

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

IRRIGATION REGULATING RESERVOIR

(No.)
Code 552



DEFINITION

A small storage reservoir constructed to regulate an irrigation water supply.

PURPOSE

Collect and store water for a relatively short period of time to:

- Improve irrigation water management by regulating fluctuating flows in streams, canals, or from pumping plants.
- Provide storage for tailwater recovery and reuse.
- Improve offsite water quality.

CONDITIONS WHERE PRACTICE APPLIES

This standard applies to reservoirs created by impoundment structures, excavated pits, or manufactured structures for short-term storage of diverted surface water, water from pumped or flowing wells, or water from an irrigation delivery system or other sources of water available for irrigation. This standard applies to structures designed primarily for flow control or those

designed to store water for only a few hours or a few days.

This standard applies to sites meeting the following applicable conditions:

1. The existing available irrigation source is of such size that regulation is necessary to accomplish the intended purposes. For example, low yield irrigation wells where collection facilities are needed for efficient irrigation application.
2. Water must be stored to be used between times of rotation delivery.
3. An adequate and dependable volume of good quality water is or can be made available by storage.
4. Topographic, geologic and soil conditions are suitable for practical construction of a regulating reservoir having adequate storage capacity, and any pervious soils in reservoir areas can be sealed to ensure seepage losses are not excessive.
5. If surface runoff enters the reservoir, the contributing drainage area is or can be protected against erosion so that normal sedimentation does not materially shorten planned reservoir life.

This standard pertains to the planning and functional design of irrigation regulating reservoirs. It does not include detailed design criteria or construction specifications for individual regulating reservoirs or components of the regulating facility.

This standard also applies to regulating reservoirs constructed of concrete, steel, and other suitable materials used to collect water from two or more irrigation wells for use in irrigation systems.

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

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).

General Criteria Applicable To All Purposes

Plan the installation and operation of irrigation regulating reservoirs to comply with all Federal, state and local laws, rules and regulations.

Make any criteria for design of components that is not addressed in NRCS practice standards consistent with sound engineering principles.

Design and construct irrigation regulating reservoirs created by earthen pits or embankments according to Florida NRCS conservation practice standard Pond, Code 378.

Design regulating reservoirs constructed of materials other than earth according to sound engineering principles for the material being used.

Design and construct pumping plants that are installed to serve irrigation regulating reservoirs according to NRCS Florida conservation practice standard Pumping Plant, Code 533.

Where additional storage is required to provide for sediment deposition, size storage facilities accordingly. Allowable retention times shall be site specific to the particular soil type(s).

Additional Criteria Applicable To Regulating Fluctuating Flows In Streams, Canals, Or From Pumping Plants

Capacity. Irrigation regulating reservoirs shall have a usable capacity sufficient to permit the existing irrigation stream to be regulated so that irrigation water can be applied with a reasonably high efficiency. In computing capacity requirements consider the diverted inflow, surface runoff, precipitation, evaporation, and seepage, as applicable. Prevent excessive seepage losses by the use of an adapted

method of sealing or lining. Provide additional capacity, as necessary, for sediment storage.

Base capacity requirements for regulating reservoirs used as part of a system for collecting water from two or more wells on the discharge capacities of the contributing wells and on the operation frequency of the irrigation system.

Inlet protection. Protect reservoir embankment or excavated side slopes at inlets from erosion by use of pipe inlets or other suitable structures. Inlet structure capacity shall be adequate to accommodate the design inflow rate (i.e. drainage, peak discharge, application, etc.).

Overflow protection. Provide an overflow protection structure having a capacity equal to or greater than the inlet stream for an enclosed embankment. Design and install this structure in combination with the outlet works.

Outlet works. Provide outlet works for the controlled release of irrigation water. The outlet works may consist of a gated conduit through or over the embankment for gravity flow to the irrigated area or to a pumping plant. They may also consist of a pumping plant designed to lift water directly from the reservoir basin.

The capacity of the outlet works shall be adequate to provide the outflow rate needed to meet peak period irrigation system demands.

Additional Criteria Applicable To Storage For Tailwater Recovery And Reuse

Irrigation regulating reservoirs used in irrigation tailwater recovery and reuse systems are often referred to as tailwater pits or sumps.

Capacity. Base capacity requirements for irrigation regulating reservoirs for tailwater recovery on irrigation system runoff volume and rate, irrigation requirements as well as, the required level of water control at the point tailwater is returned to the irrigation system. Prevent excessive seepage losses by the use of an adapted method of sealing or lining.

For systems where tailwater is discharged into an irrigation pit or regulating reservoir or into a pipeline having facilities for regulating fluctuating flows (e.g. a float valve), small pits or sumps with frequently cycling pumping plants may be used. For systems unable to regulate flows, size tailwater sumps or pits large enough to provide the regulation needed to permit efficient use of the water.

When energy sources for tailwater pump back systems are subject to interruption, safe emergency bypass areas cannot be provided, or tailwater discharges violate local or state regulations, tailwater storage requirements shall, as a minimum, include a volume adequate to store the complete runoff from a single irrigation set.

Inlet protection. Equip sumps and pits with inlets designed to protect side slopes and collection facilities from erosion. Provide a dike, ditch, or water control structure, if required by state law, to limit the entrance of rainfall runoff into the designed inlet. Install sediment traps as needed.

Additional Criteria Applicable To Improving Water Quality

Capacity. Where additional storage and/or flow regulation is required to provide adequate retention time for breakdown of chemicals in runoff waters, size storage facilities accordingly. Allowable retention times shall be site specific to the particular chemical of concern.

Control seepage from irrigation regulating reservoirs to the extent practical when the facility is expected to receive chemical-laden waters. Control may be in the form of natural soil liners, soil additives, commercial liners, or other approved methods.

Inlet protection. Protect reservoir embankment or excavated side slopes at inlets from erosion by use of pipe inlets or other suitable structures. Provide adequate inlet structure capacity to accommodate the design inflow rate.

CONSIDERATIONS

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

Effects of erosion and the movement of sediment, pathogens, and the soluble and sediment-attached substances carried by runoff.

Short-term and construction-related effects on quality of downstream watercourses.

Potential of uncovering or redistributing toxic material.

Effects on:

- The water budget, especially on volume and rate of runoff, infiltration, evaporation,

transpiration, deep percolation, and ground water recharge.

- Downstream flows or aquifers that would affect other water uses or users.
- The movement of dissolved substances to ground water.
- Wetlands or water-related wildlife habitats.
- Cultural resources.

PLANS AND SPECIFICATIONS

Keep plans and specifications for irrigation regulating reservoirs with this standard and include a description of the requirements for properly installing the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

Prepare an Operation and Maintenance plan specific to facilities installed for use by the landowner or operator. Provide specific instructions in the plan for operating and maintaining facilities to ensure they function properly. Typical maintenance provisions include but are not limited to:

- Periodic cleaning and re-grading of collection facilities to maintain proper flow lines and functionality.
- Periodic checks and removal of debris as necessary from trash racks and inlet and outlet structures to assure proper operation.
- Periodic removal of sediment from traps and/or storage facilities to maintain design capacity and efficiency.
- Inspection or testing of all pipelines and pumping plant components and appurtenances, as applicable.
- Routine maintenance of all mechanical components in accordance with manufacturer recommendations.
- Periodic inspection and maintenance of embankments including control of erosion and undesirable vegetation.
- Periodic water quality analysis as necessary to evaluate nutrients, pesticides, and pathogens.

REFERENCES

NRCS Conservation Practice Standards:
Pond, Code 378
Pumping Plant, Code 533