



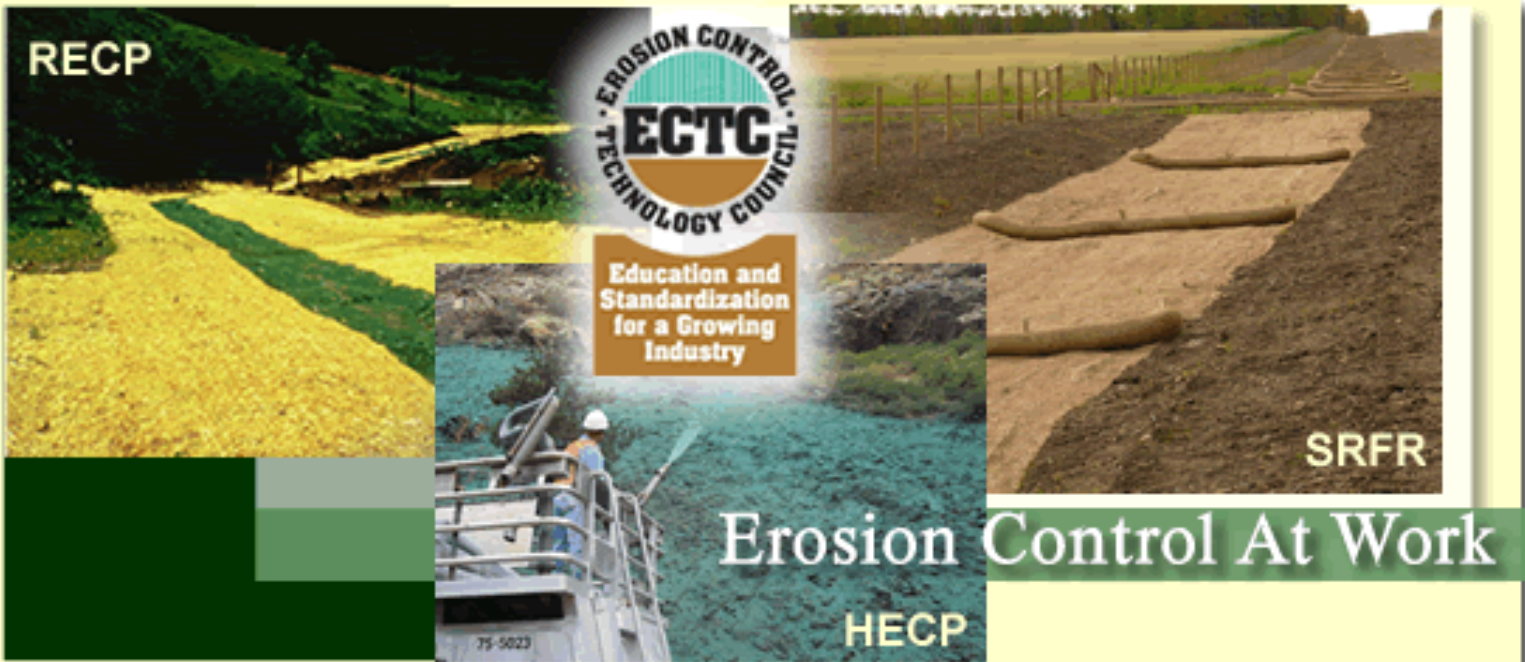
H.E.C.P. Specification and EarthGuard Fiber Matrix

Tyler Palmer





H.E.C.P Specifications





What is the ECTC's HECP Spec?

- **H.E.C.P.**

Hydraulic Erosion Control Product

- 1. Performance based specification
- 2. Based on specific site conditions
- 3. Minimums of erosion control protection and vegetative establishment



E.C.T.C. performance Chart



Chart for Standard HECP Specification ¹
Approved April 22, 2010

Type	Term	Functional Longevity ²	Typical Application Rates (lb/acre)	Typical Maximum Slope Gradient (H:1V)	Maximum Uninterrupted Slope Length (ft)	Maximum C Factor ^{3,4}	Minimum Vegetation Establishment ⁵
1	Ultra Short Term	1 mo	1500 - 2500	≤ 4:1	20	0.75	150 %
2	Short Term	2 mo	2000 - 3000	≤ 3:1	25	0.5	150 %
3	Moderate Term	3 mo	2000 - 3500	≤ 2:1	50	0.15	200 %
4	Extended Term	6 mo	2500 - 4000	≤ 1:1	75	0.1	300 %
5	Long Term	12 mo	3000-4500	<0.5:1	100	0.02	400%

1. This table is for general guidelines only. Refer to manufacturer for application rates, instructions, gradients, maximum continuous slope lengths and other site specific recommendations.
2. A manufacturer's estimated time period, based upon field observations, that a material can be anticipated to provide erosion control as influenced by its composition and site-specific conditions.
3. "C" Factor calculated as ratio of soil loss from HECP protected slope (tested at specified or greater gradient, h:v) to ratio of soil loss from unprotected (control) plot based on in large-scale testing.
4. Acceptable large-scale test methods may include ASTM D 6459, or other independent testing deemed acceptable by the engineer.
5. Minimum Vegetation Establishment is calculated as outlined in ASTM D 7322 being a percentage by dividing the plant mass per area of the protected plot by the plant mass per area of the control plot.

Please note: This chart is part of a classification system intended as a first step in developing a full HECP specification. The work on the full specification continues amongst the ECTC membership. Please use the information presented with the understanding that this chart does not include all of the information needed for a thorough specification.



Alaska DOT

- Specification can be used as written or modified to meet AK DOT needs.
- Adopting this spec allows for better products, more competition and substantial cost savings for AK





EarthGuard Fiber Matrix

- On the market since 1999
- Used extensively by dozens of DOT's and agencies
- Most specified H.E.C.P by CalTrans
- 1,000's of acres protected by EarthGuard each year
- Effective, Economical and Safe
- Distributed by Polar Supply in Alaska



EarthGuard Fiber Matrix is available in two forms





- **Soil Stabilizing Liquid Emulsion Blend**
- **Works on all Soil Types**
- **Has a High Affinity to Soil**
- **Does not Harden**
- **Requires Very Low Rates**
- **Active Immediately**
- **Non-Toxic**
- **100% Biodegradable**





EarthGuard Fiber Matrix

EarthGuard + Wood/Cellulose Fiber =
EarthGuard Fiber Matrix





EarthGuard Fiber Matrix Baled Product

Same Chemistry as liquid emulsion
Pre Packaged in 100% wood fiber
50 lb. bales

Distributed by Polar Supply in Alaska





EarthGuard Fiber Matrix

- Offers Extraordinary Erosion and Sediment Control Protection
- University Tested
- Worksite Proven

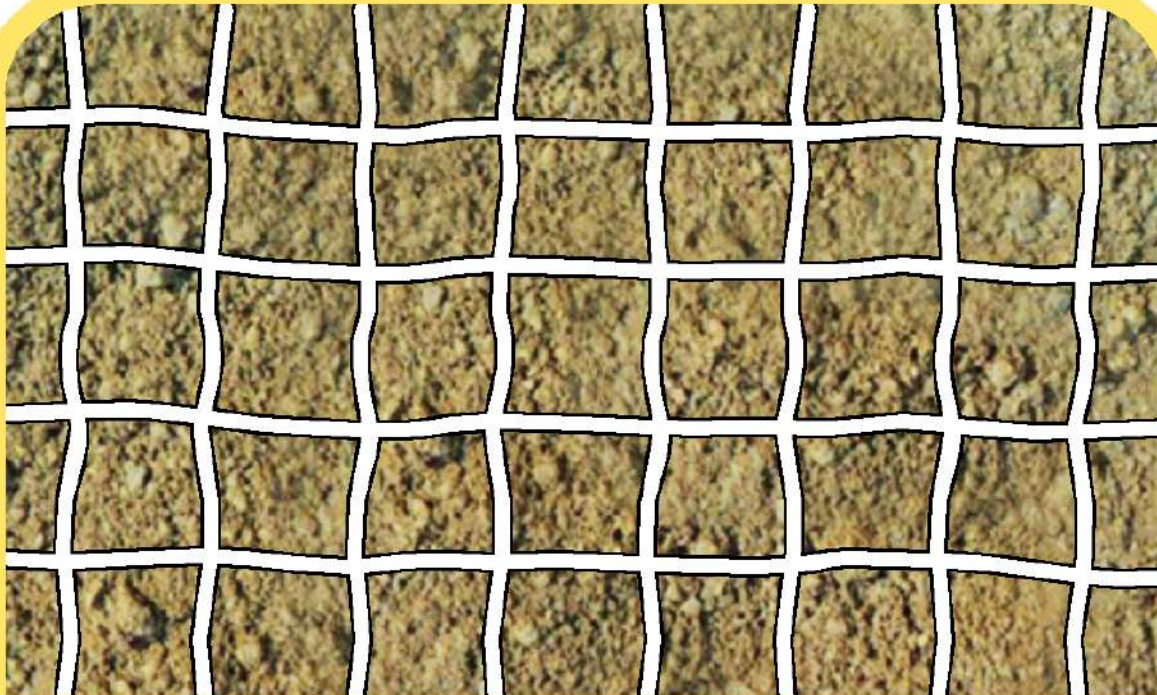




Works in 4 Distinct Manners



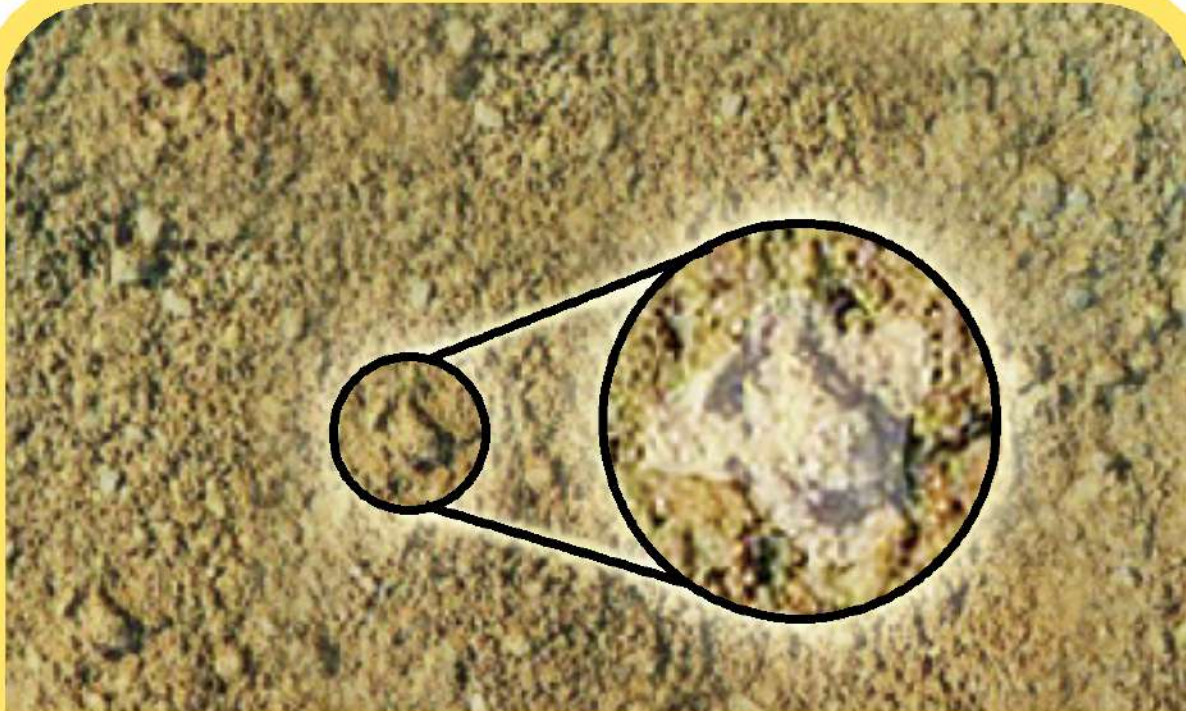
Liquid Net



A liquid net to stabilize soil



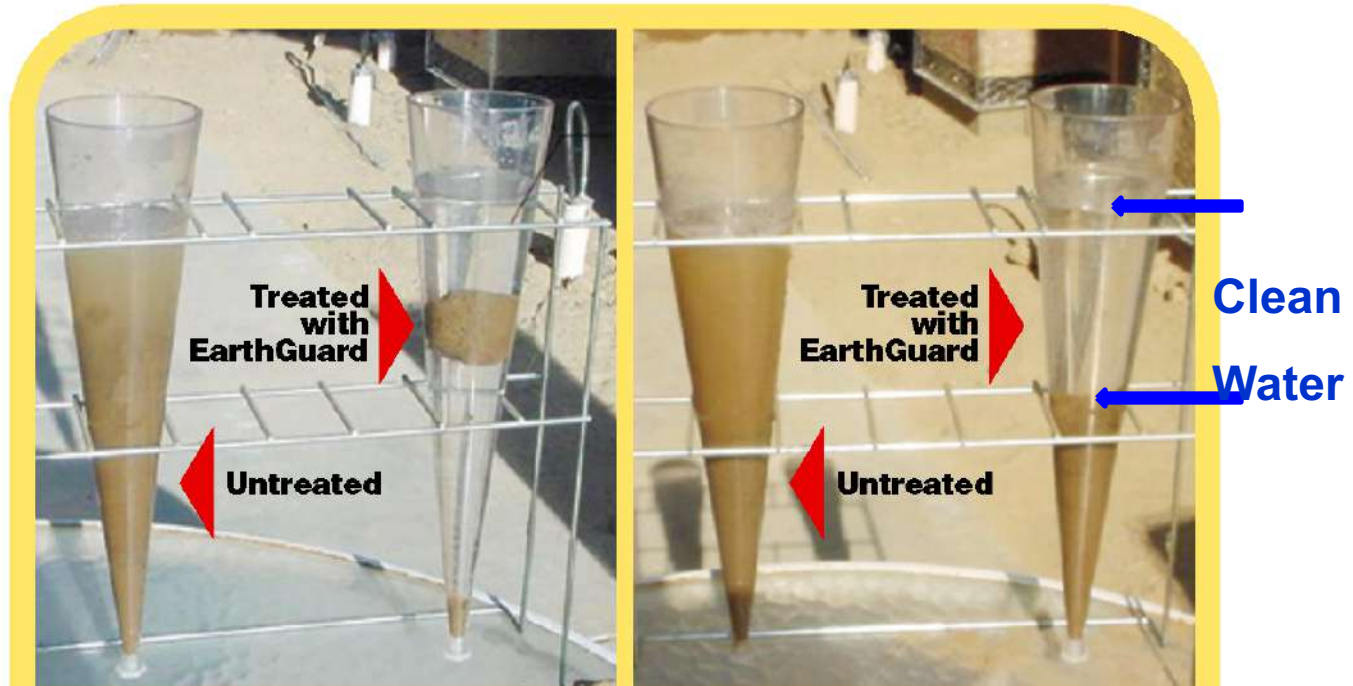
Soil Aggregate Protection



Individual aggregate structure



Stabilizes soil aggregates Reduces Sediment Runoff



**Sediment and leaves
it on the slope**



Absorbs Raindrop Impact





University Tested

Nations Top Erosion Control Testing Laboratories:

- * CA Dept of Transportation (Caltrans)
- * San Diego State Soil Erosion Lab
- * TX Dept of Transportation (TTI)



Results

2:1 Slope Testing

99.5% Effective

LA County 10 yr Storm
4" in 200 minutes





Results

- **San Diego State Soil Erosion Control Laboratory Funded by Caltrans**

“Comparable to the best performing best management practices such as some rolled erosion control products and bonded fiber matrices (BFMs).”

Michael V. Harding, CPESC



Environmental Testing

Proven to be Environmentally Friendly

Aquatic Toxicity: Non-Toxic

Chronic Toxicity : Non-Toxic

GRAS Affirmed: *Generally Regarded As Safe*

Meets NSF Drinking Water Standards

Caltrans Field Study



Non-Visible Pollutants Monitored

TEMPORARY NON-VEGETATIVE SOIL STABILIZATION EVALUATION STUDY FOR 2000 - 2001 SEASON

Orange County, California
CTSW-RT-01-066

California Department of Transportation

Environmental Program
1120 N Street, MS-27
Sacramento, California 95814

October 25, 2001

Caltrans' Environmental Field Study

- DOC
- TOC
- Nitrogen
- TKN
- Phosphorous
- Phosphate
- Ammonia
- Sulfate
- Heavy Oil
- Aluminum
- Arsenic
- Barium
- Calcium
- Cadmium
- Chromium
- Copper
- Iron
- Mercury
- Potassium
- Lithium
- Magnesium
- Sodium
- Nickel
- Lead
- Thallium
- Vanadium
- Zinc



Caltrans' Environmental Study

Results: *Erosion*

- *“Little or no evidence of soil erosion.”*
- *“Erosion control performance from the EarthGuard test plot was **High**.”*



Caltrans' Environmental Study

Results: *Environmental*

- *“No product related export (chemicals) noted in runoff samples.”*
- Reduced Non-Visible Pollutant Loading When Compared to Bare Soil



Results: Texas DOT

2:1 Slope Testing
(5.25" of Rain in 90 min)

99.8% Effective





EGFM Better Than BFM/FRM

Clay Testing	Soil Loss Bare Soil Plot (%)	% Effective	Veg. Coverage vs. Bare Soil Plot (%)
<i>EarthGuard FM 1</i>	0.61	99.79	424.19
FRM/MBFM 2	3.38	98.86	102.31
BFM 1 3	3.52	98.81	92.95
BFM 2 4	6.04	97.97	103.77
Double Net Straw Blanket 5	6.17	97.92	53.74
Double Net Coconut Blanket 6	7.72	97.40	188.19



Vegetative Study Results

- No Growth Exhibiting Factors
- Texas DOT Vegetative Establishment Results:

Clay Soils: **Passed**

Sand Soils: **Passed**

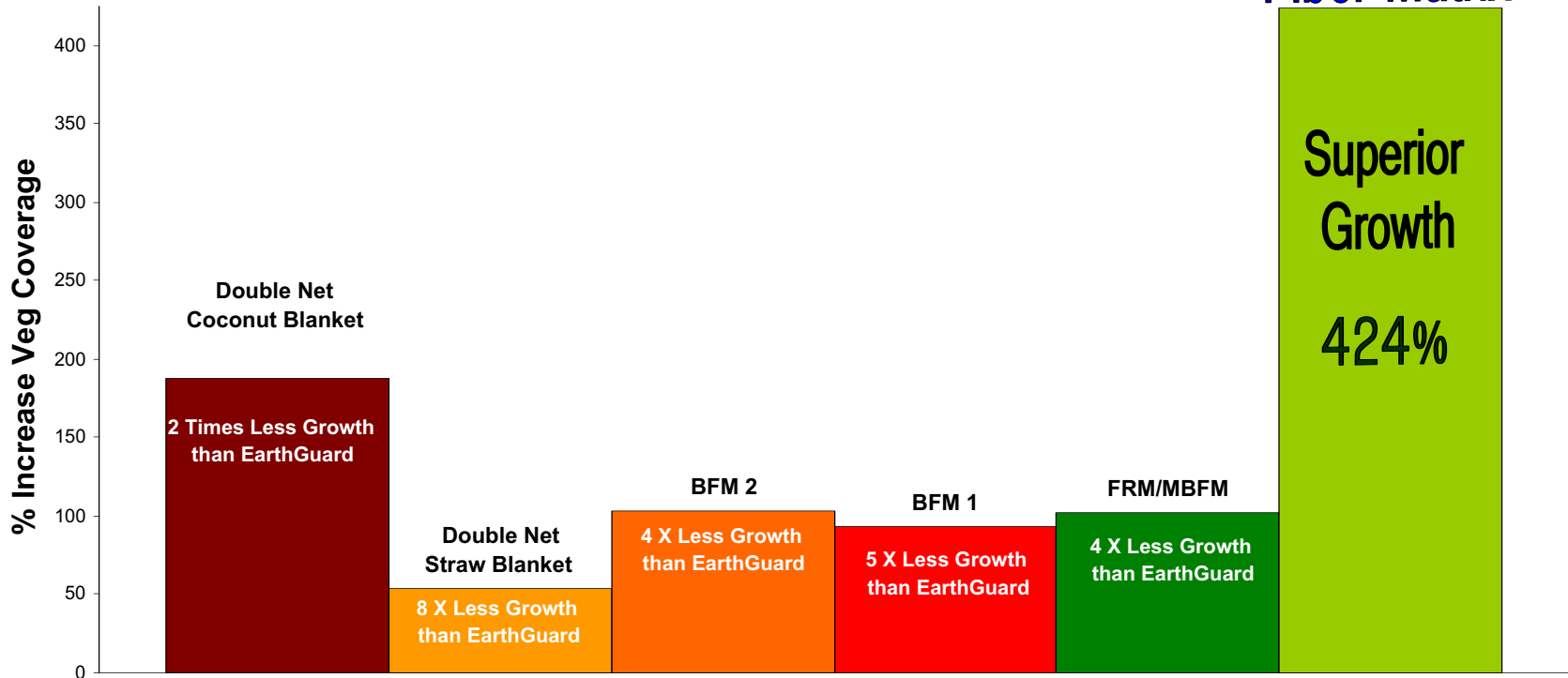




Vegetative Growth Performance Comparisons

Vegetative Coverage vs. Bare Soil: 2:1 Slope

EarthGuard
Fiber Matrix





vs. Competitive Products

- Rolled Blankets
- Bonded Fiber Matrices

Flexible Growth Medium (FGM):

Example *Flexterra*

Bonded Fiber Matrix (BFM –10% guar):

Example *HydroBlanket*



vs.. BFM's & FGM's

- BFM's and FGM's
 - Do Not Treat Soil
 - 100% Coverage Required
 - High Material Requirements
 - Undercutting Issues
 - High Water Requirements
 - Growth Inhibiting Concerns
 - Expensive

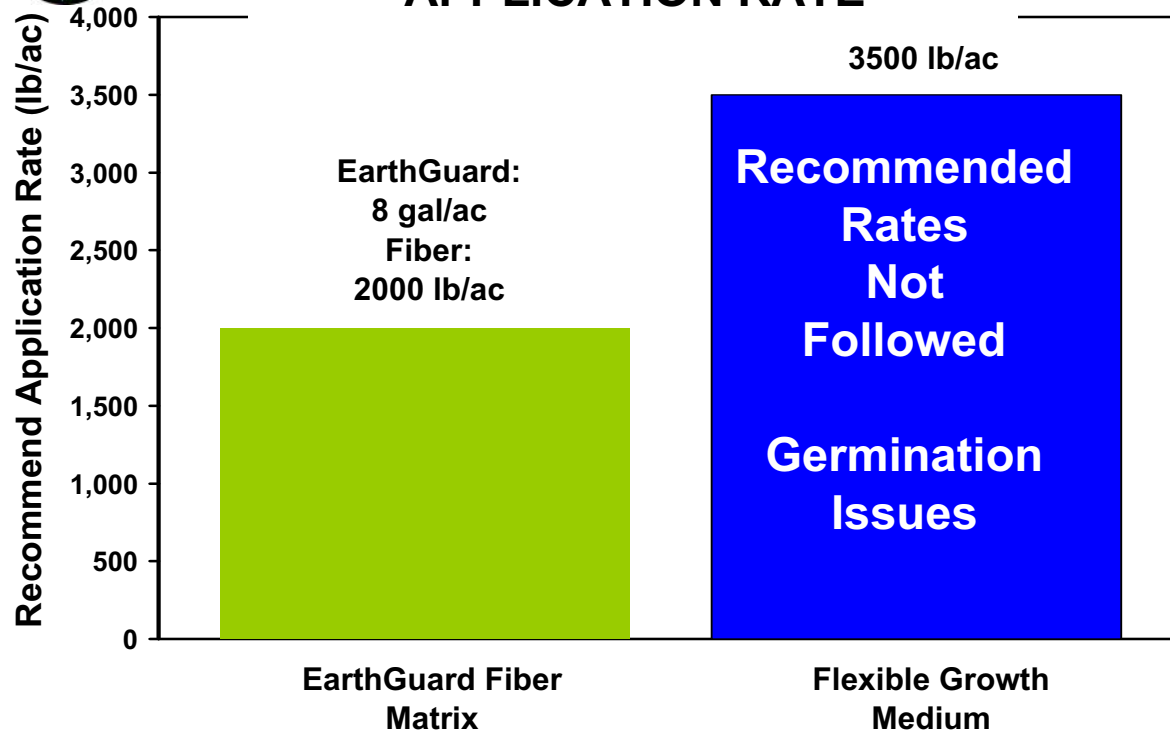




Lower application rates



MANUFACTURE RECOMMENDED APPLICATION RATE

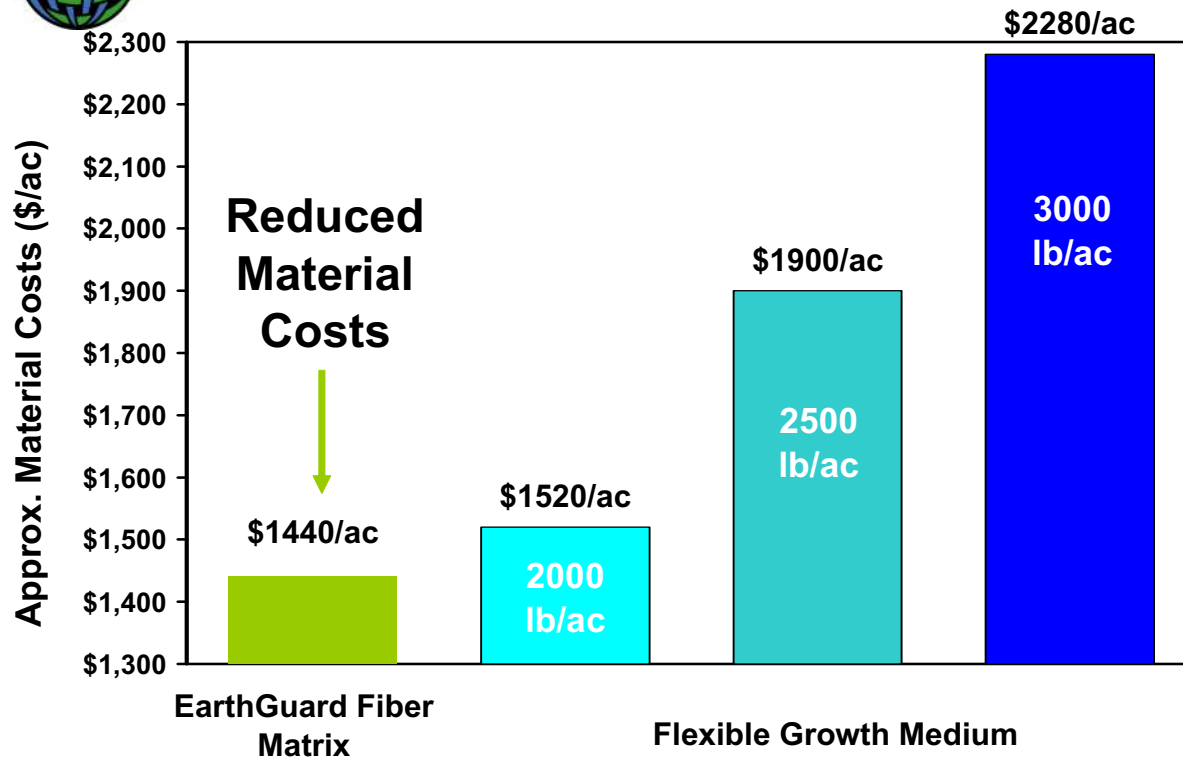




Material costs



MATERIAL COSTS 2:1 SLOPE





EarthGuard use in AK

- Chena Hot Spring Rd.
- Fairbanks International Airport
- Taylor Hwy.



Terra Novo

Terra Novo, Inc. 888.873.1029



EarthGuard Fiber Matrix called on to help with ox-gearing erosion problem on vertical slopes for Alaska DOT



FIBER MATRIX

www.earthguard.com

Chena Hot Spring Rd. Fairbanks, Alaska

Situation and Solution:

In October 2009, Alaska DOT (Northern Region) used EarthGuard Fiber Matrix on a trial installation on Chena Hot Spring Road in Fairbanks, AK. The intention of the application was to demonstrate to AKDOT that EarthGuard Fiber Matrix is the proper choice for site winterization and/or dormant fall winter seedling. The application was on a 1:1 vertical slope and the slope is composed of decayed glacial silt and schist. This slope had been a problem for the DOT over the past several years.

Results:

The slope was eroding quickly and was sending mud and debris into the road causing safety and clean up issues. The solution was to apply EarthGuard Fiber Matrix to achieve the goal of winterization and stop the slope from eroding any further. The application was done by Alaska Reclamation Inc. of Fairbanks, Alaska in 15 degree weather and the slurry consisted of 10 gallons of EarthGuard and mixed with 3,000 lbs. of mulch per acre.

After 6 months of rain, frost, snow, thawing, re-freezing and thawing again the application of EarthGuard Fiber Matrix showed little to no erosion. There were no maintenance issues, keeping roads open and clear. With Spring came warmer weather. The seeds that were applied in during the cold have sprouted and continue to grow. This will provide permanent erosion control and beauty enhancement.



Application of EGFM Oct. 2009



Application of EGFM Oct. 2009



Vegetated Slope July 2010





EarthGuard Fiber Matrix Application Scenarios





Soil Preparation Track Walking





Temporary Erosion Control: Winterization





Erosion Control (with Seed)



All Components Applied in One Slurry



Roadside Application



- Quick Application
- Minimum Lane Closure
- No Dust
- Activates Immediately



Planting





Dust Control





Fire Rehabilitation





Storm-by-Storm & Stockpile Protection



- Quick Application
- Water Truck Application
- Inexpensive
- Activates Immediately



Innovative Design





Agency Acceptance*

- **California**
- **Nevada**
- **Washington**
- **Idaho**
- **Colorado**
- **Texas (22 States use APL)**
- **Tennessee**
- **Kansas**
- **Arizona**
- **New Jersey**
- **Nebraska**
- **Missouri**
- **FHWA**
- **National Parks Service**
- **Alaska DOT - Aviation**

*Not All Agencies Require Acceptance or Maintain a QPL. Contact your EarthGuard Representative for Further Information.



www.EarthGuard.com

- Specifications (download)
- Video
- Brochures
- Studies
- Economics

The screenshot shows the EarthGuard Fiber Matrix website homepage. The browser window title is "Earthguard Fiber Matrix » Homepage - Windows Internet Explorer". The address bar shows "http://www.earthguard.com/index_revist.php". The page content includes:

- Header:** EarthGuard logo, "EarthGuard® Fiber Matrix Erosion Control", and "California's Post-Fire EROSION CONTROL CENTER" logo.
- Navigation Menu:** California Wildfire Erosion Control, Sales Brochure, Application Rate, Application Scenarios, Efficacy & Economics, Specs and Forms, Studies, Agency Acceptance, Other Products, Distributors, Terra Novo, Home.
- Main Content:** A video player showing a person applying the product to a slope. Below the video is a "View Entire EarthGuard Video" button.
- Text:** "EarthGuard Fiber Matrix (FM) is a patented methodology, which combines EarthGuard and fiber to form a matrix for full season erosion control. This effective and cost-efficient hydraulically applied formulation has set a new standard for sprayed-on erosion control BMP's." and "EarthGuard utilizes an extremely high molecular weight blend of chemistry, which results in its superior charge density and soil stabilizing ability. It is designed to work directly with soil to maintain its stability by both preserving existing soil structure and flocculating fine sediment being dislodged by storm water or wind. EarthGuard is ideal during on-going construction, where bare soil, slopes and stockpiles must be protected during the raining season, wind or an incoming storm."



Summary - EarthGuard Offers:

- Highly Effective Erosion Control
- Reduced Material Application
- Reduced Water Usage
- No Growth Inhibiting Factors
- Reduced Labor
- Safe for Remote Application
- Reduced Sediment Control Costs
- Reduced Water Clarification Needs
- Reduced Inventory
- Customizable Rates
- Repair Characteristics



EarthGuard Works

Used by Top
Erosion Control
Professionals on
1000's of Acres each
Year

www.EarthGuard.com

**EarthGuard® Fiber Matrix
Erosion Control.**
**University tested.
Worksite proven.**

EarthGuard® Fiber Matrix

EarthGuard® Fiber Matrix from Terra Novo is the economical solution more and more erosion specialists are turning to. It's the perfect short to mid-term erosion application comparable to the most expensive BMPs.

Check it out for yourself — EarthGuard® Fiber Matrix is simple to apply, safe to use and as effective as any comprehensive BMP system on the market. Call or visit us on the web to learn more about EarthGuard®.

Results from San Diego State University Study of EarthGuard® FM

Comparison of Relative Sediment Weight

Material	Relative Sediment Weight (%)
Raw Soil	100.00
EarthGuard FM	1.24

The data from this series of tests appear to support the use of EarthGuard® Fiber Matrix (FGM) to reduce soil erosion and oil-sediment delivery of sediment from slope slopes. A 99% reduction in sediment delivery weights is a high level of performance comparable to the best performing best management practices such as some riprap erosion control products (RCP's) and bonded fiber matrices (BFM). The EarthGuard® Fiber Matrix manufacturer, Terra Novo, Inc. claims an installed cost of \$4.00-\$5.00 per square foot compared to \$2.000-\$3.000 for RCP's and BFMs.

**EarthGuard®
Fiber Matrix**

Terra Novo
(888) 843-1029

www.earthguard.com