United States Department of Agriculture

NRCS Natural Resources Conservation Service

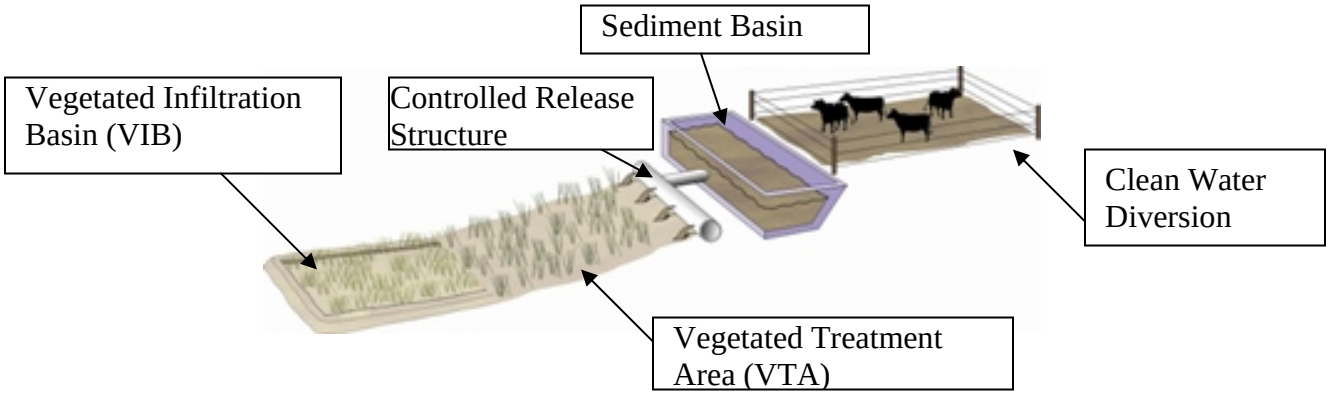
Vegetative Treatment Systems

Alternative Treatment Options for Animal Feeding Operations

SD-FS-58
April 2009

What is a Vegetative Treatment System ?

A Vegetative Treatment System (VTS) is a new alternative treatment option for treating the runoff from an animal feeding operation in an effort to protect water quality in South Dakota (SD). A VTS consists of a sediment basin to settle the solids from the feedlot, and uses controlled release of the liquids to a vegetated treatment area (VTA).



The VTA area is commonly confused with vegetative buffer (or filter) strips. A buffer strip is a narrow strip of vegetation (usually 30-60 feet wide) between cropland or a water source, such as a river, lake, or stream. In contrast, a VTA is a specifically sized area of perennial vegetation to which runoff from a barnyard or feedlot is applied uniformly. The VTA utilizes the water holding capacity of the soil to store the runoff water until the nutrients and water can be used by the vegetation. Therefore, the application of the runoff to the VTA must be at a rate to prevent deep percolation below the root zone, and not allow the flow to extend past the end of the VTA.

Advantages

- May provide lower initial investment and operating costs
- More aesthetically palatable than large ponds
- No long-term storage of runoff required, such as holding or evaporation ponds
- Fewer safety issues
- Land designated for VTA can produce usable forage

Disadvantages

- A VTA may not be a “closed” system; saturated soils from previous rains could allow a discharge
- Special management required during runoff events
- The VTAs can be damaged by a lack of maintenance and attention - gullies, erosion, and poor vegetation stands dramatically reduce their effectiveness
- Not currently permittable in SD by the Department of Environment and Natural Resources
- The VTAs may not provide the same level of water quality improvement as a total runoff containment system, such as holding or evaporation ponds provide

Three Basic Types of VTAs Available in SD

Sloped VTA refers to a treatment area that is slightly sloped. The slope allows liquid to uniformly spread across the width of the treatment area and flow the length of the VTA. Sloped VTAs should be between 0.5 percent to 6 percent downslope and should be level from side to side. Borders, berms, furrows, and cross ditches can be used to maintain uniform flow. If the site is near a receiving water and the potential for frequent discharge exists, a Vegetative Infiltration Basin (VIB) is required. A VIB is a temporary storage area to allow soils and plants to absorb and utilize the excess water exiting the end of the sloped VTA.

Terrace VTAs are terraced channels used to contain and treat runoff on fields with steep slopes. They must be fairly large and well-maintained, and should be planted to grass. Two types of terrace systems exist: (1) a flow through terrace system that acts similar to a sloped VTA, and (2) a flat channel storage terrace (water storage) similar to a VIB. Terraces used to control erosion in crop fields should not be used as a VTA without modification.

Sprinkler VTA is an area of perennial vegetation with runoff distributed by a sprinkler irrigation system. A solid set sprinkler, tow line, or side roll can be used to distribute the runoff collected in a settling basin. Although more expensive than a gravity VTA, a sprinkler VTA provides uniform application of runoff and nutrients. They are applicable to situations where a gravity system is not feasible, and can be used with any soil texture. An all-weather pumping station is required for a sprinkler VTA.

Siting Criteria for a VTS

- ☐ More appropriate for animal feeding operations with less than 500 animal units
- ☐ 0.5 percent – 6 percent slopes in VTA area
- ☐ Not located in a floodplain or on any soils prone to frequent flooding
- ☐ Site of proposed VTA is not currently a natural wetland
- ☐ Consider ground water levels
- ☐ Good underlying soils; loams are best but especially avoid very sandy, gravelly, or very heavy clay soils
- ☐ Enough land downslope of feedlot to match a 1:1 to 1:2 ratio of feedlot to VTA