

## **Penn State research helps build new greenway path at Rothrock State Forest**

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By Britney Milazzo — [bmilazzo@centredaily.com](mailto:bmilazzo@centredaily.com)

STATE COLLEGE — A group of Penn State faculty and students have come up with a unique stone mix that researchers said will last longer when a greenway is paved that gives the community direct access to Rothrock State Forest.



**David Shearer, project coordinator for Penn State's Center for Dirt and Gravel Road Studies, helped develop the mix. Nabil K. Mark — CDT photo**

The Musser Gap Greenway is expected to open by the fall and will extend 1.4 miles from the Musser Gap parking lot to Whitehall Road near the Blue Course Drive intersection.

Mike Casper, coordinator of public relations and publications at the Thomas D. Larson Pennsylvania Transportation Institute at Penn State, said researchers at the institute developed the surface material used to make the mix for dirt and gravel road studies at the university.

The mix, called Trail Surface Aggregate, is designed for use as wearing surface for trails. Casper said the TSA is a spinoff from the institute's Driving Surface Aggregate — a state Department of Transportation-specification mixture that is used on unpaved roads.

“TSA was developed based on computer modeling to create a mix of various stone sizes that bind together well,” project coordinator Dave Shearer said.



**Penn State's Trail Surface Aggregate was applied for footpaths at the Shavers Creek Environmental Center in Centre County. Photo provided.**

Casper said the specialized stone mix was made in response to the need for nonmotorized local trails that resist erosion and are low-maintenance.

"It's a more durable surface," Shearer said. "It makes the trail usable over a long period of time. Other mixes act like sand; it becomes soupy and you can't ride bikes on it and such. The mix we came up with is good for trail use."

TSA is made from a mixture of different natural rock sizes from local quarries and can be purchased at quarries like Hawbaker in Pleasant Gap and Hanson Aggregate in Boalsburg, for small projects, Casper said.

"You combine the right size stone together, then you have something that is moisture resistant, and both freeze and thaw resistant that's better than anything else," Casper said. "We put science into it by modeling context and took it into field testing."

Shearer said initial testing was done before the TSA was used to pave a trail at Shaver's Creek Environmental Center in 2008 and a 12-mile section of the Pine Creek Trail, Lycoming County, last year. But Shearer said he helped create the idea around 2004 for a more durable trail surface.

For the Musser Gap Greenway, Casper said the project was approved by the Department of Conservation and Recreation, Penn State, State College and Ferguson Township, and essentially received more than \$125,000 in grants from the DCNR Community Conservation Partnership Program, Department of Community and Economic Development, Bikes Belong, Kodak American Greenways, Penn State Office of Physical Plant, Ferguson Township and State College.

"The TSA is an important part of this recreational access project," said Katie Ombalski, a conservation biologist with ClearWater Conservancy. "Durable, locally-sourced materials make for cost-effective, long-lasting projects."

ClearWater Conservancy purchased the Musser Gap property in 2006, added a parking lot to make it publicly accessible, and then donated it to the DCNR Bureau of Forestry a year later.

Stahl Sheaffer Engineering created the trail design.

"It's a nice mix of teamwork between us, the students and those creating the trail paths," Shearer said.

Britney Milazzo can be reached at 231-4648. Follow her on Twitter @brmilazzo.