CLACKAMAS COUNTY SOIL AND WATER
CONSERVATION DISTRICT
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Oregon Department of Agriculture

NRCS

Holding Your Ground in Christmas Tree Production

Best Management Practices For Reduction of Soil Erosion

June 2011

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Holding Your Ground in Christmas Tree Production

Best Management Practices for Reduction of Soil Erosion

Introduction

Are you watching as your precious soil washes away?

Check out these recommendations for keeping soil, one of your most valuable resources, where it belongs... in your fields! In this publication you will find some good land management practices that you can apply to protect the very foundation of your growing operation!

(This list of practices is not all inclusive and may not work for every situation. Evaluation of each situation must be made before deciding on specific practices.)

What is Erosion?

When soil is exposed with no protective cover, it is susceptible to the erosive forces of water and wind. The consequences of erosion are numerous. One of the most obvious is the loss of nutrients and organic matter from topsoil, leading to reduced fertility and reduced water holding capacity.

Erosion is a three-step process involving the detachment, transportation and deposition of soil particles. There are many kinds of erosion, such as sheet and rill erosion, gully erosion and wind erosion.

Deposition of eroded soil material, pesticides and fertilizers into water bodies can also result from erosion. The good news is that these consequences can be avoided through good land management practices.

Why be concerned?

Soil erosion has been identified as a significant sources of pollution for surface water quality.

Sediment deposits destroy fish spawning areas, weaken aquatic insects which are at the base of the food chain, fill up stream channels and decrease the overall quality of lakes, streams and wetlands.

Sedimentation can cause flooding; require additional water treatment; pose safety and nuisance issues on roadways; and increase cost of production. Chemicals (such as pesticides - current and legacy, nutrients, and heavy metals) can be transported with sediment to receiving waters where they cause additional damage to fish and aquatic insects. And lastly, it is a Federal and state law to avoid water pollution

What is Sediment?

Sediment results from erosion. When soil particles are detached from the surface, wind or water transports the particles from their site of origin and they come to rest on other ground surfaces or in lakes, ponds, watercourses, or wetlands, this soil is referred to as sediment. The process of soil particles being transported and deposited is known as sedimentation.

Types of Erosion Commonly Found in Christmas Tree Fields

Mechanism for Erosion: When rain impacts exposed soil particles, the particles dislodge and splash into the air. The dislodged particles can become suspended in the water and can easily be transported great distances by surface water runoff.

Sheet & Rill Erosion: Sheet erosion is the uniform movement of a thin layer of soil from sloping, bare, unprotected land. Falling raindrops detach soil particles that are then transported down slope/grade to a point of deposition. Rills form with longer, harder rains when runoff volumes accelerate. Erosion increases as slope/grade becomes steeper and with longer slope length.

Gully Erosion: Rill erosion evolves into gully erosion as runoff increases, from one heavy rain or a series of storms over time. A gully is generally defined as a scoured out area that is not crossable with usual tillage or grading equipment.

How to Control Erosion?

In an erosion control plan, controlling erosion should be emphasized first, followed by control of sediment. Controlling erosion is easier and less expensive than sediment control. By preventing soil particles from being detached, less sediment will need to be controlled. Once erosion control is carried out, sediment control should then be used. ***An ounce of prevention really does equal a pound of cure!***

In this publication we suggest some good land management practices that you may apply to protect the very foundation of your growing operation.

Erosion Control Practices

Temporary and Permanent Vegetation

Temporary seeding helps reduce runoff and erosion during early tree establishment. Permanent seeding stabilizes disturbed or exposed areas in a manner that adapts to conditions and allows selection of the most appropriate plant materials for long-term erosion control.

Soil erosion can reduce the crop yeild on arable land by reducing the amount of nutrients in the soil. After the soil is transported to another location as a result of erosion, the sediment can affect water quality.

Producers have the dilemna of protecting their valuable soil from loss due to erosion and reducing competition between Christmas Tree seedlings and a vegetative cover. The practice that growers employ must satisfy both needs. Planting a low-growing groundcover between rows outside of the young tree's dripline means less soil is lost to erosion and less muddy conditions come harvest time. Improved soil tilth and biological activity is an added benefit of a vegetative cover. Look for low-growing groundcovers that either die out or go dormant during summer months, such as spring oats, winter wheat or barley.

Temporary seeding provides protection for no more than one year, during which time permanent stabilization should be initiated. Permanent cover could include hard fescues, clover or sheep fescue. Some caveats to to planting cover: clover can attract deer, grass can harbor voles, mowing takes time and effort and the cover rarely comes in as pure stands (i.e. they will often have broadleaf weeds sometimes needing sprays). In many cases you still need to control weeds within the tree rows, since the trees and grass compete for water.

Mulching

Mulching is applying vegetative material like straw or woodchips, tackifier or other material to keep mulch in place, protecting the soil surface from the impact of raindrops and the erosive forces of wind until vegetative cover is established. Mulch roughens the surface which impedes overland flows, allowing for slower percolation of rain down into the soil. A well crimped or "punched in" straw layer will result in a vertical "canopy" of stems perpendicular to the soil surface, providing a conduit for rainfall to more readily enter the soil. This may be an important factor on sloping sites where rainfall is apt to travel downslope on the soil surface rather than percolate into the soil.

Sheet and rill erosion can be a significant concern in Christmas trees depending on slopes, slope lengths, and management. Erosion is most significant in the first few years as trees are becoming established. Average sheet and rill erosion rates over the rotation are generally greater than the established tolerable soil loss (T value for the soil)—ranging anywhere from 5 Tons/ acre up to over 25T/acre...contributed by Oregon NRCS

The resulting increase in soil moisture provides a more hospitable environment for seedling establishment and protects them from temperature extremes. Mulching limits soil erosion and lessens the need to contain sediment. Mulches most often used include straw, fiber or wood chips.

Mulching is one of the best ways to provide instant erosion control on a bare site to protect it until vegetation can be established and has the added advantage of water conservation. Seed may be added to the mulch to help establish permanent cover. Vegetative materials may decompose over time, adding moisture-savinig carbon to your soil! A word of caution, some mulches may have unwanted seed.

- Straw mulches do not bond to the soil. They must be crimped or "punched in" by disking or by hand to prevent them from blowing away. They can also be held in place by spraying on a tackifier (glue) or fiber mulch to hold the straw in place.
- Straw mulch is usually applied at a rate of 1-2 tons per acre. Generally a depth of 3-4" would be adequate to provide the desired protection depending on the
- Fiber mulches are chopped up paper or wood fiber and are typically sprayed on as a slurry along with seed.

Reduce Compaction

Erosion control goes hand-in-hand with good soil and nutrient management farming practices. You cannot stop the rain, and the farming practices used on the farm will influence where the rain goes when it hits the soil. For example, if the soil is compacted, water will tend to move across the surface rather than move into the soil profile. If your soil is roto-tilled in the fall or heavily "worked," the lack of structure and unprotected soil particles can quickly become a muddy erosive mess. Avoid fall tillage or working the ground when soils are wet to reduce soil compaction.

Check with your local Soil and Water Conservation District or USDA Natural Resources Conservation Service for possible funding opportunities to help install conservation practices.

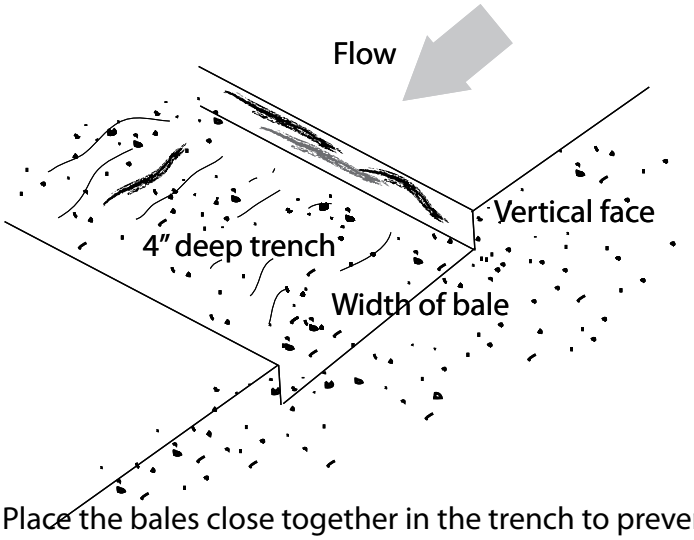
What is Sediment Control?

Sediment control, which is often confused with erosion control, is trapping detached soil particles that are already moving in the erosion process. Slowing the velocity of runoff and providing vegetative filtering helps trap sediment on-site, but typically, sediment control is achieved by temporarily impounding flows to allow sediment to settle out. It is critical that effective sediment control practices be installed and maintained when soil is exposed to the erosive force of rain and wind. Sediment control should be a secondary design goal in a soil erosion and sediment control plan, after erosion control is addressed to the extent practical.

Sediment Control Practices

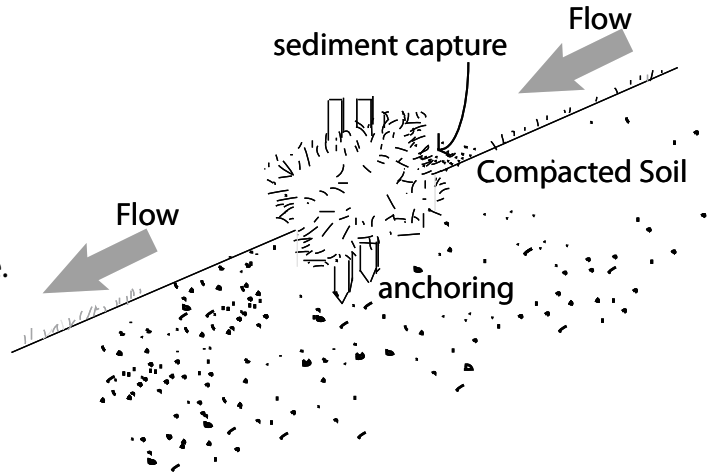
Temporary sediment barriers: hay or straw bales.

Straw bales divide the slope and therefore slow the speed at which runoff water will travel downhill. The slower water speed reduces the erosive power of the water. Straw bale barriers often work well when rills or small gullies are foming due to erosion.



Prepare the trench for the straw bales, perpendicular to the slope. Make the trench 4 inches deep.

Place the bales close together in the trench to prevent water from flowing under or around them. Secure straw bales with two re-bars, steel pickets or 2x2" stakes per bale. Sink your stakes 1 or 2 feet in the ground. It is important to install enough bales next to one another to sufficiently slow the water movement and encourage sediment to fall out.



Buffers and Field Borders

Effective stream buffers and field borders filter sediment-laden runoff from farm fields. To ensure vegetated borders are giving you the best results, water leaving the field must be well distributed across the border. This may be the most appropriate practice to use when you have overland sheet flow. For a field border to work at maximum capacity, the less water one area of vegetation has to filter, the better the result. If channels or gullies form, the water will pass through the buffer with little or no filtration.

The most severe financial cost of soil erosion is the loss of productivity of the land and ultimately not being able to raise crops (corn, beans, wheat, or Christmas trees). Once the "A" soil horizon has eroded away, only the less fertile subsoil is left to farm.

Studies show that a 15 to 20 foot wide buffer can do a good job in keeping your soil out of the road ditch or near by stream. Keep in mind that native vegetation including flowering plants may also provide habitat for beneficial pollinators.

Farm Roads

Are there roads on your Christmas tree plantation that are unusable during wet season? Do you need to constuct roads in new fields or repair existing roads?
Here are a few tips to make your roads more durable and accessable during wet periods.

Line drainage ditches with large angular gravel. The gravel will protect against gully formation while carrying water away from the road and fields.

Be Aware of the Grade! Construct your roads with a grade of no more than 9 percent to avoid washouts. (What is a 9% grade? That is a drop of 9 feet in 100 feet, or about 11 inches in 10 feet.)

Road Surface Materials Matter. Consider using more stable surface material as your slope length, grade and useage increases. Gravel is more stable than grass if the road is steep and handles heavy traffic. Geotextile fabric provides a permeable barrier that allows water through, but prevents gravel from working into the soil.

Contact your local soil and water conservation district or natural resource conservation service conservationist to enlist their help with existing road problems or designs for long-lasting future roads.

To find contact information for the Oregon Soil and Water Conservation Districts, go to the Oregon Association of Conservation Districts at http://www.oacd.org/districts.shtml
The local USDA Natural Resources Conservation Service service center locations may be found at http://offices.sc.egov.usda.gov/locator/app?state=OR

Water Quality Regulations
(What the Law Requires)

You should be aware that the Oregon Department of Agriculture (ODA) is the agency that regulates agriculture's contribution to surface water quality. This regulatory authority is from both the Clean Water Act (CWA) and the Agricultural Water Quality Management Act.

Agricultural Water Quality Management Act

Oregon's Agricultural Water Quality Management Act, also known as Senate Bill 1010 is the foundation of the Oregon Department of Agriculture's (ODA) Agricultural Water Quality Program.

Working in partnership with the 45 local Soil and Water Conservation Districts, the ODA identified 39 watershed-based Agricultural Water Quality Management Areas across the state.

Each area has a Local Advisory Committee that works with Oregon Department of Agriculture to develop rules which provide an enforceable backstop to ensure all landowners do their part to avoid and resolve water quality problems.

(excerpt from Water Quality and Agriculture - It's Everyone's Job, ODA)

Contact the Conservation District or local Natural Resources Conservation Service for more information and technical assistance on erosion control and water quality protection!

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www.conservationdistrict.org

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