CZES Coastal Zone and Estuarine Studies

Survey of Fish Protective Facilities at Water Withdrawals on the Snake and Columbia Rivers Phase II

by
George A. Swan

June 1981

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CONTENTS

INTRODUCTION

The impact of expanded water withdrawal on populations of anadromous and resident fishes in the Columbia Basin continues to be a major concern to fisheries agencies. Fish protective facilities are required by the U.S. Army Corps of Engineers (CofE) as a condition for permits to install and operate water withdrawals on navigable waters. Surveys by various fisheries agencies were conducted in 1973[1/], 1975[2/], and 1979 (Swan et al. 1980). Discrepancies (inadequate fish protective facilities) noted at some sites indicated a definite need for further study to assess the impact of present and future water withdrawals, a continuing inspection program, and enforcement of established fish screening criteria.

Mesh size (clear opening), screen condition, and water velocity through the screens are of primary interest because salmonid fry and fingerlings migrate past these sites on the Snake and Columbia Rivers. In addition, early life stages of resident fishes are often found in areas where water withdrawal intakes are located. Obviously, if screening criteria for a large number of intake structures were not met (e.g., mesh size opening too large, intake velocities too high, or screening poorly maintained), losses of young fish could be serious.

[1/]Fish Commission of Oregon, 1973. FCO-OWC PUMPING STATION SURVEY. Unpublished manuscript, 10 p., Oregon Department of Fish and Wildlife, 506 S.W. Mill, Portland, Oregon.

[2/]U.S. Fish and Wildlife Service, 1975. COLUMBIA RIVER IRRIGATION PUMPING PLANT FISH SCREEN INVESTIGATION. Unpublished manuscript, 15 p., Division of River Basin Studies, Fish and Wildlife Service, 919 N.E. 19th Ave., Portland, Oregon, 97232.

Federal and state agencies have established criteria for the open area of screening material and the flow velocities at intakes. Although there are some differences between agencies regarding criteria, the National Marine Fisheries Service's (NMFS) criteria for salmonid fry calls for a maximum clear opening of 0.14 inch and a maximum approach velocity of intake water immediately in front of the screen of 0.5 fps.[3/] These criteria were used as the baseline for our inspections of the fish protective facilities. Complete NMFS fish screening criteria are presented in Swan et al. 1980.

A survey and inventory of fish protective facilities at water withdrawals on the Snake and Columbia Rivers was conducted in fiscal year 1979 (Swan et al. 1980) as Phase I of a two-phased study conducted by NMFS with funding provided by the Bonneville Power Administration. The study provided for a survey of all known water withdrawals on the main stem Columbia River from Bonneville Dam to Wells Dam, and on the main stem Snake River from its confluence with the Columbia River to Lewiston, Idaho, (Figure 1). It was intended to serve as a baseline for a subsequent evaluation of fish protective facilities at water withdrawal sites--Phase II.

The objectives of Phase II were to: (1) identify migration routes and fish distribution in selected water withdrawal areas, (2) determine if fish protective facilities for juvenile salmonids and resident fish at water

[3/]National Marine Fisheries Service, NMFS FISH SCREENING FACILITY CRITERIA. Unpublished manuscript, 1 p., Environmental and Technical Services Division, NOAA, National Marine Fisheries Service, Northwest Regional Office, P.O. Box 4332, Portland, Oregon, 97280.

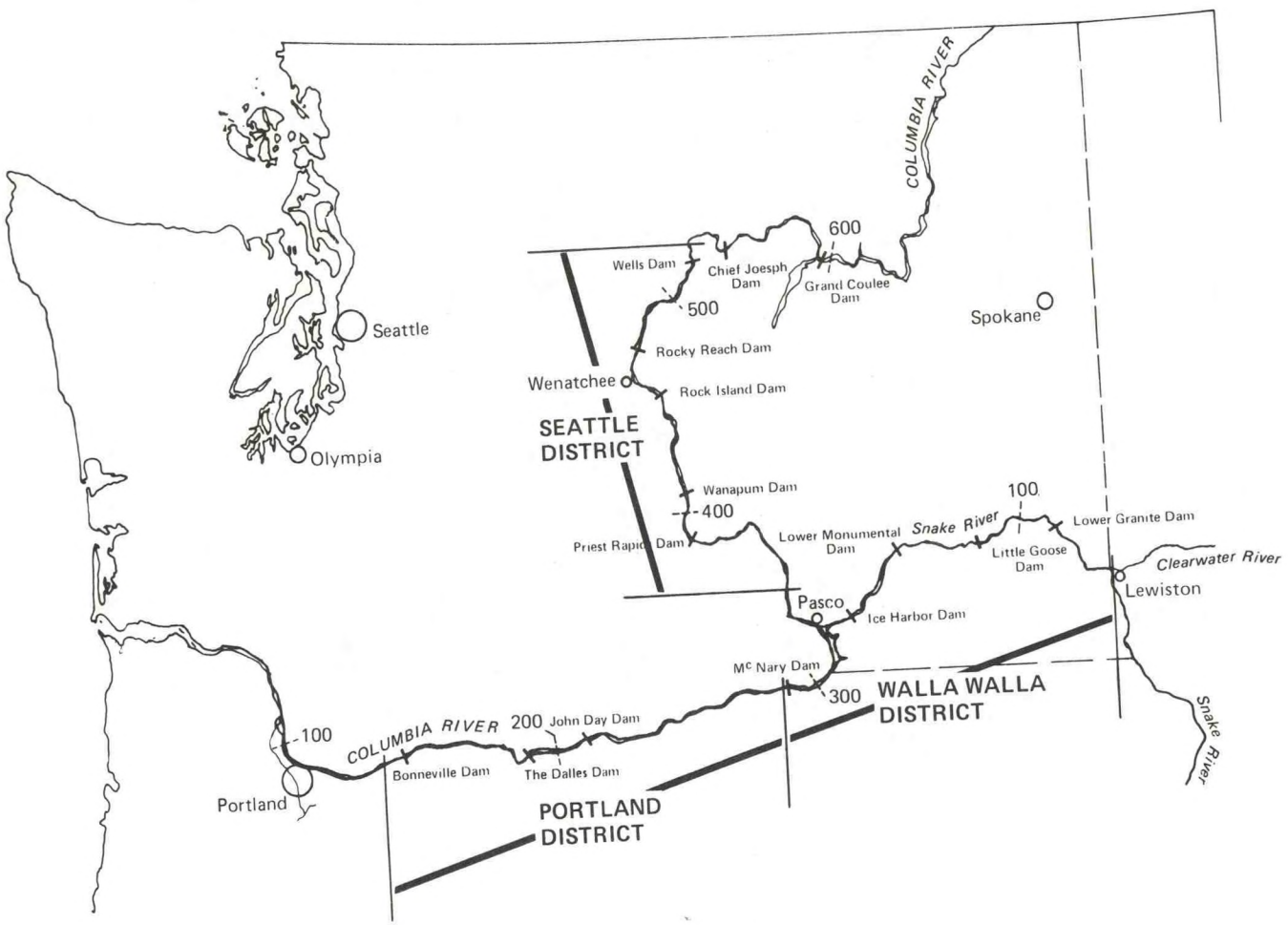

Figure 1.--The portions of the Columbia and Snake Rivers surveyed. Selected river miles and U.S. Army Corps of Engineers' districts having responsibility are shown.

withdrawal sites function as designed, and (3) develop recommendations for improving the effectiveness of fish protection facilities.

To satisfy these objectives, in 1980 efforts were concentrated in two areas, one near Wenatchee, Washington, and one in McNary Reservoir. In addition, some sites not known to us in 1979 were surveyed for the first time in 1980. Results of these field studies are contained in this report.

PROCEDURES

Extensive sampling at a water withdrawal installation is required to properly assess its potential impact on salmonid and resident fishes. With the funds and staff available in 1980, only a limited number of sites could be adequately sampled. We chose two areas to extensively sample; one was near Wenatchee, Washington, where a large number of water withdrawal installations were known to exist, and the second was in the reservoir of McNary Dam (Lake Wallula) where there were several large capacity installations by which millions of 0-age chinook salmon, Oncorhynchus tshawytscha, pass each year on their seaward migration (Figure 1). Other areas were also investigated but not as extensively.

Traditionally, sampling of small fish in reservoirs of the Columbia Basin has been conducted primarily with beach seines, purse seines, gill nets, trap nets, and two-boat trawl nets. Efforts to sample distribution and abundance of smolts and the young of resident fishes with traditional gear near many of the withdrawal sites was not feasible due to shallow water, rocky outcrops, or thick aquatic weed growth.

Since the water withdrawal sites chosen for intensive sampling at Wenatchee and the McNary Reservoir were shallow, we developed a new sampling technique for collecting fish in shoreline fringe areas. The

system consisted of two nets attached to 14-ft outriggers that were mounted on a 21-ft workboat powered by a 195-horsepower inboard/outboard motor. The outriggers extended from each side of the boat at midship and were trussed by a cable and binder to a point on the bow (Figure 2). A depth finder and the power tilt outdrive unit facilitated operation in water as shallow as 3 ft. An electromagnetic flow meter was mounted on one outrigger to measure the velocity of water through the trawl nets.

All tows were made in a downstream direction parallel to the shorelines with the boat motor held at a constant 2,000 rpm. To minimize mortality of sampled fish, tows averaged about 12 minutes each. Tow nets used most of the season were towed at a speed of about 6.7 fps. Toward the end of the sampling period, new nets were developed which were towed about 9 fps. We assumed that fish which could avoid our tow nets could avoid the highest approach velocities of the pump intakes measured in this study at that time (about 1.5 fps). Three categories of tows were made: (1) near the left shoreline, (2) mid-river, (3) near the right shoreline. This method worked well until longer hours of sunlight and higher water temperatures promoted the growth of thick beds of aquatic vegetation which plugged the nets. Tow netting was restricted to daylight hours because sampling at night was impractical.

To determine fish distribution at selected water withdrawal areas, sampling with the outrigger tow net was initiated in McNary Reservoir in early June. The reservoir was sampled between River Mile (RM) 345 (upstream from Richland, Washington) to RM 292 (McNary Dam) on nine separate days between 10 and 27 June.

In addition to tow nets, scuba and underwater TV were used to observe distribution and behavior of fish near the intakes of the pumping

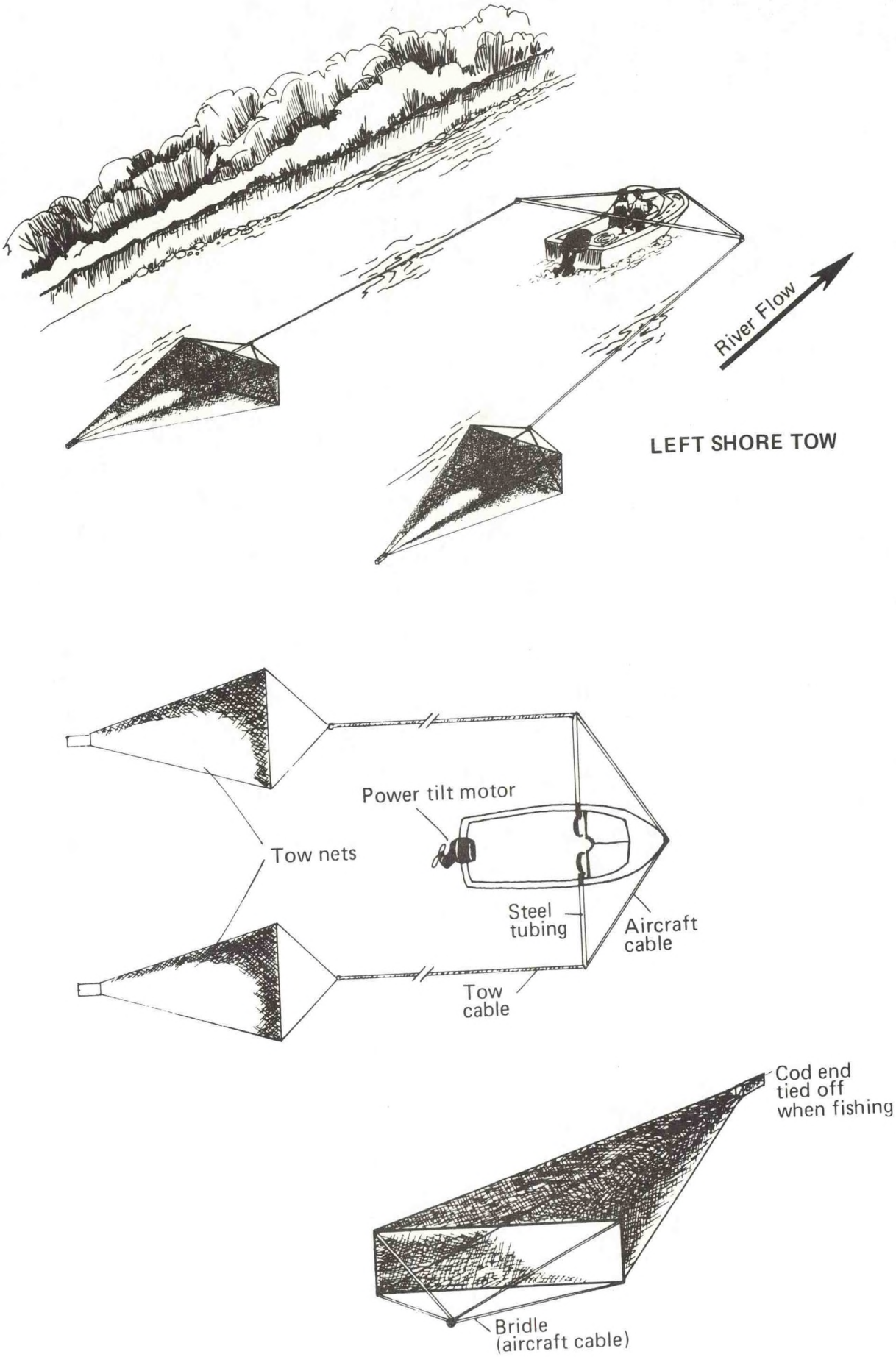

Figure 2.--Outrigger tow net system which allowed sampling of fish in the shallow water off the shoreline fringe of McNary Dam Reservoir.

facilities. Scuba was also used to observe condition of screens, impingement of fish on sreens, and water velocity at screens of additional water withdrawal sites surveyed in 1980. Gill nets and hoop nets were also used on a limited basis.

Divers conducted inspections and made observations of fish activity at various water withdrawals during 27 days between 11 April and 29 September. Divers also monitored three large withdrawal sites [Col460.5L, Col461.9R, and Col475.31s (Swan et al. 1980)] in the Wenatchee, Washington, area throughout the season.

RESULTS

Fish Distribution

Most of the fish captured in our tow nets were taken from late afternoon until dusk; this correlated with increased surface activity of fish near shorelines. Most fish taken were fall chinook salmon ranging from 40 to 75 mm fork length with a mean length of 55 mm. The majority of the fish were taken in the near shore tows, with 73% of the fish captured in the tow net adjacent to the shoreline (Table 1). Since the nets were only a few feet apart, the data strongly suggest that these small fish are quite concentrated next to the shoreline. A concurrent study by the U.S. Fish and Wildlife Service[4/] also found that the smaller fish were found near shore; whereas larger fish were found primarily in mid-water.

Gill nets and hoop nets used along the shoreline fringe on a very limited basis revealed the presence of very small fish such as juvenile

[4/]Personal communication Gerard Gray and Dennis Rondorf, National Fisheries Research Center, Pasco substation, 750 S. Lake Road, Route 6, Pasco, Washington, 99301, January 1981.

Table 1.--Catch of fall chinook salmon by tow netting in McNary Reservoir, 1980.

Location	Number of tows	Fall chinook sampled	Percentage of catch in net closest to shore
		(No.)	(%)
Left shore	30	116	74
Mid-river	13	4	--
Right shore	32	199	72
Total	75	319	73

carp, Cyprinus carpio; sculpin, Cottus sp.; yellow perch, Perca flavescens; chinook salmon, bluegill, Lepomis macrochirus; and crappie, Pomoxis sp.

In addition to examining data from net catches, we attempted to monitor distribution by visual observations. Because underwater visibility in the lower Columbia and Snake Rivers is generally poor when salmonids are migrating, only limited data were obtained.

Fish behavior and distribution were observed at the mouth of the Chelan River where underwater visibility averaged 12-15 ft. Here in a backwater area, representative of many areas where water withdrawals are located, 11 species of fish were sighted with juvenile bass, Micropterus sp.; bluegill; and crappie being abundant. Several adult bluegill were observed guarding eggs on nest sites near the intakes.

Visual observations were also possible at a boat moorage at RM 475 on 16 May 1980. No water withdrawal facility was located in the area, but the configuration of the site was typical of many withdrawal sites along the river. About 100 fall chinook salmon (≈ 40-50 mm long) were observed with a group of threespine stickleback in a school holding in a back eddy along the riprap shoreline in 2-3 ft of water.

Our tow, gill, and hoop net data and visual observations confirmed the presence of juvenile salmon and other fish near shore. The presence of bluegill nests indicates that larval fish are also present in nearshore areas.

Withdrawal Sites and Adequacy of Fish Protection

In 1980, 20 additional withdrawal sites within the study area were located--bringing the total to 225 sites surveyed in 1979-80. Of the additional 20 sites (Appendix A), 15 were owned by the CofE and were operated by the CofE or another government agency.

Four withdrawals operated by the CofE as part of the levee at Lewiston, Idaho, were of interest because they are siphons in use the year around (Figure 3). One is located on the Snake River, and three are on the Clearwater River. The purpose of these siphons is to introduce more water into a ground-water drainage ditch running parallel to the levee to create higher flow in the ditch and avoid water stagnation. NMFS divers inspected them on 3 and 18 September 80 and found intake velocities, measured with an electromagnetic flow meter, to be greater (3.3 fps) than the acceptable fish protective criteria (0.5 fps). As soon as the deficiencies were made known to the CofE, corrective action was taken.

A number of withdrawal sites that were inspected and found to have discrepancies in 1979 were inspected again in 1980. All sites reinspected were found to be in the same or worse condition (Table 3).

At the three large withdrawal sites monitored in the Wenatchee area, very few fish and no impinged fish were observed around two of the three sites. However, large numbers of threespine stickleback, Gasterosteus aculeatus, were observed in the vicinity of Col475.31s, and there were threespine stickleback impinged on the intake screens (this was also noted in 1979). In 1979, the intake velocity of the site was measured at 0.4 fps. This velocity will probably increase in 1981 when another pump is scheduled to be added.

DISCUSSION

Field studies of fish protective facilities at water withdrawals in our study area were only an initial effort to begin to assess the impact of present and future water withdrawals on fishes of the Columbia Basin. Our survey of FY 1979 and follow up in 1980 revealed that not only was it very important to establish acceptable criteria for fish protection at intakes,

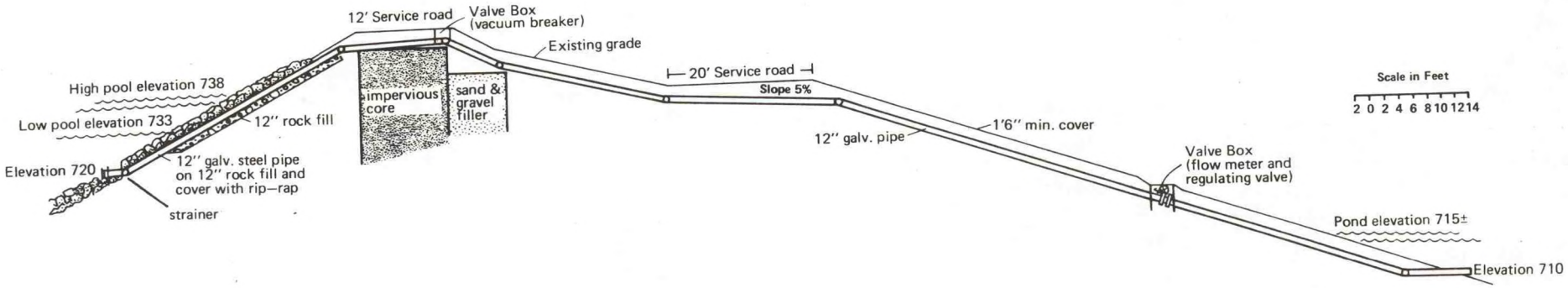

Figure 3.--Siphon No. 1 located on West Lewiston Levee, Snake River (longer and greater head loss, but typical of 3 other siphons on East Lewiston Levee, Clearwater River).

Table 3.--Sites inspected in 1979 and reinspected in 1980 that showed uncorrected problems.

Inventory No.	Intake Condition
Co1340.8R	Measured flaws in excess of 0.5 fps
Co1345.0R	Oversize mesh opening
Co1397.1L	Badly deteriorated mesh
Co1448.8R	Rusted, damaged, and oversize
Co1448.9L	Solid rust, badly deteriorated
Co1449.5RA	Rusted shut, large hole
Co1449.6L	Rusted and bent panels
Co1449.9RA	Deteriorated mesh
Co1450.2L	Rusted shut on top
Co1462.5RA	No mesh
Co1493.6R	Oversize mesh openings
Co1504.0L	Oversize mesh openings
Co1514.1R	Oversize mesh
Snk020.2R	New screens to 6 ft below surface, remaining 18 ft to river bottom is unscreened

but that adequate enforcement of the criteria was a problem. Enforcement includes ensuring that the actual screening used at a withdrawal site is in fact what was approved when the permit was issued. Furthermore, a method to ensure that the screens are maintained after they are installed is needed. Based on our observations of fish distribution, poorly maintained or inadequate screening in certain locations could have a serious impact on small or larval stage fishes.

The greatest problem associated with water withdrawals in relation to fish is the apparent apathy or lack of a proper vehicle among appropriate agencies for surveillance and enforced compliance of acceptable criteria for fish protective facilities. Repeated inspections of screening facilities by fisheries agencies have pointed out a need for enforcement of proper fish protection standards. For example, the 1979 study provided up-to-date information on the status of fish protective facilities at withdrawal sites throughout the study area, and revealed several were not in compliance with criteria. To date, there is no evidence that any agency intends to enforce permit obligations (i.e., permit owner must conform to operating criteria for protecting fish).

After completion of our 2-year study it is apparent that the screening program for withdrawals as currently managed is not in the best interests of fish production or fish protection. The CofE issues permits for water withdrawals following an acceptable review of the proposed fish protective facilities by fisheries agencies. Unfortunately, there appears to be no follow up with periodic inspections of the screening. This is especially true in the mid-Columbia River, upstream from Richland, Washington, where nearly half the withdrawal sites are located. In our inspections we found

some sites that were not equipped with the screening specified on the permit, and many cases where the screening was not maintained.

More detailed work is needed to quantify fish losses; test improvements in fish protective facilities; and develop specifications for design, installation, operation, and maintenance of fish protective facilities at water withdrawals. However, before more or new fish screening criteria is developed, there must be a means of enforcing existing criteria.

RECOMMENDATIONS

1. Current fish screening criteria of the NMFS appears adequate for protection of fry and fingerling size fish but only if screens are properly installed and maintained. Based upon this 2-year study, surveillance and enforcement of proper fish screening is a necessity.

2. Designs which enlarge gross screen area or move the screen mesh farther away from the intake pipe are desirable to minimize velocities through the screen. This not only protects fish and other aquatic life, but it reduces maintenance of intake screens by reducing impingement of debris.

3. Intake designs which draw from deeper water away from the shoreline fringe would be less likely to entrain or impinge small or larval stages of fish. This design should also require less maintenance because the intake should impinge less debris and aquatic vegetation.

4. Administration of permits for water withdrawals (new and existing) on the Columbia River upstream from Richland, Washington, should be given the attention it warrants by the agencies responsible for enforcing fish protective conditions of the permits.

LITERATURE CITED

Swan, George A., Tommy G. Withrow, and Donn L. Park.
1980. Survey of fish protective facilities at water withdrawals on the Snake and Columbia Rivers. Fiscal year 1979 report of research financed by Bonneville Power Administration (Contract DE-A179-79BP10684).

APPENDIX A

STANDARD PRINTOUT OF NEW INFORMATION

RECORDED IN DATA BASE

The available information on each new withdrawal site is summarized on the computer printouts. Headings with no information following indicate no information was applicable to that particular site or no information was available. Water rights information was compiled from records of the State of Washington Department of Ecology, Oregon Water Resource Department, and Idaho Department of Water Resources. Most of the entries on the printout are self-explanatory; however, a few need explanation:

INVENTORY NO.

Codes:

Clw = Clearwater River	R = right bank
Col = Columbia River	Is = island
Snk = Snake River	A = first site, same location
Umt = Umatilla River	B = second site, same location
L = left bank	C = third site, same location, etc.

Example:

Col 301.7 LB = A withdrawal site located on the Columbia River at river mile 301.7, the site is on the left bank (facing downstream), and it is the second site (facing downstream) at the approximate same river mile.

CRT NO.

The number of the volume in the Columbia River and Tributaries Review Study in which the site appears.

SITE NO.

The number assigned the site in the Columbia River and Tributaries Review Study.

LOCATION FROM SHORELINE TO PUMPS

Codes:

+ = pipe out into water.
- = recessed from original shoreline
= = even with existing shoreline.

Example:

+25 ft = A pipe out into the water 25 feet from shore.

LOCATION FROM PUMPS TO SCREENS

Codes:

- ↑ = pier type of structure
- ↑+ = pier out over water beyond shoreline
- ↑- = pier recessed from original shoreline
- ↑= = pier even with existing shoreline

SCREEN CODE

Codes:

- Bx = box
- Co = cone
- Cv = culvert
- Cy = cylinder
- D = drum
- Ep = end of pipe
- F = site used for fire protection only
- Fv = foot valve (check valve with screen)
- N = none
- P = panel
- Pp = pipe with slashes
- U = unable to locate or unknown
- 1 = removable screen
- 2 = nonremovable screen
- 3 = nonremovable screen cleaned by high pressure air system
- 3 = mechanical screen cleaned by high pressure water system

Example:

Pp2 = pipe with slashes with nonremovable screens

SHORE DISTANCE CODE

Codes for this entry are the same as those for LOCATION FROM SHORELINE TO PUMPS.

WATER ELEVATION

Distance from pump platform to water surface (varies with river level).

INTAKE VELOCITY READINGS

Maximum reading at the site.

AMBIENT STREAM VELOCITY

Maximum reading at the site.

INVENTORY NO. Col171.5R
PUMP
NAME ADDRESS ,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Klickitat TOWN Bingen RIVER Columbia RIVER MILE 171.5 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUR. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Fire control and log deck ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS ††
REMARKS No diving inspection performed

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE
1	7.5	3	

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN Wire mesh SCREEN CODE F DISTANCE FROM SHORELINE SHORE DIST. CODE ††
SUBMERGENCE TYPE OF MESH MATERIAL Wire MESH SIZE 0.125in WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Col475.3L
PUMP
NAME ADDRESS ,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Douglas TOWN Orondo RIVER Columbia RIVER MILE 475.3 BANK L QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUR. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Watering lawn ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
REMARKS No diving inspection

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE
1	.5	.5	

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Col484.OR
PUMP
NAME City of Entiat ADDRESS ,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Chelan TOWN Entiat RIVER Columbia RIVER MILE 484.0 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Domestic water ACRES IRRIGATED
OTHER Underground pipe, intake line 6' diameter by 100' long
ACCESS ROUTE City park PUD
PUMP INFORMATION TYPE OF STRUCTURE Pumphouse
LOCATION FROM SHORELINE TO PUMPS +100ft LOCATION FROM PUMPS TO SCREENS
REMARKS No diving inspection

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE
2	250	30	

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH SPECIES SEEN

INVENTORY NO. Col496.2R
PUMP
NAME ADDRESS ,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Chelan TOWN Stayman RIVER RIVER MILE BANK QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Irrigation ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
REMARKS No diving inspection

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE
1	15	4	

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE Ep DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk15.ORA
PUMP
NAME US Army CofE ADDRESS Big Flat Pump #1,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Franklin TOWN Pasco RIVER Snake RIVER MILE 15.0 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUR. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER PUD
ACCESS ROUTE TYPE OF STRUCTURE
PUMP INFORMATION
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 250 | 12

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk15.ORB
PUMP
NAME US Army CofE ADDRESS Big Flat Pump #2,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Franklin TOWN Pasco RIVER Snake RIVER MILE 15.0 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUR. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER PUD
ACCESS ROUTE TYPE OF STRUCTURE
PUMP INFORMATION
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 200 | 12

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE Pp DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk22.5R
PUMP
NAME US Army CofE ADDRESS Lost Island,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Franklin TOWN Pasco RIVER Snake RIVER MILE 22.5 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUR. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 100 | 10

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk25.0L
PUMP
NAME US Army CofE ADDRESS Hollenbeke,, PHONE
DIVERSION LOCATION
STATE WA COUNTY WallaWalla TOWN Pasco RIVER Snake RIVER MILE 25.0 BANK L QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUR. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 150 | 12

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE Pp DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk47.OR
PUMP
NAME US Army CofE ADDRESS ,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Franklin TOWN Ayer RIVER Snake RIVER MILE 47.0 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUR. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER PUD
ACCESS ROUTE
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 100 | 10 |

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk55.OR
PUMP
NAME US Army CofE ADDRESS 55 Mile Bar Pump #1,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Whitman TOWN Ayer RIVER Snake RIVER MILE 55.0 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUR. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER PUD
ACCESS ROUTE
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS
1 | 60 | 6 |

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE Pp DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk55.5R
PUMP
NAME US Army CofE ADDRESS 55 Mile Bar Pump #2,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Whitman TOWN Ayer RIVER Snake RIVER MILE 55.5 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER PUD
ACCESS ROUTE TYPE OF STRUCTURE
PUMP INFORMATION
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 150 | 12

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk80.5L
PUMP
NAME US Army CofE ADDRESS New York Bar,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Garfield TOWN RIVER Snake RIVER MILE 80.5 BANK L QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER PUD
ACCESS ROUTE TYPE OF STRUCTURE
PUMP INFORMATION
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 150 | 10

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk85.OR
PUMP
NAME Ed Young ADDRESS Box 372,Pomeroy,WA 99347 PHONE
DIVERSION LOCATION
STATE WA COUNTY Whitman TOWN Ctrl Ferry RIVER Snake RIVER MILE 85.0 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Gravel plant ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 25 | 3.5 |

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE Fv DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk96.OR
PUMP
NAME US Army CofE ADDRESS Swift Bar,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Whitman TOWN RIVER Snake RIVER MILE 96.0 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS
NUMBER OF PUMPS | HP EACH | SIZE OF DISCHARGE (INCHES) | TYPE OF DISCHARGE | REMARKS No diving inspection
1 | 150 | 10 |

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk76.5R
PUMP
NAME US Army CofE ADDRESS Ridpath,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Whitman TOWN RIVER Snake RIVER MILE 76.5 BANK R QUAD.MAP SEC T R
CRF NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION
LOCATION FROM SHORELINE TO PUMPS TYPE OF STRUCTURE
LOCATION FROM PUMPS TO SCREENS

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE	REMARKS Diving inspection performed
1	40	6		

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE Pp DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION Intake silted over SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk132.5L
PUMP
NAME US Army CofE ADDRESS Chief Timothy Park,, PHONE
DIVERSION LOCATION
STATE WA COUNTY Asotin TOWN Clarkston RIVER Snake RIVER MILE 132.5 BANK L QUAD.MAP SEC T R
CRF NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION
LOCATION FROM SHORELINE TO PUMPS TYPE OF STRUCTURE
LOCATION FROM PUMPS TO SCREENS

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE	REMARKS Diving inspection performed
1	60	8		

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN Pp Changed to Bx SCREEN CODE Bx DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION Pp silted over SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Snk140.OR
PUMP
NAME US Army CofE _ ADDRESS ,, PHONE
DIVERSION LOCATION
STATE ID COUNTY Nez Perce TOWN Lewiston RIVER Snake RIVER MILE 140.0 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Ditch make up water ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE	REMARKS Diving inspection performed-impinged fish
1		12		

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE Cy DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL Wire MESH SIZE 0.625in WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH New mesh installed RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. Clw2.3L
PUMP
NAME US Army CofE ADDRESS ,, PHONE
DIVERSION LOCATION
STATE ID COUNTY Nez Perce TOWN Lewiston RIVER Clearwat RIVER MILE 2.3 BANK L QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Ditch make up water ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE	REMARKS Diving inspection performed-impinged fish
1		8		

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. C1w2.5R
PUMP
NAME US Army CofE ADDRESS ,, PHONE
DIVERSION LOCATION
STATE ID COUNTY Nez Perce TOWN Lewiston RIVER Clearwat RIVER MILE 2.5 BANK R QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Ditch make up water ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE	REMARKS Diving inspection performed-impinged fish
1		12		

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN SCREEN CODE DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL MESH SIZE WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN

INVENTORY NO. C1w2.5L
PUMP
NAME US Army CofE ADDRESS ,, PHONE
DIVERSION LOCATION
STATE ID COUNTY Nez Perce TOWN Lewiston RIVER Clearwat RIVER MILE 2.5 BANK L QUAD.MAP SEC T R
CRT NO. SITE NO. CofE PUB. NOTICE DATE
CofE PERMIT NO. DATE

WATER RIGHT
WATER RESOURCE AREA APPLICATION NO. PERMIT NO. CERTIFICATE NO. PRIORITY DATE
PERMIT DATE
QUANTITY-CFS ACRE FT/YR PURPOSE Ditch make up water ACRES IRRIGATED
OTHER
ACCESS ROUTE PUD
PUMP INFORMATION TYPE OF STRUCTURE
LOCATION FROM SHORELINE TO PUMPS LOCATION FROM PUMPS TO SCREENS

NUMBER OF PUMPS	HP EACH	SIZE OF DISCHARGE (INCHES)	TYPE OF DISCHARGE	REMARKS Diving inspection performed-impinged fish
1		8		

INTAKE SCREEN
PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN Expanded diamond metal SCREEN CODE Cy DISTANCE FROM SHORELINE SHORE DIST. CODE
SUBMERGENCE TYPE OF MESH MATERIAL Metal MESH SIZE 0.5in WIRE SIZE PERFORATION SIZE
HOLES/INCH WIDTH OR DIAMETER OF SCREEN HEIGHT OR LENGTH OF SCREEN
SCREEN CONDITION TRASH RACK
FRAME BAR SPACING TRASH FENCE
MESH New mesh installed RELATION TO SCREEN
SEALS

DEBRIS LOCATION AND AMOUNT
SEDIMENTATION SCOURING SURFACE WATER TEMP DEGREE F WATER ELEVATION
INTAKE VELOCITY READINGS 0.6fps AMBIENT STREAM VELOCITY INSPECTION DATE TIME
FISH BYPASS SYSTEM FISH SPECIES SEEN