

APPENDIX G

**PROTOCOLS FOR ADULT FISH TRAPPING
OPERATIONS AT BONNEVILLE, ICE HARBOR,
AND LOWER GRANITE DAMS**

Protocols for Adult Fish Trapping Operations at Bonneville Dam

1. **General.** The following protocols will be implemented by agencies conducting research in the Bonneville Dam second powerhouse Adult Fish Collection and Monitoring Facility (AFC&MF). Trapping will not occur when fish ladder water temperatures exceed 74°F as measured at the top of the return ladder. These protocols were coordinated with fish agencies and tribes through the Fish Passage Operation and Maintenance Coordination Team (FPOM).

2. **General requirements for AFC&MF users.** All personnel conducting research in the AFC&MF will implement the following requirements.
 - a. Users must have appropriate documentation for conducting research at the dam. (See Guide for Researchers at Bonneville Dam).
 - b. Users must have a valid ESA Section 10 Permit that covers all listed species passing the project during the trapping period and users shall comply with all fish handling conditions in the permit. **Note: If Section 10 conditions are more restrictive than the following protocols, users must follow Section 10 conditions.**
 - c. Hard hats are to be worn at all times. A headpiece with magnifying glass for monitoring GBT is also acceptable.
 - d. Long pants or raingear are to be worn at all times. Shorts or sweats will not be permitted in the lab.
 - e. Steel-toed shoes or steel-toed rubber boots are to be worn at all times. No tennis shoes or sandals will be permitted.
 - f. Users will notify project biologists when they arrive on site and when they depart (x4551, x7984, or x4552). If users supply the project biologists with a season schedule, it will not be necessary to notify project biologists upon arrival and departure. If users are on site during non-business hours (1700-0630), Monday through Friday or anytime on the weekends, they are required to contact the control room (x221 or x222) when they arrive and when they depart.
 - g. Users will lower the main ladder picket leads and downstream exit bulkhead when they arrive, if necessary, and raise the picket leads and downstream exit bulkhead when they are completed for the day unless other arrangements are made.
 - h. Users will be permitted to operate valves 9 and 10 to control flow down the flumes at their discretion and the raw water booster pump. It is recommended that valves 9 and 10 remain open 55% and 40%, respectively. Users will not be permitted to operate any other valves or the overhead crane unless permitted to do so through the project biologists.
 - i. Users will record the times picket leads are lowered and raised, which agency they are representing and water temperatures when they arrive, at 1200 and 1500 hours, each day they are using the AFC&MF. Temperatures will be recorded from the temperature probe at the top of the return ladder. A spreadsheet will be provided by project biologists and located by valves 9 and 10.
 - j. Users must use a cotton mesh net, which is large enough to safely handle the largest fish passing the project during the trapping period.

3. **Trapping protocols during the fish passage season (from March 15 through November 30) when fish ladder water temperatures are <70°F.** Personnel conducting research during this time are required to be present in the AFC&MF to divert desired fish into the

anesthetic tank using the flume swing gates. Undesired fish will be bypassed to the return pool. No diversion into or holding of fish in the brail pool will be allowed. The purpose of these protocols is to provide precautionary measures to limit delayed mortality resulting from stress when handling fish.

- a. There will be no time restriction for trapping operations.
- b. There will be no more than 4 chinook, or 6 steelhead, or 6 sockeye, or a combination of 6 adult salmonids allowed in the anesthetic tank at any one time. This assumes that users can effectively track the length of time fish stay in the anesthetic tank.
- c. There will be no more than 6 adult salmonids allowed in the recovery tank at any one time.
- d. Water in the anesthetic tank will be replaced at least two times per day. Water temperatures in the anesthetic tank will be maintained within 1°C of the fish ladder water temperature. **Note: If anesthetic tank water temperature exceeds 70°F, criteria in section 4 will go into effect.**
- e. Water in the recovery tank will be running continuously allowing a constant exchange of water through the tank.
- f. Personnel shall ensure fish are sampled as quickly as possible. It is recommended that it takes no longer than 25 minutes to transition the fish from entry into the anesthetic tank to release back into the return ladder or transportation tank.
- g. Personnel shall ensure that fish are fully recovered from anesthetization prior to release into the return ladder.
- h. When trapping is completed for the day, users will raise the main ladder picket leads and the downstream exit bulkhead.

- 4. Trapping protocols during the fish passage season (from March 15 through November 30) when fish ladder water temperatures are between 70 and 74°F.** Personnel conducting research during this time period are required to be present in the AFC&MF to divert desired fish into the anesthetic tank using the flume swing gates. Undesired fish will be bypassed to the return pool. No diversion of fish into or holding of fish in the brail pool will be allowed. The purpose of these protocols is to provide precautionary measures to limit delayed mortality resulting from stress when handling fish during warm water conditions. If ladder water temperatures exceed 74°F during any time of the day when the AFC&MF is operating, trapping will be suspended immediately. The Corps reserves the right to terminate trapping operations at any time.

From 70 to 72°F

- a. Trapping will be allowed every other day or a maximum of 4-days per week and work will be accomplished between 0600-1200 hours each day. The morning operations are to take advantage of the water-cooling that occurs overnight.
- b. There will be no more than 3 adult salmonids allowed in the anesthetic tank at any one time. This assumes that users can effectively track the length of time fish stay in the anesthetic tank.
- c. There will be no more than 3 adult salmonids allowed in the recovery tank at any one time.
- d. Assure oxygen levels are maintained at saturation in the anesthetic and recovery tanks. Provide aeration as necessary to maintain oxygen levels the same as in the fish ladder water. In other words, there will be no depression in oxygen levels in the anesthetic or recovery tanks regardless of numbers of fish in and through the tank. To assure this, water in the anesthetic tank will be replaced at least every three hours.
- e. Water in the recovery tank will be running continuously allowing a constant exchange of water through the tank.

- f. Maintain the anesthetic and recovery tank water temperatures 1-2°F lower than the ladder water temperature. If ice is used to cool the anesthetic or recovery tank water, the ice should be from river water or, at least, from an un-chlorinated water source. Do not exceed a 3°F difference between the anesthetic or recovery tank water and fish ladder water.
- g. Personnel shall ensure fish are sampled as quickly as possible. It is recommended that it takes no longer than 25 minutes to transition the fish from entry into the anesthetic tank to release back into the return ladder or transportation tank.
- h. Personnel shall ensure fish are fully recovered from anesthetization prior to release into the return ladder.
- i. When trapping is completed for the day, users will raise the main ladder picket leads and the downstream exit bulkhead.

From 72 to 74°F

- a. Sampling will be permitted 1-day per week when water temperatures exceed 72°F to allow for WDFW steelhead sampling. All other research entities will also be allowed to sample during that time frame.
 - b. Protocol from subsection b to i remains the same as for water temperatures from 70-72°F.
- 5. Winter trapping protocols, from December 1 through March 14.** Personnel conducting research during this time are not required to be present in the AFC&MF. Users are allowed to activate the flume swing gates to divert all fish into the brail pool. The purpose of these protocols is to provide precautionary measures to limit passage delay, and stress from overcrowding in the brail pool.
- a. Sampling will occur on a daily basis.
 - b. Fish will not be permitted to remain in the brail pool longer than 24 hours. It is recommended that handling of fish occurs daily by 1800 hours. This assures that if fish are sampled at the end of the day, most of the fish captured are only held from the morning until afternoon since passage at night is minimal, reducing delay.
 - c. During sampling, the brail pool should be raised and one adult salmonid netted via a sanctuary net and placed into the anesthetic tank at a time. After removing fish from the brail pool into the anesthetic tank, the brail pool will be lowered back to its full depth.
 - d. There will be no more than 3 adult salmonids allowed in the anesthetic tank at any one time. This assumes that users can effectively track the length of time fish stay in the anesthetic tank.
 - e. There will be no more than 3 adult salmonids allowed in the recovery tank at any one time.
 - f. Water in the recovery tank will be running continuously allowing a constant exchange of water through the tank.
 - g. Personnel shall ensure fish are sampled as quickly as possible. It is recommended that it takes no longer than 25 minutes to transition the fish from entry into the anesthetic tank to release back into the return ladder or transportation tank.
 - h. Personnel shall ensure fish are fully recovered from anesthetization prior to release into the ladder.
 - i. If daily sampling cannot occur on weekends, the main ladder picket leads and downstream exit gate will be raised following completion of sampling on Friday. The flume swing gates are to be deactivated to allow fish to pass freely into the return pool.

Protocols for Adult Fish Trapping Operations at Ice Harbor Dam

1. **General.** Personnel conducting research at the adult fish trapping facility at Ice Harbor Dam will implement the following protocols. These protocols were coordinated with fisheries agencies and tribes through the Fish Passage Operations and Maintenance Coordination Team (FPOM).

2. **Administrative requirements.** All personnel conducting research at the facility will adhere to the following requirements.
 - a. The facility will not be operated unless there is an approved Corps-funded research project that requires its use, or the user has a letter from the Corps that permits use of the facility.
 - b. Users must have a valid ESA Section 10 Permit that covers all listed species passing the project during the trapping period and users shall comply with all fish handling conditions in the permit. **Note: If Section 10 conditions are more restrictive than the following protocols, users must follow Section 10 conditions.** A copy of the Section 10 Permit must be provided to the Corps' project biologist.
 - c. Hard hats will be worn if so required by the Corps' Operations Manager at Ice Harbor (509-543-3256).
 - d. Long pants are to be worn at all times.
 - e. Steel-toed shoes or steel-toed rubber boots are to be worn at all times.
 - f. Notification Required For Work During Regular Business Hours (Monday through Thursday, 0630 to 1700 hours). Users will notify the project biologist when they arrive on site and when they depart (509-543-3208). If users supply the project biologist with a season schedule, it will not be necessary to notify project biologist upon arrival and departure.
 - g. Notification Required For Work During All Other Hours (Monday through Thursday, 1700 to 0630 hours, or anytime from Friday through Sunday). If users are on site during times other than regular business hours, specific notification procedures must be worked out with the Operations Manager at Ice Harbor in advance. Users may be required to contact the control room (509-543-3231) upon arrival and departure.
 - h. Users must present a safety plan to the project biologist, who can provide guidance for developing the plan.

3. **Trapping protocols during the fish passage season (March 1 through December 15) when fish ladder water temperatures are less than 70°F.** Since the trap is operated manually, personnel conducting research are required to be present at the facility to divert desired fish.
 - a. The trap will be tested for proper operation before trapping begins. After each day's use the trap will be promptly removed from the water by suspending it in its guides, or by completely removing it from the fish ladder.
 - b. Trapping operations can take place between 0600 and 1200 hours, for up to 4 hours per day or until the designated number of desired fish are obtained, whichever occurs first. During the summer months, the period from 0600 to 1000 hours is preferred. The trap shall not be in the water for more than 4 hours.

- c. Netting of fish is not recommended. If transfer of fish is necessary, fish should stay in water at all times through the use of a water-filled bag, sanctuary net, or other means. The device used should be large enough to safely handle the largest fish.
 - d. Non-target fish will be released to the ladder.
 - e. **Oxygen levels** in fish handling tanks will be maintained at saturation by replacing the water and providing aeration as necessary.
 - f. **Water temperatures** in fish handling tanks will be maintained within 2°F of the fish ladder water temperature but less than 70°F.
 - g. Personnel shall sample fish as quickly as possible. It should require no longer than 25 minutes to transition the fish from entry into the anesthetic tank to release back into the ladder or transportation tank.
 - h. Fish must be adequately recovered from anesthetization prior to the next step in the handling process, whether placed in the ladder or transported.
4. **Trapping protocols during the fish passage season (March 1 through December 15) when fish ladder water temperatures are 70°F to 72°F.** The trap may be operated when water temperatures are within the range of 70°F to 72°F, provided that researchers closely adhere to the restrictions below. Researchers must have the proper ESA documentation. **Trapping operations will not be allowed, and trapping must cease immediately, if fish ladder water temperatures exceed 72°F.** Due to the narrow temperature range involved, researchers must use reliable digital thermometers.
- a. Researchers must notify the Corps project biologist in advance when trapping is to occur in this temperature range. The project biologist will occasionally monitor trapping operations.
 - b. The trap will be tested for proper operation before trapping begins. After each day's use the trap will be promptly removed from the water by suspending it in its guides, or by completely removing it from the fish ladder.
 - c. Trapping operations can take place between 0600 and 1200 hours, for up to 4 hours per day or until the designated number of desired fish are obtained, whichever occurs first. During the summer months, the period from 0600 to 1000 hours is preferred. The trap shall not be in the water for more than 4 hours.
 - d. Trapping operations may take place up to 4 days per week.
 - e. Netting of fish is not recommended. If transfer of fish is necessary, fish should stay in water at all times through the use of a water-filled bag, sanctuary net, or other means. The device used should be large enough to safely handle the largest fish.
 - f. Non-target fish will be released to ladder.
 - g. **Oxygen levels** in fish handling tanks will be maintained at saturation by replacing the water and providing aeration as necessary.
 - h. **Water temperature** in the anesthetic tank will be maintained 1-2°F lower than the ladder water temperature. If ice is used, the ice should be from river water or from an un-chlorinated water source. If practical, water temperature in the recovery tank should also be maintained 1-2°F lower than the ladder water temperature; otherwise flow-through water should be running continuously.
 - i. Personnel shall sample fish as quickly as possible. It should require no longer than 25 minutes to transition the fish from entry into the anesthetic tank to release back into the ladder or transportation tank.
 - j. Fish must be adequately recovered from anesthetization prior to the next step in the handling process, whether placed in the ladder or transported.

Protocols for Adult Fish Trapping Operations at Lower Granite Dam

1. **General.** Personnel conducting research at the adult fish trapping facility at Lower Granite Dam will implement the following protocols. These protocols were coordinated with fisheries agencies and tribes through the Fish Passage Operations and Maintenance Coordination Team (FPOM).
2. **Administrative requirements.** NOAA Fisheries is the primary user of the facility and employs personnel that are permanently based there. These and all other personnel conducting research at the facility will adhere to the following requirements.
 - a. The facility will not be operated unless there is an approved Corps-funded research project that requires its use, or the user has a letter from the Corps that permits use of the facility.
 - b. Users must have a valid ESA Section 10 Permit that covers all listed species passing the project during the trapping period and users shall comply with all fish handling conditions in the permit. **Note: If Section 10 conditions are more restrictive than the following protocols, users must follow Section 10 conditions.** A copy of the Section 10 Permit must be provided to the Corps' project biologist.
 - c. Hard hats will be worn if so required by the Corps' Operations Manager at Lower Granite (509-843-1493 x258).
 - d. Long pants are to be worn at all times.
 - e. Steel-toed shoes or steel-toed rubber boots are to be worn at all times.
 - f. Notification Required For Work During Regular Business Hours (Monday through Thursday, 0630 to 1700 hours). Users will notify the project biologist when they arrive on site and when they depart (509-843-1493 x263 or x264). If users supply the project biologist with a season schedule, it will not be necessary to notify project biologist upon arrival and departure.
 - g. Notification Required For Work During All Other Hours (Monday through Thursday, 1700 to 0630 hours, or anytime from Friday through Sunday). If users are on site during times other than regular business hours, specific notification procedures must be worked out with the Operations Manager at Lower Granite in advance. Users may be required to contact the control room (509-843-1493 x231) upon arrival and departure.
 - h. Users must present a safety plan to the project biologist, who can provide guidance for developing the plan.
3. **Trapping protocols during the fish passage season (March 1 through December 15) when fish ladder water temperatures are less than 70°F.** During the years just prior to 2003 the trap was operated automatically, 24 hours per day, during much of the fish passage season. Personnel conducting research during this time were therefore not always required to be present at the facility to divert desired fish. Automatic operation and the temporary absence of on-site personnel can continue as required. However, PIT tag detectors were installed in the upper end of the fish ladder in early 2003. As a result, the new detectors will collect PIT tag data normally collected at the trap. It is therefore anticipated that trap operation will be minimized in future years.
 - a. During lengthy periods of non-use (two days or more), the facility shall be dewatered or the water supply will be shut down. Since the facility obtains water from the fish

ladder, this action will avoid out-of-criteria water flows in the ladder. If freezing weather may cause damage during such a non-use period, the facility will be dewatered.

- b. There will be no time-of-day restrictions for trapping operations.
 - c. Adult fish generally do not need to be netted due to the layout of the facility. Netting of fish is not recommended. If transfer of fish is necessary, fish should stay in water at all times through the use of a water-filled bag, sanctuary net, or other means. The device used should be large enough to safely handle the largest fish.
 - d. Non-target fish will be released to the return pool.
 - e. There will be no more than 12 adult salmonids allowed in the anesthetic tank at any one time. This assumes that users can effectively track the length of time fish stay in the anesthetic tank.
 - f. There will be no more than 12 adult salmonids allowed in the recovery tank at any one time.
 - g. **Oxygen levels** in fish handling tanks will be maintained at saturation by replacing the water and providing aeration as necessary.
 - h. **Water temperatures** in fish handling tanks will be maintained within 2°F of the fish ladder water temperature but less than 70°F.
 - i. Personnel shall sample fish as quickly as possible. It should require no longer than 25 minutes to transition the fish from entry into the anesthetic tank to release back into the return ladder or transportation tank.
 - j. Fish must be adequately recovered from anesthetization prior to the next step in the handling process, whether placed in the return ladder or transported. In the case of the return ladder, full recovery is not desirable because fish may jump onto a grating.
- 4. Trapping protocols during the fish passage season (March 1 through December 15) when fish ladder water temperatures are 70°F to 72°F.** The trap may be operated when water temperatures are within the range of 70°F to 72°F, provided that researchers closely adhere to the restrictions below. Researchers must have the proper ESA documentation. **Trapping operations will not be allowed, and trapping must cease immediately, if fish ladder water temperatures exceed 72°F.** Due to the narrow temperature range involved, researchers must use reliable digital thermometers.
- a. Researchers must notify the Corps project biologist in advance when trapping is to occur in this temperature range. The project biologist will occasionally monitor trapping operations.
 - b. During lengthy periods of non-use (two days or more), the facility shall be dewatered or the water supply will be shut down. Since the facility obtains water from the fish ladder, this action will avoid out-of-criteria water flows in the ladder.
 - c. Trapping operations can take place between 0600 and 1200 hours, for up to 4 hours per day or until the designated number of desired fish are obtained, whichever occurs first. During the summer months, the period from 0600 to 1000 hours is preferred.
 - d. Trapping operations may take place up to 4 days per week.
 - e. Adult fish generally do not need to be netted due to the layout of the facility. Netting of fish is not recommended. If transfer of fish is necessary, fish should stay in water at all times through the use of a water-filled bag, sanctuary net, or other means. The device used should be large enough to safely handle the largest fish.
 - f. Non-target fish will be released to the return pool.
 - g. There will be no more than 3 adult salmonids allowed in the anesthetic tank at any one time. This assumes that users can effectively track the length of time fish stay in the anesthetic tank.

- h.** There will be no more than 3 adult salmonids allowed in the recovery tank at any one time.
- i.** **Oxygen levels** in fish handling tanks will be maintained at saturation by replacing the water and providing aeration as necessary.
- j.** **Water temperature** in the anesthetic tank will be maintained 1-2°F lower than the ladder water temperature. If ice is used, the ice should be from river water or from an un-chlorinated water source. If practical, water temperature in the recovery tank should also be maintained 1-2°F lower than the ladder water temperature; otherwise flow-through water should be running continuously.
- k.** Personnel shall sample fish as quickly as possible. It should require no longer than 25 minutes to transition the fish from entry into the anesthetic tank to release back into the return ladder or transportation tank.
- l.** Fish must be adequately recovered from anesthetization prior to the next step in the handling process, whether placed in the return ladder or transported. In the case of the return ladder, full recovery is not desirable because fish may jump onto a grating.