

Fish Passage (No.) 396

DEFINITION

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

PURPOSES

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

CONDITIONS WHERE PRACTICE APPLIES

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

CRITERIA

General Criteria Applicable To All Purposes

Actions taken to provide fish passage shall seek to avoid adverse effects to endangered, threatened, and candidate species and their habitats, as well as state species of concern, whenever possible. Refer to General Manual 190 ECS - Part 410.22 for actions affecting listed species.

Fish passage measures shall be designed so fish will not suffer excessive energy deficits or undue physical stress when swimming through 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 target fish to 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 all aquatic species and life stages to the extent practical.

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.

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

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

Criteria Applicable To Bridges And Culverts

Applicable to Both Structures:

- Refer to the Drainage Criteria in Conservation Practice Standard 560 Access Road for drainage capacity requirements.
- Align structure with channel sinuosity. If the structure directs channel flow toward the bank or terrace, channel realignment should be considered. Realign stream channel with as much of the natural channel length as possible.
- The width of the structure should be equal to the bankfull stream width as measured at the narrowest point outside of the impacts of the road crossing and within 600 feet of the crossing.

Bridges:

Open span bottomless bridges shall be at least the stream bankfull width. This is preferable to culverts for fish passage when practical.

Culverts:

Culverts are an option for road crossings for fish passage provided they meet the following design requirements.

- Culvert slope equal to stream slope.
- Culvert length sufficient to extend beyond toe of fill.
- Average discharge flow velocity of 3 FPS or less for 2-year flow event.
- Bury culverts about 1/6 the culvert height below the bottom of the streambed with approximately 1/2 of culvert height above the bankfull level.
- When using multiple culverts, use the fewest and largest culverts possible, and offset multiple culverts vertically by 1 foot so low culvert carries low flow.

Criteria Applicable To Fish Ladders

Fish ladders will be designed on a site-specific basis by an engineer and biologist experienced in fish ladder requirements.

CONSIDERATIONS

Native game and non-game fish species and amphibians as well as endangered, threatened, and candidate, rare and other sensitive species shall be carefully considered 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 barrier or fish passage before installing a fish ladder.

If replacement of an in-channel structure will cause degradation or aggradation of the channel upstream, installation of bed controls appropriate for the geomorphic conditions of the site and fish passage needs should be considered (see Conservation Practice Standards 584 Channel Stabilization and 410 Grade Stabilization Structure).

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

Consider other aquatic and terrestrial species, including endangered and threatened 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 fish species of concern.

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 need to prevent entrainment of fish, particularly juveniles, in irrigation diversions by installing screens.

Consider the need to design for strategic resting places for target species facing passages greater than 100 feet long.

Consider historical structures when planning. This practice may affect cultural resources and should comply with General Manual 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.

When an in-channel structure is impassable due to downstream channel incision and there is evidence of historical channels near the incised channel, consider bypassing the barrier by restoring historical channels.

PLANS AND SPECIFICATIONS

Specifications for this practice shall be prepared for each site. Plans and specifications shall be in keeping with this practice and shall describe the details adequately to apply the practice to achieve its intended purpose.

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 fish passage become impaired or inoperable at the structure or site.