Stephen M. Griffith, Ph. D

Research Plant Physiologist and Lead Scientist, USDA-ARS
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Dr. Griffith is a Research Plant Physiologist at the USDA ARS National Forage Seed Production Research Center at Corvallis, Oregon. He is the Lead Scientist of a multidisciplinary project that addresses the USDA ARS's National Program 216, Agricultural Systems Competitiveness and Sustainability. Team research assesses the effects of farm conservation practices and the potential for conversion of agricultural crop residues into bioenergy as a value-added enterprise on the profitability and sustainability of grass seed production systems in the Pacific Northwest. The function of natural landscape features including riparian forest, naturally vegetated channels and wetlands in supplementing conservation practices to maintain water quality and serve as biological indicators of watershed health is also being evaluated within multiple hydrologic basins in the Pacific Northwest, particularly the Calapooia River watershed, a sub-basin of the Upper Willamette Valley, Oregon. The impact of multiple economic variables at various scales is being evaluated in the context of agricultural profitability, and sustainability within the region. These studies will produce scientific data that can be used to develop farm management options and decision tools that promote sustainable and profitable farming systems that comply with environmental regulations and make wise use of natural and crop production resources and incorporate conservation measures that protect wildlife habitat and natural resources.

Dr. Griffith received both his B.S. in Education and M.S. in Plant Science at Utah State University and his Ph.D. in Plant Physiology and a two-year post-doc at the University of Minnesota.

Dr. Stephen M. Griffith, Research Plant Physiologist
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Last Update: 2/16/2011

USDA-ARS PUBLICATION LIST OF RESEARCH RELATED TO WESTERN OREGON AGRICULTURE (1994-2011)

Peer-Reviewed Journal Articles

1. **Griffith, S. M.** and Streeter, D. J. Nitrate and ammonium nutrition in ryegrass: Changes in growth and chemical composition under hydroponic conditions. J. Plant Nutrition 17:71-81. 1994.

2. Alderman, S. C. and **Griffith, S. M.** Influence of form of nitrogen fertilizer on infection of annual ryegrass by conidia of *Gloeotinia temulenta.* J. Applied Seed Production 12:5-8. 1994.

3. **Griffith, S. M.**, Alderman, S.C., and Streeter, D. J. Italian ryegrass and N source fertilization in western Oregon in two contrasting climatic years. I. Growth and seed yield. J. Plant Nutrition 20:419-428. 1997.

4. **Griffith, S. M.**, Alderman, S.C., and Streeter, D. J. Italian ryegrass and N source fertilization in western Oregon in two contrasting climatic years. II. Plant N accumulation and soil N status. J. Plant Nutrition 20:429-439. 1997.

5. **Griffith, S. M.**, *Owen, J. S.*, *Horwath, W. R.*, Wigington Jr., P.J., Baham, J.E., and Elliott, L.F. Nitrogen movement and water quality at a poorly-drained agricultural and riparian site in the Pacific Northwest. Soil Sci. Plant Nutr. 43:1025-1030. 1997.

6. *Horwath, W. R.*, Elliott, L.F., Davis, J.M., Steiner, J. J., and **Griffith, S. M.** Denitrification in cultivated and noncultivated riparian areas of grass cropping systems. J. Environ. Quality 27:225-231. 1998.

7. Field, J.A., Reed, R.L., *Sawyer, T.E.*, **Griffith, S. M.**, and Wigington, Jr., P.J. Diuron occurrence and distribution in soil and surface and ground water associated with grass seed production. J. Environ. Quality 32:171-179. 2003. GRIFFITH PUBS\25.pdf http://jeq.scijournals.org/cgi/reprint/32/1/171

8. Wigington, Jr., P.J., **Griffith, S. M.**, Field, J.A., Baham, J.E., *Horwath, W. R.*, Owen, J., *Davis, J.H.*, Rain, S.C., and Steiner, J. J. Effectiveness of a riparian water quality buffer along a small agricultural stream in western Oregon. J. Environ. Quality 32:162-170. 2003. GRIFFITH PUBS\26.pdf http://jeq.scijournals.org/cgi/reprint/32/1/162

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9. Banowetz, G.M., Whittaker, G.W., Dierksen, K.P., Azevedo, M.D., Kennedy, A.C., **Griffith, S. M.**, and Steiner, J. J. Fatty acid methyl ester analysis (FAME) to identify sources of soil in surface water J. Environ. Qual. 35:133-140. 2006. GRIFFITH PUBS\30.pdf http://jeq.scijournals.org/cgi/reprint/35/1/133

10. Steiner, J. J. **Griffith, S. M.**, Mueller-Warrant, G.W., Whittaker, G.W., Banowetz, G.M., and Elliott, L.F. Conservation Practices in Western Oregon Perennial Grass Seed Systems. I: Impacts of Direct Seeding and Maximal Residue Management on Production Agron. J. 98:177-186. 2006. GRIFFITH PUBS\31.pdf http://agron.scijournals.org/cgi/reprint/98/1/177

11. *Nelson, M.A.*, **Griffith, S. M.**, and Steiner, J. J. Tillage effects on N dynamics and grass seed crop production in western Oregon (U.S.A.). Soil Sci. Soc. Am. J. 70:825-831. 2006. GRIFFITH PUBS\32.pdf http://soil.scijournals.org/cgi/reprint/70/3/825

12. *Davis, J.M.*, **Griffith, S. M.**, *Horwath, W. R.*, Steiner, J. J., and Myrold, D.D. Fate of ^{15}N-in a perennial ryegrass seed field and herbaceous riparian area. Soil Sci. Soc. Am. 70:909-919. 2006. GRIFFITH PUBS\33.pdf http://soil.scijournals.org/cgi/reprint/70/3/909

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14. *Davis, J.H.*, **Griffith, S. M.**, *Horwath, W. R.*, Steiner, J. J., and Myrold, D.D. Mitigation of shallow groundwater nitrate in a poorly drained riparian area and adjacent cropland. J. Environ. Qual. 36:628-637. 2007. GRIFFITH PUBS\35.pdf http://jeq.scijournals.org/cgi/reprint/36/3/628

15. Steiner, J. J., Mueller-Warrant, G.W., **Griffith, S. M.**, Banowetz, G.M., and Whittaker, G.W. Conservation practices in western Oregon perennial grass seed systems. II: Meadowfoam rotation crop management. Agron. J. 98:1501-1509. 2007. GRIFFITH PUBS\36.pdf http://agron.scijournals.org/cgi/reprint/98/6/1501

16. Steiner, J. J., Gavin, W.E., Mueller-Warrant, G.W., **Griffith, S. M.**, Whittaker, G.W., and Banowetz, G.M. Conservation practices in western Oregon perennial grass seed systems. III: Impacts on gray-tailed vole activity. Agron. J. 99:537-542. 2007. GRIFFITH PUBS\37.pdf http://agron.scijournals.org/cgi/reprint/99/2/537

17. *Davis, J.H.*, **Griffith, S. M.**, *Horwath, W. R.*, Steiner, J. J., and Myrold, D.D. Denitrification and nitrate consumption in an herbaceous riparian area and perennial

ryegrass seed cropping system. Soil Sci. Soc. Amer. J. 72:1299-1310. 2008. GRIFFITH PUBS\39.pdf http://soil.scijournals.org/cgi/reprint/72/5/1299

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19. *Floyd, W. C.*, Schoenholtz, S. H., **Griffith, S. M.**, Wigington, Jr., P. J., and Steiner, J. J. Nitrate-nitrogen, land use/land cover, and soil drainage associations at multiple spatial scales. JEQ 38:1473-1482. 2009. GRIFFITH PUBS\41.pdf http://jeq.scijournals.org/cgi/reprint/38/4/1473

20. *El-Nashaar, H. M.*, Banowetz, G. M., **Griffith, S. M.**, Casler, M. D., and Vogel, K. P. Genotypic variability in mineral composition of switchgrass. Bioresource Technology 100:1809-1814. 2009.GRIFFITH PUBS\42.pdf http://ddr.nal.usda.gov/bitstream/10113/22209/1/IND44136676.pdf

21. Banowetz, G.M., **Griffith, S. M.**, Steiner, J. J., and *El-Nashaar, H. M.* Mineral accumulation by perennial grasses in a high rainfall environment. Energy and Fuels 23:984-988. 2009. GRIFFITH PUBS\43.pdf http://pubs.acs.org/doi/pdf/10.1021/ef800488j

22. Banowetz, G.M., **Griffith, S. M.**, and *El-Nashaar, H. M.* Mineral content of grasses grown for seed in low rainfall areas of the Pacific Northwest and analysis of ash from gasification of bluegrass (*Poa pratensis* L.) straw. Energy and Fuels. 23:502-506. 2009.GRIFFITH PUBS\44.pdf http://pubs.acs.org/doi/pdf/10.1021/ef800490w

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24. Mueller-Warrant, G.W., Whittaker, G., **Griffith, S. M.**, Banowetz, G., Dugger, B., Garcia, T., Giannico, G., Boyer, K., and McComb, B. Remote sensing classification of grass seed cropping practices in western Oregon. International J. Remote Sensing (Accepted 12/2/09).

25. *Ciotti, D.*, **Griffith, S. M.**, Kann, J., and Baham, J. Nutrient and sediment transport on flood irrigated pasture in the Klamath Basin, Oregon. Rangeland Ecology & Management 63:308-316. 2010 GRIFFITH PUBS\47.pdf http://www.bioone.org/doi/pdf/10.2111/08-127.1

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26. *Gervais, J.A.*, **Griffith, S. M.**, *Davis, J.H.*, Cassidy, J.R., and Dragila, M.I. Effects of gray-tailed vole activity on soil properties. Northwest Science 84:159169. 2010. GRIFFITH PUBS\48.pdf http://www.oregonwildlife.org/documents/Gervais%20et%20al.%20final.pdf

27. *El-Nashaar, H. M.*, Banowetz, G., Peterson, J., and **Griffith, S. M.** Genetic variability of mineral concentration in winter wheat straw. Energy Fuels 24:2020–2027. 2010. GRIFFITH\49.pdf http://pubs.acs.org/doi/pdf/10.1021/ef901181h

28. *Davis, J. H.*, **Griffith, S. M.**, and Wigington, Jr., P. J. Riparian Forest Control of Nitrogen and Phosphorus Export from a Western Oregon Agricultural Landscape. Submitted to J. Enivron. Qual. 40:1-12. 2011. (in press)

29. Griffith, S.M., Banowetz, G.M., Dick, R.P., Mueller-Warrant, G.W., and Whittaker, G.W. Western Oregon Grass Seed Crop Rotation and Straw Residue Effects on Soil Quality. Agron. J. (Accepted 02/02/11)

USDA-ARS External Research Grants
(~1992-2005)

State of Oregon, Department of Agriculture, non-thermal grass seed production system research

Riparian ecosystems water quality in northwest agricultural landscapes. U.S. Environmental Protection Agency

On-Farm Development of a Growing Degree Day Based Management Schedule to Enhance Grass Seed Production and Reduce Potential Environmental Losses of Nitrogen. A joint cooperative grant with Northwest Agricultural Consulting from Oregon Department of Agriculture - Ground Water Research and Development Grants

Optimizing N fertilization Practices in Willamette Valley in non-thermal residue managed tall fescue and perennial ryegrass seed production systems. Joint cooperative research with Oregon State University. Oregon Department of Agriculture - Ground Water Research and Development Grant

Water quality in poorly drained agriculture and riparian areas. Oregon Department of Agriculture - Ground Water Research and Development Grant

Nitrogen Processing in No-Till and Tilled Tall Fescue and Fine Fescue Seed Production Systems in Willamette Valley, Oregon. Oregon Seed Council

Maintaining Grass Seed Farm Profits by Integrating Conservation Practices, GSCSSA

Pilot Project to Determine Practical Conservation Practices and Their Effects in Willamette Valley Grass Seed Production, Oregon Seed Council

Water Quality Impacts of a Flood Irrigated Pasture, Oregon State University Agricultural Research Foundation

Managed Forest and Their Role in Maintaining Water Quality in a Multi-land Use River Basin, Fish and Wildlife Habitat in Managed Forests Research Program

Farm Conservation Practices to Reduce Sediment Loss from Grass Seed Field Drainages in the South Willamette Valley OR Dept Ag – OR Seed Council

United States Department of Agriculture
NRCS Natural Resources Conservation Service

Conservation Effects Assessment Project (CEAP)

CEAP is a multi-agency effort to quantify the environmental effects of conservation practices and programs and develop the science base for managing the agricultural landscape for environmental quality. Project findings will be used to guide USDA conservation policy and program development and help conservationists, farmers and ranchers make more informed conservation decisions.

CEAP Vision... Enhanced natural resources and healthier ecosystems through improved conservation effectiveness and better management of agricultural landscapes.

CEAP Goal... To improve efficacy of conservation practices and programs by quantifying conservation effects and providing the science and education base needed to enrich conservation planning, implementation, management decisions, and policy.

Assessments in CEAP are carried out at national, regional and watershed scales on cropland, grazing lands, wetlands and for wildlife. The three principal components of CEAP—the national assessments, the watershed assessment studies, and the bibliographies and literature reviews— contribute to building the science base for conservation. That process includes research, modeling, assessment, monitoring and data collection, outreach, and extension education. Focus is being given to translating CEAP science into practice.

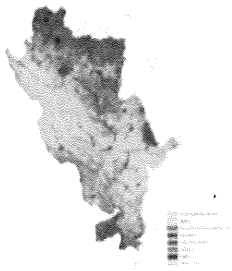
. . . More about CEAP

What's New

Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Upper Mississippi River Basin

Some documents on this page require Acrobat Reader.

- **Wildlife**: An Assessment of Wintering Waterfowl Use of Wetland Reserve Program Restored Wetlands in California Using NEXRAD Weather Radar: Final Report, November 2010 (PDF; 3.4 MB)
- **Watersheds and Wetlands**: Helping Save the Chesapeake Bay, Agricultural Research, August 2010 (PDF; 6.4 MB)
- **Highlights**: CEAP Highlights, June 2010 (PDF; 0.5 MB)
- **Cropland**: Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Upper Mississippi River Basin, June 2010



. . . More What's New

National and Regional Assessments

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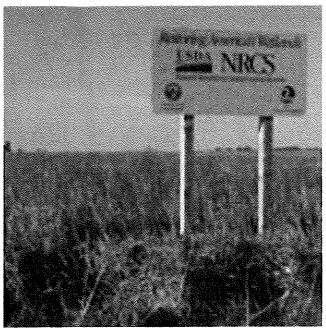
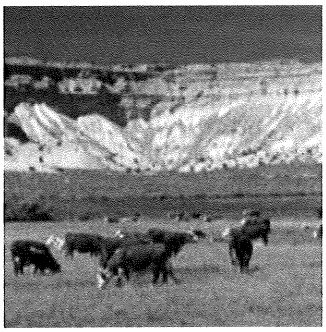
CEAP-Cropland
A sampling and modeling approach using data from representative crop fields, from the National Resources Inventory, and farmer surveys to estimate impacts of conservation practices on the environment.



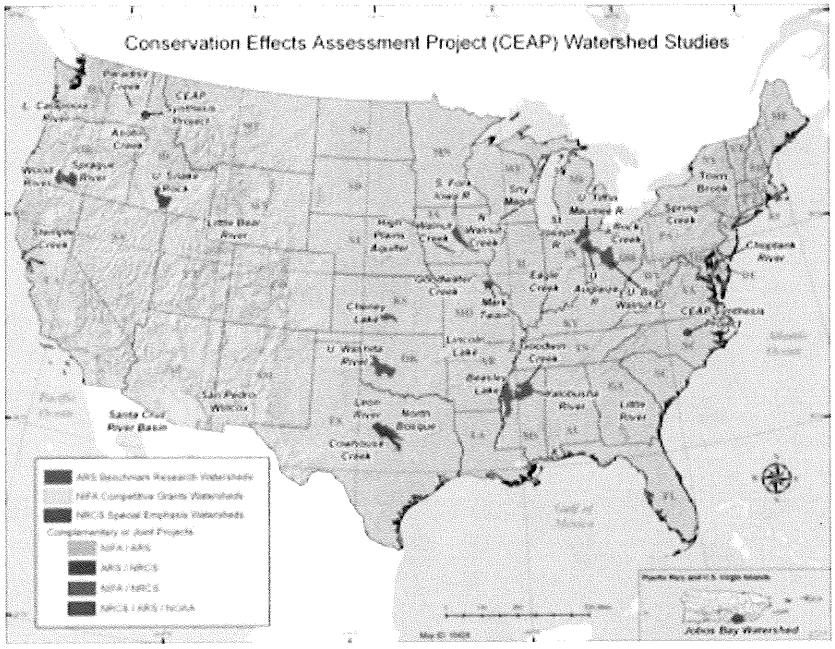
CEAP-Wetlands
An effort to develop a collaborative foundation that facilitates the production and delivery of scientific data to inform conservation decisions affecting wetland ecosystems and the services they provide.

CEAP-Wildlife
A cooperative effort with the fish and wildlife conservation community involving multiple regional assessments that document habitat condition and biological response to conservation practices and programs at multiple spatial scales.



CEAP-Grazing Lands
An effort designed to quantify the environmental effects of conservation practices on non-Federal grazing lands in the United States.

Watershed Assessments



Forty-two CEAP watershed studies have been initiated to provide in-depth analysis and quantification of the measurable effects of conservation practices at the watershed scale and enhance out understanding of the effects of conservation in the biophysical setting of a watershed.

These studies are being conducted and/or supported by USDA's Agricultural Research Service, National Institute of Food and Agriculture, and Natural Resources Conservation Service. Future efforts will include translating this science into practice to better manage agricultural landscapes.

Bibliographies and Literature Reviews

Current literature on conservation programs that documents what is known and not known about the environmental benefits of conservation practices and programs for cropland, fish and wildlife, wetlands, and grazing lands. The National Agricultural Library maintains dynamic bibliographies cataloguing studies from 2003 to the present.

Product Library

A full listing of all CEAP related documents published to date.

0180

What's New

- **Wildlife**: CEAP Wildlife Bibliography Team is honored with National 2009 Excellence in Information Award
- **Highlights**: Quarterly CEAP Highlights now available in the CEAP product library
- **Wetlands**: Regional Estimates of Ecological Services Derived from U.S. Department of Agriculture Conservation Programs in the Mississippi Alluvial Valley , June, 2010 (PDF; 2.1 MB)
- **Wetlands**: CEAP Wetlands Assessment in California's Central Valley and the Klamath River Basin: Progress Report, February, 2010 (PDF; 1.4 MB)

Research

CEAP

Watershed Assessment Study

The goal of this assessment is to provide the American people better understanding of the role agricultural conservation practices and programs play in achieving the nation's environmental objectives - clean air and water, healthy soils, and functioning habitat for wildlife. Improved understanding of conservation performance is also needed to improve future conservation programs and practices.

The ARS Conservation Effects Assessment Project (CEAP) Watershed Assessment Study (WAS) in part of the overall USDA CEAP project, providing additional scientific basis for the CEAP National Assessment being led by NRCS. The initial effort focused on croplands, with grazing lands and wetlands being added in 2007. The project has been implemented on a watershed basis in key agro-ecological regions around the nation.

Scope

The CEAP-WAS involves more than 60 ARS scientists, plus additional technical support staff, working in 14 benchmark watersheds at 12 ARS locations. The ARS-CEAP-WAS project is a fully peer-reviewed national effort that is highly relevant to the conservation policy of the USDA. Croplands CEAP-WAS is led by Mark Walbridge (National Program Staff, Beltsville MD) and John Sadler (Coordinator, Columbia MO).

To achieve the goals outlined above, Cropland CEAP-WAS is structured into 5 objectives:

- Develop and implement a web-based data system to organize, document, manipulate, and compile climate, water, soil, land-management, and socioeconomic data from ARS research watersheds for assessment of conservation practices and other hydrologic analyses.
- Measure and quantify water quality, water quantity, soil quality, and ecosystem effects of conservation practices at the watershed scale in a variety of hydrologic and agronomic settings.
- Validate models and quantify uncertainties of model predictions at multiple scales by comparing predictions of water quality to measured water, soil and land management effects of conservation practices.
- Develop and apply policy-planning tools to aid selection and placement of conservation practices to optimize profits, environmental quality, and conservation practice efficiency.
- Develop and verify regional watershed models that quantify environmental outcomes of conservation practices in major agricultural regions.

Related Topics
CEAP
STEWARDS
Data Policy
Documents
Privacy Policy

Watershed Descriptions
Georgia - Little River
Idaho - Upper Snake Rock Creek
Indiana - St. Joseph River
Iowa- North Walnut Creek
Iowa - South Fork of the Iowa River
Maryland-Choptank River
Mississippi - BeasleyLake
Mississippi - Goodwin Creek
Mississippi - Topashaw Canal
Missouri - Goodwater Creek
Ohio - Upper Big Walnut Creek
Oklahoma - Upper Washita River
Pennsylvania - Mahantango Creek
Texas - Leon River

0180

The work to accomplish these objectives was organized by six teams of ARS scientists:

Team 1: Database Development. The database, named STEWARDS (Sustaining The Earth's Watersheds – Agricultural Research Database System), will store hydrologic, economic, management, and other data from the watersheds for later analysis and model runs. This team is led by Jean Steiner (El Reno OK) and Jerry Hatfield (Ames IA).

Team 2: Watershed Design and empirical measurements of conservation effects. This objective is the core of the science basis for CEAP. The team is led by Martin Locke (Oxford MS) and Mark Tomer (Ames IA).

Team 3: Modeling of Watersheds. Data from the above objectives supports modeling using the Soil Water Assessment Tool (SWAT) and Annualized Agricultural Non-point Source (AnnAGNPS) models, which will extend the empirical data to unmonitored watersheds. This team is led by Jeff Arnold (Temple TX), Ron Bingner (Oxford MS), and Tim Strickland (Tifton GA).

Team 4: Economic Assessment. Data from the watersheds, plus the modeling procedures, are integrated into economic analyses for decision support to the conservation policy effort. This team is led by Jerry Whitaker (Corvallis OR) and Chi-Hua Huang (West Lafayette IN).

Team 5: Regionalization of Models. This objective seeks to capture legacy computer models into modular packages using collaborative Object-oriented Modeling System (OMS and CoLab) methods to facilitate development of models applicable in specific regions of the USA. This team is led by Laj Ahuja (Ft. Collins CO) and Matt Romkens (Oxford MS).

Team 6: Quality Assurance. This team supports the standardization of methods and procedures across the CEAP-WAS project. It is led by Ray Bryant (University Park PA) and Norm Fausey (Columbus OH).

Last Modified: 06/18/2009