

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:

1. The water supply available to the irrigated area is insufficient to meet irrigation requirements during part or all of the irrigation season.
2. Water is available for storage from surface runoff, streamflow, or a subsurface source.
3. A suitable site is available for the construction of an irrigation storage reservoir.

This standard pertains to the planning and functional design of irrigation storage reservoirs. Plan and locate storage reservoirs to serve as an integral part of an irrigation system.

This standard does not apply to Florida NRCS conservation practice standard Irrigation Regulating Reservoirs, Code 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

Impact to cultural resources, wetlands and Federal and state protected species shall be evaluated and avoided or minimized to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida policy, General Manual (GM) Title 420-Part 401; Title 450-Part 401, Title 190-Parts 410.22 and 410.26, National Planning Procedures Handbook (NPPH) Florida Supplements to Parts 600.1 and 600.6, National Cultural Resources Procedures Handbook (NCRPH), National Food Security Act Manual (NFSAM), and the National Environmental Compliance Handbook (NECH).

Plan the installation and operation of an irrigation storage reservoir to comply with all federal, state and local laws, rules and regulations.

The criteria for the design of components not addressed in NRCS conservation practice standards shall be consistent with sound engineering principles.

Irrigation. Determine the amount of water required to meet variations in water demand within the growing season to calculate storage requirements. Compute all demand hydrographs from the consumptive use-time relationship. Adjust demand hydrographs to reflect anticipated irrigation efficiency,

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

conveyance losses, and any other consumptive uses, such as leaching or frost control.

Storage. Design irrigation storage reservoirs to satisfy irrigation requirements in the design area, unless limited by reservoir site characteristics, available watershed yield, or limitations imposed by water rights. Provide additional capacity 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. Compute the reservoir capacity required to satisfy irrigation demands according to the length of the storage period, the anticipated inflow and outflow during this period, and the expected seepage and evaporation losses.

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

Type of structures. Base the type of dam, embankment, or pit and appurtenant structures on site-specific hydrologic studies, engineering, geologic investigations, and construction materials.

Foundation, embankment, and spillway. Design earthen dams, embankments, pits and appurtenant structures to meet the criteria in the Florida NRCS conservation practice standard for Pond, Code 378 or in Technical Release No. 60 Earth Dams and Reservoirs, as appropriate.

Design drop spillways, chute spillways, and box spillways according to the principles of the Engineering Field Handbook and the National Engineering Handbook (NEH), Section 5 - Hydraulics; Section 11 - Drop Spillways; or Section 14 - Chute Spillways, as appropriate.

Overflow protection. Provide overflow protection for enclosed embankments.

Outlet works. Provide outlet works 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 for gravitational flow to the irrigated area, to a pumping plant or another storage facility.

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

CONSIDERATIONS

When planning this practice consider the following items, as applicable:

- Short-term and construction-related effects on the quality of downstream water courses.
- Potential for earth moving during construction to uncover or redistribute toxic materials.

Consider the effects on:

- The water budget, especially on evaporation, transpiration rates of runoff, infiltration, percolation, and ground water recharge.
- Downstream flows or aquifers that would affect other water uses or users.
- The volume of downstream flow that could have undesirable environmental, social, or economic effects.
- Erosion, sediment, soluble contaminants, and contaminants attached to sediment in runoff.
- The movement of dissolved substances to ground water.
- Downstream water temperature changes that could cause undesirable effects on aquatic and wildlife communities.
- Wetlands or water-related wildlife habitats.
- The visual quality of water resources.
- Cultural resources.

PLANS AND SPECIFICATIONS

Keep plans and specifications for constructing irrigation storage reservoirs with this standard and include a description of the requirements for applying the practice to achieve its intended purposes. As a minimum, the plans and specifications shall include:

- site location
- location of all structures
- typical cross-section(s) of the reservoir, embankments, excavations, etc.

- details of all structures and components
- construction specifications for excavation, earthfill, structures, etc.
- vegetative treatment requirements.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance (O&M) plan for use by the landowner or operator. Provide specific instructions in the O&M plan for operating and maintaining facilities to ensure they function properly. Typical maintenance items include but are not limited to:

- Periodically check for debris in trash racks and inlet and outlet structures. Remove debris to assure proper operation of structures.
- Periodically check for sediment accumulation in reservoir and necessary remove sediment as necessary to maintain design capacity and efficiency.
- Perform routine maintenance of all mechanical components in accordance with the manufacturer's recommendations.

- Periodically inspect vegetation on all slopes, embankments, and other critical areas such as auxillary spillway. Revegetate damaged areas in accordance with Florida NRCS conservation practice standard Critical Area Planting, Code 342.
- Mow and fertilize vegetaion as needed to maintain vegetative growth.
- Periodic water quality analysis as necessary to evaluate nutrients, pesticides, and pathogens.
- Inspect site to ensure safety precautions are taken to protect people or animals using the area near the structure.

REFERENCES

NRCS Conservation Practice Standards
Irrigation Regulating Reservoirs, Code 552
Pond, Code 378
NRCS Engineering Field Handbook
NRCS National Engineering Handbook:
Section 5 - Hydraulics
Section 11 - Drop Spillways
Section 14 - Chute Spillways
Technical Release No. 60 Earth Dams and
Reservoirs