

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

IRRIGATION STORAGE RESERVOIR

(no. and ac.-ft.)
CODE 436

DEFINITION

An irrigation water storage structure made by constructing a dam, embankment, or pit.

PURPOSE

Conserve water by holding it in storage until it is used to meet crop irrigation requirements.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to irrigation water storage structures that meet all the following criteria:

The water supply available to the irrigated area is insufficient to meet conservation irrigation requirements during part or all of the irrigation season.

Water is available for storage from surface runoff, streamflow, or a subsurface source.

A suitable site is available for the construction of a storage reservoir.

This standard pertains to the planning and functional design of irrigation storage reservoirs. Storage reservoirs shall be planned and located to serve as an integral part of an irrigation system.

This standard does not apply to Irrigation Regulating Reservoirs (552) designed primarily for flow control or to store water for a few hours or days. It does not include detailed design criteria or construction specifications for individual structures or components of the storage facility.

CRITERIA

The installation and operation of an Irrigation Storage Reservoir shall comply with all federal, state and local laws, rules and regulations. Laws and regulations of particular concern include those involving water and drainage

rights, land use, pollution control, property easements, wetlands, Waters of the United States (U.S.), preservation of cultural resources, and endangered species.

Designs of components not addressed in Natural Resources Conservation Service (NRCS) conservation practice standards shall be consistent with sound engineering principles.

All irrigation systems shall be operated in accordance with an Irrigation Water Management (IWM) Plan conforming to South Dakota (SD) NRCS practice standard, Irrigation Water Management (449).

Irrigation. The amount of water required to meet variations in water demand within the growing season must be determined to calculate storage requirements. All demand hydrographs shall be computed from the consumptive use-time relationship. Demand hydrographs shall be adjusted to reflect anticipated irrigation efficiency, conveyance losses, and any other consumptive uses, such as leaching or frost control.

Storage. Irrigation storage reservoirs shall be designed to satisfy irrigation requirements in the design area, unless limited by reservoir site characteristics, available watershed yield, or limitations imposed by water rights. Additional capacity shall be provided as needed for sediment storage.

Water releases shall be those increments of the water demand hydrograph that exceed the available direct flows from other sources.

Capacity. Reservoir capacity required to satisfy irrigation demands shall be computed according to the length of the storage period, the anticipated inflow and outflow during this period, and the expected seepage and evaporation losses. Runoff from the 50 percent chance storm on the drainage area

Conservation practice standards are reviewed periodically and updated if needed. The current version of this standard is posted on our website at www.sd.nrcs.usda.gov or may be obtained at your local Natural Resources Conservation Service.

should generally be used to determine the volume of water available from runoff.

If storage capacity is limited, benefits may be evaluated on the basis of the more frequent availability of water to satisfy irrigation demands for the design area.

Type of structures. The type of dam, embankment, or pit and appurtenant structures shall be based on site-specific hydrologic studies, engineering, geologic investigations, and construction materials.

Foundation, embankment, and spillway. Earthen dams, embankments, pits and appurtenant structures shall meet SD NRCS conservation practice standard Pond, (378) or NRCS Technical Release TR-60, as appropriate.

Drop spillways, chute spillways, and box spillways shall be designed according to Engineering Field Handbook and National Engineering Handbook, Section 5-Hydraulics; Section 11-Drop Spillways; or Section 14-Chute Spillways, or other appropriate engineering references.

Upstream embankment slopes below the top of the irrigation pool must be 4:1 (horizontal/vertical) or flatter when not covered with riprap or other effective slope protection.

Overflow protection. Overflow protection shall be provided for enclosed embankments.

Outlet works. Outlet works shall be provided for the controlled withdrawal or release of irrigation water. Outlet works may consist of a direct pumping system, or a gated conduit through or over the dam.

The capacity of the outlet works shall meet peak period irrigation system demands.

CONSIDERATIONS

When planning this practice, consider:

Short-term and construction-related effects on down gradient water quality.

Potential for uncovering or redistributing toxic material.

Consider effects on:

The water budget, including evaporation, transpiration, runoff, infiltration, percolation, and ground water recharge.

Impacts on downstream flows or aquifers including effects on water volume, temperature, and COD; wildlife, environmental, social, or economic effects and effects on other water uses or users.

Erosion, sediment, soluble and insoluble substances, and contaminants.

Wetlands and Waters of the U.S.

The visual quality of water resources.

Cultural resources.

PLANS AND SPECIFICATIONS

Plans and specifications for constructing this practice shall meet this standard and include requirements needed to achieve the purposes.

OPERATION AND MAINTENANCE (O&M)

An O&M plan shall be prepared for use by the owner/operator. The plan shall ensure the practice functions properly by including:

Periodic checks and removal of debris from trash racks and inlets and outlets.

Periodic removal of sediment that affects design capacity and efficiency.

Maintenance of mechanical components, following manufacturer recommendations.

Periodic inspection and maintenance to control erosion and undesirable vegetation.

Periodic water quality analysis as necessary to evaluate pollutants, salts, nutrients, pesticides, and pathogens.