Northwest Power and Conservation Council

February 10, 2004

MEMORANDUM

TO: Fish and Wildlife Committee

FROM: Mark Fritsch

SUBJECT: Fish Screening Status

Action

At a recent Council meeting, Council members requested a review of the current record/status of the fish screening efforts in the Columbia Basin. At your meeting next week Council staff will provide a status report regarding the current record of information for screening projects in the basin.

Background

On March 10, 1998 the Fish Screen Oversight Committee (FSOC) submitted the 1997 Annual Fish Screen Oversight Committee Report. The report describes the current status, future plans, and problems encountered in each state fish screen programs in Idaho, Washington and Oregon. The report includes a summary and data for completed projects and discusses an implementation schedule for fish passage work above Bonneville Dam through the year 2002 (see attachment).

The Program has major screening initiatives in Northeast Oregon, the Salmon River in Idaho, the Yakima Basin and several individual projects. Also, the Mitchell Act, using congressionally appropriated funds, has supported screening in the Columbia Basin but has suffered reduced funding in recent years. We need to update the status of the Mitchell Act Program.

The 1998 report was the last received from FSOC. Since that time, status and reporting has been on an individual project or state level, and in subbasin summaries. Some reporting has

also occurred specifically in Bi-Op implementation reporting but does not help us assess progress of the screening programs against the inventories of remaining needs.

In the past, the coordination of the FSOC was a work element of CBFWA. Currently, FSOC is not an identifiable work element of the CBFWA proposal. The FSOC seems to no longer function as a regional coordinating group as it did in the past and there may be a need to reconvene such a group and work with CBFWA to update the report.

At the time of packet, Council staff has not had the time to follow-up with Bonneville (e.g. COTRs) and the state and federal contacts, but will try to obtain current summaries or define a work plan to update the information before the Committee meeting.

Attachment 1: Cover letter and report received from the Fish Screen Oversight Committee (FSOC) on March 10, 1998.

March 10, 1998

Mr. John Etchart, Chairman
Northwest Power Planning Council
851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204

Dear Chairman Etchart:

Measure 7.10 of the Council's Fish and Wildlife Program addresses the installation of new screening facilities on unscreened diversions and repair or upgrade of older facilities. On May 12, 1997, the Fish Screen Oversight Committee (FSOC) submitted a report to you covering the current status of fish screen work and the 1997 work plans for Idaho, Washington, and Oregon.

The enclosed 1997 Annual Fish Screen Oversight Committee Report describes the current status, future plans, and problems encountered in each state fish screen program. The report includes a summary and data for completed projects and discusses an implementation schedule for fish passage work above Bonneville Dam through the year 2002. This implementation schedule was developed by the three state coordinators and the National Marine Fisheries Service to satisfy Congress's request for information on Mitchell Act (MA) fish screen activities. We believe that the proposed schedule to complete fish screen work is quite ambitious, but within the capabilities of the state programs, given their current infrastructure and work force. However, the schedule depends on sufficient funding and cooperation from the irrigation community and federal land managers.

FSOC's first priority continues to be critical habitat of Snake River steelhead, sockeye salmon, and chinook salmon, which are listed under the Endangered Species Act (ESA). Diversions in Washington's ESA subbasins (Asotin, Tucannon, and Grande Ronde) are in compliance. Therefore, in 1998, Washington Department of Fish and Wildlife and the U.S. Bureau of Reclamation will continue to focus on diversions in mid-Columbia subbasins and in the Yakima Subbasin. In Oregon, only a few irrigation diversions within critical habitat remain to be treated in the mainstem Grande Ronde River, however, many unscreened diversions remain in the headwaters of this system that are in essential steelhead habitat. In the John Day system, the Oregon Department of Fish and Wildlife has finally begun the task of replacing over 250 obsolete fish screening system dating from the 1950s.

Idaho Department of Fish and Game (IDFG) has made substantial progress in the Salmon River Subbasin. By 2000, most diversions affecting critical habitat of ESA listed salmon will be treated at the current installation rate. Insufficient instream flow is the most critical problem in many small Salmon River tributaries where anadromous fish production has been reduced by irrigation withdrawals. Idaho intends to continue riparian habitat enhancement around screens,

headgates and diversions. Their objective is to eliminate as many diversions as possible, primarily through canal consolidation.

There are two major problem areas in the Columbia River Basin that still need to be addressed:

> Diversions below Bonneville Dam on the mainstem and tributaries and in all resident fish production areas of the Basin (outside the current range of anadromous fish) need to be treated; and
>
> The structural condition and fish passage effectiveness of many MA-funded adult fishways must be evaluated. Many of these fish ladders, which have deteriorated structurally to fair or poor condition, are due for major repairs or total replacement.[1]

Included with this report is the FSOC database, which contains most of the gravity diversions, pump intakes, and tributary dams affecting adult and juvenile anadromous fish passage in the Columbia River Basin above Bonneville Dam.

Questions regarding FSOC activities should be directed to me at (503) 326-7031.

Sincerely,

Frank Young
Coordinator

Enclosure

cc: FSOC
CBFWA-AFM
Robert Lohn, BPA
John Lowe, USFS
John Marsh, Doug Marker, NPPC
Bert Bowler, Michael Maffey, IDFG-Boise
Steve Rainey, Bryan Nordlund, NMFS
Paul Sekulich, Ken Bates, Tom Burns, WDFW
Mark Moulton, SNRA

[1] See December 4, 1995, CBFWA letter to Northwest Power Planning Council.

1997 FISH SCREEN OVERSIGHT COMMITTEE ANNUAL REPORT

In 1997, the state anadromous fish screen programs operated nearly up to capacity with many fish screens installed at critical gravity and pump intake diversion sites. However, many diversions that entrain juvenile fish into irrigation systems (Table 1) and many Mitchell Act (MA) funded fish ladders fail to meet current criteria. This report reviews progress of state and federal fish passage programs in 1997 and describes issues that may affect continued progress in 1998.

Major Concerns

In the 1996 Fish Screen Oversight Committee (FSOC) Report, we described several issues affecting progress towards implementation of measure 7.10 of the Columbia River Basin Fish and Wildlife Program (Program), including progress of the Yakima Phase II Program, BPA funding, federal water use authorizations, Endangered Species Act (ESA) consultation, excessive water withdrawal, Washington hydroelectric project fish passage facilities, and the status of state technical work groups (TWG). Currently, FSOC's main concern is the reliability of funding for juvenile and adult fish passage facilities in the basin. Additionally, with reduced budgets constraining the amount of new construction, the high cost of operation and maintenance (O&M) is becoming difficult for the state programs, particularly in Oregon and Idaho, to assume alone. We are also concerned that fish screen evaluations under contract to BPA do not have sufficient funding to properly complete the work.

Mitchell Act Funding.

The National Marine Fisheries Service's (NMFS) Columbia River Fisheries Development Program (CRFDP), operated under the authorization of the MA (Public Law 79-676, August 8, 1946), is one of the largest sources of funding for fish passage/protection work in the Columbia River Basin. Under the CRFDP, state fish and wildlife agencies in Oregon, Washington, and Idaho utilize MA funds to construct, operate, and maintain fish screens in a very economical manner. In addition to screening irrigation diversions, MA funds have been used to construct and maintain both simple and complex fish passage facilities, ranging from simple stream improvements to assist fish in passing barriers to large, complex fish ladders such as the one constructed to provide passage over Willamette Falls in Oregon. Most of Oregon Department of Fish and Wildlife's (ODFW) and Idaho Department of Fish and Game's (IDFG) fish passage and irrigation diversion screening facilities are funded under the MA. Washington Department of Fish and Wildlife (WDFW), on the other hand, has only a small MA funded program with most fish screens being funded by the State, Bonneville Power Administration (BPA), or the U.S. Bureau of Reclamation (BR).

Processes involved in construction under the MA are simpler that those required when the Corps of Engineers (Corps) or the BR are involved. NMFS relies on the states to use their existing authorities to carry out both the construction and the O&M of fish screens and fish passage facilities. Funds are provided to WDFW, ODFW, and IDFG through yearly cooperative

agreements. The agencies operate screen shops in Yakima, Washington; and John Day and Enterprise, Oregon; and Salmon, Idaho.

Partially due to urging from the Northwest Power Plan Council (Council), congressional appropriations for fish screen work under the CRFDP have increased in recent years. The total amount spent on screens and fishways by NMFS over the past seven years ranged from a low of $1,410,000 in fiscal year 1991 to a high of almost $4,200,000 in fiscal year 1995. Due to a reduction in the total funds available in fiscal years 1996-97, the amount provided has stabilized at around $3,600,000. As a part of this increased funding, NMFS prepared an 8-year plan to complete fish screen work within anadromous salmonid habitat in the Columbia River Basin which was submitted to Congress in 1995. In order to achieve the goal of having all of the screening done by 2002, further increases in funding will be necessary. The report estimated needs for fish screens only at more than $5,000,000 in FY 1995 and $7,600,000 in FY 1996. Since this level of funding was not made available, progress toward the 2002 goal is slipping. Again in FY 1998, the estimated need for fish screens only is almost $3,000,000 more than has been allocated. Additionally, all of the fishways are in need of significant repair or replacement making an additional demand on the limited, available funds.

Working within budgetary limitations, significant progress has been made over the past several years. Emphasis has been placed on construction within the identified critical habitat for ESA listed Snake River salmon. Construction has been completed in Washington, and is scheduled for completion using FY 1997 funds in Oregon. Construction in Washington and Oregon outside of critical habitat aimed at reaching the year 2002 screening goal has either been slowed or, in Oregon's case, placed on hold. There are still a considerable number of replacement and new screen installations needed in Idaho. Given the level of funding currently available, 20-30 treatments a year is probably about the best that can be expected. This is significant in the amount of protection provided but it is long way from the 40-50 screens a year needed to reach the 2002 goal.

FUNDING: Bonneville Power Administration

BPA has been an important source of funding for implementing the Council's fish screen Program measures, as support for the MA projects, and for FSOC coordination activities. BPA co-funded with NMFS the construction of fish screen shops in Salmon, Idaho and in Enterprise, John Day, The Dalles, and Madras, Oregon. BPA funds have also been used to implement several irrigation canal consolidation projects, thus eliminating many points of diversion and fish screen construction, operation, and maintenance costs.

With the recent execution of a Federal Memorandum of Agreement which places a cap on BPA expenditures for fish and wildlife mitigation it is doubtful that BPA funding levels will be sufficient to address remaining passage problems as quickly as the Council's Program requires. Because of funding limitations, BPA funding in FY 1997 for all fish passage projects was reduced from FY 1996 levels. Several highly ranked new projects were not funded. Additionally, during the FY 1997 allocation process confusion was expressed that BPA fish screen funding might be a duplication of MA funding. Under the circumstances, FSOC justified the need for BPA funding and explained that it does not replace MA funding.

For FY 1998, IDFG's budget was increased from to $701,000 to 800,000. In Idaho, the BPA funding was generally intended to stretch MA funding by paying for necessary facilities supplemental to the actual fish screens, such as for headgates, consolidations, ladders, fences, pump-intake screens, and fencing around fish passage facilities.

ODFW's FY 1998 BPA screening budget was increased to $426,000 from $369,000 in FY 97. ODFW is using much of this funding to replace the many obsolete fish screening systems currently in use in the John Day Basin. Some additional BPA funding has been used for the installation of new pump intake screening devices in the Grande Ronde and Imnaha basins, and for pump screen inventories in the John Day, Walla Walla, and Umatilla basins.

In Oregon, Mitchell Act funding is the only funding source for many hatcheries and passage programs. In the current climate of shrinking MA appropriations, program managers have been forced to change the apportionment of MA funds between these two activities. Hatchery budgets have been shrinking for years and further reductions in hatchery funding have required the closing of some hatcheries. Thus screening activities and hatchery programs are competing for the same shrinking supply of funds in Oregon.

In FY 1998, funding for Yakima Phase II fish screen construction (BR and WDFW) was increased from $1,700,000 in FY 1997 to $2,100,000 in FY 98. Several projects have fallen years behind schedule while BPA acquires rights-of-way. In 1997, some of the difficult projects finally moved ahead and coordination seems to have improved considerably between BPA and the BR and the review process seems to work more effectively. The BR has attempted to address cost concerns by utilizing alternative designs such as fixed panel screens where appropriate.

Work continued in FY 97 on fish passage improvements in the Walla Walla River Basin. The projects are sponsored by the Confederated Tribes of the Umatilla Indian Reservation and are being designed by Montgomery Watson Engineers. In FY 97, $500,000 was allotted for juvenile fish screen design for two new facilities and a ditch consolidation project. The budget for design of a new ladder at one irrigation diversion dam and removal of two others was $350,000. The US Army Corps of Engineers provided 75% cost share for one ladder and one irrigation dam removal project. Implementation will continue in 1998 and 1999.

FUNDING: Other Sources

The State of Washington has consistently provided funding to upgrade irrigation diversions in Washington subbasins. WDFW's capital screening budget for State FY 98-99 is $1,005,000. Included in this total is $275,000 to cost share a proposed project to abandon the Methow Valley Irrigation District's two large gravity diversions and antiquated, inefficient delivery system and replace it with a closed system of shallow wells and buried pipelines. Implementation of this project will improve instream flows and eliminate the fish passage impacts (upstream and downstream migration) at the current facilities. The $275,00 cost share included the $137,000 carried over from FY 97. A NEPA Record of Decision on the project is scheduled to be completed for the 1999 irrigation season.

Mainstem Columbia and Snake river irrigators have funded the installation of pump intake fish screens. Unless users assume greater responsibility for the installation and O&M of facilities to

regulate water usage and protect fish or more BPA funds are dedicated to O&M, it is again likely that a budget of $15 million per year (from all sources) will not be available to accelerate fish screening as directed by Program Measure 7.10A.4.

Idaho coordinates its fish screening activities with the Model Watershed and its Technical Work Group. Some projects involve multiple agency funding and cost-sharing by the irrigator.

Oregon has a modest[2] state-wide screening cost-sharing[3] program that is applicable even for water-users within the Columbia Basin. However, there has been no interest on the part of water-users to participate in this cost-share program where state crews which are funded entirely with MA funds provide both installation and maintenance at no cost to the water-user. However, in areas within the Columbia Basin where MA funding is not available[4], the Oregon state-wide program is available as a fall-back option.

Operation and Maintenance

O&M consumes a great deal of the total fish screen program budget in the Basin. Each state's laws require the operator to install, operate, and maintain fish screens. However, these costs and responsibilities are born almost exclusively by the IDFG and ODFW screen shops. Since 1983 the WDFW has required irrigators using state-funded screens[5] to be responsible for O&M costs and therefore O&M is a modest portion of WDFW's budget. In the Columbia Basin, two WDFW field inspectors visit fish screen facilities about once per week during the field season to ensure that users effectively operate and maintain their fish passage facilities. Many of the irrigators contract with WDFW to perform some of the O&M.

In Idaho and Oregon, the MA budget includes all operation and maintenance of fish screens. IDFG also maintains over 57 miles of road and associated culverts, bridges, gates, and cattle guards. In FY 1996, after personnel and travel for O&M, only about 10 percent of IDFG's MA budget was left for new construction. In 1995, Oregon eliminated the requirement, except in extremely limited situations, for small water diverters (<30 cfs) to either provide or maintain fish screens, and instead created a voluntary cost-share program. However, the installation and O&M

[2]Budgeted for the 1997-99 biennium at only $250,000 to cover fish screen installation costs for the entire state.

[3]Water-users pay 40% of the total installation cost with the State paying the balance up to $10,000 (State share of any individual project). A state tax credit is also available for up to 50% of landowner cost. Water users in the state program, however, are responsible for their own minor fish screening maintenance (for example, cleaning, lubricating joints and fittings, and making minor adjustments to equipment). ODFW is still responsible for major screen repairs.

[4]Such as pump-sites on the main-stem Columbia and in areas with only resident fish.

[5]O&M for federally funded fish screen projects is paid by the MA and BPA. At BPA-funded Yakima Phase II sites, water users still pay or perform O & M equivalent to their pre-BPA obligation.

of fish screening facilities continues to remain the legal responsibility of water users in Oregon with larger water diversions (>30 cfs).

Irrigation Water Usage

At many locations lack of instream flow is a greater factor affecting fish production than the adequacy of the diversion's fish screen. Many fish producing tributaries are seriously depleted, reducing the quantity and quality of habitat and obstructing fish migration. Currently, few water diversions are metered and many irrigators routinely divert several times the amount specified in their water right. Many of the older fish screens in the Columbia River Basin are undersized and do not meet current fish passage criteria because diversion rates have increased. In Idaho and Oregon, most fish screens must be sized to accommodate flows that are greater than state water right amounts. In Oregon ODFW MA personnel are now working closely with state watermasters to ensure that screening devices are matched closely to actual water diversion rates by water users.

Most diversions require headgates and creative solutions to restore instream flow and/or adult fish passage. Many small inefficient surface diversions could be converted to ground water and/or utilize pressurized irrigation (sprinkler) systems. Pump intake screens are substantially less expensive to install but may have higher maintenance costs because of increased power consumption.

Federal Water Use Authorizations

The upper Salmon River area contains the majority of known unscreened diversions in the Columbia River Basin. The Salmon National Forest prepared a list of USFS (74) and BLM (34), and private diversions in this area, indicating which anadromous fish species may be affected.[6] The Sawtooth National Recreation Area (SNRA) indicated that there are approximately 156 irrigation diversions on its land, including 82 diversions in critical habitat for Snake River spring/summer chinook salmon which is many more diversions than were reported earlier. Many of these diversions are on small tributaries to the Salmon River. Low instream flows and/or small dams reduce anadromous fish production at many of the diversions because they delay or block migration. Diversions higher in the watershed on federal land often affect conditions lower in the system on private lands. Excessive stream diversions can deplete the source stream for miles downstream before the excess diverted flow returns.

Many upper Salmon River diversions have been in use for over 100 years. The SNRA indicates that only seven of the SNRA diversions have current USFS Special Use Permits. Many of these diversions may be permitted or "grand-fathered" by some other means. In order to reduce ESA and NEPA related construction delays, NMFS has been asked to submit the appropriate permit authorization covering all fish screen construction. The SNRA visual requirements for screen construction have been met by IDFG.

[6]Keifenheim, M. 1992. USFS - Region 4 Salmon National Forest Level 1 Stream Diversion Inventory. In cooperation with IDFG and BLM-Salmon District.

At the Salmon Summit, the USFS and BLM committed themselves to actions such as completing an inventory of fish screening needs on federal land. Measure 7.10A.5 of the Council's Program states that the USFS, BLM, and BR shall require "as a condition of both existing and new water use authorizations, that diversion structures have functional fish screens and other passage facilities for manmade barriers to salmon that meet FSOC criteria". "In coordination with state fish screening programs, the federal land managers should proceed to design and install screens on a multi-agency or shared cost basis". To date, the federal land management agencies have done little more than submit lists of diversions in anadromous fish producing areas on federal lands to NMFS and the state fish screen programs. The USFS anadromous fish budget for FY 96 was severely reduced by Congress.

In December 1993, USFS and ODFW completed a survey of diversions in the Hells Canyon National Recreation Area, Eagle Cap Ranger, and Wallowa Valley Ranger districts. Six gravity and two pump intakes that potentially affect anadromous fish required screening. The USFS indicated that it has no funding for the projects and that a National Environmental Policy Act (NEPA) analysis and possibly ESA consultation must be conducted before the projects can proceed, potentially in 1997.

In Washington, the Okanogan and Wenatchee national forests permit several diversions affecting anadromous fish. In particular, WDFW has urged the Okanogan National Forest to treat a diversion on Eight Mile Creek in the Methow Subbasin. The Eight Mile Ranch diversion is not under Special Use Permit to an irrigator, it is used by the USFS. The current fish screen is undersized and the approach velocity three times the FSOC criteria (>1.2 feet per second), which results in the impingement of juvenile spring chinook salmon and resident salmonids on the screen. WDFW and Washington Department of Ecology (WDOE) are also concerned that the USFS's withdrawal rate may exceed its water right. The Yakama Indian Nation has recommend that the Okanogan National Forest convert this surface diversion to well water. In a February 7, 1991, letter to WDOE regarding the Eight Mile Ranch's water usage, the Winthrop District Ranger agreed to seek funding in their FY 1994 budget to install a more efficient irrigation system than the current flood system. Unfortunately, no progress was made in 1997 to improve irrigation system efficiency or fish screen effectiveness due to lack of funds.

Technical Work Groups

Fish screen work is greatly accelerated and screen construction quality appears to be high throughout the basin. To implement these projects coordination is needed between the state screen programs and the federal land managers, tribes, NRCS, BR, and the irrigation community. In 1997 Technical Work Group meetings were held only for the Yakima Phase II Fish Passage Program.

Washington Hydroelectric Projects

In the 1994 FSOC report, we described fish passage problems at PacifiCorp's Wapatox project and Chelan Public Utility District's Dryden project. These problems in passing juvenile and adult fish have remain to be addressed by the project operators.

Additionally, FERC has asked for comments on a draft environmental impact statement for the Condit Hydroelectric Project on the White Salmon River. The FERC's preferred alternative includes implementation of adult and juvenile fish passage facilities at the dam, which has blocked anadromous fish passage since 1912. Many of the intervenors would prefer dam removal because it is the most biologically feasible, and probably most economically feasible, alternative to restore anadromous fish production.

Fish Passage Facility Evaluations

The Pacific Northwest National Laboratory (Battelle) has conducted both on-site evaluations of fish screening facilities and laboratory evaluations of facility operation criteria and specific design components under the Council's Program. Phase I screens in the Yakima Basin, the Dryden Screen in central Washington, some Phase II screens in the Yakima Basin, and some screens in Idaho have been evaluated. The evaluations indicate that the screens, when properly constructed and maintained, safely and efficiently protect fish from being entrained in irrigation canals. Specific laboratory studies have been conducted to compare the effectiveness of various orifice designs used in Idaho and the effectiveness of angled versus perpendicular screens on six-foot rotary drum screens. The results of these studies are presented in monthly reports to BPA, as technical reports, as presentations at the screen workshops (held in 1997 in Salmon, ID and scheduled for John Day, OR during 1998), as presentation at Program reviews (e.g. Columbia Basin Fish and Wildlife Authorities Project Review in March 1997) and as part of Battelle's Ecology Group website. Time lags between completion of specific tasks and distribution of reports has lead to delays in dissemination of important information generated by Battelle. This problem was discussed at length during 1996. The problem was to be resolved by having Battelle present their reports on BPA's website, however, because of budget cuts this information will now have to be place on Battelle's website.

PROGRAM HIGHLIGHTS IN 1997

Idaho

1997 Fish Screen Construction

In 1997, the IDFG anadromous fish screen program in Salmon, Idaho successfully treated 40 sites in ESA-chinook salmon habitat. Of this total 8 diversions were eliminated by consolidation or conversion to ground water, 12 screens were replaced, 20 pump intake screens installed, 4 pumps were eliminated, and 3 infiltration systems were built and activated. Consolidating adjacent points of diversion eliminates potential juvenile and adult migration delay, conserves instream flow, provides more stream channel stability, and reduces long term O&M costs.

Many of the new drum screens were set at a 22.5° angle, which moves juvenile fish, silt, and debris through the system more efficiently, than the previously used 45° screens. The new screen design takes less area to build and is less expensive to install, operate, and maintain. Idaho has also installed four infiltration type water collecting systems, one solar operated screen, and has developed several alternative screen designs that are ready for field testing.

1998 Funding and Implementation Plans

In 1998, IDFG intends to implement another 40 projects. A major consolidation of several diversions on the Salmon River will be engineered by the BR in 1998.

Diversions to be treated in later years as the projects proceed from lower to upper stream reaches are generally smaller and less complicated. IDFG recognizes the critical need for upgrading riparian areas in the vicinity of diversions and plans to implement some stream bank habitat enhancement with the screen program funds.

Hundreds of Salmon River pump-intakes must also still be treated. In 1994, approximately 238 pump-intakes were identified in the Salmon River Basin from Idaho Department of Water Resources' (IDWR) records. It is likely that nearly all of these (or more) pump intakes will require fish screens to protect endangered juvenile chinook salmon. However, because of the priority on gravity diversions, IDFG has not yet treated many of these diversions. In 1998, IDFG will work on high priority pump intakes as time and funding allows.

Policy

In the 1994 FSOC report, we explained problems that IDFG was encountering when trying to design fish screens. IDFG attempted to institute a state policy to share the cost of a fish screen with the diverter if the diversion is well above the numerically quantified decreed, licensed, or permitted flow rate. Idaho has also been successful in cost-sharing the installation of headgates, canal improvements, and fish-friendly wing dams with the irrigators. Irrigators using flood technology typically maximize their diversion rate during the spring run-off, which coincides with peak juvenile fish migration. Therefore, fish screens must be sized for peak diversion rates, rather than the state-issued water right quantities. Landowners with small amounts of irrigated

acreage generally divert the most water per acre. In 1997, several surface water diversions were converted to ground water, pumps, or sprinkler delivery systems. At many sites this practice requires that the fish screens be sized many times the diversion rate specified in the water right. In 1996, IDFG followed a revised process to obtain flow agreements. Before a flow agreement was negotiated, flow measurements were taken to determine ditch capacity and other preliminary information was collected to determine the proper drum size and the range of flows the fish screen will accommodate. The number of acres irrigated and the flow requested was then compared to similar sites within the basin to determine if it fell within a reasonable range. Many flow agreements were signed for a quantity substantially less than the historic maximum high flow measured, saving in construction costs.

The services of IDFG's Easement Specialist are critical in obtaining flow agreements. Negotiation of these agreements is vital to the fish screening process and has been working well to foster community support for IDFG's efforts.

The Idaho State Soil Conservation Commission (through BPA funding) has provided a coordinator for the Lemhi, Pahsimeroi, East Fork Salmon River Model Watershed Program which has evolved into a very beneficial activity. The Model Watershed Program was responsible for initiating the transfer of a water right from the Pahsimeroi River to the Salmon River. This made 6 cfs available in a reach of the Pahsimeroi River where low instream flow adversely affects adult fish passage. Although fish habitat is of exceptional quality, production is limited in several miles of the upper Pahsimeroi River by irrigation withdrawals. The Model Watershed, NRCS, private landowners, and IDFG have been effective in working together to accomplish water conservation measures in this area.

U.S. Bureau of Reclamation Projects

Several parts of the BR's Idaho Water Conservation Demonstration Project on the Lemhi River, which was described in the 1994 FSOC report, were completed in 1996. The goal of this project is to improve fish passage past six diversions in a critical passage reach from river mile 5.5 to 8.3. L-07A diversion will be consolidated with L-07. The L-06 and L-07/07A diversion projects, which include fish ladders and variable crest weirs, were completed in the early spring of 1996 and were in operation during the entire migration season. The L-5 diversion was eliminated when the land was sold to the Nature Conservancy, saving approximately 600 acre-feet of water. L-04 diversion was converted from flood irrigation to pump-sprinkler and diverts from the L-06 canal, rather than the river. Water withdrawal will be reduced by the sprinkler system to about 6 cfs from about 30 cfs (about 1,000 acre-feet).

Even after the Lemhi River Water Conservation Demonstration Project is implemented, low instream flows during the irrigation season will continue to severely limit fish production. Therefore, the BR is also evaluating a potential reservoir site in the upper Lemhi River watershed to store water for fish flows. The irrigation community has been very active and committed to making the BR’s Lemhi Water Conservation Demonstration Project work.

Natural Resource Conservation Service Activities

NRCS engineers work with IDFG to coordinate head-gate, fish screen, and ditch consolidation projects.

Lemhi River

The Lemhi River was surveyed and all 19 pump intakes are now in compliance. Most were passive intake screens, two were self-.cleaning, and one was an infiltration pump system.

East Fork of the Salmon River

Idaho is working on a conservation easement on the East Fork that would eliminate 5 diversions. This agreement would result in the stabilization of this area and the re-establishment of riparian vegetation.

Clearwater River Basin Diversions

Based on a mail-in survey of 288 water right holders (response rate of 61%), most water withdrawals are 2 HP pump intakes used seasonally for domestic consumption. IDFG is trying to develop a procedure to bring the Clearwater Rive intakes into compliance. No gravity withdrawals were reported.

Oregon

1997 Fish Screen Construction, Operation, and Maintenance

Above Bonneville Dam, MA and BPA funding enable the Oregon Department of Fish and Wildlife (ODFW) to conduct fish screening programs in the Grande Ronde, Imnaha, John Day, Umatilla, Walla Walla, Deschutes, Fifteenmile, and Hood River basins.[7] In 1997, ODFW utilized almost $2 million of MA funds and $369,000 in BPA funds in providing fish screening protection at hundreds of water diversions. In addition, ODFW received approximately $250,000 through a separate BPA grant to begin the process of evaluating and modifying pump intake fish screens in particular NE Oregon basins. ODFW implements its federal fish screening moneys and programs through its Northeast and High Desert Regions.

ODFW Northeast Region Fish Screening Activities

By far, the bulk of MA and BPA funding received annually is spent in providing fish screening protection at over 500 water diversions in the Grande Ronde, Imnaha, Walla Walla and John Day basins (see Table 1). The Grande Ronde and Imnaha, in particular, provide essential habitat for federally listed (ESA) Snake River spring/summer chinook salmon and steelhead. The

[7] Elsewhere in the state, ODFW fish screening efforts are funded by a state fishing license surcharge and general state funding. In addition to these state funded screen programs, various other entities, such as the BOR, municipalities, and irrigation districts sometimes implement screening activities. See footnotes 2,3,4.

diversions in these basins are mostly small to medium size gravity (ditch) diversions, protected by rotary drum style screens.

Operation, maintenance (O & M), and construction activities in these basins is centered in two specialized fish screening shops located in Enterprise and John Day. In 1997, in addition to their heavy O & M responsibilities, ODFW shop personnel installed 12 new rotary drum screen systems in the Grande Ronde basin, and completely replaced 27 obsolete rotary drum screen systems dating from the 1950's in the John Day basin.

BPA also provided additional funding ($250,000) to begin the installation of new pump intake screening in the Grande Ronde basin. Approximately 86 new pump intake screens meeting NMFS criteria were installed through a private contractor there. Installation of new pump screening devices in the Grande Ronde should be completed in 1998. Inventories of pump screening needs in the John Day and Umatilla basins, also part of this special grant, should be completed within a few months.

ODFW High Desert Region Fish Screening Activities

MA and BPA funding also enables ODFW to provide fish screening protections in the Deschutes, Fifteenmile, and Hood River basins. Two small fish screening shops in The Dalles and Madras allow the Department to operate and maintain over 115 pump intake screen devices and 21 small to medium rotary drum screens. O & M in these basins was particularly difficult in 1997 due to a major January flood event. As a result of irrigation diversion damages suffered, 8 pump intake and 2 rotary drum systems had to be completely replaced. In addition, a number of other systems suffered heavy damage (15 or more), with considerable time being spent in their rehabilitation. Vandalism also caused the destruction of a fish passage and screening facility, which was replaced this year.

New installations in the Fifteenmile and Trout Creek (Deschutes) basins included the construction of 2 completely re-designed irrigation systems, including screening and passage structures, 4 pump screen systems, and 2 rotary drum screens. In 1997, the time and effort spent repairing and replacing flood-damaged screening systems in these basins precluded the installation of more new screening devices.

1998 Funding and Implementation Plans

In 1998, ODFW expects to receive similar amounts of federal MA and BPA funding for Columbia Basin fish screening and passage activities. Program administration is centralized in the Portland Headquarters Office, as well as technical engineering support. Portland staff also handle inspections and minor maintenance at MA passage facilities around the state, and are directly responsible for all O & M activities at the very large MA fish passage facilities at Willamette Falls, located on the Willamette River at Oregon City.

In 1998, ODFW will complete fish screening installations in critical chinook salmon habitat of the Grande Ronde basin, and will begin some installations in the Grande Ronde and Imnaha basins on headwater diversions critical to steelhead. In the John Day basin, it will continue its

major effort to replace obsolete and outmoded rotary drum screen systems. With weather and other factors permitting in the John Day, 30 or more replacement installations are planned.

The vast majority of John Day basin screens were built in the 1950s and 1960s, and badly need replacement. These screens do not meet current NMFS fish screening and passage criteria and are generally deteriorating.[8] The upper mainstem John Day River and Middle Fork John Day River have the most substantial diversion problems with these old designs.

BPA funding will be used to continue installing pump-intake screens in the Grande Ronde and Imnaha watersheds, and to complete inventories of existing diversions and fish screening needs in the John Day, Umatilla, Deschutes, Fifteenmile, and Hood River basins. On the basis of these inventories, additional funding will be sought to bring existing pump intake diversions in these basins into compliance with NMFS standards. In addition, 2 new re-designed fish screening and passage systems are again planned for installation in the Trout Creek sub-basin of the Deschutes River.

Washington

1997 Construction

In FY 97, BPA provided $1.8 million for design, construction, and O&M of Yakima Phase II screens (WDFW = $0.3 million; BR = $1.5 million). WDFW's state FY 97 capital budget expenditures for fish screen construction totaled $334,500. The MA provided a total of $108,680 for mainstem and tributary pump screen compliance surveys ($67,194) and O&M of MA gravity fish screens and ladders ($41,486). In CY 97, WDFW completed five gravity screens in mid-Columbia subbasins using state capital funds. Three projects were screen replacements in anadromous fish waters (Wenatchee River and Entiat River subbasins). Replacement of gravity screens for anadromous fish protection is complete in the Wenatchee River Basin and will be completed in the Entiat River Basin in CY 98. The other two projects were on unscreened resident fish diversions in the Methow River Basin with one of the projects incorporating passage barrier removal and water conservation (piping) elements. The BR and/or WDFW completed screen construction, upgrades, or pump conversions on nine Yakima Phase II sites in CY 97 including the 325 cfs Yakima-Tieton Irrigation District's diversion. Approximately 70 percent of the 66+ Phase II sites have been treated or abandoned with about 20 sites remaining. BPA, the Confederated Tribes of the Umatilla Indian Reservation, and WDFW also demolished and removed the abandoned Maiden Diversion Dam on the lower Touchet River (Walla Walla Basin) which was a partial barrier to adult steelhead passage. WDFW used Federal Emergency Management Act (FEMA) flood repair funds ($69K) secured

[8] Most are not angled, water velocities are too high, screen mesh is too large, and the bypass conduit on many facilities is too small in diameter.

by NMFS to reconstruct the Starbuck Electric screen and headgate, repair the right bank/dam abutment and modify the Starbuck fishway after the devastating 1997 New Years Day flood.

1998 Funding and Implementation Plans

In FY 98, WDFW will receive $41,486 in MA funds for screen and fishway O&M and $200,000 in additional FY 97 FEMA flood funds for fish screen/fishway repairs. A portion of the FEMA funds will be used to convert two anadromous fish gravity screens that sustained severe flood damage in 1996 and 1997 to pump stations or shallow wells with pressurized sprinkler delivery systems that will conserve water. The remainder will be used to relocate and construct a new headgate to protect the new Bull Ditch fish screen (Phase II) from flood damage. No new MA funds were allotted in FY97 or FY98 for pump station screen compliance inspections. However, sufficient FY96 funds remain ($102K) and have been carried into FY98 to continue re-inspections in the tributaries and at high priority mainstem Columbia and Snake river sites. Mainstem pump stations downstream of Bonneville Dam have been inspected, but tributary pumps downstream of the Klickitat River have yet to be inventoried and are scheduled for FY98.

The Yakima Screen Shop (YSS) is submitting a FY 98 BPA Phase II fabrication budget request totaling $291,000. Two Yakima Phase II fish screens will be completed before the 1998 irrigation season begins: Old Union (18.5 cfs) and Younger (15 cfs). The Fogarty (30 cfs) is scheduled for construction in the fall after the irrigation season (BR/YSS). YSS also plans to treat six small (< 5 cfs) Phase II sites with modular drum or plate screens (Ballard, Musetti, Big Creek (2 div.), Beck and Chapman-Nelson) which can be installed during the irrigation season. YSS will also fabricate the screens and other metalwork for the Johncox site (15 cfs), although completion is not anticipated until CY 99.

YSS FY 98 capital funding is $365,000 for new screen/fishway construction. In CY 98, YSS will finish screen replacements/upgrades in the Entiat River Basin (Martin-Sanders, Gaines-Miller and Chelan PUD--all <2cfs) and begin work in the Methow River Basin. Presently, no funds are available from MA or BPA for Methow screen construction and WDFW intends to proceed with only state capital funding. Two large projects and one small screen are scheduled for CY 98—Barclay (20 cfs, Methow River), Chewuch (27 cfs, Chewuch River) and Beaver Creek (2.5 cfs). An additional $275,000 has been encumbered for the Methow Valley Irrigation District (MVID) conversion project cost share in lieu of conventional screen construction. The MVID cost share eliminates the East Canal (40 cfs, Methow River), the East Canal wood crib diversion dam and MA fishway, and the West Canal (30 cfs, Twisp River). The YSS's field construction capability has been limited by the lack of good quality heavy construction equipment. In 1997, a late model used boom truck was acquired on the capital construction budget. In 1998, YSS will look for a adequately powered, relatively new 10 yard dump truck capable of towing excavators and other heavy equipment.

Work will also continue in the Walla Walla River basin in CY 98 (BPA funds) with the construction of the Burlingame Dam fishway and design of the Burlingame Canal (100 cfs) fish screen facility.

Yakima River Water Rights Adjudication

Last year, FSOC reported that the Yakima Phase II Program was moving faster than resolution of water right determinations through the Yakima Basin Water Rights Adjudication (WDOE vs. Acquavella et. al.). In the past year, the Washington passage TWG has monitored water rights status for remaining Phase II projects and has adjusted the implementation schedule in an attempt to prevent design flow vs. water right conflicts. Nevertheless, in the six years since Phase II construction began, nine of the 34 treated sites (26%) were designed for flow significantly different than the amount eventually confirmed by the court. This year, water rights were confirmed for differing amounts at three sites. At two sites, the screen design flow exceeded the confirmed right (Fruitvale: 39.1 cfs design, 32.0 confirmed; Naches-Cowiche: 40.0 cfs design, 29.0 confirmed). At one site, the TWG underestimated the flow that would be confirmed (Old Union: 18.5 cfs design, 24.1 cfs confirmed). Over-sizing costs the project additional BPA dollars, but does not jeopardize fish survival. Under-sizing is a more serious concern because the screen approach velocity criteria will be violated when the diversion flow exceeds the screen design flow. Small fish, particularly emergent fry, can be impinged and killed or injured. Significantly under-sized facilities may have to be enlarged or completely replaced depending on whether the water rights holder actually diverts the maximum confirmed flow.

Pump Diversion Inventory/Assessment

In 1997, WDFW's diving contractor completed inspections of 21 large pump stations on the mainstem Columbia River downstream of Bonneville Dam. Fifteen sites were found to be active diversions with eight (53%) meeting the screening criteria. The remaining seven were screened, but had mesh openings exceeding 0.125 inches. In FY 98, the diving contractor and/or YSS will assess screen condition at tributary pump stations downstream of The Dalles Dam. WDFW enforcement officers from the Region 5 office in Vancouver have identified approximately 70 pump stations in 15 watersheds extending from the Grays River to the Klickitat River.

In July 1997, YSS staff began compliance re-inspections of Columbia/Snake tributary pump diversions utilizing MA funding. Snake River Basin inspections were completed on Joseph Creek, the lower Grande Ronde River and Asotin Creek. Re-inspection of the Tucannon River is about 90 percent complete. In late September and October, inspections were completed on the Entiat River and initiated on the Wenatchee River before suspending efforts for the year. Funding has been extended through the end of FY 98, inspections will resume next summer. Currently, Asotin Creek has 20 active pump diversions, down from 22 diversions in 1992 when the last inventory was conducted. At that time, 16 new pump screens were installed for diversion owners by YSS using state capital budget funds; 6 were already in compliance. Presently, 19 diversions (95%) meet current criteria and are still using the screens provided by YSS in 1992. At least one screen was lost during flooding in February of 1996 and four diversions that were active in 1992 have been abandoned due to flood damage. Data have not yet been reviewed for the Tucannon River, but similar results are expected because YSS screens were also installed in 1992. Pump screens were installed on the Entiat R. in 1989 and a higher percent may be missing

due to attrition. An initial Walla Walla River Basin pump station inventory is scheduled to be completed in CY 98.

Bureau of Reclamation Mainstem Irrigation Facilities

Last year, FSOC reported on the proposal to conventionally screen the intake channels to BR's Burbank No. 2 and No. 3 pump stations located within Casey Pond (lower Burbank Slough) several miles downstream of the mouth of the Snake River. High costs and technical problems caused WDFW and BR to abandon plans for conventional screening. Instead, a decision was made in late winter to evaluate the effectiveness of a commercially-available underwater strobe light behavioral barrier at the intake to Burbank No. 3. Equipment was rapidly specified, procured and installed in May 1997 with the hope of obtaining data on the effectiveness of the strobe light barrier in preventing fall chinook fry entrainment. Unfortunately, a sudden increase in water temperature caused salmon fry to leave Casey Pond before any data could be collected. Behavioral barrier testing will resume in March 1998— early enough to provide conclusive data on the effectiveness in repulsing fall chinook fry. If successful, BR will deploy full-scale operational strobe light barriers at both pump station intake channels by the spring of 1999.

Construction of the new screen facility at the East Unit Pumping Plant (East Wenatchee) began in October 1996. The Brewster Flat Pumping Plant screen is scheduled for construction in CY 98. Both sites will use submerged, cylindrical profile bar screens with air burst cleaning systems. Work on the Shellrock Point Pumping Plant screens has been deferred pending additional design work. However, BR and WDFW are working with the Okanogan Irrigation District to construct upstream fish passage facilities at the currently unladdered Salmon Creek Diversion Dam (Conconully Project) for Okanogan River Basin for summer steelhead listed as endangered under the Endangered Species Act. The fish screen on the Salmon Creek diversion will also be upgraded to meet current criteria. Fish passage construction is scheduled for summer 1998.

Yakima River Basin Water Enhancement Project

The Lower Teanaway River Irrigation Project is progressing slowly. The Seaton Ditch water users have formed an irrigation association which makes them eligible to accept ownership, collect assessments and perform O&M for the project facilities constructed with BPA funds. The pump station and pressurized delivery system are still scheduled for completion by early in the 1999 irrigation season.

Fish Screen Oversight Committee

In 1997, FSOC activities included:

- FSOC conference call meetings;

- sponsorship of the 5th Annual Pacific Northwest Fish Screen Workshop and Vendor Trade Show hosted by IDFG and BR in Salmon, Idaho, September, 9-11, 1997;
- maintenance of the database on water diversions and fish screens: and
- preparation and distribution of FSOC Annual Report.

Table 1. Status of Columbia River Basin Anadromous Fish Screens on Gravity Diversions above Bonneville Dam.

Subbasin	Constructed to Criteria	Existing-Need Upgrade	Unscreened	Total
OREGON				
Deschutes	13	2	1	16
Fifteenmile	5	0	0	5
Grande Ronde	128	2	44	174
Hood	0	2	1	3
Imnaha	26	0	0	26
John Day	36	257	32	325
Snake (mainstem tribs)	0	1	1	2
Umatilla	7	6	6	19
Walla Walla	2	26	0	28
Total	**217**	**296**	**85**	**598**
WASHINGTON				
Asotin	3	0	0	3
Entiat	3	3	0	6
Grande Ronde	1	0	0	1
Methow	10	13	1	24
Tucannon	9	0	0	9
Walla Walla	0	14	0	14
Wenatchee	6	0	0	6
Yakima	60	23	1	84
Total	**92**	**53**	**2**	**147**
IDAHO-SALMON RIVER				
Salmon R (mainstem)	13	33	4	50
Lemhi	75	29	82	186

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Subbasin	Constructed to Criteria	Existing-Need Upgrade	Unscreened	Total
N Fk Salmon	14	2	8	24
Pahsimeroi	11	17	3	31
E Fk Salmon	9	18	9	36
M Fk Salmon	2	0	15	17
S Fk Salmon	0	0	4	4
Salmon R (small tribs)	5	11	135	151
Little Salmon	0	4	1	5
Panther Cr	0	0	13	13
Total	**129**	**114**	**274**	**517**