



Protecting Watersheds thru Erosion Control Methods

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Maine Temperature Conversion Chart

60 above zero:

People in Tennessee are still turning on the Heat in the house

People in Maine are planting gardens

20 above zero:

Floridians wear coats, gloves and woolen hats

Mainers start breaking out sweatshirts

Zero degrees:

People in Miami cease to exist....

Mainers have their last cook-out before it gets cold

-40 Below:

Hollywood disintegrates...

Maine Girl scouts start selling cookies outside of grocery stores

-100 Below:

Santa Claus abandons the North Pole

Maine-iacs get frustrated when they can't thaw the Keg!

-460 Below

All atomic motion stops...

People in Maine Start saying... "Cold 'nuff for ya?"

Erosion

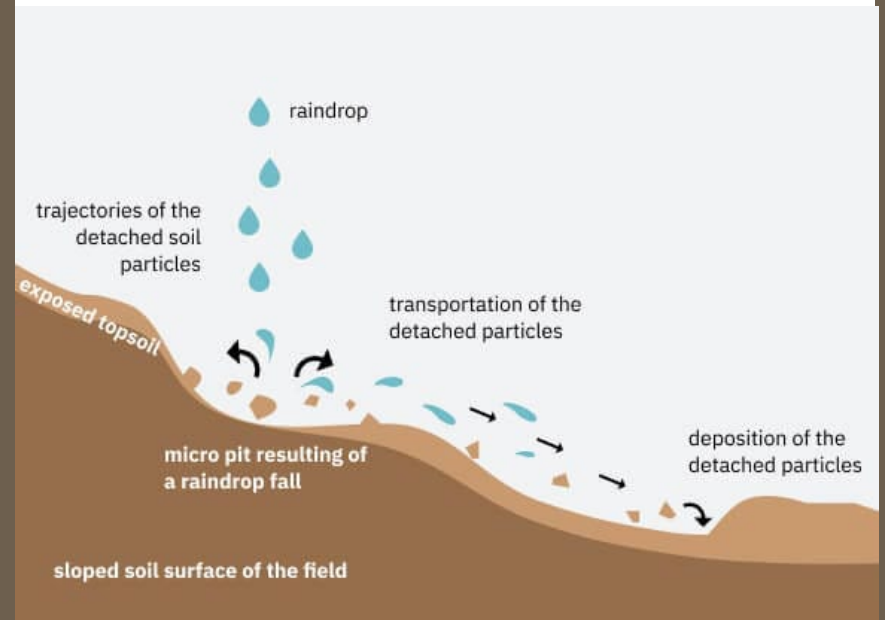
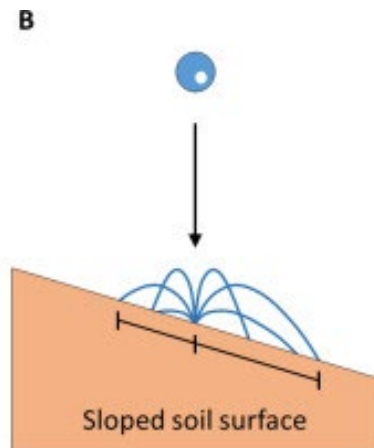
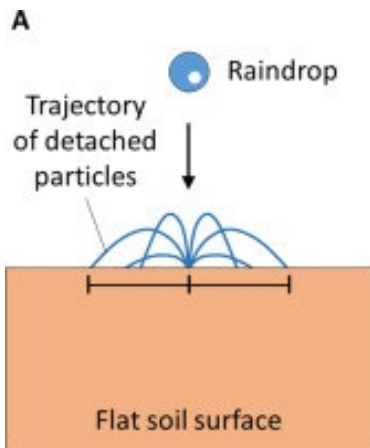
- Erosion is the action of a surface process that moves soil, rock and dissolved material from one location to another. Typical cause is either water flow or wind.
- Many erosion control methods stem around creating sustainable vegetation. To help protect against detachment and transportation of soil particles.



Sediment Loss

- Sediment Loss is the result of erosion. When you have erosion, you will have sediment runoff.
- Sediment control is the process of trying to keep sediment from leaving a site.





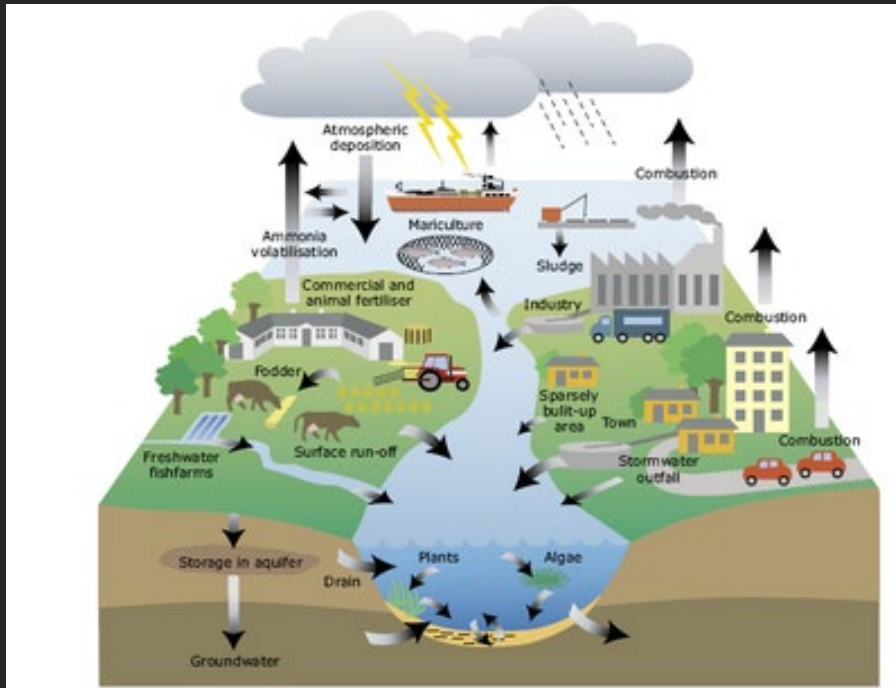


Sediment loss from erosion is one of the leading causes of water pollution









Impacts on Watersheds *Water Quality*

- Sediment runoff
- Nutrient overloading
- Toxic Chemicals
- Organic loading
- Altered Hydrology
- Pathogens
- Metals
- Road Salt
- Thermal loading

What is the best form of
Erosion Control?

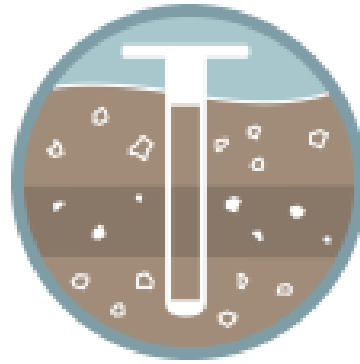




Sustainable vegetation!



So, What makes it grow?



How do we Establish Sustainable Vegetation

Create Optimal Soil Conditions

Select the correct Soil Amendments

Select the correct Erosion Control Material

Select the correct Seed

Ensure Proper Installation



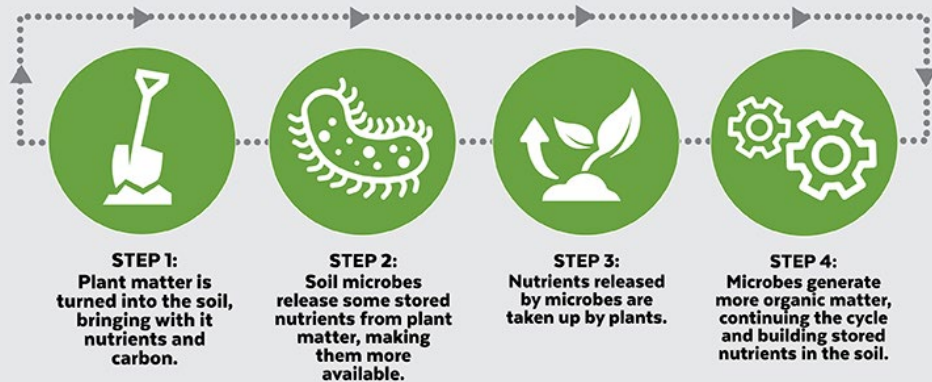
Create Optimal Soil Conditions

- Evaluate soil fertility **Soil Test!!!**
- Provide a basis for amendment recommendations
- Help ensure appropriate plant species selection
- Predict probability of desired outcome

Sustainability Comes From Nutrient Cycling

Requires a healthy soil as the infrastructure to support and nurture vegetation

HOW MICROBES INCREASE SOIL NUTRIENT AVAILABILITY & BUILD SOIL ORGANIC MATTER

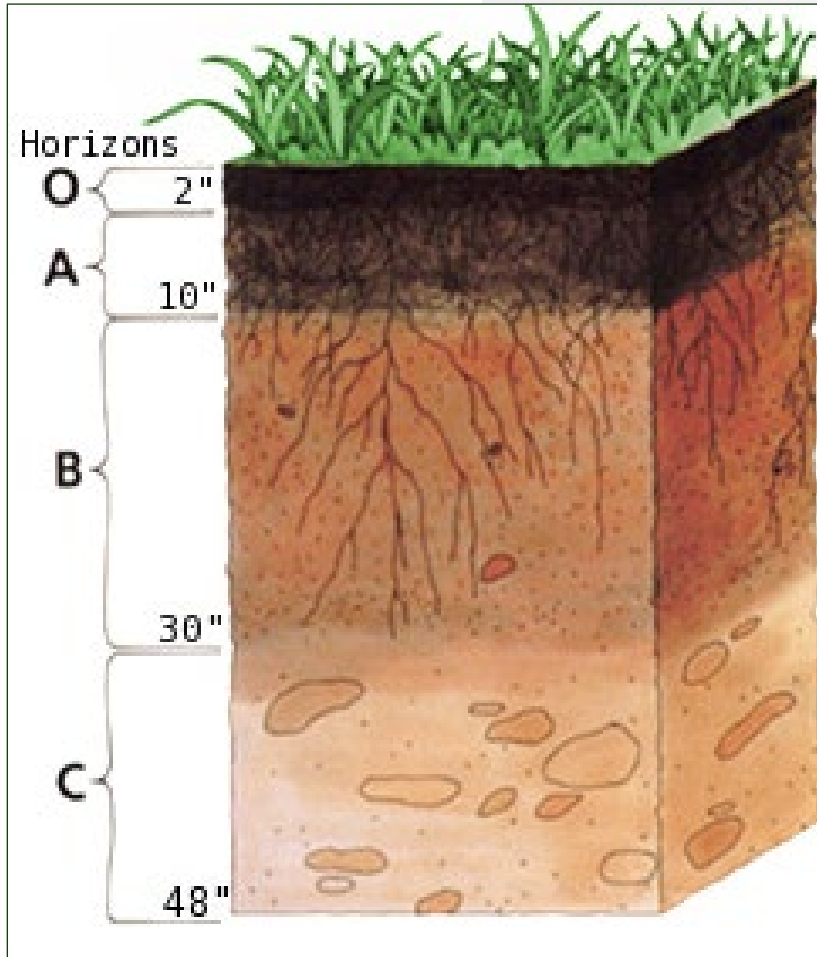


Organic Matter and Biological Activity

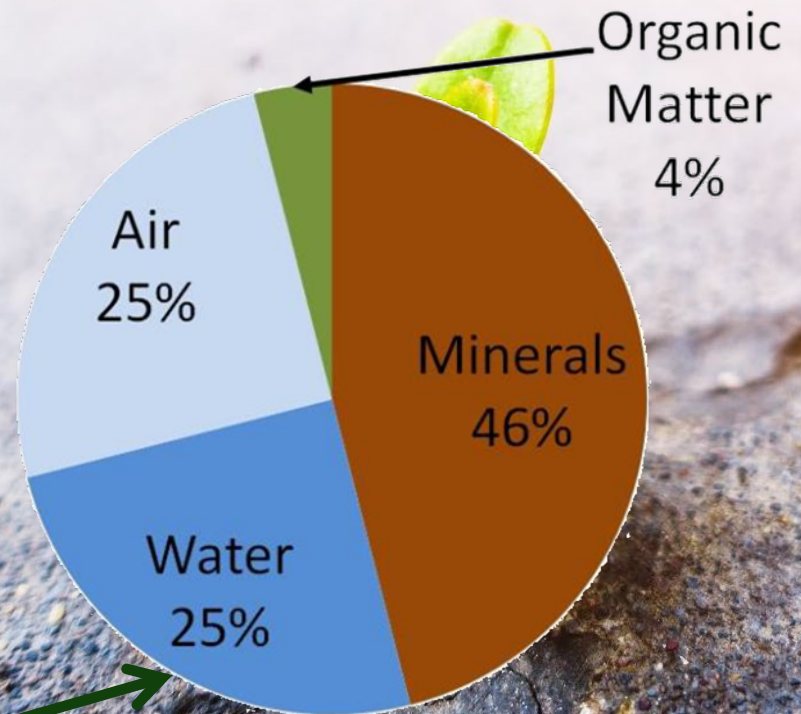
- Organic Matter (OM) is the foundation for all biological life in the soil
- OM provides structure and water-holding capacity
- Without biological life, the OM is not capable of building a solid foundation
- Microbes generate more Organic Matter continuing the cycle and building stored nutrients in the soil.



Ideal Soil Profile



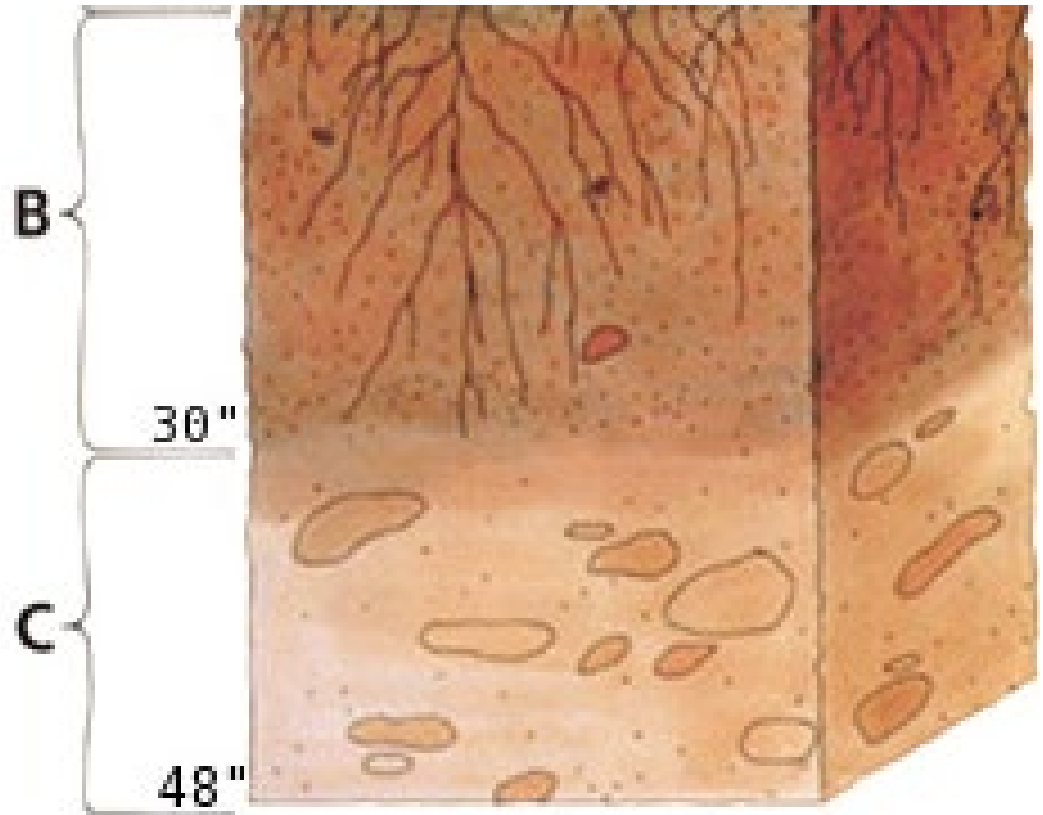
An ideal soil composition contains a balance of components as shown below.



Ideal Soil Composition

Typical Construction Site Soil Profile

- Most projects start with “B” or “C” horizons, perhaps even worse:
 - Low organic environments
 - pH values out of range
 - High soil erodibility values
 - Toxic environments
 - Saline Soils



Do you routinely conduct soil testing for agronomic potential when designing or installing a project?

☐ Yes

☐ No



Historically, 72% of attendees said "no"



What we are looking for in a Soil Test

- Texture/Type – sand, silt, or clay?
 - pH – to determine soil acidity or alkalinity
 - % Organic Matter and Organic Acids
 - Nitrogen, Phosphorus and Potassium (N, P, K)
 - Electrical Conductivity (EC)
 - Total Dissolved
- Salts (TDS)
 - Cation Exchange Capacity (CEC)
 - Sodium Adsorption Ratio (SAR)
 - Excess metals and salts



Do you know
where your
soil needs to
be?

Ideal pH?

6.3 to 7.3

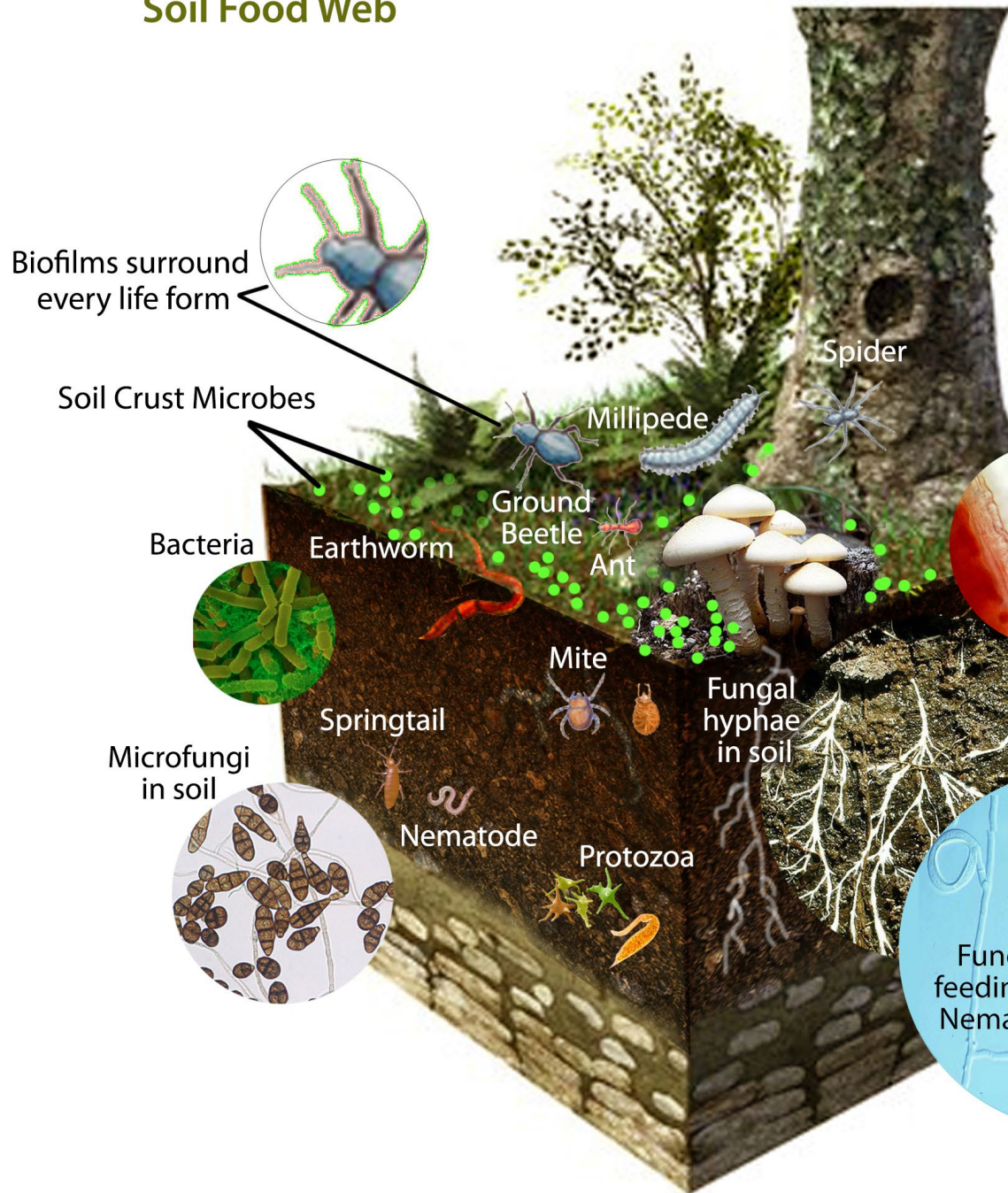
Ideal Organic Matter?

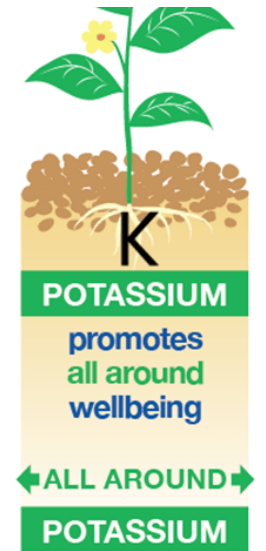
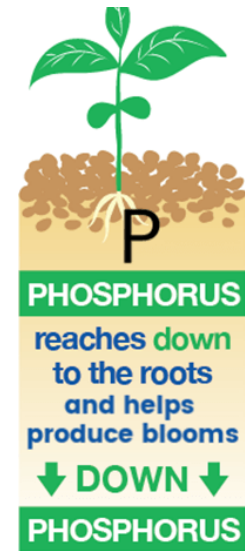
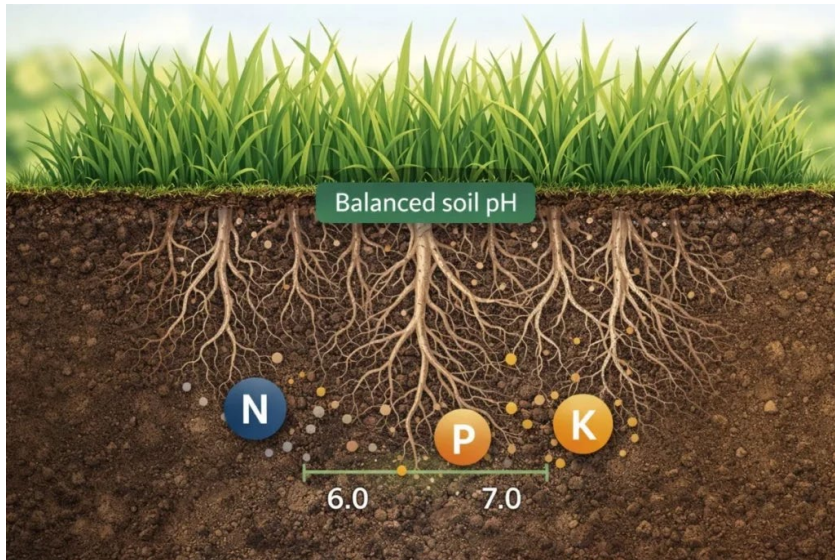
5% or more

Soil Food Web

Soil Ecology

Maintaining or developing healthy soil ecology is important to soil & vegetation health.





Possible Soil Amendments

- **Fertilizers**
- **Soil Neutralizers**
- **Organic Matter**
- **Growth Stimulators and Enhancers**
- **Biotic Soil Amendments/
Biotic Soil Media**



What fast acting growth stimulants can do

Without treatment



With treatment







- **Recycled Thermally Refined**
- **Bark & Wood Fibers**
- **Biopolymers**
- **Biochar**
- **Seaweed Extract**
- **Humic Acid**
- **Endomycorrhiza**
- **Bacteria Microbes**
- **Non-Toxic**
- **Phyto-Sanitized**



What role does organic matter and soil organisms play in improving soil infiltration?

Organic Matter:

- **Improves Soil Structure:** Organic matter helps bind soil particles into aggregates, creating a more porous structure that allows water to infiltrate more easily
- **Increases Water Holding Capacity:** Organic matter can hold many times its weight in water, which helps maintain soil moisture and enhances infiltration
- **Reduces Compaction:** By improving soil structure, organic matter reduces soil compaction, which can otherwise impede water movement

Soil Organisms:

- **Create Pores and Channels:** Earthworms, insects, and other soil organisms burrow through the soil, creating channels that facilitate water infiltration
- **Decompose Organic Matter:** Microorganisms break down organic matter into humus, which further improves soil structure and water retention
- **Enhance Soil Aggregation:** The activity of soil organisms helps form and stabilize soil aggregates, promoting better water infiltration



Compacted Soil

Loosening Soil

**According to the USDA
Increasing Organic
Matter by 1% will retain an
extra 25,000 gals of water
Per acre**

**NHDOT Project Site
2016 Soil Test Made the
Difference**



Slopes prior to application, Sept. 21st

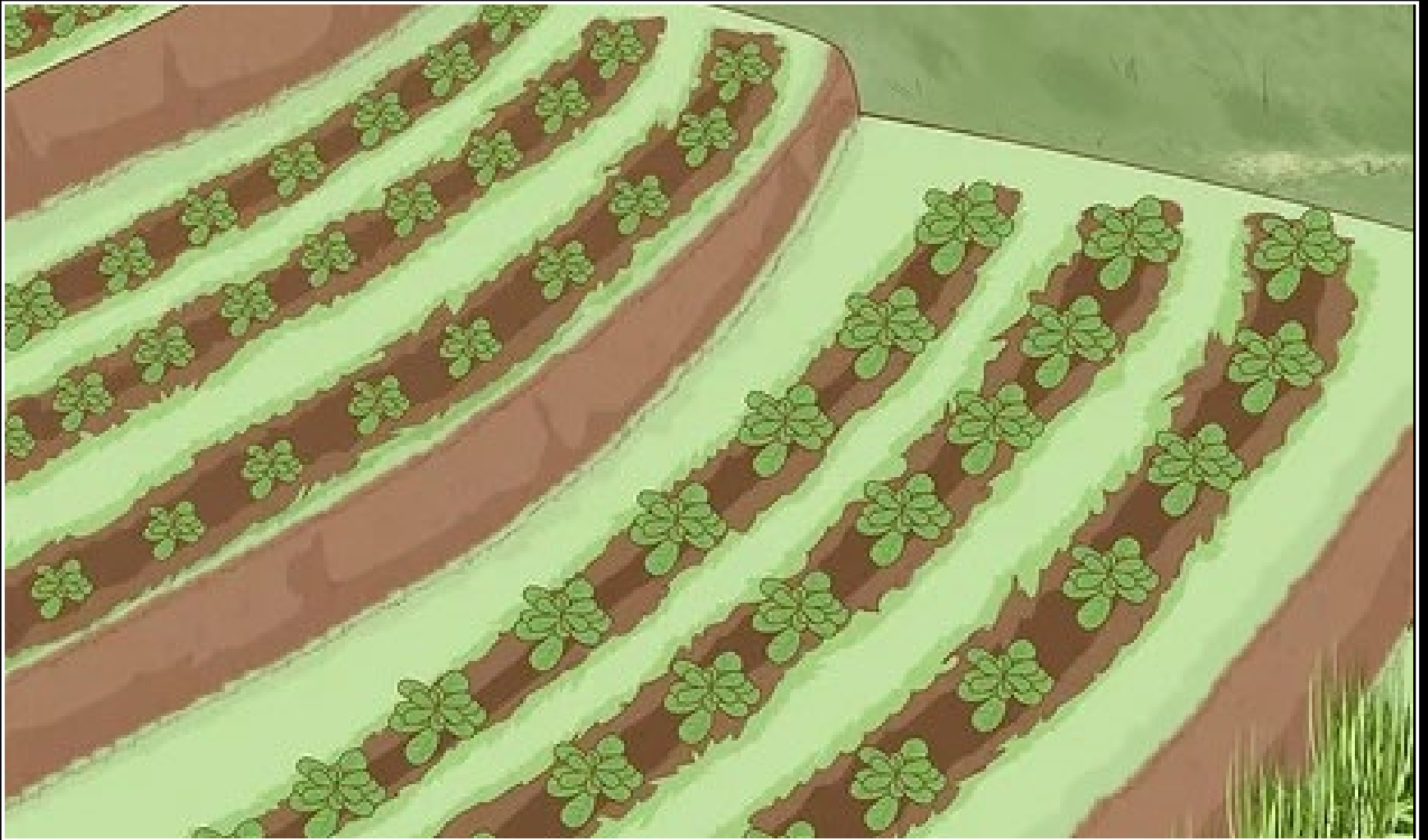


Installation date, Sept. 21st



Established Vegetation on Oct. 31st, 2016





Erosion Control Methods



Erosion Control Methods

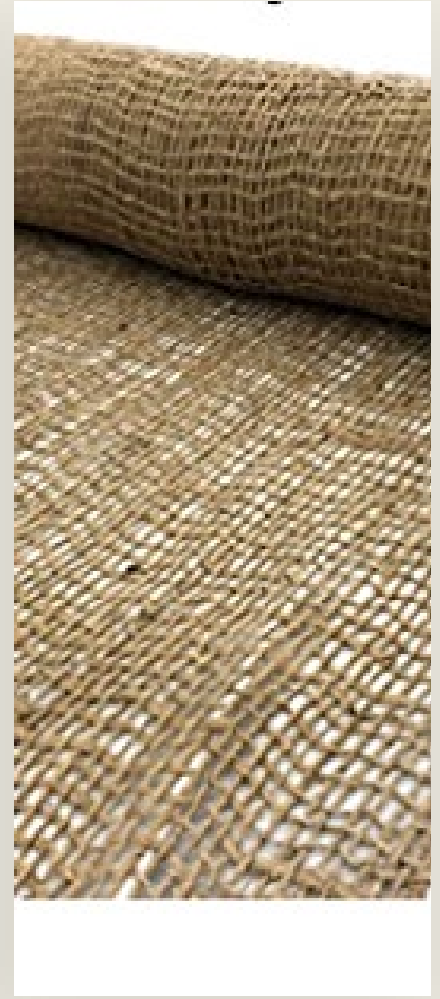
- Ground Manipulation (terracing, tracking, etc.)
- Loose Mulches (blown straw, compost, wood)
- Chemical Erosion Control, promotes aggregation of soil (PAM)
- Hydraulic Erosion Control Products (HECPs)
- Rolled Erosion Control Products (RECP)
 - Temporary Erosion Control Blankets (ECB)
 - Permanent Turf Reinforcement Mats (TRM)
- Revetment Systems
- Hard Armor
 - Rock Riprap
 - Rock filled baskets (gabions, reno mattresses, Triton)
 - Articulated Concrete block
 - Poured Concrete







Erosion Control Blankets

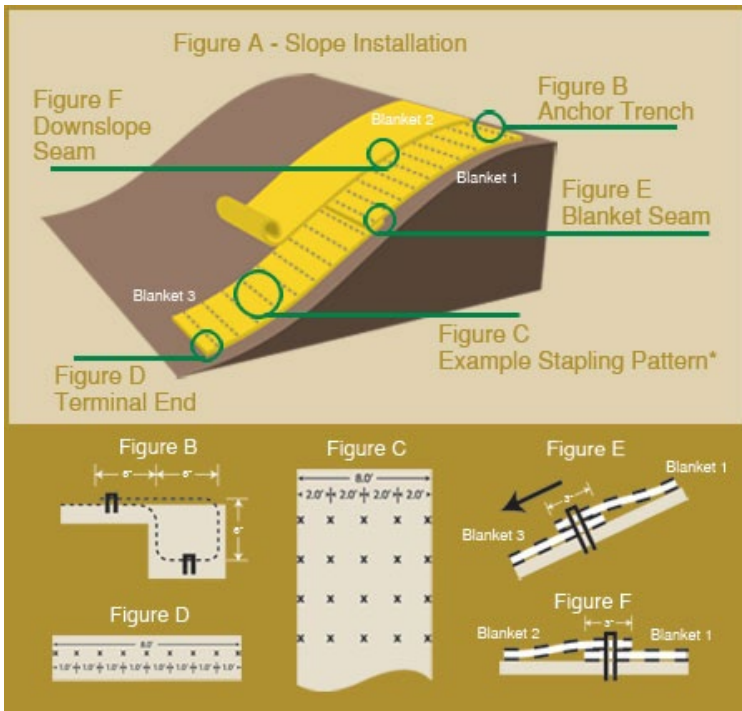


Erosion Control Blankets



Erosion Control Blankets

Proper Installation of Erosion Control Blankets



Step to take when using ECB's

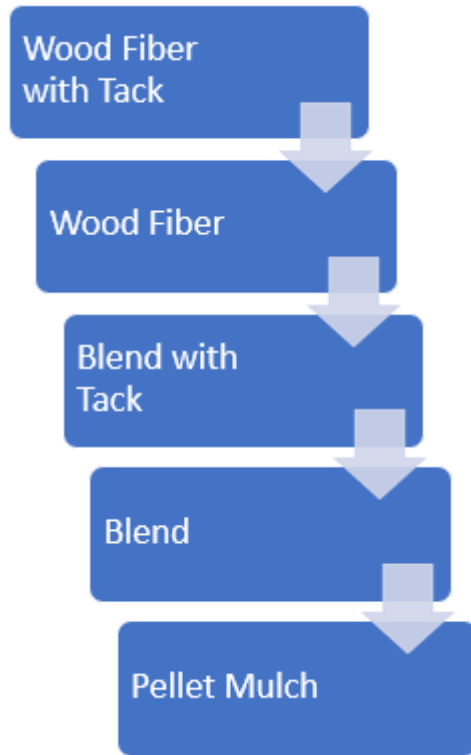
- Start 1-2 feet behind crest of slope
- Trench for keying in Blanket
- Seeding and amendments prior to installation of ECB
- Staple ECB in Trench
- Backfill Trench
- Roll ECB down slope
- Pull ECB tight while stapling down slope
- Verify 100% ground contact

Hydraulically-Applied Erosion Control Products

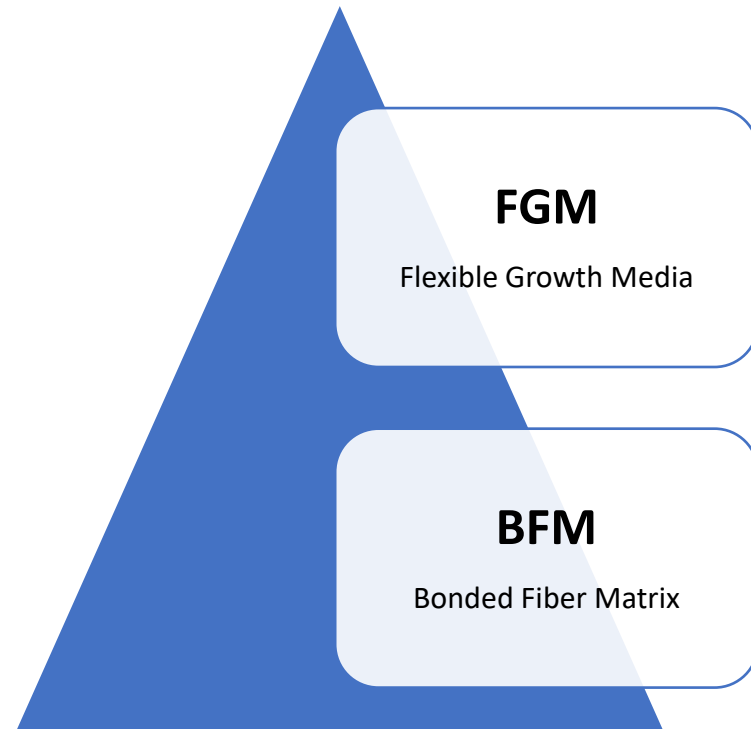
- Customized to site specific conditions
- Minimal labor required
- Economical way to control erosion and establish vegetation
- Wide range of performance platforms
- Safe for environment



Types of Hydraulic Mulch



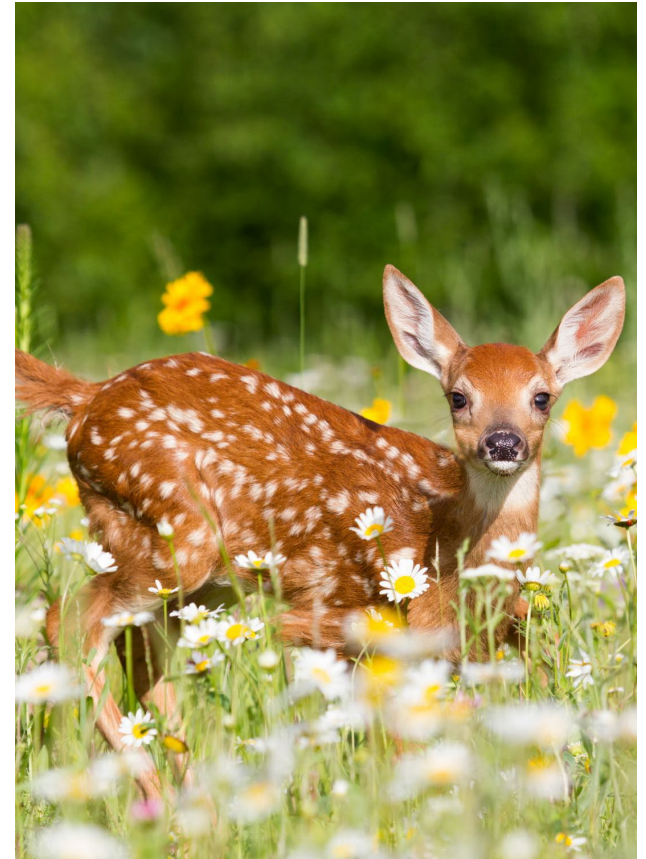
Seeding Mulch Products



Erosion Control Mulch Products

Enhanced Environmental Benefits

- **100% Biodegradable**
 - Including interlocking man-made fibers
 - Verified via ASTM D5338 testing
- **100% Recycled Wood Fibers**
 - Verified via ISO 14021
- **100% non-toxic and safe for aquatic and terrestrial life**
 - Verified via EPA 2021.0 Testing
- **Phyto-Sanitized wood fibers (weed and pathogen free)**
 - Thermally refined process heats wood fibers to $>380^{\circ}\text{F}$







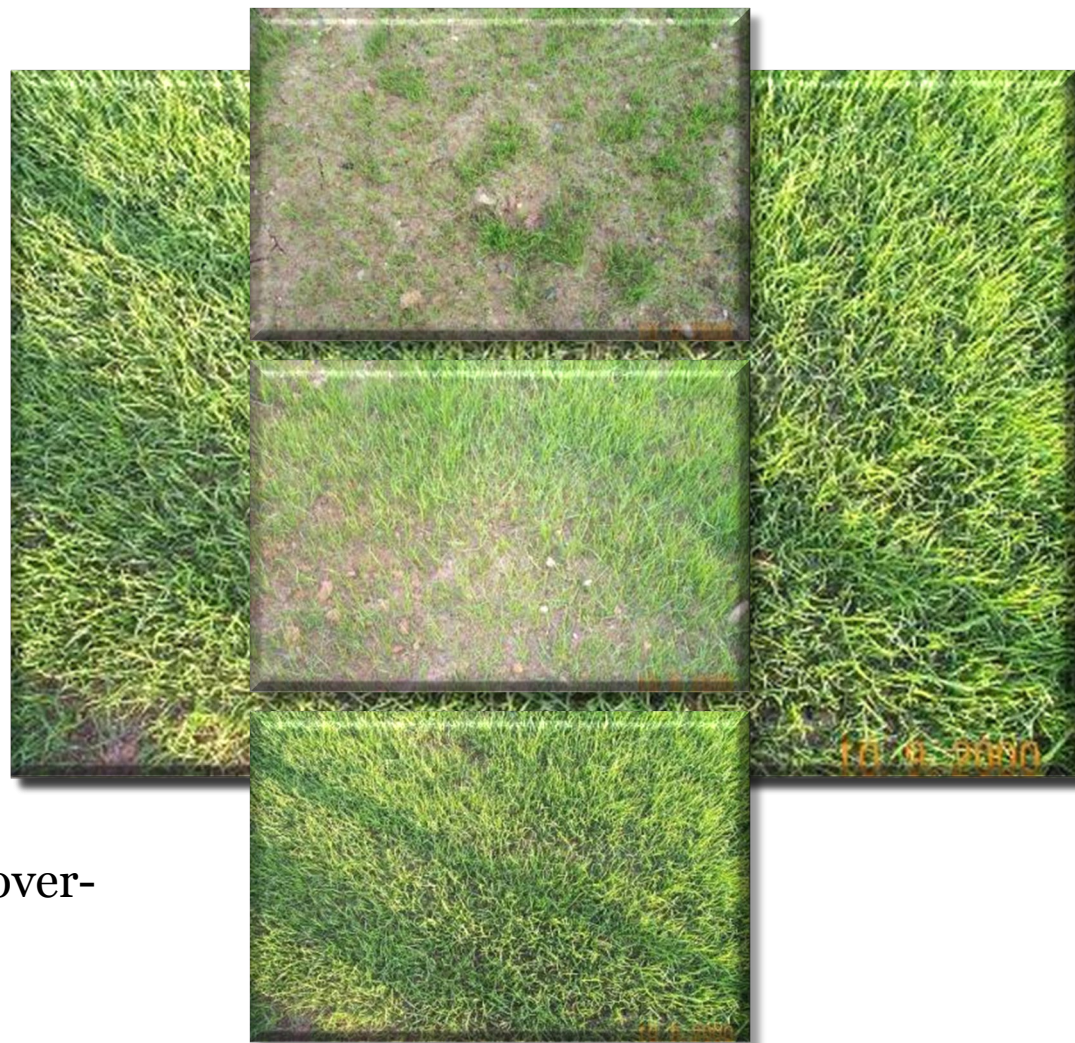


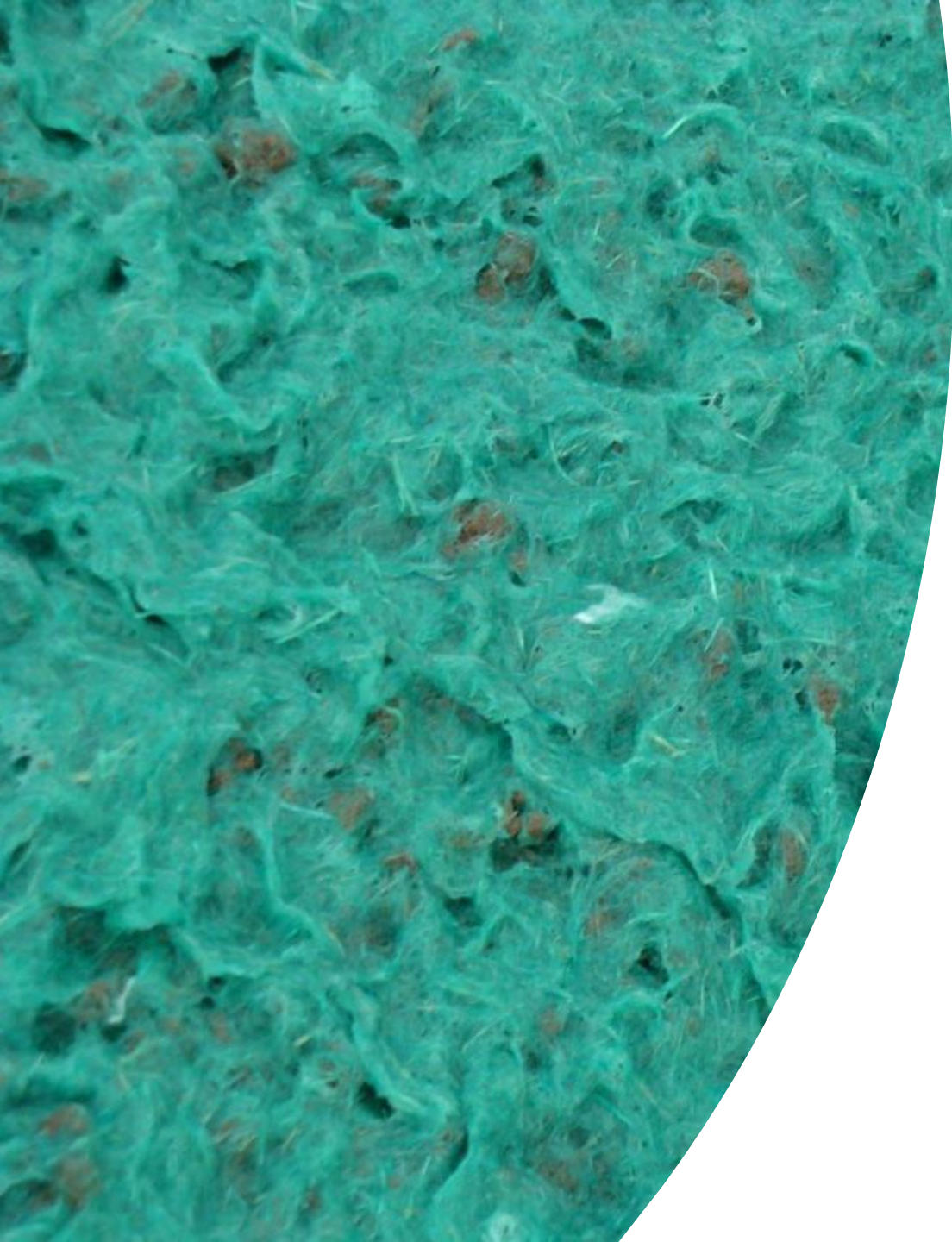


Mulch Rates Makes a Big Difference in Results

- Test Plot 1 After 18 Days
(1,500 lbs. mulch)
- Test Plot 2 After 18 Days
(2,500 lbs. mulch)
- Test Plot 3 After 18 Days
(3,500 lbs. mulch)

HECP's are a very small part of the overall project cost!





You should see
no exposed soil
at a 3,500
lb./acre rate of a
erosion control
mulch like FGM



- Immediately effective upon application—bonds directly to soil
- Excellent functional longevity that lasts through grow-in
- Ideal for dormant seeding and long-term protection and steep slopes
- Less soil preparation lower installed cost
- Faster vegetative establishment and greater biomass production
- Minimizes soil loss and turbidity of effluent runoff
- Environmentally friendly



Case Study-Club Motorsports Tamworth, NH



Case Study-Club Motorsports Tamworth, NH

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Frenchville, ME
MDOT
ED Pelletier & Sons Co.
Applied Summer of 2023

Plymouth, MA



Plymouth, MA



Plymouth, MA



Evaluating a Site



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Thank You

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