# A new way to predict and track soil erosion

## May 2015 Snapshots

Healthy soil is foundational to life as we know it, so keeping soil healthy, and keeping it on the land, are important priorities.  One of the greatest threats to our soil is erosion, which happens across all kinds of landscapes, and can be moved by a variety of methods including water, wind and human activity.
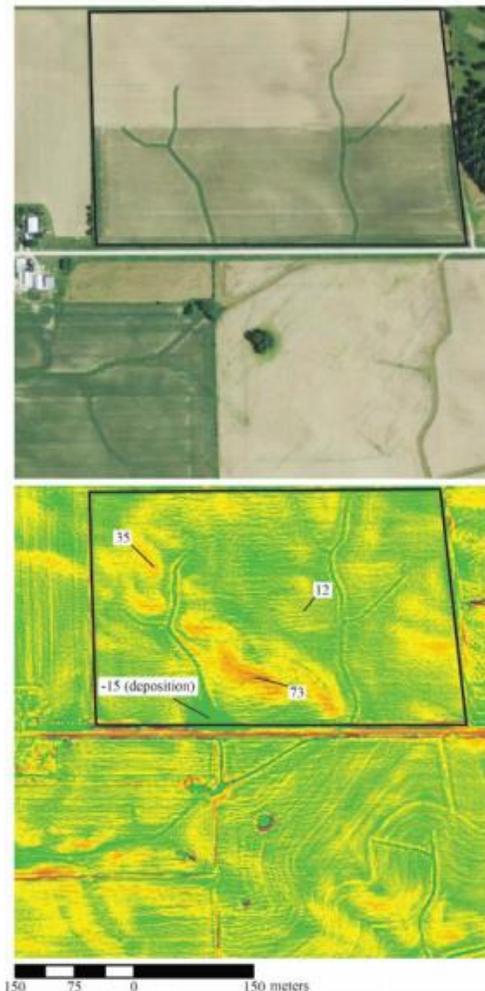
Erosion removes nutrients from soil and deposits them in bodies of water, leading to water pollution and reducing soil quality.  Erosion also suspends very small soil particles in the air causing air pollution, health concerns and reduced visibility.  While erosion is sometimes caused by natural events, such as heavy rain, melting snow or high winds, changing how we manage the land around us has also resulted in soil loss and erosion.  Given the resulting significant impact soil erosion has on the health of our air, water, and food, it would be great to be able to predict and track soil erosion.  With new tools, now we can.

The Measuring Conservation Outcomes project was funded by the Minnesota Environment and Natural Resources Trust Fund as recommended by the Legislative-Citizen Commission on Minnesota Resources (LCCMR) and managed by the Board of Water and Soil Resources (BWSR). It developed a new soil erosion model that produces estimates of soil erosion across Minnesota's agricultural landscape.  The new model was developed thanks to an unconventional approach from researchers from the University of Minnesota's Department of Soil, Water and Climate.

The model takes advantage of a unique isotope that binds very strongly with soil particles, making soil movement easier to track.  LIDAR data combined with isotope concentrations in the soil are used to predict soil movement at a very fine resolution across large landscapes.  In essence, it's an MRI of the landscape that tells us where the soil is most at risk.

These maps have a number of important uses. We can generate soil erosion estimates for land as small as a farm field or as large as a county. The maps can also be used to target portions of the landscape that can get the most benefit from conservation practices. Along the same lines, the maps can be used to determine the soil and water quality benefits of converting farmland into perennial vegetation (such as RIM, CRP, or CREP easements). They can also show the reverse: predict erosion if an area of land is converted to farmland.

The soil erosion maps and model are available for 48 counties in Minnesota, covering four Major Land Resource Areas.  Find the model geodatabase and project report on BWSR's website: http://www.bwsr.state.mn.us/soils/index.html



*For this field in Dodge County, the overall field average erosion rate is 2.7 tons per acre per year.  Areas of potentially high soil erosion are marked in red.*