

NATURAL RESOURCES CONSERVATION SERVICE
MONTANA CONSERVATION INTERIM PRACTICE STANDARD

FISH SCREEN (NUMBER)

CODE 700

DEFINITION

A structure designed, installed, and operated to prevent fish and other aquatic species of concern from unintentional entry in, and injury from a surface water diversion, drawdown, or withdrawal site.

PURPOSE

This practice is applied to protect fish and other aquatic species of concern from entrainment, injury, mortality, and/or accidental escapement resulting from the placement, operation, and management of structures and/or pumps for withdrawing, diverting, or drawing down surface waters for agricultural, domestic, recreational or other purposes.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies wherever diversion, withdrawal, or draw-down of water from a fish-bearing stream or water body occurs, including:

- Irrigation or domestic surface water diversion sites
- irrigation or domestic surface water pump sites
- aquaculture ponds and raceways
- enhanced or constructed wetlands with water control structures
- constructed fish ponds

A fish screen installation should be considered a facilitating practice used to meet site specific management goals as established by **Field Office**

Technical Guide (FOTG), Section IV, practice standards Wetland Wildlife Habitat Management (Code 644) or Stream Habitat Improvement and Management (Code 395).

This practice does not apply to experimental fish exclusions, e.g. behavioral devices.

CRITERIA

General Criteria Applicable to all Purposes

NRCS must determine if the proposed installation will affect any federal, tribal, or state listed species or their habitat during the planning process. This determination is generally accomplished through completion of the Environmental Evaluation Worksheet (see the National Environmental Compliance Handbook for more information). In Montana, this process also may involve the use of species-specific habitat determination screens and/or on-line databases (e.g., Montana Fisheries Information System, Montana Natural Heritage Program).

Fish screens shall be designed to meet specific site conditions and the physiological and behavioral characteristics of the relevant aquatic species at the time of their life history in which the screen is operating. **In Montana, the following biological information shall be provided in writing to the engineering screen design team for all target species: species name, life stage(s) at target location, timing of migration (where applicable), and spawning location.**

Fish screens shall be designed on an individual basis to meet job site conditions and functional requirements. Designs must meet the requirements of Federal, State, or **Tribal** fish screening criteria developed to accommodate the requirements of species for which the screen is

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Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard contact the Natural Resources Conservation Service.

NOTE: This type of font (AaBbCcDdEe 123..) indicates NRCS National Standards.
This type of font (AaBbCcDdEe 123..) indicates Montana Supplement.

providing protection. If such criteria are not available, the structure shall be designed in accordance with National Engineering Handbook (NEH), Part 654, Technical Supplement 14N, Fish Passage and Screen. **Design and screen criteria will adhere to Chapter 11 of the NOAA document titled *Anadromous Salmonid Passage Facility Design* available at:**

<http://www.nwr.noaa.gov/Publications/Reference-Documents/Passage-Refs.cfm>

In Montana, when NRCS' environmental evaluation process indicates that a fish species is listed by the U.S. Fish and Wildlife Service (USFWS) as Threatened (T) or Endangered (E) and may be negatively affected by the proposed action, screening is required. In addition, the screen must meet the requirements of the USFWS as determined through programmatic, informal, or formal consultation.

Criteria Applicable to Water Diversion Sites

Provisions of gravity flow fish screens will include return of the target organisms to the stream or water body in a manner which insures their survival.

Water diversion facilities that include bypasses must provide adequate cover and depth in the bypass to minimize predation by birds and other predators during recovery periods.

When practical, screens shall be designed for convenient removal from the water as needed for operations and maintenance.

When applicable, screen designs shall include a pump safety shutoff mechanism, or bypass, with instrumentation to determine the status of the system.

Criteria Applicable to Draw-down Sites

Water control structures to allow passive drawdown of flooded natural or enhanced wetlands shall be designed and operated to allow juvenile fish using the wetland for seasonal habitat to migrate to the stream at will and not be trapped in the wetland beyond the time in which they would normally be expected to migrate.

Provide a screen at all conduits used to draw down constructed farm ponds and aquaculture facilities, to assure organisms intentionally

contained therein will not enter a natural stream, floodplain wetland, or river.

CONSIDERATIONS

Federal Candidate (C) Species and State/Tribal Listed Species: Although there are no existing legal requirements in Montana to screen fish in this category, screening may be applicable. When NRCS' environmental evaluation process indicates that a fish species within one of these categories may be adversely affected, NRCS will attempt to fulfill its National Environmental Policy Act (NEPA) requirements (GM Title 190, Part 410.22) using a collaborative approach. In the instance of a Candidate species, NRCS should solicit written screening requirement input from the USFWS. In the instances of state or tribal listed species, NRCS should solicit written screening requirement input from Montana Fish, Wildlife and Parks and/or Native American Tribes, as appropriate.

Non-Listed Species: Although there are no existing legal requirements in Montana to screen fish in this category, screening may be applicable. When NRCS' environmental evaluation process indicates that the target species is a non-listed species, NRCS should solicit written screen requirement input from Montana Fish, Wildlife and Parks and/or Native American Tribes, as appropriate. Additional written input may also be solicited from non-governmental organizations or citizen groups.

Other Considerations (all species):

Diversion or withdrawal of water from streams will affect habitat at and downstream of the site. Maintain instream flows to the greatest degree possible to protect stream function and aquatic species habitats.

When determining where to install a fish screen, it is usually preferred to keep fish within the body of water they are presently occupying.

Consider the watershed management context of the site, structure maintenance, and operational costs before deciding on whether to construct in-stream or off-stream exclusion structures.

Sediment, debris loads, algae, leaves, and other suspended material will dictate the types of cleaning and debris systems required on fish screens.

The site for installing a fish screen facility can limit the types of screens, O&M capabilities of the design, and capital and maintenance costs. Careful consideration of the screen location can lead to simplification of the structure, and reduction of stress to fish, as well as reduction in maintenance demands and overall costs to the operator.

Required easements for construction and O&M at the site should not be overlooked in the planning process. Include easements for the fish screening site, O&M access, and power and other utility lines.

Consolidate multiple diversions at one site in the watershed to minimize impacts from hydrological alterations to the stream corridor.

PLANS AND SPECIFICATIONS

Plans and specifications for installing fish screens shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose.

The plan and specification shall identify the location, grades, quantities, dimensions, materials, and any hydraulic and structural requirements for the individual screen and the species it is being designed to protect.

Document any special considerations for species of concern in the Practice Requirements Worksheet.

OPERATION AND MAINTENANCE

An operation and management plan shall be provided to, and reviewed with, the land manager. The plan shall be site specific and include but not be limited to the following:

- Fish screens will be operated and maintained to meet the life history requirements of the targeted species.
- Fish screens will be checked routinely and necessary maintenance, including removal of debris, shall be performed as required to allow the screen to function properly.

- Water level management and timing of control shall be adequately described wherever applicable.

REFERENCES

1. General References:

Fish Protection at Water Diversions, USDI, Bureau of Reclamation, Chapters I and II
http://www.usbr.gov/pmts/hydraulics_lab/pubs/manuals/fishprotection/Fish%20chapters%20I,II.pdf

Gale, S. B and Zale, A. V. 2005. Evaluation of entrainment losses of westslope cutthroat trout at private irrigation diversions and the efficiency of fish screens on Skalkaho Creek, Montana. Montana Cooperative Fishery Research Unit, USGS, Department of Ecology, Montana State University, Bozeman, Montana 59717.
http://wildfish.montana.edu/docs/IrrigationStudy_FinalReportSkalkaho.pdf

NRCS, General Manual, Title 190, Part 410.22 Endangered and Threatened Species and Species of Concern. Amendment 16: October 2009.

USGS, MTFWP, USFWS. Sampling Larval Pallid Sturgeon in Large Rivers: Maximizing the Likelihood of Catch Based on Vertical Sampling Location in the Water Column, Net Design, and Lateral Sampling Location.

2. Technical Design References:

NRCS NEH 654: Fish passage and screen design
http://directives.sc.egov.usda.gov/media/pdf/H_210_654_ts23.pdf

USBR, Fish Protection at Water Diversions. April, 2006. Chapters VII-VIII: Operation and Maintenance
http://www.usbr.gov/pmts/hydraulics_lab/pubs/manuals/fishprotection/Fish%20chapters%20VII,VIII,Biblio,Appendices.pdf

USBR, Fish Protection at Water Diversions. April, 2006. Chapter III: Overview of Fish Exclusion
http://www.usbr.gov/pmts/hydraulics_lab/pubs/manuals/fishprotection/Fish%20chapter%20III.pdf

NMFS, Northwest Region. Anadromous Salmonid Passage Facility Design. February 2008.
<http://www.nwr.noaa.gov/Publications/Reference-Documents/Passage-Refs.cfm>

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**USBR, Intake Diversion Dam Fish Screens:
Evaluation of Fish Screens for Protecting Early Life
Stages of Pallid Sturgeon. September 2008.**