

TRIECA | 2016 CONFERENCE

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Credit Valley
Conservation



ECHELON
ENVIRONMENTAL



Lake Simcoe Region
conservation authority



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HOSTS



Northern Climate Revegetation





Just getting to
work can be tough!

Taylor HWY

Seeing where your landing? Details, Details....



Seeing where your landing? Details, Details....



Simple Logistics



Complex Logistics



Expensive Logistics





Complicated Site Access



Unique Mobilizations



Complicated Crews



**Erosion is the same everywhere.
Just different, like everywhere else.**

Thermal Degradation / Freeze Thaw Erosion



- Freezing & Thawing detaches soil particles and causes down-slope movement
- Frost loosened soil is more susceptible to erosion by rain and snowmelt
- Eroded soil can become saturated with spring breakup resulting in mass movement

Plan Ahead



Avoid preparing for spring
break-up & runoff the hard way!



Longevity
Break Up Survival

Easier to Prepare Than Repair





Even in Winter
Water Will Flow

Where Will It Go?

2 Choices

- Slow it Down
- Armor For the Flows



A photograph of a winter landscape. A stream flows through a snow-covered area. A long, curved, straw-filled erosion control structure, possibly a silt fence or straw log, is placed across the stream. The surrounding terrain is covered in snow, with patches of dark vegetation visible. The text "Design Standards?" is overlaid in the upper right corner.

Design Standards?

Break Up



Ice Pass Thru & Scour



Chevak, Alaska

Pop. 838



We tend to focus on water erosion....



Wind erosion can be just troublesome.



Moving tons of material.



Stabilize soils early to prevent both water and wind erosion.



Washington Creek

1 year later



Spray & Pray?



Seed, Silt & Fertilizer Creep



Kongiganak

Some Seed, Some Trackwalking, Some RECP

Maybe we'll get lucky and grass will grow...



“Luck is the residue of design”

-John Milton



Pop. 2212



Phasing Stabilization Finish as you Go!





Typical Trackwalking

A Twist on Surface Texture



- 
- ✓ Stabilize Soils
 - ✓ Manage flows
 - ✓ Good Housekeeping

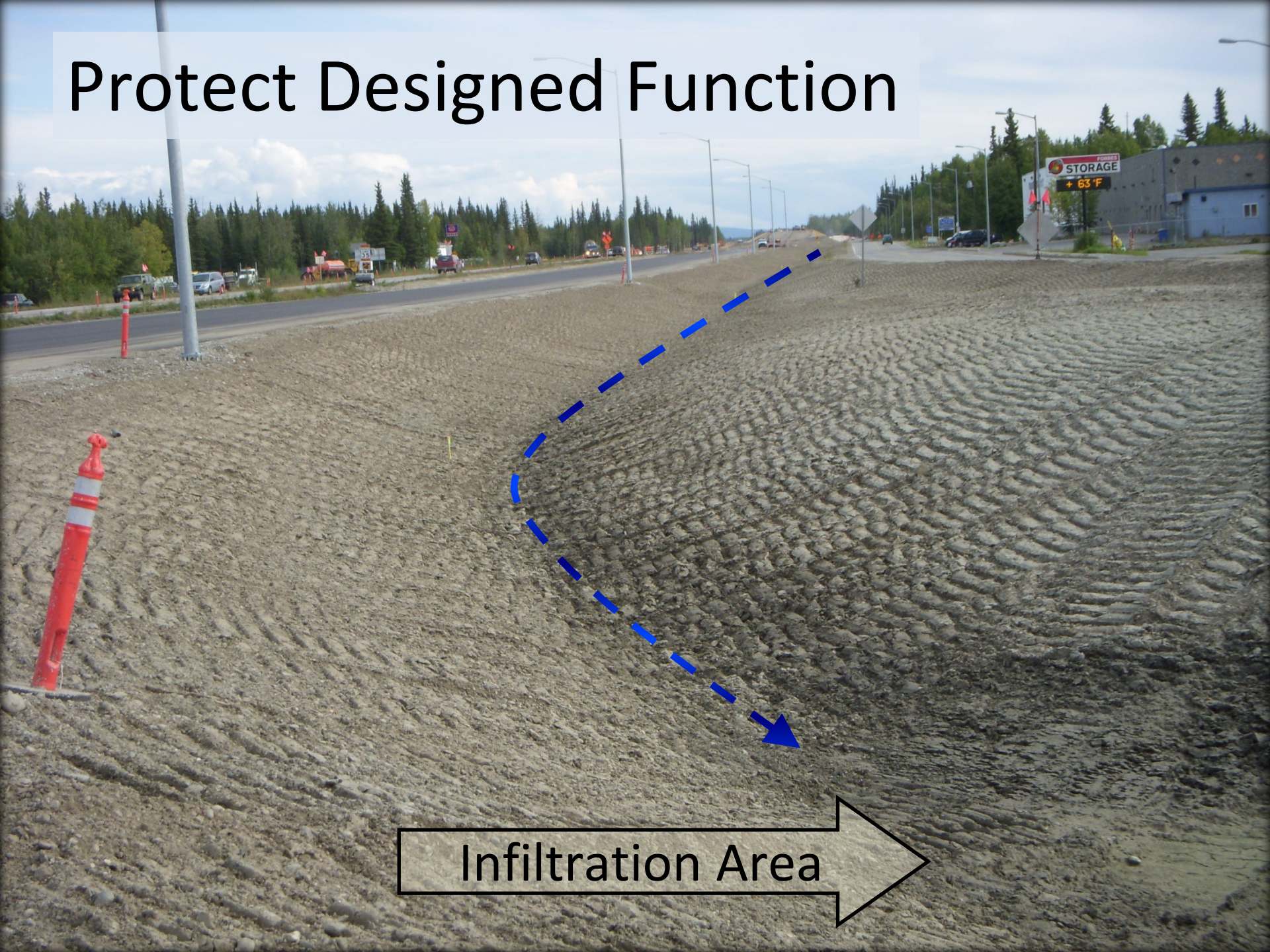






High Risk Areas?
Invest in completion.

Protect Designed Function



Infiltration Area



Reduce Compaction
Remove Fine Sediment

Infiltration & Snow Storage



Is this Good?

Vegetation Establishment
In the Arid Arctic





Is It Good enough for Santa.



The Goal:

Not just Germination





Sustainable Revegetation



Current Practices

- 
- Strip topsoil & stockpile
 - Compact the ground
 - Haul & Spread topsoil
 - Apply seed, fertilizer & erosion control,
 - Sometimes irrigate...



What Happens to Soil During Construction?

- Organic matter, the soil's food bank, is lost.
- Porosity, crucial for air and water exchange, is reduced.
- Microbes essential for nutrient cycling are absent.

The Biotic Approach Asks...



Is importing topsoil
really needed for
establishing vegetation
& controlling erosion?



213.02 Materials. Provide topsoil that consists of fertile, friable soil of loamy character and that contains an amount of organic matter normal to the region. Obtain topsoil from well-drained arable land and reasonably free from subsoil, refuse, roots, heavy or stiff clay, large stones, coarse sand, sticks, brush, litter, and other deleterious substances. Incorporate vegetative matter into topsoil, except brush, trees, and noxious weeds.

Provide microorganism inoculants that contain a diverse mix of regional specific mycorrhizal species for specific condition, provide macronutrients and micronutrients to plants that are tolerant of chemical imbalances in the soil, produce humic compounds and binding compounds, and improve soil structure.

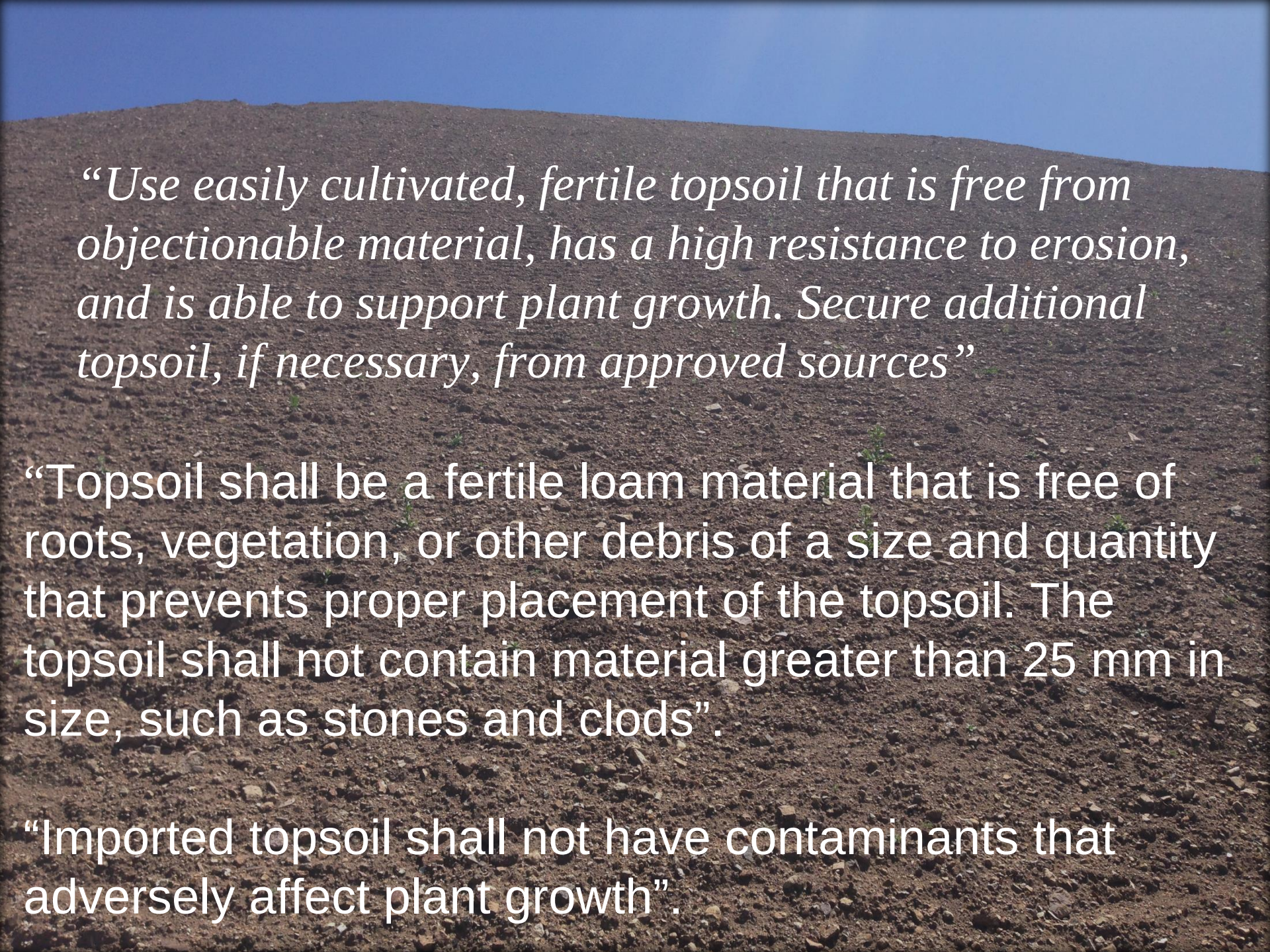
213.03 Construction Requirements.



Ensure topsoil stockpiles do not exceed 4 ft in height unless otherwise Engineer approved. If the stockpile is undisturbed for longer than 3 months, mix the top 1 ft with the remainder of the stockpile to ensure that living organisms are distributed throughout at the time of final placement, or add microorganism inoculants, after final placement, in accordance with manufacturer recommendations. Apply microorganism inoculants as dry granular mixes, tablets, or injectable soluble.

If I pile it 4 feet thick is it topsoil?





“Use easily cultivated, fertile topsoil that is free from objectionable material, has a high resistance to erosion, and is able to support plant growth. Secure additional topsoil, if necessary, from approved sources”

“Topsoil shall be a fertile loam material that is free of roots, vegetation, or other debris of a size and quantity that prevents proper placement of the topsoil. The topsoil shall not contain material greater than 25 mm in size, such as stones and clods”.

“Imported topsoil shall not have contaminants that adversely affect plant growth”.



The function of organic material, or biotics, is soil improvement & building.

Biotic Soil Ammendments promote natural microbial activity, and natural topsoil forming processes- the hallmarks of healthy vegetation-supporting soil systems.

Compost: a great organic matter but in the tendering and low bid system is inconsistent and fraught with poor quality products.
In other words, you can compost anything.



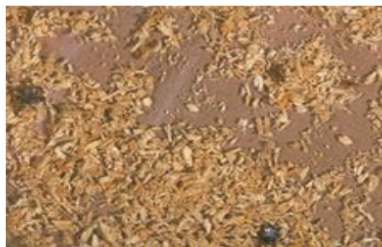
Refuse in a Compost Log



Carbon:Nitrogen ratio

About the Carbon:Nitrogen ratio

The carbon-nitrogen ratio is a useful way to compare soil amendments. This ratio is an indicator of the stability of the soil supplement. Lower ratios mean the supplement is very stable and will not draw down nutrients from the soil that plants need to grow. In general, carbon-nitrogen ratios of 30 to 1 or lower are best.



The high C:N ratio of soil amendments such as saw dust can limit the amount of soil nutrients (especially nitrogen) available for plants.

How to use the ratio

Saw dust has a very high ratio (400 to 1). As a result, saw dust makes water and nutrients unavailable (or less available) for the plants.

By contrast, compost, with a 30 to 1 rating, is nearly ideal. A drawback, however, is that compost breaks down quickly in the soil.

Peat moss, at 50 to 1, is near compost on the carbon-nitrogen scale. It draws down nitrogen slightly, but not enough to hurt plants. Another advantage is that peat moss lasts for years in the soil.

Common Carbon:Nitrogen Ratios

Material	C : N Ratio
Soil Humus	10 : 1
Tomato Leaves	13 : 1
Manure (Rotted)	20 : 1
Agrisol (Compost)	30 : 1
Sphagnum Peat Moss	50 : 1
Oak Leaves	65 : 1
Oat Straw	80 : 1
Pine Needles	225 : 1
Saw Dust	400 : 1

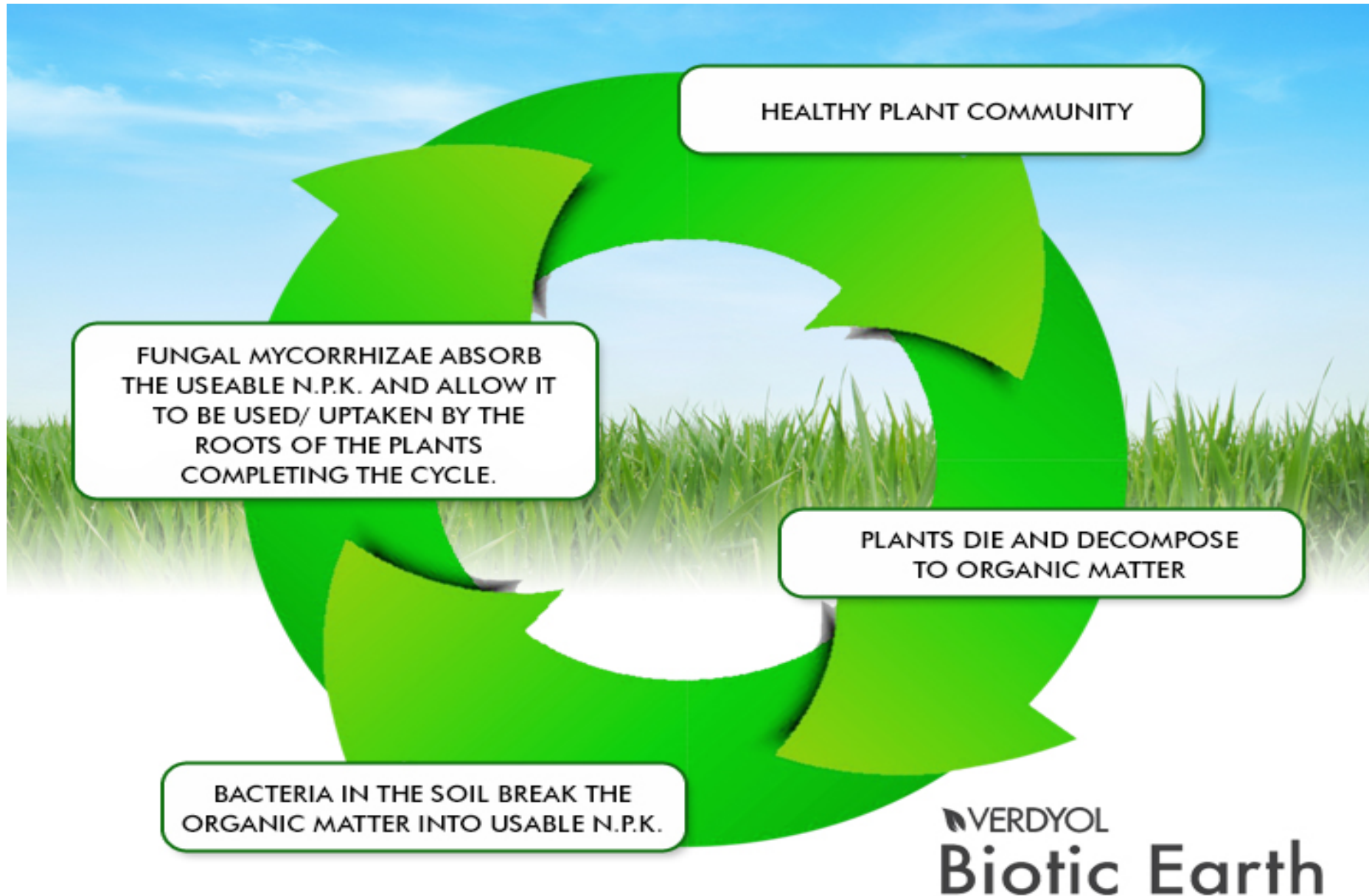
Prepared by Muhammad Marrush October 24, 2007

For more information visit: International Programs www.aes.ucdavis.edu/IntProg/Default.htm

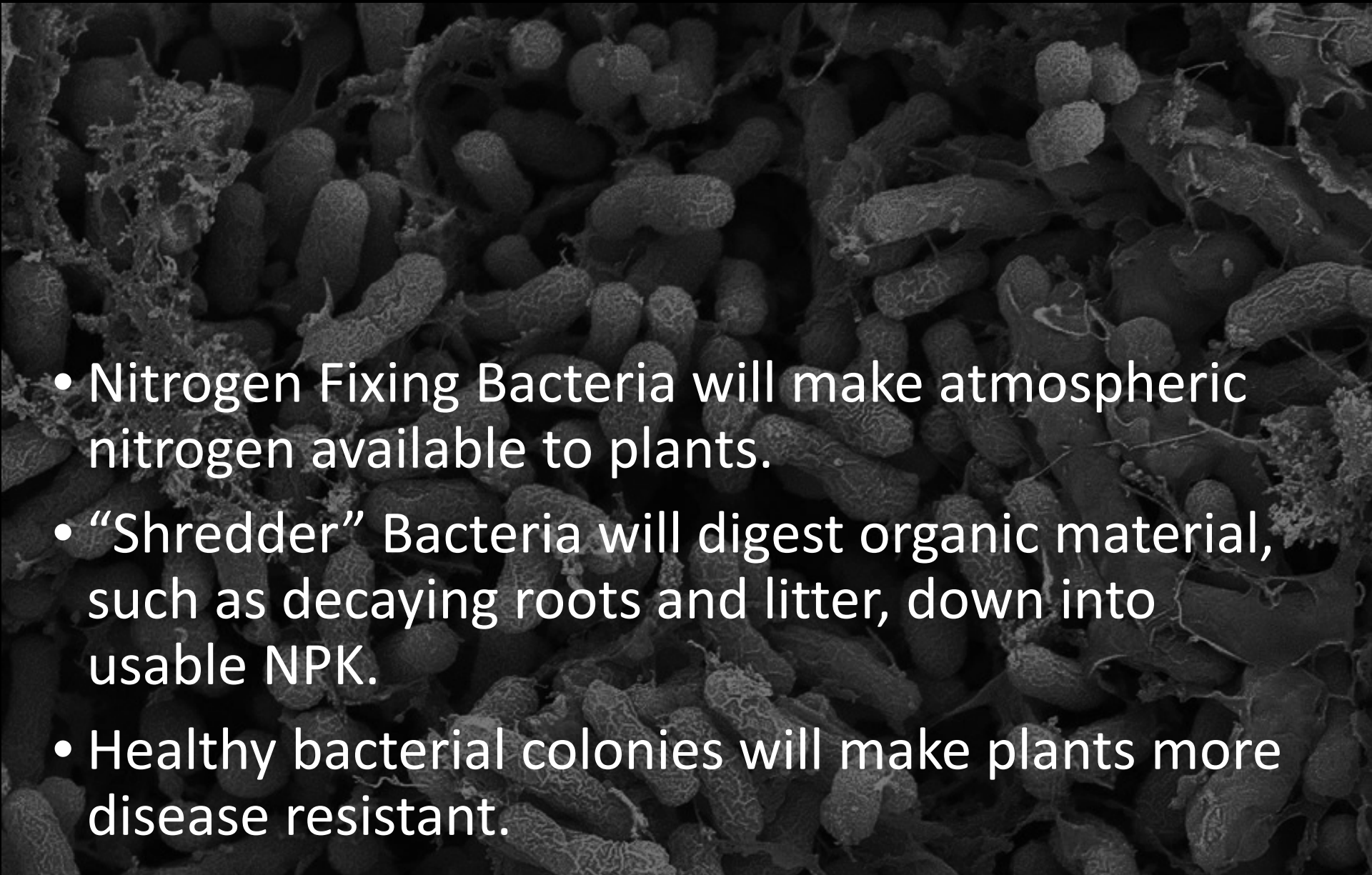
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Putting it All Together



Role of Bacteria in the Food Cycle

- 
- A black and white scanning electron micrograph (SEM) showing a dense population of bacteria. The bacteria exhibit various shapes, including rod-like, oval, and spherical forms, some with textured or granular surfaces. They are clustered together, filling the frame.
- Nitrogen Fixing Bacteria will make atmospheric nitrogen available to plants.
 - “Shredder” Bacteria will digest organic material, such as decaying roots and litter, down into usable NPK.
 - Healthy bacterial colonies will make plants more disease resistant.

Role of Mycorrhizae in the Food Cycle

- A fungus that aids in the absorption of nutrients by forming a symbiotic relationship with plant roots.
- 90% of plants form a relationship with mycorrhizae.
- They dramatically increase the area of root systems.
- Reintroduction of mycorrhizae can dramatically improve plant performance with less water and fertilizer.



Treated vs Untreated



Dillingham, AK



Pop. 2,143



- Poor Soils
- Low Organics
- Low Fertility
- Topsoil alternative

07.14.2013

- Surface Prep
- Biotic Soil Amendments





Erosion Control: Bonded Fiber Matrix



MATERIALS	REASONS/BENEFIT	APPLICATION
Verdyol Biotic Earth Black	To build a complete soil structure / Obtain vegetative growth	3,000 pounds per acre
Custom grass seed blend	A combination of native seeds suited to environment / Obtain vegetative growth	2 pounds per thousand square feet
Fertilizer – 10-10-10-8.5	Matching a fertilizer to enhance deficient soil conditions / Obtain vegetative growth	500 pounds per acre



To Whom It May Concern;

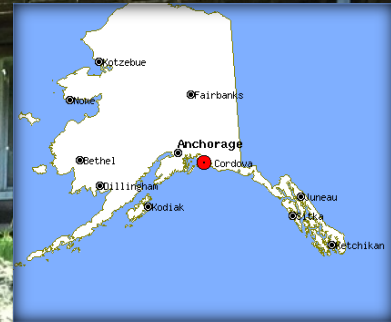
My name is Troy Gray. I was the superintendent on the Dillingham Airport project. At the end of June 2014, my hydro seed crew applied Verdyol Biotic Black Earth for the first time. Application was slightly different than the mulch we normally use, but adjustments were minimal. Because of the small hydroseed applicator equipment we have, we had to make multiple loads to cover the area. That made us experts on the application. Based on the training by Alaska Garden & Pet, ease of use, lower cost of the Verdyol program compared to top soil, and results we obtained, I would suggest this product to anyone.

Troy Grey – Knik Construction



- 
- Faster Establishment
 - Project Closeout
 - Permit termination
 - No Maintenance

Cordova, AK



8-28-15

9-2-15

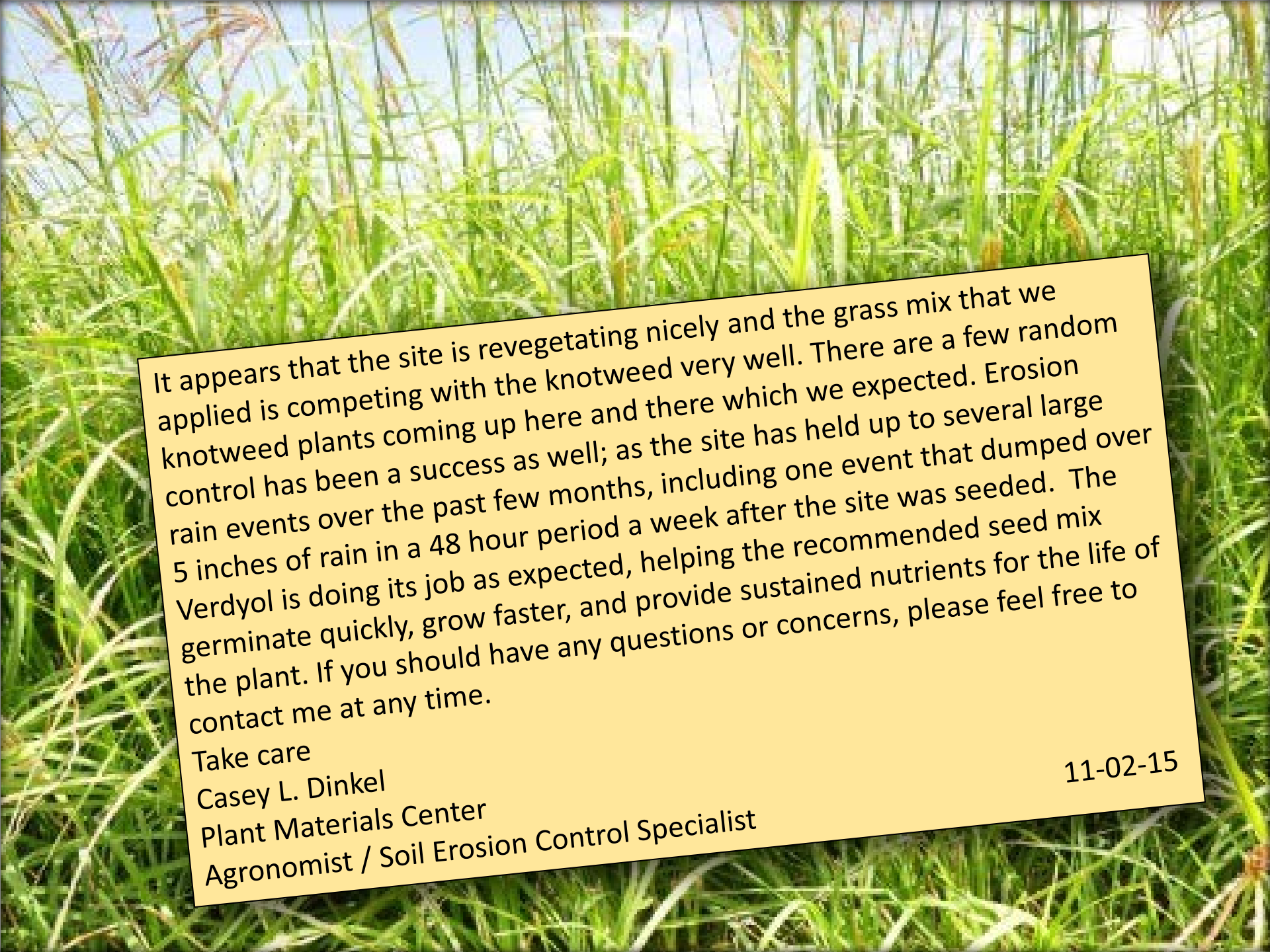


10-22-15



10-22-15





It appears that the site is revegetating nicely and the grass mix that we applied is competing with the knotweed very well. There are a few random knotweed plants coming up here and there which we expected. Erosion control has been a success as well; as the site has held up to several large rain events over the past few months, including one event that dumped over 5 inches of rain in a 48 hour period a week after the site was seeded. The Verdyol is doing its job as expected, helping the recommended seed mix germinate quickly, grow faster, and provide sustained nutrients for the life of the plant. If you should have any questions or concerns, please feel free to contact me at any time.

Take care

Casey L. Dinkel

Plant Materials Center

Agronomist / Soil Erosion Control Specialist

11-02-15

Eagle River Road



- ✓ Stabilize Soils
- ✓ Control the Flow



- ✓ Stabilize Soils
- ✓ Control the Flow





- ✓ Project Closeout
- ✓ Happy Paid Contractor
- ✓ No Maintenance Costs

Winnipeg

A photograph of a riverbank in Winnipeg. In the foreground, there is a dark, sandy or silty area. A large pile of light-colored gravel is on the left. A blue hose runs across the gravel and sand. A black cable is coiled on the sand. On the right, a clipboard with a black handle and a black clip is resting on a surface. The background shows a dense forest of green trees along the riverbank. The Assiniboine River is visible in the distance.

Assiniboine River



Installation June 1st





June 28th



August 1st

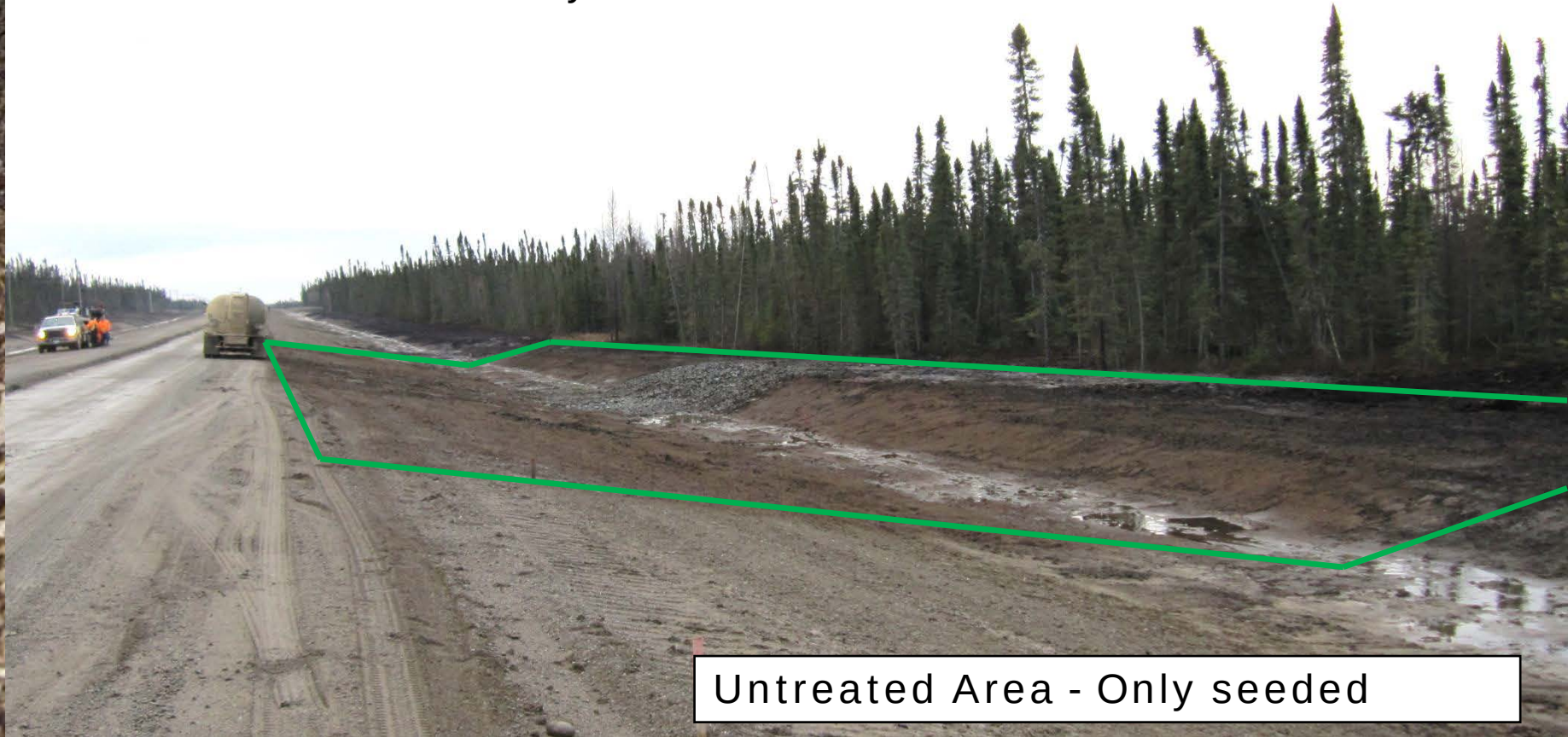


What does success look like?





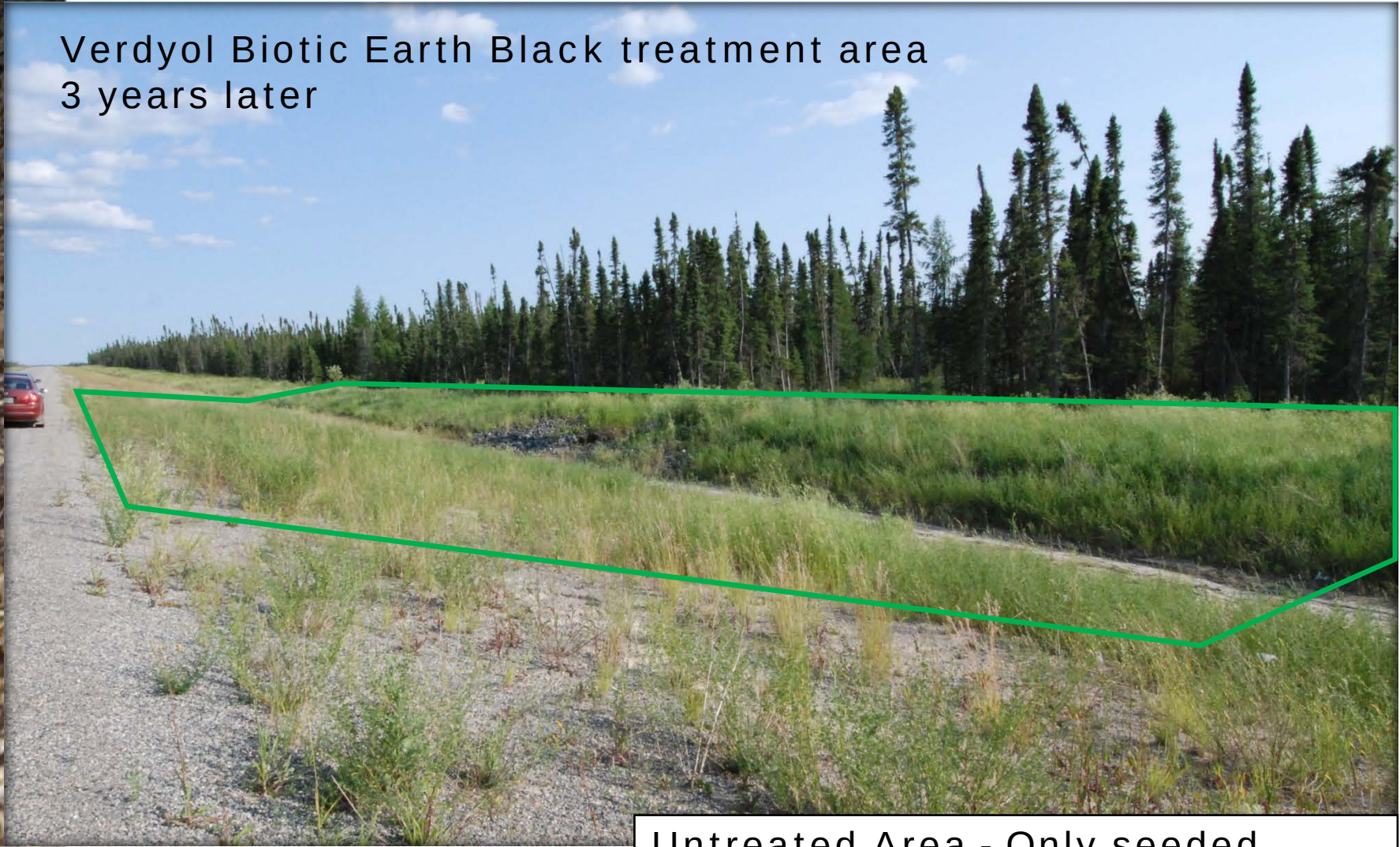
Verdyol Biotic Earth Black treatment area



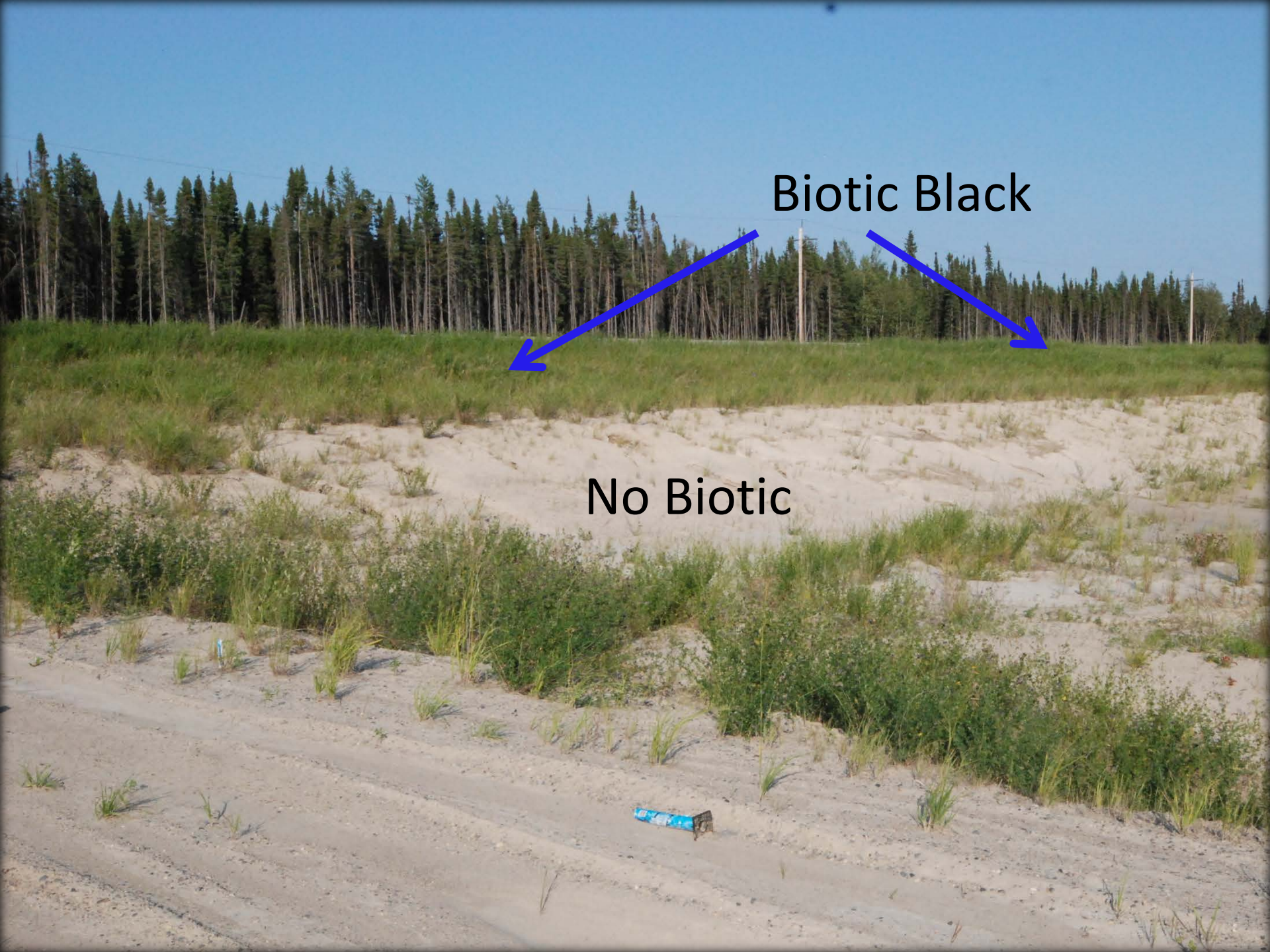
Untreated Area - Only seeded



Verdyol Biotic Earth Black treatment area
3 years later



Untreated Area - Only seeded



Biotic Black

No Biotic

3 years after application



Biotic Ends Here

Biotic Benefits

Deeper Roots

Taller Plants

Greater Density



3.5 years





Milner Ridge Project



6+ year case study

6+ year case study



Microbial Community Analysis of Milner Ridge A and B Turf Grass Samples Using TRFLP

Prepared for Mark Myrowich (CEO) and Natalie Pienkowski

mark@erosioncontrolblanket.com

MM - 204-797-3797, NP - 204-292-1221



December 22, 2014

Jae Min Park, Andrew Wojcik, and George Lazarovits



Table 1: Enumeration of bacteria, yeast, and mold in the turf samples.

Sample	Total Bacteria Count	Total Yeast Count	Total Mold Count
Milner Ridge A	17,975,000	4,825,000	112,500
Milner Ridge B	1,655,000	190,000	15,500

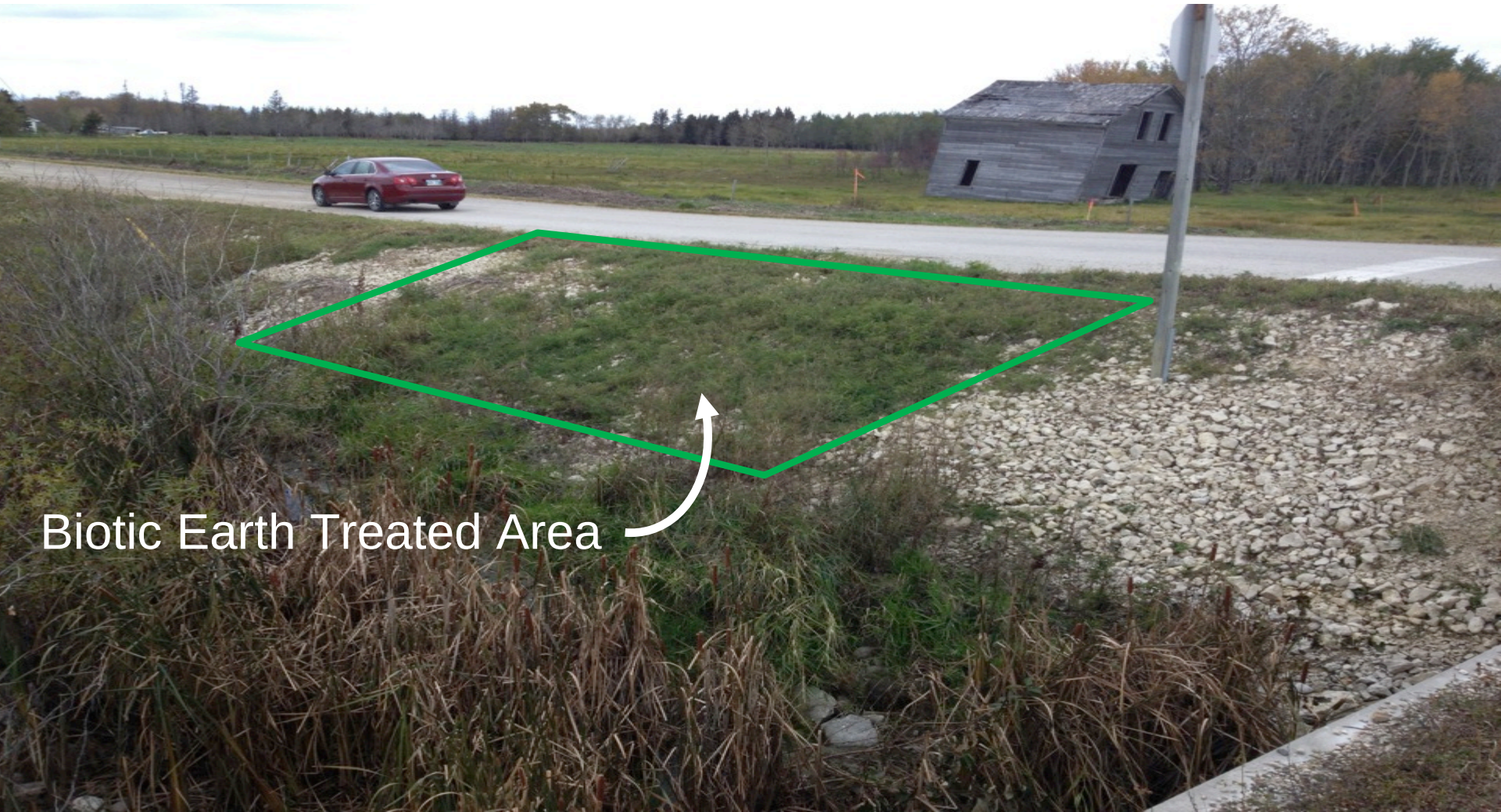
Establish Vegetation in Hard Armor



Hand Application Directly Onto Riprap



Vegetation Establishment



Biotic Earth Treated Area



1 growing season

Can you tell where the Biotic is?



 VERDYOL
Biotic Earth™
AN ORGANIC APPROACH TO SOIL BUILDING

Any Questions?



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