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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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SURVEY OF FISH PROTECTIVE

FACILITIES AT WATER WITHDRAWALS

ON THE SNAKE AND COLUMBIA RIVERS

PHASE II

by

George A. Swan

Fiscal Year 1980 Report of Research Financed by Bonneville Power Administration (Contract DE-A179-80BP18490)

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Northwest and Alaska Fisheries Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
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June 1981

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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 1973½, 1975½, 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.

 $^{1/{\}rm Fish}$ 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 Unpublished manuscript, 10 p., Oregon Department of Fish and Wildlife, 506 S.W. Mill, Portland, Oregon.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 Unpublished manuscript, 15 p., Division of River Basin Studies, Fish and Wildlife Service, 919 N.E. 19th Ave., Portland, Oregon, 97232.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.

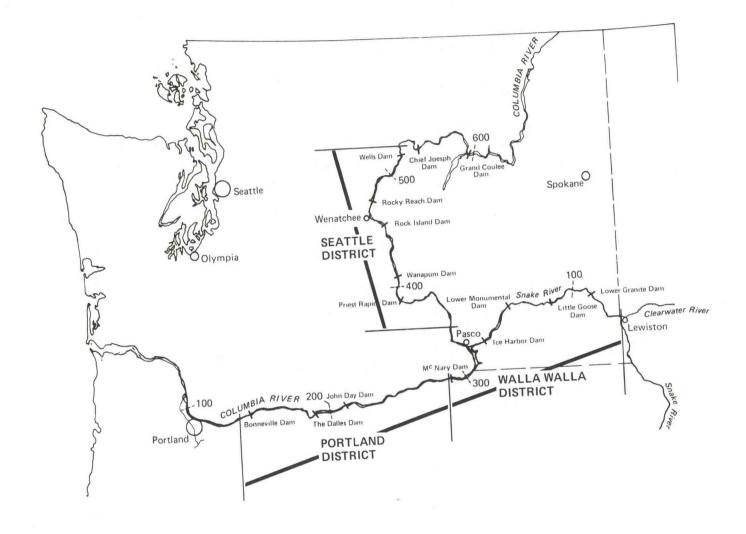


Figure 1.—The portions of the Columbia and Snake Rivers surveyed. Selected river miles and U.S. Army Corps of Engineers' districts having responsibility are shown.

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

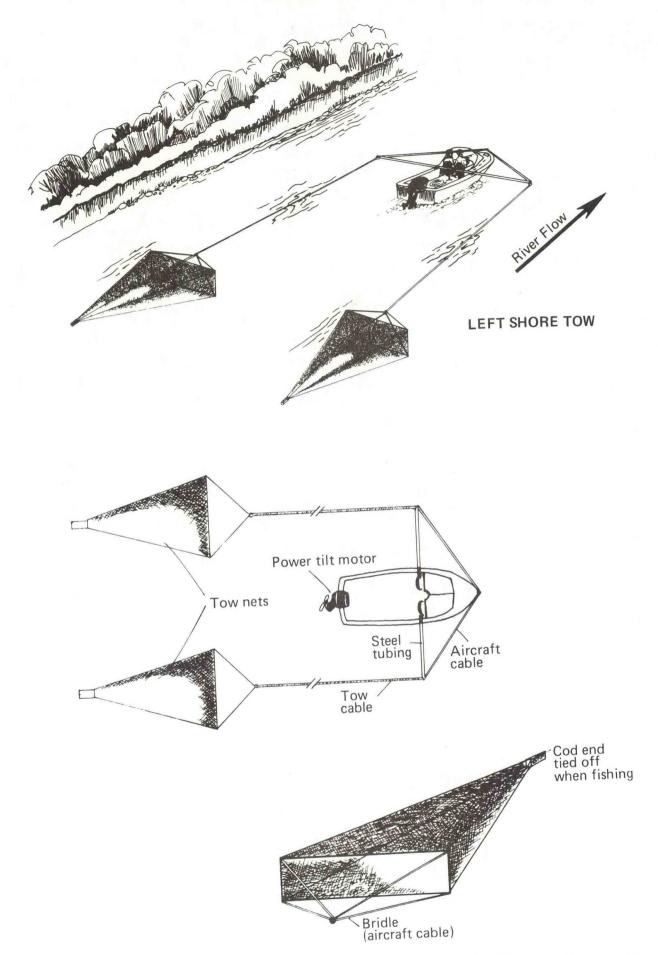


Figure 2.--Outrigger tow net system which allowed sampling of fish in the shallow water off the shoreline fringe of McNary Dam Reservoir.

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

 $[\]frac{4}{\text{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, <u>Cyprinus carpio</u>; sculpin, <u>Cottus</u> sp.; yellow perch, <u>Perca flavescens</u>; 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 ($\approx 40-50$ 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, <u>Gasterosteus aculeatus</u>, 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,

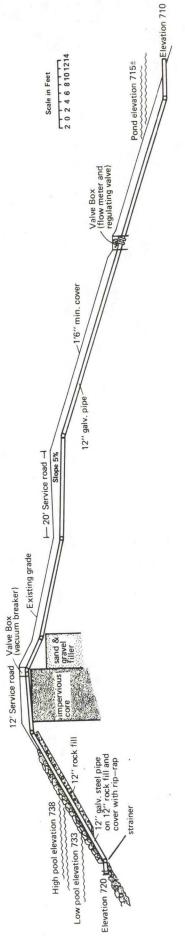


Figure 3. -- Siphon No. 1 located on West Lewiston Levee, Snake River (longer and greater head loss, but typical of 3 other siphons on East Lewiston Levee, Clearwater River).

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.OR	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 $\underline{\text{LOCATION FROM SHORELINE}}$ 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.

INVENTURY NO. Col171.5K PI IMP DIVERSION LOCATION

ADDRESS ,,

PHONE

STATE WA COUNTY Klickitat TOWN Bingen CRT NO. SITE NO. CHT NO.

RIVER Columbia RIVER MILE 171.5 BANK R GUAD.MAP Cofe PUR. NOTICE DATE Cofe PERMIT NO. DATE

WATER RIGHT WATER RESUURCE AREA

APPLICATION NO.

PERMIT NO. PERMIT DATE CERTIFICATE NO.

PRIORITY DATE

SEC

SHORE DIST. CODE ++

GIANTITY-CFS OTHER

ACRE FI/YR

PURPOSE Fire control and log deck

ACRES IRRIGATED

PERFORATION SIZE

ACCESS ROUTE PLIMP INFORMATION

LOCATION FROM SHORELINE TO PUMPS NUMBER HP SIZE OF DISCHARGE OF PUMPS EACH

TYPE OF DISCHARGE

SCOURTING

TYPE OF STRUCTURE LOCATION FRUM PUMPS TO SCREENS ++

REMARKS No diving inspection performed

(INCHES) 7.5 1

INTAKE SCREEN PLIMP NO.

PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN Wire mesh
SUMMERGENCE TYPE OF MESH MATERIAL Wire
HOLES/INCH WIDTH OR DIAMETER OF SCREEN

SCREEN CUMDITION

FRAME MESH SEALS

DEBRIS LOCATION AND AMOUNT SEDIMENTATION
INTAKE VELOCITY READINGS
FISH BYPASS SYSTEM

N CODE F DISTANCE FROM SHORELINE MESH SIZE 0.125in WIRE SIZE HEIGHT OR LENGTH OF SCREEN SCREEN CODE F

TRASH RACK TRASH FENCE RELATION TO SCREEN

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELUCITY
FISH SPECIES SEEN INSPECTION DATE TIME

INVENTORY NO. Co1475.34.

PLIMP NAME

DIVERSION LOCATION

ADDRESS ,,

PHONE

STATE WA CULINTY Douglas CHT NO. SITE NO.

TOWN Orondo

RIVER Columbia RIVER MILE 475.3 BANK L QUAD.MAP CofE PUR. NOTICE CofE PERMIT NO.

DATE DATE

WATER RIGHT WATER RESULTED AREA

APPLICATION NO.

PERMIT NO. PERMIT DATE

CERTIFICATE NO.

PRIURITY DATE

PERFORATION SIZE

SEC

ACRES IRRIGATED

SHORE DIST. CODE

T

QUANTITY-CFS

ACRE FT/YR

PURPOSE Watering lawn

OTHER ACCESS ROUTE PLIMP INFORMATION

NUMBER

LOCALION FRUM SHORFLINE TO PUMPS SIZF OF

LOCATION FROM PUMPS TO SCREENS REMARKS No diving inspection

DISCHARGE EACH OF PUMPS (INCHES) 1

. 5 .5 DISCHARGE

TYPE OF

SCOUR ING

INTAKE SCREEN PUMP NO.

PUMP NO.
SCREEN DESCRIPTION
TYPE OF SCREEN
TYPE OF MESH MATERIAL
TYPE OF MESH MATERIAL
TYPE OF MESH MATERIAL SURMERGENCE TYPE OF MESH MATERIAL HOLES/INCH WIDTH OR DIAMETER OF SCREEN

SCREEN CONDITION FRAME MESH SFALS

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READINGS FISH BYPASS SYSTEM

SCREEN CODE DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE HEIGHT OF SCREEN

TRASH RACK TRASH FENCE HAR SPACING

RELATION TO SCREEN

SURFACE WATER TEMP DEGREE F WATE WATER ELEVATION AMBIENT STREAM VELICITY
FISH SPECIES SFEN

INVENTORY NO. CO1484.OR PLIMP

ADDRESS ,,

PHONE

NAME City of Entiat DIVERSILN LOCATION STATE WA COUNTY Chelan CRI NU. SI'E NO.

10WN Entiat

RIVER Columbia RIVER MILE 484.0 BANK R QUAD. MAP DATE COFE PUH. NOTICE DATE

SEC

WATER RIGHT

PERMIT NO.

CERTIFICATE NO.

PRIORITY DATE

PERFORATION SIZE

TYPE OF STRUCTURE Pumphouse

ACRES IRRIGATED

SHORE DIST. CODE

GHANTITY-CFS ACRE FT/YR PURPUSE Domestic water
OTHER Underground pipe, intake line 6' diameter by 100' long
ACCESS ROUTE City park
PUMP INFORMATION
LOCATION FROM PUMP INFORMATION LOCATION FROM SHORELINE 10 PUMPS +100ft STZF OF TYPE OF NUMBER

SIZE OF DISCHARGE DISCHARGE (INCHES)

LOCATION FROM PLMPS TO SCREENS

OF PUMPS EACH 250

2

30

REMARKS No diving inspection

INTAKE SCREEN

PUMP NO. SCREEN DESCRIPTION

SCHEEN DESCREEN
SUBMERGENCE TYPE OF MESH MATERIAL
HOLES/INCH WIDTH OR DIAMETER OF SCREEN
SCHEEN COMDITION

FRAME MESH SEALS

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELCITY READINGS

SCOUR ING

SCHEEN CODE DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN

TRASH RACK

BAR SPACING

TRASH FENCE

RELATION TO SCREEN

SURFACE WATER TEMP DEGREE F WATER ELEVATION
DIGITY INSPECTION DATE AMBIENT STREAM VELOCITY
FISH SPECIES SEEN

INVENTURY NO. Co1496.2R

FUMP

NAME

ADDRESS ,,

PHONE

DIVERSION LOCATION STATE WA COUNTY Chelan SITE NO.

10WN Stayman

RIVER RIVER MILE COFE PUR. NOTICE COFE PERMIT NO.

BANK QUAD. MAP DATE DATE

SEC

ACRES INRIGATED

WATER RESUURCE AREA

APPLICATION NO.

PERMIT NO. PERMIT DATE

CERTIFICATE ND.

PRIORITY DATE

OTHER ACCESS ROUTE

QUANTITY-CFS ACRE F1/YR

PURPUSE Irrigation

TYPE OF STRUCTURE

PLIMP INFORMATION LOCATION FROM SHORELINE TO PUMPS

NUMBER HP SIZE OF OF PUMPS EACH DISCHARGE (INCHES)

TYPE OF DISCHARGE LOCATION FROM PUMPS TO SCREENS REMARKS No diving inspection

INTAKE SCREEN PUMP NO.

1

SCREEN DESCRIPTION SCREEN DESCRIPTION
TYPE OF SCREEN
SUBMERGENCE TYPE OF MESH MATERIAL
HOLESVINCH WIDTH OR DIAMETER OF SCREEN

FRAME MESH SEALS

SCREEN CODE ED DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE HEIGHT OF LENGTH OF SCREEN

SHORE DIST. CODE PERFORATION SIZE

TRASH RACK PACING TRASH FENCE RELATION 10 SCREEN

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READINGS FISH BYPASS SYSTEM

SCUURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION INSPECTION DATE AMBIENT STREAM VELUCITY
FISH SPECIES SEEN

INVENTORY NO. SHIS, ORA

SITE NO.

ADDRESS Big Flat Pump #1,,

PHONE

PLIMP NAME US Army Cofe DIVERSION LOCATION STATE WA CUUNTY Franklin

TOWN Pasco

RIVER Shake RIVER MILE 15.0 BANK R GHAD.MAP Cofe PUR. NOTICE DATE COFE PERMIT NO.

SEC T

CRI NO. WATER RIGHT

WATER RESIDURCE AREA

APPLICATION NO.

12

PERMIT NO. PERMIT DATE

CERTIFICATE NO.

PRIORITY DATE

PUD

QUANTITY-CES

ACRE FT/YR

PURPOSE Wildlife habitat

ACRES IRRIGATED

OTHER ACCESS ROUTE

TYPE OF STRUCTURE

DATE

PUMP INFORMATION LOCATION FROM SHORELINE TO PUMPS

SIZE OF DISCHARGE NUMBER EACH OF PUMPS (INCHES) 250

TYPE OF DISCHARGE LOCATION FROM PUMPS TO SCREENS REMARKS No diving inspection

INTAKE SCREEN

PI MP NO. SCHEEN DESCRIPTION

1

SCHEEN UESCHEN
TYPE (F SCHEEN
SLAMERGENGE TYPE OF MESH MA]ERIAL
UM ESTINCH WIDTH OR DIAMETER OF SCHEEN SCHEEN CUMDITION

FRAME MESH SEALS

N CODE DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN SCREEN CODE

SHORE DIST. CODE PERFORATION SIZE

TRASH RACK

TRASH FENCE

BAR SPACING RELATION TO SCREEN

DEBRIS LOCATION AND AMOUNT SEDIMENTALION
INTAKE VELOCITY READINGS
FISH BYPASS SYSTEM

SCOURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION INSPECTION DATE AMBIENT STREAM VELTCITY
FISH SPECIES SEEN

INVENTORY NO. Shk15.ORB

PLIMP NAME US Army CofE

ADDRESS Big Flat Pump #2,,

DIVERSION LOCATION STATE WA COUNTY Franklin CRI NO. SITE NO.

TOWN Pasco

RIVER Snake Cofe PUR. NUTICE CofE PERMIT NO.

RIVER MILE 15.0 BANK R QUAD. MAP

SEC

WATER KIGHT WATER RESIDERCE AREA

APPLICATION NO.

PERMIT NO. PERMIT DATE

CERTIFICATE NO.

DATE

DATE

PRIURITY DATE ACRES IRRIGATED

QUANTITY-CFS

ACRE FT/YR

PURPOSE Wildlife habitat

TYPE OF STRUCTURE

OTHER ACCESS ROUTE

PUMP INFORMATION LOCATION FROM SHORFLINE TO PUMPS HP NUMBER SIZE OF DISCHARGE EACH

TYPE OF DISCHARGE LOCATION FRUM PUMPS TO SCREENS REMARKS No diving inspection

OF PUMPS (INCHES) 200 1 12

INTAKE SCREEN PLIMP NO.

SCREEN DESCRIPTION

SCREEN DESCRIPTION
TYPE OF SCREEN
SURMERGENCE TYPE OF MESH MATERIAL
HOLESTINCH WIDTH OR DIAMETER OF SCREEN

FRAME MESH SEALS SCREEN CODE Pp DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN

SHORE DIST. CODE PERFORATION SIZE

TRASH RACK BAR SPACING TRASH FENCE RELATION TO SCREEN

DEBRIS LOCATION AND AMOUNT SEDIMENTALION INTAKE VELOCITY READINGS FISH BYPASS SYSTEM

SCOURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION INSPECTION DATE AMBIENT STREAM VELCCITY FISH SPECIES SEEN

INVENTORY NO. Shk22.5R PLIMP NAME US Army CofE

ADDRESS Lost Island,,

PHONE

DIVERSION LOCATION STATE WA COUNTY Franklin TOWN Pasco SITE NU.

RIVER Shake RIVER MILE 22.5 BANK R GUAD.MAP Coff PUR. NOTICE DATE Coff PERMIT NO.

SEC

WATER RESUURCE AREA

APPLICATION NO.

PERMIT NO. PERMIT DATE

CERTIFICATE NO.

PRIORITY DATE

PUD

QUANTITY-CFS

OTHER ACCESS RUUTE

ACRE FT/YR PURPOSE Wildlife habitat ACRES IRRIGATED

PUMP INFORMATION LOCATION FROM SHORELINE TO PUMPS NUMBER

TYPE OF DISCHARGE LOCATION FRUM PUMPS TO SCREENS

SIZE OF DISCHARGE OF PUMPS EACH (INCHES)

100 10 REMARKS No diving inspection

1

INTAKE SCHEEN PLIMP NO. SCHEEN DESCRIPTION TYPE OF SCREEN

TYPE OF MESH MATERIAL
SUBMERGENCE TYPE OF MESH MATERIAL
WIDTH OR DIAMETER OF SCREEN SCREEN CUNDITION

FRAME MESH SEALS

N CODE DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN SCHEEN CODE

SHORE DIST. CODE PERFURATION SIZE

TRASH RACK

BAR SPACING TRASH FENCE

RELATION TO SCREEN

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELUCITY READINGS FISH BYPASS SYSTEM

SCOURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION INSPECTION DATE AMBIENT STREAM VELCICITY

FISH SPECIES SEEN

INVENTORY NO. Shk25.OL FLIMP

NAME US Army Cofe DIVERSION LOCATION

ADDRESS Hollenbeke,,

PHONE

STATE WA COUNTY Wallawalla TOWN Pasco CRT NO. SITE NO.

RIVER Snake RIVER MILE 25.0 BANK L QUAD.MAP COFE PUR. NOTICE DATE DATE

SEC

WATER RIGHT

WATER RESOURCE AREA

APPLICATION NO.

PERMIT NO.

CERTIFICATE NO.

PRIORITY DATE

QUANTITY-CFS

ACRE FT/YR

150

PERMIT DATE PURPUSE Wildlife habitat

ACRES IRRIGATED

OTHER ACCESS ROUTE

1

TYPE OF STRUCTURE LOCATION FROM PUMPS TO SCREENS

PUMP INFORMATION LOCATION FROM SHORELINE TO PUMPS HP EACH NUMBER OF PUMPS

TYPE OF SIZE OF DISCHARGE DISCHARGE (INCHES) 12

REMARKS No diving inspection

INTAKE SCHEEN

SCREEN DESCRIPTION

SCREEN DESCRIPTION
TYPE OF MESH MATERIAL
HOLES/INCH WIDTH OR DIAMETER OF SCREEN SURMERGENCE HOLES/INCH WI SCREEN CONDITION

FRAME

MESH SEALS SCREEN CODE Pp DISTANCE FROM SHORELINE MESH SIZE WIRF SIZE HEIGHT OF SCREEN

PERFORATION SIZE

TRASH RACK

TRASH FENCE

RELATION TO SCREEN

DEBRIS LOCATION AND AMOUNT SEDIMENTALION
THAKE VELOCITY READINGS
FISH BYPASS SYSTEM

SCOURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELOCITY
FISH SPECIES SEEN INSPECTION DATE

INVENTORY NO. Shk47.OR PUMP NAME US Army Cofe DIVERSION LUCATION STATE WA COUNTY Franklin TOWN Ayer SITE NO. WATER HIGHT WATER KESTURCE AREA ACRE FT/YR GI IANT ITY-CFS

ADDRESS ,,

RIVER Shake RIVER MILE 47.0 BANK R GUAD.MAP
COFE PUR. NOTICE
COFE PERMIT NO. DATE

SEC

APPLICATION NO.

PERMIT NO. PERMIT DATE CERTIFICATE NO.

PRIORITY DATE

PUD

ACRES IRRIGATED

PHONE

OTHER ACCESS ROUTE

PURPOSE Wildlife habitat

TYPE OF STRIKTURE

DATE

LOCATION FROM PUMPS TO SCREENS

PUMP INFORMATION
LOCATION FRUM SHORFLINE TO PUMPS NUMBER HP SIZE OF EACH

100

OF PUMPS 1

DISCHARGE (INCHES) 10

TYPE OF DISCHARGE REMARKS No diving inspection

INTAKE SCREEN PLIMP NO. SCREEN DESCRIPTION

MESH

SEALS

SCREEN DESCRIPTION
TYPE OF SCREEN
SUBMERGEBORG
TYPE OF MESH MATERIAL
HOLES/INCH WIDTH OR DIAMETER OF SCREEN

SCREEN CODE DISTANCE FROM SHORELINE
MESH SIZE WIRE SIZE
HEIGHT OR LENGTH OF SCREEN

SHORE DIST. CODE PERFORATION SIZE

TRASH RACK BAR SPACING RELATION TO SCREEN

TRASH FENCE

DEBMIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY MEADINGS FISH BYPASS SYSTEM

SCOURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION INSPECTION DATE

AMBIENT STREAM VELOCITY
FISH SPECIFS SEEN

INVENTORY NO. Shk55.OR

NAME US Army Cofe DIVERSION LOCATION

ADDRESS 55 Mile Bar Pump #1,,

STATE WA CULINTY Whitman SITE NO.

TOWN Ayer

RIVER Shake RIVER MILE 55.0 BANK R QUAD.MAP DATE DATE

SEC T

WATER HIGHT

WATER RESOURCE AREA

APPLICATION NO.

PERMIT NO. PERMIT DATE CERTIFICATE NO.

PRIDRITY DATE

GUANT ITY-CFS OTHER

SEALS

PLIMP

ACRE FT/YR

PURPOSE Wildlife habitat

ACRES IRRIGATED

ACCESS ROLLE PUMP INFORMATION

TYPE DE

DISCHARGE

TYPE OF STRUCTURE LOCATION FROM PUMPS TO SCREENS

LOCATION FROM SHORELINE TO PUMPS NUMBER HP SIZE OF

OF PUMPS EACH DISCHARGE (INCHES)

REMARKS

1 6

INTAKE SCREEN PLMP NO. SCREEN DESCRIPTION TYPE OF MESH MATERIAL
HOLES/INCH WIDTH OR DIAMETER OF SCI WIDTH OR DIAMETER OF SCREEN SCREEN CUMDITION FRAME

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READIMES FISH BYPASS SYSTEM SCUURING SCREEN CODE Pp DISTANCE FRUM SHORELINE MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN

SHORE DIST. CUDE PERFORATION SIZE

TRASH RACK BAR SPACING TRASH FENCE RELATION TO SCREEN

AMBIENT STREAM VELOCITY
FISH SPECIES SEEN

INVENTORY NO. SAKSS. SR PLIMP NAME US Army Cofe DIVERSION LOCATION

ADDRESS 55 Mile Bar Pump #2,,

PHONE

STATE WA COUNTY Whitman

RIVER Snake Coff PUR. NOTICE Coff PERMIT NO. TOWN Ayer

RIVER MILE 55.5 BANK R QUAD. MAP DATE DATE

CERTIFICATE NO.

SEC 1

WATER RESOURCE AREA

PERMIT NO. APPLICATION NO. PERMIT DATE PRICEITY DATE

ACRES IRRIGATED

GIANTITY-CFS

ACRE FT/YR

PURPUSE Wildlife habitat

OTHER ACCESS ROIDE

TYPE OF STRUCTURE

PUMP INFORMATION LOCATION FRUM SHORELINE TO PUMPS

SIZE OF NUMBER HP EACH DISCHARGE OF PUMPS (INCHES)

TYPE OF D1SCHARGE LOCATION FROM PUMPS TO SCREENS REMARKS No diving inspection

1

150

INTAKE SCREEN

SCREEN DESCRIPTION
TYPE OF SCREEN
SUMMERGENCE TYPE OF MESH MATERIAL SUMMERGENCE WIDTH OR DIAMETER OF SCREEN HOLESTINCH

SCREEN CUNDITION FRAME

SEAL S

N CODE DISTANCE FRUM SHORELINE MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN SCREEN CODE

SHORE DIST. CODE PERFORATION SIZE

PACING TRASH FENCE RELATION TO SCREEN

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READINGS

FISH BYPASS SYSTEM

SCOURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION

INSPECTION DATE AMBIENT STREAM VELUCITY
FISH SPECIES SEEN

INVENTURY NO. Shk80.5L

PI MP

ADDRESS New York Bar,,

PHONE

NAME US Army Cofe DIVERSION LOCATION STATE WA COUNTY Carfield SITE NO.

RIVER Shake RIVER MILE 80.5 BANK L GUAD.MAP
Cofe PUR. NOTICE DATE
Cofe PERMIT NO. DATE

SEC

ACRES IRRIGATED

T

R

WATER RIGHT WATER RESOURCE AREA

APPLICATION NO.

(INCHES)

PERMIT NO. PERMIT DATE CERTIFICATE NO.

PRIORITY DATE

GIANTITY-CFS OTHER

ACRE FT/YR

PURPUSE Wildlife hebitat

ACCESS ROLITE

PUMP INFORMATION

LOCATION FRUM SHORELINE TO PUMPS SIZE OF HP

TYPE OF

TYPE OF STRUCTURE LOCATION FROM PUMPS TO SCREENS

NUMBER OF PUMPS EACH DISCHARGE 150

DISCHARGE

REMARKS No diving inspection

1

INTAKE SCREEN

PLIMP NO. SCHEEN DESCRIPTION

FISH BYPASS SYSTEM

SCREEN DESCRIEN
TYPE OF SCREEN
SUBMERGENCE TYPE OF MESH MATERIAL
HOLES/INCH WIDTH OR DIAMETER OF SCREEN SCHEEN CONDITION

FRAME MESH SEALS

SCOURING

N CODE DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN SCHEEN CUDE

SHORE DIST. CODE PERFORATION SIZE

TRASH RACK

TRASH FENCE RELATION TO SCREEN

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READINGS

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELICITY
FISH SPECIES SEEN INSPECTION DATE

INVENTORY NU. SHABS.OR PLIMP NAME Ed Young

ADDRESS Box 322, Pomeroy, WA 99347

PHONE

DIVERSION LOCATION STATE WA COUNTY Whitman CRI NO. SITE NO.

TOWN Ctrl Ferry RIVER Shake RIVER MILE 85.0 BANK R GUAL.MAP
COFE PUR. NOTICE
COFE PERMIT NO. DATE

WATER RIGHT WATER RESUURCE AREA

APPLICATION NO.

PERMIT NO. PERMIT DATE CERTIFICATE NO. PRIORITY DATE

SEC

QUANTITY-CFS

ACHE FT/YR

PURPOSE Gravel plant

ACRES INRIGATED

OTHER ACCESS ROUTE

PUMP INFORMATION LOCATION FROM SHORELINE TO PUMPS NUMBER HP SIZE OF

TYPE OF DISCHARGE

TYPE OF STRUCTURE LOCATION FROM PUMPS TO SCREENS REMARKS No diving inspection

OF PLIMPS EACH DISCHARGE

(INCHES) 25 1 3.5

INTAKE SCREEN PLIMP NO. SCHEEN DESCRIPTION

SCHEEN DESCRIPTION
TYPE OF SCREEN
SUBMERGENCE TYPE OF MESH MATERIAL
HOLES/INCH WIDTH OR DIAMETER OF SCREEN FRAME

MESH SFALS SCREEN CODE FV DISTANCE FRUM SHORELINE MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN

TRASH RACK

SHORE DIST. CODE PERFORATION SIZE

BAR SPACING TRASH FENCE RELATION TO SCHEEN

DEBRIS LUCATION AND AMOUNT SEDIMENTATION
INTAKE VELOCITY READINGS
FISH BYPASS SYSTEM

SCOURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELOCITY
FISH SPECIES SEEN INSPECTION DATE

INVENTORY NO. Shk96.OR FLIMP

NAME LA Army Cofe

ADDRESS Swift Bar,,

PHONE

DIVERSION LOCATION STATE WA COUNTY Whitman CRI NU. SITE NO.

TOWN

MIVER Shake RIVER MILE 96.0 BANK R QUAD.MAP COFE PUR. NOTICE DATE DATE

WATER HIGHT

WATER RESOURCE AREA

APPLICATION NO.

PERMIT NO. PERMIT DATE

SCREEN CUDE

CERTIFICATE NO.

PRIORITY DATE

GUANT ITY-CFS

ACRE FT/YR

PURPOSE Wildlife habitat

ACRES IRRIGATED

OTHER ACCESS ROUTE

TYPE OF STRUCTURE

PUMP INFORMATION LOCATION FROM SHORELINE TO PUMPS NUMBER SIZE OF

TYPE OF EACH OF PUMPS DISCHARGE DISCHARGE LOCATION FROM PUMPS TO SCREENS REMARKS No diving inspection

(INCHES) 1 150

INTAKE SCREEN PLIMP NO. SCREEN PESCRIPTION

TYPE OF MESH MATERIAL
TYPE OF MESH MATERIAL SUBMERCENCE TYPE OF MESH MATERIAL HOLESZINCH WIDTH OR DIAMETER OF SCREEN SCHEEN CUNDITION

FRAME MECH

MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN TRASH RACK

PERFORATION SIZE

N CODE DISTANCE FROM SHORELINE MESH SIZE

BAR SPACING TRASH FENCE RELATION TO SCREEN

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READINGS FISH BYPASS SYSTEM

SCOURING

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELTICITY
FISH SPECIES SEEN INSPECTION DATE

INVENTORY NO. Shk76.5R FLIMP NAME US Army CofE DIVERSION LOCATION STATE WA COUNTY Whitman

ADDRESS Ridpath,,

PHONE

CHI NO. S11E NO. WATER RIGHT

RIVER Shake RIVER MILE 76.5 BANK R QUAD. MAP COFE PERMIT NO.

DATE

SEC

WATER RESULTE AREA

APPLICATION NO.

TOWN

PERMIT NO. PERMIT DATE CERTIFICATE NO.

PRIORITY DATE

GUANT TTY-CFS

ACRE FT/YR

PURPOSE Wildlife habitat

ACRES IRRIGATED

OTHER ACCESS ROUTE

PUMP INFORMATION LOCATION FROM SHORFFINE TO PUMPS NUMBER SIZF OF OF PUMPS FACH

TYPE OF DISCHARGE

TYPE OF STRUCTURE LOCATION FROM PUMPS TO SCREENS

DISCHARGE (INCHES) 40 1

REMARKS Diving inspection performed

INTAKE SCREEN PLIMP NO. SCREEN DESCRIPTION TYPE OF SCREEN

TYPE OF MESH MATERIAL
SURMERGENCE TYPE OF MESH MATERIAL
HOLESTINCH WIDTH OR DIAMETER OF SCREEN SCHEEN CUNDITION

FRAME MESH SEALS

SCREEN CODE Pp DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE

MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN

SHORE DIST. CODE PERFORATION SIZE

TRASH RACK

PAR SPACING TRASH FENCE RELATION TO SCREEN

DEBRIS LOCATION AND AMOUNT SFDIMENTATION Intake silted over INTAKE VELUCITY READINGS FISH BYPASS SYSTEM SCHIBING

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELOCITY INSPECTION DATE FISH SPECIES SEEN

INVENTORY NO. Shk132.5L PUMP NAME US Army Cofe DIVERSION LOCATION

ADDRESS Chief Timothy Park,,

PHONE

STATE WA COUNTY Asotin CRI NO. SITE NO.

TOWN Clarkston RIVER Snake RIVER MILE 132.5 BANK L QUAD.MAP Cofe PUB. NOTICE COFE PERMIT NO. DATE

SEC T

WATER HIGHT

WATER RESIDENCE AREA

APPLICATION NO.

DISCHARGE

PERMIT NO. PERMIT DATE

CERTIFICATE NO.

PRIORITY DATE

GIJANT I IY-CFS UTHER

MESH SFALS ACRE FI/YR

PURPOSE

ACRES IRRIGATED

ACCESS ROUTE

TYPE OF STRUCTURE

PLIMP INFORMATION LOCATION FROM SHORELINE TO PUMPS

NUMBER HP OF PUMPS EACH

TYPE OF DISCHARGE LOCATION FRUM PUMPS TO SCREENS REMARKS Diving inspection performed

(INCHES) 60 1 8

INTAKE SCHEEN PUMP NO. SCREEN DESCRIPTION SUREEN UPSCHIEFTIGHT
TYPE OF MESH MATERIAL
HOLES/INCH WIDTH OR DIAMETER OF SCHEEN SCREEN CUNDITION FRAME

SCREEN CODE Rx DISTANCE FROM SHORELINE MESH SIZE WIRE SIZE HEIGHT OF SCREEN

SHORE DIST. CODE PERFORATION SIZE

TRASH RACK

BAR SPACING TRASH FENCE RELATION TO SCREEN

DEBRIS LUCATION AND AMOUNT SEDIMENTATION PP silted over INTAKE VELOCITY READINGS FISH BYPASS SYSTEM

SCOURING

AMBIENT STREAM VELOCITY FISH SPECIES SEEN

SURFACE WATER TEMP DEGREE F WATER ELEVATION INSPECTION DATE

INVENTORY NO. Shk140.08 PLIMP NAME US Army Cofe NAME US Army Cofe _______ADDRESS
DIVERSION LOCATION
STATE IN COUNTY New Perce TOWN Lewiston CR'T NO. SITE NO.

ADDRESS ,,

PHINE

RIVER Shake RIVER MILE 140.0 BANK R QUAD.MAP COFE PUR. NOTICE DATE DATE RIVER Snake

SEC

WATER RIGHT

APPLICATION NO.

PERMIT NO. PERMIT DATE CERTIFICATE NO.

PRIGRITY DATE

PUD

PERFORATION SIZE

QUANTITY-CFS

ACRE FT/YR

PURPOSE Ditch make up water

TYPE OF STRUCTURE

ACRES INRIGATED

SHORE DIST. CODE

ACCESS RUITE PUMP INFORMATION LOCATION FROM SHORELINE TO PUMPS

1

NUMBER HP SIZE OF OF PUMPS EACH DISCHARGE

TYPE OF DISCHARGE LOCATION FROM PUMPS TO SCREENS

REMARKS Diving inspection performed-impinged fish

(INCHES) 12

INTAKE SCREEN SUMMERGENCH TYPE OF MESH MATERIAL WIFE HOLES/INCH WIDTH OR DIAMETER OF SCREEN SCREEN CONDITION FRAME

MESH New mesh installed SEALS

DEBRIS LOCATION AND AMOUNT SEDIMENTATION
TNIAKE VELOCITY READINGS
FISH BYPASS SYSTEM

SCREEN CODE CY DISTANCE FROM SHURELINE MESH SIZE O.625in WIRE SIZE HEIGHT OR LENGTH OF SCREEN

TRASH RACK BAR SPACING

TRASH FENCE

RELATION TO SCREEN

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELOCITY FISH SPECIES SEEN INSPECTION DATE

INVENTORY NO. CIW2.3L PUMP NAME US Army Cofe DIVERSION LUCATION

ADDRESS ,,

SCOURING

PHONE

OIVERSILM LUCATION
STATE 1D COUNTY Nez Perce 10WN Lewiston RIVER Clearwat RIVER MULE 2.3
CRI NO. SITE NO. Cofe PUB. NOTICE
Cofe PERMIT NO.

BANK L QUAD. MAP DATE DATE

SEC T

WATER HIGHT

WATER RESCURCE AREA

APPLICATION NO.

PERMIT NO.

CERTIFICATE NO.

PRIGRITY DATE

QUANTITY-CFS

ACHE FT/YR

(INCHES)

PERMIT DATE PURPOSE Ditch make up water

ACRES IRRIGATED

SHORE DIST. CODE

OTHER ACCES'S ROUTE

PLIMP INFORMATION

LOCATION FROM SHORELINE TO PUMPS NUMBER SIZE OF OF PUMPS EACH DISCHARGE

TYPE DE DISCHARGE

SCOURING

TYPE OF STRUCTURE LOCATION FROM PUMPS TO SCREENS

1

REMARKS Diving inspection performed-impinged fish

INTAKE SCREEN

PUMP NO.

SCHEEN DESCRIPTION
TYPE UF SCREEN
SUMMERGENCE TYPE OF MESH MATERIAL WIDTH UR DIAMETER UF SCREEN HOI ES/ (NCH SCHEEN CONDITION

FRAME MESH SEALS

DEBHIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READINGS FISH BYPASS SYSTEM

V CODE DISTANCE FROM SHORELINE
MESH SIZE WIRE SIZE
HEIGHT OR LENGTH OF SCREEN

PERFORATION SIZE

TRASH RACK BAR SPACING TRASH FENCE HELATION TO SCHEEN

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELCCITY
FISH SPECIES SEEN INSPECTION DATE

INVENTURY NO. CIWE. SR PLIMP NAME US Army Cofe DIVERSION LOCATION

WATER RESOURCE AREA

ADDRESS ,,

PHONE

TYPE OF STRUCTURE

STATE 10 CULINTY Nez Perce TOWN Lewiston SITE NO.

RIVER Clearwat RIVER MILE 2.5 BANK R GHAD.MAP COFE PUB. NOTICE. DATE COFE PERMIT NO.

DATE

APPLICATION NO.

PERMIT NO. PERMIT DATE PURPUSE Ditch make up water CERTIFICATE NO.

PRIORITY DATE

QUANTITY-CFS OTHER

ACRE FT/YR

ACRES IRRIGATED

SEC

ACCESS ROUTE PLIMP INFORMATION LOCATION FROM SHORETINE TO PUMPS

NUMBER HP SIZE OF OF PLIMPS EACH DISCHARGE TYPE OF DISCHARGE LOCATION FROM PUMPS TO SCREENS

REMARKS Diving inspection performed-impinged fish

1

(INCHES) 12

INTAKE SCREEN FUMP NO. SCREEN DESCRIPTION

SCREEN DESCRIPTION OF SCREEN
TYPE OF MESH MATERIAL
TYPE OF MESH MATERIAL TYPE OF MESH MATERIAL
SUMMERGENCE, TYPE OF MESH MATERIAL
UNIFS/INCH WIDTH OR DIAMETER OF SCREEN

FRAME MESH SFALS

SCREEN CODE

N CODE DISTANCE FRUM SHORELINE MESH SIZE

SHORE DIST. CODE PERFORATION SIZE

MESH SIZE WIRE SIZE HEIGHT OR LENGTH OF SCREEN

TRASH RACK

TRASH FENCE

RELATION TO SCREEN

DEBRIS LUCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READINGS FISH BYPASS SYSTEM

SCOUR ING

SURFACE WATER TEMP DEGREE F WATER ELEVATION

AMBIENT STREAM VELCICITY INSPECTION DATE FISH SPECIES SEEN

INVENTORY NO. CIWE. SL HUMP NAME LES Army CofE

ADDRESS ,,

SCOUR ING

PHONE

NAME US Army Cofe
DIVERSION LOCATION
STATE 1D COUNTY Nez Perce TOWN Lewiston RIVER Clearwat RIVER MILE 2.5
CRY NO. SITE NO. COFE PUB. NUTICE
COFE PERMIT NO.

BANK L GLIAD MAP DATE

SEC

WATER RESOURCE AREA

APPLICATION NO.

PERMIT NO.

PRIORITY DATE

GLIANT ITY-CFS

ACRE FT/YR

PERMIT DATE PURPOSE Ditch make up water CERTIFICATE NO.

ACRES IRRIGATED

OTHER ACCESS ROUTE

INFORMATION LOCATION FROM SHORELINE TO PUMPS NUMBER

SIZE DE DISCHARGE TYPE OF

TYPE OF STRUCTURE LOCATION FROM PUMPS TO SCHEENS

1

EACH OF PUMPS (INCHES)

D1SCHARGE

REMARKS Diving inspection performed-impinged fish

INTAKE SCREEN FUMP NIL SCHEEN DESCRIPTION TYPE OF SCREEN Expanded diamond metal SUBMERGENCE. TYPE OF MESH MATERIAL Metal HOLES/INCH WIDTH OR DIAMETER OF SCREEN SCREEN CONDITION FRAME

MESH New mesh installed SEALS

DEBRIS LOCATION AND AMOUNT SEDIMENTATION INTAKE VELOCITY READINGS 0.66ps FISH BYPASS SYSTEM

SCREEN CODE CY DISTANCE FROM SHORELINE MESH SIZE 0.5in WIRE SIZE HEIGHT OR LENGTH OF SCREEN

SHORE DIST. CODE PERFORATION SIZE TRASH RACK

PACING TRASH FENCE RELATION TO SCREEN

SURFACE WATER TEMP DEGREE F WATER ELEVATION AMBIENT STREAM VELICITY
FISH SPECIFS SEEN INSPECTION DATE

Northwest Fisheries Science Ctr. 2725 Montlake Blvd. E Seattle, WA 98112