Appendix F

Dewatering Guidelines & Fish Salvage Plans

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1. INTRODUCTION

1.1. Each Corps mainstem project on the Columbia and Snake rivers has dewatering and fish handling/salvage plans which describe procedures for any handling or salvaging of fish within a facility or project area when it is dewatered. All dewatering and fish handling plans should be reviewed and revised where appropriate to reflect new information and guidelines listed below as coordinated by the Fish Passage Operations & Maintenance (FPOM) workgroup.

2. COORDINATION

2.1. The dewatering and fish handling/salvage plan for each project shall include coordination procedures for planned and emergency fish salvage activities. The Project Biologist shall coordinate all fish salvage activities with Project and District personnel.

3. DEWATERING & FISH HANDLING PERSONNEL

3.1. The plans shall specify the number and specialty of personnel required for each type of dewatering activity, including the Project Biologist, fisheries staff, crane operators, riggers, winch operators, forklift operators and maintenance workers. Adequate personnel must be available for fish salvage activities to avoid or minimize fish stress and mortality.

3.2. The plans shall include a requirement that *all participants* involved in a dewatering activity attend a fish salvage briefing prior to dewatering in order to define responsibilities for each participant.

3.3. All emergency fish salvage operations will be coordinated and overseen by the Project Biologist or fisheries staff if possible.

4. FACILITIES

4.1. Salvage plans shall be project-specific and contain step-by-step dewatering and fish salvaging procedures for all facilities and project features which may contain fish, most commonly the adult fish ladders and collection channels, juvenile bypass systems, juvenile fish sampling facilities, turbine unit scroll cases and draft tubes, gatewell slots and navigation locks. Individual projects may have other facilities or features that contain fish.

4.2. The plans shall specify how the facility is to be dewatered, where and how fish are to be salvaged, and the location of designated release sites for the various types of fish expected to be encountered during each dewatering activity.

4.3. Fish Safety Pools. The fish salvage plans shall identify areas for “safety pools” in each facility that pond enough water to hold fish temporarily. The plan shall specify whether the safety pools are usually maintained by leakage or a controlled water flow. The plans shall specify how long and under what conditions each safety pool can be used to hold fish safely. If

there is potential for the safety pools to freeze or lose their water source, the fish should be evacuated as soon as possible.

5. EQUIPMENT

5.1. The plans shall specify where equipment is required for use during a dewatering, where certain equipment should be pre-positioned before work begins, and any heavy equipment needed for fish salvage activities.

5.2. Fish Handling Equipment. The plans shall specify all fish handling equipment required during each type of dewatering activity, including gloves, hand-held fish nets, seines, fish buckets, gatewell dip baskets, and fish transport tanks and vehicles. All equipment should be in good condition and pre-positioned before dewatering begins.

5.3. Support Equipment. The plans shall include a detailed list of all support equipment required for each dewatering activity, including items such as hard-hats, boots, safety harnesses, flashlights, portable radios, ladders, cranes, man-baskets, pumps, forklifts, and any other equipment required for a dewatering activity.

6. FISH HANDLING PROCEDURES

6.1. The plans shall include procedures to minimize fish mortality and stress. The primary fish handling objective will be to collect and transport fish to release sites with minimal stress and without injury or mortality to any fish.

6.2. Plans shall specify the details of all fish handling activities including how to crowd and handle fish within each facility, specifics on the number of fish that can be hauled or transported in containers or transport tanks at varying water temperatures, and how and where to release fish at each project.

6.3. The plans should reflect the following general fish handling guidelines:

6.3.1. Adult salmonids and other large adult fish should be salvaged first.

6.3.2. Netting of fish should be minimized whenever possible.

6.3.3. Fish should not be crowded in the holding containers.

6.3.4. Fish will be less stressed in larger containers ($\geq$ 300 gallons preferred), in colder water, and with supplemental oxygen or aeration.

6.3.5. If fish are transported in warmer water ($>65^{o}$ F), reduce fish loading density and holding times.

6.3.6. All fish will be returned to the river as soon as possible at predetermined release sites.

6.3.7. Fish should not be held in holding tanks or containers for more than two hours under any circumstances.

6.3.8. Fish should be released from the holding tanks into the river as soon as the fish salvage operation stops for any reason.

6.3.9. Fish should be carefully released into the tailwater or forebay with a short vertical drop to the river. Fish release slides are desirable.

6.3.10. Water temperature in the transport tank should be monitored and maintained within 2^{o}F of the river water at the release site.

6.3.11. Fish should be removed prior to debris removal if possible.

7. FISH SALVAGE REPORT

7.1. The fish salvage plan should include a report template for fish salvage operations that should be completed for all fish salvage activities and kept permanently on file at each project.