Appendix F – NMFS Water Drafting Guidelines and Pump Screen Criteria

General Water Drafting Guidance for Road Maintenance and Non-emergency Fire Use for Watersheds with Anadromous Fish in the Blue Mountain Tri-Forest Area

Within the Blue Mountain Tri-Forest area (Malheur National Forest, Umatilla National Forest, and Wallowa Whitman National Forest), water drafting regularly occurs to accomplish road maintenance activities as well as control fires. Because of the wide distribution of ESA-listed anadromous salmonids within the Tri-Forest area, and frequency of drafting water for Federal activities, there is potential for water drafting activities interfering with ESA listed anadromous salmonids. This is particularly true in northeast Oregon where streams used for water are small and support ESA-listed anadromous salmonids.

Water drafting for road maintenance activities can happen at any time of the year, though the largest water withdrawals typically occur in spring. Water is used to soften soil for road shaping, grading, and rocking. These activities usually involve tanker trucks ranging from 500 gallons to 3500 gallons which fill their tanks from local surface water sources and distribute water on roads as they drive. Most tankers used for this application are equipped with power take off (PTO) pumps which are powered by the vehicles engine. PTO pumps for these types of tankers typically range from about 150 gallons per minute (gpm) (approximately 0.3 cubic feet per second (cfs)) to about 550 gpm (approximately 1.2 cfs) and are often not capable of varying pump rates. Because these types of pumps are capable of removing large volumes of water at high rates, and streams available for water drafting are often small, it is important to avoid or minimize the potential to harm or harass ESA listed anadromous salmonids.

Water drafting for prescribed fire use can vary from use of small pumps (less than 40 gpm/ 0.1 cfs) for direct use with hoses to larger pumps as described above for filling tanks or water tenders. Regardless of pump rate, physical damage to redds, spawning adults, or juveniles can occur from incorrect placement of water drafting equipment. Proper equipment handling and placement in sensitive areas is important to reduce the likelihood of direct harm of ESA listed anadromous salmonids.

This document provides guidance for water drafting activities mainly associated with road maintenance and non-emergency fire suppression activities in the Blue Mountain Tri-Forest area (Umatilla, Malheur, and Wallowa Whitman National Forests). The goal is to create an understandable and workable protocol that will allow water drafting to occur while avoiding or minimizing risks to ESA-listed fish.

The following guidance is intended to minimize or avoid adverse effects to listed fish in the Blue Mountain Tri-Forest area when engaging in water drafting activities. As with any activity, site specific or project specific information may require more stringent or relaxed criteria to avoid adverse effects. In addition, compliance with these criteria may not minimize adverse effects to avoid take of listed fish in all cases, and therefore does not preclude the need for consultation. Projects will be reviewed on a case by case basis to ensure that guidance is reasonable, prudent, and adequately avoids or minimizes adverse effects to listed species.

1. Any intake used for drafting water will be screened according to NMFS Juvenile Fish Screen Criteria For Pump Intakes for salmonid fry.

2. Non-stream water (i.e. ponds) sources will be used prior to the use of stream sources whenever feasible.
3. When non-stream sources are unavailable, streams with the greatest flow will be used whenever feasible.

4. Water withdrawal will not reduce stream flow by more than 1/10th. In order to accomplish the lowest reduction of flow from marginal water sources (sources in which water drafting will reduce flows by more than 5%), the lowest drafting rate on pumps that have adjustable draft rates, and the smallest volume tender appropriate for the project will be used. Whenever feasible, marginal water sources will be avoided.

5. During drafting, streams will be monitored for reduced flows. If a flow concern is identified, operators will reduce pumping rates to ensure that flow reduction is not more than 1/10th of the existing stream flow is being removed or discontinue drafting.

6. If marginal water sources are used, withdrawal from single marginal sites will be limited to 18,000 gallons per day.

7. No more than one high-volume pump per site will be used, except sites in which the use of multiple pumps will not measurably decrease stream flows.

8. To avoid disturbing fish that may be spawning, No drafting will occur from any pools which contain adult salmonids.

9. Operators will avoid direct effects to redds or pre-emergence alevins by placing the intake hose in the deepest part of a drafting pool (where redds are unlikely to be present) and will avoid placing equipment on areas that redds are known or suspected to be. Operators will also ensure that tailout areas of pools that are known or suspected to have redds will not be dewatered.

10. Blading, shaping, aggregate placement, and dust control should be performed in spring and early summer when flows are high, to take advantage of available road soil moisture content to minimize the need for water drafting. Exceptions during the low-flow period will be limited to roads receiving heavy summer through fall traffic creating hazardous road surface conditions that require maintenance for human safety reasons. Essential maintenance during low-flow conditions will be deferred, when possible, until fall precipitation reduces the need for water drafting. Spring and fall blading and shaping will minimize demands for water usage, will minimize dust production, and will reduce sediment generated from surface erosion.

11. NMFS may periodically review drafting activities to ensure that these measures are adequate for the protection of listed fish.

**NMFS Juvenile Fish Screen Criteria for Pump Intakes**

Developed by:
National Marine Fisheries Service
Environmental & Technical Services Division
Portland, Oregon
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The following criteria serve as an addendum to current National Marine Fisheries Service gravity intake juvenile fish screen criteria. These criteria apply to new pump intake screens and existing inadequate pump intake screens, as determined by fisheries agencies with project jurisdiction.

**Definitions used in pump intake screen criteria**

Pump intake screens are defined as screening devices attached directly to a pressurized diversion intake pipe. Effective screen area is calculated by subtracting screen area occluded by structural members from the total screen area. Screen mesh opening is the narrowest opening in screen mesh. Approach velocity is
the calculated velocity component perpendicular to the screen face. Sweeping velocity is the flow velocity component parallel to the screen face with the pump turned off.

Active pump intake screens are equipped with a cleaning system with proven cleaning capability, and are cleaned as frequently as necessary to keep the screens clean. Passive pump intake screens have no cleaning system and should only be used when the debris load is expected to be low, and:

1. If a small screen (less than 1 CFS pump) is over-sized to eliminate debris impingement, and
2. Where sufficient sweeping velocity exists to eliminate debris build-up on the screen surface, and
3. If the maximum diverted flow is less than .01% of the total minimum streamflow, or
4. The intake is deep in a reservoir, away from the shoreline.

**Pump Intake Screen Flow Criteria**

The minimum effective screen area in square feet for an active pump intake screen is calculated by dividing the maximum flow rate in cubic feet per second (CFS) by an approach velocity of 0.4 feet per second (FPS). The minimum effective screen area in square feet for a passive pump intake screen is calculated by dividing the maximum flow rate in CFS by an approach velocity of 0.2 FPS. Certain site conditions may allow for a waiver of the 0.2 FPS approach velocity criteria and allow a passive screen to be installed using 0.4 FPS as implementation criteria. These cases will be considered on a site-by-site basis by the fisheries agencies.

If fry-sized salmonids (i.e. less than 60 millimeter fork length) are not ever present at the site and larger juvenile salmonids are present (as determined by agency biologists), approach velocity shall not exceed 0.8 FPS for active pump intake screens, or 0.4 FPS for passive pump intake screens. The allowable flow should be distributed to achieve uniform approach velocity (plus or minus 10%) over the entire screen area. Additional screen area or flow baffling may be required to account for designs with non-uniform approach velocity.

**Pump Intake Screen Mesh Material**

Screen mesh openings shall not exceed 3/32 inch (2.38 mm) for woven wire or perforated plate screens, or 0.0689 inch (1.75 mm) for profile wire screens, with a minimum 27% open area. If fry-sized salmonids are never present at the site (by determination of agency biologists) screen mesh openings shall not exceed 1/4 inch (6.35 mm) for woven wire, perforated plate screens, or profile wire screens, with a minimum of 40% open area.

Screen mesh material and support structure shall work in tandem to be sufficiently durable to withstand the rigors of the installation site. No gaps greater than 3/32 inch shall exist in any type screen mesh or at points of mesh attachment. Special mesh materials that inhibit aquatic growth may be required at some sites.

**Pump Intake Screen Location**

When possible, pump intake screens shall be placed in locations with sufficient sweeping velocity to sweep away debris removed from the screen face. Pump intake screens shall be submerged to a depth of at least one screen radius below the minimum water surface, with a minimum of one screen radius clearance between screen surfaces and adjacent natural or constructed features. A clear escape route should exist for fish that approach the intake volitionally or otherwise. For example, if a pump intake is located off of the river (such as in an intake lagoon), a conventional open channel screen should be considered, placed in the channel or at the edge of the river. Intakes in reservoirs should be as deep as
practical, to reduce the numbers of juvenile salmonids that approach the intake. Adverse alterations to riverine habitat shall be minimized.

**Pump Intake Screen Protection**

Pump intake screens shall be protected from heavy debris, icing and other conditions that may compromise screen integrity. Protection can be provided by using log booms, trash racks or mechanisms for removing the intake from the river during adverse conditions. An inspection and maintenance plan for the pump intake screen is required, to ensure that the screen is operating as designed per these criteria.