SECTION 4

ADULT SALMON MIGRATION

INTRODUCTION

Mainstem Columbia and Snake river hydroelectric projects and some tributary projects are physical barriers to adult salmon and steelhead migrating from the ocean to spawning areas upstream. To solve this problem, adult fish passage facilities have been constructed at 13 mainstem dams on the Snake and Columbia rivers. Water flows and spill guidelines also have been adopted to provide unimpeded passage and maximum attraction of the fish to the fishway entrances.

However, at some adult passage facilities, there are still problems that result in delayed passage and mortality. For example, flow and spill conditions intended to assist juvenile migrants at some dams tend to discourage upstream fish migration, mask the flows that attract fish to the fishway, or induce fallback so the fish must relocate and reascend the ladder. These conditions may also increase the level of total dissolved gas in the water to levels lethal to both fish and fish food organisms.

In addition, inadequacies in certain mainstem adult passage facilities and in the operation and maintenance of these facilities create passage delays or reduce the success of adult fish passage. Losses and delays of returning adult salmon and steelhead at each dam due to upstream migration problems can be significant and have a cumulative effect. Reducing these passage mortalities could increase significantly the number of adult salmon available for harvest and production.

The Council has adopted a number of measures to improve adult migrant survival. The Council calls on the Corps of Engineers to implement all spill and operating criteria for mainstem adult fish passage facilities and to make needed improvements. In addition, the Council calls on the Corps to leave juvenile fish screens installed for a longer period to provide protection for adult salmon that fall back through the powerhouse. The Council also recommends adding project biologists to routinely inspect fish passage facilities at mainstem Corps dams. The Council also calls for various evaluations and studies to improve the effectiveness of passage facilities and, ultimately, the survival of adult salmon and steelhead.

4.1 MEASURES

Corps of Engineers

1. Adhere to all existing fishway operating and spill criteria and evaluate needed improvements in criteria jointly with fishery managers.
2. Continue to evaluate all mainstem adult passage facilities, evaluate the need for new facilities, and make facility improvements as necessary. Provide and install, as necessary, back–up parts, attraction water pumps or fish turbines at each dam for use in the event of failure of these systems.
3. Keep fish screens in place at each dam beyond the juvenile migration where adult fallback is a documented problem, as indicated in the fishway operating criteria developed jointly with the fishery managers and subject to the need for annual screen maintenance.
4. Continue to upgrade existing adult fish passage facilities, including: a) automation of control systems; b) placement of staff gauges (flow measuring devices) in areas that are accessible for both cleaning and reading; and c) providing velocity meters in areas of known low velocity in the collection channels.
5. Provide at least two additional project biologists to inspect both adult and juvenile fish passage facilities at each of the eight federal mainstem dams on a regular basis throughout the fish passage season to ensure all fish facilities are operating according to agreed–upon criteria.
6. Evaluate the effects of shad population increases on adult salmon passage at mainstem dams. Include in the evaluation the feasibility of selective shad remov-

al in adult ladders. Report results to the Council by November 1994.

7. Evaluate potential methods for decreasing water temperature in mainstem fish ladders and apply where appropriate.

8. Evaluate the effects on adult salmon passage of zero nighttime flow conditions in the lower Snake River. Report results to the Council by December 1993.

Corps of Engineers, Bonneville and Fishery Managers

9. Evaluate the extent, and identify the causes of inter-dam adult salmon losses, including non–dam losses, and take action to address these causes, as necessary. Report results to the Council by January 1994.

Corps of Engineers and Bonneville

10. To improve the accuracy of the present adult fish counting procedures, evaluate the feasibility and benefits of using video–based or other automatic counting and species recognition systems for monitoring adult fish passage at mainstem Columbia and Snake river dams. Report results to the Council by December 1993. If approved by the Council, institute video–based counting of adult fish at appropriate locations.

Bonneville

11. Continue with research and development on the feasibility of installing adult fish PIT–tag detectors in the adult fish passage facilities of mainstem dams, including consideration of the capability of removing selected fish stocks for transport. Report results to the Council by December 1994.

Bonneville and Corps of Engineers, in Cooperation with Idaho Power Company and Other Interested Parties

12. Continue to evaluate whether releasing cool water from both Dworshak Dam and the Hells Canyon Complex during August and September improves adult fall chinook survival. This evaluation should be consistent with the guidelines specified in Sections 3.3B1, 3.3B2 and 3.3B4–3.3B6. The objective of this evaluation is to reduce water temperatures at Ice Harbor Dam by September 1 of each year, and to determine the effectiveness of these operations on adult fish survival and passage through the lower Snake River. Report results of this evaluation to the Council by December 1993. Policy and technical guidance for determining the magnitude and timing of Snake River temperature control releases from Dworshak and Brownlee should be provided in a July meeting of the Fish Operations Executive Committee. In addition:

   a. Upgrade the COLTEMP[4] water temperature prediction model using the data and knowledge gained from all previous water temperature control operations and monitoring;
   b. Add to the existing water temperature data monitoring network to collect meteorological and hydrological data that will identify the effect of tributary watershed management and resulting inflow temperatures on mainstem Snake River water temperatures. Include additional water temperature and water velocity measurements in the lower Snake River.
   c. Conduct additional salmon and steelhead migration studies, and coordinate with ongoing fish migration and behavior such as timing, movement, fallback, straying and other characteristics. Report results to the Council by December 1993.
   d. Provide for coordinated data base management.

Mid–Columbia Public Utility Districts

13. Subject to Federal Energy Regulatory Commission approval, evaluate adult fish passage at each mid–Columbia public utility district project to determine if losses are occurring at or between the dams. This study should include adult fish count evaluations and development of a coordinated, comprehensive study plan with fishery managers to evaluate existing adult fish passage at all five mid–Columbia dams and reservoirs. To the extent possible, such evaluations should be coordinated with similar adult fish passage studies being planned by the Corps of Engineers for the federal Columbia River mainstem projects, as well as complementing the terms of existing Federal Energy Regulatory Commission Wells and Rock Island Settlement Agreements between Douglas and Chelan County public utility districts and fishery managers. Compile the results of such evaluations into a comprehensive report on adult fish passage at the five mid–Columbia Public Utility Districts' projects and submit it to the Federal Energy Regulatory Commission, the Council and members of the three mid–Columbia coordinating committees.

4. COLTEMP is a Columbia River Basin water temperature model developed by the U.S. Army Corps of Engineers. It is used to predict water temperatures under alternative reservoir release strategies.

Eugene Water and Electric Board

14. Subject to Federal Energy Regulatory Commission approval, design, construct and operate by August 1, 1995, a new right bank fish ladder at Leaburg Dam and a velocity barrier in the Leaburg powerhouse tailrace, or equivalent alternative means to prevent injury and migration delay of adult salmon. Assume full responsibility for annual operation and maintenance of these adult passage facilities. If the Leaburg relicense application is delayed, take prompt action to amend the existing license to complete the right bank fish ladder on schedule. In the event Federal Energy Regulatory Commission approval is earlier than anticipated in the Eugene Water and Electric Board's proposed schedule, make a good–faith effort to accelerate completion of the right bank fish ladder.
15. Subject to Federal Energy Regulatory Commission approval, design and construct a velocity barrier in the Walterville Hydroelectric Project tailrace to prevent the migration delay and injury of adult anadromous fish. The velocity barrier should be completed and operational no later than July 1, 1995. Assume full responsibility for annual operation and maintenance of this adult passage facility. If the Walterville relicense application is delayed, take prompt action to amend the existing license to complete the velocity barrier on schedule. In the event Federal Energy Regulatory Commission approval is earlier than anticipated in the Eugene Water and Electric Board's proposed schedule, make a good–faith effort to accelerate completion of the Walterville project tailrace velocity barrier.

Starbuck Dam, Tucannon River

Various habitat problems are being addressed through cooperative efforts in the Tucannon Subbasin. There is a need to modify Starbuck Dam, however, to allow salmon and steelhead to pass the structure while blocking squawfish from passage.

Bonneville

16. Fund the placement of structures immediately downstream of Starbuck Dam to provide sufficient backwater for spring chinook and steelhead to jump the dam during spring runoff, and construction of a structure at the base of the dam to allow fall chinook passage during low flows.