

COMPOST-BASED EROSION CONTROLS

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F. E. Warren Air Force Base (WAFB) has recently completed limited comparative field tests to assess the use of compost-based erosion and sediment controls at construction sites. The final test results were impressive.

Storm Water Problems at Construction Sites. Controlling erosion at construction sites is a major concern. Construction processes disturb soils, which are vulnerable to being washed downstream when it rains or snows, causing sediment build-up in waterways. Sedimentation from erosion is a primary cause of water quality impairment.

During brief periods, construction sites can contribute more sediment to Wyoming waters than decades of natural processes. State and Federal regulations require construction operators to control the quantity and quality of storm water runoff to prevent polluted site discharges from reaching surface water. Runoff is controlled by employing best management practices (BMPs).

BMPs at Construction Sites. Typical erosion/sediment control BMPs installed at WAFB construction sites include silt fences or straw wattles to slow runoff velocity and allow sediment settling, as well as standard drill seeding to establish vegetative cover on bare soils. These BMPs must be maintained both during and after construction is completed until disturbed areas are finally stabilized (i.e., 70% of uniform native perennial vegetative cover has been established).

The problem with these BMPs is their cost and poor performance. They require high maintenance and may not be well-suited for the harsh climate experienced in Wyoming. Silt fence is often improperly installed, not maintained, and damaged by high winds. State regulators often find silt fences are ineffective for containing construction sediment. Straw wattles are more costly than silt fence, and the covering quickly photodegrades causing the wattles to fall apart and fail. Standard drill seeding may require months or even years to reach 70% vegetation, and reseeded is often needed in windy areas and on steep slopes.

Limited Field Trials at WAFB. Because of inherent problems with traditional erosion control methods, WAFB conducted limited field studies at two active construction sites using compost-based BMPs. The field trials ran for four weeks (8/10 - 9/11/06).

Test Site A assessed the efficiency of re-vegetation using seeded compost blankets compared to standard drill seeding methods. Five test plots were installed and seeded with the same standard grass seed mixture. A 2-inch seeded compost blanket was installed in two test plots using a pneumatic blower packed with seeded compost to form a blanket, and three plots were drill seeded and mulched.

Remarkably, vegetation growth in the two compost blanket test plots significantly out performed all of the drill seeded plots (see table below).

Test Plot	BMP Type Installed	Watering Schedule	% Vegetation Cover
1	2-inch Compost Blanket	Once (2-in of water)	50% at 4 weeks
2	2-inch Compost Blanket	Bi-weekly (2-in of water)	70% at 3 weeks 100% at 4 weeks
3	Standard Drill Seeding	Once (2-in of water)	3% at 4 weeks
4	Standard Drill Seeding	Bi-weekly (2-in of water)	5% at 4 weeks
5	Standard Drill Seeding	No water	0.5 % at 4 weeks

Test Site B was established to evaluate compost-based BMPs for erosion control on a steep slope. A compost blanket, compost filter socks, and a 'living wall' (i.e., a wall seeded for vegetation growth) were installed for testing. Post-construction BMPs consisting of straw wattles for erosion control and drill seeding for vegetation previously installed at this site had failed. The slope never stabilized after a year-long effort and reseeded for vegetation was necessary because of persistent erosion problems.

A 2-inch seeded compost blanket was installed on the unprepared slope to evaluate the effectiveness of the blanket in reducing runoff, curtailing sheet and rill erosion, and promoting vegetation. Lengths of 12-inch diameter compost filter socks were also installed for erosion control and a 'living wall' was constructed from pre-made compost filter socks and the seeded compost used for the blankets to help stabilize a small escarpment that had formed due to slope erosion.

Significant progress toward slope stabilization and vegetation was observed during the four week test period using the compost-based BMPs. No down-slope erosion was observed during the test period, and 50% slope vegetation was achieved. Both the compost filter socks and compost blanket protected the slope from erosion effects during several hard rain storms, and the 'living wall' stabilized the small escarpment, even though only minimal vegetative growth occurred on the wall. Clearly the test trial demonstrated that the compost-based BMPs effectively reduced slope erosion, which was not achieved using traditional BMPs.

Conclusion. Both DEQ and WAFB agree that the limited trials have demonstrated compost-based BMPs may provide a better alternative to the marginal storm water and erosion control management tools traditionally used at WAFB. An added benefit is that compost can be purchased locally and is annually renewable. Although the initial expense for compost-based BMPs may or may not be as cost-effective as current practices, the total cost will likely be competitive when expenditures for maintenance, replacement, and disposal for traditional BMPs are considered. The promise of using compost-based BMPs lies in their effectiveness compared to other storm water management practices.