



# Grassed Waterways

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## Definition:

Grassed waterways are natural or constructed channels established for transport of concentrated flow at safe velocities using adequate vegetation. They are generally broad and shallow by design to move surface water across farmland without causing soil erosion.

## Purpose:

Grassed waterways are used as outlets to prevent rill and gully formation. The vegetative cover slows the water flow, minimizing channel surface erosion. When properly constructed, grassed waterways can safely transport large water flows down slope. These waterways can also be used as outlets for water released from contoured and terraced systems and from diverted channels. This best management practice can reduce sedimentation of nearby water bodies and pollutants in runoff. The vegetation improves the soil aeration and water quality (impacting the aquatic habitat) due to its nutrient removal (nitrogen, phosphorus, herbicides and pesticides) through plant uptake and sorption by soil. The waterways can also provide a wildlife habitat.

## How Does This Practice Work?

Due to the entrapment of sediment and the establishment of vegetation, phosphorus sorbed to the sediment remains on the field landscape rather than being deposited into nearby water bodies. Vegetation in conservation buffers recycles entrapped nutrients in the harvested material and provides permanent habitat for many types of fauna. The grassed waterways also decrease flow velocity, thereby minimizing erosion.

## Where This Practice Applies and Its Limitations:

Grassed waterways can be applied anywhere that sufficiently sized land areas contribute contaminants to a water body and necessi-

tate flow reduction velocity. They can be applied to agricultural areas where both point and nonpoint source pollution occur, particularly in areas with sediment erosion, leaching and runoff potential.

Advantages of these best management practices include flood damage prevention; erosion control; aesthetic value; water quality improvement; design based on landowner's/farmer's experience; soluble contaminant flow retardation; and dispersion of concentrated flow, thereby minimizing gully erosion and the availability of assistance from federal, state and local programs. Lastly, farm machinery can generally cross the grassed waterways.

Limitations of these practices include the cost of



Grassed Waterway.  
Photo by Ontario Ministry of Agriculture and Food.

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installation (e.g., grading slopes and vegetation establishment), loss of acreage for pasture or crops and the variability of effectiveness due to the uncertainty of runoff rate and frequency. Disadvantages of a grassed waterway include working around it with farm equipment, vegetative growth may be troublesome and the depth of the waterway limits it as a tile drainage outlet. The construction of the waterway will depend on the soil's erosive potential. For example, a shallower waterway will result in an area with more erodible soil. The vegetation should not be overgrown, since tall growth could trap snow, thereby blocking runoff. Vegetation could also bend, thereby not reducing flow velocity and its erosive potential.

### **Effectiveness:**

The effectiveness of the grassed waterways depends on soil characteristics, land slope/topography impacting drainage into them, the vegetation, area for establishment and the correct construction and maintenance. A wider grassed waterway with established vegetation will be more effective at trapping sediment and reducing pollutants, due to greater surface contact area and greater contact time with runoff. As an old adage says, "Something is better than nothing, and bigger is always better."

The shape of the waterway greatly impacts the flow velocity and its erosive force, so proper construction and maintenance must occur for it to be effective. The waterway should be constructed when there is sufficient time to attain good grass growth, before the season of high runoff occurs. The vegetation selected will also impact the effectiveness of the waterway. The vegetation should provide a suitable cover and should

be able to establish quickly and form a deep-rooted sod. Seeding should occur perpendicular to the flow of water to further reduce the velocity. The waterway should be assessed after large runoff events. Bare or eroded spots should be repaired or reseeded.

### **Cost of Establishing and Putting the Practice in Place:**

As previously stated, depending on the equipment and labor costs, grading, seed and fertilizer selected, the cost of establishing grassed waterways will vary. Potential returns include revenue from harvesting and marketing grassed-waterway hay. The landowner/farmer may be eligible for CRP and EQIP programs and may receive both technical and financial assistance from federal, state and local levels.

Additional factors to consider before installing grassed waterways include:

- types and concentrations of pollutants for which they are being designed
- soil characteristics, such as clay content, organic material and infiltration rate
- size of contributing area
- previous or existing vegetation
- steepness of slope/irregularity of topography
- dimensions of the watershed that will be draining into the grassed waterway
- types of vegetation adaptable to the area
- climatic conditions at planting times
- possible combinations of conservation practices to reduce erosion and chemical loss
- dominant wind direction

### **Operation and Maintenance:**

The operation and maintenance of this best management

practice is minimal once the vegetation is established. The vegetation must receive sufficient moisture and nutrients. However, the waterway should not be so wet as to impede vegetative growth. A wet waterway will also inhibit accessibility by farm machinery. Drainage tiles may need to be installed to remove water.

Maintenance for grassed waterways includes harvesting and marketing forage, repairing rills and gullies and removing accumulation of deposited sediment. Grassed waterways should be mowed regularly to encourage dense sod establishment.

Grassed waterways are considered effective at natural field grade. However, 1 to 5 percent has proven to be the most acceptable grade. The contract life for grassed waterways is 10 years.

### **References:**

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- Stone, R. March 1994. *Grassed Waterways*. Ontario Ministry of Agriculture and Food. Order #94-039.
- University of Illinois Extension. July 2003. *Plant Vegetative Filter Strips or Make Critical Area Plantings*. 60 Ways.

### **For Further Information:**

Contact your local conservation district, USDA-NRCS or Cooperative Extension Service office.