

Past Accomplishments of Gregory W. McCarty, Soil Scientist

Education:

1978–1982 Agronomy, Depart. of Agronomy, Iowa State Univ., B.S.

1982–1985 Soil Fertility, Depart. of Agronomy, Iowa State Univ., M.S.

1985–1989 Soil Microbiology, Depart. of Agronomy, Iowa State Univ., Ph.D.

Experience:

1982–1985, Research Assistant, Dept. of Agronomy, Iowa State Univ.

1985–1990, USDA Fellow, Dept. of Agronomy, Iowa State Univ.

1990–1992, Postdoc. Research Associate, Dept. of Agronomy, Iowa State Univ.

1992–1995, GS-12, Soil Scientist, Environmental Chem. Lab., USDA, ARS, MD

1995–2000, GS-13, Soil Scientist, Environmental Chem. Lab., USDA, ARS, MD

2000–2005, GS-14 Soil Scientist, Environmental Quality Lab., USDA, ARS, MD

2005–present, GS-15 Soil Scientist, Hydrol. & Rem. Sens. Lab., USDA, ARS, MD

Accomplishments:

- Improved ability to measure carbon sequestration in agricultural ecosystems and to gain better understanding of the impact of soil movement on carbon dynamics within agricultural landscapes.
- Developed infrared methods for rapid analysis of soils for carbon as well as other characteristics which will enable inclusion of soil carbon sequestration in a market-based system for regulating emissions of greenhouse gases.
- Assessed the effectiveness of forested riparian buffer ecosystems for removal of agricultural pollutants of surface and ground water. His research deals primarily with fate of nutrients, and he collaborates on studies of pesticide fate within riparian buffers.
- His research has used radionuclides to measure rates of carbon sequestration and carbon burial in riparian buffers.
- Developed LiDAR methodology for mapping wetland hydrology and assessing influence of topographic controls.
- Developed remote sensing approaches for assessing winter cover crop performance on cropland in Maryland.
- Assessed influences of land use and drainage condition on degree of nitrate export from agricultural watersheds.

Selected Publications: (recent 25 publications)

McCarty, G.W. and Ritchie, J.C. 2002. Impact of soil movement on carbon sequestration in agricultural ecosystems. *J. Environ. Pollut.* 116:423–430.

McCarty, G.W., and Reeves, J.B. Comparison of near infrared and mid infrared diffuse reflectance spectroscopy for field scale measurement of soil fertility parameters. *Soil Sci.* 171: 94-102.

Schumacher J.A., Venteris E.R., McCarty G.W., Ritchie J.C., Kasper T.C., Colvin T.S., Jaynes, D.B. Karlan, D.L., Fenton T.E., Schumacher, T.E., Lindstrom, M.J. 2005. Identifying spatial patterns of erosion for use in precision conservation. *J. Soil Water Cons.* 60:355-362.

Van Oost, K., T.A. Quine, G. Govers, S. DeGryze, J. Six, J.W. Harden, J.C. Ritchie, G.W. McCarty, G. Heckrath, C. Kosmas, J.V. Giraldez, J.R. Marques da Silva, and R. Merckx. 2007. The impact of agricultural soil erosion on the global carbon cycle. *Science* 318:626-629.

McCarty, G.W., Pachepsky, Y.A., Ritchie, J.C. 2009. Impact of Sedimentation on Wetland Carbon Sequestration in Agricultural Watershed. *J. Environ. Qual.* 38:804-813. DOI: 10.2134/jeq2008.001

Lang, M.W., and McCarty, G.W. LiDar intensity for improved detection of inundation below the forest canopy. *Wetlands*. 29: 1166-1178. 2009.

Serbin G., Hunt E.R., Daughtry C.S.T., McCarty G.W., and Doraiswamy P.C. An improved ASTER index for remote sensing of crop residue. *Remote Sensing* 1:971-991. 2009.

Whitall, D., Hively, W.D., Leight, A.K. Hapeman, C.J., McConnell, L.L., Fisher, T., Codling, E.E., Rice, C., McCarty, G.W., and Sadeghi, A.M. Pollutant fate and spatio-temporal variability in the choptank river estuary: factors influencing water quality. *Science of the Total Environment*. 408: 2096-2108. 2010.

Hunt, E.R., Hively, W.D., Fujikawa, S.J., Linden, D.S., Daughtry, C.S.T., and McCarty, G.W. Acquisition of NIR-green-blue digital photographs from unmanned aircraft for crop monitoring. *Remote Sensing*. 2: 290-305. 2010.

Causarano, H.J., Doraiswamy, P.C., Muratova, N., Pachikin, K., McCarty, G.W., Akhmedov, B., and Williams, J.R. Improved modeling of soil organic carbon in a semiarid region of central east Kazakhstan using EPIC. *Agron. Sustain. Dev.* DOI:10.1051/agro/2010028. 2010.

McCarty, G.W., Reeves III, J.B., Yost, R., Doraiswamy, P.C., and Doumbia, M. Evaluation of methods for measuring soil organic carbon in West African soils. *African Journal of Agricultural Research* 5(16):2169-2177. 2010.

Hively, W.D., Hapeman, C.J., McConnell, L.L., Fisher, T.R., Rice, C.P., McCarty, G.W., Sadeghi, A.M., Whitall, D.R., Downey, P.M., Niño de Guzmán, G.T., Bialek-Kalinski, K., Lang, M.W., Gustafson, A.B., Sutton, A.J., Sefton, K.A. Harman Fetcho, Jennifer A. Relating nutrient and herbicide fate with landscape features and characteristics of 15 subwatersheds in the Choptank River watershed. *Science of the Total Environment*, pp. 1-13. 2011.

Hively, W.D., McCarty, G.W., Reeves III, J.B., Lang, M.W., Oesterling, R.A., Delwiche, S.R. Use of airborne hyperspectral imagery to map soil properties in tilled agricultural fields. *Applied and Environmental Soil Science*. pp. 1-13. 2011.

Lang, M., McDonough, O., McCarty, G., Oesterling, R., and Wilen, B. Enhanced detection of wetland-stream connectivity using LiDAR. *Wetlands*. 32:461-473. 2012.

Lang, M., McCarty, G., Oesterling, R., and Teo, I.-Y. Topographic metrics for improved mapping of forested wetlands. *Wetlands*. 33:141-155. 2012

Denver, J.M., Ator, S.W., M.W. Lang, Fisher, T.R., Gustafson, A.B., Fox, R., Clune, J.W., McCarty, G.W. Nitrate fate and transport through current and former depressional wetlands in an agricultural landscape, Choptank Watershed, Maryland, United States. *Soil and Water Conservation Society*. 69(1):1-16. 2014.

Huang, C., Peng, Y., Lang, M., Yeo, I.-Y., McCarty, G.W. Wetland inundation mapping and change monitoring using Landsat and airborne LiDAR data. *Remote Sensing of Environment*, 141, 231-242. 2014

McCarty, G.W., Hapeman, C.J., Rice, C.P., Hively, W.D., McConnell, L.L., Sadeghi, A.M., Lang, M.W., Whittall, D.R., Bialek, K., Downey, P. Metolachlor metabolite (MESA) reveals agricultural nitrate-N fate and transport in Choptank River watershed. *Science of the Total Environment*, 473-482. 2014

Young, C.J., Liu, S., Schumacher, J.A., Schumacher, T.E., Kaspar, T.C., McCarty, G.W., Napton, D., Jaynes, D.B. Evaluation of a model framework to estimate soil and soil carbon redistribution by water and tillage using ¹³⁷Cs in two U.S. Midwest agricultural fields. *Geoderma*. 232-234:437-448. 2014.

Lee, S., Y. In Young, A.M. Sadeghi, G.W. McCarty, D.W. Hively. Assessing effectiveness of winter cover crops to improve water quality. *Journal of Hydrology and Earth System Sciences*. 10:14229-14263. 2013.

Shelton, D.R., Kiefer, L., Pachepsky, Y.A., Martinez, G., Mccarty, G.W., Dao, T.H. Comparison of microbial quality of irrigation water delivered in aluminum and PVC pipes. *Agricultural Water Management*. 129:145–151. 2013.

Hunt, P. J. Miller, T. Ducey, M. Lang, A. Szogi, and G. McCarty. Denitrification in Natural, Restored and Converted Wetlands of the Delmarva Region of the US. *Ecological Engineering* 71:438-447. 2014.

Fenstermacher, D.E., M. C. Rabenhorst, M. W. Lang, G. W. McCarty, and B. A. Needelman. Distribution, morphometry, and land use of Delmarva Bays. *Wetlands* (2014) 34:1219–1228. 2014.

Yeo I.-Y., S. Lee, A. M. Sadeghi, P. C. Beeson, W. D. Hively, G. W. McCarty, and M.W. Lang. Assessing winter cover crop nutrient uptake efficiency using a water quality simulation model. *Hydrology and Earth System Sciences*. 18:5239–5253. 2014.

Prabhakaraa, K, W. D Hively, G.W. McCarty. Evaluating the relationship between biomass, percent ground cover and remote sensing indices across six winter cover crop fields in Maryland, United States. *International Journal of Applied Earth Observation and Geoinformation* 39:88–102. 2015.