

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

DRAINAGE WATER MANAGEMENT

(Ac.)
Code 554



DEFINITION

Control of water surface elevations and discharge from surface and subsurface drainage systems.

PURPOSES

- To improve water quality.
- To improve the soil environment for vegetative growth.
- To reduce the rate of oxidation of organic soils.
- To aid in the control of nematode and other pest populations.
- To prevent wind erosion.
- To enable seasonal shallow flooding.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to areas where:

- The topography is relatively smooth, uniform and flat to gently sloping.
- A water table may be maintained without excessive seepage and without having an adverse impact on adjoining properties.

General Criteria Applicable To All Purposes

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).

All planned work shall comply with all Federal, state, and local laws and regulations. Plans for water control structures may need to be permitted by the appropriate Water Management District (WMD) and comply with the appropriate WMD rules contained in Chapter 40-4 Florida Administrative Code (F.A.C.), Environmental Resource Permits: Surface Water Management Systems; Chapter 40-40 F.A.C., Standard General Environmental Resource Permits: Regulation of Stormwater Management Systems; Chapter 40-41 F.A.C., Environmental Resource Permits: Surface Water Management Basin Criteria; Chapter 40-42 F.A.C., Environmental Resource Permits: Regulation of Stormwater Management Systems; Chapter 40-44 F.A.C., Environmental Resource Permits: Regulation of Agricultural Surface Water Management Systems.

The system shall be designed to remove the water required for adequate drainage. The rate of outflow and the level of the water table shall be controlled by structures or pumps. Water velocities in the soil near the drain shall be kept slow enough to prevent soil particles from entering the drainage system.

Structures and pumps shall be located where they are accessible and subject to convenient

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

control. Designs of critical components shall be in accordance with pertinent NRCS conservation practice standards.

For crops that are highly sensitive to excessive or inadequate soil water conditions, the field surface must be smooth, and the distance between the soil water level and the ground surface must be as uniform as practical. Fields shall be smoothed or graded in accordance with Florida NRCS conservation practice standard Land Smoothing, Code 466; Irrigation Land Leveling, Code 464; or Precision Land Forming, Code 462, as required, to achieve this uniformity.

Additional Criteria to Improve Water Quality

The system shall prevent automatic discharge for flows less than the drainage rate. The controlled discharge of excess water shall account for water not otherwise removed by evapotranspiration and seepage. The uniformity of storm water draw down shall be improved throughout the areas influenced by the designed system. The distance the water must travel in surface ditches before it reaches the main discharge point shall be maximized when practical.

Additional Criteria to Improve Soil Environment for Vegetative Growth

The combined capacity of the surface and subsurface facilities shall satisfy the appropriate drainage coefficient for the crops to be grown. The water table shall be held between predetermined elevations at all points in the design area when the system is being used for sub-irrigation. See Florida NRCS conservation practice standard Irrigation System, Surface and Subsurface, Code 443. To prevent excess drainage, water level elevations in the surface drainage ditches should not exceed one (1) foot variation from natural ground throughout the system. Recommended variation is 0.5 foot.

Additional Criteria to Reduce the Rate of Oxidation of Organic Soils

Drainage beyond that necessary to provide an adequate root zone for a crop shall be kept to a minimum. When practicable, the water table shall be raised to the surface, or to a designated maximum elevation, for a sufficient time to return the saturated zone to anaerobic conditions. The implementation of this practice must result in a

reduced average annual thickness of the aerated layer of the soil.

Additional Criteria to Prevent Wind Erosion

The system shall provide sufficient moisture to the soil surface, either by ponding or capillary action, to prevent wind erosion when there is insufficient organic residue or plant material on the surface.

Additional Criteria to Enable Seasonal Soil Saturation or Shallow Flooding

The system shall provide saturation to the surface or shallow flooding for a sufficient time to accomplish the desired pest control, provide wildlife habitat, or reduce the rate of oxidation of organic soils.

Flooding used to aid in the control of nematode and other pest populations may be accomplished through the use of dikes, water control structures and/or low head lift pumps. Water control structures and pumps shall be located where they are easily accessible for operation and maintenance. Water control structures shall meet Florida NRCS conservation practice standard, Structure for Water Control, Code 587. Pumps shall meet Florida NRCS conservation practice standard, Pumping Plants for Water Control, Code 533. Additional criteria for the use of flooding to aid in the control of nematode is as follows.

Capacity. The water delivery system shall have the capacity to provide a minimum of 10 gpm per acre for the area to be flooded.

Duration. Flooding (complete soil saturation) shall be maintained for a minimum of 30 continuous days with the design water level at an elevation that will ensure a minimum of 90 percent of the design land surface area is at or below the design water level.

If pumping is intermittent, additional water depth shall be added to account for seepage and evaporative losses during non-pumping periods.

Drainage. Release of water at the end of the flooding period must be controlled at a discharge rate that will not result in erosion damages.

Embankments. Dikes used to contain the flooding shall be designed and constructed in accordance with Florida NRCS conservation

practice standard, Dike, Code 356 if the possibility of a breach of the constructed dike could cause off-site damages.

If a breach of the dike poses no potential damage, the dike may be temporary in nature with little or no shaping of the cross-section. Minimum height of temporary dikes shall be 0.5 feet above the planned water level with a minimum top width of 2.0 feet. Existing roads or spoil banks of adequate height (minimum of 0.5 feet above planned water level) are acceptable for temporary dikes.

CONSIDERATIONS

An adequate water supply should be available when it is necessary to raise the water.

The effect of drainage systems on wetlands should be evaluated.

To further reduce subsidence of organic soils, the water management infrastructure should be designed for temporary flooding of fallow fields.

PLANS AND SPECIFICATIONS

Plans and specifications for regulating water in drainage systems shall be in keeping with this standard and shall describe the requirements for properly installing and operating the practice to achieve its intended purpose. As a minimum, the plans and specifications shall include:

- Location and extent of area to be flooded.
- Typical dike cross-section.
- Pumping plant size and location.
- Location of all systems.
- Details of water control structures, component practices, etc.

OPERATION AND MAINTENANCE

A site specific operation and maintenance (O&M) plan shall be developed that will identify the intended purposes of this practice and that will identify critical dates and target elevations of the water level necessary to accomplish the intended purposes.

The plan shall also include the O&M of critical components of the infrastructure used to manage the drainage water.

REFERENCES

Florida NRCS Conservation Practice Standards:
Irrigation Land Leveling, Code 464
Irrigation System, Surface and Subsurface,
Code 443
Land Smoothing, Code 466
Precision Land Forming, Code 462
General Manual
Title 420-Part 401
Title 450-Part 401
Title 190-Parts 410.22 and 410.26
National Cultural Resources Handbook
National Environmental Compliance Handbook
National Food Security Act Manual
National Planning Procedures Handbook
Florida Supplements to Parts 600.1 and
600.6
WMD Rules Chapter 40-4, 40-40, 40-41, 40-42,
40-44 F.A.C.