NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

FISH PASSAGE

(No.)

CODE 396

DEFINITION

Modification or removal of barriers that restrict or prevent movement or migration of fish.

PURPOSE

Allow upstream and downstream movement of fish past barriers where feasible or desirable.

CONDITIONS WHERE PRACTICE APPLIES

All rivers, streams, and outlets of ponds, lakes or wetlands where barriers impede desired fish passage.

CRITERIA

General Criteria Applicable to all Purposes

All planned work shall comply with all federal, state and local laws and regulations.

Actions taken to provide fish passage shall seek to avoid adverse affects to federal and state listed species of concern (endangered, threatened, proposed and candidate) and their habitats. Refer to GM 190 ECS-Part 410.22 for actions affecting listed species.

Fish passage design and implementation shall meet the requirements of the Washington Department of Fish and Wildlife, as found in "*Fish Passage Design at Road Culverts"* and "*Fishway Guidelines for Washington State"* (see References).

Fish passage measures shall be designed so fish will not suffer excessive energy deficits or undue physical stress when swimming past a fish passage structure or site.

Fish passage shall be designed so that fish shall not be excessively delayed during passage at the structure or site unless modification or removal of a barrier, such as a tidegate, could result in undesirable effects to other resources.

Minimum and maximum flows through fish passage structures or sites must be adequate to attract key fish species to, and through, the structure or site.

Location and overall design of fish passage structures, or fish passage features, shall accommodate watershed conditions such as variations in stream flow and bedload movement.

Location and overall design of fish passage structures or features shall accommodate different aquatic species and age classes to the extent possible.

Location and overall design of fish passage structures or features shall be compatible with local conditions and stream geomorphology.

Materials selected for constructing fish passage structures will be non-toxic to fish and other aquatic life.

At stream crossings, jump height below culverts and flow velocity through culverts must not exceed the abilities of those target species expected to move upstream and downstream of the site.

Modifications to dams or impassible weirs to provide fish passage must be in accordance with existing laws and engineering specifications for dams.

CONSIDERATIONS

Consider all indigenous and non-indigenous fish species and amphibians when designing

and implementing fish passage features.

Consider a stream simulation design for culverts at road crossings that incorporates natural streambed substrates.

Consider removal of the fish passage barrier before planning for a fish ladder.

If replacement of an instream structure will cause degradation (head-cutting) of the channel upstream, installation of bed controls appropriate for the geomorphic conditions of the site and fish passage needs should be considered (see Stream Channel Stabilization –Code 584 and Grade Stabilization Structure – Code 410).

Consider potential negative effects of providing passage for invasive or non-native species that may hybridize with, compete with, or spread disease to desirable fish or other aquatic species above a barrier.

Consider other aquatic and terrestrial species that have established habitat in areas where barriers currently exist or in upstream and downstream areas that would be directly affected by the action.

Consider the amount of habitat both upstream and downstream of a barrier and the potential for connectivity of important habitats for the targeted fish species.

Consider seasonal variations in headwater and tailwater levels and how these may impact passage hydraulics for the life history stages of the fish for which the structure is being designed.

Consider the upstream and downstream impacts of temporary removal of a barrier (i.e., stoplogs in a dam) for the time interval(s) when fish are expected to need passage. This may involve agreement from other involved agencies.

Consider the need to prevent entrainment of fish, particularly juveniles, in irrigation diversions by installing screens (Code 587).

Consider historical structures when planning. This practice may affect cultural resources and should comply with GM 420, Part 401 during planning, prior to installation and during maintenance of fish passage structures.

Consider the need to balance fish passage with other water management objectives.

To the extent possible, fish passage structures should be designed to minimize excessive predation on fish entering or exiting the structure.

Removal of a fish passage barrier should take into consideration effects on wetlands, flooding potential, existing infrastructure and social impacts.

Consider bypassing the barrier by restoring a historical channel or creating a new channel that is geomorphically stable and which provides a more natural fish passage.

PLANS AND SPECIFICATIONS

In-stream construction activities where determined necessary, require permitting by the Alaska Department of Fish and Game.

Specifications for this practice shall be prepared for each site. Plans and specifications shall describe the details adequately to apply the practice to achieve its intended purpose of improving conditions for a diverse and healthy aquatic ecosystem. The plans and specifications should address the following five common conditions that create fish migration barriers:

- Excess drop at outlet;
- High velocity within the structure;
- Inadequate depth within the structure;
- High velocity and/or turbulence at structure inlet;
- Turbulence within the structure;
- Debris accumulation at the inlet.

OPERATION AND MAINTENANCE

An operation and maintenance plan shall be developed for all applications. The plan shall provide for periodic inspection and prompt repair should the application of practices cause passages to become impaired or inoperable. All instream structural measures shall be evaluated in an annual basis.

REFERENCES

Previously cited references can be found at www.wa.gov/wdfw/hab/ahg

Bates, Ken. 1999. Fish Passage Design at Road Culverts. *for* Washington Department of Fish and Wildlife (WDFW)

Bates, Ken.2000. Fishway Guidelines for Washington State. *for* WDFW

Easterbrooks, John and K. Bates. 1998. Screening Requirements for Water Diversions. *for* WDFW