

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
STRUCTURE FOR WATER CONTROL

(No.)

CODE 587

DEFINITION

A structure in a water management system that conveys water, controls the direction or rate of flow, maintains a desired water surface elevation or measures water.

PURPOSE

The practice may be applied as a management component of a water management system to control the stage, discharge, distribution, delivery or direction of water flow.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies wherever a permanent structure is needed as an integral part of a water-control system to serve one or more of the following functions:

1. Convey water from one elevation to a lower elevation within, to or from a water conveyance system such as a ditch, channel, canal or pipeline designed to operate under open channel conditions. Typical structures: drops, chutes, turnouts, surface water inlets, head gates, pump boxes and stilling basins.
2. Control the elevation of water in drainage or irrigation ditches. Typical structures: checks, flashboard risers and check dams.
3. Control the division or measurement of irrigation water. Typical structures: division boxes and water measurement devices.
4. Keep trash, debris or weed seeds from entering pipelines. Typical structures: debris screen and fish screen.
5. Control the direction of channel flow resulting from tides and high water or back-flow from flooding. Typical structures: tide and water management

gates.

6. Control the water table level, remove surface or subsurface water from adjoining land, flood land for frost protection or manage water levels for wildlife or recreation. Typical structures: water level control structures, flashboard risers, pipe drop inlets and box inlets.
7. Convey water over, under or along a ditch, canal, road, railroad or other barriers. Typical structures: bridges, culverts, flumes, inverted siphons and long span pipes.
8. Modify water flow to provide habitat for fish, wildlife and other aquatic animals. Typical structures: chutes, cold water release structures and flashboard risers.
9. Provide silt management in ditches or canals. Typical structure: sluice.
10. Supplement a resource management system on land where organic waste or commercial fertilizer is applied.
11. Create, restore or enhance wetland hydrology.
12. Improve irrigation water quality, such as salinity reduction, thereby improving soil health, reduction in water applied, and improved water quality at tailwater outfalls.

CRITERIA

General Criteria Applicable to All Purposes

If soil and climatic conditions permit, a protective cover of vegetation shall be established on all disturbed earth surfaces. If soil or climatic conditions preclude the use of vegetation and protection is needed, non-vegetative means, such as mulches or gravel, may be used. In some places, temporary

vegetation may be used until permanent vegetation can be established. Seedbed preparation, weeding, fertilizing, and mulching shall comply with the instructions in technical guides.

Provide design features to facilitate continuation of fish migrations, where appropriate.

Provide fencing, if necessary, to protect the vegetation.

Structures shall not be installed that have an adverse effect on septic filter fields.

The water level upstream of water control structures shall not be raised on adjacent landowners without their permission.

Additional Criteria for Fish Screens

Fish screens shall be designed on an individual job basis to meet site conditions and functional requirements. Fish screen designs must meet the requirements of the current version of the State of California, Fish Screening Criteria and the National Marine Fisheries Service, Southwest Region, Fish Screening Criteria for Anadromous Salmonids.

Provisions of gravity flow fish screens will include return of the fish to the point of diversion in a manner which insures their survival. Provisions for fish trapping need to be considered and incorporated into the design if necessary.

Fish screens should be designed for easy removal from the river for ease of operations and maintenance.

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

Water backwash systems should incorporate appropriate water filtration devices.

Additional Criteria for Water Quality Modification

All designs for water quality improvement systems will be approved by a professional engineer registered in California. Designs shall include:

1. The designated, maximum allowed Total Dissolved Solids (TDS) for the planned crop use;
2. The system flow rate needed to meet peak demands;
3. Diversion of storm water runoff from evaporation ponds or other brine drying systems;
4. A quality assurance plan to test and analyze water quality data from source water, evaporation ponds, and finished water (permeate, for example).

There shall be no land or ocean disposal from processes such as reverse osmosis or others that generate a byproduct exceeding any water quality criteria such as TDS, organics, etc. For treatment processes that produce brine in salt reduction treatments, on-site evaporation with properly designed and installed conveyance, storage, and byproduct handling and disposal is required. Ponds will be designed and installed to meet NRCS Practice Standard 378, Ponds, as well as local and state regulations for proper pond lining and leachate collection, if required. Disposal of the remaining salts or other byproducts will be to an approved landfill. Pond design shall address local wildlife concerns to minimize accidental take.

CONSIDERATIONS

When planning, designing, and installing this practice, the following items should be considered:

Water Quantity

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation and ground water recharge.
2. Potential for a change in the rate of plant growth and transpiration because of changes in the volume of soil water.
3. Effects on downstream flows or aquifers that would affect other water uses or users.
4. Effects on the volume of downstream flow that might cause environmental, social or economic effects.
5. The effect on the water table of the field to ensure that it will provide a suitable rooting depth for the anticipated crop.

- Potential use for irrigation management to conserve water.

Water Quality

- Effects on stream system channel morphology and stability as it relates to erosion and the movement of sediment, solutes and sediment-attached substances carried by runoff.
- Effects on the movement of dissolved substances below the root zone and to ground water.
- Effects of field water table on salt content in the root zone.
- Effects on the turbidity of downstream water resources.
- Short term and construction-related effects of this practice on the quality of downstream water.
- Effects of water level control on the temperatures of downstream waters for their effects on aquatic and wildlife communities.
- Effects on wetlands or water-related wildlife.

Design alternatives presented to the client should address economics, ecological concerns and acceptable level of risk for design criteria as it relates to hazards to life or property.

CULTURAL RESOURCES CONSIDERATIONS

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

<http://www.nrcs.usda.gov/technical/cultural.html> is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Evaluation CPA-52 also provide guidance on how the NRCS must account for cultural

resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

ENDANGERED SPECIES CONSIDERATIONS

If during the Environmental Evaluation CPA-52 process NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

PLANS AND SPECIFICATIONS

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

The plan shall specify the location, grades, quantities, dimensions, materials, and hydraulic and structural requirements for the individual structure.

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:

- Structures will be checked and necessary maintenance, including removal of debris, shall be performed after major storms and at least semi-annually.
- Water level management and timing shall be adequately described wherever applicable.

REFERENCES

1. California Department of Fish and Game, June 19, 2000, Fish Screen Criteria, <http://iep.water.ca.gov/cvffrt/DFGCriteria 2.htm>
2. National Marine Fisheries Service, January 1997, Fish Screening Criteria for Anadromous Salmonids, <http://swr.nmfs.noaa.gov/hcd/fishscrn.pdf>
3. National Marine Fisheries Service, May 9, 1996, Addendum to Fish Screening Criteria for Pumped Water Intakes. <http://swr.nmfs.noaa.gov/hcd/pumpcrit.pdf>
4. California NRCS, September 2003, Technical Notice TN-Engineering-CA-14, NRCS California, Planning and Design Guide for Stream Corridor Restoration