Attachment H: Fish Salvage Plan

Pacific Connector Gas Pipeline, LP

Fish Salvage Plan

Pacific Connector Gas Pipeline Project

(During the previous NEPA process, PCGP submitted a Plan of Development to meet BLM Right-of-Way Grant requirements based on BLM regulations. These plans will be updated in consultation with the Federal land managing agencies [BLM, USFS, and Reclamation] during the current NEPA process.).

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1.0 INTRODUCTION

This fish salvage plan has been developed to minimize adverse effects to Endangered Species Act (ESA) listed salmonids (Southern Oregon/Northern California Coast coho salmon and Oregon Coast coho salmon), non-listed salmonids (Chinook, steelhead, cutthroat trout) and ESA-listed catostomids (Lost River sucker and shortnose sucker) during construction of the Pacific Connector Gas Pipeline Project (Pipeline project). The plan has been developed to:

1. Exclude fish from instream construction sites;
2. Minimize risk of injury or death while capturing fish that might remain after exclusion efforts,
3. Minimize risk of injury or death due to handling captured fish, and
4. Release fish to non-impacted environments.

Portions of the plan relevant to salvaging ESA-listed salmonids were adapted from the protocol developed by Washington State Department of Transportation (WSDOT, 2008) which specifies procedures to 1) isolate the work area, 2) remove fish and dewatering the work area, 3) handle, hold and release fish, and 4) document fish that have been captured, handled, held and released and notify the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). Application of the same protocol will be suitable for salvaging ESA-listed catostomids (Larson, 2009).

2.0 PERMITS

ODFW requires an Oregon Scientific Take Permit to take fish for scientific purposes, including rescue/salvage required for construction activities. (Required by ORS 497.298 and OAR 635-043, see http://www.dfw.state.or.us/fish/license_permits_apps/scientific_taking_permit.asp#oar).

In addition, an In Water Blasting Permit from the ODFW "is required for any use of explosives in the cause of removing any obstruction in any waters of this state, in constructing any foundations for dams, bridges or other structures, or in carrying on any trade or business" (Required by ORS 509.140, see http://licenseinfo.oregon.gov/?fuseaction=license_icon&link_item_id=14778).

For threatened endangered species, permits may be issued by NMFS and FWS for scientific research, enhancement of propagation or survival, and taking that is incidental to an otherwise lawful activity.

3.0 INSTREAM CONSTRUCTION

Construction across waterbodies will occur within the Oregon Department of Fish and Wildlife (ODFW) recommended instream construction timing window, although the majority of bridges, where required, will be installed prior to and removed after the instream timing window. General timing of activities for each of the 5 construction spreads is discussed below and shown schematically in Resource Report 1. A more comprehensive project description specific to each listed species will be included in the Applicant-Prepared Draft Biological Assessment (APDBA).

If water is present in the streambeds at the time of construction, PCGP will utilize a dry-open cut crossing method (flume or dam and pump) to cross all minor and intermediate waterbodies consistent with the requirements of Section V.B.6 of the Federal Energy Regulatory Commission's (FERC) Wetland and Waterbody Procedures. Fluming and dam-and-pump

procedures are described in Resource Report 2. Both techniques require that the work space within a waterbody is isolated, usually by dams constructed of sand bags with interwoven plastic sheeting installed upstream and downstream from the site where the pipeline will be installed. Sand bag dams would be placed on the edges of the certificated construction right-of-way, whether 95 feet or 75 feet wide at the stream crossing site.

If blasting is required because the streambed is exposed bedrock, the dam-and-pump procedure will be utilized. Generally, the pipeline trench is not in the center of the instream construction right-of-way but offset to one side so that a temporary equipment crossing bridge can be placed on the opposite side of the right-of-way. The equipment bridge would be located across the stream within the area eventually to be isolated by the sand bag dams.

3.1 Fish Exclusion

Prior to any instream work and placement of the sand bags to be used for fluming or dam-and-pump procedures, as many fish as possible will be excluded from an area that includes the construction right-of-way. If blasting within the streambed or on stream banks is necessary during construction, the area of fish exclusion will likely be larger than the limits of the construction right-of-way across the waterbody. In order to minimize risk to listed and non-listed fish by blasting, they should be excluded from a distance where the overpressure change from the blast dissipates to 2.7 psi (Alaska Department of Fish and Game, 1991) a level for which no fish mortality would be expected (see Resource Report 3). Typical trench blasting scenarios use multiple 1 to 2 pound charges separated by an 8-milisecond delay to excavate the trench. With use of 1 to 2 pound charges in rock, the set back distance (at which 2.7 psi would occur) from the blast trench to the fish habitat is between 34 and 49 feet.

When using the dam-and-pump stream crossing methodology, the typical right-of-way distribution of an isolated streambed (dry open-cut) will be no less than 25-feet on one side of the pipe trench and 50+ feet on the opposite side of the pipe trench depending on whether it's a 75 or 95 foot width crossing. Therefore, an area within the waterbody crossing equivalent to length of the blasting trench and approximately 25-feet wide (in the worst case scenario) would be exposed to instantaneous hydrostatic pressure changes above 2.7 psi. Thus, fish would be excluded within waterbodies from an additional 25 feet beyond the construction right-of-way.

One or more block nets will be installed upstream from the pipeline crossing, farther than 50 feet from the pipeline trench if blasting is required, and upstream from where the sand bag dam will be installed. The block net material is typically a 9.5 millimeter stretched mesh (WSDOT, 2008) that will prevent fish and other organisms from moving into the work area from upstream locations. Sites will be selected based on desirable attributes such as slower flows and without heavy vegetation, undercut banks, or deep pools so that the block net seals off the work area to the maximum extent possible. The block net(s) will have to be frequently inspected for sealing capacity and leaf/debris collected will be frequently removed. Block nets need to be secured on both banks and within the stream channel to prevent failure during rain events or debris collection (WSDOT, 2008).

Once the upstream block net is in place, one or more seining crews will proceed from that site to the downstream block net site. The objective of seining is not to capture fish but to maneuver them downstream and out of the construction zone. Small two-stick seines will be operated by at least 2 people although a third person may be required to move the seine over bottom debris and/or to seal the bottom of the net along the streambed. Similar to the block net, seines would

be made of a 9.5 millimeter stretched mesh (WSDOT, 2008) that will prevent fish and other organisms from escaping.

In some situations where heavy instream and/or stream bank vegetation is present, or with undercut banks or deep pools, a haul seine or two-stick seine may not completely seal the water column from bank to bank or from water surface to streambed. In those situations, compressed air will be used to generate underwater bubbles, either from a perforated hose, wand or nozzle, that will drive fish away from vegetation debris, out from undercut banks or from deep pools in advance of the seining crew. Whether one or more air compressors are required to generate bubbles through more than one hose will depend on site conditions and the distances over which the bubble generator must operate. The use of bubble scare tactics will be site-dependent and may require one or more people in addition to the seining crew(s) to dislodge fish from difficult instream situations, to increase the efficiency of the seine, and to exclude as many fish as possible from the construction area.

Once the seining crew(s) reaches the downstream block net site, the downstream block net will be installed behind (upstream from) the seining crew(s). Similar precautions to insure an adequate seal as those employed at the upstream site will be necessary. The downstream block net will also be monitored for accumulated litter and debris that will be removed during the entire construction operation. These actions to exclude fish from the construction right-of-way and from areas where they could be affected by blasting should reduce or eliminate the risk of death or injury to fish by construction and by dewatering the isolated work area that will require other fish removal methods.

When construction is completed and flume pipe or dam-and-pump diversion is removed, the upstream and downstream block nets will remain in place as the sand bag dams are removed. Generally, the downstream dam is the first to be removed. Retention of the block nets will limit fish from entering the construction zone as water flows over the site and when turbidity is most likely. Turbidity and sedimentation impacts associated with dry open cut methods are generally minor and are associated with 1) installation and removal of the upstream and downstream dams, 2) water leaking through the upstream dam and collecting sediments as it flows across the work area and continues through the downstream dam, 3) movement of instream rocks and boulders to allow proper alignment and installation of the flume and dams, and 4) when streamflow is returned to the construction work area after the crossing is complete and the dams and flume are removed (Reid et al., 2004). Both block nets will be removed when turbidity at the construction site has dissipated.

3.2 Dewatering and Fish Removal

Once the upstream and downstream block nets are in place, construction crews will begin building sand bag and plastic sheeting dams on the edges of the construction right-of-way to completely isolate the construction zone. When the dams are functional with flume pipes or dam-and-pump diversion is installed and working, water contained between the dams will be pumped out and discharged within dewatering structures (see Resource Report 2). All water intakes, whether for dewatering or for dam-and-pump diversion, will be screened according to NMFS standards to prevent entrainment of aquatic species. The screens will also prevent aquatic life from entering the intake hose if a block net should fail. Screens shall be placed approximately 2 to 4 feet from the end of the intake hose to assure fish are not pinned upon the screen (WSDOT, 2008). Dewatering will be slow enough to allow for additional removal of fish if any remain after the fish exclusion procedures described above. During dewatering, the construction site will be monitored to prevent stranding organisms.

PCGP will retain contracted fish removal and handling personnel to conduct the fish removal operations. Agency personnel will be allowed to observe the fish removal activities but active participation will be limited to contractor personnel. When crossing Bureau of Reclamation (Reclamation) facilities, fish salvage will be performed in coordination with Reclamation and the Klamath Falls U.S. Fish and Wildlife Service office. Additional fish removal from within the isolated construction site may include additional seining with two-stick seines, using dip nets, or removing fish and other organisms by hand. Additional fish removal will also be conducted in the remaining water column between the block nets and sand bag dams only if blasting is required to construct the pipeline through bedrock. Even though electrofishing can result in injury to fish, the risk of injury due to blasting in those water columns is likely to be greater and warrant electrofishing. Electrofishing will be used only when other methods have been determined to be ineffective (WSDOT, 2008), and if its use is approved by NMFS. At other (non-blasting) work areas, if other methods are ineffective, electrofishing will be utilized if its use is approved by NMFS.

The following have been incorporated or adapted from procedures and conditions developed by WSDOT (2008) to minimize risks to ESA-listed species by electrofishing to remove fish from construction zones:

1. The USFWS and NMFS will be provided a project schedule 10 working days prior to the potential initiation of construction, whether or not electrofishing is actually utilized at a specific location.

2. Electrofishing shall only be conducted when a biologist with at least 100 hours of electrofishing experience is on site to conduct or direct all activities associated with capture attempts. Appropriate experience includes knowledge about electrofishing including the interrelated effects of voltage, pulse width and pulse rate on fish species and associated risk of injury/mortality, knowledge and abilities to recognize symptoms associated with galvanotaxis, narcosis, and tetany, and their respective relationships to injury/mortality rates.

3. The following table provides guidance for electrofishing in water where the potential to encounter ESA-listed juvenile fish exists. Only direct current (DC) or pulsed DC current will be used. Visual observation of the size classes of fish in the work area is helpful to avoid injury to larger fish by the mistaken assumption that they are not present.

Parameter	Initial Setting	Conductivity (µS/cm)	Maximum Settings
Voltage	100 V	≤300	800 V
		>300	400 V
Pulse Width	500 µs		5 ms
Pulse Rate	15 Hz		60 Hz [1]

[1] In general, exceeding 40 Hz will injure more fish

Source: WSDOT, 2008 - adapted from NMFS Backpack Electrofishing Guidelines, June 2000, and WDFW Electrofishing Guidelines for Stream Typing, May 2001

4. Electrofishing within each waterbody will begin with low settings for pulse width and pulse rate. If fish present in the area being electrofished do not exhibit an appropriate response, the settings shall be gradually increased until the appropriate response is achieved (galvanotaxis). The lowest effective setting for pulse width, pulse rate and voltage will be used to minimize personnel safety concerns and help minimize injury/mortality rates to listed fish species.

5. If blasting is required and electrofishing is necessary to remove fish from the water column between the sand bag dam and block net (whether upstream or downstream from the blasting site), an individual will be stationed at the downstream dam or block net continuously during electrofishing sessions to recover stunned fish in the event they are washed downstream and pinned against the structure or net.
6. The electrofishing operator will avoid allowing fish to come into contact with the anode. The zone of potential fish injury is 0.5 m from the anode. Netting shall never be attached to the anode. Techniques employed when using an unnetted anode keep fish farther from the anode and expose them to significantly less time in the zone of potential injury. Extra care shall be taken near in-water structures or undercut banks, in shallow waters or high-density fish areas. In these areas, fish are more likely to come into close contact with the anode because fish may be less visible and the voltage gradients may be abnormally intensified.
7. Voltage settings in shallow water sections shall be checked and readjusted by the operator, if necessary. When electrofishing areas near undercut banks or where structures may provide cover for fish, the anode will be used to draw the fish out by placing the activated anode near the area fish are likely present and slowly drawing the anode away. Fish experiencing galvanotaxis will be attracted to the anode and will swim away from the structure toward the anode so that they can be netted. This will not work on fish that experience narcosis or tetany. Therefore, fish response will be noted in adjacent areas prior to attempts made near structures. This should help avoid prolonged exposure of fish to the electrical field while in an immobilized state.
8. Electrofishing shall be performed in a manner that minimizes harm to fish. Once an appropriate fish response (galvanotaxis) is noted, the stream segment should be worked systematically, moving the anode continuously in a herringbone pattern through the water without electrofishing one area for an extended period of time. The number of passes will be kept to a minimum, will be dependent upon site-specific characteristics, and be at the discretion of the directing biologist. Adequate numbers of personnel shall be on-site to minimize the number of passes required for fish removal. Adequate staff to net, recover, and release fish as soon as possible shall be present. Fish shall be removed from the electrical field immediately. Fish shall not be held in the net while continuing to capture additional fish.
9. Condition of captured fish will be carefully observed and documented. Dark bands on the body and extended recovery times are signs of injury or handling stress. When such signs are noted, the settings for the electrofishing unit and/or manner in which the electrofishing session is proceeding will require adjustment and evaluation as to whether continued electrofishing is appropriate at the site.
10. Electrofishing will not occur when turbidity reduces visibility to less than 0.5 meter, when water conductivity exceeds 350 µS/cm, or when water temperature is above 18°C (64.4°F) or below 4°C (39.2°F).

Adult Pacific lamprey, and possibly ammocoetes, are expected to be captured during fish salvaging by seining. However, salvage techniques for salmonids may not be effective for salvaging ammocoetes which may remain in dewatered sediments. Electrofishing procedures to sample larval Pacific lampreys have been recommended (see Appendix A in FWS, 2010) but seining and use of dip-nets may also be effective once the workspace has been dewatered, depending on substrate conditions at the time of construction. PCGP will contract with either ODFW or a qualified consultant to capture the fish. Personnel that would handle and/or remove

fish on federal lands would be approved by the Forest Service or the BLM or Reclamation or be done directly by agency personnel if approved by ODFW.

3.3 Fish Handling, Holding and Release

The following has been adapted from procedures and conditions developed by WSDOT (2008) to minimize risks to ESA-listed species during their removal from construction zones and release:

1. Fish handling will be kept to the minimum necessary to remove fish from the work site.

2. Fish will not be sampled or anesthetized during removal activities as this protocol is intended to address fish removal not research. Fish species, number, age class estimate, and release location will be documented.

3. Individuals handling fish will ensure that their hands are free of sunscreen, lotion, or insect repellent and bare skin will be wetted to avoid drying out fish skin at points of contact and increasing potential for fungal or other skin lesions.

4. Fish or other aquatic life captured will immediately be put into dark colored containers filled with clean stream water. Fish removal personnel shall provide a healthy environment for fish with minimum holding periods and low fish densities in holding containers to avoid effects of overcrowding. Large fish shall be kept separate from smaller fish to avoid predation during containment. Water-to-water transfers will occur whenever possible.

5. ESA listed fish should not be transferred out of water to prevent added stress. Holding container temperature and well being of specimens will be frequently monitored to assure that all specimens will be released unharmed. Potential shade areas and supplemental oxygen for fish holding shall be considered in designing fish handling operations.

6. Unless site conditions require alternative release locations, all fish captured by any means will be released upstream from the upstream block net. Release at an upstream site will ensure that the captured fish will be held for very short durations. Also, release upstream will minimize effects of turbidity generated when the sand bag dams are removed and water flows over the dry open-cut construction site.

7. Each released fish shall be capable of remaining upright and have the ability to actively swim upon release. ESA-listed or proposed fish will have priority over other species for release. One person shall be designated to transport specimens in a timely manner to the site selected for release.

8. All dead ESA-listed fish will be preserved and delivered to the pertinent regulatory agency (see documentation below) as outlined in the appropriate permit conditions.

9. If authorized level of take is exceeded, the pertinent regulatory agency shall be notified as soon as possible.

3.4 Documentation

1. All work area isolation, fish removal and fish release activity shall be thoroughly documented in a log book with the following information: project location, date, methods, personnel, instream temperature, visibility, electrofisher settings, and other comments.

2. Species, number of each species, age class estimate, and location of release will be recorded for all fish handled.

3. Information regarding injuries or mortalities to ESA-listed or proposed species will be documented and provided within to NMFS or USFWS, depending on which agency has jurisdiction over that species, within a timeframe specified by each agency.

4.0 REFERENCES

Alaska Department of Fish and Game. 1991. Rationale for Blasting Standards (11 AAC 95) Developed to Prevent Explosive Injury to Fish. Alaska Department of Natural Resources Office of Habitat Management and Permitting. Online at: http://www.dnr.state.ak.us/habitat/explosives.htm

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