

Successes **in** Stewardship

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May 2010

FHWA Pilot Points to Carbon Sequestration Potential

The Federal Highway Administration (FHWA) created the groundbreaking Carbon Sequestration Pilot Program (CSPP) in 2008 to explore the potential for State Departments of Transportation (DOTs) to reduce their total carbon emissions and earn revenue by changing vegetation-management practices in State-DOT-owned rights-of-way (ROW). FHWA conducted a study based on data from pilots in two States and data collected nationwide. The study concluded that highway ROW sequesters significant amounts of carbon. The potential for this to occur varies greatly at the State level, and DOTs should examine a suite of actions to determine those that are most appropriate to their individual situations and goals. The [September 2008 issue](#) of *Successes in Stewardship* provides further background on the CSPP.

Putting ROW to Work

Many State DOTs recognize that ROW has values that extend beyond the safety, operations, and maintenance of highway operations. However, few have developed land-management plans that focus on the value of the ROW for wildlife habitat, nutrient reduction, and other ecosystem services. There is currently discussion on mandating an emissions-trading market, commonly referred to as cap and trade. The connection between cap and trade and ROW land-management plans is that vegetation growing in the ROW sequesters carbon in the atmosphere that might be sold as “credits” to companies required to reduce their emissions. Managing DOT lands for carbon sequestration could provide an ecosystem service that also generates revenue for the agency, which is allowed under Federal statutes.

Recognizing this opportunity, FHWA has focused the CSPP on quantifying the amount of carbon that could be sequestered with use of native vegetation management on National Highway System (NHS) land. Additionally, FHWA has centered the CSPP on developing estimates of the revenue that could be generated through the sale of carbon credits.

Pilot Program Results

FHWA worked closely with State DOTs in New Mexico and Minnesota and collected data from several other States to address a number of questions related to the science and management of carbon sequestration. The data also address how to deliver carbon to an emissions-trading market.

Efforts in New Mexico identified the need for a model to quantify the amount of carbon that can be sequestered in grasslands on NHS ROW. The New Mexico DOT (NMDOT) is developing a multi-year research project to address this need. The resulting protocol will provide measurement rules that should allow State DOTs nationwide to enter future carbon markets. FHWA has documented additional information and lessons learned from the NMDOT pilot in its 2009 *CSPP Implementation and Next Steps Progress Report*, which is available on the [DOT Transportation and Climate Change Clearinghouse](#).

Using data from Minnesota and other States, FHWA developed an estimate of the amount of unpaved NHS ROW available for carbon sequestration. This marks the first time that a rigorous study had been conducted to quantify the amount of soft acreage, or unpaved ROW, that State DOTs manage.

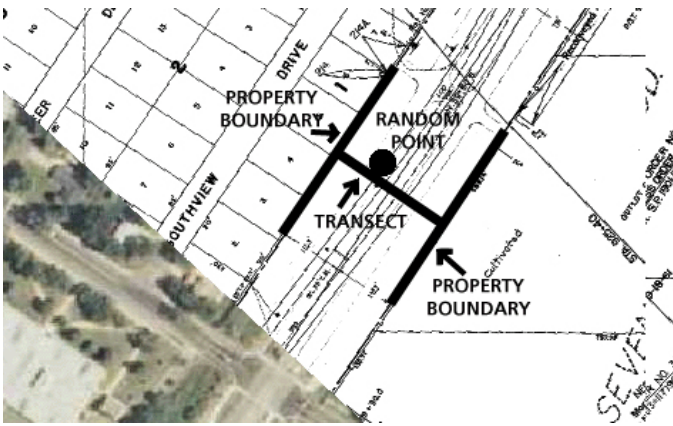
In the first of two analytical approaches that it used, the project team manually measured ROW widths on property maps at random locations in nine States to provide common ROW dimensions and observed vegetation types. The second

What is biological carbon sequestration?

Biological carbon sequestration is the natural intake of CO₂ by plants, which incorporate it into their wood, leaves, and roots via photosynthesis and also bind it to the underlying soil. Lands managed with a goal of carbon sequestration can retain many tons of carbon per acre indefinitely, even when individual plants die and release carbon.



An example of the kind of native vegetation that NMDOT will be quantifying to determine the amount of carbon that can be sequestered. (Courtesy of FHWA New Mexico Division Office)



An example of a ROW property map overlaid on an aerial photo. Property maps were used to determine and measure distances between legal property boundaries at random sites. (Courtesy of the Voloe Center)

approach involved a geographic information system analysis of 1,000 random locations nationwide. The latter approach was used to gain insight into the types of land cover typically found near the NHS.

Results suggest that there are approximately five million acres of NHS land nationwide, with an upper limit estimated at 8.7 million acres. Unpaved NHS land is expected to account for 68 percent of the total acreage. Assuming that the NHS comprises five million acres, roughly 3.4 million acres may be available for sequestration activities.

FHWA estimates that NHS ROW has already sequestered 91 million metric tons (MMT) of carbon and that it continues to sequester approximately 3.6 MMT per year nationwide. That equals the annual carbon dioxide emissions of approximately 2.6 million passenger cars and is about one percent of the

carbon that U.S. forests and soils absorb annually. (For more information, see the 2009 [USGS Report](#).) At its maximum capacity, the entire NHS network can likely sequester between 425 and 680 MMT of carbon. With European emissions markets pricing carbon futures at \$20 per ton for 2012, the value of carbon in the NHS could exceed \$8.5 billion nationwide. State-specific estimates for the contiguous United States are provided in the final CSPP report, which is available upon request and is also available at www.fhwa.dot.gov/hep/climate/resources.htm.

In addition to these State-level estimates, FHWA is beta-testing a decision-support tool to help DOTs quantify the return on investment for various carbon-sequestration scenarios. The tool allows transportation officials to make estimates based on State-specific considerations. It is available upon request.

Recognizing Carbon as an Asset

Congress, as it deliberates many approaches to climate-change legislation, is placing great emphasis on minimizing the cost of any cap-and-trade system for greenhouse gases that would affect the economy and consumers. Allowing the sale of carbon offsets opens a potential revenue stream for those who wish to adopt carbon sequestration as a land-management strategy. In addition, the use of vegetation for living snow fences, landslide eliminators, and other human infrastructure protections—practices for which carbon sequestration would be a supplementary benefit—might, in some cases, eventually be found to be more cost-effective than traditional engineering solutions.

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Look What's New!

- A three-day Environmental Conflict Resolution (ECR) conference, *ECR2010: Environmental Collaboration and Conflict Resolution—Evolving to Meet New Opportunities*, will be held May 25–27, 2010, in Tucson, Arizona. The conference will include workshops, panel sessions, discussions, and exhibitions on various topics within three tracks:
 - Policy Challenges of the Next Decade and the Role of ECR
 - Engaging Federal-Tribal-State-Local Governments
 - New Tools and Technology and Their Application to ECR
 Discounted [registration](#) is available until May 8.
- FHWA is currently accepting nominations for the [Exemplary Ecosystem Initiative Program](#) and the [Exemplary Human Environment Initiative](#) through Monday, May 17, 2010. To view the call for entries, please visit the [Annual Call for Entries](#) website. All submittals and questions should be sent to Julianne Schwarzer at julianne.schwarzer@dot.gov or 617-494-3259.
- The Federal Transit Administration (FTA) has announced the availability of \$75 million under the Transit Investments for Greenhouse Gas and Energy Reduction ([TIGGER](#)) [grant program](#) and \$81.2 million under the [Clean Fuels Grant Program](#). For more information, see the [Federal Register notice](#) website.
- FHWA recently launched a new [Livable Communities](#) website with updates on FHWA programs that support livability activities, case studies, and information on the Partnership for Sustainable Communities.