

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

VEGETATED TREATMENT AREA

(No.)
Code 635



DEFINITION

An area of permanent vegetation used for agricultural wastewater treatment.

PURPOSE

To improve water quality by reducing loading of nutrients, organics, pathogens, and other contaminants associated with livestock, poultry, and other agricultural operations.

CONDITIONS WHERE PRACTICE APPLIES

Where a Vegetated Treatment Area (VTA) can be constructed, operated and maintained to treat contaminated runoff from such areas as feedlots, compost areas, barnyards, and other livestock holding areas; or to treat process wastewater from agricultural operations.

CRITERIA

Plan and design vegetated treatment areas to comply with all Federal, state, and local laws and regulations. Waste management systems may need to be approved or permitted by the Florida Department of Environmental Protection.

Evaluate and avoid or minimize impact to cultural resources, wetlands and Federal and state protected species 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).

Base the total treatment area for the VTA on the soil's capacity to infiltrate and retain runoff within the root zone and the vegetation's agronomic nutrient requirements. Use the soil's water holding capacity in the root zone, infiltration rate, permeability, and hydraulic conductivity to determine its ability to absorb and retain runoff. Base the runoff determination on the most restrictive soil layer within the root zone regardless of its thickness.

Divert uncontaminated water from the treatment area to the fullest extent possible unless additional moisture is needed to manage vegetation growth in the treatment area.

Design the VTA based on the need to treat the runoff volume from the 25-year, 24-hour storm event from the agricultural animal management facility. Design the VTA to infiltrate a portion or the entire volume of the design storm, based on management objectives. The portion of the design volume not infiltrated shall be stored for utilization or treatment unless discharge is permitted by applicable regulations.

Base the VTA design for processed water on the nutrient contents of the processed water and the VTA's ability to hold and uptake the nutrients.

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

Base the nutrient loading of VTA's on crop removal of the vegetation used in the VTA.

Establish permanent vegetation consisting of a single species or a mixture of grasses, legumes and/or other forbs adapted to the soil and climate in the treatment area. Select species to be suited to current site conditions and intended use. Select species to have the capacity to achieve adequate density, vigor and yield within an appropriate time frame to treat contaminated runoff. Complete site preparation and seeding at a time and in a manner that best ensures survival and growth of the selected species.

Select vegetation to be able to withstand anticipated wetting and/or submerged conditions. Harvest VTA as appropriate to encourage dense growth, maintain an upright growth habit, and remove nutrients and other contaminants that are contained in the plant tissue.

Exclude livestock access to the vegetated treatment area.

Design discharge into and through treatment areas to be applied as sheet flow. Where sheet flow is planned, provide some means, such as a ditch, curb, gated pipe, level spreader or a sprinkler system, to disperse concentrated flow and ensure sheet flow across the treatment area. Provide land grading and structural components necessary to maintain sheet flow throughout the treatment area as necessary.

Specify the application period not exceed 12 hours per day and the application frequency not to exceed 5 days per week unless longer application periods and frequencies can be justified based on local conditions.

Ensure the water table to be either naturally deep enough or artificially lowered so that the infiltrated runoff does not mingle with the ground water at the bottom of the root zone. Do not provide subsurface drainage within the VTA. Use subsurface drainage to lower the seasonal high water table to an acceptable level provided the subsurface drain lines are at least 10 feet away from the VTA.

Do not plan infiltration areas where soil features such as cracking will result in preferential flow paths that transport untreated runoff from the surface to below the root zone, unless the soil moisture can be maintained to prevent drying and cracking.

Design vegetated treatment areas to have a minimum flow length of 100 feet. Specify the natural or constructed slope of the VTA to be 0.3 to 6 percent. Design the entrance slope to the VTA not to be flatter than 1 percent.

CONSIDERATIONS

Consider providing more than one treatment area to allow for resting, harvesting vegetation, maintenance, and to minimize the potential for overloading.

Consider using warm and cool season species in separate areas to ensure that plants are actively growing to maximize nutrient uptake during different times of the year.

Consider pre-treating influent with solid/liquid separation to reduce organic loading, odor generation, and nutrients to levels that will be tolerated by the VTA and to prevent excessive accumulation of solids in the treatment area.

Consider utilizing inlet control structures to prevent undesirable debris from entering the VTA, to control the rate and timing of inflow during normal operations and to control inflow as necessary for operation and maintenance.

Consider supplementing water as necessary to maintain plants in a condition suitable for the treatment purpose.

Consider storing seasonal contaminated water upstream of the VTA during excessively wet or cold climatic conditions.

Consider suspension of application to treatment area when weather conditions are not favorable for aerobic activity or when soil temperatures are lower than 39^o F. When soil temperatures are between 39^o F and 50^o F, consider reducing application rate and increasing application period while maintaining a constant hydraulic loading rate.

Consider managing the VTA to maintain effectiveness throughout the growing season. Time the harvest of the VTA plants so vegetation can re-grow to a sufficient height to effectively filter effluent late in the growing season.

Consider storing effluent from the VTA for land application, recycled through the wastewater management system, or otherwise used in the agricultural operation.

Fences or other measures may be needed to exclude or minimize access of the VTA to humans or animals that would inhibit its function.

PLANS AND SPECIFICATIONS

Prepare plans and specifications in accordance with the criteria of this standard that describe the requirements for applying the practice to achieve its intended use. Include critical construction perimeters, necessary construction sequence, vegetation establishment requirements, and nutrient removal.

Plans and Specifications will include:

- A plan view showing the location of the VTA
- Details of the length, width, and slope of the treatment area to accomplish the planned purpose (length refers to flow length down the slope of the treatment area)
- Herbaceous species, seed selection, and seeding rates to accomplish the planned purpose
- Planting dates, care, and handling of the seed to ensure that planted materials have an acceptable rate of survival
- Site preparation sufficient to establish and grow selected species
- Provisions for use exclusion from livestock, traffic, etc.
- Location of utilities and notification requirements.

OPERATION AND MAINTENANCE

Develop an operation and maintenance plan that is consistent with the purposes of the practice, its intended life, safety requirements, and the criteria for its design.

The plan shall include the following as appropriate:

- Control undesired weed species, especially state-listed noxious weeds, and other pests

that could inhibit proper functioning of the VTA

- Inspect and repair treatment areas after storm events to fill in gullies, remove flow disrupting sediment accumulation, re-seed disturbed areas, and take other measures to prevent concentrated flow
- Apply supplemental nutrients and soil amendments as needed to maintain the desired species composition and stand density of herbaceous vegetation
- Maintain or restore the treatment area as necessary by periodically grading when deposition jeopardizes its function, and then reestablishing to herbaceous vegetation
- Routinely de-thatch and/or aerate treatment areas used for treating runoff from livestock holding areas in order to promote infiltration
- Conduct maintenance activities only when the surface layer of the VTA is dry enough to prohibit compaction

Treatment areas in arid or semiarid regions that potentially could be affected by high salinity and/or sodium content should be monitored for excessive salt and sodium buildup. If excessive salt or sodium is found, an appropriate corrective action shall be taken.

REFERENCES

- Environmental Protection Agency "Technology Transfer Process Design Manual for Land Treatment of Municipal Wastewater"
General Manual (GM)
Title 420-Part 401
Title 450-Part 401
Title 190-Parts 410.22 and 410.26
- National Cultural Resources Procedures Handbook
- National Environmental Compliance Handbook
- National Food Security Act Manual
- National Planning Procedures Handbook
Florida Supplements to Parts 600.1 and 600.6