an interpretive sign is located on the dike relating to the rockshelter. The pond behind the dike is stocked with rainbow trout by the Washington State Department of Game. A residence for the Park Manager is located adjacent to this natural area and an unimproved service road leads to the rockshelter from there.

In 1964, Indian burials at the mouth of the Palouse River were relocated under contract with Washington State University and in 1975, Indian burials at the mouth of the Tucannon River were relocated under contract with the University of Idaho. Following examination and analysis the remains were reinterred at a site owned by the Nez Perce Indian Tribe which is located within the Palouse Canyon Natural Area. The site, known as Chief Old Bones Cemetery, is named after Chief Old Bones, one of the last leaders of the Palouse Indians, who died in 1916. His body is buried here and a headstone marks his grave.

A gravel-surfaced trail leads from Lyons Ferry State Park to a shelter located adjacent to the cemetery, (Figure 4.3). Both the trail and the shelter are within the

Figure 4.3 - The shelter constructed adjacent to Chief Old Bones Cemetary overlooks Lyons Ferry State Park.

Palouse Canyon Natural Area. During FY 1979, interpretive plaques will be constructed and installed at the shelter and a gravelled trail will be constructed leading north from the shelter to a secondary viewpoint.

a. Leased Land - State of Washington.

A major portion (756.3 acres) of the 1609.2 acre Palouse Canyon Natural Area is included with Lyons Ferry State Park in a lease to the State of Washington Parks and Recreation Commission (DACW68-1-71-104; Section 12.01-a.). The leased land includes the Marmes Rockshelter site with the dike and the pond behind it, the Park Manager's residence, and the trail and shelter.

The Commission is responsible for the operation and maintenance of the leased land which includes maintenance of the interpretive sign, the shelter adjacent to Chief Old Bones Cemetery, and the trail to the shelter. Management duties also include grounds maintenance and surveillance. Special attention is given to insure the protection of the raptors and especially the rare prairie falcons from human disturbance. These birds nest in cavities and sheltered outcroppings in the steep cliffs and canyon walls.

These duties are performed by the resident park manager, a ranger, and seasonal park aides who are responsible for the operation and management of Lyons Ferry and Palouse Falls State Parks. The management of Lyons Ferry State Park is discussed further in SECTION 5.04.

b. Corps Land.

The remaining 852.9 acres of the Palouse Canyon Natural Area are managed by the Corps of Engineers in accordance with SECTION 8.02-f. of the LOWER MONUMENTAL MASTER PLAN. The area is characterized by steep cliffs and talus slopes which make visitor access by foot difficult. Since there are no trails or other facilities in these areas, management responsibilities consist of surveillance of the area and maintenance of the boat dock at Marmes Rockshelter. Special attention is given to insure protection of the raptors and especially the rare prairie falcons from human disturbance. These birds nest in cavities and sheltered outcroppings in the steep cliffs and canyon walls.

c. Future Development.

No development is planned by either the Corps of Engineers or the Washington State Parks and Recreation Commission on land in the Palouse Canyon Natural

Area. However, when funds become available beyond FY 1984, development of the interpretive program should take highest priority. Possibilities for interpretive themes include the area's geologic features, the valuable nesting habitat for falcons along the canyon walls, the riparian habitat, and the archaeologic and historic values of the area.

Figure 4.4 - Port of Columbia.

4.05 Public Port and Industrial Areas.

Under provisions of Section 108 of the River and Harbor Act of 1960 (P.L. 86-645), land may be made available for conveyance to states, political subdivisions thereof, port districts, or port authorities for the development of public port and industrial facilities.

Presently, 20.3 acres on the south shore of Lake West between Lyons Ferry Marina and the mouth of the Tucannon River are conveyed to the Port of Columbia for public port and industrial uses. This land is part of a 179.7 acre tract allocated for these uses. A grain elevator and barge loading facilities have been constructed on port land. Approximately 176,500 tons of wheat were shipped from this terminal in 1977 and 160,300 tons in 1978.

SECTION 5 - PUBLIC RECREATION AREAS

5.01 Lower Monumental Lock and Dam.

The visitor facilities at the dam consist of four sites totalling approximately five acres. The south shore overlook west of the dam was originally constructed to provide visitors with a location to view the dam and take photographs during its construction. However, with completion of the dam and its associated visitor facilities, use of this site has declined. The fence and shelter will be removed by project personnel to lessen the site's visual intrusion on the landscape.

A parking area, restroom, and boat tie-up dock are located at a small site on the south shore near the upstream end of the navigation lock. This area is managed as a day-use area for visitors to the dam and boaters awaiting lockage. The restriction of lockages by the Corps during periods of drought makes the installation of a tie-up dock at the downstream end of the lock a necessity. This dock will be installed in FY 1980 parallel to the shoreline to minimize interference with boat traffic moving into the lock.

Figure 5.1 - The tie-up dock at the upstream end of the lock for boaters awaiting lockage.

On the north shore of Lake West just below Joso Bridge, 23.0 acres are conveyed to the Port of Kahlotus for use as a public port facility along with 172.0 acres for industrial development. These figures include 10.7 and 20.4 acres, respectively, which lie below the level of ordinary high water. A large part of this area is too steep to develop and no facilities have been constructed.

Management of all conveyed land is the responsibility of the respective port districts. Annual inspections are conducted by personnel from Real Estate Division and surveillance is maintained by project personnel throughout the year to insure that development and use of the land adheres to conditions of the quitclaim deeds. Public port and industrial land not conveyed is managed by project personnel in accordance with SECTION 8.02-a. (2) and (3) of the LOWER MONUMENTAL MASTER PLAN.

An industrial survey, presented as Item #5 in the supporting data of the LOWER MONUMENTAL MASTER PLAN, concluded that there was no need to provide additional land for public port terminals or industrial development on the Lower Monumental Project.

Goose, and Lower Granite dams to insure a desirable degree of diversity between their interpretive exhibits.

The small site on the north shore of the lake below the dam is managed as a day-use picnic area for visitors to the dam. This site gets occasional use but there is little shade from the sun and wind. The powerhouse contractor will be using the adjacent area until 1980 which detracts somewhat from the beauty of the area.

During FY 1983, approximately twenty small trees will be planted around the picnic area, parking area, and access road. A bubbler irrigation system will be installed concurrently to provide them with water. There is no expansion of the existing picnic area or lawn grass area planned.

A petroglyph is on display at this site but lacks any interpretive explanation, (Figure 5.3). During FY 1984, a small sign or interpretive exhibit will be designed and installed by project staff and constructed at the Division Sign Shop.

Figure 5.3 - Petroglyph on display at Lower Monumental Dam.

The visitor center in the powerhouse building on the north shore of the lake is managed as a day-use area with fish viewing facilities and interpretive displays. It is unmanned with the exception of seasonal fish counters. Some of the interpretive exhibits and displays are oudated and ineffective and visitor traffic through the center is poorly coordinated. During FY 1981, a contract will be let for renovation of this facility. Under this contract, displays will be renovated, replaced, removed, and reorganized.

Figure 5.2 - Visitor entrance at Lower Monumental Dam.

While the interpretive exhibits should cover all of the project resources (fish and wildlife populations and habitats, land for a variety of uses, geological features, archaeological and historical resources, and water for power production and navigation), special emphasis should be given to one particular facet of the project's resources.

Displays should also be included to describe the role of the Corps throughout the country and how this project fits into the regional water resource development program. Renovation of this visitor center will be coordinated with the visitor centers at Ice Harbor, Little

Figure 5.4 - Devil's Bench.

The main site is managed as a boat launching facility by fishermen and project personnel. During FY 1984, approximately twenty trees will be planted around the parking area and picnic site and along the shoreline. A bubbler irrigation system will be installed concurrently to provide them with water. There is no planting of lawn grass planned here due to the lack of topsoil in the area.

During the same year, a small simple kiosk will be constructed to provide an attractive, weatherproof structure for the dissemination of necessary information to the public. Its design will be coordinated with the construction of others at Ayer Boat Basin, Texas Rapids, and Riparia. This kiosk will incorporate an exhibit showing the restricted and hazardous boating areas near the dam. In addition, a sun shelter similar to ones located at Ayer Boat Basin will be installed in FY 1984 at the picnic site to provide some shade for visitors.

The north shore overlook is the second site, which was constructed for visitors to view the dam and take photographs during construction. The site gets very little

All four sites are managed for day-use activities by the Corps of Engineers out of the Ice Harbor-Lower Monumental Project Office. All major grounds maintenance is accomplished through contract; duties specified include cleaning of the restrooms, picnic tables and grills, grounds maintenance, litter and garbage collection, and stocking of the restrooms with toilet supplies. Tree and shrub pruning is contracted.

The visitor center is maintained by the Lower Monumental project maintenance staff. Project personnel are responsible for the operation and maintenance of the sprinkler systems, minor repairs of facilities, potable water samples, contract compliance inspections, monthly car counter checks, law enforcement, and control of noxious weeds. All major repairs and maintenance are accomplished by project personnel or through contract.

Management requirements will not increase appreciably as the result of the proposed projects. There may be a need for litter collection at the downstream boat tie-up dock but a trash receptacle will be located here if necessary. Litter and garbage collection will be included in the maintenance contract for this area. Renovation of the visitor center will create no additional management requirements.

The tree planting planned at the small picnic area on the north shore will require frequent watering and occasional minor pruning. The watering will be accomplished with the bubbler irrigation system.

5.02 Devil's Bench.

This area on the north shore of the lake just above the dam consists of two sites totalling four acres. Both sites are managed by the Corps out of the Ice Harbor-Lower Monumental Project Office. Two factors are responsible for the area's rather unattractive appearance. First, the area is generally deficient in topsoil and as a result, vegetation is scarce. Secondly, construction at the powerhouse has resulted in the use of the adjacent undeveloped land for construction purposes. Construction is expected to continue through 1979.

5.03 Ayer Boat Basin.

This 10 acre area is managed by the Corps out of the Ice Harbor-Lower Monumental Project Office as a day-use boat launching area and picnic site. Several factors are responsible for low visitor use of this area. First, the east shore of the embayment is rather barren and rocky making it somewhat unappealing for picnicking. Secondly, the railroad line that runs between the embayment and the lake detracts from the aesthetic value of the area. Most importantly, however, is its isolation from major highways and population centers.

Because of low visitor use projections, very little work is scheduled between FY 1980 and FY 1984. During FY 1982, approximately sixty trees will be planted along the shoreline of the embayment to provide shade for visitors and improve the aesthetic qualities of the area. Varieties should be selected which are fast-growing and somewhat drought-tolerant since soils are poor and there will not be any irrigation at this site. The installation of an irrigation system would require bringing electrical power to the site and the low visitor use of this area does not justify such an expenditure.

A small, simple fire site will be constructed at each of the two picnic sites on the east shore of the embayment during FY 1983. Also planned for this year is the construction of a simple, unpaved trail around the south shore of the embayment linking the parking area with the picnic area on the west shore. The trail should result in greater use of these existing picnic sites. These sites are inaccessible by car and foot traffic along the south shore is difficult because of bank erosion.

During FY 1984, a small simple kiosk will be constructed to provide an attractive, weatherproof structure for the dissemination of necessary information to the public. Its design will be coordinated with the construction of others at Devil's Bench, Texas Rapids, and Riparia. Part of this kiosk could consist of an interpretive exhibit relating to the history of the local area, or the surrounding upland game bird and warm-water fish habitats.

Major grounds maintenance is accomplished as part of the same maintenance contract for the Lock and Dam and Devil's Bench. The duties specified in the contract include cleaning of the vault toilets, picnic sites, and boat docks, litter and garbage collection, and stocking toilet supplies. The vault toilets are pumped out under a separate contract.

use, therefore the fence and shelter will be removed to reduce the visual intrusions on the landscape. This work will be accomplished by project personnel.

Major grounds maintenance is accomplished as a separate part of the same maintenance contract for the Lock and Dam and Ayer Boat Basin. Duties specified in the contract include cleaning of the vault toilets, picnic site, and boat dock, litter and garbage collection, and stocking toilet supplies. The vault toilets are pumped out under a separate contract. Project personnel are responsible for minor repairs of facilities, contract compliance inspections, law enforcement, and noxious weed control. All major repairs and maintenance are accomplished by project personnel or through contract.

A minor increase in the management requirements at this area is expected as a result of the proposed projects. The trees planted at the boat launching site will require frequent watering and occasional minor pruning. The watering will be accomplished with the bubbler irrigation system.

Figure 5.5 - Ayer Boat Basin.

5.04 Lyons Ferry State Park.

Of the 115.5 acres allocated for intensive recreation use at this site, approximately 35 acres are developed and managed as a park with camping, picnicking, swimming, and boating facilities. It is part of a 1,177-acre area leased to the State of Washington Parks and Recreation Commission. Besides the abundance and quality of the facilities, the site's attractive appearance, spectacular geologic features, archaeologic and historic value, and proximity to State Highway 261 all contribute to make this the most popular area on the project.

The Parks and Recreation Commission is responsible for the operation and maintenance of this park. There is a resident park manager and a park ranger on duty all year responsible for the daily on-site park operation and maintenance. Both of these employees are commissioned and authorized to enforce state laws including park regulations within the park boundary. However, whenever possible they utilize the Franklin County Sheriff and the Washington State Patrol.

The park manager and ranger have been assisted from April through October by temporary park aides, and there are three lifeguards employed from mid-June through Labor Day at the swimming area. The park manager, park ranger, park aides, and lifeguards are all employed by the Parks and Recreation Commission. The regional office is located in Wenatchee.

In addition to their maintenance responsibilities, the park staff collects camping fees each night at occupied sites. This fee must be approved biannually by the District Engineer and is based on the quantity and quality of facilities available to the campers. The snack bar is operated by a third party under a concession agreement. Noxious weed control is the responsibility of the Commission on land under the lease.

Corps personnel check the car counter at the entrance to the site and survey the park for lease compliance. It should be noted that the Washington State Parks and Recreation Commission have been managing this park satisfactorily.

Although this is the biggest and most highly developed park on this project, there are no O&M projects scheduled for the period between FY 1980 and FY 1984. The proposals which follow are needs which will be fulfilled by future development beyond FY 1984 when funds are available.

Project personnel are responsible for minor repairs of facilities, contract compliance inspections, law enforcement, noxious weed control, and monthly car counter checks. All major repairs and maintenance are accomplished by project personnel or through contract.

The proposed projects will require very few changes in the management requirements of this area. The trees may require occasional pruning, but this will be accomplished under contract. They should be planted in areas where soil moisture is available so that hand watering is not required.

The trail from the parking area to the picnic sites on the west shore may require periodic mowing if weeds or brush begin to grow over it. This will be added to the maintenance contract, if necessary. The two new fire sites will be cleaned by the maintenance contractor, also.

Figure 5.6 - Lyons Ferry State Park is located at the confluence of the Snake and Palouse Rivers.

compliance. All formal dealings concerning this park are with the manager of the Port of Columbia. The Corps does not deal directly with the concessionaire.

The Port of Columbia has expressed their desire to expand the camping area to provide additional trailer sites with hookups. The Corps of Engineers can share the cost of such development under a cost-sharing agreement however, no formal plans have been presented to date and there is no cost-sharing agreement currently in effect between the Corps of Engineers and the Port of Columbia.

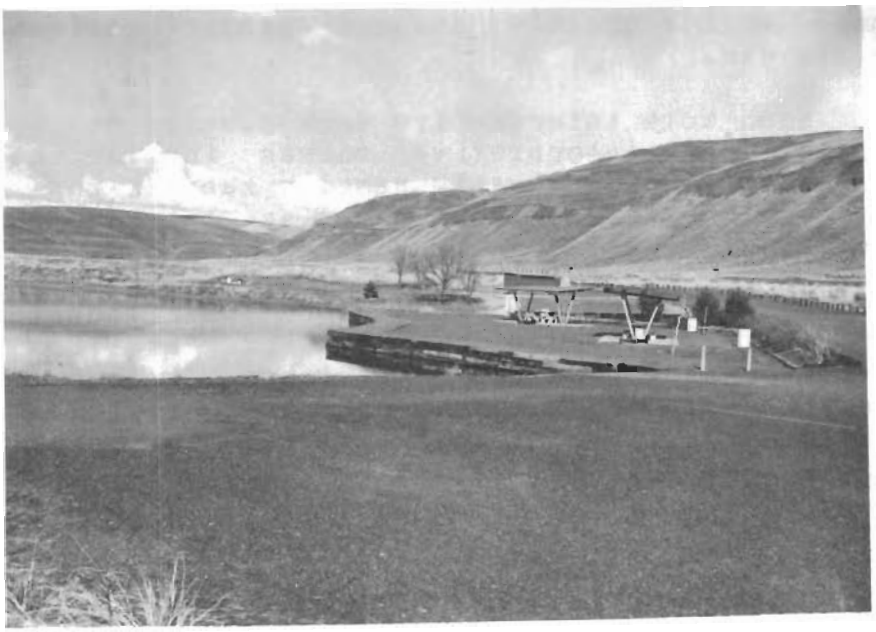


Figure 5.7 - Texas Rapids.

5.06 Texas Rapids.

This 15-acre site is named for a dangerous stretch of rapids located at this point in the wild river prior to inundation. It is managed as a day-use picnic area and boat access point by the Corps out of the Granite-Goose Project Office.

Because of its location on the tailwaters of the lake, the lake level here fluctuates more than in other areas. During periods of high flow when water is passed

Additional boat tie-up facilities are needed in the day-use area. During periods of heavy use, the crib wall does not provide enough spaces for boat tie-ups and consequently, some boaters use the handling dock at the launching ramp which hampers boat launching and loading.

An irrigation system and landscaping are needed in the camping area. Visitor use of the camping area is far below capacity because of the lack of vegetation. The existing trees are watered by hand from spigots located throughout the area. The proposed irrigation system would greatly reduce the maintenance requirements of this area and make more efficient use of the temporary personnel. Landscaping would greatly enhance its attractiveness and increase its use.

Much more interpretive work remains to be done. Possibilities for interpretive themes include the area's geologic features, the valuable nesting habitat for falcons on the canyon walls, the riparian habitat, and the archaeologic and historic values of the area.

Boat tie-up docks need to be installed along the shore of the lake adjacent to the camping area for boaters who camp overnight at the park. Visitors do not wish to leave their boats unattended and out of sight along the crib wall in the day-use area. Boat tie-up docks located closer to the camping area will increase the use of the camping area by boaters.

5.05 Lyons Ferry Marina.

This site on the south shore is leased to the Port of Columbia and is operated under a concession agreement with a third party, providing the only marina services between Pasco Boat Basin (Columbia R.M. 327) and Boyer Park (Snake R.M. 105.5). The lease covers an area of 37.0 acres which consists of 21.6 acres above and 15.4 acres below the level of ordinary high water.

The area is managed as a commercial marina with a small park with picnicking and camping facilities. The concessionaire operates a small grocery store and snack bar on the site, performs routine maintenance of all facilties, collects fees for camping, boat moorage, and the marine dump station, and performs minor boat and outboard motor repairs.

Corps personnel check the car counter at the entrance to the site and survey the park for lease

over the spillways, lake levels may rise as much as five feet above the 537-foot minimum lake elevation.

Visitor use at this site is not anticipated to increase significantly from FY 1980 to FY 1984. During FY 1982, the irrigation system will be modified to reduce maintenance requirements. There is no electricity or running water at the site and in order to water the lawn grass and trees in the picnic area, a gasoline powered pump is tranported to the site to pump water from the lake into a surface sprinkler system which must be assembled and dismantled with each watering.

Plans for the new system are not definite, but could include the installation of a permanent underground system, a permanent intake in the lake, and a gas or diesel-powered pump located in a small housing constructed adjacent to the vault toilets. The system will only cover that area which is presently developed and will not be expanded into undeveloped areas.

A sun shelter similar to those which already exist at this area will be added in FY 1982 to provide more shade in the picnic area.

During FY 1983, after modification of the irrigation system, approximately forty trees and shrubs will be planted in the picnic area and along the shoreline to beautify the area and provide more shelter from wind and sun.

During FY 1984, a kiosk will be constructed and installed at this site to provide an attractive, weatherproof structure for the dissemination of necessary information to the public. Its design will be coordinated with the construction of others at Devil's Bench, Ayer Boat Basin, and Riparia. This kiosk could incorporate an interpretive exhibit relating to the stretch of rapids which were located here in the wild river or some other interpretive theme.

Minor maintenance is performed by the Grounds Maintenance Worker stationed at Little Goose Dam with the assistance of temporary Laborers. Their duties include garbage collection; cleaning the picnic tables and grills; cleaning and stocking the vault toilets; collection and removal of litter and debris; and lawn mowing and watering. With the exception of lawn watering, these duties require little time. The modification of the irrigation system will greatly reduce maintenance time.

Project personnel are also responsible for checking the car counter, law enforcement, and noxious weed control. The vault toilets are pumped out under contract and major repairs and maintenance are done by contractors when possible.

Management of this site will not undergo any appreciable change between FY 1980 and FY 1984. Maintenance requirements may actually decrease.

Figure 5.8 - Riparia is located at the mouth of Alkali Flat Creek.

5.07 Riparia.

This 20-acre site is managed by the Corps out of the Granite-Goose Project Office primarily as a boat access point and secondarily as a fishing and picnicking site. Like Texas Rapids, this area is also subject to higher and greater fluctuations in lake level than other areas. This occurs when water is passed over the spillways during periods of high flow. While normal forebay fluctuation is three feet, water levels at this site may rise as much as five feet above the 537-foot minimum lake elevation (250,000 CFS).

Although visitor use is not expected to increase much between FY 1980 and FY 1984, modifications and improvements to this site are required to correct management problems. Gravel bars have formed across the mouth of the boat ramp which have made launching and loading difficult and somewhat hazardous. During FY 1980, the gravel will be cleared from the ramp and a jetty will be constructed which extends out into the lake to deflect water carrying the gravel into deeper areas of the lake. This jetty will be designed wide enough so that equipment may be moved out onto it to allow clearing the ramp in the future.

A sun shelter will be constructed during FY 1982. The existing picnic site adjacent to the bridge abutment provides protection from the wind but no protection from the sun or rain. The shelter will either be constructed over the existing picnic site or a new one will be established.

Many fishermen use the undeveloped area at the mouth of Alkali Flat Creek to fish from shore and some camp there although there are no formal campsites. Use is random and unorganized. In order to organize and manage the existing use, a non-fee camping area should be established here. Facilities should include a gravelled access road, designated sites for trailers and tents, fire sites, and a portable toilet.

During FY 1984, approximately two dozen trees will be planted at this site to improve its appearance and attractiveness and about five acres to the west of the parking area will be cleared and planted with dryland grasses to control weed growth. This area does not receive enough visitation to justify installing an irrigation system, therefore, plant varieties must be selected which will survive without irrigation.

A kiosk will be constructed and installed in FY 1984. Its design will be coordinated with the others at Devil's Bench, Ayer Boat Basin, and Texas Rapids. This kiosk could contain an interpretive exhibit relating to the old Texas Bridge or the Lewis and Clark Expedition which used this area as a campsite on their journey down the Snake River.

Minor maintenance is performed by the Grounds Maintenance Worker stationed at Little Goose Dam with the assistance of temporary Laborers. Their duties consist of collecting and removing litter and debris; cleaning the picnic table and grill; cleaning and stocking the vault toilets; and garbage collection.

Project personnel are also responsible for checking the car counter, law enforcement, and noxious weed control. The vault toilets are pumped out under contract and major repairs and maintenance are done by contractors when possible.

Additions to the management requirements will be minimal. The trees may require periodic watering by hand during the first few summers to encourage their establishment. This may be added to the work plans for project personnel. Once the dryland grasses have been planted, weeds must be kept down by spraying until the grass becomes firmly established. After this, weed control should not be necessary.

The construction of a portable toilet in the primitive camping area will require minor servicing and cleaning by project personnel. This and other additions to the maintenance requirements at this area are not expected to be significant and can be handled with current personnel.

SECTION 6 - CULTURAL RESOURCES MANAGEMENT

6.01 Introduction.

The term "cultural resource" refers to any building, site, district, structure, object, data, or other material significant in history, architecture, archaeology or culture. The lower Snake River provides this region with a wealth of cultural resources and the Lower Monumental Project is endowed with more than its share of them. Marmes Rockshelter, in the Palouse River Canyon, is the most significant archaeological site in the Western Hemisphere to date. SECTIONS 5.02 and 5.03 of the LOWER MONUMENTAL MASTER PLAN and SECTION 4.04 of this appendix contain a general review of the archaeological and historic resources of this project. A more detailed accounting of these resources is included in ARCHAEOLOGICAL RECONNAISSANCE ON THE MID-COLUMBIA AND LOWER SNAKE RIVER RESERVOIRS FOR THE WALLA WALLA DISTRICT ARMY CORPS OF ENGINEERS (Cleveland, Gregory; Bruce Cochran; Judith Giniger; and Hallett Hammatt. 1976. Project Reports 27. Washington Archaeological Research Center; Pullman, Washington. 110 pp.) and A CULTURAL RESOURCES SURVEY FOR THE UNITED STATES ARMY CORPS OF ENGINEERS, WALLA WALLA DISTRICT (Stratton, David H. and Glen W. Lindeman. 1976. Project Reports 28. Washington Archaeological Research Center; Pullman, Washington. 102 pp.).

6.02 Legislative Background.

The following list provides a legislative background clarifying the responsibilities of the Corps of Engineers with respect to the management of the project's cultural resources.

- o Antiquities Act of 1906 (P.L. 59-209) (34 STAT. 225)
- o Historic Sites Act of 1935 (P.L. 74-292) (49 STAT. 666)
- o Reservoir Salvage Act of 1960 (P.L. 86-523) (74 STAT. 220)
- o National Historic Preservation Act of 1966 (P.L. 89-655) (80 STAT. 915)
- o National Environmental Policy Act of 1969 (P.L. 91-190) (83 STAT. 852)
- o Preservation of Historic and Archeological Data (P.L. 93-291) (88 STAT. 174)

- o Executive Order 11593, Protection and Enhancement of the Cultural Environment, 13 May 1971 (36 F.R. 8921, 15 May 1971)
- o Archeological and Historical Data Conservation Act of 1974 (74 STAT. 220)

Until 1966, the National Park Service was delegated by legislation with the primary responsibility for the management of cultural resources associated with Federal programs and projects. With the enactment of the National Historic Preservation Act of 1966 and subsequent legislative and administrative actions, however, this responsibility was shifted to agencies having jurisdiction or control over these resources. Executive Order 11593 affirms this point clearly stating that, "Agencies of the executive branch of the Government. . . shall (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, . . . " As a result, the Corps now has an Archaeological Coordinator with responsibility for cultural resources management. The role of the National Park Service in these matters has shifted now to that of a principal coordinator and expert advisor to other agencies.

6.03 Cultural Resource Management Program.

In the Walla Walla District, the Archaeological Coordinator has the primary responsibilities for the management of cultural resources. In accordance with ER 1105-2-460, a three-step program has been developed and is currently in progress under his direction. Step One is the reconnaissance of project land to locate all sites of archaeological importance. This step was accomplished in 1976 under a contract with the Washington Archaeological Research Center at Washington State University in Pullman, Washington. The findings of this study are contained in ARCHAEOLOGICAL RECONNAISSANCE ON THE MID-COLUMBIA AND LOWER SNAKE RIVER RESERVOIRS FOR THE WALLA WALLA DISTRICT ARMY CORPS OF ENGINEERS (Cleveland, et. al.; op. cit. - Section 6.01). Besides locating all visible archaeological sites, each was evaluated in its present condition, and the geologic processes affecting or threatening them were analyzed and recorded. In addition, the study presents the Corps with specific recommendations for the preservation of these sites.

The second step of the program is to return to each site and complete a further investigation, testing for

archaeological significance. Since all sites cannot be tested simultaneously, a priority list is developed with highest priority given to sites threatened by disturbance in the form of erosion or vandalism. Once significant or valuable archaeological sites have been located and tested, action is taken to either (1) preserve the site in its present condition and protect it from erosion and vandalism, or (2) salvage the site (step 3).

At the present time, a priority site list has been developed and testing of sites for archaeological significance is scheduled for FY 1981 and FY 1982. This work is being coordinated and administered by the Archaeological Coordinator at the Walla Walla District Office; actual field work is done by the contractor. The responsibilities of project personnel with regard to this three-step program vary from site to site but are generally limited to support activities for the contractor, such as transportation of equipment to and from the site when necessary.

6.04 Protection of Cultural Resources.

Besides providing support to archaeological contractors, project personnel assist the Archaeological Coordinator through random surveillance of project lands (1) to discover, recognize and report any and all burials or other archaeological materials exposed due to shoreline erosion, and (2) to protect all archaeological sites, either known or unknown, from vandalism. In the first case, it is believed that there are many archaeological sites not discovered by the reconnaissance study in 1976 that will become exposed over time as shoreline erosion continues. Project personnel must keep an eye open for these sites as they become exposed, especially following periods of high water flow or strong wind. Whenever an exposed site is reported or a site is discovered, the Archaeological Coordinator and Resource Manager should be notified immediately. All personnel should familiarize themselves with WWDR 1180-1-5, 20 September 1977.

The Antiquities Act of 1906 makes it a Federal offense to appropriate, excavate, injure or destroy any historic ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States. In addition, Section 327.14 of Title 36 of the Code of Federal Regulations states that destruction, injury, defacement or removal of public property including natural formations, historical and archaeological features

and vegetative growth is prohibited without written permission of the District Engineer. Further guidance on this matter is contained in ER 405-1-875, 7 May 1973.

The documents cited above enable project personnel with citation authority to protect archaeological sites from vandalism. Any persons who appear to be digging, carrying digging equipment, loitering, or exhibiting suspicious behavior in the vicinity of known sites should be approached and questioned.

6.05 Cultural Resource Awareness Program.

In addition to his other responsibilities, the Archaeological Coordinator administers a Cultural Resource Awareness Program to increase the awareness of project personnel with respect to cultural resources and their management. This program should be presented to all project personnel annually to provide for the effective management of cultural resources.

6.06 Source of Funds.

Funds for the management of cultural resources come from O&M allocations in the project budget. The anticipated funding requirements for this program between FY 1980 and FY 1984 are listed in SECTION 16.

SECTION 7 - MAINTENANCE AND STORAGE FACILITIES

There are no maintenance or storage facilities at the Lower Monumental Project. Instead, maintenance and storage facilities of the McNary, Ice Harbor, Little Goose, and Lower Granite Projects are utilized in the operation and maintenance of the Lower Monumental Project. (The relationship between these projects is discussed in SECTION 2.01.) The maintenance and storage facilities at each of the other projects are described in detail in APPENDIX A of the respective Master Plans.

SECTION 8 - OFFICE AND ADMINISTRATIVE FACILITIES

There are no office or administrative facilities at the Lower Monumental Project. Instead, office and administrative facilities of the McNary, Ice Harbor, Little Goose, and Lower Granite Projects are utilized in the operation and management of the Lower Monumental Project. (The relationship between these projects is discussed in SECTION 2.01.) Descriptions of these office and administrative facilities at each of the other projects are found in APPENDIX A of the respective Master Plans.

SECTION 9 - MAINTENANCE ACTIVITIES

9.01 Turf.

Recreation areas are mowed as needed throughout the growing season, normally 1 April through 30 October. The mower cutting height is between two and three inches (SECTION 3.03-d., APPENDIX B). Hand trimming around natural and man-made obstacles such as buildings, fences, trees, and shrubs is included as part of the mowing activities. Strict supervision will help insure that mower damage to trees and shrubs is kept to an absolute minimum. All trees wounded during mowing are treated with a sealing substance to lessen the danger of further damage from insects, disease, or dessication. SECTION 3.03-e. of APPENDIX B contains more specific guidelines.

Areas of grass that become bare or die are reseeded and fertilized during the spring or fall. Recreation areas with lower activity such as Devil's Bench, Ayer, and Riparia are seeded with dryland grasses. Recommended varieties of lawn grasses and dryland grasses, and planting guidelines are listed in APPENDIX B.

Due to the lack of rainfall to maintain a healthy turf, irrigation systems are located at all sites where lawn grasses are planted. These areas are irrigated as often as is required. The system is operated to minimize conflict with recreationists during periods of visitor use.

Common fertilizers may be applied to all grassy areas as needed. The Resource Manager will determine the type of fertilizer to be used and the application rate based on soil sample test results.

9.02 Trees and Shrubs.

The benefits derived from the planting of trees and shrubs on recreation areas include a higher aesthetic value and protection from the wind and the hot summer sun. New tree and shrub plantings are generally cultivated and watered regularly for several growing seasons or until they become well established. Shrubs are, in general, more shallow rooted than trees and may require irrigation on a regular, sustained basis. Tree plantings are pruned in the fall, after they have become dormant, to develop or shape them into desirable shade trees. More specific pruning

guidelines are contained in SECTION 3.03-c. of APPENDIX B. Dead trees are marked for removal and replaced with a new planting. Dead limbs considered dangerous are removed as needed. Trees damaged by wind or lightning are trimmed and repaired with a sealing substance and supportive materials as needed.

9.03 Restrooms.

Since the condition of restrooms is one of the most important and long-lasting impressions visitors receive during their visit to the project, it is imperative that these facilities are constantly maintained in a high state of cleanliness and repair. Flush toilets are located in areas where visitor use is relatively high (i.e., Lower Monumental Lock and Dam, Lyons Ferry State Park, and Lyons Ferry Marina); vault toilets are located at Devil's Bench, Ayer Boat Basin, Texas Rapids, and Riparia. Both types are well illuminated and well ventilated. All openings to the outside except the doors are screened; doors are self-closing.

All restrooms and vault toilets are cleaned, serviced, and stocked with supplies as needed. This includes such things as sweeping and washing floors and walls; washing lavatories, urinals, and mirrors; and supplying toilet tissue, paper towels, and soap. Disinfectants are used in each cleaning and deodorizers are installed if needed. Insects and their nests, webs, and waste are removed from all restroom facilities whenever they are discovered. Painted surface areas are sanded and repainted as necessary to present a trim and clean appearance. Deteriorated surfaces (i.e., chipped tiles, and decayed or damaged wood) are replaced soon after they are discovered. Floor areas subject to being slippery are covered with non-skid friction-type materials.

The effluent level on all vault toilets is checked during servicing and vaults are pumped before storage reaches 80 percent capacity.

9.04 Picnic Tables and Shelters.

Picnic tables and benches are cleaned periodically as needed. Shelters are swept, with insect nests and webs removed from the walls and ceilings. They are also occassionally washed with a high-pressure spray. All damaged and vandalized items are repaired soon after

discovery with consideration given to preventing similar damage and vandalism following repair. All tables and benches are refurbished as needed; painted surfaces are sanded and repainted when necessary.

9.05 Fireplaces and Grills.

Fires on project land are permitted only in fireplaces, grills, or other facilities designed for this purpose and only in areas designated by the District Engineer (CODE OF FEDERAL REGULATIONS, TITLE 36, SECTION 327.10-b.). Unauthorized and illegal fire rings are dismantled, the ashes and debris removed, and the soil restored whenever they are discovered. In all authorized fireplaces and grills, ashes and other debris are removed periodically.

9.06 Refuse Disposal.

At the visitor facilities at the Lower Monumental Lock and Dam, Devil's Bench and Ayer Boat Basin, trash is collected by the maintenance contractor and disposed of at an approved solid waste disposal site in Kahlotus. At Lyons Ferry State Park and Lyons Ferry Marina, the lessee is responsible for trash collection and disposal. At Texas Rapids and Riparia, trash is collected by the Grounds Maintenance Worker stationed at Little Goose Dam and disposed of by contract.

9.07 Grounds Policing.

Grounds policing is a continuing requirement and is done in conjunction with refuse collection. Any trash, litter, or other debris on project land is picked up and disposed of whenever discovered.

9.08 Boat Ramps and Docks.

Boat ramps are located at Devil's Bench, Ayer Boat Basin, Lyons Ferry State Park, Lyons Ferry Marina, Texas Rapids, and Riparia. They are all constructed of non-skid corrugated concrete to enhance traction. It is the managing agency's responsibility to keep these ramps free of silt and obstructions. Presently, there is a problem with gravel deposition on the boat ramp at Riparia which makes boat launching hazardous if not impossible during low lake levels. This is discussed in SECTION 5.07-c. (APPENDIX A).

Handling docks are located at Devil's Bench, Ayer Boat Basin, Lyons Ferry State Park, and Lyons Ferry Marina to facilitate boat launching. At Texas Rapids and Riparia crib walls are provided for this purpose. Tie-up docks are located at the upstream end of the Navigation Lock, Devil's Bench, Ayer Boat Basin, Lyons Ferry Marina, and at the Marmes Rockshelter site. At Lyons Ferry State Park, there is a crib wall for boat tie-ups. At Lyons Ferry Marina, boats may tie-up along the floating breakwater and the crib wall in addition to the tie-up docks. It is the managing agency's responsibility to keep all floating docks level and stable. Docks and crib walls are kept free of all tripping hazards.

9.09 Beaches and Swimming Areas.

The only recreation site on the project with a designated swimming area is Lyons Ferry State Park, which is leased to the Washington State Parks and Recreation Commission. This agency is responsible for the safety of the swimmers using it. The swimming area is clearly marked by a floating boom to keep bathers and boaters separated. Three lifeguards are employed by the Commission from mid-June through Labor Day. Floating and submerged debris is removed and the beach is cleaned to remove hazardous objects. Water quality is monitored and maintained at or above those standards specified in the standard operating procedures for monitoring water quality at swimming areas managed by the Corps of Engineers.

9.10 Project Roads and Parking Areas.

Gravel roads and parking lots are graded and resurfaced as needed. Paved roads and parking lots, however, require less maintenance. Cracks and potholes in paved roads and parking lots should be filled and sealed at the earliest convenience. Guard posts, wheel stays or other barriers are installed where there is a danger of vehicles accidentally rolling into developed areas or over embankments. Traffic control lines are painted on roads and parking lots in areas of heavy visitor use. The Federal Department of Transportation (D.O.T.) MANUAL ON UNIFORM TRAFFIC DEVICES FOR STREETS AND HIGHWAYS (referred to in the NPD SIGN MANUAL) contains guidelines for traffic control devices.

9.11 Trails, Paths, and Sidewalks.

All deteriorated pathways are repaired to maintain safe and easy travel. Tripping hazards are identified and eliminated. Steps are maintained in a safe condition at all times. Handrails are provided where needed, in accordance with latest safety requirements. Ramps are installed for handicapped persons in areas of heavy visitor use. Trees, shrubs, and bushes interfering with normal safe foot travel are trimmed. Fallen trees and limbs are removed from all pathways as soon as possible. Noxious and poisonous plants are removed to a distance of ten feet or more from the trail's edge.

9.12 Signs.

All signs are constructed and placed in accordance with the Division's Sign Manual. Missing, damaged, and deteriorated signs are replaced as soon as possible. These may be obtained from the Division Sign Shop.

9.13 Potable Water.

Three sites on the Lower Monumental Project have potable water. They are Lyons Ferry State Park, Lyons Ferry Marina, and Lower Monumental Lock and Dam. According to the LOWER MONUMENTAL MASTER PLAN, all domestic water must conform to standards of the Washington State Board of Health. Requirements for the operation and testing of potable water systems are contained in ER 1130-2-407, 10 June 1977.

- o Lyons Ferry State Park - This park is leased to the Washington State Parks and Recreation Commission, which has the responsibility for the maintenance of water quality. Water samples are taken and tested on a regular basis.

- o Lyons Ferry Marina - This park is leased to the Port of Columbia which, in turn, has a concession agreement with a third party for the operation and maintenance of the park and marina. It is the responsibility of the lessee to maintain water quality. Sampling and testing is done by the Columbia County Public Health Service (114 N. 2nd St., Dayton, WA; Telephone: 509/382-2181) under a cooperative agreement with the concessionaire.

- o Lower Monumental Lock and Dam - Water samples are taken monthly by a member of the resource staff at the visitor center on the north shore of the river in the powerhouse building, the restroom in the south shore near the navigation lock, and the picnic area on the north shore below the dam on a rotating basis. These samples are sent to the Benton - Franklin District Health Department (1005 Goethals Drive, Richland, WA) for analysis.

  The water at the picnic area on the north shore is shut off from November to April which precludes the taking of water samples here during this period. However, the visitor center and the restroom on the south shore have water all year.

9.14 Irrigation Systems.

All turfed areas on the Lower Monumental Project have irrigation systems in place which are operated and maintained by the resource staff. The operation of irrigation systems is coordinated to minimize conflict with recreationists. Sprinkler heads are located at or near ground level to minimize tripping hazards and foot injuries.

SECTION 10 - RANGER ACTIVITIES

10.01 Ranger Duties.

Ranger duties are performed by resource management personnel in addition to their other duties. At the Ice Harbor - Lower Monumental Project Office, which is responsible for the lower half of the Lower Monumental Project, ranger duties are accomplished by the Resource Manager, Park Managers, and Resource Ranger. At the Granite - Goose Project Office, which is responsible for the upper half of the Lower Monumental Project, they are accomplished by the Resource Manager, Assistant Resource Manager, and the Resource Ranger. There are no persons at either project employed solely and specifically to patrol project lands and perform the duties listed below. Instead, ranger duties comprise only a small part of their job. Because of this and the distance between Lake West and the Ice Harbor - Lower Monumental Project Office at the Ice Harbor Dam and the Resource Management Office in Clarkston, there is no formal patrolling of the Lower Monumental project land. Instead, resource management personnel maintain surveillance of project lands while performing their other duties. Resource management personnel must remain alert at all times while in the field for violations of Title 36 regulations (e.g. encroachments and vandalism), lease and easement violations, fires, health and safety hazards, etc.

The following is a list of ranger duties:

- o provide assistance to the public as needed.
- o enforce rules and regulations contained in Part 327 of Title 36 of the CODE OF FEDERAL REGULATIONS.
- o contract administration and inspection.
- o insure compliance with leases and easements.
- o detect erosion, fires, pollution, and pests.
- o identity needed repairs and maintenance of facilities and equipment.
- o identify health and safety hazards.

10.02 Citation Authority.

a. Legislative Background.

In 1962, the United States Congress enacted Public Law 87-874 which proclaimed that "the water areas of all water resource development projects shall be open to public use generally without charge, for boating,

swimming, bathing, fishing, and other recreational purposes. . .all under such rules and regulations as the Secretary of the Army may deem necessary." This law was supplemented by Section 234 of Public Law 91-611 which gave persons designated by the Chief of Engineers the authority to issue citations for violations of the rules and regulations adopted by the Secretary of the Army. ER 190-2-4 establishes an implementation program for this law. It is the responsibility of all rangers and other personnel with citation authority to remain cognizant of the rules and changes introduced thereto.

b. Policy.

The primary purpose of citation authority is to insure the visiting public a safe and pleasant recreation experience. Citation procedures are executed in accordance with ER 190-2-4, Citation Authority and Procedures. Maximum use of oral and written warnings is made in minor cases. Project personnel with citation authority cannot carry weapons or make arrests. Whenever possible, Federal, state, and local law enforcement authorities are utilized to provide law enforcement on project land and water.

c. Limits of Authority and Jurisdiction.

In the original acquisition of land at the Lower Monumental Project, the Corps of Engineers obtained proprietary interest only. Individual state, county, and Federal law enforcement agencies retained statutory authority and inherent responsibility for law enforcement on project lands.

Law enforcement on the Lower Monumental Project is provided by the F.B.I., U.S. Coast Guard, Washington State Patrol, and the Franklin, Walla Walla, Whitman, and Columbia County Sheriffs. The F.B.I. is responsible for enforcing Federal laws, the Coast Guard enforces safe boating regulations, the State Patrol investigates traffic accidents and enforces motor vehicle laws on state highways, and county sheriffs take responsibility for other state laws and county ordinances.

Violations of these laws are reported to the appropriate authorities. Telephone numbers are included in the Law Enforcement Directory at the end of this section. Contact is made directly by public phone, or indirectly by contacting either the Lower Monumental or Little Goose Control Room Operator who relays the message to the appropriate authority.

In accordance with Section 120 of the Water Resource Development Act of 1976 (P.L. 94-587) and ER 1130-2-418, the Corps was authorized to contract with local law enforcement agencies for additional surveillance and law enforcement at water resource development projects for a two-year trial period. Funds for this program came out of the regular project O&M budget during FY 1978 and 1979 (SECTION 16.05).

During FY 1978, contracts were in effect with the Walla Walla and Franklin County Sheriffs, which provided additional patrols at all Corps-operated recreation areas in these two counties. Only a few of these areas are located in the Lower Monumental Project; most are located in the Ice Harbor and McNary Projects. The costs of these contracts were divided between the separate projects but were not part of the regular project budgets in FY 1978.

At the present time, there are no law enforcement service contracts with either the Whitman or Columbia County Sheriffs and patrols and enforcement of safe boating ordinances in these two counties are inadequate. An attempt is being made to secure contracts for FY 1979 with the Whitman and Columbia County Sheriffs for boat patrols on Lake West above the Joso Bridge.

The future of this program remains in doubt since the Corps doesn't have Congressional authorization to negotiate contracts for FY 1980.

Citation authority for enforcement of Title 36 is granted to designated Corps employees who have successfully completed the Citation Authority Training Program. This authority is restricted to lands owned by the Corps of Engineers. Citation authority may be exercised at outgranted areas when necessary, but it is the policy of the Corps to delegate this responsibility to the party involved in the outgrant.

d. Citation Procedures.

All Corps employees with citation authority must wear a prescribed uniform and their vehicles should be equipped with a radio, fire extinguisher, emergency first aid kit, and flares or some other roadside warning devices. Project information pamphlets and copies of Title 36 regulations and the Privacy Act should be carried in the vehicles for distribution to visitors.

Once a violation is detected, a determination must be made as to the method for handling it.

In situations which involve motor vehicles and motor vehicle accidents on state and county roads, either the county sheriff or the Washington State Patrol should be contacted. Situations involving criminal activity, such as assault and robbery, should be reported to the appropriate county sheriff. Violations of Part 327 of Title 36 of the CODE OF FEDERAL REGULATIONS can only be enforced by resource management personnel with citation authority. Under circumstances where an incident represents both a violation of the CODE OF FEDERAL REGULATIONS (Title 36, Part 327) and a state law or county ordinance, the incident should be reported to the appropriate law enforcement agency for citation under the applicable state or county statute.

In exercising citation authority, the use of good judgement and objectivity is imperative. In minor cases, either verbal communication or a letter to the violator may be appropriate and sufficient. Written warnings are issued on ENG Form 4381, Warning Citation, with the yellow copies forwarded at least monthly to the Walla Walla District Office, ATTN: Recreation - Resource Management Branch. The white copy along with a copy of Title 36 regulations with the specific violation circled and a copy of the Privacy Act is given to each violator (an incident report is not required in these cases). A letter should accompany warnings sent through the mail explaining the violation.

When conditions warrant, a violation notice is issued to the offender, using DD Form 1805. Guidance on the use of this form is included in AR 190-29 as well as Appendices G, L, and M of NPD Supplement 1 to ER 190-2-4. Each offender receives a copy of Title 36 regulations with the specific violation circled, in addition to the citation. The multiform Violation Notice (four copies) is distributed as follows:

Copies 1 and 2. These copies are sent to the Walla Walla District Office, ATTN: Recreation - Resource Management Branch. These must be sent within 24 hours at which time they are reviewed and then sent to the Central Violations Bureau (CVB) of the U.S. District Court in Spokane (address below) accompanied by a letter of transmittal listing all Violation Notice numbers. A sample copy of a letter of transmittal is found in Figure 10.1.

Clerk, United States District Court
Eastern District of Washington
P.O. Box 1493, ATTN: CVB
Spokane, Washington 99210

Figure 10.1 Letter of Transmittal for Violation Notices (Example)

DEPARTMENT OF THE ARMY
Walla Walla District, Corps of Engineers
Bldg. 606, City-County Airport
Walla Walla, Washington 99362

NPWOP-PM (Date)

Clerk, United States District Court
Eastern District of Washington
P.O. Box 1493, ATTN: CVB
Spokane, Washington 99210

Dear Sir:

The following Violation Notices, DD Form 1805, were issued by U.S. Army Corps of Engineers Ranger personnel of the U.S. Army Engineer District, Walla Walla, in the U.S. District Court, Eastern District of Washington, jurisdiction.

Violation Notice Number	Date Issued

Please indicate receipt of these Violation Notices on this form and return a copy of it to the U.S. Army Engineer District, Walla Walla, in the inclosed return envelope.

Sincerely yours,

(Signature)

Copy 3. This copy is retained in project files.

Copy 4. This copy, which incorporates the mailing envelope, is given to the violator along with a copy of the Privacy Act and Title 36 regulations with the specific violation circled. The issuing ranger enters the Central Violations Bureau (CVB), U.S. District Court Clerk's Office address on the envelope portion of copy 4, Violation Notice, prior to giving copy to the violator.

The collateral schedule for the U.S. District Court (Eastern District of Washington) is included as an appendix to NPD Supplement 1 to ER 190-2-4. In issuing a violation notice, the corresponding fine listed on this schedule must be entered on the notice in the lower right-hand corner. For the five more serious offenses, no fine is listed, but a mandatory appearance before the U.S. Magistrate in Spokane is required. A date and time for this appearance is scheduled by the Court Clerk and a notice is then sent to the alleged violator. It is the responsibility of the Issuing Officer to appear at all trials before the U.S. Magistrate.

In all other less serious cases where collateral is established, the alleged violator may elect to either pay the fine or request an appearance before the U.S. Magistrate in Spokane. If the alleged violator elects to pay the fine in lieu of a court appearance, he/she must mail the payment and related citation, within seven days, to the Court Clerk in the preaddressed envelope which incorporates Copy 4 of the Violation Notice. If the alleged violator elects to request a hearing before the U.S. Magistrate, he/she must check the appropriate box on the notice and mail it within seven days to the Court Clerk in the preaddressed envelope. As in cases requiring a mandatory appearance, the issuing ranger must appear at all trials before the U.S. Magistrate.

An Incident Report, ENG Form 4337, is prepared or every Violation Notice issued. The Incident Report shows all information contained on the Violation Notice (Violation Notice number, date of violation, violation charged, alleged violator's name and address, etc.) plus names of witnesses, if any, and any additional facts deemed appropriate and useful in the event that the alleged violator requests an appearance before the U.S. Magistrate. The original Incident Report is forwarded to the District Security Officer with a copy to the Walla Walla District Office, ATTN: Recreation - Resource

Management Branch, where information is extracted for preparation of the Recreation - Resource Management Data Report (RCS DAEN-CWO-39). In addition, the Issuing Ranger is required to submit a follow-up report to the District Security Officer indicating the outcome of each citation issued.

If an individual is uncooperative and refuses to accept a citation, employees with citation authority may not take such a person into custody. However, the alleged violator's vehicle license plate number and description should be recorded as well as statements, names, and addresses of witnesses. The Magistrate may cause a summons or warrant for an arrest and appearance to be issued provided that sufficient evidence is presented.

If a Corps employee encounters a situation where he/she requires assistance from local law enforcement agencies, contact should be made first, with the County Sheriff and then the Project Office. Although Ranger's vehicles are equipped with radio units, they operate on a different frequency than the sheriff's and cannot be used to communicate directly with them. Therefore, contact with the sheriff should be made directly by public phone, if available, or indirectly by contacting either the Lower Monumental or Little Goose Control Room Operator. The Control Room Operator will then relay the message to the County Sheriff by phone. Telephone numbers and radio call numbers are contained in the Law Enforcement Directory at the end of this section.

For the citation program to operate smoothly and successfully, liason must be established and maintained with the U.S. District Court Clerk and Magistrate in Spokane. This relationship should provide a harmonious atmosphere of cooperation and understanding between the Resource Managers and Resource Rangers, and the Court Clerk and Federal Magistrate. Court appearances and other administrative details related to the citation program must be coordinated through these persons.

10.03 Encroachments.

a. Procedures.

An encroachment may be generally defined as unauthorized use of project land. In general, they refer to improper, non-recreational uses of project lands. ER 1130-2-414 dated 1 October 1976 defines an encroachment

as including the unauthorized existence of boat docks, other floating facilities, water or utility lines, permanent structures (fee and/or easement lands), vegetation, grazing, and farming or sharecropping, etc., on Corps-managed lands. In most cases, encroachments are enforced under provisions of Title 36. Specifically, Sections 327.20 and 327.22 serve as the enforcement instruments. In addition, the construction of any structure in a navigable waterway (i.e., Lake West) is strictly regulated under Section 10 of the River and Harbor Act of 1899 (30 STAT. 1151; 33 U.S.C. 403). Furthermore, any construction on project land which includes either dredging or the disposal of dredge material is strictly regulated under Section 404 of the Federal Water Pollution Control Act as amended by the Clean Water Act of 1977 (P.L. 95-217; 33 U.S.C. 1344). While the penalties for violations of Title 36 are at the most $50, violations of either of the two Federal Acts mentioned above carry a much more severe penalty.

In most cases, encroachments are discovered by project personnel in the field but may also be discovered by Real Estate Division during outgrant inspections or by district Recreation-Resource Management Branch personnel. Those discovered by Real Estate Division are reported to the Recreation-Resource Management Branch on biannual compliance inspection reports. In turn, the appropriate project office is notified and attempts resolution. Likewise, the appropriate project office is notified when an encroachment is discovered by personnel of the Recreation-Resource Management Branch.

Generally, encroachments are resolved at the project office by personal contact if the responsible party is present during discovery or by letter if not. Warning citations are often used to officially serve notice to the encroacher of their encroachment. Citation notices are issued when the encroachment has not been corrected during the prescribed period or in cases of major importance.

The role of the Recreation-Resource Management Branch in resolving encroachments is to provide advice and assistance to the project office, coordinate solutions with Real Estate Division, and handle encroachments which cannot be resolved at the project level. The following is a list of options available in resolving an encroachment at the District level.

- o Department of Army Permits - Activities such as dredging and construction of fixed structures may be

permitted under provisions of Section 10, River and Harbor Act of 1899 (33 U.S.C. 403) and Section 404 of the Federal Water Pollution Control Act (33 U.S.C. 1344) as amended by the Clean Water Act of 1977 (P.L. 95-217). These permits are issued by the Regulatory Functions Section of Operations Division in the District Office.

- o Outgrant - If the encroachment is compatible with the use for which the land is designated, a license, easement, or lease may be issued to the party invclved through Real Estate Division.

- o Disposal - The land involved in an encroachment may be disposed of if it is deemed that this land is not needed.

- o Fencing - This method is a physical deterrent to the encroacher.

- o Summary Removal - Section 327.20 (Unauthorized structures), Title 36, Chapter 3, CODE OF FEDERAL REGULATIONS, 16 March 1973, states that structures not under permit are subject to summary removal by the District Engineer.

- o Citation - If not issued at the time when the encroachment was detected, the District Office and the Project Office may decide to issue a citation to the party involved.

- o Further Legal Action - The Office of Counsel in the District Office may initiate legal proceedings against individuals or parties for encroaching on project land and for violations of Section 10, River and Harbor Act of 1899 (33 U.S.C. 403) and Section 404 of the Federal Water Pollution Control Act (33 U.S.C. 1344) as amended by the Clean Water Act of 1977 (P.L. 95-217).

b. Prevention.

Experience has repeatedly demonstrated that once an encroachment becomes established and persists tor any appreciable length of time, it becomes extremely difficult and very time consuming to resolve. Therefore, it cannot be emphasized too strongly that every possible effort must be made to prevent new encroachments from developing. The following is a list of preventive measures.

- o Boundary Surveying and Monumentation - This was completed on the Lower Monumental Project in 1974. Drawings of the project boundary and location of monuments are on file in the Survey Section at the District Office. Monuments were originally located so that a person standing at any given monument could see the next monument in either direction. Monuments that have been removed or are otherwise missing should be replaced by the Survey Section.

  Removal of boundary monuments is prohibited under 18 U.S.C.A. 1858 and Title 36, Section 327.14, of the CODE OF FEDERAL REGULATIONS. Project personnel with citation authority will cite first-time offenders under the CODE OF FEDERAL REGULATIONS which requires an appearance before the U.S. Magistrate in Spokane. However, it may be more desirable to prosecute persistent violators under 18 U.S.C.A. 1858 which carries a $250 fine. In this case, all pertinent information must be included in a report and sent to the Office of Counsel at the District Office with a copy to the Recreation-Resource Management Branch also.

- o Fencing - In many cases, this method is a very effective method of preventing encroachments. Some of the project land, especially former railroad right-of-ways, was fenced when it was acquired. In 1978, approximately 19.3 additional miles of the project boundary were fenced as part of the work accomplished under the Lower Snake River Fish and Wildlife Compensation Plan. Now, most of the project boundary is protected by fence or natural barriers.

- o Surveillance - It is essential that project personnel, as well as district personnel, be constantly alert while in the field, in order to detect encroachments as they develop. If initial action is taken shortly after the encroachment develops, its resolution will be easier.

10.04 Violations of Leases, Easements, and Licenses.

This is the joint responsibility of Operations and Real Estate Division. Real Estate Division personnel conduct compliance and utilization inspections periodically to insure that outgranted lands are being managed in accordance with the terms of their agreement. They should coordinate their inspections with the Resource Manager and if possible, a project employee shall accompany the realty specialist.

In addition, project personnel should include monitoring outgranted lands for violations of the terms of their agreement with their normal surveillance duties. Upon detection of violations, contact shall be made with Real Estate Division.

10.05 Detection of Erosion, Fires, Pollution, and Pests.

In the course of their normal, assigned duties, project personnel must continually be aware of any erosion, fires, pollution, and pest problems. Reports should be relayed to the Resource Manager immediately. Any of these problems which cannot be handled at the project level should be referred to the District Office. Fires should be reported and handled in accordance with APPENDIX C. Refer to SECTION 11 for pest problems. The discharge of pollutants in any of the project's waters is reported to the U.S. Coast Guard local headquarters in Kennewick (582-7081). This topic is discussed further in SECTION 4.08 of APPENDIX E.

10.06 Detection of Health and Safety Hazards.

All project personnel should be alert during the course of their normal duties for potentially hazardous health and safety situations. Health and safety standards are outlined in APPENDIX E. If the situation cannot be remedied at the time it is detected, then either a sign should be constructed to warn people or the area should be roped off to prevent visitor or employee access.

10.07 Training.

A formal training program in citation procedures for resource personnel is currently conducted when needed by the North Pacific Division Office.

LAW ENFORCEMENT DIRECTORY

F.B.I. (Seattle)	206-622-0460
U.S. Coast Guard (Kennewick)	582-7081

Area #1: Franklin County - north shore of Snake River, west of Palouse River.

Washington State Patrol (Kennewick)	783-6102
Franklin County Sheriff (Pasco)	545-3411
Lower Monumental Control Room Operator	
Telephone	282-3218
Radio	WUJ 43
Code call	7-11

Area #2: Walla Walla County - south shore of Snake River, West of Lyons Ferry Marina.

Washington State Patrol (Kennewick)	783-6102
Walla Walla County Sheriff (Walla Walla)	525-0410
Lower Monumental Control Room Operator	
Telephone	282-3218
Radio	WUJ 43
Code call	7-11

Area #3: Whitman County - north shore of Snake River, east of Palouse River.

Washington State Patrol (Spokane through Colfax)	397-2831
Whitman County Sheriff (Colfax)	397-4341
Little Goose Control Room Operator	
Telephone	399-2234
Radio	WUJ 44
Code call	80-111

Area #4: Columbia County - south shore of Snake River, east of Lyons Ferry Marina, inclusive.

Washington State Patrol (Kennewick)	783-6102
Columbia County Sheriff (Dayton)	382-2518
Little Goose Control Room Operator	
Telephone	399-2234
Radio	WUJ 44
Code call	80-111

SECTION 11 - PEST CONTROL

11.01 Pesticide Application.

The Resource Manager is responsible for the organization and supervision of the pest control program and ultimately for the safe and proper application of pesticides on project lands. Pesticides are applied only in areas designated by the Resource Manager, and only by authorized personnel who have successfully completed all training requirements. Additional training is required for certification to use certain "restricted" pesticides designated by the Environmental Protection Agency (EPA). At least one member of the spray crew must be familiar with the operation and maintenance of the spray equipment.

The selection of chemicals and methods of application is based on the references listed below.

- PACIFIC NORTHWEST PEST CONTROL HANDBOOK - University of Idaho, et. al. 1978.
- 1978 W.S.U. WEED CONTROL HANDBOOK - W.S.U. College of Agriculture, et. al. 1978.
- 1978 PACIFIC NORTHWEST INSECT CONTROL HANDBOOK - W.S.U. College of Agriculture, et. al. 1978.

Directions on the pesticide label are strictly adhered to. All handling of pesticides is done in well-ventilated areas by personnel clothed in protective apparel. Respiratory devices must be worn while spraying. Other safety precautions are contained in the following references.

- APPENDIX A of ER 1130-2-413 (PEST CONTROL PROGRAM FOR CIVIL WORKS PROJECTS; 15 July 1977).
- PACIFIC NORTHWEST PEST CONTROL HANDBOOK - University of Idaho, et. al. 1978.
- PESTICIDE APPLICATOR TRAINING MANUAL - Cornell University, Ithaca, New York. September, 1974.
- Training Manual for NTTC Course 150, BASIC PEST CONTROL TECHNOLOGY (NAVFAC Technical Training Center, Norfolk, Virginia 23511).

At least one copy of each of the references listed above is retained by the Resource Manager at both the

Ice Harbor - Lower Monumental Project Office and the Lower Granite - Little Goose Project Office. All pesticide applications must be recorded on NPW Form 537 and copies must be furnished to the District Office on the first of each month.

Every effort is made to mix only as much pesticide as is needed for the day's spray activities and to finish the day's spray activities with an empty tank. This makes it necessary to accurately calculate the acreage to be sprayed and the amount of mixed spray solution needed.

In areas where pesticides have been applied and a reasonable chance exists that the visiting public will come into contact with harmful pesticide residues, an effort will be made to inform visitors that the area has been sprayed. Sprayed areas will be appropriately marked with portable signs stating that the area has been sprayed and visitors should keep out. The manufacturer's label often specifies a period of time during which residues are potentially dangerous. The signs should remain in place during this interval.

11.02 Pesticide List.

The following list contains brand names of herbicides and insecticides currently used in the Walla Walla District:

Herbicides	Insecticides
2,4-D	BAYTEX 2
BANVEL	CYTHION
CASORON G-10	DIAZINON
CUTRINE PLUS	DURSBAN 2E
DIQUAT	DURSBAN 10CR
AQUAKILL	FLIT-MLO
DMA	KORLAN
ROUND UP	MALATHION
SIMAZINE	SEVIN
SOCAL	
TELVAR	
TORDON 22K	

11.03 Common Pests.

The list below is a compilation of the most common pests on the Lower Monumental Project.

Plants	Insects
Scotch Thistle	Mosquitos
Bull Thistle	Wasps and Hornets
Canada Thistle	Black Widow Spider
Common Burdock	Recluse Spider
Field Sandbur	
Poison Hemlock	**Mammals**
Puncturevine	Moles
Russian Thistle	
Yellow Starthistle	
Morning Glory	

11.04 Rattlesnakes.

The Northern Pacific Rattlesnake (Crotalus viridis oreganus) is a member of the wildlife community indigenous to S.E. Washington and inhabits the talus slopes and rock outcrops along the Snake River. Here they play a necessary and important role in the local food web. The small mammals such as deer mice (Peromyscus maniculatus) are preyed upon by rattlesnakes which, in turn, are preyed upon by the native birds of prey (i.e., red-tailed hawks and prairie falcons).

Although this rattlesnake is the only snake indigenous to Washington State with venom of sufficient strength to warrant concern for human health, the snake is believed to be of no serious threat to the safety of our visitors because of its scarce distribution and reclusive character. This conclusion is supported by a survey of indigenous poisonous snakes in the Palouse River Canyon[1] conducted under the direction of Dr. Kenneth V. Kardong (Department of Zoology, Washington State University). Besides that, the extreme paucity of incident reports relating to rattlesnakes further supports the above conclusion.

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[1] Kardong, Kenneth V. 1974. A STUDY OF INDIGENOUS POISONOUS SNAKES AND ENVIRONMENTAL EFFECTS OF THE TRAIL. (Lyons Ferry - Palouse Falls Trail System - Cover title: Snakes along the Palouse) U.S. Army Corps of Engineers, Walla Walla District. Walla Walla, Washington. July 1974.

Therefore, there is no need to develop a rattlesnake control program on this project. However, in rare, isolated instances where a rattlesnake ventures into an intensively managed recreation area and poses an imminent threat to the safety of visitors, the snake may and should be exterminated. Indiscriminate or unwarranted extermination of rattlesnakes is not permitted.

11.05 Training.

All personnel directly involved in pest control must be properly trained in the safe application of all pesticides. The current Division policy for training and certification of pest control personnel requires that all pest control applicators and supervisors attend the training course offered by the Washington State Department of Agriculture and pass the state pesticide applicator's licensing examination. In addition, they must receive federal training covering applicable federal pesticide regulations.

11.06 Transportation of Pesticides.

Pesticides may be transported in vehicles in metal containers provided that they are tightly and securely closed and properly blocked and secured. Non-compatible hazardous materials should not be carried in the same vehicle. Proper Department of Transportation placards (DANGER, POISON, WARNING, or CAUTION) should be placed on vehicles carrying over 100 pounds of pesticides. Drivers should also make certain that these containers will not be damaged by other freight or by nails or rough sides and flooring within the vehicle. The storage area of the vehicle must be well-ventilated and separate from the passengers' compartment and pesticides should not be carried along with foodstuffs or other contaminable cargo.

Pesticides transported by project boats must be in water-tight metal containers secured in place on deck in a well-ventilated area separate from the cabin. Other precautions listed in the paragraph above should be followed when transporting pesticides by boat as well.

11.07 Storage of Pesticides.

There are no pesticides stored at the Lower Monumental Project. Those used for the pest control program

here are stored at the Pasco Maintenance Shop (McNary Project) and the Resource Management Office in Clarkston (Lower Granite Project).

11.08 Disposal of Pesticide Containers.

The disposal of empty pesticide containers must be coordinated with the local county health departments. All containers should be triple-rinsed and those in good condition should be returned to pesticide suppliers that accept them for reuse. Otherwise, glass containers should be broken and metal containers should be crushed and punctured, then disposed of in a sanitary landfill. Combustible containers may be burned provided such burning conforms with local regulations. Specific federal recommendations regarding the disposal of pesticide containers are found in 40 C.F.R. 165.9.

11.09 Disposal of Pesticide Wastes.

Excess pesticides are disposed of in accordance with local health department standards. At the Lower Granite Project, there is a wash-down platform adjacent to the Warehouse Building in Clarkston, designed specifically for rinsing the spray rig and tank. The wash-down fluid drains into an underground temporary storage tank, which stores waste water from the emergency eyewash and shower, and the clothes washer, as well.

SECTION 12 - OUTGRANTS

The Corps of Engineers currently has four distinct areas on the Lower Monumental Project under leases and several other tracts of land under easements for a variety of purposes. In each case, project personnel should be familiar with the terms of these agreements and insure compliance. Violations should be reported immediately to the Real Estate Division and the Recreation - Resource Management Branch at the District Office. A compliance inspection report (ENG Form 3560), maintained by Real Estate Division, lists all outgrants on the Lower Monumental Project.

12.01 Leases.

a. State of Washington - Parks and Recreation Commission (DACW68-1-71-104).

A 1,177 acre tract along the Palouse River is leased to the State of Washington and is operated and managed according to the terms of this lease by the Washington State Parks and Recreation Commission. This leased acreage is composed of 305.2 acres of water surface and 871.8 acres of land area. Most of the land area (466.5 acres) is allocated for management as a natural area. In addition, 289.8 acres is allocated for recreation use and development but is currently managed as a natural area. The remaining 115.5 acres are designated for intensive recreation use and are developed as Lyons Ferry State Park. A more complete discussion of Natural Areas is contained in SECTION 4.04; Lyons Ferry State Park is discussed in SECTION 5.04.

b. Port of Columbia (DACW68-1-71-20).

Thirty-seven acres are leased to the Port of Columbia on the south shore of the Snake River across from Lyons Ferry State Park. This tract is composed of only 21.6 acres of land area which is operated and managed by a third party under a concessionaire agreement with the Port of Columbia; the remaining 15.4 acres are located underwater. Facilities at this leased area, named Lyons Ferry Marina, include a small park and marina. A more complete discussion is contained in SECTION 5.05.

c. Alkali Flat Creek (DACW68-1-69-132).

Forty-eight acres along Alkali Flat Creek are currently leased to an adjacent landowner for dryland cattle grazing. At present, however, this land is allocated for intensive wildlife habitat development. It is planned that upon expiration of the current lease on 31 May 1979, a new lease will not be negotiated and this area will undergo moderate intensity wildlife habitat development.

d. State of Washington - Division of Aeronautics (DACW68-1-78-42).

A 38.5 acre area on the south shore of the lake just west of the Lower Monumental Lock and Dam is leased to the Department of Transportation for the maintenance of a landing field.

12.02 Easements, Licenses, and Permits.

A multitude of easements, licenses, and permits are issued on the Lower Monumental Project for livestock watering, pumping plants, road right-of-ways, water and gas pipelines, and power and telephone lines. These are all on file at the Real Estate Division at the District Office. Permits are issued for the construction of fixed structures under provisions of Section 10, River and Harbor Act of 1899 (33 U.S.C. 403) by the Regulatory Functions Section of Operations Division. In addition, permits are issued through the same office for dredging or filling in project waters under the provisions of Section 404 of the Federal Water Pollution Control Act (33 U.S.C. 1344) as amended by the Clean Water Act of 1977 (P.L. 95-217).

All applications for easements, licenses, and permits are reviewed by various elements in the District Office and an environmental assessment is written by the Fish and Wildlife Section of Planning Branch for all easements and licenses. Environmental assessments are prepared by Operations Division for all Section 10 and Section 404 permits. Consideration is given to potential impacts of the proposed outgrant on fish and wildlife habitat and populations, air and water quality, recreational opportunities, adjacent communities, etc.

12.03 Perpetual Reservations.

Several perpetual reservations were granted on the Lower Monumental Project in lieu of severance payments

to landowners who owned lands along the Snake River prior to inundation. These reservations were granted primarily for pumping plants and livestock watering.

SECTION 13 - EQUIPMENT INVENTORY

Since this project is jointly administered, equipment utilized on the Lower Monumental Project is assigned to either the Ice Harbor - Lower Monumental Project Office or the Lower Granite - Little Goose Project Office. Within each project, equipment is assigned to a specific location for storage but may be transported and utilized anywhere within the project boundary. Equipment may also be loaned to other projects. Therefore, a list of equipment for both the Ice Harbor - Lower Monumental Project and the Lower Granite - Little Goose Project is included in this section since all of this equipment may be used on the Lower Monumental Project.

ICE HARBOR - LOWER MONUMENTAL
EQUIPMENT LIST

AUTOMOBILES

1	Wagoneer, 4 x 4
1	Van, 4 x 2, with radio
5	Pickup, 1/2 ton, 4 x 2
5	Pickup, 1/2 ton, 4 x 2, with radio
3	Pickup, 1/2 ton, 4 x 4, with radio
1	Pickup, 3/4 ton, 4 x 2
1	Pickup, 3/4 ton, 4 x 2, with radio
1	Pickup, 3/4 ton, 4 x 4
3	Pickup, 1 ton, 4 x 4
1	Truck, 1 1/2 ton, 4 x 2
1	Truck, 2 1/2 ton, 4 x 2, flatbed
1	Truck - Tractor, 5 ton
2	Trash trucks with dump trailer
1	Dump truck, 7 1/2 ton, 4 x 2

TRAILERS	
1	Wisconsin tilt-top trailer, 16 tons
1	Water tank trailer, 5,000 gallons
1	Utility trailer, 8 tons
1	Fayette utility trailer, 4 tons
BOATS	
1	8 foot plywood rowboat
1	11 foot bellboy, cartopper
1	24 foot work boat
1	ICM - 8 (73 foot)
CRANES	
1	Bay City, mobile, 20 tons
FORKLIFTS	
1	Yale and Towne, 2 tons
TRACTORS	
1	Massey-Ferguson, wheeled
1	John Deere, wheeled
1	Case, wheeled, with loader
1	John Deere, wheeled, with mower
1	Ford, wheeled, with attachments
1	Caterpillar, crawler, D-4
1	Caterpillar, crawler, D-7
GRADERS	
1	Caterpillar, Model 12-E, 1960
PUMPS	
1	Homelite, 6-cylinder
1	Hale, centrifugal
1	Berkeley, 600 GPM, JD engine
WELDERS	
1	Westinghouse, electric
1	Hobart

MISCELLANECUS

1	Cement Mixer
1	Weedburner, truck mounted, propane
1	Bean Sprayer - insect, weed
1	Bean Sprayer, 300 gallons
1	Friend Sprayer
2	Mower, "Hustler"
1	Mower, Excell "Hustler"
1	Ditch - Witch Trencher
1	Tractor, Hydro, Hustler XL 272A
1	Rolling Plow, 10 foot
1	Pulvi-mulcher
1	Shredder
2	Seeder
1	Bush Hog
1	Tanker, 1,000 gallon

LOWER GRANITE - LITTLE GOOSE
EQUIPMENT LIST

AUTOMOBILES

1	Sedan
1	Sedan Delivery
4	Pickup 1/2 ton, 4 x 2
1	Pickup 1/2 ton, 4 x 2, with hydraulic tailgate
2	Pickup 1/2 ton, 4 x 2, with radio
1	Pickup 1/2 ton, 4 x 4
1	Pickup 1/2 ton, 4 x 4, 5 passengers
1	Pickup 1/2 ton, 4 x 4, with radio
1	Pickup 3/4 ton, 4 x 2
1	Pickup 3/4 ton, 4 x 2, with dump bed
1	Pickup 3/4 ton, 4 x 4
1	Pickup 1 ton, 4 x 4, with electric crane

TRAILERS

1	Water tank trailer, 1 1/2 tons
1	Cheney light 2-wheel trailer
1	Flatbed, Little Dude boat trailer
1	Fayette utility trailer, 9 tons
1	Wisconsin tilt-top trailer, 16 tons

BOATS	
1	14 foot Jon Boat, with oars
1	21 foot Aluminum Inboard/Outboard, with trailer
1	24 foot Aluminum Jet Boat, with depth indicator and trailer
1	ICM-6 (56 foot), with hydraulic crane
CRANES	
1	Galion, mobile, 12 1/2 tons
FORKLIFTS	
1	Towmotor, 2 tons
TRACTORS	
1	John Deere, wheeled Ag. tractor
1	John Deere, wheeled tractor with loader, blade, rotary mower, side bar cutter
1	John Deere, wheeled tractor with backhoe, loader, and rotary mower
PUMPS	
2	Homelite portable self-priming pumps 4300 GPM
4	Centrifugal Gorman Rupp pumps, trailer mounted
WELDERS	
1	Miller, electric arc, trailer mounted, 200 amp
1	Miller, electric arc, 200 amp

MISCELLANECUS

3	100 gallon McGregor Sprayers
1	200 gallon Friend Sprayer, trailer mounted with booms
1	Rolling Plow, 10 foot
1	Rotary Cutter, Bush Hog
1	Brady Shredder, Model 840
1	Brillion Seeder, Model SST-96
1	Packer, Schmeiser
1	Springtooth Harrow
1	Drill, International Model 510
1	Mower, Excell "Hustler" with rotary broom, flail mower, rotary mower, trailer
1	Mower, Sears rider with three point hitch, disc harrow, drag harrow, roto-spader, spreader-seeder
1	Portable air compressor, Campbell-Mansfield, 10.5 CFM
2	Portable gas Generators, McCullock, 110 V A.C.
1	Post-hole Hammer, motor
1	Post-hole Auger, Sears 5 H.P.
1	Portable Concrete Mixer, electric, 3 cubic feet
1	Paint Sprayer, Speed #107
2	Weedburners, propane, 120 gallons

SECTION 14 - IN-SERVICE TRAINING

14.01 Orientation.

Every new employee hired at the GS 5-11 levels will receive an orientation during the first several months of employment. This will include but not be limited to the following:

- o Review of ENG Form 3529 (Employee Orientation Checklist) with supervisor.
- o Introduction to each of the projects in the Walla Walla District.
- o Introduction to the District Office including Operations Division, Recreation-Resource Management Branch; Engineering Division, Fish and Wildlife Section, Reproduction Branch, Civil Design Section; Real Estate Division; Procurement and Supply Division; Personnel Office; Office of Counsel; ADP; Safety Office; and the Security Officer.
- o (For GS 7-11 levels only) Introduction to the Division Office including Operations Division and the Recreation-Resources Management Branch.

In addition to the above items which must be scheduled in advance by the supervisor, the following tasks should be included in an employee's training program and may be accomplished by the employee without assistance or advance scheduling.

- o Study and review of the Project Operating Manual.
- o Study and review of the Master Plans.
- o Study and review of pertinent regulations (Section 15) especially ER 1130-2-400.
- o Study and review of existing leases of the project.
- o Study of State Fish and Game Regulations.
- o Study of the history of the project and Walla Walla District.
- o Study of lake and public use regulations.
- o Develop a knowledge of tourist attractions within the local area and the entire Walla Walla District (State Parks, Historical Sites, Museums, Recreation Areas, etc.).

The orientation of Wage Grade employees consists of a review of ENG Form 3529 with their supervisor and a tour of the project and related facilities and equipment.

14.02 Continuing Training.

It is the policy of this District, in accordance with ER 350-1-410 (18 May 1977), to provide employees with training on a continuous basis to insure maximum efficiency of all employees in the performance of their official duties and to encourage employees in their efforts for self-improvement. In addition to courses offered by the Department of the Army, there are a variety of Interagency courses offered by the Civil Service Commission and other government agencies. Other training is provided by state and local governments, colleges, universities, private industry, and private organizations. These training courses may be justified on the basis of one of the following criteria:

- o As a result of a change in the Corps' mission or policies.
- o As a result of new technology.
- o As a result of new work assignment.
- o To improve present performance.
- o To meet future staffing needs.
- o To develop unavailable skills.
- o To meet requirements for journeyman status in a trade or craft apprenticeship program.
- o To provide orientation to the policies, purposes, mission, and functions of the Corps of Engineers or the federal government.
- o To provide the employee with basic adult education.

The prime consideration of the continuing training program will be to provide training that is required to perform assigned duties more efficiently and to develop an effective work force for future needs. A systematic report of training needs will be completed each year by the supervisor and will include training needs and a list of available courses. It is the management, not the employee, who determines whether any particular training will be approved. Approval will depend on:

- o assessment of the employee's potential and goals,
- o linking that potential with assigned or projected duties supporting the organization's program or in support of an approved upward mobility plan,

- o demcnstrated interest in self-improvement by the employee, and

- o availability of funds for such training.

A concerted effort is made to provide each emplcyee with training necessary to improve their job performance and fulfill their career goals. While final approval of a training program depends upon the supervisor, the training of an employee is basically his own responsibility. The desire for self-development and the physical and mental effort necessary to increase his knowledge and skills rest with the individual. All employees, therefore, are capable of and are expected to plan their own career goals in collaboration with their supervisor and take full advantage of the available training opportunities and apply them to their job.

14.03 Summer and Seasonal Personnel Training.

An effort is made to provide training to all summer and seasonal personnel in related fields of interest in addition to the standard training necessary for performance of their job related duties. These employees generally have some academic background in Park Administration, Park Management, Natural Sciences, Environmental Science, or other related fields. An effort is made to supplement this with some related on-the-job experience.

14.04 Citation Authority Training.

A formal training program in citation procedures for resource personnel is currently conducted when needed by the North Pacific Division Office.

14.05 Pest Control Training.

The pest control training requirements are described in SECTION 11.05.

14.06 Safety Training.

Organized safety meetings are conducted monthly at the project office to provide training in public and employee safety procedures. In addition, each employee is

issued a copy of EM 385-1-1, GENERAL SAFETY REQUIREMENTS MANUAL.

SECTION 15 - RECREATION - RESOURCE MANAGEMENT REGULATIONS

The following list is a compilation of Corps of Engineers regulations, manuals, and publications applicable to the planning, operation, maintenance, and management of project resources.

Pub. No.	Title (Pub. date)
AR 190-29	Minor Offenses and Uniform Violation Notices Referred to U.S. District Courts (17 June 1977)
AR 670-10	Furnishing Uniforms or Paying Uniform Allowances to Civilian Employees (22 July 1969) esp. OCE Supplement 1 (19 May 1978)
- - - - - - -	
ER 190-2-3	Law Enforcement at Corps of Engineer Civil Works Installations (15 January 1971)
ER 190-2-4	Citation Authority and Procedures (1 February 1972) and NPD Supplement 1 (1 August 1973)
- - - - - - -	
ER 350-1-410	Civilian Personnel Training and Development (18 May 1977)
- - - - - - -	
ER 405-1-800	Outgrants - General Procedures for Issuance and Administration (10 March 1972)
ER 405-1-830	Leases (24 March 1964)
ER 405-1-840	Easements (24 July 1972)
ER 405-1-860	Licenses (24 February 1964)
ER 405-1-875	Permits to Other Federal Government Agencies (7 May 1973)

- - - - - - -	
ER 670-2-1	Uniforms for Recreation - Resource Management Staff (19 April 1974) and NPD Supplement 1 (15 May 1973)
- - - - - - -	
ER 1105-2-129	Preservation and Enhancement of Fish and Wildlife Resources (15 August 1973)
ER 1105-2-167	Resource Use: Establishment of Objectives (12 April 1978)
ER 1105-2-180	Wastewater Collection and Treatment Policy (3 November 1975)
ER 1105-2-460	Identification and Administration of Cultural Resources (3 April 1978)
ER 1105-2-502	Public Meetings (4 December 1972)
ER 1105-2-507	Preparation and Coordination of Environmental Statements (15 April 1974)
ER 1105-2-509	Statement of Findings on Impacts of Civil Works Action (9 October 1973)
ER 1105-2-800	Public Involvement: General Policies (2 April 1975)
- - - - - - -	
ER 1110-2-400	Design of Recreation Sites, Areas, and Facilities (7 July 1972)
- - - - - - -	
ER 1120-2-400	Recreation Resources Planning (1 November 1971)
ER 1120-2-403	Procedure for Estimating Recreation Use (26 March 1970)
ER 1120-2-404	Federal Participation in Recreational Development (14 August 1970)
- - - - - - -	

ER 1130-2-334	Reporting of Water Quality Management Activities at Corps Civil Works Projects (16 December 1977)
ER 1130-2-335	Levee Maintenace Standards and Procedures (5 December 1968)
ER 1130-2-400	Recreation - Resource Management of Civil Works Water Resource Projects (28 May 1971)
ER 1130-2-401	Visitor Center Program (30 November 1977)
ER 1130-2-404	Recreation Use Fees (1 June 1976)
ER 1130-2-405	Use of Off-Road Vehicles on Civil Works Projects (17 January 1974)
ER 1130-2-406	Lakeshore Management at Civil Works Projects (13 December 1974)
ER 1130-2-407	Operating and Testing Potable Water Systems (10 June 1977)
ER 1130-2-409	Recreation Development at Completed Projects Annual Report on Code 710 Program Obligations (1 September 1977)
ER 1130-2-410	Johnny Horizon Program (10 May 1974)
ER 1130-2-411	Regulation of Seaplane Operations at Civil Works Water Resource Development Projects (15 November 1977)
ER 1130-2-412	Aquatic Plant Control Program (28 May 1976)
ER 1130-2-413	Pest Control Program for Civil Works Projects (15 August 1977)
ER 1130-2-414	Recreation Resource Management System (1 November 1977)
ER 1130-2-415	Water Quality Data Collection, Interpretation, and Application Activities (28 October 1976)
ER 1130-2-417	Major Rehabilitation Program (8 April 1977)

ER 1130-2-418	Law Enforcement Service Contracts at Civil Works Water Resource Projects (8 December 1977)
EP 1130-2-419	Dam Operations Management Policy (18 May 1978)
- - - - - - -	
ER 1145-2-301	Use of Navigable Waters Policy, Practice and Procedure (1 July 1968)
ER 1145-2-303	Permits for Activities in Navigable Waters or Ocean Waters Policy, Practice and Procedure (3 April 1974)
- - - - - - -	
ER 1165-2-1	The Federal Responsibility in Water Resources Development (9 November 1964)
ER 1165-2-2	Consideration of Aesthetic Values in Water Resource Development (6 March 1967)
EP 1165-2-112	Streamflow Regulation for Water Quality Control (26 June 1964)
ER 1165-2-116	Pollution Control at Civil Works Projects (28 February 1968)
ER 1165-2-302	Definition of Navigable Waters of the United States (11 September 1972)
FR 1165-2-400	Recreational Planning, Development, and Management Policies (3 August 1970)
- - - - - - -	
EP 1130-2-400	Lakeside Campgrounds (1 June 1972)
EP 1130-2-401	Recreation Statistics (June 1978)
EP 1165-2-501	Environmental Policies, Objectives, and Guidelines for the Civil Works Program of the Corps of Engineers (29 October 1976)
- - - - - - -	

EM 385-1-1	General Safety Requirements (1 June 1977)
EM 1110-1-103	Design for the Physically Handicapped (15 October 1976)
EM 1110-2-38	Environmental Quality in Design of Civil Works Projects (3 May 1971)
EM 1110-2-400	Recreation Planning and Design Criteria (1 September 1971)
- - - - - - - -	
NPDR 385-1-10	Safety Administration Manual (27 September 1976)
NPDR 1130-2-400	Posting of Title 36, Part 327 - Rules and Regulations (9 May 1973)
- - - - - - - -	
WWDR 1105-2-1	Environmental Awareness (28 January 1974)
WWDR 1180-1-5	Reporting Discovery of Human Remains (Burials) and Items of Archaeological Significance (20 September 1977)

SECTION 16 - FUNDING REQUIREMENTS

16.01 Labor.

a. Ice Harbor - Lower Monumental Project Office.

Each of the sixteen permanent employees of the Resource Management Section at this project office spend an average of 104 hours/year or five percent of their time on the Lower Monumental Project, for a total of 1664 man-hours/year. At an average effective hourly rate of $9.07/hour, this adds up to approximately $15,100 annually.

An additional 20 employees are hired on temporary appointments each year at this project office. Although the number of them and the duration of the appointment varies, the average appointment lasts six months with five percent of the time devoted to work on the Lower Monumental Project. Based on a total of 1040 man-hours/year and an average effective hourly rate of $6.55/hour, this portion of the annual labor costs come to $6,820.

No increases in either permanent or temporary staff at this project office are anticipated from FY 1980 through FY 1984.

b. Granite - Goose Project Office.

The Resource Management Section at the Granite-Gocse Project Office is staffed by 12 permanent employees, who spend approximately five percent of their time or 104 hours/year on the Lower Monumental Project, for a total of 1248/man-hours annually. With an average effective hourly rate of $9.31/hour, permanent labor costs add up to $11,620.

The temporary labor force at this project office includes an average of 12 employees on six-month apppointments. Again, approximately five percent of their time is devoted to the Lower Monumental Project. This amounts to a total of 624 man-hours/year at an average effective hourly rate of $6.81/hour, for a total of $4,250 annually.

No increases in either permanent or temporary staff at this project office are anticipated from FY 1980 through FY 1984.

16.02 Materials and Supplies.

Materials and supplies for the Lower Monumental Project are budgeted collectively for the entire project rather than separately for each section. Also, since there are no major parks managed by the Corps on this project, materials and supplies costs are negligible. Therefore, no costs are included for materials and supplies for the Resource Management Section.

16.03 Equipment.

While most equipment for the Lower Monumental Project is budgeted collectively for the entire project rather than separately for each section, three items are to be purchased specifically for the Resource Management Section. They are a boat motor ($1,200), boat ($5,000), and flatbed truck ($11,000). Each of these items are scheduled to replace existing equipment.

16.04 Park Maintenance Service Contract.

This contract provides for maintenance of the recreation facilities at the Lower Monumental Lock and Dam, Devil's Bench, and Ayer Boat Basin, as well as three sites on the Ice Harbor Project. While the total cost of this contract is $30,000 for FY 1979, only $8,300 of the total contract cost applies to the three sites on the Lower Monumental Project.

TABLE 16.1 LAW ENFORCEMENT SERVICE CONTRACT COSTS

CONTRACTEE	ACTUAL COST FY 1978	ESTIMATED COST FY 1979	% OF TOTAL CONTRACT COST
Franklin County	$3,060	$3,500	10%
Walla Walla County	$2,500	$3,000	10%
Whitman County	--	$1,700	10%
Columbia	--	$5,000	50%

16.05 Law Enforcement Service Contracts.

These contracts are described in SECTION 10.02-c. The actual contract costs for FY 1978 and

estimated contract costs for FY 1979 are listed in TABLE 16.1. These figures, however, represent that portion of the total contract costs which are assigned to the Lower Monumental Project; each of the contracts covers more than one project. The table also lists the percentage of the total contract cost assigned to this project.

16.06 Cultural Resources Management Program.
This program is addressed in SECTION 6. Funds anticipated for this program include funds allocated for work at prioritized sites (SECTION 6.03) as well as contingency funds allocated for emergency work.

FY	Prioritized Sites	Contingency	Total
1980		$2,500	$2,500
1981	$5,000	$2,500	$7,500
1982	$5,000	$2,500	$7,500
1983		$2,500	$2,500
1984		$2,500	$2,500

16.07 Miscellaneous Non-Routine Contracts.
These contracts include all of the O & M projects scheduled for recreation areas on the project as described in SECTION 5.

a. Lower Monumental Lock and Dam.
   1980 - Install a small boat tie-up dock on downstream end of lock - $7,000.
   1981 - Renovation of visitor center - $50,000.
   1983 - Beautification of picnic area on north shore below the dam. 20 trees with bubbler irrigation @ $200 each - $4,000.
   1984 - Interpretive sign at picnic area - $300.

b. Devil's Bench.
   1984 - Construction of kiosk - $600.
   1984 - Beautification of day-use area. 20 trees with bubbler irrigation @ $200 each - $4,000.
   1984 - Construction of sun shelter - $2,500.

c. Ayer Boat Basin.
   1982 - Beautification. 60 trees @ $50 each - $3,000.
   1983 - Construction of unpaved foot trail between parking area and west shore picnic area. 2,000 feet @ $1/linear foot - $2,000.
   1983 - Construction of two firesites @ $50 each - $100.
   1984 - Construction of kiosk - $600.

d. Texas Rapids.
   1982 - Construction of sun shelter - $2,500.
   1982 - Modification of irrigation system - $5,000.
   1983 - Beautification. 40 trees and shrubs @ $50 each within existing area and along shoreline - $2,000.
   1984 - Construction of kiosk - $600.

e. Riparia.
   1980 - Modification of boat ramp. 2,000 yard^3 fill @ $15/yard^3 - $30,000.
   1982 - Construction of sun shelter - $2,500.
   1984 - Beautification. 24 trees @ $50 each and 5 acres dryland grass @ $300/acre - $2,700.
   1984 - Construction of kiosk - $600.
   * - Development of primitive camping area. 10 sites @ $500/site - $5,000.

* Necessary but not scheduled to be completed prior to FY 1985.

16.08 Summary.

a. FY 1980.

Labor	$38,000
Equipment	
Boat motor	$ 1,200
Cultural Resources	$ 2,500
Contracts	
Park maintenance - Lock and Dam, Devil's Bench, Ayer Boat Basin	$ 8,300
Installation of small boat tie-up dock at Lock	$ 7,000
Modification of boat ramp at Riparia	$30,000
TOTAL	$87,000

b. FY 1981.

Labor	$ 38,000
Equipment	
Flatbed truck	$ 11,000
Cultural Resources	$ 7,500
Contracts	
Park maintenance - Lock and Dam, Devil's Bench, Ayer Boat Basin	$ 8,300
Renovation of visitor center	$ 50,000
TOTAL	$114,800

c. FY 1982.

Labor	$38,000
Equipment	
Boat	$ 5,000
Cultural Resources	$ 7.500
Contracts	
Park maintenance - Lock and Dam, Devil's Bench, Ayer Boat Basin	$ 8,300
Beautification of Ayer Boat Basin	$ 3,000
Installation of sun shelter at Texas Rapids	$ 2,500
Modification of irrigation system at Texas Rapids	$ 5,000
Installation of sun shelter at Riparia	$ 2,500
TOTAL	$71,800

d. FY 1983.

Labor	$38,000
Cultural Resources	$ 2,500
Contracts	
Park maintenance - Lock and Dam, Devil's Bench, Ayer Boat Basin	$ 8,300
Beautification of picnic area on north shore below the Lock and Dam	$ 4,000
Construction of foot trail at Ayer Boat Basin	$ 2,000
Construction of fireplaces at Ayer Boat Basin	$ 100
Beautification of Texas Rapids	$ 2,000
TOTAL	$56,900

e. FY 1984.

Labor	$38,000
Cultural Resources	$ 2,500
Contracts	
Park maintenance - Lock and Dam, Devil's Bench, Ayer Boat Basin	$ 8,300
Interpretive sign at Lock and Dam picnic area	$ 300
Beautification of Devil's Bench	$ 4,000
Construction of kiosks	$ 2,400
Beautification of Riparia	$ 2,700
Construction of sun shelter at Devil's Bench	$ 2,500
TOTAL	$60,700

APPENDIX B

VEGETATION MANAGEMENT PLAN

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APPENDIX B: VEGETATION MANAGEMENT

SECTION 1 - INTRODUCTION

The objectives of a vegetation management program, as stated in ER 1130-2-400, are to increase the value of project lands for recreation and wildlife, and to preserve the natural ecological conditions. It further states that the removal of vegetation, either living or dead, will be done only with sound justification (e.g., urgent disease control, urgent insect pest control, fire hazard reduction, construction of recreational facilities, or specific essential uses).

Impoundment resulted in the loss of rich alluvial bottom land soils and the riparian habitat associated with them. For the most part, only rocky, dry, steep slopes with shallow soils remain. Deeper soils of several feet occasionally occur on gentle slopes and sandy alluvial deposits. Vegetive cover on the slopes is sparse generally consisting of bluebunch wheatgrass, cheatgrass, and rabbitbrush. Trees and shrubs can be found in isolated draws and canyons along the river.

Vegetive restoration and landscape enhancement will be accomplished using plants endemic to the lower Snake River or others found to be more beneficial for wildlife and planting. Consideration should be given to establishing and maintaining a diversity of plant species of different ages to minimize the possibility of complete loss by natural causes.

Vegetation management will be the responsibility of the Resource Management Section. Much of the work involved can be accomplished through contracts but small-scale work projects will be accomplished by project personnel.

The specific vegetation management program will consist of the following treatments:

o Fencing - to protect project lands from unauthorized use and trespass including encroachments by livestock.

o Planting - to provide landscaping, control soil erosion, and restore riparian habitat lost following completion of the dam.

o Maintenance - to insure vitality, longevity, and pleasant appearance of vegetation already planted.

o Pest and Disease Control - to combat serious outbreaks of detrimental plant pests and diseases.

SECTION 2 - PHYSICAL AND ECOLOGICAL CHARACTERISTICS

2.01 Setting.

The Lower Monumental Project lies within the Columbia Plateau physiographic province. This province is bounded on the west by the Cascade Mountains, on the north and east by the Rocky Mountains, and on the south by the Blue Mountains.

The region is noted for its thick accumulation of lava flows which form an extensive basaltic plateau that rates among the largest outpourings of lava known in the world. The basalt flows covers an area of over 130,000 square miles and in places has a maximum depth in excess of 1,000 feet.

Where weathering, erosion, and the action of the rivers have carved into the basaltic plateau, interesting formations of the dark rock are exposed. Ledges, cliffs, and outcroppings are prominent (Figure 2.1).

Throughout its length, the lake is flanked by rugged basalt bluffs, some rising almost vertically from the water's edge, some at a distance from it (Figure 2.2). At various locations along the lake, there are benchlands, somewhat restricted in size at elevations above normal lake level, lying generally between the lake and the adjoining bluffs or talus slopes.

Three streams enter Lake West; the Palouse and Tucannon Rivers and Alkali Flat Creek. The Palouse River has formed a scenic gorge with Palouse Falls, a well known and impressive 190-foot waterfall, located six miles from the mouth.

Aerial maps of the project are included in the LOWER MONUMENTAL MASTER PLAN.

2.02 Soils.

The construction of Lower Monumental Dam and the filling of the lake covered the rich alluvial bottomland soils along the Snake River. Shallow soils do occur on some of the gentler slopes, and some of the benches along the shoreline have soils of moderate depth. However, deep soils

Figure 2.1 - The Palouse River cut this spectacular canyon through the basaltic plateau leaving prominent cliffs, talus slopes, elevated benchlands, and alluvial bottomlands.

are rare and are found primarily as alluvial deposits along the rivers and in some of the small canyons and embayments along the shore of the lake.

A soil survey of the project was performed by the U.S. Department of Agriculture, Soil Conservation Service. The survey delineates existing soil conditions in the Lower Snake River Canyon and provides data to rate the developmental capabilities of the soils for future possible land uses.

There are two soil associations on the north side of Lake West. The first is the Starbuck - Roloff - Ritzville Association which is dominated by well-drained soils, some of which are very deep. Others are underlain by basalt bedrock or sand and gravel at 12 to 36 inches.

The second association is the Starbuck - Alpowa Association, soils characterized by silt loams on steep and very steep land with moderately steep stream terraces. Bedrock outcrops are common on the steep slopes.

Figure 2.2 - Most of the Snake River is now flanked by rugged, steep, rocky slopes rising directly out of the water.

On the south side of the lake there are three soil associations. The first of these, the Magallon - Starbuck - Rockland Association, is characterized by soils and rockland formed from material derived from basalt. Bedrock is generally close to the surface.

The second association is the Kuhl - Farrell - Roloff Association which is dominated by sloping to steep well-drained medium-textured and moderately coarse-textured soils formed on top of wind-deposited silt or glacial outwash. Many of these soils are rocky and underlain by bedrock that is close to the surface.

The third association on the south side of the lake is the Walla Walla - Asotin - Chard Association which is characterized by sloping to steep well-drained and medium-textured soils that formed in wind-deposited silts. Bedrock outcrops in places.

The soils of the bottom land consist of recent deposits of silt, sand, gravel, and cobbles. Soil horizon is lacking, but profiles may be stratified or layered. The land types classified as alluvial land and riverwash are subject to frequent flooding, as they occur below the high waterline. These soils have potential as wildlife habitat.

The soils of the low terraces occur above the high waterline and have a slope range of 0-5 percent. The hazard of wind erosion is high, and the soils are generally too dry for establishing turf areas, most trees and shrubs, and several crops without irrigation. For construction purposes the soils have few or no limitations.

2.03 Meteorological Characteristics.

The climate in this general area is characterized by relatively low precipitation, wide annual temperature variations, low humidity, high evaporation, and abundant sunshine. Annual precipitation averages between 10 and 12 inches per year, which occurs mostly in the winter and spring. In some years there is no rainfall at all during some of the summer months.

The mean annual temperature is 52 degrees. July, the warmest month, has a mean temperature of 75 degrees, a mean maximum of 90 degrees, and a mean minimum of 56 degrees. In January, the coldest month, the mean is 30 degrees. Normally sub-zero temperatures occur only a few days, but in some years there are two or three week periods of sub-zero temperatures.

Moderate daytime winds, generally from the southwest with a speed of ten miles per hour or less, blow throughout the year. Occasionally gusty conditions do occur but the gusts rarely exceed 30 miles per hour. However, on the wheatlands above the lake, the wind velocities can be considerably higher and, at times, severe dust storms develop.

Climate is of particular importance when viewed in relation to the vegetation management program. Plant associations relate directly to moisture gradients and any management action should be taken only after due consideration of climatological factors.

2.04 Vegetation.

Natural vegetation on most upland areas surrounding Lake West is sparse and low growing, due to semi-arid conditions and generally shallow soils. In isolated areas where deep alluvial soils border streams, a riparian vegetation of trees and shrubs grows profusely and luxuriantly.

On steep slopes the sparse vegetative cover is primarily Cheatgrass (Bromus tectorum), Bluebunch wheatgrass (Agropyron spicatum), and occasional stands of Rabbitbrush (Chrysothamnus nauseosus). On the more gentle slopes the cover is somewhat denser and includes Bluebunch wheatgrass, Cheatgrass, and Sandberg bluegrass (Poa secunda), and a fair amount of Rabbitbrush (Figure 2.3). Probably 95 percent of the project lands around the lake fall within these two categories, which are characteristic of the endemic Agropyron spicatum (Bluebunch wheatgrass) - Poa secunda (Bluegrass) community.

Figure 2.3 - A typical example of the Bluebunch wheatgrass - Bluegrass community with some Rabbitbrush and Big sagebrush.

Major areas of riparian vegetation are found along the Tucannon River, Alkali Flat Creek, and its outwash plain where the creek enters the lake at Riparia (Figure 2.4). There also are two minor areas, one at Magallon, and a small embayment on the south shore of the lake at River Mile 56.

Figure 2.4 - Riparian habitat near the mouth of the Tucannon River.

The Tucannon River area supports a Bluebunch wheatgrass - Bluegrass plant community, a Cattail-Sedge community, and a community dominated by Poplar, Willow, and Maple trees. Associated shrubs are primarily Alder, Elderberry, Currant, and Red osier dogwood.

In the Alkali Flat Creek area, there is a Cattail-Sedge community dominated by tall, coarse grass and scattered Black locust and Willow. Near the mouth of the creek, arcund Riparia there are Smooth sumac, Rabbitbrush, Cheatgrass, Bluegrass, Mustard, Cattail, Sedge, Rushgrass, Bullrush, Goldenrod, Clover, Willow, and Black locust.

In addition to the natural indigenous vegetation, there are three recreation areas - Lyons Ferry State Park, Lyons Ferry Marina, and Texas Rapids - where large turf areas have been established and trees and shrubs have been planted to make them attractive, stabilize the shoreline, and provide a ground cover that will stand heavy public use. These areas are sustained by irrigation systems.

A more complete and detailed inventory of riparian communities along Lake West is contained in

Volumes IIIA and IIIB of the INVENTORY OF RIPARIAN HABITATS AND ASSOCIATED WILDLIFE ALONG COLUMBIA AND SNAKE RIVERS (Asherin, Duane A. and James J. Claar. 1976. Idaho Cooperative Wildlife Research Unit, University of Idaho).

SECTION 3 - TREATMENTS

3.01 Fencing.

History tells us that prior to the construction of this dam, the land along the lower Snake River was extensively grazed by livestock. Over the years, continual grazing pressure seriously damaged or completely eliminated the Bluebunch wheatgrass - Bluegrass community in many areas, replacing it with Cheatgrass and Rabbitbrush. It also resulted in trailing, terracing, and soil erosion problems (Figure 3.1). Any vegetation management plan must incorporate efforts to control grazing on project land.

Currently, there are three ways for livestock to gain access to project land - grazing leases, encroachments, and livestock watering corridors. On the Lower Monumental Project, all project lands are allocated for specific purposes as described in SECTION 4 of APPENDIX A. No land is allocated specifically for livestock grazing however, it can be used as a tool in managing land for wildlife habitat (e.g., goose pastures) and for fire protection. If permitted, limits will be placed on the number of livestock that may be grazed at any one time and the period of time that they may be grazed.

Forty-eight acres along Alkali Flat Creek are currently leased to an adjacent landowner for dryland cattle grazing. However, this land is presently allocated for intensive wildlife habitat development. It is planned that when the current lease expires on 31 May 1979, a new lease will not be negotiated and this area will undergo limited wildlife habitat development. This is the only grazing currently authorized on the Lower Monumental Project.

Livestock encroachments are a very real problem on the Lower Monumental Project and in many cases, pose chronic problems to Resource Managers. Adjacent landowners should but cannot be expected to curtail encroachments by their livestock in all instances.

The maintenance of barbed-wire fence along the project boundary will seriously restrict cattle encroachments on project land. Some of the project land, especially former railroad right-of-ways, was fenced when it was acquired. In 1978, approximately 19.3 additional miles of the project boundary were fenced as part of the work accomplished under the Lower Snake River Fish and Wildlife

Figure 3.1 - The continued grazing allowed on the land along the Snake River prior to inundation resulted in terracing and elimination of the Bluebunch wheatgrass - Bluegrass community.

Compensation Plan. Presently, most of the project lands threatened by cattle encroachments are protected by fences or natural barriers. There are no future plans for constructing additional fence unless new encroachments develop.

Although most of this section has concentrated on livestock encroachments, almost every type of encroachment results in the destruction of natural vegetation. Therefore, a policy of strict enforcement of all encroachments is an integral part of a vegetation management program.

Besides grazing leases and encroachments, livestock can gain access to project land through a livestock watering corridor. On the Lower Monumental Project, there are several perpetual reservations granted to adjacent landowners for livestock watering corridors through project land. Most of these were fenced in 1978 under the Fish and Wildlife Compensation Plan. The maintenance of the

fence is the Corps' responsibility. Funding comes out of the routine O&M budget and work is performed by resource personnel. No additional funds or personnel are required.

3.02 Planting.

Revegetation, which is an important aspect of the vegetation management program on this project, was initiated during project construction. Trees, shrubs, and lawn grass were planted at the Lock and Dam site, Lyons Ferry State Park, Lyons Ferry Marina, and Texas Rapids; while at Ayer Boat Basin and Riparia only trees were planted. Devil's Bench recreation area is still barren with no trees, shrubs, or grass. Since then, only minor additions have been made to these sites. Some trees were planted on one of the wildlife management areas between 1970 and 1972 but very few survived.

A revegetation program will be continued to beautify and landscape those areas being used intensively for recreation, provide food and cover for wildlife, and restore the natural beauty of the Snake River Canyon lost when the lake was filled and the shoreline vegetation was inundated. Furthermore, revegetation will be used to prevent erosion.

Below is a list of revegetation projects planned at the recreation areas over the next five years. These projects are discussed in SECTION 5 (APPENDIX A). Work will be performed by contract or resource personnel. Funding is discussed in SECTION 16 (APPENDIX A). No additional personnel are required.

- o Lower Monumental Lock and Dam (small picnic area); trees; FY 1983.
- o Devil's Bench; trees; FY 1984.
- o Ayer Boat Basin; trees; FY 1982.
- o Texas Rapids; trees and shrubs; FY 1983.
- o Riparia; dryland grasses and trees; FY 1984.

Planting will be accomplished as well on wildlife management areas between FY 1980 and FY 1984 under the Fish and Wildlife Compensation Plan. However, at this time, plans are not finalized. Grasses, forbs, trees and shrubs will be planted for wildlife cover, food, and nesting sites. Work will be performed under contract; no additional personnel are required. Funding is covered by the LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN (SECTION 1.01, APPENDIX D).

When planning the revegetation program, the following considerations should be kept in mind:

- Choose plants which are well-suited to the specific site factors (i.e.; soil type, climate, topography, exposure to direct sunlight).

- The planting of lawn grass will be kept to a minimum in accordance with the LOWER MONUMENTAL MASTER PLAN. Dryland grasses and preferably native species will be planted over the majority of the parks.

- The revegetation program will be accomplished through the use of endemic trees and shrubs or suitable domesticated trees and shrubs found to be more beneficial to wildlife or more adaptable to local site factors.

- Consideration should be given to establishing and maintaining a diversity of plant species of different ages, where practical, to minimize the possibility of complete loss by natural causes, (ER 1130-2-400).

a. Lawn Grass.

The following are some general planting guidelines recommended for lawn grass areas:

- Clear land of stumps, stones, roots, cable, wire, etc.

- Grade area to provide smooth, gently undulating terrain.

- Till to a depth of four inches.

- Fertilize, if necessary, according to soil test recommendations for establishing lawn grasses. This may be applied during seeding.

- Plant seed at a rate of 130 pounds per acre when drilled to a depth of one-quarter inch. If broadcast seeded, use 260 pounds per acre and sow one-half of the seed in one direction, and the remainder in a direction perpendicular to the first sowing. Planting should be done either between April 1 and June 1 or between August 15 and October 15, but preferably during the latter period. The seed mixture should consist of a combination of Kentucky bluegrass (Glade, Fylking, or Merion) and Manhattan or Pennfine perennial ryegrass. Although it is not

satisfactory as a grass cover alone, ryegrasses may be used in mixtures for immediate cover since they tend to become established quickly. In areas of high winds, this immediate cover serves to reduce serious wind erosion which would occur between planting and establishment of the other varieties.

- o Spread mulch over seeded area by hand or suitable mechanical spreader. Hydro-mulch method applies a wood fiber mulch with seed. The following are acceptable mulching materials and rates of application: Straw, two tons per acre; Peat, 1,800 pounds per acre; Wood cellulose fiber, 1,400 pounds per acre.

- o Compact the entire area immediately after mulching with approved equipment weighing 60 to 90 pounds per linear foot of roller.

- o The seeded areas shall be protected against foot traffic or other use immediately after seeding is completed by some form of barrier and/or warning signs.

When an area to be seeded is relatively inaccesible, sloping, and/or large, seed may be hydro-seeded under contract. This method shoots a high-pressure slurry of seed, fertilizer, and wood-cellulose fiber mulch through a hose onto the soil surface.

In certain cases, where the area to be seeded is relatively small and vulnerable to visitor disturbance, the Resource Manager may elect to have the area sodded. This may be done around a visitor center or restroom for example, where visitors would be likely to trample newly planted grass before it became established.

b. Dryland Grass.

1. Seed selection - The following is a partial list of dryland grass species and varieties well-suited for plantings on the Lower Monumental Project. TABLE 3.1 summarizes this information.

Crested wheatgrass (Fairway) - This grass is well-suited to the meteorological characteristics of this area, being adapted to areas where the average annual precipitation is between six and 15 inches. It can be planted on moderately coarse or medium-textured soils

that have a minimum depth of ten inches. However, it does best on medium-textured soils over 20 inches deep.

The Fairway variety is lower-growing than the Nordan variety and requires less maintenance. Despite the fact that it is a bunchgrass, this grass does provide good erosion control because it is rhizomatous. Also, it is better adapted to sandy, arid sites than the sod-forming grasses such as Streambank, Pubescent, and Thickspike wheatgrass.

Crested wheatgrass (Nordan) - This variety has the same adaptation to climate and soils as Fairway crested wheatgrass. The stems of this variety however, are longer and thicker than Fairway. It provides moderately good erosion control and good forage material. While crested wheatgrass, in general, is easy to establish, the Nordan variety was developed for good seedling vigor.

Siberian wheatgrass (P-27) - This bunchgrass is slightly more drought-resistant than either variety of Crested wheatgrass described above. Also, it is better-adapted to sandy soils but nevertheless does best on medium-textured soils over 20 inches deep. Since it can adapt to the more sandy soils, it can be valuable in providing some erosion control on these soil types where other grasses could not become established.

Beardless wheatgrass (Whitmar) - This bunchgrass, along with Bluebunch wheatgrass, are the most abundant native long-lived perennial grasses in Washington. The Whitmar variety is a named, registered variety that was domesticated from the native vegetation. It is adapted to areas where the average annual precipitation is between six and 35 inches. Medium-textured loamy soils over ten inches deep are preferred but this variety may be established on moderately coarse-textured sandy loams also. It does not tolerate excessive amounts of salts.

Whitmar beardless wheatgrass provides very good forage for grazers such as white-tailed deer. Because of its prominent bunching growth habit, it also provides cover and nesting sites for non-game as well as game birds.

Since this grass is native to the area of the Snake River canyon, and provides good erosion control, forage and cover, this grass is very desirable and highly recommended for dryland grass plantings on the Lower Monumental Project. It should be noted, however, that there

have been some problems in the past obtaining Whitmar seed, however, it does seem to be available.

Streambank wheatgrass (Sodar) - This is an improved, native sod-forming grass adapted to the medium-textured soils and moderately alkaline soils. An average annual precipitation of 12 inches or more is recommended for establishment and growth. This variety is not as drought tolerant as any of the above bunchgrasses. Streambank wheatgrass forms a dense, low-growing sod and is rhizomatous. Therefore, it provides excellent erosion control, requires very low maintenance, and creates a very low fire hazard compared to other grasses.

Pubescent wheatgrass (Luna, Topar) - This grass is adapted to areas in eastern Washington where the average annual precipitation is 12 inches or more. Like Streambank wheatgrass, it is only moderately drought tolerant. It is best adapted to medium to fine-textured, well-drained soils, but will do well on some of the coarser-textured soils in areas of higher rainfall. It is moderately salt tolerant, and it is adapted to moderately deep to shallow soils.

Once established, this grass makes a complete cover, is remarkably persistent, and requires a minimum of maintenance. It provides good erosion control, good nesting and escape cover for game birds and excellent forage for grazers. Of the two varieties, Luna and Topar, the latter has demonstrated superior growth and vigor in eastern Washington.

Thickspike wheatgrass (Critana) - This is the most widely distributed native sod-forming grass in the low rainfall areas of the Pacific Northwest. It is highly drought tolerant, growing well in areas where the average annual precipitation is between six and 16 inches. It is native on deep to moderately deep sand, sandy loam, and loamy sands. It also does well when planted on well-drained medium-textured silt loams. This dryland grass does not grow well on clay, clay loam, or other heavy soils. Seedling vigor is excellent and establishement is rapid.

Like Pubescent wheatgrass, this grass provides good erosion control. Due to its adaptability to sandy soils, it is especially effective for stabilizing sandy soils and sand dune areas along the river. The principal wildlife users of this grass are wild rabbits while it does provide cover and protected nesting sites for birds.

An excellent variety of Thickspike wheatgrass is P-1822 developed from native varieties. However, it is not commercially available yet. The only local source of the Critana variety discovered at this time is the Jacklin Seed Company (Rt. 2, Box 80, Post Falls, Idaho 83854).

Intermediate wheatgrass (Greenar) - This grass is generally adapted to areas of greater rainfall where the average annual precipitation is at least 14 inches. However, on deep, fine-textured, fertile soils and good sites its adaptation can extend into the Lower Monumental Project area. It is a mild sod former and is easy to establish. Its primary use is for hay and pasture in mixtures with alfalfa. Due to its heavy root producing habit, it can improve soil stability. Also, it produces a high-quality forage, especially when mixed with alfalfa, and provides excellent cover for upland game birds.

Indian ricegrass (P-2575) - This grass is native on coarse-textured soils in arid and semiarid climates throughout the intermountain area of the west. It is adapted to areas where the average annual precipitation is betweeen six and 30 inches. Indian ricegrass prefers deep to moderately deep sand, sandy loam and loamy sands. Therefore, like Thickspike wheatgrass, it is especially effective for stabilizing sandy soils and sand dune areas along the river. Besides that, it provides nutritious forage for grazers such as white-tailed deer. The abundant nutritious seeds are an excellent food source for upland game and non-game birds, particularly doves, pheasants and quail, and small rodents.

Mammoth wildrye (Volga) - Like Thickspike wheatgrass and Indian ricegrass, this grass is used primarily for stabilization of inland sand dunes and wind erosion control on sandy and coarse-textured soils. It provides cover and nesting sites for upland game and non-game birds but is of limited nutritional value.

This variety has the same adaptation to climate and soils as Indian ricegrass.

The following species appear to be well-suited for planting on the Lower Monumental Project, however no information concerning their cultural requirements and uses could be found in the references examined: Sheep fescue, Russian wildrye, Needlegrasses, and Sand dropseed. Other species may be suggested by the local County Extension Service.

TABLE 3.1 Characteristics of Adaptable Dryland Grass Types

SPECIES (Variety)	Minimum annual precipitation (inches)	SOIL TEXTURE					USES		
		Fine	Medium	Moderately coarse	Coarse	Sand dunes	Erosion control	Forage	Wildlife cover
Crested wheatgrass (Fairway)	6		x	x			G	F	F
Crested wheatgrass (Nordan)	6		x	x			G	G	G
Siberian wheatgrass (P-27)	6		x	x	x		G	G	G
Beardless wheatgrass (Whitmar)	6		x	x			G	V	G
Streambank wheatgrass (Sodar)	12		x				V	F	F
Pubescent wheatgrass (Luna, Topar)	12	x	x	x			G	V	G
Thickspike wheatgrass (Critana)	6		x	x	x	x	G	F	G
Intermediate wheatgrass (Greenar)	*14		x	x			G	V	V
Indian ricegrass (P-2575)	6				x	x	G	V	F
Mammoth wildrye (Volga)	7				x	x	G	F	G

V - Very good

G - Good

F - Fair

*Can adapt to deep fertile soils at good sites where annual precipitation averages 12 inches.

2. Time of planting - The best time for planting dryland grasses is the late fall between 1 October and 1 December. During this period, soil moisture is adequate for successful germination and establishment of the plant before the growing season begins.

3. Planting methods - There are a variety of methods commonly used for seeding dryland grasses. These include broadcast seeding, drilling, and hydro-seeding. In general, drilling is recommended for the best results but cannot be used in all situations. For small sites or sites where maneuvering drilling machinery and a tractor is difficult, broadcast seeding may be more practical. For sites too large for broadcast seeding and inaccessible or too steep for drilling machinery and tractors, seed may be hydro-seeded under contract. This method shoots a high-pressure slurry of seed, fertilizer, and wood-cellulose fiber mulch through a hose onto the soil surface.

4. Seedbed preparation - The site should be cleared of stumps, large rocks, roots, cable, wire, etc. Then, the site should be graded as needed and feasible to permit the use of the drill and tractor and other equipment used in seedbed preparation, and mulch application, and maintenance.

The third step in seedbed preparation is to install any needed irrigation systems and erosion control devices, structures, or practices such as interceptor ditches, dikes and terraces, contour ripping, erosion stops, channel liners, and desilting basins.

5. Fertilizer application - Fertilizer should be applied if necessary according to soil test recommendations and worked into the soil to a depth of four inches with a disk, springtooth harrow or other suitable equipment. If desired, fertilizer may be applied during seeding.

6. Seeding directions - In broadcast seeding, seed is applied to the soil surface by hand or with a small seeder, raked into the soil to a depth of one-half to three-quarters of an inch, then packed down. Seeding by this method should be done at a rate double that recommended for drilling (TABLE 3.2), since it is only half as effective.

Hydro-seeding must be done under contract. When drilling seed, most grasses should be drilled with a rangeland (dryland grass, deep furrow) drill

to a depth of one-half to three-quarters of an inch. Drills should be spaced about six inches apart. On very sandy sites, Indian ricegrass, Mammoth wildrye and Thickspike wheatgrass should be drilled to a depth of four inches to insure adequate moisture and provide protection from erosion. Beardless wheatgrass and Indian wildrye should be drilled with drills spaced at least 12 inches apart. Mammoth wildrye may be planted by stems or drilled.

TABLE 3.2 DRILLING RATES FOR DRYLAND GRASSES

SPECIES (Variety)	Drilling Rate (lbs./acre)
Crested wheatgrass (Fairway, Nordan)	7
Siberian wheatgrass (P-27)	8
Beardless wheatgrass (Whitmar)	10
Streambank wheatgrass (Sodar)	8
Pubescent wheatgrass (Luna, Topar)	8
Thickspike wheatgrass (Critana)	6
Intermediate wheatgrass (Greenar)	8
Indian ricegrass (P-2575)	10
Mammoth wildrye (Volga)	*
Sheep fescue (P-274)	5

* Information unavailable

7. Mulch application - The step following seeding is mulch application. This is done primarily to hold water in the upper levels of the soil to encourage germination. Also, this helps to prevent wind and water erosion before the grass becomes established. Following application the entire area should be compacted with approved equipment weighing 60 to 90 pounds per linear foot of roller.

The final step in seeding dryland grass is to take measures necessary to protect the area from disturbance and promote the establishment of the seeding.

c. Trees and Shrubs.

1. Plant selection - In choosing trees and shrubs for planting on project lands, the following details should be considered:

(a) Soil characteristics - This should include consideration of soil texture, depth, moisture, drainage, pH, salinity, and nutrient deficiencies.

(b) Climate - The plants chosen must be adaptable to the local climate (e.g. precipitation and minimum winter temperature).

(c) Water availability - If irrigation is not provided and ground water is too deep for roots to reach, plants should be selected which are drought-tolerant. Hand watering is extremely time-consuming and should be avoided if possible.

(d) Landscaping objectives - Plants should be selected which achieve the desired results (i.e., providing shade, erosion control, audio/visual barriers, windbreaks, or increasing the scenic qualities of the area). Where possible, plants should be selected which are also of value to wildlife.

(e) Wind - High wind velocities are common on the Lower Monumental Project and can be severe in certain sites. In areas where high winds are common, trees and shrubs should be selected which are less vulnerable to wind damage.

(f) Plant characteristics - For example, hardiness, mature size, form, growth rate, life span, color, diseases. Brightly colored and exotic species should be avoided.

(g) Maintenance requirements

(h) Light tolerance - Certain species (i.e. broadleaf evergreens) are relatively intolerant of direct bright sunlight which is common along much of the Snake River shoreline in eastern Washington.

TABLE 3.3 is a list of trees and shrubs recommended for use in the revegetation program on the Lower Monumental Project. It is by no means a complete listing; instead it lists a few of the species that have proven to be successful in this area. The Recreation - Resource Management Branch at the District Office should be consulted for additional suggestions.

2. Obtaining plant materials - Trees and shrubs are normally requisitioned through Supply Division, but small purchases may be made at the project level on

SF 44. The limit on these purchases is subject to modification.

Three types of nursery stock are available - bare-root, containerized, and balled and burlapped. Bare-root stock is limited to deciduous trees and is usually available in the early spring. It cannot be easily stored at the project for future planting like containerized and balled and burlapped plants and it is more vulnerable to desiccation. Bare-root stock should be protected from desiccation at all times and heeled in, if not.

Containerized stock comes from the nursery in a rigid plastic, metal, or paper container with roots and soil. The container size depends on the size of the plant and should conform to the American Standard for Nursery Stock (published by the American Association of Nurserymen, 230 Southern Building, Washington, D.C. 20005; ANSI Z60.1-1973).

Most large conifers and some other trees and shrubs come from the nursery balled and burlapped. A ball of the roots with soil intact is wrapped in burlap. Specifications for all types of nursery stock are contained in the American Standard for Nursery Stock and should be used as a reference at the project office.

All plant materials should be obtained from sources in locations with similar or more harsh climatic conditions than those on the Lower Monumental Project (e.g. Salt Lake City, Boise). Reference should be made to the Plant Hardiness Zone Map (U.S.D.A. Agrucultural Research Service, Miscellaneous Publication No. 814).

3. Planting design - Advice in this area may be obtained from the Civil Design Section or the Recreation - Resource Management Branch at the Walla Walla District Office or from Anatomy of a Park (Albert J. Rutledge, McGraw-Hill Book Co., San Francisco, 1971, 180p.).

4. Time of planting - Trees and shrubs should be planted in the late fall (after 1 October) if possible when temperatures are low, precipitation adequate, and plant growth reduced to lessen the physiological shock to the plants. Fall planting will insure that enough water will be available to the plant and the loss of water by transpiration will be minimal. Planting during the summer should be avoided due to high mortality. Winter planting is

possible provided that the ground is not frozen. Spring planting (after 1 May) is also possible but risky since the plant may not have enough time to establish a root system before the hot, dry summer weather begins.

5. Planting directions

(a) Bare-root stock - For bare-root plantings to be successful, the roots should be fresh, not dry and withered. They should be stored prior to planting in a cool, moist environment. If there is reason to doubt the freshness of the roots, soak them overnight in a bucket of water before planting.

The hole should be about twice the width of the root system and at least half again as deep. When ready to plant, locate a cone-shaped mound of soil in the bottom of the hole to act as a standard for the plant. Adjust the height of the cone so that with the plant set on it, the old nursery soil line on the trunk is at ground level. Next, place the plant in the hole on the cone with the roots spread out over it and refill the hole incorporating commercial fertilizer tablets and any available organic material (i.e., leaves, grass clippings, compost, etc.), working the soil around all the roots. Bare-root plantings will require very little watering after planting since they are dormant at this time. When growth begins in the early spring there should be sufficient soil moisture to establish a root system.

(b) Balled and burlapped stock - Handle these plants carefully; cradle the root ball well, with one hand supporting the bottom. The planting hole should be about twice the width of the root ball, and at least half again as deep. Place enough compacted soil in the bottom of the hole so that the top of the root ball is slightly higher than ground level. Next, place the plant in the hole and fill it halfway with soil, commercial fertilizer tablets, and any available organic material (i.e., leaves, grass clippings, compost, etc.). Continue to compact the soil as it is added to the hole. Loosen the twine and burlap at the top of the ball, and fold it back towards the sides of the hole, then fill the hole to the top with soil. Build a berm around the planting and fill with water two or three times. For both types of plantings, a layer of mulch should be placed around the plant to reduce evaporation from the soil.

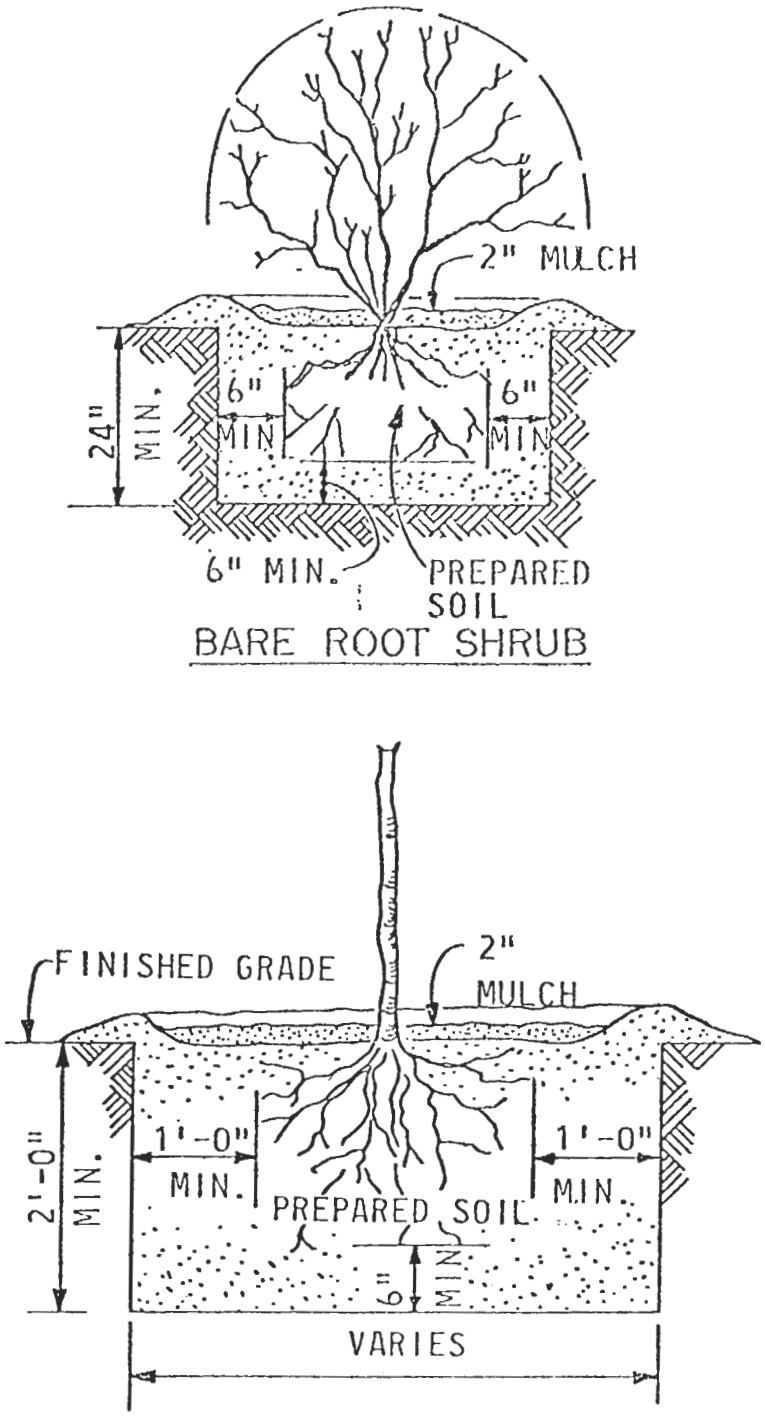
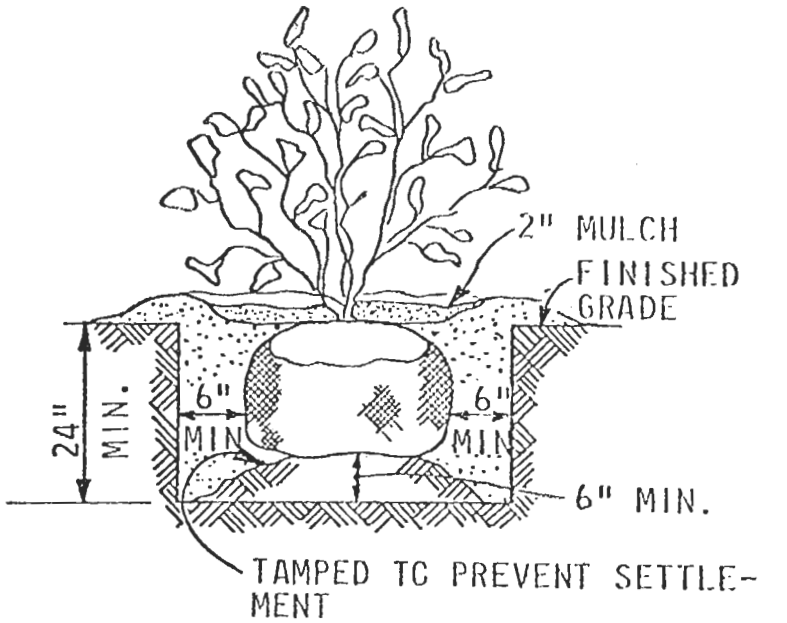
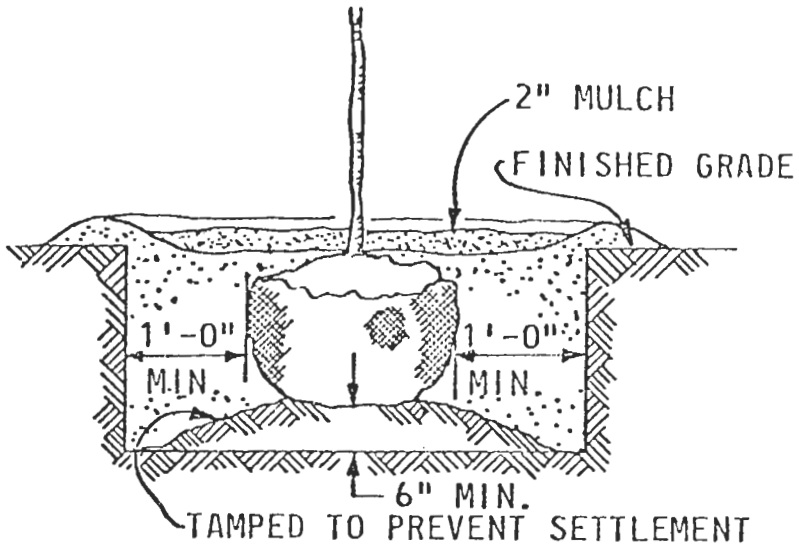


Figure 3.2 - Suggested methods for bare-root plantings.



BALLED AND BURLAPPED SHRUB



BALLED AND BURLAPPED TREE

Figure 3.3 - Suggested methods for balled and burlapped plantings.

(c) Containerized stock - Directions for planting balled and burlapped stock are identical to those for containerized stock except that the plant must be completely removed from its container before it is placed in its hole.

6. Staking - High wind velocities are common on the Lower Monumental Project and can be severe at certain sites. Therefore, newly planted trees may need to be supported to promote root growth. However, many trees do not need and should not have support stakes. Most conifers, trees with upright growth habits, and trees planted bare-root usually do not need staking.

There are many satisfactory methods to stake a tree. However, the following precautions should be taken for the safety of visitors and health of the plant:

- o If guy wires are run from the tree trunk to the ground, they should be conspicuously flagged to warn visitors of their presence.
- o When stakes are driven into the ground, care should be taken to insure that they do not damage the roots.

For more information, consult Staking Landscape Trees (Harris R.W., A.T. Leiser, and W.B. Davis. AXT-311. Berkeley: U.C. Agricultural Extension, 1972).

TABLE 3.3 ORNAMENTAL SPECIES SUITED FOR PLANTING AT LOWER MONUMENTAL

Ground Cover - Up to 18-Inches High

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	PS	Sh	REMARKS
Carpet bugle (Ajuga reptans)	Spreading: stoloniferous	Blue, April-May	x	x	x	Herbaceous plant with persistent leaves; effective throughout year as ground cover. Varieties have white flowers, bronze or variegated leaves. Grows in full sun or shade, but does best in partial shade. Plant 18 inches apart.
Bearberry cotoneaster (Cotoneaster dammeri)	Trailing	White, May-June	x	x		Slow-growing ground cover; ultimate spread of 6-8 feet. Useful on small banks, among rocks or on masonry walls and terraces. For quick cover, plant 18-inches apart. Red berries.
English Ivy (Hedera helix)	Spreading ground cover or climbing vine	Unimportant	x	x	x	A vigorous ground cover once established. Plant 4 feet apart. For large areas only.
Bar Harbor creeping juniper (Juniperus horizontalis Bar Harbor)	Spreading		x	x		Bar Harbor and Andorra juniper useful without being quite so vigorous as Pfitzers.
Common periwinkle (Vinca minor)	Trailing stoloniferous	Lilac blue, Feb-May	x	x	x	Vigorous, invasive ground cover - isolate from small shrubs and perennials. Adaptable to various conditions of soil and exposure.

TABLE 3.3 (Cont'd)

Small Shrubs--18-Inches to 3-Feet High

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	EXPOSURE PS	EXPOSURE Sh	REMARKS
Rock cotoneaster (Cotoneaster horizontalis)	Spreading horizontally	Pale pink, May-Jun	x	x		Deciduous, spreading shrub useful as bank cover. Bright red berries. Can be espaliered.
Pfitzers juniper (Juniperus chinensis Pfitzers)	Spreading horizontally		x	x		Vigorous conifer to 3-feet or more. Keep low by removing higher branches. Plant 5-6 feet apart for quick cover. Tolerant of dry situations.
Tamarix Savin juniper (Juniperus sabina tamariscifolia)	Spreading		x	x		One of most useful forms. Does not exceed height of 2 feet, except in age.
Bush cinquefoil (Potentilla fruticosa)	Round; stems ascending	Yellow, May-Aug	x	x		A 3-4 foot decidious shrub with leaves sometimes persisting most of winter. Several varieties, with bright yellow to white flowers. Tolerant of wet, dry, acid, or alkaline soil.
Common snowberry (Symphoricarpos albus)	Round	Pinkish, Jun-Sep	x	x	x	This 3-foot deciduous shrub is reliable, tolerant of most conditions of soil and moisture. White berries.
Dwarf European cranberry bush (Viburnum opulus Dwarf (nanum))	Rounded	Seldom flowers	x	x		Slow-growing deciduous viburnum. Seldom exceeds 2 feet. Compact habit of growth. Ornamental foliage.

TABLE 3.3 (Cont'd)

Medium Shrubs--3 to 5 Feet High

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	EXPOSURE PS	EXPOSURE Sh	REMARKS
Darwin barberry (Berberis thunbergi)	Rounded, dense	Pale yellow, April	x	x		Spiny, deciduous shrub with brilliant scarlet and yellow fall color. Red and dark green.
Redleaf Japanese barberry (Berberis thunbergi atropurpurea)	Rounded, dense	Yellow-reddish, April-May	x	x		Same general description as above plant. Leaves dark reddish-purple in spring and summer.
Warty barberry (Berberis verruculesa)	Round; dense	Gold yellow, May	x	x		Sturdy, spiny broadleaf evergreen plant with fine texture, dark green leaves. Reported to be very hardy but evidence of successful use in central Oregon is lacking.
Common box (Buxus sempervirens)	Round		x	x		Broadleaf evergreen hedge or specimen plant. Grows slowly to a height of 10 feet or more-can be kept lower by pruning.
Pfitzers juniper (Juniperus chinensis)	Spreading horizontally		x	x		Vigorous conifer to 3 feet or more. Keep low by removing higher branches. Plant 5-6 feet apart for quick cover. Tolerant of dry situations.
Mugho Swiss mountain pine (Pinus mugo mughus)	Rounded to round		x	x		Hardy conifer with compact habit of growth and climatic adaptability. Useful as foundation plant.

TABLE 3.3 (Cont'd)

Medium Shrubs--3 to 5 Feet High (Cont'd)

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	EXPOSURE PS	EXPOSURE Sh	REMARKS
Thunberg spirea (Spiraea thunbergi)	Round	White, Feb-May		x	x	Deciduous shrub with light green leaves. Good fall color.
Indiancurrant coralberry (Symphoricarpos)	Oval to round	See remarks, August		x	x	Deciduous. Small flowers yellow-white, flushed with rose. Purplish-red fruit ornamental during winter.
Berckmanns Oriental arbor-vitae (Thuja orientalis Berckmanns)	Oval			x	x	Slow growing, golden-foliaged conifer.

TABLE 3.3 (Cont'd)

Large Shrubs--5 to 8 Feet High

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	EXPOSURE PS	EXPOSURE Sh	REMARKS
Winged euonymus (Euonymus alatus)	Rounded	Unimportant	x	x		Deciduous shrub to 10 feet or more. Horizontally spreading branches. Crimson-scarlet fall color.
Greenstem forsythis (Forsythis viridissima)	Rounded	Yellow, Mar-Apr	x	x		This forsythis develops a purple-green fall color.
Peegee panicle hydrangea (Hydrangea paniculata Peegee)	V-shaped or round	White to purplish, Aug-Sep	x	x		Grows to considerable height. Large flower clusters make it attractive.
Meyer single-seed juniper (Juniperus squamata meyeri)	V-shaped, irregular		x	x		Distinguished by blue and purple tints.
Regels border privit (Ligustrum obtusifolium regelianum)	Rounded	White, Jul	x	x		Reliable screen plant, Horizontal character. Deciduous.
Morrow honey-suckle (Lonicera morrowi)	Rounded	White, Apr-May	x	x		Hardy old-timer.
Oregon grape (Mahonia aquifolium)	Oval to round	Yellow, Apr-May	x	x		A hardy broadleaf evergreen plant. Frequently takes on purplish color in winter. Grows taller in partially shaded location.

TABLE 3.3 (Cont'd)

Large Shrubs--5 to 8 Feet High (Cont'd)

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	EXPOSURE PS	EXPOSURE Sh	REMARKS
Mugho Swiss mountain pine (Pinus mugo mughus)	Rounded to round		x	x		Hardy conifer with compact habit of growth and climatic adaptability. Useful as foundation plant.
Cutleaf staghorn sumac (Rhus typhina laciniata)	Rounded or irregular	Greenish, Jun-Jul	x	x		Irregular in form; spreading. Foliage light green; yellow and crimson in fall. Suckers freely.
Vanhoutte spirea (Spiraea vanhouttei)	Round	White, May	x	x		Useful in all zones.
Persian lilac (Syringa persica)	Rounded	Pale lilac, May	x	x		Hardy, free-flowering lilac.
Burkwood viburnum (Viburnum burkwoodi)	Rounded	Pink-white, Mar-Apr	x	x		Semi-evergreen, vigorous shrub. Fragrant flowers, dark green foliage.
European cranberry viburnum (Viburnum opulus)	Round	White, May-Jun	x	x		Deciduous plant, grows to 12 feet. Red fall color and red berries.
Common Snowball viburnum (Viburnum opulus Common Snowball)	Round	White, May-Jun	x	x		Deciduous plant. Grows to 12 feet--red fall color and red berries. Flowers in round clusters. Sterile.

TABLE 3.3 (Cont'd)

Tall Shrubs and Shrubby Trees--8 to 20 Feet High

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	EXPOSURE PS	EXPOSURE Sh	REMARKS
Siberian peashrub (Caragana arborescens)	V-shaped or oval	Yellow, Mar-May	x	x		Deciduous. Used as hedge plant, screen, or as lower member of windbreak planting. Cut back of dense form required.
Weeping forsythis (Forsythis suspensa)	Oval; pendulous	Yellow, Feb-Mar	x	x		Good forsythis where weeping effect is desired.
Creambush rockspirea (Oceanspray) (Holodiscus discolor)	Oval	Creamy white Jun-Jul	x	x		Deciduous shrub to 12 feet. Large panicles of flowers its chief attribute.
Reeves Chinese juniper (Juniperus chinensis Reeves (femina))	Pyramidal		x	x		Vigorous plant of light blue-green color.
European privet (Ligustrum vulgare)	Round	White, Jun-Jul	x	x		Deciduous or half-evergreen shrub. Grows to 12 to 15 feet. Responds well to pruning.
Tatarian honeysuckle (Lonicera tatarica)	Rounded	Pink to White, Apr-May	x	x		Deciduous-grows to about 10 feet. Grows to 12 or 15 feet. Responds well to pruning.
Gordon mockorange (Philadelphus gordianus)	Oval	White, Jun-Jul	x	x		Deciduous native shrub. Grows to 12 feet. Fragrant white flowers.

TABLE 3.3 (Cont'd)

Tall Shrubs and Shubby Trees--8 to 20 Feet High (Cont'd)

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	EXPOSURE PS	EXPOSURE Sh	REMARKS
Staghorn sumac (Rhus typhina)	Round or irregular	Greenish, Jun-Jul	x	x		Deciduous shrub or tree. Grows to 20 feet or more. Greenish flowers followed by crimson fruiting bodies. Fall color bright red. Suckers freely.
Common lilac (Syringa varieties)	Oval to rounded		x	x		There are innumerable varieties of the common lilac differing primarily in color from white, pink, blue, to purple in single or double flower forms. Most varieties become tree-like to 15 or 20 feet. Irrigation required.
Ware Gold eastern arborvitae (Thuja occidentalis Ware Gold)	Narrowly pyramidal		x	x		This conifer has golden-yellow foliage. Useful as screen. Ultimate height about 20 feet.
Common snowball (Virburnum opulus Common Snowball)	Round	White, May-Jun	x	x		Deciduous plant. Grows to 12 feet. Red fall color and red berries. Flowers in round clusters. Sterile.
Scheidecker crabapple (Malus scheideckeri)	Rounded	White, May	x	x		White flowers pink in bud, red and yellow fruit.

TABLE 3.3 (Cont'd)

Medium Trees--20 to 30 Feet High

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	EXPOSURE PS	EXPOSURE Sh	REMARKS
Pauls Scarlet English hawthorn (Crataegus oxyacantha Pauls Scarlet)	Oval to round	Scarlet, May	x	x		Dense, light green foliage. Double flowers. White, pink, and scarlet varieties available.
Koster blue Colorado spruce (Picea pungens Koster)	Pyramidal		x			Another slow-growing but persistent tree. Foliage light silvery green.
Goldenrain tree (Koelreuteria paniculata)	Round	Yellow, Jul-Aug	x	x		Light green leaves, large panicles of flowers followed by yellowish to brown capsules. Tolerant of alkaline soil.
Chinese Elm (Ulmus parvivolia)	Round to Oval		x			Rapid growth under adverse conditions.
European mountain ash (Sorbus aucuparia)	Oval to round	White, May	X	X		Dull green foliage turns yellow in fall. Berries red in August and September.

TABLE 3.3 (Cont'd)

Large Trees--50 to 75 Feet High

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su	PS	Sh	REMARKS
Horsechestnut (Aesculus hippocastanum)	Oval or round	White with red, May		x		Foliage coarser and a little lighter. Foliage of this horsechestnut a dark green. Casts dense shade.
European white birch (Betula pendula)	Oval or pyramidal			x		The species a slow-growing graceful tree. Several varieties available, such as cutleaf, pyramidal and purple leaf forms.
Green ash (Fraxinus pennsylvanica lanceolata)	Round			x		Hardy shade tree. Grows in most soils with moderate moisture.
Scarlet oak (Quercus coccinea)	Oval to round			x		Bright green leaves turn scarlet in fall. Less rounded head than above tree.
Black locust (Robina pseudoacacia)	V-shaped to oval	White, May-Jun		x		Common in eastern and central Oregon. Vigor and tolerance of relatively poor, dry soil make it useful for quick shade.
Golden willow (Salix aureum)	Weeping			x		Subject to twig blight, normally will head out too low to furnish shade. Very fast growing.
Eastern red oak (Quercus rubra)	Round			x		Handy, useful as shade or street tree. Red fall color.

TABLE 3.3 (Cont'd)

Large Trees--75 to 100 Feet High (Cont'd)

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su PS Sh	REMARKS
Norway maple (Acer platanoides)	Round	Yellow-green, Apr	x	Dense round tree. Light green leaves. Variety Crimson King has dark purplish-red leaves all summer. Variety Schwedler has reddish leaves in early summer, gradually turning dark green.
Austrian pine (Pinus nigra)	Pyramidal to oval		x	Austrian pine excellent as ornamental or part of a windbreak in all zones. Branches to ground and will survive relatively dry conditions under cultivation.
Lombardy poplar (Populus nigra Lombardy)	Columnar		x	Greedy, invasive root system. Long association of eastern and central Oregon.
Littleleaf linden (Tilia cordata)	Oval		x	Slow-growing deciduous tree. Useful under 50 feet as shade or street tree. Fragrant yellowish-white blooms in July. Requires moderate moisture.
Sycamore (Platanus acerifolia)	Round		x	Large tree - Covers wide area with shade.
Silver maple (Acer saccharinum)	Oval to round		x	Silver maple widely planted because of vigor and hardiness. Yellow fall color.

TABLE 3.3 (Cont'd)

Large Trees--Over 100 Feet High (Cont'd)

COMMON/BOTANICAL NAME	GROWTH MANNER	FLOWERS	EXPOSURE Su PS Sh	REMARKS
Sugar maple (Acer saccharum)	Oval to round		x	One of the most colorful fall trees. Does best with summer irrigation.
Ponderosa pine (Pinus ponderosa)	Columnar to oval		x	Conifer, widely used as specimen or as windbreak member. Drought resistant.
American linden (Tilia americana)	Oval		x	Hardy deciduous tree of coarse texture. Intolerant of dry situation.

3.03 Maintenance.

a. Watering.

At Lower Monumental Lock and Dam, Lyons Ferry State Park, and Lyons Ferry Marina, the lawn grass areas are watered by an underground sprinkler system. At Texas Rapids, the lawn grass area is watered by a portable surface sprinkler system. Since there is no permanent water supply at this area, a gasoline powered water pump is used to pump water directly from the river into the system.

In general, the frequency of watering depends on the soil texture at the site. Sandy soils require frequent watering in small amounts whereas clay soils require infrequent watering in large amounts. Watering should be done either in the early morning or late evening, or at night, if possible, to coincide with intervals of low visitor use and low evaporation.

Avoid watering lawn grass lightly at frequent intervals if possible; this causes shallow growth of grass roots and stimulates growth of weeds. Apply enough water to wet the soil to a depth of six inches or more. Do not apply water faster than it may be taken in by the soil.

As a rule, dryland grasses do not require irrigation. This is why they are recommended over lawn grasses in the LOWER MONUMENTAL MASTER PLAN. Besides lower planting costs, dryland grass plantings have lower maintenance costs.

Most trees and shrubs in this area may require watering until a supportive root system has been established. However, consideration must be given to the water requirements of tree and shrub species in the planning of a revegetation program. Shallow rooted trees and shrubs that are especially vulnerable to drought must be planted in irrigated areas. Species that are drought resistant or deep rooted to get moisture from sub-surface soil levels may be distributed more liberally. The primary considerations in the revegetation program should be to either (1) select species which will adapt to soil moisture levels at a particular site, or (2) select sites where soil moisture levels are adequate for planting desired species. The installation of irrigation systems should be the last resort, since they are expensive to install, require frequent maintenance, and are subject to vandalism. Soil texture, which influences the water retention capacity of a site, should also be considered.

b. Fertilizing.

For the maintenance of average quality turf grasses, the Washington State University Cooperative Extension Service recommends four applications of Nitrogen (N) per season between April and September at a rate of 1 pound N/1000 square feet or 43.5 pound N/acre. Fertilizers containing N should be applied to dry turf to prevent burning followed by watering to move the fertilizer into the soil. Care should be taken to prevent any run-off.

Where soil testing indicates a deficiency, Phosphorus (P) and Potassium (K) should be applied to encourage a healthy and vigorous turf. P will not cause burning and will not leach out of the soil significantly. Therefore, the entire P requirement may be applied at once. However, if applied in excess, run-off will carry some of this nutrient into the river which may contribute to a decline in the water quality. Fertilizers containing K must be applied to dry turf then watered in to prevent burning.

Application rates for P and K depend on soil test recommendations. The W.S.U. Cooperative Extension Service recommends that soil tests be repeated every two or three years to determine if the fertilizer needs have changed. For more information, refer to FERTILIZER GUIDE: HOME LAWNS, PLAYFIELDS AND OTHER TURF (Law, A.G., K.J. Morrison, A.B. Halvorson, and C.D. Fanning. FG-24. Pullman: W.S.U. Cooperative Extension Service, November 1972).

Dryland grasses, in general, should not require routine fertilization following planting. However, applications of nitrogen may stimulate plantings of low vigor.

Trees and shrubs should be planted with slow-release fertilizer tablets to promote the establishment of a viable young plant.

c. Pruning.

Once a tree or shrub has been planted, pruning should be accomplished as needed throughout its' life to maintain its' health, vigor, and appearance. Under ideal conditions, very little pruning of trees and shrubs is required. However, few trees exhibit ideal growth and therefore require minor periodic pruning. To minimize pruning requirements, it is essential to select a tree with the size and growth characteristics which satisfactorily adapt to the specific site. If this is done during the

planning stages before planting, pruning requirements will be reduced.

Dead, diseased or injured wood will be removed from all trees or shrubs. Not only will this enhance their appearance but it will check the spread of any diseases which develop. Pruning will be used furthermore to correct weak or unattractive growth patterns and branch crowding.

It is obvious that each tree is unique and therefore no specific uniform pruning guidelines can be offered. However, there are some general principles which should be kept in mind when pruning or inspecting pruning work. First of all, shoots should be pruned just above a bud and branches should be removed at the crotch. Never leave a stub. Secondly, shoots and small branches are cut with pruning shears. The shears should be positioned so that the cutting blade of the shears cuts up through the branch (Figure 3.4).

Large limbs must be cut with a saw. The recommended procedure for removing a very large limb consists of two steps involving four cuts (Figure 3.5). The first cut is made on the underside of the branch one to two feet above the crotch. This cut should be at least one-third of the diameter of the branch. The second cut should be made on the upperside of the branch one to three inches further from the crotch than the first cut. The limb will split cleanly between the two cuts without tearing or peeling the bark. Following this, the third cut is made through the bark on the underside of the crotch. The final cut is made on the upperside of the crotch and intersects the cut on the underside. This procedure lessens the chance of the bark or sapwood tearing or splitting and leaving a jagged cut surface.

Many trees form ridges above and below the point of limb attachments. These are called shoulder rings. The final cuts at the crotch should be made between the centermost ridges of these rings (Figure 3.6). The cut will not be flush or parallel to the trunk, but will be out from it slightly with the lower edge of the cut further away from the trunk than the top.

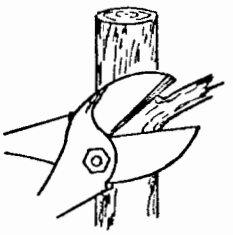


Figure 3.4 - For close, easy cutting, place blade next to trunk and cut up.

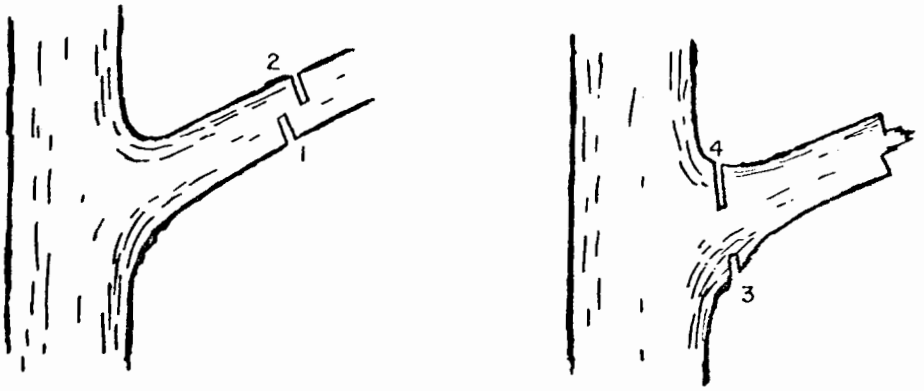


Figure 3.5 - Removing a large limb.

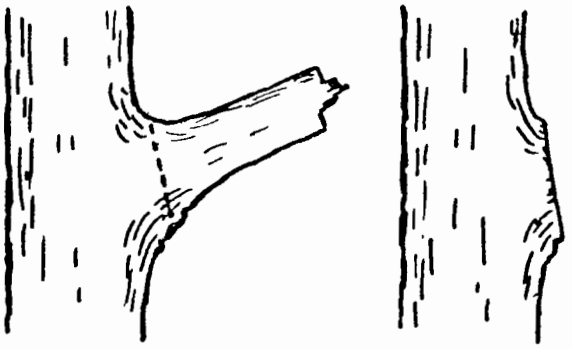


Figure 3.6 - Final cut made at shoulder rings.

If shoulder rings are not present at limb attachments, the cut may be sighted by a line connecting the point bisecting the top angle of the crotch and a similar point bisecting the lower angle of attachment (Figure 3.7).

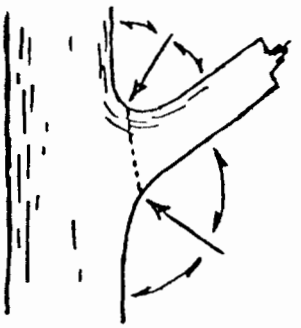


Figure 3.7 - Final cut when shoulder rings absent.

A major consideration in pruning is to choose wisely the best time to prune. This depends on the type of tree or shrub as well as the amount of pruning required. Evergreen plants should be pruned just before spring growth. In this way, pruning cuts will be concealed quickly by new spring growth.

Light, minor pruning may be done anytime with no fear of injuring the plant. However, on deciduous trees and shrubs, best results will be obtained if pruning is accomplished well into the dormant season but prior to spring growth.

Major pruning and pruning of large limbs will be done in the winter when the tree or shrub is dormant. The loss of a major portion of a tree's photosynthetic area following leaf emergence in the late spring or summer would have disasterous results. In addition, branching patterns are more visible and thus easier to correct after the leaves have fallen.

Young, newly planted trees will be pruned intensively for the first five years following planting to promote a desirable branching pattern and shape. If accomplished during this period, the future pruning requirements are minimized and major pruning should not be necessary.

The first step in training young trees is to encourage the growth and dominance of a vertical shoot or leader up to the point where branching is desired. All vigorous laterals which form below this point and compete with the leader should be removed at the trunk. Laterals of low or moderate vigor should be left because they supply the trunk with strength and nourishment. These may be removed later.

Once the desired height has been attained, laterals that develop above this point may be allowed to develop. If none develop, pinching the leader will cause the formation of laterals at this point. However, if an upright leader is desired beyond this point, the fastest growing and most erect lateral should be encouraged by removing its closest competitors while leaving laterals of low or moderate vigor.

After a leader is established and exceeds the desired branching height, and laterals are allowed to form, the next task is to select limbs for development as primary branches. These will be the main branches of the matured tree originating from the trunk. The selection of the primary branches should be based on the following criteria:

- o Spacing - Primary branches must be well spaced at regular intervals to allow for future growth of secondary and tertiary branches (Figures 3.8, 3.9, and 3.10).

- o Vigor - Primary branches should be of moderate vigor otherwise they may tend to outgrow the leader. All laterals which grow to challenge the leader in height or girth should be removed or cut back.

- o Direction of Growth - Primary branches should be selected which have a wide stronger angle of attachment (Figure 3.11) and are growing in a desirable direction. Narrow angled branches may be strongly attached and in their early years most of the weight will be nearly parallel to the axis of the branch and trunk. In later years, these branches,

become heavier and more spreading, and are apt to split out during a storm. Such losses not only deform the tree but are dangerous (Figure 3.12).

Older, mature trees will be pruned as needed for the following purposes:

- To remove any dead, injured, or diseased branches.
- To remove closely spaced branches which are interfering with each other.
- To remove branches which contribute to an unattractive shape.
- To remove branches which exhibit inherently weak growth patterns.

The final guideline to be followed in pruning is a good rule of thumb for all corrective pruning. To change the direction which a branch grows, one should cut the branch back to a bud which points in the direction of desired growth. It also should be remembered that pruning is a means of strengthening and thickening the stem below the cut.

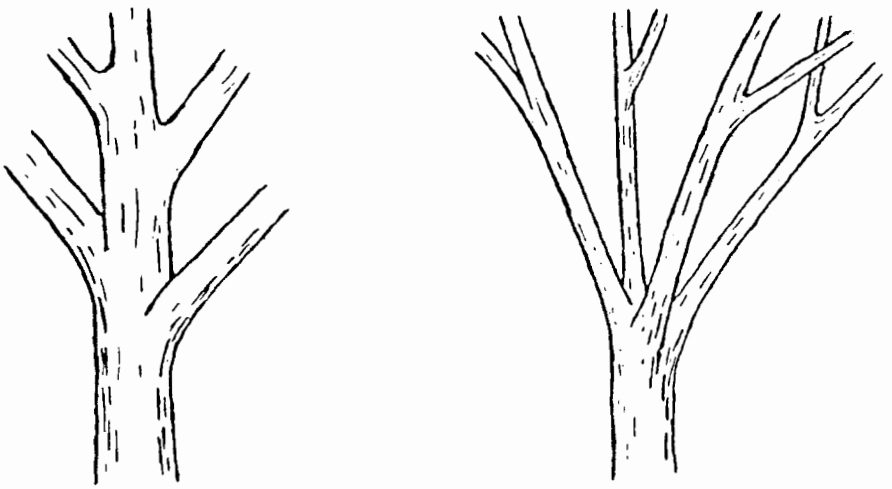


Figure 3.8 - Well-spaced branches (left) are less likely to split out or break than those close together (right).

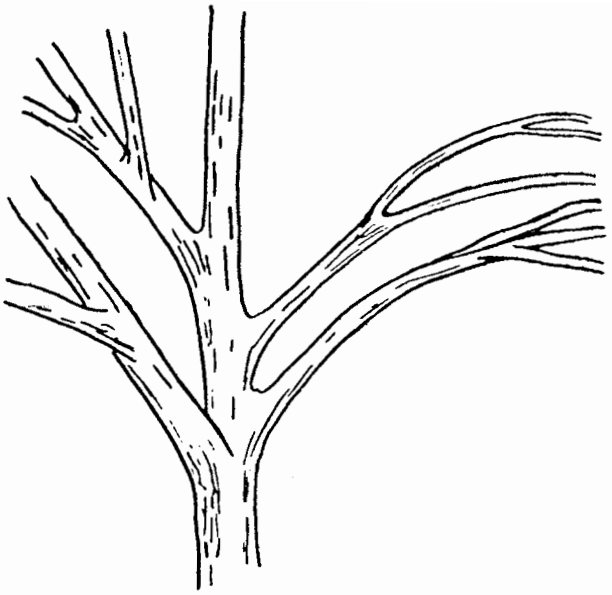


Figure 3.9 - Two limbs, one over the other, interfere with the proper development of each other.

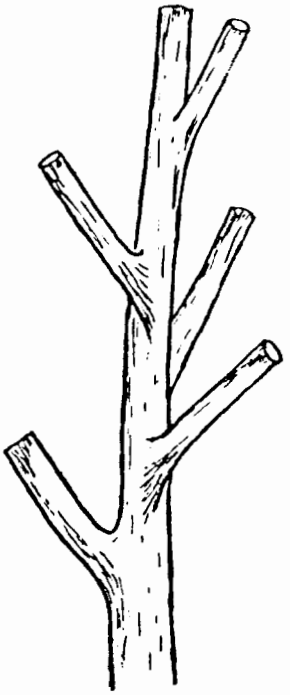


Figure 3.10 - Primary branches with good vertical and radial spacing on the trunk.

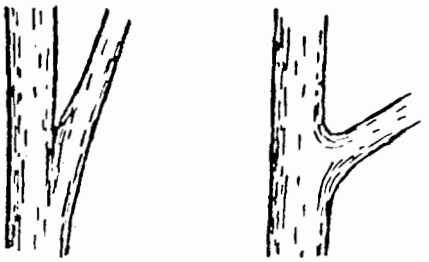


Figure 3.11 - Branch attachments: (left) weak, narrow angle; (right) strong, wide angle.

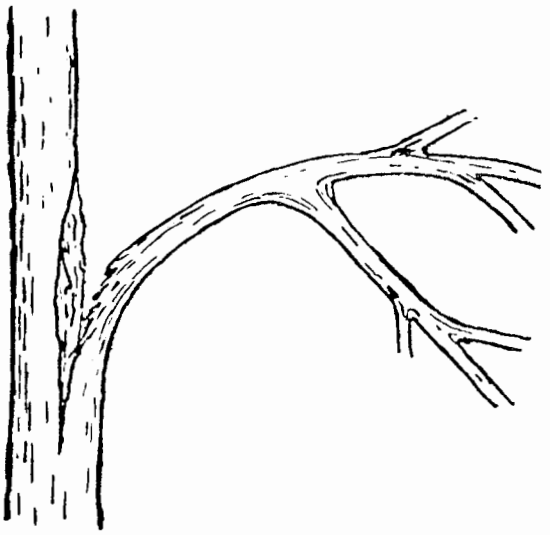


Figure 3.12 - A branch with a narrow angle of attachment may not split until branch is quite large.

More information may be found in the follcwing references:

- o Chandler, W.H., and R.D. Cornell. 1952 PRUNING ORNAMENTAL TREES, SHRUBS, AND VINES. California Agricultural Extension Circular No. 183 44pp.

- o Davey, K.L. 1967 PRUNING MATURE TREES. Western Landscaping News 7 (12): 14.

- o Harris, Richard W.; W. Douglas Hamilton; William B. Davis; and Andrew T. Leiser. 1969 PRUNING LANDSCAPE TREES. University of California Agricultural Extension Service. Leaflet No. 2574 Davis, California. 25pp.

- o Hudson, R.L. 1952 SUNSET PRUNING HANDBOOK. Lane Books Menlo Park, California. 80pp.

d. Mowing.

The recommended cutting height for cool-season grasses, such as bluegrasses and ryegrasses, is between two and three inches. Closer mowing will certainly weaken them, and may kill them.

Frequent mowing removes little top growth and keeps down weed competition. Lawn grass should not be allowed tc grow unusually high before it is cut. This is a physiological shock to the grass and necessitates removal of the clippings to prevent diseases and smothering of the grass. However, if mowed frequently, clippings may be left on the lawn.

No matter which type of mower is used, it should be kept sharp enough to cut the grass cleanly without bruising or tearing the leaves. Rotary mower blades require frequent sharpening.

Mowing may be done during any period of the day with little fear of burning the grass, provided that these areas are adequately watered and mowed frequently to no less than two inches in height. However, mowing will be less injurious to grasses when it is done on cloudy days or later in the afternoon. Mowing should be done only when the turf is dry.

e. Sealing.

The application of a sealing substance such as TREFHEAL (Flintkote Co.) will protect tree wounds from decay, rot, and disease. These wounds may occur as a result of pruning, accidental breakage or splitting of limbs, or injury from mowers. Any time the sapwood is exposed, a sealant should be placed over the wound. For best results, allow the wound to dry before applying the sealant. If the coating cracks, re-seal the wound. Black-colored coatings can become very hot if exposed to the sun. The high temperatures generated may prevent or seriously reduce callus formation. To reduce this risk it is a good idea to paint the dried sealant with a white water-base paint wherever treated wounds are directly exposed to the sun.

3.04 Pest and Disease Control.

a. Noxious Weeds.

A weed is nothing more than a plant which is established in an area where it is not wanted and the presence of noxicus weeds (unwanted plants that tend to become established in quantities sufficient to create serious conflicts with intended land uses) is, in general, unnatural. Most plants which are commonly considered weeds are successional species, able to compete temporarily on disturbed sites but in time replaced by desirable species. Under favorable growing conditions, desirable species such as Bluebunch wheatgrass and Bluegrass will replace some weeds such as Yellow starthistle. Disturbed sites may be the result of either grazing, erosion, fire, or vegetive destruction by mechanical equipment (e.g., off-road vehicles, plows, bulldozers).

Four treatments will be used to control noxious weeds on land where they present serious land use problems. The first step is to prevent further disturbance of the site. This may be accomplished either by fence construction, more intensive surveillance, erosion control, or by fire prevention techniques, depending on the nature of the disturbance.

The second treatment available is to encourage vigorous growth of desirable species. These may be either native species or other species which are well suited to the area. Selection of desirable species will be based on consideration of site factors including climatic conditions, topography, and soil types. The growth of

desirable species may be accomplished either by watering if an irrigation system is present, or by mowing and fertilizing on a basis timed to prevent vigorous growth of weeds and encourage growth of the desired species.

The third alternative treatment to control weeds is to plow up the area and re-seed with desirable species. However, if a cover is not established quickly after the area is plowed, the weeds will re-establish themselves.

The last control treatment involves the application of pesticides, which should be accompanied by treatments to encourage the growth of desirable species and prevent the re-establishment of the weeds. Pesticides shall be used only as a last resort control measure after all other alternatives have been considered.

Further guidance on weed control is contained in ER 1130-2-413 (Pest Control Program for Civil Works Projects, 15 August 1977) and SECTION 11 of APPENDIX A.

Resource Managers shall seek advise concerning weed control problems from the following sources:

- o Qualified people in the District Office.
- o County Extension Service.
- o Washington State University, College of Agriculture.
- o 1978 WASHINGTON STATE UNIVERSITY WEED CONTROL HANDBOOK: Washington State University College of Agriculture, et. al.; 1978.

b. Plant Pests.

Tent catepillars, aphids, and spider mites are potential plant pests on the Lower Monumental Project. Control measures will be initiated only when these pests become numerous enough to create a serious threat to the vitality of the vegetation, whether it is grasses, shrubs, or trees.

Guidance on the control of plant pests is contained in ER 1130-2-413 (Pest Control Program for Civil Works Projects, 15 August 1977) and SECTION 11 of APPENDIX A. Resource Managers shall seek advise concerning control of plant pests from the following sources:

- o Qualified people in the District Office.
- o County Extension Service.
- o Washington State University, College of Agriculture.

- o PACIFIC NORTHWEST PEST CONTROL HANDBOOK; University of Idaho, et. al.; 1978.
- o 1978 PACIFIC NORTHWEST INSECT CONTROL HANDBOOK; Washington State University College of Agriculture, et. al.; 1978.

c. Plant Diseases.

In the past, plant diseases have posed no serious threat to the vegetation on the Lower Monumental Project. However, in the event that such a problem develops in the future, the Resource Manager shall seek advice on control measures from the sources listed above as well as the Sunset Western Garden Book (Dunmire, John R. 1967 Lane Books Menlo Park, California 448pp.).

SECTION 4 - IDENTIFICATION AND PRESERVATION OF UNIQUE HABITAT

The vegetation management program will include the identification and preservation of any special or unique habitats in accordance with ER 1130-2-400. Such habitats may be of either significant biological, scientific, or aesthetic value. These might include, but not be limited to: nesting or breeding areas, roosting sites, denning sites, food or cover for wildlife, and large and interesting trees. These sites will receive management considerations designed to protect and buffer them from incompatible adjacent management practices.

APPENDIX C

FIRE PROTECTION PLAN

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APPENDIX C: FIRE PROTECTION

SECTION 1 - INTRODUCTION

1.01 Purpose.

While the Corps of Engineers is not a fire suppression organization, it does serve as the caretaker of public lands and protects them from wildfire. In addition, the Corps has a general responsibility to local residents of the area to insure that fires do not spread from project lands and threaten their property or lives. All Corps personnel will remain constantly alert to prevent and detect fires.

This appendix will describe established policies and procedures for the prevention and prompt suppression of uncontrolled range and structure fires on Lower Monumental project lands. It will describe relationships with local firefighting organizations, fire prevention guidelines, the training of personnel, available firefighting equipment, and firefighting procedures.

1.02 Fire Season.

The critical fire season in the lower Snake River generally occurs from June through late October. However, this season varies greatly depending on the temperature and rainfall. This period coincides with the period of heaviest recreational use, increasing the danger of fires. The risk of fire is greatest in areas, and at times, of heaviest visitor use.

SECTION 2 - LOCAL FIREFIGHTING ORGANIZATIONS

Lower Monumental project land is located in four local fire districts: Franklin County Fire District #2, Whitman County Fire District #8, Walla Walla County Fire District #1, and Columbia County Fire District #1. These districts are shown and identified on the map which follows.

Area #1. This area covers project land on the north shore of the Snake River between the Lower Monumental Lock and Dam and the confluence of the Palouse River including project land along the western shore of the Palouse River. The land lies within the jurisdiction of Franklin County Fire District #2.

This local fire district is staffed by twenty-eight volunteers and is equipped with the following apparatus:

- 4 all wheel drive pumpers:
  - 2 - 700 gallon capacity
  - 1 - 500 gallon capacity
  - 1 - 300 gallon capacity
- 1 - 2,500 gallon tanker

There are plans under way for the acquisition of three additional pumpers which will be located throughout the district. The rest of the equipment is located in Kahlotus which is 20 miles from Lyons Ferry State Park and 8 miles from Lower Monumental Lock and Dam.

Area #2. This area includes project land on the south shore of the Snake River in Walla Walla County between the Lower Monumental Lock and Dam and the Walla Walla - Columbia County boundary near the Joso Bridge. This land lies within the jurisdiction of Walla Walla County Fire District #1.

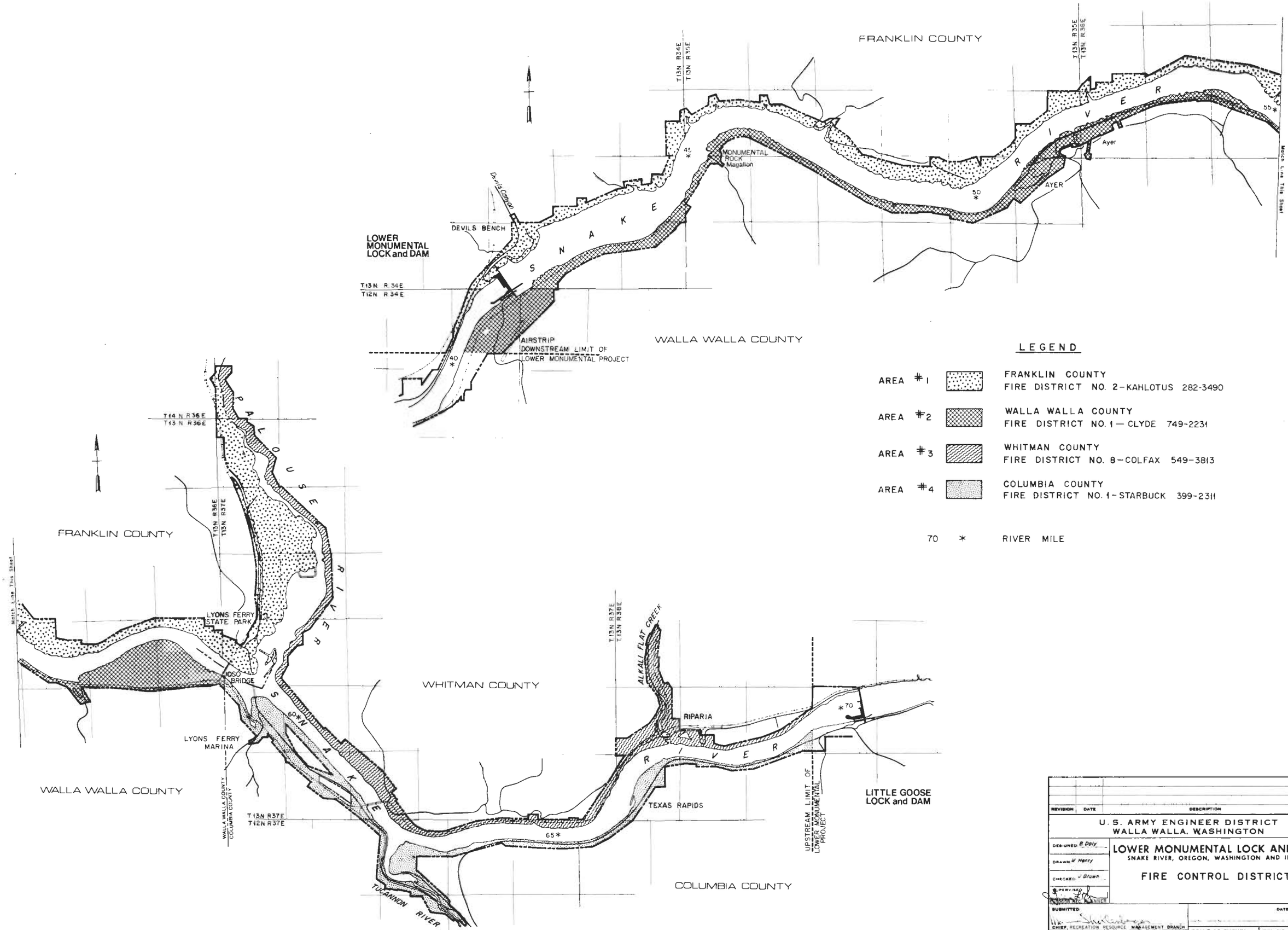
This fire district is staffed by volunteers and equipped with the following apparatus:

- 7 all wheel drive pumpers:
  - 5 - 750 gallon capacity
  - 2 - 300 gallon capacity
- 1 - 1,200 gallon tanker

There are plans under way for the construction of an additional 1,200-gallon tanker. Although the district headquarters are located in Clyde, the fire fighting equipment is scattered throughout the district so that

CORPS OF ENGINEERS

U.S. ARMY



LEGEND

AREA #1		FRANKLIN COUNTY FIRE DISTRICT NO. 2 – KAHLOTUS 282-3490
AREA #2		WALLA WALLA COUNTY FIRE DISTRICT NO. 1 – CLYDE 749-2231
AREA #3		WHITMAN COUNTY FIRE DISTRICT NO. 8 – COLFAX 549-3813
AREA #4		COLUMBIA COUNTY FIRE DISTRICT NO. 1 – STARBUCK 399-2311
70 *		RIVER MILE

REVISION	DATE	DESCRIPTION	BY

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA, WASHINGTON

DESIGNED B. Daly
DRAWN W. Henry
CHECKED J. Brown
SUPERVISED

LOWER MONUMENTAL LOCK AND DAM
SNAKE RIVER, OREGON, WASHINGTON AND IDAHO

FIRE CONTROL DISTRICTS

SUBMITTED
CHIEF, RECREATION RESOURCE MANAGEMENT BRANCH

CHIEF, OPERATIONS DIVISION

DATE

SCALE AS SHOWN | INV. NO.

SHEET | FILE NO. LM-05-44/1

assistance can arrive on the scene of a fire within 15 minutes.

Area #3. This area covers project land on the north shore of the Snake River between the confluence of the Palouse River and Little Goose Lock and Dam including project land along the eastern shore of the Palouse River. This land lies within the jurisdiction of Whitman County Fire District #8.

This fire district is equipped with six trucks which are scattered throughout the district. One truck is stationed in Hay, within 15 minutes of the river. In addition, there are several more trucks owned by a local landowner at the district's disposal if needed. The district is manned by a volunteer force of forty-two volunteers.

Area #4. This area includes project land on the south shore of the Snake River in Columbia County between the Little Goose Lock and Dam and the Walla Walla - Columbia County boundary near the Joso bridge. This land lies within the boundary of Columbia County Fire District #1. This district is equipped with two pumpers and one tanker which are located in Starbuck, within five minutes of the river and ten minutes of Little Goose Lock and Dam.

It is policy of the Corps of Engineers that local fire districts are responsible for fire suppression on project lands without financial reimbursement. This policy intends to provide fire protection on project lands equal to that enjoyed by adjacent landowners.

SECTION 3 - FIRE PREVENTION

The prevention of fires through an effective public information campaign, and safe operations and maintenance practices is essential to every fire protection program.

3.01 Laws and Regulations.

The Resource Managers and Resource Rangers will familiarize themselves with all state and local laws governing fire hazards and prevention activities since they apply to project as well as private lands. Also, resource personnel with citation authority will use Sections 327.10 and 327.13 of Title 36 of the CODE OF FEDERAL REGULATIONS to enforce fire safety.

3.02 Public Information.

Fire prevention posters and/or fire danger signs should be displayed in appropriate locations in each recreation area. These may be posted on the kiosks planned for installation at Corps-managed parks. These kiosks are described in SECTION 5 (APPENDIX A).

In addition, patrolling Resource Rangers will remind campers and picnickers of the fire danger during periods of hazardous conditions. Where possible and practical, the Corps will make use of local newspapers, radio stations, and television stations to disseminate fire hazard information to the public.

3.03 Project Operation and Maintenance.

a. Surveillance.

During periods of extreme fire danger, Corps personnel will carefully watch park users to detect fire hazards and violations of fire laws and regulations. Special attention will be directed toward proper disposal of matches and smoking materials, fires in unauthorized areas, and the proper extinguishing of campfires to prevent rekindling. Persons found in violation of Title 36 of the CODE OF FEDERAL REGULATIONS will be informed of the fire safety violation. If they persist in their practices, they should be issued a citation under Title 36 regulations.

b. Maintenance.

Litter and garbage are not permitted to accumulate at shelter sites since they present a potential fire hazard. In general, facilities are maintained in a clean, well-kept state to reduce fire potential.

The accumulation of highly combustible, dry vegetative material such as tumbleweed along fences, in roadside ditches, or in undeveloped areas frequented by recreationists poses a serious hazard during the fire season. At Devil's Bench, the dam overlooks, Ayer Boat Basin, the camping area at Lyons Ferry State Park, and Riparia, the sagebrush - rabbitbrush plant community has not been replaced with lawn grass as it has in other recreation areas. Consequently, they are more susceptible to range fires, and public camping and picnicing at these sites may create a significant fire threat. The accumulation of combustible vegetation at these areas further contributes to the fire danger. Therefore, during the fire season, dry and highly flammable vegetation which collects along fences and roadsides at Riparia is removed, or collected and burned by project personnel to eliminate this fire hazard. At Devil's

Figure 3.1 - Dry vegetative material accumulates along fences.

Bench, the dam overlooks, Ayer Boat Basin, the maintenance contractor is responsible for this task. At areas conveyed by or leased from the Corps of Engineers, such as Lyons Ferry State Park, it is the responsibility of the lessee to remove or burn flammable vegetation which accumulates in the area and presents a fire hazard. Project personnel are responsible to check to see that this is done during their surveillance of the park.

c. Operations.

All project personnel are to be alert at all times to potential fire hazards and take necessary precautions to prevent fires. The Project Engineer shall make sure that all project personnel receive training in fire safety practices. This training will be reviewed twice annually at informal safety meetings.

Contractors are to be briefed on project fire safety requirements and the Contracting Officer's Representatives will periodically inspect the contractor's operations to insure compliance.

A controlled burn may be prescribed on a small tract of land for weed control or to prepare a wildlife area for cultivation and seeding. However, the use of a large-scale controlled fire to eliminate accumulated combustible vegetation and reduce the danger of wildfire is not recommended on the Lower Monumental Project. This technique has little practical application here because of the resultant destruction of wildlife habitat, the sparse vegetation with relatively insignificant litter accumulation, and the soil erosion problems which it creates.

During periods of extreme fire danger, the District Engineer may decide that it is in the best interest of the public to close portions of the project to public use. However, when the fire danger is less than severe, the Resource Manager may decide only to prohibit open fires.

If experience indicates that certain areas are particularly susceptible to wildfires, it may be advantageous to construct a firebreak to contain wildfires and protect adjacent farmland.

SECTION 4 - TRAINING

The Project Engineers will make sure that all project personnel receive fire protection training which shall include the following list of topics:

- Training in the use and location of firefighting equipment.
- Fire prevention activities.
- Organization of personnel.
- Procedures for reporting fires.
- General duties in fire suppression.
- Specific firefighting procedures and techniques.
- First aid.

The training program shall be coordinated with local fire districts and conducted annually in the spring before the beginning of the fire season. Reviews and discussions of selected aspects of the program will be scheduled during the monthly safety meetings especially during the fire season.

SECTION 5 - FIRE CONTROL AND SUPPRESSION

5.01 Firefighting Equipment.
The following is a list of firefighting equipment on hand in the vicinity of the Lower Monumental Project.

Location	Items
Lower Monumental Dam	several buckets, shovels and rakes
Little Goose Dam	1 4x4 pickup equipped with 300-gallon water tank, water pump, and spray nozzle several shovels, hoes, and axes 4 portable backpack pumps (4 gallon capacity)
Maintenance contractor	1 shovel 1 bucket 1 10 lb. dry chemical fire extinguisher type ABC

In addition, fire extinguishers are located throughout both dams and in project vehicles and boats. All of the above equipment is to be maintained in a state of readiness and stored and designated specifically for firefighting use. Fire extinguishers are inspected monthly.

Following a fire, all equipment used in firefighting will be cleaned, repaired, and returned to its proper location. Any damaged equipment will be replaced as soon as possible and fire extinguishers used in firefighting activities will be inspected and refilled immediately. Extra fire extinguishers will be used as replacements during the interim.

5.02 Organization of Personnel.
The division of this project's management responsibilities between the Ice Harbor - Lower Monumental Project Office and the Little Goose - Lower Granite Project Office (SECTION 2, APPENDIX A) includes all fire protection responsibilities as well. The Ice Harbor - Lower Monumental Project Office staff is responsible for fire prevention and

suppression on project land between Lower Monumental Lock and Dam and the Joso Bridge at Snake River Mile 59. The Granite - Goose Project Office staff is responsible for these activities on project land between the Joso Bridge and Little Goose Lock and Dam.

The following chart illustrates the division of fire control responsibilities among project personnel at both the Ice Harbor - Lower Monumental Project Office and the Granite - Goose Project Office.

	Ice Harbor- Lower Monumental	Granite-Goose
Fire Chief	Resource Manager	Project Engineer
Assistant Fire Chief		Resource Manager
Deputy	Resource Rangers	Assistant Resource Manager Resource Ranger
Firefighters	Dam Tenders, Summer Aides, Park Technicians, Park Aides	Grounds Maintenance Workers, Dam Tenders, Summer Aides

Although certain duties may be delegated to either the Assistant Fire Chiefs and the Deputies, the Project Engineers have the ultimate responsibility for all aspects of the Fire Protection Program on their respective areas of this project.

5.03 Reporting a Fire.

All fires are to be reported to the Control Room Operator as soon as possible by either phone or radio. For fires below the Joso Bridge, the Lower Monumental Control Room Operator should be notified. For fires above the Joso Bridge, the Little Goose Control Room Operator should be notified. If contact is made by radio, begin the transmission with "This is a fire report." These conversations have priority over all others.

The fire report should include the following information:

- o Location - If possible, include which shore of the river the fire is on and the county the fire is in. Furthermore, an attempt should be made to describe the fire's location in terms of a nearby road or river mile and in relation to identifiable landmarks such as recreation areas, structures, or river features.

- o Direction of spread

- o Magnitude - The size of the fire and rate of spread should be reported and whether or not local fire district assistance should be requested.

- o Fuel - Report the type of material(s) that is burning (i.e., grass, brush, trees, grain, gasoline, rubbish, structures, etc.).

After receiving the report, the Control Room Operator will report the fire to the proper local fire district if necessary, then notify the Project Engineer or Resource Manager. They will dispatch available project personnel as needed.

Telephone numbers and call numbers for radio transmission are contained in the Fire Control Directory at the end of this appendix.

5.04 Firefighting Duties.

Although project personnel receive training in firefighting procedures and techniques, and they are delegated with responsibilities for protecting project resources from wildfire, these responsibilities do not include activities which pose a serious risk to their health and safety. In general, firefighting duties of project personnel are limited to attempts to suppress small fires in their initial stages. Project personnel should be regarded only as an initial attack, or first strike force of firefighters.

Specific procedures to be followed at the scene of a fire vary depending on the situation at hand. In general, if a small fire is discovered in its initial stages shortly after onset, an attempt should be made immediately to bring the fire under control with available personnel and

equipment. However, when it becomes obvious that this attempt has failed and the fire continues to grow and burn out of control, the attack should be suspended and the fire should be reported to the Control Room Operator. On the other hand, if a fire is discovered in its later stages and there is no chance of bringing it under control with available personnel and equipment, the first step is to report the fire to the Control Room Operator.

After reporting a fire, the employee will return to the fire scene. Until sufficient help and assistance arrives, activities should include alerting persons in possible danger areas, protecting public and private property if possible, and containing the fire as well as possible by organizing available personnel and using available firefighting equipment.

At the scene of a fire, either the Fire Chief, his assistant, or a Deputy will direct any firefighting activities until the local fire department has arrived. When they arrive, the local district's fire boss will take charge of the fire suppression activities and project personnel will assist. The Corps supervisor will work closely with the fire boss at the scene of the fire. The fire boss will be in charge, but the Corps supervisor will assist as much as possible with equipment and personnel.

A thorough review of the fire will be conducted by the Project Engineer or Resource Manager at the earliest convenience with participation by all employees involved. Suggestions and procedural improvements will be discussed and adopted if appropriate.

5.05 Structural Fires.

There are few structures on the Lower Monumental Project. The protection of the dam, lock, and powerhouse is the responsibility of the Lower Monumental Operations and Maintenance Sections and they have a fire protection plan in effect. There are a few structures at Lyons Ferry State Park and Lyons Ferry Marina but fire protection at these areas is the responsibility of the lessee. The only other structures on the project are vault toilets and shelters at Ayer Boat Basin, Texas Rapids, and Riparia and these pose no significant fire hazard.

5.06 Fire Reports.

Individual reports are prepared on DA Form 285, giving all particulars related to cause, location, damage, and effectiveness of control procedures for all fires occuring on project lands. Three copies are forwarded through Operations Division to the District Safety Office. Chronological fire records are maintained at the project to provide an indicator of changes in the incidence of fires, acreage burned, and patterns in locations of fire origins. Any necessary accident or injury reports will be completed immediately after the fire is extinguished.

FIRE CONTROL DIRECTORY

Area #1

Report to: Lower Mcnumental Control Room Operator

Telephone: 282-3218, or 3219

Radio: WUJ 43

Code Call: 7-11

Notify:

1. Franklin County Fire District #2 — 282-3490
2. Project Engineer (office) — 547-7781 ex. 51
   or (home)
   Resource Manager (office) — 547-7781 ex. 65
   or (home)
   Resource Rangers (office) — 547-7781 ex. 64
   or (home)

Area #2

Report to: Lower Monumental Control Room Operator

Telephone: 282-3218, or 3219

Radio: WUJ 43

Code Call: 7-11

Notify:

1. Walla Walla County Fire District #1 — 749-2231
2. Project Engineer (office) — 547-7781 ex. 51
   or (home)
   Resource Manager (office) — 547-7781 ex. 65
   or (home)
   Resource Rangers (office) — 547-7781 ex. 64
   or (home)

Area #3

Report to: Little Gocse Control Room Operator

Telephone: 399-2233, or 2234

Radio: WUJ 44

Code Call: 80-111

Notify: 1.	Whitman Ccunty Fire District #8		549-3813, or 3422
2.	Project Engineer	(office)	843-3796 ex. 51
	or	(home)	
	Resource Manager	(office)	758-9676
	or	(home)	
	Assistant Resource Manager	(office)	758-9676
	or	(home)	
	Resource Ranger	(office)	758-9676
	or	(home)	

Area #4

Report to: Little Gocse Control Room Operator

Telephone: 399-2233, or 2234

Radio: WUJ 44

Code Call: 80-111

Notify: 1.	Columbia County Fire District #1		399-2311
2.	Project Engineer	(office)	843-3796 ex. 51
	or	(home)	
	Resource Manager	(office)	758-9676
	or	(home)	
	Assistant Resource Manager	(office)	758-9676
	or	(home)	
	Resource Ranger	(office)	758-9676
	or	(home)	

APPENDIX D

FISH AND WILDLIFE MANAGEMENT PLAN

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APPENDIX D - FISH AND WILDLIFE MANAGEMENT

SECTION 1 - INTRODUCTION

1.01 Purpose.

Under provisions of Section 3 of the Fish and Wildlife Coordination Act of 1958 (P.L. 85-624), agencies administering water resource projects such as the Lower Monumental Project are authorized to conserve, maintain, and manage fish and wildlife resources and habitats. Stemming from this, the Corps of Engineers developed the LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN (U.S. Army; 1975a) to compensate for losses sustained by fish and wildlife populations in and around the lower Snake River as a result of the construction of the four lower Snake River Projects. The Water Resource Development Act of 1976 (P.L. 94-587) gave congressional approval of the plan and authorized the expenditure of $58 million for the implementation of its provisions.

The purpose of this appendix is to describe the fish and wildlife management program at this project. However, it must be remembered that the programs at all four lower Snake River Projects are the components of one large plan for fish and wildlife management on the lower Snake River. Thus, they are unavoidably interrelated and intertwined. Although the management of game species is an important function of this program, non-game species should receive equal consideration.

1.02 Physical Description of the Project.

The Lower Monumental Project is the second in a series of four run-of-the-river water resource projects on the lower Snake River. The dam has created a lake 28.7 miles long, ranging in depth from 110 feet in the forebay to 8 feet in the tailwater. The water surface amounts to 5996 acres. There are 78 miles of shoreline.

In addition to the surface area of the lake, there are 7148.8 acres of land within the project boundary. Of this land area, 48 percent (3428 acres) is allocated specifically for the development and management of the fish and wildlife resources on the project. There are six sites allocated for intensive management and nine sites allocated for moderate management practices. This wildlife management

will be conducted in accordance with the DESIGN MEMORANDUM FOR WILDLIFE HABITAT DEVELOPMENT ON PROJECT LANDS: LOWER SNAKE RIVER PROJECT (U.S. Army; 1975b). Habitat development will be conducted by the Corps of Engineers; operations and maintenance by the Washington State Department of Game.

SECTION 2 - AQUATIC HABITATS

2.01 Major Species.

a. Algae.

The algal community of the lower Snake River was sampled and analyzed between 1970 and 1972 under a joint contract with the University of Idaho and Washington State University for the Walla Walla District Corps of Engineers. In Volume 2 of the report (U.S. Army; 1973b), diatoms were listed as the dominant form of algae throughout the year. Their greatest numbers occurred in the spring; major species identified were Asterionella formosa and Cyclotella sp. The numbers of planktonic green algae did not show an increase in the summer, as expected, but remained very low in relation to the level of diatoms. Also reported was heavy growth of Spirogyra sp. (a periphytic green alga) along the shoreline of the lower Snake River and Aphanizomenon flos-aquae (a planktonic blue-green alga).

Similar results were described in a report published one year later (Johnstone and Bailey; 1974). This study was designed to evaluate the water quality at recreation areas on the lower Snake River; samples on the Lower Monumental Project were taken at Lyons Ferry State Park and Lyons Ferry Marina (Turner Bay Marina). Table 5 of the report by Johnstone and Bailey (1974) contains numbers and types of algae found at these sites. This table is quite comprehensive as it includes 14 genera of diatoms, 8 genera of green algae, and 2 genera of blue-green algae.

In 1975, another joint University of Idaho - Washington State University study was initiated, under contract for the Corps of Engineers, with the objective of describing the aquatic ecology of the lower Snake River. An interim report (U.S. Army; 1977) reaffirmed the dominance of diatoms (Asterionella formosa, Cyclotella sp., and Melosira sp.) within the algal community. This report also listed Radiofilum sp. (a planktonic green alga) and Aphanizomenon flos-aquae.

More information will be available in the final report of this latter study, which should be published soon.

b. Aquatic Macrophytes.

A preliminary study of aquatic macrophytes (U.S. Army; 1972) reported the dominance of Potomogeton nodosus (Long-leaved Pondweed) in Lake West, primarily along

the shallow areas on the north shore of the lake. The dominance of this species was confirmed one year later in another report by the U.S. Army Corps of Engineers (1973a). Also indentified were Ceratophyllum sp. and Cattail (Typha latifolia L.). The majority of vascular growth was reported along the north shore of the lake, west of the mouth of the Palouse River. Maps are included in the report identifying areas of vascular development.

As part of a comprehensive lower Snake River water quality study done by the University of Idaho and Washington State University for the Walla Walla District Corps of Engineers, the aquatic macrophytic community was sampled and analyzed. The report (U.S. Army; 1973b) identified well developed beds of Potomogeton sp. in the Palouse River arm of Lake West. It was concluded that throughout the lower Snake River there is a high potential for aquatic vascular development in shallow areas with a water depth of less than ten feet provided that there is no strong wave or current action, and the substrate is stable and other than solid rock.

In 1972, a study was undertaken by the University of Idaho under a contract with the Walla Walla District Corps of Engineers to survey the aquatic vascular flora of the Columbia and Snake River drainage basins and the coastal drainages of Washington. One of the primary objectives of this survey was to identify and describe the distribution of aquatic vascular vegetation. The report (U.S. Army; 1974) indicated the presence of Potomogeton spp., as well as P. crispus and P. pectinatus in Ayer Boat Basin. This was the only site within the Lower Monumental Project which was sampled.

In 1975, another joint University of Idaho - Washington State University study was initiated under contract for the Corps of Engineers, with the objective of describing the aquatic ecology of the lower Snake River. This report (U.S. Army; 1977) lists in decreasing order of abundance throughout the lower Snake River, Potomogeton crispus, P. nodosus, Elodea sp., and P. richardsonii. Also reported are Ceratophyllum sp., Chara sp., and Myriophyllum spicatum Var. exalbescens which were only found in the pond behind the dike at the Marmes Rockshelter site.

Although not reported in any of the above studies, there are areas of heavy aquatic vascular flora in the mouths of the Tucannon River and Alkali Flat Creek as well.

c. Zooplankton.

Zooplankton populations were found to increase between the Lower Granite and Ice Harbor Project (U.S. Army; 1977). This report lists Daphnia galeata, Bosmina sp., Cyclops vernalis, C. bicuspidatus, and Diaptomus sp. as the dominant organisms between River Mile 18 and 83.

d. Aquatic Macroinvertebrates.

Little attention has been given in the past to developing an inventory of aquatic invertebrates for any of the lower Snake River Projects. Two studies were done on the free-flowing sections of the lower Snake River prior to inundation (Edwards, et. al.; 1974 and The Institute of Paper Chemistry; 1970), however it is certain that the transformation of the Snake River from a free-flowing river into a lake resulted in drastic changes in species composition. A limnological study of the lower Snake River Projects has recently been completed by the University of Idaho and Washington State University. An interim report (U.S. Army; 1977) indicates that the lower Snake River is dominated by oligochaetes (aquatic worms), pelecypods (freshwater clams), and chironomid (blood worm) larvae. The final report should supply more detailed and complete information on aquatic invertebrate species present in the impoundments. Johnstone and Bailey (1974) reported the presence of Craspedacusta sowerbii (a freshwater jellyfish about 0.5 cm in size) in the vicinity of Lyons Ferry Marina in 1973.

e. Aquatic Vertebrates.

Several species of fish are found in Lake West. These include many anadromous species as well as several resident species. The major anadromous species include chinook, coho, and sockeye salmon, steelhead trout, and American shad. The major resident species managed are largemouth and smallmouth bass, rainbow and Dolly Varden trout, black and white crappie, yellow perch, channel catfish, white sturgeon, and mountain whitefish. Appendix C of the FINAL ENVIRONMENTAL IMPACT STATEMENT - FISH AND WILDLIFE COMPENSATION (U.S. Army; 1976a) contains a complete inventory of all fish species.

Besides fishes, there are several species of amphibians known to occur along the lower Snake River. These are listed in Volume IIIA of the INVENTORY OF RIPARIAN HABITATS AND ASSOCIATED WILDLIFE ALONG THE COLUMBIA AND SNAKE RIVERS (Asnerin and Claar; 1976). The only aquatic reptile known to occur on the lower Snake River is the western painted turtle.

The inventory cited above also indicates the presence of three species of aquatic mammals on this project. They are river otter, beaver, and muskrat. Their abundance is limited.

f. Threatened and Endangered Species.

There are no aquatic species on the Lower Monumental Project listed as either Threatened or Endangered Species by the U.S. Fish and Wildlife Service.

2.02 Water Quality.

a. Nutrient Levels.

The Snake River and its tributaries drain vast areas of agricultural land in southeastern Washington, eastern Oregon, central and southern Idaho, and northern Utah. Consequently, the water of the Snake River is very rich in nutrient material. Two reports (U.S. Army, 1973b; and U.S. Army, 1977) contain results of intensive water quality sampling done by the University of Idaho and Washington State University under contract for the Corps of Engineers.

b. Turbidity.

The results of turbidity measurements taken in the lower Snake River are included in reports by Johnstone and Bailey (1974) and the Walla Walla District Corps of Engineers (U.S. Army; 1973b). Increases in the turbidity of Lake West in the spring are caused by the growth of the floral and faunal micro-communities (SECTION 2.01-a., c.) and the extremely heavy silt loads contributed by the Palouse River. Information on sediment transported by this river may be obtained through the U.S. Geological Survey in Spokane and the Soil Conservation Service.

c. Temperature.

The temperature of the lower Snake River varies slightly between Clarkston and Pasco, Washington, ranging approximately from 38 degrees F. in the winter to 80 degrees F. in the summer. A study by the University of Idaho and Washington State University (U.S. Army; 1977) has demonstrated that exceptional mixing occurs in the Snake River and there is very little vertical stratification.

d. Further Information.

More complete and detailed limnological information will be presented in the final report of the

study referred to above, which should be published soon. Also, information is contained in Section 2 and Appendix F of the Final Environmental Impact Statement for the Lower Monumental Lock and Dam (U.S. Army; 1976b).

2.03 Anadromous Fish Management.

a. Upstream Passage Facilities.

Facilities were constructed at Lower Monumental Dam to allow upstream migration of adults and downstream migration of juvenile salmon, and steelhead. These facilities include two fish ladders which were a part of the initial dam construction (Figure 2.1). The ladder on the south shore is located adjacent to the spillways and climbs up along the side of the navigation lock. The north shore fish ladder passes through the visitor center which has underwater windows for public fish-viewing. Both of these ladders are used by adult upstream migrants en route to their spawning grounds. The ladders were not designed to pass shad, but modifications to allow shad passage were completed in 1979.

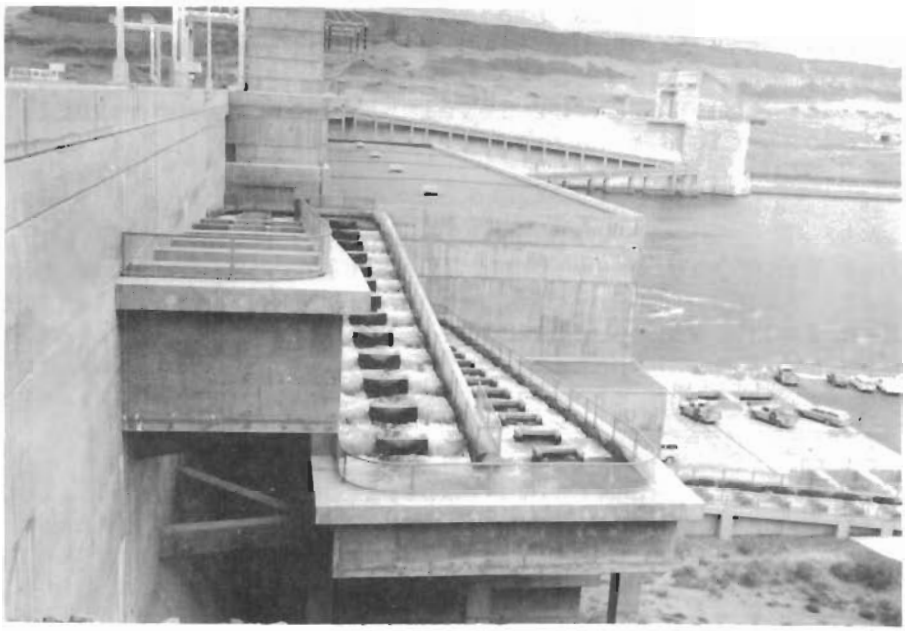

Figure 2.1 - The north shore fish ladder at Lower Monumental Dam.

Fish counters are on duty at the north shore fish counting station 16 hours per day between April and November and record the numbers of the major species that pass up the ladders. A television camera focused on the window at the south shore station transmits a live picture to the north shore station. The information collected by these fish counters is reviewed and used by the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, the Washington State Department of Game, the Washington State Department of Fisheries, the Oregon Fish and Wildlife Department, and the Idaho Fish and Game Department in managing these species. Besides the fish ladders, upstream migrants may use the navigation lock, however, it is felt that this contribution to upstream passage is negligible at Lower Monumental Dam.

Both fish ladders and the navigation lock are operated and maintained by the Operations and Maintenance Sections at the Ice Harbor-Lower Monumental Project Office. The seasonal fish counters are assigned to the Operations Section at the Lower Monumental Project. The Recreation-Resource Management Branch at the District Office provides training for fish counters and fish counter supervisors, and acts as liaison between the project and the Federal and state fisheries agencies with respect to the operation of the fish ladders. The Resources Management Sections at the project level have no responsibilities in the anadromous fish management program.

b. Downstream Passage Facilities.

Following construction, juvenile anadromous fish had only four possible routes past the Lower Monumental Dam. Two of these, the fish ladders and navigation lock, were relatively insignificant in terms of the numbers of fish passed. The other two routes, over the spillways or through the turbines, were the major downstream pathways.

Repetitive experiments demonstrated that approximately 15 percent of the fingerlings that passed through the turbines were killed, or stunned and subject to predation (U.S. Army 1975a). Since then, a number of modifications to powerhouses have been tested at the Lower Snake River Projects. At this dam, there are no facilities, such as traveling screens, to deflect fingerlings up into the powerhouse intake bulkhead slots. However, a percentage of them that enter the powerhouse intakes do find their way into the bulkhead slots where they are siphoned off into the fingerling bypass collection pipe. This pipe conducts them through the powerhouse and discharges them into the

tailrace. Once fingerling collection facilities at Lower Granite and Little Goose Dams are improved, the majority of fingerlings coming down the Snake River will be collected at these two dams and transported around Lower Monumental Dam.

Other research revealed that both adult and juvenile migrants were adversely affected by water which used to pass over the spillways and plunge deep into the stilling basin. This water became supersatured with air which gradually came out of solution and bubbled to the surface. It was shown that when fish came into contact with this water supersaturated with air, they absorbed air into their bloodstream through their gills at a rate commensurate with the supersaturated state. As the fish swam near the surface and external pressures were reduced, the air in their blood began to come out of solution, gas embolisms developed, and many of the fish were killed. Others were injured or stressed, and a percentage of these fish were lost too.

To rectify this problem, flip lips, concrete deflectors on the ogee section of each spillway, were installed in 1971 and 1974 on six of the eight spillways to deflect water out across the top of the stilling basin. This has prevented the water from plunging deep into the basin and becoming supersaturated with air.

The operation and maintenance of the fingerling bypass system and the spillways is the responsibility of the Operations and Maintenance Sections at the Ice Harbor-Lower Monumental Project Office.

c. Operation Fish Run.

The trapping and transportation program has evolved since the construction of Lower Monumental Dam and figures to be a major aspect of the downstream migration program in the future. In both 1977 and 1978, over 5.4 million chinook and coho salmon, and steelhead smolts were collected primarily by the fingerling bypass collection facilities at Lower Granite and Little Goose Dam, and from several National Fish Hatcheries. Of these fingerlings, slightly more than one percent were transported by plane from Lower Granite Dam in 1977 while 34 percent were transported by truck from both Lower Granite and Little Goose Dams. The remainder of them (65 percent) were barged

down the river past Bonneville Dam (Figure 2.2). In 1978, 29 percent were transported by truck and 71 percent by barge.

Figure 2.2 - Barges such as these play a major role in Operation Fish Run.

Operation Fish Run is a project administered by the Corps of Engineers and conducted under contract by the National Marine Fisheries Service. This contract also includes various research projects relevant to fisheries management. The primary responsibilities of the Corps with respect to this project are in the areas of program development and planning, and contract administration.

d. Research Activities.

Many studies have been done in the past concerning anadromous fish and the effects of water resources projects in this district as well as throughout the division. Three more studies are planned for 1980 and 1981.

o Re-evaluation of the Effects of Spill Patterns on Upstream Migating Fish - Upstream passage of adult salmon

and steelhead may be enhanced by differential spilling patterns. This research will be done by the Oregon Department of Fish and Wildlife and continue through 1981 under contract with the Corps of Engineers.

o Electronic Tunnel Surveillance of Fish Passage into Powerhouse Collection System - Adult salmon and steelhead may selectively use only certain of the powerhouse orifices to gain access to the powerhouse collection system. This research, to be done by the Corps, will provide information needed to increase the efficiency of the collection system.

o Evaluation of the Effects of Spill Patterns on Downstream Migrating Fish - Spill patterns may be developed to maximize passage of downstream migrating smolts while minimizing the amount of water spilled. The passage of fish over the spillways will be monitored with sonar equipment. This research will be done by the Corps.

e. Hatchery Construction.

Plans are currently underway for the selection of sites on the Snake River and along its tributaries in Washington, Oregon, and Idaho for the construction of hatcheries for the production of spring, summer, and fall chinook salmon, and steelhead trout. This is intended to compensate for the reductions in the anadromous fish runs which resulted from construction of the four dams along the lower Snake River. Although subject to modification, current requirements are for hatchery production as listed in TABLE 2.1. For a more detailed discussion of the compensation plans refer to the LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN - LOWER SNAKE RIVER, WASHINGTON AND IDAHO (U.S. Army, 1975a).

TABLE 2.1 Proposed Hatchery Production Levels

Species	No. of Smolts	Pounds of Smolts	No. of returning Adults
Spring chinook	5,830,000	388,700	50,700
Summer chinook	920,000	61,300	8,000
Fall chinook	9,160,000	101,800	18,300
Steelhead	11,020,000	1,377,500	55,100

Figure 2.3 - Fish hatcheries such as this one (Dworshak National Fish Hatchery) are to be built to compensate for reductions in anadromous fish runs in the Snake River.

t. Fishermen Access.

To compensate for the loss of 140 miles of stream-type fishing for steelhead along the Snake and Clearwater Rivers, plans are underway to acquire 750 acres (700 acres in Washington and 50 acres in Idaho) of streamside lands along such streams as the Grande Ronde, Salmon, Clearwater, Tucannon, and main Snake Rivers for assured fishermen access. Criteria have been established for the identification of desirable sites and site selection is now in progress.

2.04 Resident Fish Management.

a. General.

Prior to dam construction, resident fish species most important to anglers were smallmouth bass, channel catfish, sturgeon, and whitefish. These species, which are dependent upon a live flowing stream environment, generated an intensive sport fishery in the project area. Project completion created large, slow-moving lakes more favorable to other species (U.S. Army, 1975a).

It has been estimated that approximately 67,500 stream resident fish angler-days per year were lost due to construction of the four dams along the lower Snake River. This loss is cumulative over all four lower Snake River Projects. All management programs will be implemented to compensate for the losses over all four projects rather than attempting to compensate for the losses at each project individually.

To date, very little work has been accomplished in the area of resident fish management. There are many avenues to be explored in managing resident fish species but little progress has been made to date in determining which of these avenues to pursue. However, on 2 June 1978, the Washington State Department of Game and the U.S. Fish and Wildlife Service agreed to investigations of warm water fishery enhancement and to substituting a warm water fishery enhancement program for 50 percent of the resident trout requirements specified in the LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN (U.S. Army; 1975a) if the research demonstrates a potential for the success of such a program.

b. Hatchery Construction.

Prior to the meeting on 2 June 1978 mentioned above, the main thrust of the program to

compensate for resident fishery losses has been in the direction of constructing a hatchery capable of producing 93,000 pounds of rainbow trout annually (approximately 233,000 fish). These legal-size fish would be planted in Snake River tributaries in southeastern Washington and western Idaho. However, the present determination is to rear 45,000 pounds of rainbow trout and investigate resident fish management as follows.

c. Habitat Development.

While it is perhaps obvious to the casual observer that the filling of the lake behind the Lower Monumental Dam flooded and destroyed thousands of acres of wildlife habitat along the Snake River, it is less likely that as many people realize that the inundation of the Snake River Canyon in this area also destroyed thousands of acres of fish habitat. In most cases, spawning areas, cover, and food sources for these resident fish were reduced which undoubtedly had a significant negative impact on resident fish populations.

Therefore, any resident fish management program along the lower Snake River must incorporate projects to establish spawning areas, increase protective cover, and provide food sources. A Design Memorandum for the management of resident fish will be developed in the near future for the lower Snake River. The following paragraphs describe four types of projects which may be implemented under this program. Details can be found in the Design Memorandum.

o Development of Subimpoundments - Embayments along the shoreline of the lake which are large enough and, in other aspects, suitable for supporting resident fish populations may be separated from the lake by earth or gravel fills designed to stabilize water levels and allow fish population management. Screens over existing culverts may be used for this purpose, also, where applicable. Such subimpoundments can be used concurrently in a waterfowl management program.

In 1975, work was completed on the construction of a subimpoundment at Riparia (Figure 2.4). Since then, no management programs have been implemented here, however, work is anticipated. No plans have been finalized.

Figure 2.4 - The subimpoundment at Riparia.

During project construction, a subimpoundment was created behind the railroad right-of-way near Lyons Ferry Marina and a dike was constructed around the Marmes Rockshelter in an effort to prevent the waters of the lake from inundating the site. However, due to subsurface geologic features in the area, this effort was unsuccessful. Now it exists as a subimpoundment. The Washington State Department of Game stocks both of these subimpoundments with rainbow trout.

o Construction of Artificial Reefs and Stake Beds - The purpose of this is to provide cover for prey and predator fish and also provide production for forage fish.

o Development of Spawning Areas - This type of development will depend upon the species being managed.

o Shoreline Revegetation - Shoreline vegetation benefits fish populations by reducing shoreline erosion which results in siltation and disturbance of spawning areas. The vegetation also increases insect populations in the area, which are a major food source for the fish. The roots of shoreline vegetation exposed under the surface provide cover and the canopy provides some shade over the water.

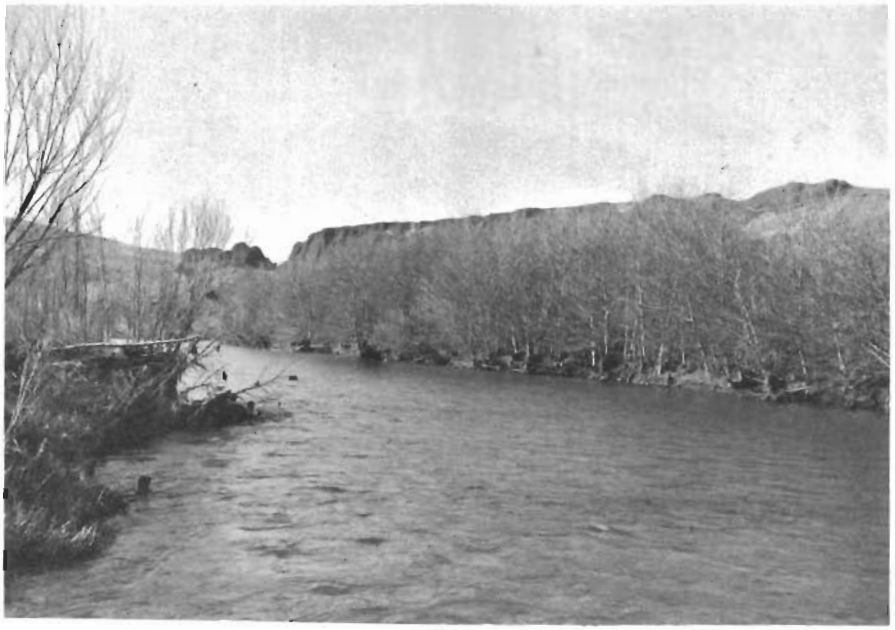

Figure 2.5 - Shoreline vegetation such as this along the Tucannon River helps to reduce erosion while also providing a source of food for fish.

A revegetation program is discussed in APPENDIX B. Its purpose is to return the shoreline of the Snake River to an aesthetically pleasing and natural condition. This program should be done in conjunction with the resident fish management program.

d. Research Activities.
No research relating to resident fish and

their management has been done since completion of Lower Monumental Dam. Several studies are needed for the development and implementation of a scientitic and effective resident fish management program. They are being considered for funding and are briefly described in this section in order of priority.

o Resident Fish Survey - This study would identify extant fish species and provide information concerning population size, age distribution, growth rates, spawning behavior, movements, habitat preferences, food habits, and the effects of lake level fluctuations on hatching success. The data on population levels, structure, and growth rates would enable Fisheries Biologists to evaluate the health of a given population and decide whether or not they need protection. This study would also provide baseline information on fish species in the large run-of-the-river water resource projects of the Northwest as well as information which would enable management of resident fish species through the control of lake level fluctuations.

o Creel Census - This study would be to measure use of the fishery resource and public interest in resident fish.

o Habitat Inventory - The purpose of this study would be to determine critical spawning, rearing, and feeding areas in each lake.

o Tributary Surveys - This study would identify tributary streams used by resident fish species for spawning, rearing, and feeding.

o Food Chain Studies - This study would include in-depth studies of aquatic food chains, including plankton, benthos, fish, etc., to establish a complete picture of the biology of resident fish in these large lakes.

e. Fishermen Access.

The access of fishermen to the lower Snake River has been vastly improved by the aquisition of land along its entire length. Extensive areas of the shoreline once privately owned are now in the public domain. In addition, boat launching facilities are now found at Devil's Bench, Ayer Boat Basin, Lyons Ferry State Park, Lyons Ferry Marina, Texas Rapids, and Riparia. These facilities provide adequate access to the lower Snake River for fishermen.

f. Stocking.

The Washington State Department of Game

stocks the subimpoundments at Lyons Ferry Marina and Marmes Rockshelter with rainbow trout.

g. Control of Water Level Fluctuations.

Fluctuations in the lake level have an adverse effect on fish species by exposing their spawning areas to air. In addition, they also have impacts on food production and cover. Some resident fish will only spawn in relatively shallow water depths. For example, perch generally spawn within two feet of the water surface and bass spawn in one to ten feet of water. Thus, operation of the lake over its entire three foot range during spawning could adversely effect both of these species.

Besides spawning depths, different species spawn at different water temperatures. Thus, by coordinating lake level fluctuations with water temperatures, the hatching success of different species may be controlled independently. For example, the hatching success of undesirable species such as carp could be severely reduced by fluctuating the lake level after these species have spawned. Conversely, the hatching success of desirable species such as bass would be enhanced by stabilizing the lake level after their spawning periods. This technique for managing resident fish populations will be seriously investigated once the resident fish survey is completed (SECTION 2.04-d.). This study will, in part, provide information concerning the effects of lake level fluctuations on hatching success.

h. Control of Undesirable Species.

In isolated cases, certain fish species may reach population levels where they compete with more desirable species or create operational problems. These undesirable species include, but are not limited to, carp, squawfish, and suckers. Carp uproot vegetation and increase water turbidity, inhibiting plant growth that would benefit most other fish as well as waterfowl. Squawfish are highly predacious and in pond and river environments, prey on desirable species. Unless the desirable species are highly predacious themselves and can hold squawfish populations in check, squawfish can seriously inhibit these desirable fish populations.

Suckers become detrimental when they, in conjunction with carp and squawfish, crowd the fish ladders during the summer months. These species can become so numerous that they not only hamper the passage of salmon and steelhead through the ladders, but also expose anadromous fish to diseases (Fujihara and Hungate; 1971).

Three methods may be used to control undesirable species.

o Piscicide Application - Rotenone or Squoxin are two chemical preparations used to help control undesirable species.

o Electrofishing Equipment - This equipment can be very effective in controlling undesirable fish in the fish ladders.

o Control of Lake Levels - As mentioned in SECTION 2.04-g., the hatching success of undesirable species such as carp could be severely reduced by fluctuating the lake level after these species have spawned.

2.05 Effects of Pest Control Program.

The effects of pesticide applications will be limited to target species only and no major effects will be incurred by aquatic species except when these species are the target species themselves. These cases would most likely include weed and insect control, and control of undesirable fish such as carp, squawfish, and suckers as mentioned in SECTION 2.04-h.

2.06 Wetlands Inventory.

As a result of the Presidental Executive Order entitled, "Protection of Wetlands" (24 May 1977), the Resource Management Section began an inventory of wetlands in 1978. This Order directs all Federal agencies to take action to preserve and protect all Federally-owned wetlands from degradation and destruction. These areas are managed in accordance with this Executive Order.

The table below lists wetland areas identified on the Lower Monumental Project. Other sites will be added as they develop and are identified.

TABLE 2.2 Wetland Inventory

Area	Shore	River Mile	Approx. Acreage
Ayer Boat Basin	S	51	10
Lyons Ferry Marina Pond	S	59	10
Palouse River Canycn	N	59	20
Tucannon River	S	63	70
Riparia	N	68	40

Figure 2.6 - Lyons Ferry Marina Pond

SECTION 3 - TERRESTRIAL HABITATS

3.01 Major Species.

a. General.

While the Corps of Engineers has management responsibilities with respect to all wildlife species found on the project, it is certain that, for a variety of reasons, the major management effort will be directed at enhancement of Canada goose and upland game bird populations. However, it is important to recognize that most development and management which benefits these species will also benefit other species.

The following paragraphs contain a brief description of wildlife species occurring on the lower Snake River. A detailed listing of wildlife species occurring in this area is found in Volume IIIA of INVENTORY OF RIPARIAN HABITATS AND ASSOCIATED WILDLIFE ALONG THE COLUMBIA AND SNAKE RIVERS (Asherin and Claar; 1976).

b. Amphibians and Reptiles.

There are several species of amphibians and reptiles including salamanders, frogs, toads, and lizards found in the lower Snake River area. Only one turtle species, the western painted turtle, occurs here. Seven species of snakes are known to occur in the lower Snake River area, however, the northern Pacific rattlesnake is the only venomous species. A Washington State University study surveyed the rattlesnake population in the Palouse River Canyon between Lyons Ferry State Park and Palouse Falls (Kardong; 1974).

c. Birds.

Approximately 170 species of birds are listed as occurring on the lower Snake River area. While some of these species are common throughout the year, others can only be found at certain times of the year and then only rarely. Geese and ducks are common, as are upland game birds. The golden eagle and numerous species of hawks are found in this area. The prairie falcon, once classified by the U.S. Fish and Wildlife Service as "threatened," nests along Lake West.

The National Audabon Society's Blue List contains several species found on the Lower Monumental, Little Goose, and Lower Granite Projects. This list identifies species that are declining in numbers. Among

these species are the prairie falcon, marsh hawk, American kestrel, and barn owl, of which all are known to nest on this project, and the great blue heron. Swainson's hawk, osprey, Cooper's hawk, loggerhead shrike, and western grebe are also on the Blue List but are uncommon visitors to the area. The bald eagle, which is classified by the U.S. Fish and Wildlife Service as "threatened" in the State of Washington, is a rare visitor to the Lower Monumental Project as well.

d. Mammals.

About 55 different species of mammals are known to occur in the Lower Snake River Project area. The larger mammals include mule deer, white-tailed deer, bobcat, and coyote. Intermediate-sized mammals include the badger, beaver, yellow-bellied marmot, mink, muskrat, river otter, porcupine, black-tailed jackrabbit, mountain cottontail, raccoon, skunk, and weasel. There are also numerous small rodents and eight species of bats.

e. Threatened and Endangered Species.

There are no terrestrial species classified as "endangered" by the U.S. Fish and Wildlife Service which are known to occur on the Lower Monumental Project. The prairie falcon was classified as "threatened" and is known to nest in the Palouse River Canyon as well as along the Lake West. A wildlife inventory reported seven nesting territories occupied by this species on the Lower Monumental Project (Asherin and Claar; 1976). The Palouse River Canyon is managed as a natural area, in part, to protect this species (APPENDIX A, SECTION 4.04).

The Palouse River Canyon is being recommended for study by the Department of Interior for its potential listing as critical habitat for the peregrine falcon. However, this species was not reported in the wildlife inventory by Asherin and Claar (1976).

3.02 Soils.

The construction of the Lower Monumental Dam and the filling of the lake covered the rich alluvial bottomland soils along the Snake River. Shallow soils (less than one foot) do occur on some of the gentler slopes, and some of the benches along the shoreline have soils of moderate depth (from one to three feet). However, deep soils (greater than three feet) are rare and are found primarily as alluvial deposits in some of the small canyons and embayments along the shore of the river.

There are five soil associations in the Lower Monumental Project. These are briefly described in APPENDIX B (SECTION 2.02). Additional descriptions of the soils of this area are contained in the Final Environmental Impact Statement for the Lower Monumental Lock and Dam (U.S. Army, 1976b) and Appendix F of the Design Memorandum for wildlife habitat development (U.S. Army, 1975b). Accurate mapping and detailed descriptions of the physical properties and limitations of the various soil series are available from the Soil Conservation Service (SCS), U.S. Department of Agriculture.

3.03 Vegetation.

Natural vegetation on most upland areas surrounding Lake West is sparse and low growing, due to semi-arid conditions and generally shallow soils. In isolated areas where deep alluvial soils border streams, a riparian vegetation of trees and shrubs grows profusely and luxuriantly.

The Lower Monumental project land is dominated by the Agropyron spicatum (Bluebunch wheatgrass) - Poa secunda (Bluegrass) community. A complete, detailed inventory of vegetative communities along the lower Snake River is found in Volumes IIIA and IIIB of the INVENTORY OF RIPARIAN HABITATS AND ASSOCIATED WILDLIFE ALONG THE COLUMBIA AND SNAKE RIVERS (Asherin and Claar; 1976).

3.04 Public Use.

a. Consumptive.

Consumptive activities such as hunting, fishing, and trapping are by far the primary uses of project lands allocated specifically for the development and management of fish and wildlife resources. However, such activities are allowed only if commensurate with management objectives and state game regulations. The CODE OF FEDERAL REGULATIONS (Title 36, Section 327.8) states that hunting, fishing, and trapping are permitted on project land in accordance with applicable Federal, state, and local laws except in areas designated by the District Engineer.

The primary responsibility for regulating hunting, fishing, and trapping on the Lower Monumental Project lies with the Washington State Department of Game. Their regulations are issued annually. On the Lower

Monumental Project, waterfowl hunting in the past, has been prohibited within one-half mile of the Snake River in Franklin and Walla Walla County and within one-quarter mile of the river in Whitman and Columbia County. Also, hunting is not allowed on land at Lyons Ferry State Park and in the Palouse Canyon Natural Area which is leased to the State of Washington Parks and Recreation Commission (DACW68-1-71-104).

Enforcement of game regulations is the responsibility of Wildlife Agents employed by the Washington State Department of Game. Section 4 describes in more detail the relationship between these agents and the Corps' resource management personnel. Besides the Wildlife Agents, local county sheriffs and the Washington State Patrol are authorized to enforce game laws on project land.

According to visitation data from 1978, less than one percent of visitors to the Lower Monumental Project hunted while 16 percent fished.

b. Non-Consumptive.

In addition to the consumptive activities discussed above, fish and wildlife management lands are also open to such non-consumptive activities as hiking, backpacking, primitive camping, birding, environmental education, and wildlife photography. It is difficult to assess, however, the extent of participation in these activities on fish and wildlife management areas and natural areas since visitor use data is only collected at recreation sites.

3.05 Habitat Development and Maintenance.

The development of wildlife habitat is authorized under provisions of the LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN (U.S. Army; 1975a) in an attempt to replace inundated riparian habitat. Supplement No. 1 to the DESIGN MEMORANDUM FOR WILDLIFE HABITAT DEVELOPMENT (U.S. Army; 1978) outlines a $7,060,000 program for the entire lower Snake River wildlife compensation area which began in FY 1978 and will continue through FY 1981. Of that amount, approximately $1,380,000 is scheduled to be spent during this period on the Lower Monumental Project.

The supplement lists nine sites on this project where some form of development is planned, but intensive habitat development is planned at only two sites: Skookum (North Shore, River Mile 48) and Fifty-five Mile (North

Shore, River Mile 55). Both of these sites are accessible only by boat.

Development of these two sites will include the following components: barbed wire fence, bird cisterns, nest boxes, nesting platforms, meadows, pastures, fields, trees and shrubs, irrigation, and annual food plots. TABLE 2 of the supplement lists the components that are planned at each site. For more detailed information of the plans for wildlife habitat development, refer to the supplement referenced previously.

In addition to the habitat development program, a program will be developed to stock wildlife areas with game farm birds. However, effective and successful habitat development will reduce the need for stocking. The details of this program are not yet completed.

Most, if not all, of the habitat development will be accomplished by contract. Contract fencing was started in 1978 with the construction of 19.3 miles of fence along the project boundary and cattle watering corridors, and contracts are being drawn up for the procurement of plant materials and gallinaceous guzzlers and for the installation of irrigation systems.

The operation and maintenance of the wildlife management areas will be accomplished through contract with the Washington State Department of Game. Duties will initially include watering recently planted areas and controlling noxious weeds and expand to include mowing pastures, seeding annual food plots, and development of selected moderate development areas. Also included are incidental repairs of equipment and structures and fence. This work will be done in accordance with the Design Memorandum for the operation and maintenance of wildlife management areas. The Wildlife Biologist in Operations Division at the District Office will serve as the Contract Officer's Representative. Resource personnel in the field will be responsible for inspection of contract work.

On lands managed by the Corps, routine management practices should be followed which benefit wildlife. For example, brush piles should be left to provide cover for rabbits and other small mammals and dead trees should be left standing, unless they represent a safety hazard, to provide nesting habitat and food sources for birds.

3.06 Effects of the Pest Control Program.

The pest control program is discussed in APPENDIX A (SECTION 11). The effects of pesticide applications will be limited to target species as much as possible. Open field mowing to control noxious weeds can be very detrimental to upland game birds and waterfowl if accomplished prior to their hatching period. This result can be reduced somewhat if either mowing is delayed until after hatching or the area is walked before mowing.

3.07 Effects of the Vegetation Management Program.

The revegetation program discussed in APPENDIX B will be coordinated with Biologists in the District Office so that benefits to wildlife may be achieved along with the primary objectives of this program. Species of value to wildlife will be utilized whenever possible.

3.08 Research Activities.

Under authority of the DESIGN MEMORANDUM FOR WILDLIFE HABITAT DEVELOPMENT (U.S. Army; 1975b), a study will be conducted under contract with the Washington State Department of Game for the evaluation of wildlife habitat development. This study, which will span a twenty-five year period, will attempt to evaluate plant and animal responses before, during, and after development. The objectives of this study are:

o to determine the amount of change within selected animal populations such as deer (mule and white-tailed), ring-necked pheasants, gray partridges, chukar partridges, California quail, mourning doves, and waterfowl (ducks and geese), occurring as a result of habitat development.

o to determine the response of selected animal and plant populations to the specific methods being implemented to accomplish wildlife compensation (i.e., fencing; goose nesting structures, gallinaceous guzzlers, meadows and pastures, etc.)

o to provide technical information that can be used in evaluating the wildlife habitat development plan, and writing and evaluating the wildlife habitat operation and maintenance plans.

SECTION 4 - COORDINATION WITH OTHER AGENCIES

The following is a list of the major organizations who are involved in the planning and management of fish and wildlife resources:

U.S. Environmental Protection Agency
U.S. Department of Commerce
National Marine Fisheries Service
U.S. Department of Interior
U.S. Fish and Wildlife Service
Washington Department of Game
Washington Department of Fisheries
Washington Department of Ecology

In addition to these agencies, project personnel should maintain good relations with local community sportsman's organizations as well as those groups concerned with fish and wildlife and environmental conservation to promote a spirit of cooperation and understanding with the Corps.

The Washington Department of Game has the primary responsibility for regulating hunting on the Lower Monumental Project. Their regulations are issued annually. Although resource management personnel are not authorized to enforce these regulations they are familiar with them and report violations to the local Game Department Wildlife Agent.

The procedures for contacting them differ with respect to the urgency of the situation. In matters where prompt attention is required, one should contact the Washington State Patrol which, in turn, can quickly contact the proper agent by radio. When a violation is detected in the field away from a public phone, the Control Room Operator should be contacted by radio so he can then relay the information to the State Patrol. In less urgent cases, one may contact the agent directly by phone as soon as possible. The Wildlife Enforcement Directory contained in this section contains the names and areas of jurisdiction of the local Wildlife Agents and home telephone numbers of these agents as well as the Washington State Patrol.

WILDLIFE ENFORCEMENT DIRECTORY

Washington State Patrol	
Franklin County (Kennewick)	783-6102
Walla Walla County (Kennewick)	783-6102
Whitman County (Spokane through Colfax)	397-2831
Columbia County (Kennewick)	783-6102
Washington Department of Game - Wildlife Agents	
Franklin County	
Jim McColgin (Kennewick)	783-3867
Walla Walla County	
Regional Office (Walla Walla)	527-4368
Ken Woltering (Walla Walla)	529-0164
Whitman County	
Steven Dauma (Pullman)	332-3134
Columbia County	
Morris Owen (Dayton)	382-4879

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SECTION 6 - FUNDING

The funding required for development described in this appendix will come from the $58 million appropriated by Congress under the LOWER SNAKE RIVER FISH AND WILDLIFE COMPENSATION PLAN. Funds for the operation and maintenance of fish and wildlife developments will come from the regular project O & M budget. However, since development outlined in this plan has not been completed, the O & M costs cannot be estimated at this time.

APPENDIX E

SAFETY PLAN

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APPENDIX E: PROJECT SAFETY PLAN

SECTION 1 - INTRODUCTION

The main concern of the Resource Management Section at both the project and the district level is to insure the safety of project employees and visitors to the project. The primary purpose of the Project Safety Plan is to describe current practices that protect the visiting public and project employees. The scope of this plan includes the safety of the general public while using the lake and visiting project lands and structures as well as the safety of Resource Management Section personnel and contractors.

Furthermore, the Project Safety Plan identifies common, recurring and potential hazards, unsafe conditions and practices. These are accompanied by suggested preventative and corrective measures.

SECTION 2 - VISITOR SAFETY

2.01 General.

All restrooms, day-use areas, parking areas, boat ramps and docks, swimming areas, and potable water systems are maintained in a condition which provides a safe and healthful environment for visitors using them. The maintenance of these facilities is described in SECTION 9 (APPENDIX A).

2.02 Dam.

Vehicular traffic across the dam is permitted during daylight hours, according to the schedule below. Speed is limited to ten miles per hour. A small parking area on the dam is located adjacent to the project office entrance.

March - April	7:00 A.M. - 8:00 P.M.
May - August	5:00 A.M. - 10:00 P.M.
September - October	6:00 A.M. - 8:00 P.M.
November - February	7:00 A.M. - 6:00 P.M.

Visitors are permitted to walk across the top of the dam during daylight hours. Handrails and barriers are adequate for visitor protection.

2.03 Powerhouse.

Visitors are restricted in the powerhouse to the visitor center on the north shore and the administrative offices. Normally, these areas are relatively hazard-free. Trash containers are provided for solid waste and are emptied daily by the project maintenance staff. All walkways are kept free of mud, dirt, snow, ice, grease or other materials and obstructions which would create hazardous footing. Non-skid materials are used on surfaces that are inherently slippery. Sturdy handrails are provided along stairways. The entrance and doorways are kept unobstructed at all times. Dangerous obstructions in accessways are clearly marked. Stairways, entrances, walkways, the exhibit rooms, and the offices are adequately illuminated. Lighting intensities conform to specifications in EM 385-1-1, Section IX, paragraph 09.A.03. Exit lights are continuously illuminated.

2.04 Navigation Lock.

The navigation lock is safely operated in accordance with the NORTH PACIFIC DIVISION NAVIGATION LOCK STANDARD OPERATING PROCEDURE FOR SNAKE AND COLUMBIA RIVERS. This guide conforms to navigation lock regulations contained in Title 33 of the CODE OF FEDERAL REGULATIONS (Section 207.718). These two sources provide for the safety of boaters using the lock. Project brochures contain simple instructions for safe locking procedures.

Spectators must remain behind the concrete barriers and fences surrounding the lock provided for their safety.

2.05 Marinas.

Lyons Ferry Marina is the only marina on the Lower Monumental Project. It is part of a 37 acre tract leased to the Port of Columbia which, in turn, has a concession agreement with a third party for the operation of the park including the marina.

The safety of the public at the marina is the responsibility of the lessee. Open flame in the vicinity of the gas dock is strictly prohibited. The docks, crib walls, and moorage are kept free of tripping hazards. Visitors must remain clear of the boat hoist during operation and swimming is prohibited throughout the marina.

2.06 Leased Areas.

Only two areas on the Lower Monumental Project are leased for public recreation: Lyons Ferry State Park and Lyons Ferry Marina. The former is leased to the Washington State Parks and Recreation Commission while the latter is leased to the Port of Columbia.

At both of these areas the lessee has the primary responsibility for the health and safety of the public on their land. Health and safety standards for facilities at leased areas should meet or exceed those standards at Corps-operated areas as described in this section.

Compliance inspections are conducted annually at Lyons Ferry State Park and Lyons Ferry Marina by Real Estate Division. During these inspections, unsafe or hazardous conditions are reported. In addition, resource personnel must remain alert at all times while in the field and report

all health and safety hazards and unsafe situations and practices at these areas to the Resource Manager.

2.07 Terrain Hazards.

Water and wave action continually saturate and undercut banks and slopes along the shoreline, and until beaches or slopes are sufficiently established against such water action, slopes will occasionally fail. People using the lake should be cautioned to stay clear of these slumping and overhanging areas, as they are unstable and could collapse without warning. Slopes prone to slumping, overhangs, cliffs, pits, and holes should either be fenced to prevent visitor access or signed to warn the public. Presently, no serious threats of this type are realized.

2.08 Public Information.

Signs should be installed in locations where hazards exist and cannot be practically avoided. Also, any brochures or pamphlets available from safety-oriented organizations such as the American Red Cross, local fire districts, law enforcement agencies, and the U.S. Coast Guard should be obtained and made available to the public along with project brochures at suitable locations.

Safety posters and pertinent information will be posted on kiosks which are planned for recreation areas at Devil's Bench, Ayer Boat Basin, Texas Rapids, and Riparia. These kiosks are discussed in more detail in SECTION 5 (APPENDIX A).

2.09 Law Enforcement.

Law enforcement on project land is provided by a variety of Federal, state, and local law enforcement agencies. The Corps relationship with these agencies is discussed in SECTION 10 (APPENDIX A). In addition to these agencies, protection is offered the public through Title 36 of the CODE OF FEDERAL REGULATIONS (Part 327). Enforcement of these regulations is accomplished by resource personnel with citation authority. This subject is thoroughly covered in SECTION 10 (APPENDIX A).

2.10 Inspection and Surveillance.

All project personnel should be alert during the course of their normal duties for potentially hazardous health and safety situations in accordance with the standards outlined in this appendix. If the situation cannot be remedied at the time it is detected, then either a sign should be installed to warn people or the area should be roped off to prevent visitor or employee access.

SECTION 3 - EMPLOYEE SAFETY

3.01 Tools and Equipment.

Tools and equipment are operated in a safe manner in accordance with the manufacturer's operating instructions and EM 385-1-1. In addition, they are kept in good working condition to eliminate danger to the user. Defective power tools and safety gear are removed from service. The use of the right tool for the right job is strictly adhered to in all work performance. Overloading or placing tools under unreasonable stress is avoided. Proper shields, guards, and goggles of the recommended shade for filtering are used in drilling, grinding, chipping, and welding. All electrical tools and extension cords are of the three-conductor type.

When work is being performed overhead, tools not in use are secured. Equipment and tools conveyed in vehicles are also secured. All tools are stored in designated racks or holders when not in use.

3.02 Protective Apparel.

In accordance with EM 385-1-1, goggles, gloves, aprons, respiratory equipment, safety shoes, and foul weather gear are worn by all employees who are engaged in work which requires such protection. Safety hats, Class B, are worn by all employees in working situations. Protective leg chaps are worn by personnel when operating chain saws.

3.03 Pesticides.

This topic is discussed thoroughly in SECTION 11 (APPENDIX A).

3.04 Flammable Liquids.

Flammable liquids (i.e., paint, thinner, solvents, petroleum products, etc.) are handled in accordance with EM 385-1-1 (Sections XII and XIX), the Occupational Safety and Health Act of 1970 (P.L. 91-596), all applicable Federal and state laws, and county ordinances, and common trade techniques. Smoking and open flames are prohibited when handling these materials.

3.05 Instruction and Training.

Requirements for the training of employees in safe working procedures are contained in Section I of EM 385-1-1 and the Occupational Safety and Health Act. All employees receive initial instructions in methods of performing their duties in a safe manner. They also are acquainted with the project safety program. EM 385-1-1 requires at least one regularly scheduled safety meeting each month for all supervisors and at least one each week for all employees conducted by field supervisors or foremen. Minutes of all safety meetings should be kept and copies are sent to the District Safety Office.

All motor vehicle operators must pass a written and driving test when applying for their driver's license. Boat operators are trained in boating safety and pass a written as well as practical examination. Pesticide application is performed only by trained employees. Training requirements are specified in SECTION 11 (APPENDIX A). These training courses cover safe handling and application procedures.

At the Ice Harbor-Lower Monumental Project Office, all permanent employees have first aid training. At the Lower Granite-Little Goose Project Office, at least half of the permanent employees have first aid training. The remaining employees are scheduled for first aid training during the winter of FY 1979.

Bulletin boards are located throughout the project which display safety posters and other pertinent safety information.

SECTION 4 - GENERAL SAFETY PROGRAM

4.01 Safety Officer.

In accordance with ER 1130-2-400 (paragraph 8b.) the Resource Manager at each project appoints a member of the project staff as Project Safety Officer. At the Ice Harbor-Lower Monumental Project Office, the Project Engineer is the Project Safety Officer; the Assistant Resource Manager assumes this role at the Granite-Goose Project Office. This individual is responsible for developing plans and programs designed to implement and enforce pertinent provisions of EM 385-1-1, as well as regulations in the 385 series and requirements related to accident prevention. Guidance and assistance is available from the District Safety Office.

4.02 Accident Reporting.

All resource management personnel report all accidents and injuries directly to their supervisor. It is the responsibility of the supervisor to submit ENG Form 3394 Mishap Report in all cases involving Corps employees, contractors' employees, and visitors. Guidelines for completing this form are contained in OCE Supp 1 to AR 385-40, Appendix F (30 July 1977). Supervisors are responsible for investigating all accidents to determine if measures can be developed to prevent similar mishaps.

4.03 Safety Equipment.

There are fire extinguishers and first aid kits located at the dam and in some project vehicles. In addition, fire hoses are located at the dam. All resource management personnel are familiar with the operation of all the above equipment.

4.04 Contractor Safety.

All rules and regulations that apply to resource management personnel apply equally to contractors working on project land. Inspections are made at least weekly by the contractor to insure safe working conditions. Casual irregular inspections are performed by Contracting Officers' Representatives to insure that safety standards are adhered to by the contractor.

4.05 Fire Safety.
This topic is discussed in detail in APPENDIX C.

4.06 Traffic Safety.
Vehicular traffic is restricted to project access roads and state and county roads which pass through project lands. The state highways are maintained by the Washington State Department of Highways and the county roads are maintained by the appropriate county authority. Project roads however, are the responsibility of the Resource Management Sections.

Project roads generally provide access to public use areas and project operations facilities. They are designed for safe, low speed traffic flow. Guard rails are located where necessary. Striping and signing of project roads is done in accordance with the MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (EM 1110-2-400) and the NORTH PACIFIC DIVISION SIGN MANUAL. Copies of both documents are retained in the project office.

All project roads are maintained in a safe condition. Gravel roads are graded, paved roads are resurfaced, and traffic control lines on all paved roads are repainted as necessary. Signs are requisitioned from the Division Sign Shop. The safe operation of vehicles on project roads is insured through enforcement of motor vehicle laws by the local county sheriffs and through enforcement of Section 327.2 of Title 36 of the CODE OF FEDERAL REGULATIONS by resource personnel with citation authority.

Parking areas are provided for vehicle parking at all the public use areas and project operations facilities. Gravel lots are graded, paved lots are resurfaced, and parking lines are repainted as necessary. Guard posts, wheel stays or other barriers are installed in areas where there is a danger of vehicles accidently rolling over embankments or into developed areas.

4.07 Boating Safety.

a. Boating Rules.
All boats and boaters, including Corps boats and operators, must conform to applicable Federal and state laws, and county ordinances. In addition,

Section 327.3 of Title 36 of the CODE OF FEDERAL REGULATIONS applies to all boaters using the Lower Monumental Project. Enforcement of this regulation is the responsibility of resource personnel with citation authority. The Coast Guard enforces their regulations while county sheriffs enforce state laws and county ordinances.

Within the vicinity of boat launching areas, tie-up and handling docks, floating moorage, swimming areas, and the navigation locks, boats are operated at a "no wake" speed. In general, nonmotorized craft and barges have the right-of-way. The swimming area at Lyons Ferry State Park is off-limits to boating and is clearly marked by a floating boom.

Boating is also prohibited in the forebay of the dam in front of the spillway gates and the powerhouse. This area is designated by a series of buoys. The area between the downstream end of the navigation lock wing wall and the dam is designated a hazardous boating area (Figure 4.1). Although boating is not prohibited here, at times it can be very hazardous (i.e., when spillway gates are open) and boaters should be reminded to exercise caution.

b. Safe Boating Programs.

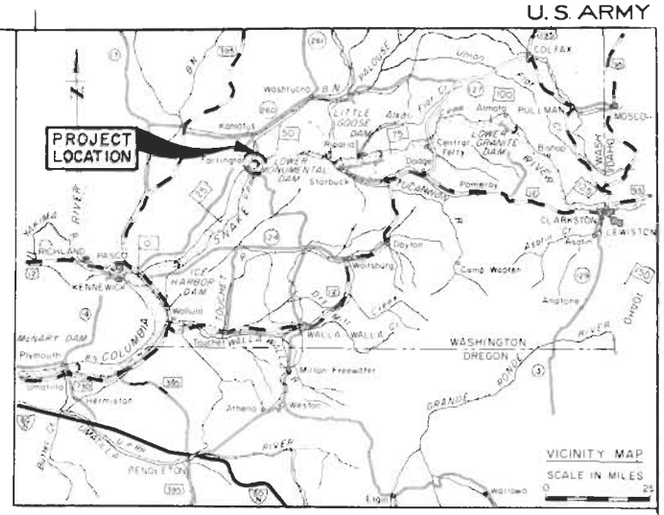
The project offices participate in activities in conjunction with National Safe Boating Week each year. These activities are coordinated with the local Coast Guard Auxiliary. Safe boating information is available from the local Coast Guard offices and is kept in supply for distribution to the public. Boating safety posters may be displayed on a bulletin board or kiosk at each recreation area. Project recreation pamphlets and brochures contain safe boating messages and information.

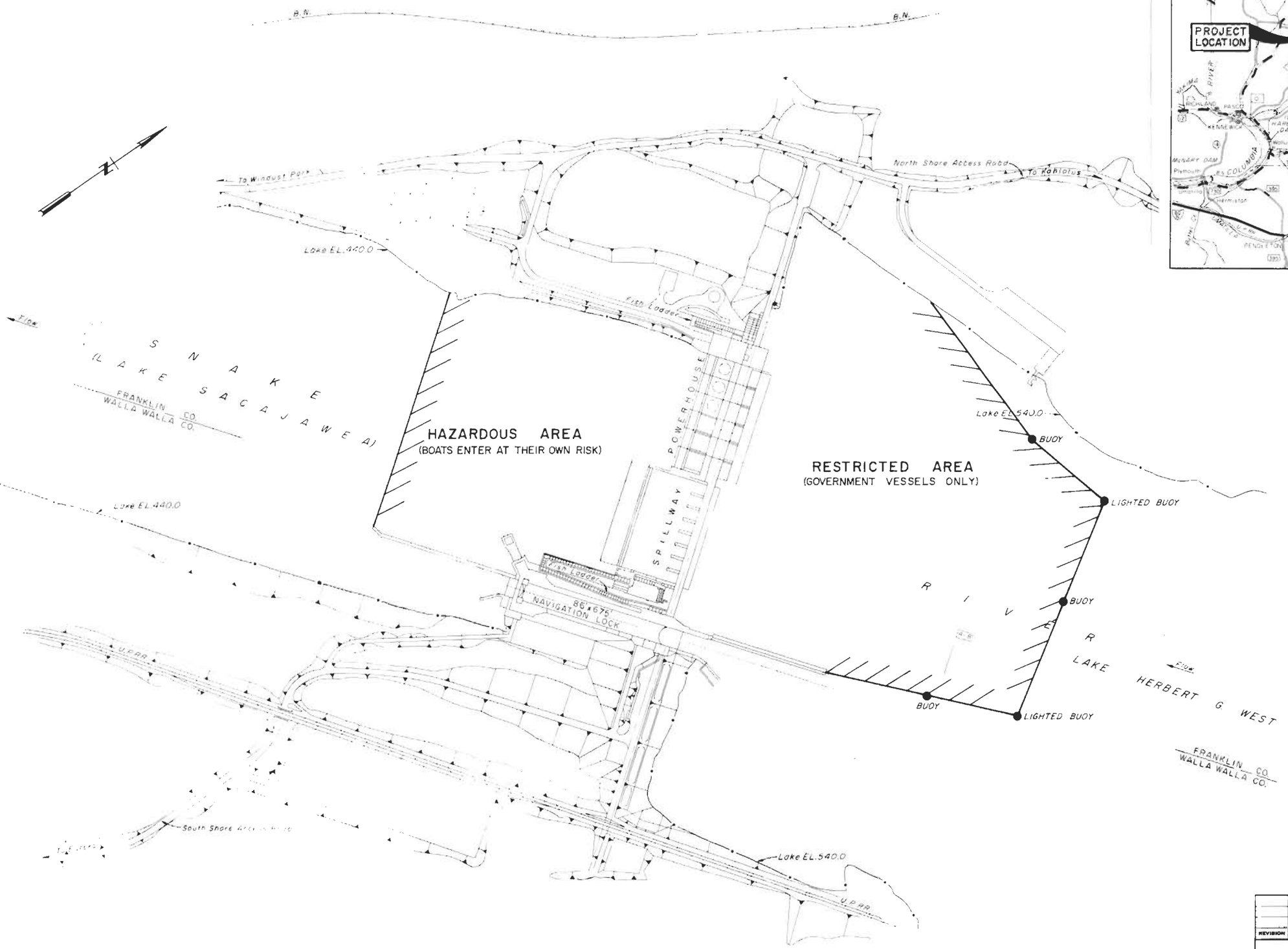
c. Floating Debris.

Floating debris in the reservoir represents a hazard to boaters. However, if boat operators are attentive, many collisions with large debris may be avoided. Debris is removed annually under contract at the Lower Granite Project. This diminishes the hazards in Lake West significantly.

d. Storm Warnings.

The United States Weather Service's weather forecasts are broadcast regularly over commercial radio stations. In addition, weather forecasts are disseminated by the National Weather Service over the Maritime Band at 162.55 MHz.





NOTE
Compiled from U.S.C.E. Mapping & Aerial Photography dated March 1974.

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REVISION	DATE	DESCRIPTION	BY

U.S. ARMY ENGINEER DISTRICT
WALLA WALLA, WASHINGTON

DESIGNED B. Dolz
DRAWN Graham
CHECKED Flanagan
SUPERVISED
OUTDOOR REC. PLANNER

LOWER MONUMENTAL LOCK AND DAM
LAKE HERBERT G. WEST
SNAKE RIVER, OREGON, WASHINGTON AND IDAHO

RESTRICTED AND HAZARDOUS BOATING AREAS

SUBMITTED
CHIEF, RECREATION RESOURSE MANAGEMENT BRANCH

DATE
COLONEL, C.E. DISTRICT ENGINEER

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SHEET

CHIEF, OPERATIONS DIVISION

4.08 Pollutant Spills.

In order to provide an orderly procedure for fast, effective responses to all liquid spills, to minimize the danger to life and property, and to facilitate a speedy containment of the spilled material, the Emergency Operations Planner at the District Office is preparing standard operating procedures for combating pollutant spills at the Lower Monumental Project. These procedures begin with the designation of the On-Scene Coordinator (OSC). This employee assumes control at the spill scene and coordinates activities until the arrival of an OSC from the Environmental Protection Agency or the U.S. Coast Guard.

On the lower section of the project, downstream from the Joso Bridge, the Resource Manager of the Ice Harbor-Lower Monumental Project Office is the OSC. These responsibilities are assumed by the Assistant Resource Manager of the Granite-Goose Project Office on the upper section of the project. All project personnel should be familiar with the standard operating procedures for combating pollutant spills and a review of these procedures should be conducted at least annually by the OSC.

All spills of pollutants must be reported immediately to the OSC. Following this, actions may be taken by project personnel at the spill scene prior to arrival of the OSC which include: (1) attempting to locate and stop the discharge of the pollutant, (2) taking photographs of the spill scene with color film, if possible, and (3) collecting samples of the pollutant both from the source and the spill.

4.09 Pest Control.

Generally, there are no plant or animal pests on the Lower Monumental Project that pose a serious threat to the safety of employees or visitors. A more complete discussion of this topic is contained in SECTION 11 (APPENDIX A).