Annual Report for Period: 11/2006 - 10/2007
Submitted on: 10/21/2007
Principal Investigator: Gragson, Theodore L.
Award ID: 0218001
Organization: U of Georgia Res Fdn Inc
Title:
LTER: Consequences of Land Use Change in the Southern Appalachian Mountains

Project Participants

Senior Personnel

Name: Gragson, Theodore
Worked for more than 160 Hours: Yes
Contribution to Project:
11/06-10/07: LPI of the Coweeta LTER, responsible for project management and administration as well as liaison with UGA sponsored program administration. Research on historical ecology of Native American and Euroamerican settlement in collaboration with P. Bolstad, and development of forecast framework of the effects of land use with J. Clark and others. Partial support from Coweeta LTER research funds. Partial support for activities from Coweeta LTER.

Name: Vose, James
Worked for more than 160 Hours: Yes
Contribution to Project:
11/06-10/07: Co-principal investigator of the Coweeta LTER and Research Leader of the USFS Coweeta Hydrologic Laboratory. Directs all research activities of cooperating USFS scientists at Coweeta and is the liaison with USFS Southern Research Station. Research on ecosystem function and water quantity/quality. Partial support from Coweeta LTER through subcontract to Coweeta Hydrologic Laboratory.

Name: Kloeppel, Brian
Worked for more than 160 Hours: Yes
Contribution to Project:
11/06-10/07: Co-Principal Investigator and LTER Site Director. Supervises on-site technicians, oversees management of dormitory facilities, and coordinates use and maintenance of on-site equipment. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. Receives 10 months/year salary plus a research budget from Coweeta LTER project.

Name: Benfield, Fred
Worked for more than 160 Hours: No
Contribution to Project:
11/06-10/07: Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. Partial support from Coweeta LTER.

Name: Bolstad, Paul
Worked for more than 160 Hours: No
Contribution to Project:
11/06-10/07: Research on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Clark, James
Worked for more than 160 Hours: No
Contribution to Project:
11/06-10/07: Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. Partial support for activities from Coweeta LTER.

Name: Clinton, Barton
Worked for more than 160 Hours: No
Contribution to Project:

11/06-10/07: Characterizing changes in the riparian zone structure and function resulting from the loss of eastern hemlock. No direct support for these activites from Coweeta LTER.

Name: Elliott, Katherine

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Dendrochronology study to characterize stand dynamics and disturbance history along topographic or compositional gradients in the Coweeta Basin and two old-growth stands in Joyce Kilmer National Forest in order to determine stand similarities and differences, and the cause of the variation. No direct support for these activities from the Coweeta LTER.

Name: Grossman, Gary

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Hendrick, Ron

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Research on the role of ecto- and ericoid mycorrhizae and soil/litter chemistry in regulating nutrient pools and acquisition in Rhododendron maximum-Hardwood forests. Partial support for these activities from Coweeta LTER.

Name: Knoepp, Jennifer

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: USFS research scientist at Coweeta Hydrologic Laboratory characterizing terrestrial C pools in vegetation types across the gradient in the Coweeta basin from examination of soil, forest floor and coarse woody debris. No direct support from the Coweeta LTER research funds. No direct support for this activity from Coweeta LTER.

Name: Leigh, David

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Project geomorphologist determining sedimentation history of streams in the study region and the measurable extent of human-impact on stream morphology, sedimentology, floods, and water quality. Partial support from Coweeta LTER research funds.

Name: Pearson, Scott

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Research on the effects of land use history on terrestrial biological diversity and community composition in forest ecosystems testing hypotheses related to the mechanisms that might explain land use effects including the role of anthropogenic alterations to soil chemistry (for plants) and habitat quality (for animals). Partial support for activities from Coweeta LTER.

Name: Pringle, Catherine

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Research on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. Partial support for activities from Coweeta LTER.

Name: Pulliam, Ron

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Research on the demography and distribution of six forest-understory herb species in the lower Piedmont of Georgia through the Blue Ridge to develop a rigorous method of delineating suitable habitat then test hypotheses about how habitat suitability, demography, and dispersal interact to influence species distributions. Partial support from Coweeta LTER research funds.

Name: Reynolds, Barbara

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Effects of various disturbance on abundance of soil microarthropod taxa common in forest soils and important in the decomposition process in southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Riedel, Mark

Worked for more than 160 Hours: No

Contribution to Project:

11/05-6/06: USFS research scientists at Coweeta Hydrologic Laboratory with activities focused on fine-scale hydrologic modeling based on collecting and collating information from on-site weirs. No direct support from the Coweeta LTER research funds.

Name: Turner, Monica

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Research on how current and past landscape patterns, abiotic conditions, and the native plant community influence the occurrence and abundance of invasive plants in forests of the Southern Blue Ridge province, and the factors that best explain the distribution of invasive plants as well as what locations are most vulnerable to invasion. Partial support for activities from Coweeta LTER.

Name: Wallace, Bruce

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Long-term follow up study on the effects of clear-cut logging on WS 7 at Coweeta on benthic fauna and organic matter standing crop. Nominal support for these activities from a research budget from Coweeta LTER.

Name: Webster, Jack

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Scott, Mark

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Coordinated Stream Hazard Site sampling cycle for water chemistry, channel geomorphology, and community structure of algae, macroinvertebrates, and fishes. No direct support for these activities from Coweeta LTER.

Name: Bradford, Mark

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Characterizing how disease agents that cause mortality of dominant canopy & sub-canopy tree species affect soil organic carbon (SOC) cycling & the related microorganisms through impacts on edaphic climate and detrital resource quality and quantity. Partial support for activities from Coweeta LTER.

Name: Dehring, Carolyn

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Spatially-explicit research on property markets in the Buncombe County, NC, based on transaction data, and the effect of land use regulations on house prices and land markets. Partial support for activities from Coweeta LTER.

Name: Ford, Chelcy

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as

impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Depken, Craig

Worked for more than 160 Hours: No

Contribution to Project:

01/07-10/-7: Spatially-explicit research on property markets in the Buncombe County, NC, based on transaction data, and the effect of land use regulations on house prices and land markets. Partial support for activities from Coweeta LTER.

Post-doc

Name: Jong, Kwang Seuk

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Collaborator with G. Grossman. Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. No direct support for these activities from Coweeta LTER.

Name: Buchanan, Nathan

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with J. Clark. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No direct support for these activities from Coweeta LTER.

Name: McMahon, Sean

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with J. Clark. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No direct support for these activities from Coweeta LTER.

Name: Chamblee, John

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Spatially-explicit research on property markets in the Buncombe County, NC, based on transaction data, and the effect of land use regulations on house prices and land markets. Working with Ted Gragson. Partial support for activities from Coweeta LTER through May 2007, then full support starting August 2007.

Name: Wu, Wie

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. Partial support for activities from Coweeta LTER.

Graduate Student

Name: Burcher, Chris

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: MSc student working with F. Benfield at VA Tech. Stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Kirk, Ryan

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: PhD student working with P. Bolstad at U of Minnesota. Research on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Dietze, Michael

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-8/06: PhD student working with J. Clark at Duke University. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. Partial support for activities from Coweeta LTER.

Name: Ibanez, Ines

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: PhD student working with J. Clark at Duke University. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. Partial support for activities from Coweeta LTER.

Name: Wolosin, Michael

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: PhD student working with J. Clark at Duke University. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No direct support for these activities from Coweeta LTER.

Name: Butler, Sarah

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-6/06: MSc student working with K. Elliot and A. White (University of Maine). Dendrochronology study to characterize stand dynamics and disturbance history along topographic or compositional gradients in the Coweeta Basin and two old-growth stands in Joyce Kilmer National Forest in order to determine stand similarities and differences, and the cause of the variation. No direct support for these activities from Coweeta LTER.

Name: Fly, Jessie

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-8/07: PhD student working with T. Gragson at University of Georgia. Assist with Buncombe County land records study. Partial support for activities from Coweeta LTER.

Name: Devine, Meredith

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: PhD student working with T. Gragson at University of Georgia. Assist with French collaboration. Graduate research assistantship from Coweeta LTER.

Name: Ball, Becky

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-5/07: PhD student working with M. Bradford at the University of Georgia. Research on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. Full support from Coweeta LTER funds. Graduates with PhD from UGA in May 2007.

Name: Price, Katie

Worked for more than 160 Hours: No

Contribution to Project:

8/06-10/06: PhD student with Rhett Jackson and David Leigh on stream sedimentology. Partial support from Coweeta LTER.

Name: Kominoski, John

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: PhD student working with C. Pringle at University of Georgia. Research on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. Full support from Coweeta LTER funds.

Name: Warren, Robert

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-8/07: PhD student working with R. Pulliam at the University of Georgia. Research on the demography and distribution of six forest-understory herb species in the lower Piedmont of Georgia through the Blue Ridge to develop a rigorous method of delineating suitable habitat then test hypotheses about how habitat suitability, demography, and dispersal interact to influence species distributions. Partial support for activities from Coweeta LTER. Graduates from UGA with a PhD August 2007.

Name: Diez, Jeff

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: PhD student working with R. Pulliam at the University of Georgia. Research on the demography and distribution of six forest-understory herb species in the lower Piedmont of Georgia through the Blue Ridge to develop a rigorous method of delineating suitable habitat then test hypotheses about how habitat suitability, demography, and dispersal interact to influence species distributions. Partial support for activities from Coweeta LTER.

Name: Hagen, Elizabeth

Worked for more than 160 Hours: Yes

Contribution to Project:

11/02-5/04: MSc student working with J. Webster at VA Tech. Graduates May 2004 with a thesis entitle: Influence of agricultural land use on allochthonous input and leaf breakdown in southern Appalachian streams.

Name: Wojculewski, Christy

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: MSc student working with J. Webster at VA Tech. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Sokol, Eric

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: MSc student working with F. Benfield at VA Tech. Stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Jeremiah, Nick

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: MSc student working with F. Benfield at VA Tech. Stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Powers, Matthew

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: MSc student working with F. Benfield at VA Tech. Stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Gray, Travis

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Brookshire, Jack

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: MSc student working with J. Webster at VA Tech. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Rogers, James

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-8/07: MSc student working with D. Leigh at University of Georgia. Human impact to stream morphology, sedimentology, and water quality. Partial support for activities from Coweeta LTER.

Name: Suther, Bradley

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: MSc student working with D. Leigh at University of Georgia. Human impact to stream morphology, sedimentology, and water quality. Partial support for activities from Coweeta LTER.

Name: Luebke, Michelle

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-5/07: MSc student working with D. Leigh at University of Georgia. Human impact to stream morphology, sedimentology, and water quality. Partial support for these activities from Coweeta LTER. Graduates with MS in May 2007.

Name: Hazelton, Peter

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: PhD student working with G. Grossman at U of Georgia. Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Wurzburger, Nina

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: PhD student working with R. Hendrick at U of Georgia. Research on the role of ecto- and ericoid mycorrhizae and soil/litter chemistry in regulating nutrient pools and acquisition in Rhododendron maximum-Hardwood forests. Partial support for activities from Coweeta LTER.

Name: Zamor, Rich

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: PhD student working with G. Grossman at U of Georgia. Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Welch, Nathan

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: PhD student working with J. Clark at Duke University. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No direct support for these activities from Coweeta LTER.

Name: Gananapathy, Narayanaraj

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: PhD student working with P. Bolstad at U of Minnesota on terrain mapping and land surface morphology.

Name: Dunbar, Kate

Worked for more than 160 Hours: Yes

Contribution to Project:
11/05-6/06: PhD student working with T. Gragson at University of Georgia. Assist with Buncombe County land records study. Partial support for activities from Coweeta LTER.

Name: DeRocher, Julien

Worked for more than 160 Hours: Yes

Contribution to Project:
11/05-10/06: MA student working with T. Gragson and B. Collins at University of Georgia. Information management support for the Coweeta LTER and development of COGENT - the Coweeta Geographic data server. Graduate research assistant support from Coweeta LTER.

Name: Fievet, Charles

Worked for more than 160 Hours: Yes

Contribution to Project:
11/05-6/06: MA student working with T. Gragson and B. Collins at University of Georgia. Develop the Coweeta LTER land cover intertemporal classification. Graduate research assistantship from Coweeta LTER.

Name: McBride, Allen

Worked for more than 160 Hours: Yes

Contribution to Project:
11/05-10/06: Working with J. Clark. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No direct support for these activities from Coweeta LTER.

Name: Oakley, Clint

Worked for more than 160 Hours: Yes

Contribution to Project:
11/05-10/06: Working with J. Clark. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No direct support for these activities from Coweeta LTER.

Name: O'Keefe, Joy

Worked for more than 160 Hours: Yes

Contribution to Project:
11/05-10/06: Working with B. Clinton. Characterizing changes in the riparian zone structure and function resulting from the loss of eastern hemlock. No direct support for these activites from Coweeta LTER.

Name: Cladis, Sheila

Worked for more than 160 Hours: No

Contribution to Project:
11/06-10/07: Working with B. Kloeppel. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Meadows, Jason

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06-10/07: Working with D. Leigh. Human impact to stream morphology, sedimentology, and water quality. Partial support for activities from Coweeta LTER.

Name: Albright, Thomas

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06-10/07: Working with M. Turner. Research on how current and past landscape patterns, abiotic conditions, and the native plant community influence the occurrence and abundance of invasive plants in forests of the Southern Blue Ridge province, and the factors that best explain the distribution of invasive plants as well as what locations are most vulnerable to invasion. Partial

support for activities from Coweeta LTER.

Name: Anderson, Dean

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Working with M. Turner. Research on how current and past landscape patterns, abiotic conditions, and the native plant community influence the occurrence and abundance of invasive plants in forests of the Southern Blue Ridge province, and the factors that best explain the distribution of invasive plants as well as what locations are most vulnerable to invasion. Partial support for activities from Coweeta LTER.

Name: Kuhman, Timothy

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Working with M. Turner. Research on how current and past landscape patterns, abiotic conditions, and the native plant community influence the occurrence and abundance of invasive plants in forests of the Southern Blue Ridge province, and the factors that best explain the distribution of invasive plants as well as what locations are most vulnerable to invasion. Partial support for activities from Coweeta LTER.

Name: Ely, Damon

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Morkeskie, Kate

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER. Graduates from VaTech with MS in May 2007.

Name: McManamay, Ryan

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Taylor, Phil

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Windfeldt, Katherine

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Research on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Working with Paul Bolstad. Partial support for activities from Coweeta LTER.

Name: Silva, Fabiana

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06 to 10/07: Working with Brian Kloeppel on sLTER research. Full support from Coweeta LTER funds.

Name: Anderson, Ryan

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Paul Bolstad on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: bowden, Joseph

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Chelcy Ford on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Cheever, Beth

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Jack Webster on functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Egeloff, Josh

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson Assist on Buncombe County land records study. Partial support for activities from Coweeta LTER.

Name: Eilers, April

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Jack Webster on functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Frisch, John

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Cathy Pringle on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. Full support from Coweeta LTER funds.

Name: Hall, Eboni

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Chelcy Ford on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Hughes, April

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Fred Benfield on stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Jenks, Andrew

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Paul Bolstad on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Kratzer, Erika

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06 to 10/07: Working with Jack Webster on functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Lutz, Brian

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jack Webster on functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Martin, Leslie

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06 to 10/07: Working with David Leigh on human impact to stream morphology, sedimentology, and water quality. Partial support for these activities from Coweeta LTER.

Name: Maxwell, Corrie

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Fred Benfield on stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Schultz, Mary

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Ron Pulliam on the demography and distribution of six forest-understory herb species in the lower Piedmont of Georgia through the Blue Ridge to develop a rigorous method of delineating suitable habitat then test hypotheses about how habitat suitability, demography, and dispersal interact to influence species distributions. Partial support for activities from Coweeta LTER.

Undergraduate Student

Name: Minter, Zach

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Undergraduate student working with J. Webster at VA Tech. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Kaminski, Cynthia

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Undergraduate student working with K. Reynolds at UNC Asheville. Effects of various disturbance on abundance of soil microarthropod taxa common in forest soils and important in the decomposition process in southern Appalachia. Partial support for these activities from Coweeta LTER.

Name: Flores, Diana

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06 to 10/07: Working with Monica Turner on the effects of land use history on terrestrial biological diversity and community composition in forest ecosystems testing hypotheses related to the mechanisms that might explain land use effects including the role of anthropogenic alterations to soil chemistry (for plants) and habitat quality (for animals). Partial support for activities from

Coweeta LTER.

Name: Srivistava, Jaya

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Undergraduate student working with M. Bradford at U of Georgia. Characterizing how disease agents that cause mortality of dominant canopy & sub-canopy tree species affect soil organic carbon (SOC) cycling & the related microorganisms through impacts on edaphic climate and detrital resource quality and quantity. Partial support for activities from Coweeta LTER.

Name: Rosamilia, Nichole

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-8/07: Undergraduate student working with T. Gragson and B. Collins at University of Georgia. Information management support for the Coweeta LTER and development of TRENDS socioeconomic dataset. Partial support for activities from Coweeta LTER.

Name: Greene, Jason

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with G. Grossman at University of Georgia. Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Jander, Yorke

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with B. Kloeppel. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. Partial support for these activities from Coweeta LTER.

Name: Grancos, Tara

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with M. Bradford. Characterizing how disease agents that cause mortality of dominant canopy & sub-canopy tree species affect soil organic carbon (SOC) cycling & the related microorganisms through impacts on edaphic climate and detrital resource quality and quantity. Partial support for activities from Coweeta LTER.

Name: Bell, Dave

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with J. Clark. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No direct support for these activities from Coweeta LTER.

Name: Styons, Jason

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with J. Clark. Data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No direct support for these activities from Coweeta LTER.

Name: Livingston, Grace

Worked for more than 160 Hours: No

Contribution to Project:

5/06-8/06: Working with K. Elliott. Dendrochronology study to characterize stand dynamics and disturbance history along topographic or compositional gradients in the Coweeta Basin and two old-growth stands in Joyce Kilmer National Forest in order to determine stand similarities and differences, and the cause of the variation. No direct support for these activities from Coweeta LTER.

Name: Riddle, Jess

Worked for more than 160 Hours: No

Contribution to Project:

5/06-8/06: Working with K. Elliott. Dendrochronology study to characterize stand dynamics and disturbance history along topographic or compositional gradients in the Coweeta Basin and two old-growth stands in Joyce Kilmer National Forest in order to determine stand similarities and differences, and the cause of the variation. No direct support for these activities from Coweeta LTER.

Name: Bahkta, Jagruti

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-05/07: Working with T. Gragson. Assist with Buncombe County land records study. Partial support for activities from Coweeta LTER.

Name: Carter, Lee Ellen

Worked for more than 160 Hours: No

Contribution to Project:

01/07-10/07: Working with T. Gragson. Assist with Buncombe County land records study. Partial support for activities from Coweeta LTER.

Name: Cote, Angela

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with G. Grossman. Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Slafkowsky, Matt

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with G. Grossman. Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Walters, Jennifer

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with G. Grossman. Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Martin, Briahn

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with B. Kloeppel. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Vose, Aaron

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with B. Kloeppel. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Camp, Thomas

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Assist J. Knoepp with characterizing terrestrial C pools in vegetation types across the gradient in the Coweeta basin from examination of soil, forest floor and coarse woody debris. No direct support from Coweeta LTER. No direct support for these

activities from Coweeta LTER.

Name: Brunton, Chris

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Working with S. Pearson. Research on the effects of land use history on terrestrial biological diversity and community composition in forest ecosystems testing hypotheses related to the mechanisms that might explain land use effects including the role of anthropogenic alterations to soil chemistry (for plants) and habitat quality (for animals). Partial support for activities from Coweeta LTER.

Name: Nix, Jared

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Working with S. Pearson. Research on the effects of land use history on terrestrial biological diversity and community composition in forest ecosystems testing hypotheses related to the mechanisms that might explain land use effects including the role of anthropogenic alterations to soil chemistry (for plants) and habitat quality (for animals). Partial support for activities from Coweeta LTER.

Name: Geffen, Rachel

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with R. Pulliam. Research on the demography and distribution of six forest-understory herb species in the lower Piedmont of Georgia through the Blue Ridge to develop a rigorous method of delineating suitable habitat then test hypotheses about how habitat suitability, demography, and dispersal interact to influence species distributions. Partial support for activities from Coweeta LTER.

Name: Mordecai, Erin

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with R. Pulliam. Research on the demography and distribution of six forest-understory herb species in the lower Piedmont of Georgia through the Blue Ridge to develop a rigorous method of delineating suitable habitat then test hypotheses about how habitat suitability, demography, and dispersal interact to influence species distributions. Partial support for activities from Coweeta LTER.

Name: McKenzie, Clifford

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Barabara Reynolds on the effects of various disturbance on abundance of soil microarthropod taxa common in forest soils and important in the decomposition process in southern Appalachia. Partial support for these activities from Coweeta LTER.

Name: Frank, Julie

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Whitfield, Anne

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Blackmon, Jimmy

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06-10/07: Research on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. Working with Cathy Pringle. Full support from Coweeta LTER funds.

Name: Becknell, Justin

Worked for more than 160 Hours: Yes

Contribution to Project:
11/05-10/06: Research on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia in support of the activities of Paul Bolstad. Partial support for activities from Coweeta LTER.

Name: Burns, Steven

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Research on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia in support of the activities of Paul Bolstad. Partial support for activities from Coweeta LTER.

Name: Brass, Timothy

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Research on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia in support of the activities of Paul Bolstad. Partial support for activities from Coweeta LTER.

Name: Laurson, Zachary

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Research on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia in support of the activities of Paul Bolstad. Partial support for activities from Coweeta LTER.

Name: Maxa, Melissa

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Research on carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia in support of the activities of Paul Bolstad. Partial support for activities from Coweeta LTER.

Name: Anderson, Zach

Worked for more than 160 Hours: Yes

Contribution to Project:
6/07 to 10/07: Working with Ted Gragson on Coweeta LTER IT support. Full support from Coweeta LTER.

Name: Dellinger, Rebecca

Worked for more than 160 Hours: Yes

Contribution to Project:
11/006 to 10/07: Working with Monica Turner on the effects of land use history on terrestrial biological diversity and community composition in forest ecosystems testing hypotheses related to the mechanisms that might explain land use effects including the role of anthropogenic alterations to soil chemistry (for plants) and habitat quality (for animals). Partial support for activities from Coweeta LTER.

Name: Ellis, Blaine

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Scott Pearson on how current and past landscape patterns, abiotic conditions, and the native plant community influence the occurrence and abundance of invasive plants in forests of the Southern Blue Ridge province, and the factors that best explain the distribution of invasive plants as well as what locations are most vulnerable to invasion. Partial support for activities from Coweeta LTER.

Name: Filer, Kelly

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Gary Grossman on effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Hutchins, Matt

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Monica Turner on the effects of land use history on terrestrial biological diversity and community composition in forest ecosystems testing hypotheses related to the mechanisms that might explain land use effects including the role of anthropogenic alterations to soil chemistry (for plants) and habitat quality (for animals). Partial support for activities from Coweeta LTER.

Name: Ackison, Laurel

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Jack Webster on tunctional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Minter, Zack

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Fred Benfield on stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Radow, Jordan

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Fred Benfield on stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Stadler, Jacob

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Fred Benfield on stream-response to disturbance at multiple scales based on physical and biotic measurement. Partial support for activities from Coweeta LTER.

Name: Aubucon, Elizabeth

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Paul Bolstad carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Klueggel, Jasper

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Paul Bolstad carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Mueller, Andrew

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Paul Bolstad carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Hein, Augustina

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Paul Bolstad carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Buchanan, Nathan

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. Partial support for activities from Coweeta LTER.

Name: Racke, Danielle

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. Partial support for activities from Coweeta LTER.

Name: Blythe, Tyler

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Chelcy Ford Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Farakesh, Abigal

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Gary Grossman on the effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Herrin, James

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Gary Grossman on the effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Farina, Serge

Worked for more than 160 Hours: Yes

Contribution to Project:
6/07 to 10/07: Working with Brian Kloeppel as undergraduate researcher. Partial support for activities from Coweeta LTER.

Name: Seachrist, Katie

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Cathy Pringle on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. Partial support for activities from Coweeta LTER.

Name: Hennessy, Sean

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Barabara Reynolds on the effects of various disturbance on abundance of soil microarthropod taxa common in forest soils and important in the decomposition process in southern Appalachia. Partial support for these activities from Coweeta LTER.

Name: Fidler, Ellen

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Monica Turner on the effects of land use history on terrestrial biological diversity and community composition in forest ecosystems testing hypotheses related to the mechanisms that might explain land use effects including the role of anthropogenic alterations to soil chemistry (for plants) and habitat quality (for animals). Partial support for activities from Coweeta LTER.

Technician, Programmer

Name: Collins, Barrie

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Coweeta LTER data manager, supervising staff and activities (working with T. Gragson). All salary and benefits provided by Coweeta LTER.

Name: Steiner, Susan

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-2/06: Field technician and Coweeta Schoolyard LTER coordinator. Full salary and benefits provided by Coweeta LTER.

Name: Deal, James

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Coweeta Analytical Laboratory technician (working with B. Kloeppel). Full salary and benefits provided by Coweeta LTER.

Name: Harper, Carol

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Coweeta Analytical Laboratory technician working with B. Kloeppel. Full salary and benefits provided by Coweeta LTER. Full salary and benefits provided by Coweeta LTER.

Name: Ratajczak, Robert

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Full-time research professional working with G. Grossman at University of Georgia. Effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. No direct support for these activities from Coweeta LTER.

Name: Eustis, Scott

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: PhD student working with R. Pulliam at the University of Georgia. Research on the demography and distribution of six forest-understory herb species in the lower Piedmont of Georgia through the Blue Ridge to develop a rigorous method of delineating suitable habitat then test hypotheses about how habitat suitability, demography, and dispersal interact to influence species distributions. Partial support for activities from Coweeta LTER.

Name: Baughens, Renee

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Office manager for the Coweeta LTER project working with T. Gragson. Support from UGA cost-share.

Name: Ogden, Lee

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Research technician working with R. Hendrick at University of Georgia. Research on the role of ecto- and ericoid mycorrhizae and soil/litter chemistry in regulating nutrient pools and acquisition in Rhododendron maximum-Hardwood forests. No direct support for these activities from Coweeta LTER.

Name: Porterfield, Dale

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Research technician working with R. Hendrick at University of Georgia. Research on the role of ecto- and ericoid mycorrhizae and soil/litter chemistry in regulating nutrient pools and acquisition in Rhododendron maximum-Hardwood forests. No direct support for these activities from Coweeta LTER.

Name: Kitzner, James

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-4/07: Coweeta Analytical Laboratory technician working with B. Kloeppel. Partial salary and benefits provided by Coweeta LTER.

Name: Fowler, Randy

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: USFS Technology Transfer specialist at Coweeta Hydrologic Laboratory working with J. Vose. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Gruhala, Jim

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with B. Clinton. Characterizing changes in the riparian zone structure and function resulting from the loss of eastern hemlock. No direct support for these activites from Coweeta LTER.

Name: Clinton, Patsy

Worked for more than 160 Hours: Yes

Contribution to Project:

11/05-10/06: Working with K. Elliott. Dendrochronology study to characterize stand dynamics and disturbance history along topographic or compositional gradients in the Coweeta Basin and two old-growth stands in Joyce Kilmer National Forest in order to determine stand similarities and differences, and the cause of the variation. No direct support for these activities from Coweeta LTER.

Name: Zausen, Greg

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Working with B. Kloeppel. Coweeta Analytical Laboratory technician. Full salary and benefits provided by Coweeta LTER. Full salary and benefits provided by Coweeta LTER.

Name: Sobek, Christine

Worked for more than 160 Hours: Yes

Contribution to Project:

11/06-10/07: Assist J. Knoepp with characterizing terrestrial C pools in vegetation types across the gradient in the Coweeta basin from examination of soil, forest floor and coarse woody debris. No direct support from Coweeta LTER. No direct support for these activities from Coweeta LTER.

Name: Niederlehner, B

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Parrish, Michael

Worked for more than 160 Hours: No

Contribution to Project:
11/05-8/06: Assist Mark Bradford in characterizing how disease agents that cause mortality of dominant canopy & sub-canopy tree species affect soil organic carbon (SOC) cycling & the related microorganisms through impacts on edaphic climate and detrital resource quality and quantity. Partial support for activities from Coweeta LTER.

Name: McCollum, Robert

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Chelcy Ford on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Muldoon, Neal

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Paul Bolstad on research into carbon and water cycles, human land use change, and the interaction of these at a range of scales in Southern Appalachia. Partial support for activities from Coweeta LTER.

Name: Sundin, Gary

Worked for more than 160 Hours: No

Contribution to Project:
11/07 to 10/06: Working with Gary Grossman on effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. No direct support for these activities from Coweeta LTER.

Name: Wieben, Ann

Worked for more than 160 Hours: Yes

Contribution to Project:
11/06 to 10/07: Working with Monica Turner on IT management. Partial support from Coweeta LTER.

Other Participant

Name: Fratterrigo, Jen

Worked for more than 160 Hours: No

Contribution to Project:
11/06-10/07: Post-Doctoral research working with M. Turner at University of Wisconsin Madison. Research on how current and past landscape patterns, abiotic conditions, and the native plant community influence the occurrence and abundance of invasive plants in forests of the Southern Blue Ridge province, and the factors that best explain the distribution of invasive plants as well as what locations are most vulnerable to invasion. Partial support for activities from Coweeta LTER.

Name: Bixby, Becky

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Collaborates with C. Pringle. Evaluate the response of stream chemistry and algal primary producers to hemlock death from infestations of hemlock woolly adelgids. No direct support from Coweeta LTER.

Name: Ashkenas, Linda

Worked for more than 160 Hours: No

Contribution to Project:
11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support from Coweeta LTER funds.

Name: Dahm, Cliff

Worked for more than 160 Hours: No

Contribution to Project:
11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and

wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Dodds, Walter

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Findlay, Stuart

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Gregory, Stan

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Johnson, Sherry

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/06: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: McDowell, Bill

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Peterson, Bruce

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Poole, Geoff

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. Partial support for activities from Coweeta LTER.

Name: Tank, Jennifer

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock

adelgid. Partial support for activities from Coweeta LTER.

Name: Grimm, Nancy

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Hall, Bob

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Hamilton, Steve

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: Mulholland, Pat

Worked for more than 160 Hours: No

Contribution to Project:

11/06-10/07: Working with J. Webster. Functional response of streams including organic matter dynamics, litter inputs, leaf and wood decomposition, and nitrogen and phosphorous dynamics based on disturbances such as logging, agriculture, and hemlock adelgid. No direct support for these activities from Coweeta LTER.

Name: White, Alan

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with K. Elliott. Dendrochronology study to characterize stand dynamics and disturbance history along topographic or compositional gradients in the Coweeta Basin and two old-growth stands in Joyce Kilmer National Forest in order to determine stand similarities and differences, and the cause of the variation. No direct support for these activities from Coweeta LTER.

Name: Hodder, Jan

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with B. Kloeppel, OBFS collaborator. No direct support for these activities from Coweeta LTER.

Name: McKee, Art

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Brian Kloeppel on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Shapiro, Sedra

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with B. Kloeppel, OBFS collaborator. No direct support for these activities from Coweeta LTER.

Name: Weider, Larry

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/06: Working with Brian Kloeppel on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Agarwal, Pankaj

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Coombs, Sheryl

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Working with G. Grossman. ended sediment of dominant water-column fish predatory efficiency and diversity. Partial support for activities from Coweeta LTER.

Name: Costa, Jim

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Working with B. Kloeppel. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Ellison, Aaron

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Scott Pearson on effects of natural gradients and landscape change on terrestrial biological diversity. No direct support for these activities from Coweeta LTER.

Name: Hubbard, Rob

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Working with B. Kloeppel. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Jaffe, Rudolf

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/06: Working with Brian Kloeppel on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Oleksyn, Jacek

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Working with B. Kloeppel. Improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Knox, James

Worked for more than 160 Hours: No

Contribution to Project:
11/05-10/06: Working with D. Leigh. Human impact to stream morphology, sedimentology, and water quality. Partial support for activities from Coweeta LTER.

Name: Walters, David

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with D. Leigh. Human impact to stream morphology, sedimentology, and water quality. Partial support for activities from Coweeta LTER.

Name: Madson, Stephanie

Worked for more than 160 Hours: No

Contribution to Project:

11/05-10/06: Working with B. Reynolds. Effects of various disturbance on abundance of soil microarthropod taxa common in forest soils and important in the decomposition process in southern Appalachia. No direct support for these activities from Coweeta LTER.

Name: McNab, Henry

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Monica Turner on the ffects of land-use history on the presence and abundance of invasive plant species in the forest understory. No support for activities from Coweeta LTER.

Name: Peet, Robert

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Monica Turner on the ffects of land-use history on the presence and abundance of invasive plant species in the forest understory. No support for activities from Coweeta LTER.

Name: Cunchinabe, Dominique

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. No support for these activities from the Coweeta LTER.

Name: Chen, Zehao

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Courbaud, Benoit

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Kaufman, Cari

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Loucks, Amber

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity

focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Pangle, Luke

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Rougier, Jonty

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Schultz, Howard

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Uriarte, Maria

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: White, Emily

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Jim Clark on data collection and modeling to understand the factors affecting forest biodiversity focusing on how variation in the environment, including changes in climate and disturbance, affect species composition. No support for activities from Coweeta LTER.

Name: Fierer, Noah

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Mark Bradford on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. Full support from Coweeta LTER funds.

Name: Lauber, Chris

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Mark Bradford on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. Full support from Coweeta LTER funds.

Name: Bowden, Joseph

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Chelcy Ford on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Hubbard, Robert

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/06: Working with Chelcy Ford on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Harbin, Lee

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/06: Working with Chelcy Ford on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Teskey, Robert

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/06: Working with Chelcy Ford on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Balent, Gerard

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. No support for these activities from the Coweeta LTER.

Name: Bortoli, Dolores

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. No support for these activities from the Coweeta LTER.

Name: Casteret, Patricia

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. No support for these activities from the Coweeta LTER.

Name: Cussey, Dominique

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: D'Amico, Frank

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Deconchat, Marc

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Gavaland, Andre

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Gibon, Annick

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Hautefeuille, Florent

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Ladet, Sylvie

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Monteil, Claude

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Palu, Pascal

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Sabrier, Roger

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Sourdril, Anne

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/07: Working with Ted Gragson on the comparative research on sustainability of transatlantic mountain landscapes. Partial support for these activities from the Coweeta LTER.

Name: Avise, John

Worked for more than 160 Hours: No

Contribution to Project:
11/06 to 10/06: Working with Gary Grossman on effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. No direct support for these activities from Coweeta LTER.

Name: Fiumera, Anthnoy

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Gary Grossman on effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. No direct support for these activities from Coweeta LTER.

Name: Jones, Beatrix

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Gary Grossman on effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. No direct support for these activities from Coweeta LTER.

Name: Porter, Brady

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Gary Grossman on effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. No direct support for these activities from Coweeta LTER.

Name: Walsh, Daniel

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Gary Grossman on effects of suspended sediment of dominant water-column fish predatory efficiency and diversity. No direct support for these activities from Coweeta LTER.

Name: Costa, James

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Brian Kloeppel on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Whipple, Amy

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/06: Working with Brian Kloeppel on improved scaling of carbon, water, and nutrient cycling in forest ecosystems in natural and altered systems as impacted by exotic and native insects and diseases. No direct support for these activities from Coweeta LTER.

Name: Motzkin, Glenn

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Scott Pearson on effects of natural gradients and landscape change on terrestrial biological diversity. No direct support for these activities from Coweeta LTER.

Name: Ardon, Marcel

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Cathy Pringle on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. No support for activities from Coweeta LTER.

Name: Eggert, Sue

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Cathy Pringle on the relationship between species diversity and leaf litter breakdown in terrestrial and aquatic settings to predict the effects of land-use change of this process. No support for activities from Coweeta LTER.

Name: Hoellein, Tim

Worked for more than 160 Hours: No

Contribution to Project:

11/06 to 10/07: Working with Cathy Pringle on the relationship between species diversity and leaf litter breakdown in terrestrial

and aquatic settings to predict the effects of land-use change of this process. No support for activities from Coweeta LTER.

Research Experience for Undergraduates

Name: McQuade, Sarah

Worked for more than 160 Hours: Yes

Contribution to Project:

5/06-8/06: Working with T. Gragson. REU focused on repeat photography. Partial support for activities from Coweeta LTER.

Years of schooling completed: Junior

Home Institution: Other than Research Site

Home Institution if Other: University of Georgia

Home Institution Highest Degree Granted(in fields supported by NSF): Doctoral Degree

Fiscal year(s) REU Participant supported: 2006

REU Funding: REU supplement

Name: Rosamilia, Nichole

Worked for more than 160 Hours: Yes

Contribution to Project:

5/06-8/06: Working with T. Gragson. REU focused on development of TRENDS socio-economic dataset. Partial support for activities from Coweeta LTER.

Years of schooling completed: Junior

Home Institution: Other than Research Site

Home Institution if Other: University of Georgia

Home Institution Highest Degree Granted(in fields supported by NSF): Doctoral Degree

Fiscal year(s) REU Participant supported: 2006

REU Funding: REU supplement

Organizational Partners

Virginia Polytechnic Institute and State University

Provides laboratory and office facilities for J. Webster and students associated with his Coweeta LTER research. Provides partial salary and benefits for J. Webster, although a significant portion of his total EFT is dedicated to Coweeta LTER research and support activities. Provides institutional accounting and management services on sub-contract award.

Duke University

Provides laboratory and office facilities for J. Clark and graduate students associated with his work at Coweeta. Provides partial salary and benefits to J. Clark, although a significant portion of his total EFT is dedicated to research or support activities on the Coweeta LTER. Provides institutional accounting and management services on sub-contract award.

UNIVERSITY OF MINNESOTA

Provides laboratory and office facilities for P. Bolstad and graduate students associated with his work on the Coweeta LTER. Provides partial salary and benefits for P. Bolstad, although a significant portion of his total EFT is dedicated to Coweeta LTER research and support activities. Provides institutional accounting and management services on sub-contract award.

Mars Hill College

Provides laboratory and office facilities for S. Pearson and undergraduate students in support of his Coweeta LTER research. Provides partial salary and benefits for S. Pearson, although a significant portion of his total EFT is dedicated to Coweeta LTER research or support activities. Provides institutional accounting and management services on sub-contract award.

University of North Carolina at Asheville

Provides laboratory and office facilities in support of K. Reynolds and undergraduate students in support of her Coweeta LTER research. Provides partial salary and benefits for K. Reynolds, although a significant portion of her total EFT is dedicated to Coweeta LTER research and support activities. Provides institutional accounting and management services on sub-contract award.

University of Wisconsin-Madison

Provides laboratory and office facilities for Monica Turner and her students on Coweeta LTER research.

USDA Forest Service

Long-term cooperative agreement with USDA Forest Service, Southern Research Station, Coweeta Hydrologic Laboratory. Cooperation involves shared facilities (analytical labotory, researcher dormitory, conference center); personnel exchanges (technical staff supported by Coweeta LTER providing analytical services to Forest Service activities). Direct funding to Coweeta LTER activities is provided through numerous and varied cooperative agreements; purchasing and procurement of analytical supplies; salaries and benefits for all collaborating USFS research scientists and varied facilities support staff; direct maintenance expenses on all facilities and infrastructure including roads and weirs.

University of Georgia

Provides office and laboratory facilities for all UGA-affiliated researchers, students and staff. Covers 100% of salary and benefits for administrative associate (Renee Baughens). Provides partial salaries and benefits for several UGA researchers, and tuition waivers for all UGA graduate students supported on Coweeta LTER project. Provides personnel exchanges so that Coweeta Site Manager (B. Kloeppel), analytical lab staff (J. Deal and C. Harper), and field technician (S. Steiner) employed by UGA are stationed at Coweeta Hydrologic Laboratory.

Universite de Pau

Provides laboratory and office space for all collaborating researchers and their students, and visiting Coweeta researchers. Provides in-kind support in the form of lodging, consumption, and transportation expenses for visiting researchers. Provides transportation costs from Europe to US for collaborating French researchers.

South Carolina Department of Natural Resources

Provides salary and benefits for M. Scott and the flexibility to collaborate on the project.

Other Collaborators or Contacts

OTHER COLLABORATORS or CONTACTS 11/01/2006 Through 10/31/07

Mark Bradford: in molecular research on microbial redundancy, collaborations were with Noah Fierer and Chris Lauber at University of Colorado.

Jim Clark: multiple collaborations in the context of modeling changes in climate variables, soil moisture, and streamflow to understand how disturbance and climate change affects biodiversity forests: Pankaj Agarwal, Duke Univeristy, computer science; Zehao Chen, China, forest ecology; Benoit Courbaud, CEMAGREF, forest ecology; Cari Kaufman, NCAR, statistics, climatology; Howard Schultz, Univ Massachusetts, computer science; Maria Uriarte, Columbia University; Jonty Rougier, Imperial College, statistics, climatology.

Chelcy Ford: research addressing the relationship between tree water uptake and its effect on carbon gain has involved collaborations with numerous individuals: Dr. Nina Wurzburger and Dr. Robert Teskey at University of Georgia; Dr. Robert Hubbard and Dr. Harbin Li at USDA Forest Service labs; Dr. William Bauerle at Clemson University.

Gary Grossman: collaboration with several individuals in estimating differential reproductive success from nests of related individuals, with application to a study of the mottled sculpin, Cottus bairdi: Beatrix Jones & Daniel C. I. Walsh, Massey University - Auckland, New Zealand; Brady A. Porter. Duquesne University; John C. Avise, University of California, Irvine; Anthony C. Fiumera, Cornell University.

Scott Pearson: research on the effects of natural gradients and landscape change on terrestrial biological diversity focusing on response of populations of exotic plant species and birds to these factors. Collaborators include: John A. Gerwin, NC Museum of Natural Sciences; Aaron Ellison, Harvard University; Glenn Motzkin, Harvard University.

Cathy Pringle: in addressing the relationship between species diversity and leaf litter breakdown, species loss is predicted to be nonrandom and therefore it is important to understand the manner in which those species that we anticipate losing interact with other species to affect ecosystem function. This research has involved collaborations with: Dr. John Kelly, Loyola University Chicago; Dr. Tim Hoellein, University of Notre; Dr. Marcelo Ardon, Duke University; Dr. Sue Eggert, University of Georgia.

Monica Turner: vegetation studies expanded to include non-native invasive plants that are shade tolerant and hence have the potential to impact this densely forested region. This work involves several collaborations: Dr. Dean Anderson, USFS, Rhinelander, WI; Dr. Jennifer Fraterrigo, Iowa State University; Dr. Robert Peet, University of North Carolina.

Ted Gragson: collaboration with Dolores de Bortoli and other researchers of the Site Atelier AnthroposystÞmes et HydrosystÞmes PyrÚnÚens Atlantiques of the Zone Atelier Adour Garonne based at the University of Pau, France. There has been a regular exchange of researchers between the two sites, participation in scheduled meetings both in Europe and the United states, and publication of one collaborative article. Objective is to promote and enhance understanding of long-term phenomena across regional, national and oceanic boundaries through social and ecological sciences approaches.

Jack Webster: collaboration on The Lotic Intersite Nitrogen eXperiment (NSF) study of nitrogen cycling in streams involving simulation modeling, field tracer (15N) additions, and intersite comparison. Collaborators are based at U of Tennessee, Oak Ridge National Laboratory, Arizona State U, Institute of Ecosystems Studies, Kansas State U, Marine Biological Laboratory, Michigan State U, U of Notre Dame, Oregon State U, U of Georgia, U of New Hampshire, U of New Mexico, U of Wyoming, and Eco-Metrics, Inc. They include: Pat Mulholland, Jennifer Tank, Robert Hall, Steve Hamilton, Bruce Peterson, Geoff Poole, Stuart Findlay, Water Dodds, Maury Valett, Nancy Grimm, Cliff Dahm, Stan Gregory, Sherri Johnson, and Bill McDowell.

Ted Gragson: Agrarian Landscapes in Transition (NSF) is an interdisciplinary project tracing the effects of the introduction, spread, and abandonment of agriculture at six U.S. LTER sites, with cross comparisons in Mexico and France. Principal contact is Charles Redman of Arizona State University. Additional collaborators include David Foster at Harvard University; Myron Gutmann at the University of Michigan; Craig Harris at Michigan State; Gerad Middendorf at Kansas State University; and Peter Kareiva at The Nature Conservancy. Full information on this research collaboration is available at http://ces.asu.edu/agtrans/.

Jim Vose: A collaboration with Dr. Larry Band, University of North Carolina-Chapel Hill and the Baltimore Ecosystem LTER, is directed at a cross-site comparison of streamflow and water quality. The research will use large scale models to examine contemporary and future impacts of land use change (i.e., development) on water resources. It will also examine scaling issues to determine how fine-scale disturbances (i.e., subwatershed level development or forest harvesting) integrate to influence large scale hydrologic responses.

Activities and Findings

Research and Education Activities:

RESEARCH AND EDUCATION ACTIVITIES - 11/01/06 THROUGH 10/31/07

Activities

Activities this year depended on funding from the Coweeta LTER award (DEB-0218001) as well as funding from NSF (other programs), National Park Service, NASA, EPA, DOE, US Forest Service, or US Fish and Wildlife Service, and Andrew W. Mellon Foundation. It also includes support from McIntire-Stennis formula funding to the U of Georgia Warnell School of Forest Resources. Activities this year include:

1.We continued longterm studies of in-stream organic matter processing in response to logging, agriculture, and urbanization at multiple scales in the landscape. Litter-breakdown rates were measured through standing stocks of benthic organic matter and litter input in 3 streams draining a clear-cut (WS7) and three streams draining a long-term reference site (WS14) at Coweeta. Students compared streams from north Georgia to central Virginia draining agricultural areas with forested streams, agricultural vs urban streams, rapidly urbanizing streams vs slowly urbanizing streams, old growth vs logged streams, and streams with different widths of riparian buffer left after watershed clear-cutting. Measurements were made of macroinvertebrate and fish, litter breakdown rates, standing stocks of BOM, whole-stream metabloism, detailed stream geomorphology, and detailed land cover using GIS and path analysis.

2.We continued to increase the time depth and specificity of our historical observations of human disturbance regimes in the southern Appalachian Mountains. We developed observations on a hierarchically nested set of watersheds, counties and the region back to the last 1800s in order to develop a predictive understanding of the causes and consequences of land use change. We focused particularly on the development of a site-specific model that may estimate human-caused disturbance probability and intensity. A related activity involves historical reconstruction and modeled resource demand footprints for colonial period Cherokee.

3.We focused on the processes of sediment generation and transport, particularly how they are affected by human disturbance regimes. This work entails the development of sediment and water quality measurement and modeling methods, measurement of water quality variables, and

historical prediction of water quantity and quality through the series of disturbance regimes observed at the hierarchical set of nested watersheds.

4.We developed information on the spatial distribution of Tsuga in southern Appalachia in anticipation of its near extirpation by an invasive exotic, the hemlock wooly adelgid. This is part of a larger project focused on processes of the regional water cycle that combines measurements of Tsuga transpiration through sap flux measurements, a network of hydrographic and climatological measurements, and regional species-dependent estimates of water use.

5.We characterized how establishing disease agents, that cause mortality of dominant canopy & sub-canopy tree species, affect soil organic carbon (SOC) cycling & the related microorganisms through impacts on edaphic climate and detrital resource quality and quantity.

6.We investigated the slow-cycle effects of foliar herbivores on soil decomposer population structure and functioning (data analysis completed and manuscript submitted this year). Samples were taken under three different canopy types (oak, rhododendron, other species) from the nine experimental plots, permitting a spatial assessment of the microbial and SOC variables being measured.

7.Analytical approaches to experimentally evaluate litter diversity were developed.

8.Coweeta soils were incorporated to a project looking for novel processes in the terrestrial nitrogen cycle and test fundamental understanding of how soil microorganisms cycle C (these projects have been funded by sources other than CWT but acknowledge CWT support).

9.Established a proof-of-concept study (named 'SCILS) to understand better processes involved in the sequestration of belowground plant-C inputs and to test the feasibility of stable-isotope labeling soil organic carbon.

10.Executed a study to look at plant-microbe nitrogen competition under hardwood canopies which have/have not been invaded by the grass Microstigium vimineum.

11.Research was carried out on how disturbance and climate change affects biodiversity forests, the propensity of species and communities to respond to environmental variation, in the context of their local biotic environment. This led to developing models for changes in climate variables, principally temperature, precipitation, soil moisture, and streamflow, that are using projected changes in those variables with models for forest response to understand impacts of climate change.

12.Buncombe County land-parcel database developed (100,000+ land records) used to prepare several manuscripts: a) effect of watershed protection regulations on vacant land prices; b) modeling participation in the State of North Carolina's value-in-use property tax deferment program for participating agricultural, horticultural, and timber land; and c) explain variation in the price of lands adjacent to conservation parcels as a function of easement or fee donation characteristics.

13.Research using sap flux methodology led to estimating whole-tree water transport, that we were able to scale from the sap flux probe to watershed evapotranspiration (ET) with a fair amount of confidence (e.g., sap flux scaled ET for two years was within 7% and 14% of watershed ET estimated from water balance P-Ro).

14.Using the sap flux methodology and scaling techniques on eastern hemlock, CWT researchers quantified the transpirational flux of this tree in the southern Appalachians. This species is at risk of potential extirpation throughout its range due to attack by the invasive, exotic insect hemlock woolly adelgid (HWA). Using transpiration estimates and statistical modeling techniques, the potential impact of the loss of this species on the hydrologic budget was calculated.

15.Research was carried out into the relationship between tree water uptake and its effect on carbon gain that involved 1) assessing water use and soil dissolved inorganic carbon (DIC) uptake, 2) assessing sap flux and resin flux in pine species, and 3) elucidating the relationship between forest soil CO2 efflux and transpiration.

16.We began research to discern the relationship between forest soil CO2 efflux and transpiration. By combining the ongoing measurements of forest transpiration in a species-rich system with measurements of soil CO2 efflux and modeling techniques, we will be able to elucidate patterns of soil autotrophic respiration.

17.Laboratory experiments were continued followed by analysis of previous results of a study examining the effects of suspended sediment on the foraging behavior of a native (Clinostomus funduloides) and invasive (Notropis lutipinnis) minnows found in Coweeta Creek and surrounding watersheds.

18.Data collection for river chub, a common fish in the Little Tennessee drainage, was completed; data collection on a congeneric species, the blue-headed chub that lives in Piedmont drainages, was begun.
19.Parentage analysis using molecular markers was used to estimate the reproductive success of different groups of individuals in natural populations. This will be used to understand how variation in reproductive success is related to demography is a critical component in understanding the life history of an organism.

20.A model was developed to compare reproductive success in natural fish populations using molecular markers. Inference for the parameters of the model was done in a Bayesian framework by sampling the joint posterior of parental assignments and fertility parameters. The model was then used to compare reproductive success among different age groups of mottled sculpin, Cottus bairdi, from a natural population and demonstrate that older adults are more likely to contribute to a nest and that females in older age groups contribute more eggs to a nest than younger individuals.

21.Research continued on the role of ecto- and ericoid mycorrhizae and soil/litter chemistry in regulating nutrient pools and acquisition in Rhododendron maximum-Hardwood forests. We examined how R. maximum litter polyphenols create a pool of organic N that is recalcitrant to ectomycorrhizal (ECM) overstory recruits, yet remains available to R. maximum itself. This feedback was explored in high elevation hardwood forests at the Coweeta hydrologic lab using a series of paired plots (R. maximum thicket and neighboring hardwood stand).

22.Research on sediment transport and storage in the fluvial system and its relation to aquatic ecosystems advanced understanding of long-term and short-term timescales in the region.

23.Research continued on the effects of natural gradients and landscape change to terrestrial biological diversity by focusing on the response of populations of exotic plant species and birds. Tasks included conducting simulation modeling on the effects of habitat fragmentation and demographic variation on persistence of native plant populations, coordinating a field study of invasive plant distributions in watersheds of the French Broad River Basin, and modeling the spatial distribution of native bird and plant species.

24.We conducted a 183 d study at the Coweeta Hydrologic Laboratory to assess the effect of leaf litter species diversity on the relative contributions of phytochemistry, detritivores (macroinvertebraes), and microbes (fungi and bacteria) to leaf litter breakdown in stream a ecosystems. As a means of examining the land-water interface as one ecosystem, comparable methods were used to detect patterns in leaf litter breakdown between terrestrial and aquatic ecosystems.

25.Collections for litter bag decomposition experiment on the Coweeta gap was completed, which were co-located with soil cores microarthropod samples. The last few collections are currently being sorted.

26.An experiment was conducted in Ball Creek to investigate the effects of leaf litter quality on microbial diversity of biofilms colonizing single- and mixed-species decomposing leaf litter. Leaf litter was incubated in Ball Creek for 50 days, after which time samples were collected for microbial respiration, leaf litter C:N, and bacterial and fungal diversity. Microbial diversity was determined using 16s DNA extraction, polymerase chain reaction (PCR) replication of DNA, and denatured gradient gel electrophoresis (DGGE) methods.

27.Research was begun to examine stream macroinvertebrate seasonal resource partitioning on labile vs. recalcitrant leaf litter. Macroinvertebrate communities in rhododendron versus red maple artificial litter packs are being examined û rhododendron is recalcitrant and available year round whereas red maple is labile and only present for a short period in autumn. Litter packs will be sampled monthly, with year-round coverage anticipated.

28.Activities focused on understanding the role of land-use history and contemporary landscape patterns on the presence and abundance of invasive plants in the forest understory through

29.Activities extended vegetation studies to non-native invasive plants that are shade tolerant and hence have the potential to impact this densely forested region. Field data revealed that Celastrus orbiculatus (oriental bittersweet, a woody vine native to east Asia) and Microstegium vimineum (Japanese stiltgrass, a shade-adapted C-4 grass) were the invasives that most often encountered.

30.Analysis of the regional distribution of Microstegium using data from the Carolina Vegetation Survey was completed to prepare a manuscript.

31.A field study was conducted at Bent Creek Experimental Forest on the effect of land-use history on invasive species presence and abundance. Data revealed a very strong positive association between land-use history and invasive species occurrence, along with intriguing differences in both overstory composition and the evergreen understory.

32.Twenty-five watersheds in the French Broad River basin were sampled to determine whether recent exurban development is facilitating the spread of non-native invasive plants.

Institutional Affiliations & Collaborators
Coweeta LTER research by senior personnel and graduate students was carried out in part or in whole through diverse collaborations. Their primary affiliation is with one of the following institutions and organizations:

1.Arizona State University
2.Bent Creek Experimental Forest
3.Blue Ridge Parkway National Park
4.Buncombe County, NC
5.CEMAGREF (France)
6.Cherokee Indian Reservation
7.Clemson University
8.Columbia University
9.Cornell University
10.DYNAFOR- INRA (France)
11.Duquesne University
12.Eco-Metrics, Inc., Tucker, Georgia
13.Ecosystems Center at Woods Hole
14.Florida International University
15.George Washington/Thomas Jefferson National Forest
16.Georgia DNR
17.Georgia Military College
18.Harvard Forest
19.Harvard University
20.Highlands Biological Station
21.Imperial College
22.Institute of Dendrology - Kornik Poland
23.Iowa State University
24.Kansas State University
25.Little Tennessee Watershed Association
26.Loyola University, Chicago
27.Macon Middle School
28.Massey University - Auckland, New Zealand
29.Michigan State University
30.Nantahala National Forest
31.NC Geological Survey
32.NC Museum of Natural Sciences
33.NCAR
34.North Carolina Department of Natural Resources
35.Oak Ridge National Laboratory
36.Oregon State University
37.Organization of Biological Field Stations
38.Pisga National Forest
39.Shenandoah National Park
40.Smokey Mountain National Park
41.Society of Sigma Xi
42.Southwestern Community College
43.UniversitÚ de Pau et d'Adour (France)
44.UniversitÚ de Toulouse le Mirail (France)
45.University of California û Irvine
46.University of Massachusetts
47.University of New Hampshire
48.University of New Mexico
49.University of North Carolina û Chapel Hill
50.University of Notre Dame

51.University of Wyoming
52.USDA Forest Service labs
53.USFS - Rhinelander, WI
54.USFS Fisheries Unit
55.Virginia Academy of Science
56.Virginia Department of Game and Inland Fisheries
57.Virginia Department of Agriculture
58.Virginia Department of Environmental Quality
59.Western Carolina University

Presentations
Coweeta LTER senior personnel and their students delivered the following oral presentations from their research:

1.Ball, Becky, Mark A. Bradford, Dave C. Coleman, Mark D. Hunter, John S. Kominoski, Cathy Pringle. Effects of leaf litter species richness and composition on nutrient turnover and decomposer biota. Ecological Society of America Annual Meeting, San Jose, California, August 5-10, 2007.

2.Beaulieu, J.J., W.K. Dodds, N.B. Grimm, R.O. Hall, S.K. Hamilton, W.H. McDowell, P.J. Mulholland, B.J. Peterson, J.L. Tank, H.M. Valett, J.R. Webster, C. Arango, M.J. Bernot, A.J. Burgin, C. Crenshaw, B. Niederlehner, J.M. O'Brien, J.D. Potter, R.W. Sheibley, D.J. Sobota, and S.M. Thomas. Nitrous oxide production via denitrification in 71 headwater streams measured with stable isotope additions. North American Benthological Society meeting. Columbia, South Carolina, June 2007.

3.Cladis, S., Kloeppel, B.D., Ford, C.R., Costa, J.T., & Klepzig, K.D., Interactions of resin flow, sap flow, and climatic variables in two pine species. Contributed poster presentation at the 2007 North American Forest Biology Workshop in Bloomington, IN

4.Eggert, S.L., J.B. Wallace, J.L. Meyer, and J.R. Webster. Functional diversity of detrital inputs alters particulate organic matter dynamics in a forested headwater stream. North American Benthological Society meeting. Columbia, South Carolina, June 2007.

5.Findlay, S., P.J. Mulholland, R.O. Hall, S.K. Hamilton, B.J. Peterson, J.L. Tank, C.N. Dahm, W.K. Dodds, N.B. Grimm, W.H. McDowell, H.M. Valett, J.R. Webster, C. Crenshaw, J. Potter, M.J. Bernot, and D.J. Sobota. Stream Denitrification Potential- Where and How Much? North American Benthological Society meeting. Columbia, South Carolina, June 2007.

6.Gragson, Ted L. Southern Landscapes in Memory & Action. School of Human Evolution & Social Change, Arizona State University. January 26, 2007.

7.Gragson, Ted L. Coweeta LTER. Luquillo LTER Annual PI Meeting. San Juan, Puerto Rico. January 13, 2007.

8.Gragson, Ted L. L'impact de la conquÛte sur les paysages agraires au travers de l'exemple des Appalaches. Maison de la Recherche, UniversitÚ de Toulouse le Mirail (France). March 2, 2007.

9.Gragson, Ted L. Autour des ÚcosystÞmes : approche pluridisciplinaire Ó travers l'exemple des Etats-Unis. Maison de la Recherche, UniversitÚ de Toulouse le Mirail (France). March 9, 2007.

10.Helton, A.M., G.C. Poole, J.L. Meyer, Mulholland, P.J., L.R. Ashkenas, L.W. Cooper, C.N. Dahm, W.K. Dodds, S. Findlay, S.V. Gregory, N.B. Grimm, R.O. Hall, S.K. Hamilton, S.L. Johnson, W.H. McDowell, B.J. Peterson, J.L. Tank, H.M. Valett, J.R. Webster, C. Arango, M.J. Bernot, J.J. Beaulieu, C. Crenshaw, J. Merriam, B. Niederlehner, J.M. O'Brien, J.D. Potter, R.W. Sheibley, D.J. Sobota, S.M. Thomas, L.H. Zeglin. Implication of the LINX-II 15N addition experiments for patterns of biotic nitrogen uptake across stream networks. North American Benthological Society meeting. Columbia, South Carolina, June 2007.

11.Jeremiah, N.G and E.F. Benfield. 2007. Life history and secondary production of Goniobasis proxima in four headwater streams in western NC. North American Benthological Society Annual Meeting. Columbia, SC, June 3-7, 2007.

12.Kloeppel, B.D., Hubbard, R.M., Ford, C.R., Vose, J.M., Zausen, G., Soil carbon dioxide efflux in forested ecosystems: the comparison of watershed conversion from deciduous to evergreen leaf habit. Contributed oral presentation at the 2007 Ecological Society of America Annual Meeting in San Jose, CA.

13.Li, Harbin & Ford, C.R., Uncertainty in scaling up transpiration estimates from tree to watershed. Poster presented at the 2007 Ecological

Society of America Annual Meeting in San Jose, CA.

14.McManamay, R.A., and J.R. Webster. The bottom-up effect of nutrient availability on fish and macroinvertebrate stoichiometry and nutrient excretion. North American Benthological Society meeting. Columbia, South Carolina, June 2007.

15.Michael S. Strickland, Ernest D. Osburn, Mark A. Bradford, Noah Fierer. Soil microbes and biogeography: Are communities from differing environments functionally equivalent? Ecological Society of America Annual Meeting, San Jose, California, August 5-10, 2007.

16.Mulholland, P. R. Hall, S. Hamilton, B. Peterson, J. Tank, L. Ashkenas, L. Cooper, C. Dahm, W. Dodds, S. Findlay, S. Gregory, N. Grimm, S. Johnson, B. McDowell, J. Meyer, G. Poole, M. Valett, J. Webster, J. Baeulieu, M. Bernot, A. Burgin, C. Crenshaw, A. Helton, L. Johnson, J. Merriam, B. Niederlehner, J. O'Brien, J. Potter, R. Sheibley, D. Sobota, S. Thomas, and S. Thomas. Lotic Intersite Nitrogen eXperiment II. Rates and mechanisms of nitrate retention in streams: from streams reaches to landscapes. Presented at the NSF-sponsored Research Coordination Network Denitrification Modeling Workshop, Millbrook, New York, Nov 28-30, 2006.

17.Mulholland, P.J., L.R. Ashkenas, L.W. Cooper, C.N. Dahm, W.K. Dodds, S. Findlay, S.V. Gregory, N.B. Grimm, R.O. Hall, S.K. Hamilton, S.L. Johnson, W.H. McDowell, J.L. Meyer, B.J. Peterson, G.C. Poole, J.L. Tank, H.M. Valett, J.R. Webster, C. Arango, M.J. Bernot, J.J. Beaulieu, A.J. Burgin, C. Crenshaw, A.M. Helton, L. Johnson, J. Merriam, B. Niederlehner, J.M. O'Brien, J.D. Potter, R.W. Sheibley, D.J. Sobota, and S.M. Thomas. Nitrate uptake and denitrification rates in streams determined during the LINX II 15N addition experiments. North American Benthological Society meeting. Columbia, South Carolina, June 2007.

18.Mulholland, P.J., R.O. Hall, S.K. Hamilton, B.J. Peterson, J.L. Tank, L.R. Ashkenas, L.W. Cooper, C.N. Dahm, W.K. Dodds, S. Findlay, S.V. Gregory, N.B. Grimm, S.L. Johnson, W.H. McDowell, J.L. Meyer, G.C. Poole, H.M. Valett, J.R. Webster, C. Arango, M.J. Bernot, J.J. Beaulieu, A.J. Burgin, C. Crenshaw, A.M. Helton, L. Johnson, B. Niederlehner, J.M. O'Brien, J.D. Potter, R.W. Sheibley, D.J. Sobota, and S.M. Thomas. Stream denitrification rates determined from field 15N addition experiments: Results from the LINX II study. XXX Congress International Association of Theoretical and Applied Limnology, Montreal, Canada, August 2007.

19.Pearson, S. M. and J. A. Gerwin. Predicting avian habitat suitability at landscape scales: finding the Appalachian Yellow-bellied Sapsucker. University of Maine, Dept. of Ecology and Environmental Biology Symposium, February 2007.

20.Pearson, S. M. Land use history and patterns of biodiversity in Southern Appalachian forests. University of Vermont, Natural Resources Symposium, November 2006.

21.Sokol, E. R. and E. F. Benfield. 2007. A trait based approach to evaluate how nested environmental filters affect the assembly of benthic macroinvertebrate communities in headwater streams. North American Benthological Society Annual Meeting. Columbia, SC, June 3-7, 2007.

22.Sokol, E. R. and E. F. Benfield. 2007. Using traits to predict benthic macroinvertebrate community assembly processes at multiple scales. 92nd Annual meeting of the Ecological Society of America, San Jose, Ca, Aug 5-10, 2007

23.Thomas, S.A., H.M Valett, M.J. Bernot, P.J. Mulholland, J.R. Webster, R.O. Hall, S.K. Hamilton, B.J. Peterson, J.L. Tank, L.R. Ashkenas, C.N. Dahm, W.K. Dodds, S. Findlay, S.V. Gregory, N.B. Grimm, S.L. Johnson, W.H. McDowell, J.L. Meyer, G.C. Poole, C. Arango, J.J. Beaulieu, A.J. Burgin, C. Crenshaw, A.M. Helton, L. Johnson, B. Niederlehner, J.M. O'Brien, J.D. Potter, R.W. Sheibley, D.J. Sobota, and S.M. Thomas. Whole stream nitrification rates determined using a coupled isotope tracer and mass balance approach: Results from the LINX II study. XXX Congress International Association of Theoretical and Applied Limnology, Montreal, Canada, August 2007.

24.Vose, J.M. & Ford, C.R. Eastern Hemlock water use: Implications for systemic insecticide application. Organized oral presentation at the 233rd American Chemical Society National Meeting in Chicago, IL, March 25-29, 2007.

25.Webster, J.R. Spiraling down the river continuum: Stream ecology and the U-shaped curve. Deans' Forum on the Environment. Virginia Tech, Blacksburg. 26 February 2007.

26.Wurzburger, Nina and Ronal L. Hendrick. 2007. Exploring a plant-soil-mycorrhiza feedback with Rhododendron maximum in a temperate hardwood forest. ESA/SER Joint Meeting, August 6, 2007.

Educational & Other Outreach
Coweeta Schoolyard LTER activities involved five instructors and approximately 60 students with instructional presentations at Macon County Middle School in Franklin, NC Southwestern Community College in Sylva, NC, the Coweeta Hydrologic Laboratory, and surrounding southern Appalachian study sites such as the Joyce Kilmer Old Growth Memorial Forest near Robbinsville, NC. Conducting projects across multiple

grade levels and settings allows us to assess the potential success of our project with respect to teachers, students, and facilities. Projects undertaken included: for Grade School: riparian zone vegetation study, gradient leaf litter collection and sorting, weather overview, water quality, carbon flux & GPS, stream macroinvertebrate survey, and fish inventory; and for College: forest carbon cycling. Materials including a list of participants, summaries of project experiences, online data sets, photographs of some of the field days, and evaluations from teachers and students are available at http://coweeta.ecology.uga.edu/education/schoolyardlter.htm.

Findings: (See PDF version submitted by PI at the end of the report)

NARRATIVE FINDINGS - 11/01/06 THROUGH 10/31/07
(Selected research highlights with citations)

Using the sap flux methodology and scaling techniques on eastern hemlock, CWT researchers have quantified the transpirational flux of this tree in the southern Appalachians. Results showed that the impact can be substantialùa reduction in annual forest ET by 10% and a reduction in spring and winter forest ET by 30%. In addition, our research shows that the amount of water transported in these trees is exponentially related to diameter, and this may impact chemical, systemic insecticide treatments that are applied to these trees to control HWA infestation (Ford et al., 2007c). For example, treatment protocol requires applying a certain mass of insecticide per unit tree diameter. Given the exponential relationship between water use and diameter, treatment protocols result in differing concentrations of insecticide in the xylem sap.

Soil DIC uptake research, which was a greenhouse experiment on loblolly pine seedlings, showed that although the majority of carbon flux in roots is outwards towards the soil (e.g., respiration), roots also take up dissolved inorganic carbon (DIC) from soil water and transport this DIC in the transpiration stream. While this specific process has been demonstrated by in the past, our work focused on the potential importance of this process on tree C gain with results showing that tree and mycorrhizal tissues can 1) fix DIC through light and dark reactions, 2) incorporate DIC into biomass, and 3) fix varying amounts of DIC depending on nitrogen availability and tissue growth rates (Ford et al., 2007b). Our results highlighted that although soil DIC is likely to contribute only a small amount of C to forest trees, it may be important in C fixation processes of specific tissues, such as newly formed stems and fine roots, and ectomycorrhizal roots assimilating NH4.

The properties of how the historic Cherokee occupied the land are central to understanding why they underwent the cultural changes they did during the colonial and early American periods, and set the stage for the transformation of Southern Appalachia over the ensuing 200 years. Without a clear understanding of the regional social landscape of the eighteenth-century Cherokee, many historical claims about them are little better than conjectures. In two recent articles we present results from our original analysis of Cherokee town placement and population c. 1721 that address the issues of settlement intensity and resource demand. The data is significant because it represents the first point after the earliest contact between the Cherokee and the British for which there is substantial eyewitness evidence, but it also precedes the major social, economic, and political changes the Cherokee underwent during the late colonial and early American periods. In the first article (Gragson and Bolstad 2007) we dissect first-relative to second-order processes of settlement events to measure settlement intensity a regional context. In the second article (Bolstad and Gragson 2007) we analyze resource demand for five key resources: architectural land, agricultural land, firewood, hard mast, and white-tailed deer (Odocoileus virginianus). The conclusion is that Cherokee demands for architectural and agricultural land, hard mast, and fuelwood were easily met within a short proximity to each town under all combinations of production and demand. These resources were likely not limiting, and were satisfied for the entire Cherokee population by less than 1% of the entire recognized Cherokee territory in 1721. Deer resources, however, were likely harvested over a much larger area and to a much greater extent than the other resources. Our best estimate is that 32% of annual sustainable production of deer in the Cherokee territory was taken in 1721, and this harvest level ranged from 16 to 48% of estimated sustainable production. We offer several estimates that vary in response to uncertainties in deer production, harvest proportion, deer density, and sustainable harvest rates but under all combinations the demand exceeded the supply of deer within the convex hull of Cherokee villages indicating that significant travel was needed to furnish deer requirements. Spatially explicit models that consider terrain- and distance-related tradeoffs suggest that Cherokee demand for deer drove harvest over areas consisting of over half the 325,000 km2 recognized Cherokee territory.

Herbivory in the previous growing season affects leaf quality in the subsequent growing season, which manifests as slower decomposition rates, decreased soil faunal abundance and altered soil faunal nitrogen acquisition patterns. These results demonstrate that aboveground-belowground interactions in one growing season may be dependent on phenomena in previous growing seasons.

The process of anaerobic ammonium oxidation is not solely an aquatic process, but is also active in soils. As such it presents a second pathway in the terrestrial nitrogen cycle by which nitrogen may be lost from ecosystems as N2 gas. This pathway does not produce the greenhouse gas N2O and can close the nitrogen cycle in the absence of oxygen. Second, the general assumption in biogeochemical models that the microbial biomass performs as a single, homogenous unit across space is not consistent with our experimental observations. Our results suggest that, despite the incredibly high species diversity in soils, that microbial communities are functionally distinct across space and are adapted to local resource conditions.

Long-term monitoring results was combined with experiments across gradient to understand responses of all life history stages. Demography data (tens of thousands of tree-years for dozens of species) come from experiments that include canopy gaps and pathogens. Observations include remote sensing, wireless sensing, and molecular tools. Hierarchical Bayes (HB) models were developed for fecundity, dispersal, seed banks, germination, growth, survival, and sprouting to assimilate the data. With HB, correlated observations can be integrated, because unknown relationships are modeled stochastically at the process stage. Reasons for this are technical and detailed in Clark (2005, 2007a). Fitting is synthetic and allows for consistent predictions of allocation tradeoffs that interact with environmental change (Clark 2005, Clark and Gelfand 2006a, Clark et al. 2007b).

The Scalable Landscape Inference and Prediction (SLIP) simulator (Govindarajan et al. 2007) is individual-based, continuous space, discrete time (annual, event-based), and continuous or discrete states (individual attributes, environmental variables). At each time step spatial variables (light, temperature, soil moisture) are evaluated. Transitions are assessed (germination, survival, maturation), allocation to growth and fecundity are calculated, and seeds are dispersed. SLIP builds from Foret (Shugart 1984) and the pioneering Sortie (Pacala et al. 1996). Data structures and algorithms speed large landscape simulation (quad trees for dispersal, parallel calculations in hardware). It is developed for default parameter values as priors to be updated as information accumulates. Inference and prediction are seamless, based on the same inferential model. Data are available from Coweeta LTER and FACE web sites.

The State of North Carolina's watershed protection regulations restrict development density within watersheds designated as existing or potential water supply sources. By examining land prices in Buncombe County's Ivy River watershed, we found that regulations impose significant costs on land owners in the watershed for whom the option to subdivide land is impeded. This cost is not shared by those residents who benefit from the protective measures but whom reside outside the watershed. We estimate the total costs borne by landowners in the watershed, and translate this into a per capita tax levied on all households in the surrounding County. In a paper under review, awareness is raised about the direct costs of water supply protection measures that restrict developmental density. That is, protective measures are not costless from a land market perspective. However, unlike with eminent domain, landowners are not entitled to just compensation from regulatory measures unless they are denied a reasonable return on their land. The paper encourages discussion about a more equitable allocation of costs due to compliance with water supply protection measures.

Recent analyses of long-term findings have produced the counter-intuitive result that fish biodiversity in Coweeta Creek is inversely correlated with flow and allowed us to provide the first mechanistic quantification of processes producing longitudinal diversity gradients in stream fishes (in prep). In addition, tests of an optimal foraging-based habitat selection model for stream fish was published (Rincon et al. 2007, Skyfield & Grossman 2007). On the population-level we have published one of the most thorough analyses of population regulation for a vertebrate species (Grossman et al 2006).

A manuscript examined the microhabitat use by gilt darters (Percina evides) in two streams in the Coweeta region (Skyfield & Grossman 2007). Darters were over-represented in erosional microhabitats with higher average velocities and more cobble. Male darters tended to show stronger selection than females. Size-based analyses showed that larger (≥60 mm) gilt darters tended to use microhabitats with more heterogeneous substrata and more boulder than smaller (≤59 mm) darters. We also conducted a short-term movement study and calculated population estimates based on mark-recapture data in Autumn 2005. Darters moved both long and short distances with 40% of all recaptures occurring within 5 meters of the initial capture point. Using Program MARK and model averaged parameter estimates gilt darter density was 0.31 darters/m2 (225 darters/730 m2). Conservation of this species will require the preservation of riffle and run habitats in streams.

In a study published on the effects of turbidity on foraging success of rosyside dace we demonstrate that foraging success is significantly reduced by turbidities commonly observed in the Little Tennessee drainage (Zamor & Grossman 2007). The amount of time that foraging success is reduced varies greatly between stream classes but we predict few population-level effects in unimpacted streams in the region. Additional work on this topic is ongoing and includes the work described above and a dissertation examining the effects of turbidity on foraging success of river chub (Nocomis micropogon), bluehead chub (Nocomis leptocephalus) and warpaint shiner (Luxilus coccogenis) in which the laboratory studies are almost completed.

Rhododendron maximum L. is a spreading understory shrub that inhibits overstory regeneration and alters forest community structure in southern Appalachian hardwood forests. Using paired plots and reciprocal litter transplants in forests with and without R. maximum cover, we examined the influence of R. maximum on litter mass and quality, N cycling and soil extracellular enzymes (Wurzburger and Hendrick 2007). Standing stocks of soil organic matter, soil N, leaf litter mass and fine root biomass were greater in forests with R. maximum than those without. Tannin extracts from R. maximum foliage, and leaf litter and fine roots collected under R. maximum had a relatively high capacity to precipitate protein compared to extracts from trees. Across the growing season, soil inorganic N availability was generally lower under R. maximum, mostly due to reduced NO3_ availability. Our data suggest that R. maximum litter alters N cycling through the formation of recalcitrant polyphenolûorganic N complexes. Soil extracellular enzymes indicate the potential processing rates of organic substrates. Between forest types, polyphenol oxidase activity was greatest in R. maximum O horizons, regardless of litter type, suggesting that the local microbial

community can better degrade and access proteinûtannin-complexed N. Protease activity did not differ between forest types, but was greater on R. maximum leaf litter than hardwood leaf litter. The alteration of the N cycle via the formation of polyphenolûorganic N complexes may contribute to hardwood seedling suppression, while the enzymatic release of these complexes by ericoid mycorrhizal fungi may increase N acquisition

My research on carbon, water, and nutrient cycling has resulted in more refined techniques to measure the resulting pools and fluxes of elemental and biomass cycling (Kloeppel et al. 2007). In particular, the estimation of species-specific density and biomass and the scaling of water flux from the tree to the watershed scale in diverse southern Appalachian forests has been greatly improved by past and current research. These findings allow ecologists to measure the changes in forest composition and water flux due to exotic and native insects and diseases on our forest ecosystems. In particular, my improved techniques allow the forest changes to be quantified due to the hemlock woolly adelgid that is rapidly altering our riparian forests and the potential impact of sudden oak death on our widespread oak and rhododendron forests that will have a permanent and dramatic change on the functioning of these ecosystems.

A study of five sites was carried out that represent a range in N pool sizes, cycling patterns and process rates, from N limited sites with low soil N transformation rates and N leaching to sites with high soil N transformation rates and N leaching (Knoepp et al. 2007). Multivariate analyses suggest that abiotic variables account for up to 63% of the variation in site biotic characteristics; biotic site variables regulate N availability while abiotic variables regulate canopy N cycling processes.

In a recent paper (Kominoski et al. 2007) we tested whether litter species diversity, measured as richness and composition, affects break-down dynamics in a detritus-based stream. Using full-factorial analyses of single- and mixed-species leaf packs (15 possible combinations of four dominant litter species; red maple [Acer rubrum], tulip poplar [Liriodendron tulipifera], chestnut oak [Quercus prinus], and rhododendron [Rhododendron maximum]), we tested for single-species presence/absence (additive) or species interaction (nonadditive) effects on leaf pack breakdown rates, changes in litter chemistry, and microbial and macroinvertebrate biomass. Overall, we found significant nonadditive effects of litter species diversity on leaf pack breakdown rates, which were explained both by richness and composition. Leaf packs containing higher litter species richness had faster breakdown rates, and antagonistic effects of litter species composition were observed when any two or three of the four litter species were mixed. Less-consistent results were obtained with respect to changes in litter chemistry and microbial and macroinvertebrate biomass. Our results suggest that loss of litter species diversity will decrease species interactions involved in regulating ecosystem function. To that end, loss of species such as eastern hemlock (Tsuga canadensis) accompanied by predicted changes in riparian tree species composition in the southeastern United States could have nonadditive effects on litter breakdown at the landscape scale.

We examined the affects of hemlock woolly adelgid infestation of eastern hemlock (Tsuga canadensis) trees on the timing, quality, and quantity of hemlock needle inputs to Ball Creek. We found that the timing of hemlock needle inputs coincided with the life cycle of the invasive woolly adelgid and that the C:N of hemlock needles from infested T. canadensis was lower than high quality deciduous leaf litter, such as L. tulipifera and A. rubrum. (Kominoski, Pringle and Ball in press).

Training and Development:

TTRAINING & DEVELOPMENT - 11/01/06 THROUGH 10/31/07

Senior Coweeta LTER personnel in the context of Coweeta LTER research and allied projects worked directly with: 2 High School Students, 30 Undergraduate Students, 33 Graduate Students, and 3 Post-Doctoral Researchers.

Modeling work has resulted in workshops on hierarchical modeling attended by 50 upper level graduate students and postdocs.

Research findings from this project have been used in a graduate seminar Vertebrate Biodiversity and Conservation; Biodiversity Science and Application; Models for Environmental Data; General Geomorphology; Fluvial Geomorphology; Geomorphology Seminar; Historical Ecology Seminar; Ecosystem Ecology

Invited graduate seminars have been offered at UC Davis, Utah State University, UGA River Basin Center, Tailwater Chapter of Trout Unlimited, Cohutta Chapter of Trout Unlimited, Rabun Chapter of Trout Unlimited and the Annual Conclave of the SE Chapter of Federation of Fly Fishers.

A book chapter entitled 'Methods in Stream Ecology' (Benfield, E.F. 2006. Leaf breakdown in stream ecosystems. 2nd Edition.. In: F.R. Hauer and G.A. Lamberti (eds).Methods in stream ecology. Academic Press, San Diego, CA.) includes exercises suitable for high school, undergraduates, or graduate students.

Approximately 100 students from middle school to community college level were reached through various Coweeta LTER Schoolyard

activities.

Research activities have been the basis for collaborations with sabbatical fellows from France and China.

Some 26 outreach presentations were offered between September 2006 to August 2007 to K-16 students that instill an appreciation for the effort involved, the value, and the knowledge gained by conducting long term ecological research.

Student researchers on this project in the last year have had the opportunities to give presentations on their research at the ESA National Meeting, at regional and national meetings of Undergraduate Research (NCUR); Sigma Xi;

S. Pearson serves as the Program Coordinator of the Regional Studies Program at Mars Hill College, which is an interdisciplinary endeavor that includes studies in the humanities, social sciences, and natural sciences.

Seven PhDs and three MSc degrees were awarded during this award year to students directly involved in Coweeta LTER research, and graduate and undergraduate students presented at nine professional venues.

Coweeta LTER and the University of Georgia hosted a SEEDS trips November 2-5, 2006. Attendees included seventeen students from twelve schools across the country and Puerto Rico; two SEEDS faculty advisors; and two staff persons from the Ecological Society of America. Students' evaluations confirmed it was a positive experience for the participants. Asked which aspects of the field trip increased their interest and/or understanding of ecology, students rated 'seeing what ecologists do' as most important. Students were also asked to rate their understanding of various aspects of ecology before and after the field trip to see where they developed the most as a result of the field trip. As a result of their participation, students' 'awareness of the diverse students and professionals interested in ecology' increased the most.

Outreach Activities:

OUTREACH ACTIVITIES - 11/01/06 THROUGH 10/31/07

The public's understanding of science and technology has been enhanced by results of the research being conveyed to nonprofit watershed conservation organizations, such as the Little Tennessee Watershed organization.

Our K-16 program and public lectures help educate the public about Southern Appalachia land-use change planning issues: flooding, landslides, steep slope development, flood plain planning and regulation. It also serves as a valuable recruitment tool to create interest in the sciences among school aged children.

Coweeta LTER researchers have given lectures on their Coweeta research to local civic organizations, led educational hikes for public programs, and, interacted with K-5 teachers on incorporating environmental science into their classroom activities.

Through the end of 2006 (results tallied by calendar year), Coweeta LTER senior personnel participated or led a total of 69 groups and 1,315 individuals on tours of the Coweeta Basin. This represents 696 contact hours with groups ranging from 1st û 5th grade through visiting scientists. (Further details available at: http://coweeta.ecology.uga.edu/ecology/education/tours.html)

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Web/Internet Site

URL(s):

http://coweeta.ecology.uga.edu

Description:

The Coweeta LTER program subscribes to the philosophy that the future of scientific research is tied to the free and efficient exchange of research and ideas in the scientific community. We have accordingly invested heavily in supporting emerging worldwide standards for research and GIS data and metadata, and the Coweeta LTER website was completely overhauled during Year 1 to reflect this approach. All information holdings were inventoried to determine that relevant parts (i.e., data, metadata, GPS, coverages, etc.) were complete; the missing information was either collected or key-coded. EML-compliant metadata was then developed for our tabular data legacy to provide machine-readable information for data harvesters. We simultaneously developed Coweeta Data Set Summaries to provide human-friendly metadata. The Coweeta Data Summaries incorporate the information contained in the EML-compliant metadata, but also provide access to geographic coordinates as well as data.

The single most important accomplishment of the overhaul of the Coweeta LTER website was the move to Open Source Software to develop a relational database management system. This provides complete access to the entire Coweeta data legacy in a recursive fashion from anywhere in our website. The architecture is based on MySQL and PHP. MySQL is a powerful, flexible and efficient database management system, while PHP is a CGI program with a built-in scripting language that dynamically accesses MySQL and outputs to an HTML browser. In contrast to a Google search that is static and only as good as the meta-tagging on individual web-pages, the Coweeta GLOBAL Data Search gives access to all holdings of any kind anywhere in the archives from anywhere on the site. First access to this search engine is available in the ?Data & Research? section of the Coweeta LTER homepage.

Other Specific Products

Product Type:

Data or databases

Product Description:

The foremost reason for developing the Coweeta MySQL-PHP relational data management system was to give us complete control over our data legacy. The tabular data legacy now consists of nearly 200 data sets fully described and accessible according to the NSF LTER Type I and Type II criteria as implemented at Coweeta. Following are the most significant online resources available from the "Data & Research" section of the Coweeta LTER homepage:

>>Publications - 1219 citations dating from 1928, 1104 PDF publications available online.

>>Thesis/Dissertations - 225 theses and dissertations online, dating from 1937.

>>Researcher's Biographical Sketches - formatted biographies of all 27 PIs.

>>Sample Archives - 93 collections featuring 17,000+ archived samples.

>>Species Lists I, GMNH Mammal/Amphibian Collection - 20,000+ vouchered specimens for southern Appalachia from 1905 onward held at the Georgia Museum of Natural History.

>>Species Lists II - Observed and collected species at Coweeta Hydrologic Laboratory.

>>Digital Elevation Model (DEM) Catalog - raster contour maps for the southern Appalachian study region.

>>Digital Raster Graphic (DRG) Catalog - DRGs for the southern Appalachian study region.

>>Digital Orthophoto Quadrangle (DOQ) Catalog - DOQs for the greater Coweeta area.

>>Demographics - US Census block-level data for the southern Appalachian study region.

>>Monthly Climate Data (NOAA/NCDC) - Geo- and temporally-referenced records for 123 stations in the southern Appalachian study region. (Daily climate data will soon also be available.)

Sharing Information:

The relational data structure allows us to assemble, manage and dynamically deliver via the Coweeta website many types of information including species lists, biographical sketches, and a comprehensive bibliography of publications, theses, and dissertations that we are in the process of converting to downloadable PDFs.

Product Type:

Audio or video products

Product Description:

This video cassette program focuses on one important stage in the flow pattern of a river or stream: the bankfull stage. This video demonstrates how to consistently identify bankfull stage for a variety of stream types located in five physiographic provinces of the eastern United States. The program focuses primarily on streams located in forested areas and provides a systematic, reproducible procedure for determining and verifying that bankfull stage has been properly identified.

Sharing Information:

This video (published in 2003) is distributed by the USDA Forest Service, Rocky Mountain Research Station. [VHS Closed Caption, 46-min.] It is a public-accessible product and is available via government and university libraries.

Contributions

Contributions within Discipline:

Contributions Within Discipline 11/06 to 10/07

A paper published this year introduced a novel concept called 'The land-cover cascade' that demonstrated pathways through which land cover disturbance results in distrubance to stream geomorphology and stream biota (Burcher, C.L., Benfield, E.F., and H.M. Valett. 2007. The land cover cascade: disturbance propagation between landscapes and streams., Ecology 88:228-242)

Our research activities and findings have helped expand our scientific understanding of the importance of terrestrial resource diversity to consumer structure and ecosystem functioning in stream ecosystems. We have also helped develop appropriate experimental design and statistical analysis methods to adequately address biodiversity-ecosystem function experiments.

Research has contributed to a better general understanding of the base of knowledge, theory, and pedagogical methods in the field of fluvial geomorphology.

We have a developed a unique spatial database that includes a time record and specificity of human development to be made available via the web next year, which we expect will serve as a test bed for landscape change modeling methods.

Our research is assisting natural resource managers to make decisions / predictions on the impacts of disturbances to the environment, e.g.., sedimentation impacts on aquatic ecosystems, which can help them prioritize the effects due to differences in species responses and environment changes (temperatures.

Our results are leading to improved understanding of how change in biodiversity, under human drivers, is likely to impact ecosystem functioning and in particular nonrandom species loss.

We are demonstrating that the terrestrial nitrogen cycle includes an additional process, which itself was first identified in marine ecosystems in 2003, that fundamentally alters expectations of nitrogen transformations and losses from soils.

We have demonstrated that, contrary to the dominant opinion, that soil microbial communities are not functionally redundant despite their incredibly high species diversity. This work provides the first assessment of 'whole' microbial community succession during decomposition of foliar litter.

We have demonstrated that aboveground herbivory may have legacy effects that alter soil mesofaunal population and resource-utilization dynamics in subsequent growing seasons.

Our results have demonstrated some of the complexities of responses to climate change in natural biodiversity

This research contributes to the literature on the effects of environmental protection regulations on land prices. In particular we address the private vs. social cost argument of these types of protective measures.

We published a current understanding of how individual tree sap flow is linked with watershed scale stream flow. In past hydrological research, vegetative evapotranspiration was calculated as the difference between precipitation input and stream flow output. The more detailed approach that we used accounts for the source and flux of water through forested ecosystems.

We have published on the restoration of degraded urban ecosystems where Aesculus hippocastanum L. trees (horse chestnut) are growing on deep 'cultural layer' soils typical of European urban areas. We found that a mild soil fertilization and wood chip mulch treatment resulted in a significant improvement in tree vigor and growth of this valued street tree.

Contributions to Other Disciplines:

Contributions To Other Disciplines 11/06 to 10/07
Our papers on the Cherokee Indian resource exploitation provide a substantially different kind of analysis than customary in historical research. It is also the first time to our knowledge that spatial modeling driven by contemporary knowledge and models of resource production has been combined with a historical and archeological synthesis to quantitatively estimate resource use footprints. This approach may substantially alter analysis of early population extent, structure, and ecological footprints.

Some of our research has integrated techniques and concepts from microbiology, plant biology and soil science.

Our fluvial research has contributed to improved understanding of aquatic ecosystems in terms of interactions between the geomorphic an biotic systems.

Collaborations have included work with statisticians and computer scientists as well as invited presentations to the following professional societies:

òPlenary, International Statistical Ecology Conf, St Andrews (2008)
òSpeaker, International Society for Bayesian Analysis, Hamilton Island (2008)
òSpecial Seminar, Data Assimilation for the Carbon Cycle, NCAR (2007)
òPlenary, Neural Information Processing Systems (NIPS) Conf, Vancouver (2006)
òKeynote, 1st Annual Ecosystem Informatics Symposium, Oregon State (2006)
òKeynote, Uncertainty in Ecological Analysis, Mathematical Biosciences Inst, Columbus (2006)

Contributions to Human Resource Development:

Contributions to Human Resource Development 11/06 to 10/07
A text book and computer lab manual were published (J. S. Clark) for the developing field of hierarchical modeling.

We have created numerous opportunities for students and interns to participate in and gain knowledge from the research and educational projects of the Coweeta LTER program. These include training in field and laboratory research skills as well as in the summary, synthesis, and presentation of research findings at research conferences, educational outreach presentations, and in Schoolyard activities. We have distributed hundreds of brochures on the research and educational activities of the Coweeta LTER program and the LTER Network in general.

Undergraduate students have attended ESA where they have had dinner meetings with a prominent ecologist, Meg Lowman, who also works closely with undergraduates.

Contributions to Resources for Research and Education:

CContributions to Resources for Research and Education 11/06 to 10/07
Coweeta hosted the November 2006 SEEDS (Strategies for Ecology Education, Diversity, and Sustainability) field trip in coordination with the Ecological Society of America. Two of the students who participated in the field trip, Serge Farinas and Fabiana Silva, were recruited to Coweeta summer intern and temporary staff positions, respectively. A more complete summary of the field trip is attached and a link to the ESA web site trip summary is http://www.esa.org/seeds/fieldtrips/past.php

Laboratory facilities in the Geomorphology Laboratory at the University of Georgia have been improved as a result of the Coweeta LTER project.

Contributions Beyond Science and Engineering:

Contributions Beyond Science and Engineering 11/06 to 10/07
Results from our study of whole-tree water transport (Ford and Vose 2007; Ford et al. 2007) are mainly applied. While ecosystem transpiration is most elegantly measured by analyzing water vapor concentration in wind transported off forest canopies (e.g., eddy flux), this technique cannot be applied in steep, complex terrain. Eddy flux also cannot provide information on contributions of specific tree species to the total flux. Through a scaling method developed by CWT investigators, tree-level information can be used to identify species-level composition to ecosystem transpiration as well as the fact that individual species do not respond to climate in analogous ways. Results from the eastern hemlock research were featured in the following media sources and contributed to the public's understanding of science and technology:

North Carolina Public Radio program The State of Things. August 28, 2007
http://wunc.org/tsot/archive/Arbor_day.mp3/view

Asheville-Citizen Times. August 20, 2007
http://www.citizen-times.com/apps/pbcs.dll/article?AID=200770819018

Asheville-Citizen Times. July 13, 2007
http://www.citizen-times.com/apps/pbcs.dll/article?AID=200770713044

Macon County News. August 23, 2007
http://www.maconnews.com/index.php?option=com_content&task=view&id=1237&Itemid=34

Christian Science Monitor. August 2, 2007
http://www.csmonitor.com/2007/0802/p13s02-sten.html?page=1

Atlanta Journal Constitution. July 22, 2007
(archived/password protected)

The Daily Reflector, Pitt County/Greenville NC. August 25, 2007
http://www.reflector.com/local/content/gen/ap/NC_Exchange_Tree_Loss.html

Raleigh News & Observer. August 25, 2007
http://www.newsobserver.com/1565/story/681878.html

Winston-Salem Journal. August 25, 2007
http://www.journalnow.com/servlet/Satellite?pagename=WSJ%2FMGArticle%2FWSJ_BasicArticle&c=MGArticle&cid=1173352506648&path=!l

StarNewsOnline.com, Wilmington NC. August 25, 2007
http://www.starnewsonline.com/article/20070825/APN/708250528

IndependentTribune (Concord & Kannapolis). August 24, 2007
http://www.independenttribune.com/servlet/Satellite?pagename=CIT%2FMGArticle%2FWSJ_BasicArticle&c=MGArticle&cid=1173352508192&

Herald Tribune (Sarasota, Manatee, Venice, Englewood). August 25, 2007
http://www.heraldtribune.com/article/20070825/APN/708250528

WBT 1110AM 99.3FM (Charlotte). August 26, 2007
http://www.wbt.com/news/details.cfm;jsessionid=783053af7450d4b06eaa6d552f334c462533TR?article_id=32967

Pittsburgh Tribune-Review (PA). August 25, 2007
http://hosted.ap.org/dynamic/stories/N/NC_EXCHANGE_TREE_LOSS_NCOL-?SITE=PAGRE&SECTION=US&TEMPLATE=DEFAULT

Science Daily. July 12, 2007
http://www.sciencedaily.com/releases/2007/07/070709111435.htm

Landscape Online. August 20, 2007
http://www.landscapeonline.com/research/article/9514

Timber Buy Sell. August 20, 2007
http://www.timberbuysell.com/Community/DisplayNews.asp?id=1356

The Charlotte Observer. August 25, 2007
http://www.charlotte.com/204/story/250186.html

There are numerous eyewitness descriptions of the eighteenth-century Cherokee Indians of Southern Appalachia by traders, missionaries, and military personnel. From the wealth of primary information, subsequent interpreters have described the Cherokee social, political, legal, and ideological organization or the political and economic changes that took place among them during the eighteenth century. However, the study of colonial Cherokee settlement can still be characterized as 'drawing circles or 'jelly beans' around clusters of sites where archaeologists have found similar material remains.' Two studies (Gragson & Bolstad 2007; Bolstad & Gragson 2007) of historic Cherokee occupation of Southern Appalachia have contributed to increased public understanding of why the Cherokee underwent the cultural changes they did during the colonial and early American periods and how this set the stage for the environmental transformation of Southern Appalachia over the next 200 years. Results from the Cherokee research were featured in the following media sources under the general banner of 'Widely held beliefs about early Cherokee settlement patterns likely incorrect' and contributed to the public's understanding of science and technology:

MSNBC Life Science - Sept 20, 2007
http://www.msnbc.msn.com/id/20895021/

Eureka Alert - Sept 4, 2007
http://www.eurekalert.org/pub_releases/2007-09/uog-whb090407.php

UGA Office of Public Affairs News Service - Sept 4, 2007
http://www.uga.edu/news/artman/publish/070904_CherokeeSettlementPatterns.shtml

All American Patriots - Dispatches from the Depths of U.S. Government - Sept 4, 2007
http://www.allamericanpatriots.com/48731199_native_americans_widely_held_beliefs_about_early_cherokee_settlement_patterns_likely_incorr

Innovations Report - Forum for Science, Industry and Business - Sept 6, 2007
http://www.innovations-report.com/html/reports/studies/report-90276.html

Science Codex - Sept 4, 2007
http://www.sciencecodex.com/what_happened_to_the_cherokee

The University of Georgia Franklin College of Arts & Sciences - Sept 4, 2007
http://www.franklin.uga.edu/news/2007/article120_07.htm

Tanasi Journal: Connecting All Our Relation - Sept 5, 2007
http://www.tanasijournal.com/main/index.php?option=com_content&task=view&id=551&Itemid=1&ed=72

Science Tech-archive.net - Sept 5, 2007
http://sci.tech-archive.net/Archive/sci.archaeology/2007-09/msg00244.html

Sci.Bio.Paleontology - Sept 8, 2007
http://groups.google.com/group/sci.bio.paleontology/msg/7bdefc5bf79977ce

History Hunters International - Sept 2007
http://historyhuntersinternational.org/index.php?topic=2357.0

Yahoo Groups - Sept 26, 2007
http://groups.yahoo.com/group/NatNews/message/45943

Dental and Health Articles - Sept 4, 2007

http://www.dentalplans.com/articles/24277/

Project Muse: Scholarly Journals Online - Sept 2007
http://muse.jhu.edu/login?uri=/journals/social_science_history/v031/31.3gragson.pdf

Go Forth Alabama - Slow Travel on the Long Trail - Sept 21, 2007
http://blog.al.com/goforth/2007/09/two_to_think_about.html

University of Minnesota Dept. of Forest Resources - Sept 7, 2007
http://fr.cfans.umn.edu/

Social Science History, Duke University Press - Sept 2007
http://ssh.dukejournals.org/cgi/content/refs/31/3/435

Wikipedia: The Free Encyclopedia - Sept 2007
http://en.wikipedia.org/?title=Talk:Cherokee

Special Requirements

Special reporting requirements: None
Change in Objectives or Scope: None
Animal, Human Subjects, Biohazards: None

Categories for which nothing is reported:

Coweeta LTER Year 1 (Nov 2002-Oct 2003) Annual Report
NSF Award DEB-0218001
Consequences of Land Use Change in the Southern Appalachian Mountains
Submitted October 25, 2003

Introduction

This report covers Year 1 (November 2002-October 2003) activities on the Coweeta LTER program in the following four categories: Participants, Activities & Findings, Products, and Contributions. The Coweeta LTER Program has evolved since 1980 from a site-based to a site- and region-based project examining the effects of disturbance and environmental gradients on biogeochemical cycling, and the underlying watershed ecosystem processes that regulate and respond to those cycles. The objective for the proposed 2002-2008 research is to advance scientific understanding of the spatial, temporal, and decision-making components of land use and land-use change in the southern Appalachian Mountains over the last 200 years, and forecast patterns 30 years into the future. To accomplish this task, we will address the ecological and socioeconomic aspects of land-use change while continuing long-term studies of environmental gradients and natural disturbance regimes.

1. Participants: Who has been involved?

Participants in the Coweeta LTER program include a large number of individuals from numerous State and Federal institutions. By virtue of the expertise of the individuals involved and the nature of the research itself, numerous collaborators and contacts have also been established.

What people have worked on the project and what other organizations are involved as partners?
A total of 27 investigators from eight institutions worked on the Coweeta LTER program as listed on the following table.

Participant	Institution	Role
Fred Benfield	Virginia Tech	Investigator
Paul Bolstad	U Minnesota	Investigator
James Clark	Duke U	Investigator
Barrie Clinton	USDA-USFS	Investigator
David Coleman	U Georgia	Investigator
Katherine Elliott	USDA-USFS	Investigator
Ted Gragson	U Georgia	Principal Investigator
Gary Grossman	U Georgia	Investigator
Bruce Haines	U Georgia	Investigator
Gene Helfman	U Georgia	Investigator
Ron Hendrick	U Georgia	Investigator
Mark Hunter	U Georgia	Investigator
Brian Kloeppel	U Georgia	CoPrincipal Investigator
Jennifer Knoepp	USDA-USFS	Investigator
David Leigh	U Georgia	Investigator
David Newman	U Georgia	Investigator
Scott Pearson	Mars Hill	Investigator

Catherine Pringle	U Georgia	Investigator
Ron Pulliam	U Georgia	Investigator
Barbara Reynolds	UNC Asheville	Investigator
Mark Riedel	USDA-USFS	Investigator
Wayne Swank	USDA-USFS	Investigator
Monica Turner	U Wisconsin	Investigator
James Vose	USDA-USFS	CoPrincipal Investigator
Bruce Wallace	U Georgia	Investigator
David Wear	USDA-USFS	Investigator
Jack Webster	Virginia Tech	Investigator

Working directly with these investigators are 31 graduate students, both M.S. and Ph.D., and three post-doctoral fellows. One of the post-doctoral fellows and approximately half of the graduate students are supported by Coweeta LTER funds; for the students, this means they also receive tuition grants-in-aid from their home institution. The balance of graduate students while engaged in Coweeta LTER activities, are supported by other funds. There are four full-time technicians affiliated with the Coweeta LTER program; three are based at the Coweeta Hydrologic Laboratory in Otto and one at the University of Georgia campus in Athens. Finally, we sponsored three REU students during summer 2003, and worked with 20 undergraduate students involved as summer or fall interns, or hourly lab and field assistants during the school year.

Have you had other collaborators or contacts? Either by leveraging the Coweeta LTER project resources – data, personnel, infrastructure – participants on the Coweeta LTER have established several important collaborations. These include:

Jack Webster: The Lotic Intersite Nitrogen eXperiment (NSF) is a collaborative study of nitrogen cycling in streams involving simulation modeling, field tracer (^{15}N) additions, and intersite comparison. The principal contact is Pat Mulholland of Oak Ridge National Laboratory. Additional collaborators include Prof. Alan Hildrew, Queen Mary and Westfield College, London; Prof. Horton Hobbs, Whittenburg College, Ohio; and Linda Ashkenas and Dan Soboda, of Oregon State University. Full information on this research collaboration is available at http://sparc.ecology.uga.edu/webdocs/linx/.

Ted Gragson: Agrarian Landscapes in Transition (NSF) is an interdisciplinary project tracing the effects of the introduction, spread, and abandonment of agriculture at six U.S. LTER sites, with cross comparisons in Mexico and France. Principal contact is Charles Redman of Arizona State University. Additional collaborators include David Foster at Harvard University; Myron Gutmann at the University of Michigan; Craig Harris at Michigan State; Gerad Middendorf at Kansas State University; and Peter Kareiva at The Nature Conservancy. Full information on this research collaboration is available at http://ces.asu.edu/agtrans/.

Jim Vose: A collaboration with Dr. Larry Band, University of North Carolina-Chapel Hill and the Baltimore Ecosystem LTER, is directed at a cross-site comparison of streamflow and water quality. The research will use large scale models to examine contemporary and future impacts of land use change (i.e., development) on water resources. It will also examine scaling issues to

determine how fine-scale disturbances (i.e., subwatershed level development or forest harvesting) integrate to influence large scale hydrologic responses.

Brian Kloeppel: Collaborations with Dr. Jacek Oleksyn, Poland Academy of Sciences at the Institute of Dendrology in Kornik, Poland and Dr. Adolf Korczyk, of the Poland Academy of Sciences at the Forest Research Institute in the Białowieża National Park in Białowieża, Poland to conduct international LTER studies in Poland (NSF). The studies use the natural ^{13}C isotope signals in wood to determine the impact of historic (>300 years to present) changing CO_2 regimes on water use efficiency. A related study compares the foliar natural ^{13}C ratio of 12 populations of Norway spruce (*Picea abies*) along its native elevational gradient in the Tatra Mountains as well as in a 12-year-old common garden site from the same seed source to determine if water-use efficiency depends more on genetic or microsite factors.

David Coleman: A collaboration with Dr. Barny Whitman, to develop an International workshop on the molecular basis of soil biodiversity with Dr. Chih-Yu Chiu, Academia Sinica, and Dr. Hen-Biau King, Taiwan Institute of Forestry Research. The conference will be held in Taipei on April 18-24, 2004, and will involve persons from six+ LTER sites as well as several foreign countries.

2. Activities and Findings: What have you done & what have you learned?

The guiding hypothesis for the Coweeta LTER is that the frequency, intensity, and extent of land use represents human decision-making in response to socioeconomic and biogeophysical conditions with consequences that cascade through ecosystems. The research activities are organized into three initiatives: (1) characterization of the socio-natural template, (2) ecosystem responses to the socio-natural template, and (3) forecasting ecosystem responses to changes in the socio-natural template. As the first year of a significantly reorganized project, most effort has been on activities to enable the research so that findings are still limited.

What were your major research and education activities? The major research activity in Year 1 was the organization of the research activities and initial compilation of information relative to the characterization of the socio-natural template (Initiative 1). Organizational aspects of this activity were carried out at our two regular meetings of the Coweeta LTER: the All-PI Winter 2003 Meeting (7-8 January), and the Summer 2003 Science Meeting (June 24-25). Full reports and presentations are available at: http://cwt33.ecology.uga.edu/science_meeting/archives.html. Following are highlights from these meetings.

The All-PI Winter meeting was organizational in nature since funding had just been received by the University of Georgia, and research accounts had not yet been established. The main outcome was the consensus on developing study plans for individual research themes as outlined in the proposal. The Summer Science Meeting convened all investigators and their students to report on the progress-to-date of their research activities or advances in planning their research. Six students prepared posters for the 1st Coweeta Student Poster competition with a prize to the winner in support of their research. This year's winner was Chris Frost with a poster entitled "Frass from Canopy Herbivores Increases Soil Nitrogen, Carbon, and Nitrogen Export from *Quercus rubra* Mini-ecosystems." We also had two invited presentations by researchers working in the region and/or on topics relevant to the Coweeta LTER program. J. Hilten

presented on the "All Taxa Biotic Inventory" at the Great Smoky Mountains National Park while B. Clinton and P. Gulusky described their rhododendron ecophysiology research.

There have been several interrelated research activities over the past year focused on improving the temporal sampling of our land use data: 1) increasing the spatial and categorical detail and accuracy of current and recent historical land use information; and 2) extending the time period of land use back to the late 17th century. The results from these activities will serve as the basis for testing a number of hypotheses on techniques (e.g., categorical detail/accuracy tradeoffs in multi-scale data, quantification of classification accuracy for high-resolution spatial data, mapping sub-canopy features on high-resolution data). It will also be used to establish the location and pattern of disturbance (a disaggregation of disturbance through time with the change from a primarily agricultural to a diversified service economy with related changes in riparian vegetation). Finally, anthropogenic disturbance trajectories will be derived that reveal, for example, the divergence in disturbance regimes on public vs. private lands.

During summer 2003, the Coweeta LTER program sponsored three REU students. **Davis C. Pinner** worked with Dr. Katherine J. Elliott (Coweeta Hydrologic Laboratory) on dendroecological reconstruction of the disturbance history of Coweeta Basin. **Hunter M. Keyes** worked with Dr. Mark Hunter (University of Georgia) on the ecosystem effects of the hemlock wooly adelgid in the southern Appalachian region. Finally, **Kenneth D. Marcus** worked with Dr. Jennifer Knoepp (Coweeta Hydrologic Laboratory) on the nutrient content and bulk density determination of coarse woody debris in the Coweeta Basin.

What are your major findings from these activities? A unifying theme of both present and historic Coweeta LTER research is the quantification of ecological responses to natural and anthropogenic disturbance on levels ranging from the organism to the ecosystem. To build on our core research effort, we are undertaking a number of activities directed at cross-site and synthetic research. These activities are directly tied to our future efforts of constructing and validating explicit forecast scenarios on the response-trajectories of terrestrial and aquatic systems to natural and anthropogenic disturbance. Synthesis and cross-site comparison projects supported with supplemental NSF funds include:

- *Mark Hunter* who is conducing long-term monitoring of hemlock stands for woolly adelgid infestation.
- *Katherine Elliott* who is directing dendroecological research in the southern Appalachian mountains.
- *David Leigh* who is benchmarking "Hazard Sites" in the Little Tennessee and French Broad drainages.
- *Brian Kloeppel* who is bringing archived data sets on-line as part of our effort to convert all our holdings to a relational data structure compliant with EML.
- *Ted Gragson* who is comparing long-term land use trajectories between southern Appalachia and the southern Pyrenees.

What opportunities for training and development has the project helped provide? In the Coweeta Schoolyard LTER initiative we are partnering with five instructors and approximately 65 students. The schools involved are: Sixth grade science classes at Macon County Middle School in Franklin, NC; High School environmental science students at Rabun Gap Nacoochee

School in Rabun Gap, GA; and, Freshmen College level biology and chemistry classes at Southwestern Community College in Sylva, NC. Field work is conducted on school property study areas, the Coweeta Hydrologic Laboratory, and surrounding southern Appalachian study sites such as Joyce Kilmer Old Growth Memorial Forest. Data summary and discussions take place at Coweeta and the home institution of participating teachers and students. Data archives can be found at http://coweeta.ecology.uga.edu/webdocs/1/schoolyardlter.htm.

What outreach activities have you undertaken? Coweeta LTER scientists and staff conduct numerous tours for varied groups both on and off-site. Outreach activities this year were also carried out with The Macon County Historical Museum (Franklin, NC). Details of these activities follow.

Brian Kloeppel: In 2002, 58 groups and a total of 825 individuals including primary through college education classes, visiting scientists, and forest and watershed managers were provided educational and guided scientific tours (http://coweeta.ecology.uga.edu/webdocs/1/tours.html). These tours were led by a variety of scientists and staff at Coweeta Hydrologic Laboratory who specialize in the various topics presented. Depending on the need of each group, tours covered ecosystem function, vegetation management, stream biology, water quality and yield, and road construction and maintenance. In 2003 we also hosted several international science visitors: A group of six Japanese led by Dr. Hideaki Shibata, Associate Professor at Hokkaido University; a group of six French led by Ms. Dolores de Bortoli, Researcher at the Universite de Pau; Dr. Martin Sharman, Head of the Biodiversity Sector of the European Commission, Brussels; and Dr. Adolf Korczyk, Natural Forests Department Head of the Forest Research Institute of the Poland Academy of Sciences in the Białowieża National Park in Białowieża, Poland.

Bruce Haines: Conducted a field tour of the Coweeta Basin for the 88th Annual Meeting of the Ecological Society of American, held in Savannah (GA), August 2003. In asking the visitors, "Are there any lessons, approaches, methods, or findings from the Coweeta Project that could help you better manage water, nutrients, vegetation, wild life and people back in your homeland?" Dr. Haines sought to encourage tour participants to become interested in landscape ecology.

Ted Gragson: With the assistance of graduate students Meredith Devine and William Jurgelski, prepared a permanent museum exhibit entitled "Chuttahsotee's Long Rifle and the Sand Town Cherokee." The exhibit incorporates Coweeta LTER results on early white settlement in southern Appalachia and a unique pre-Civil War rifle manufactured in western North Carolina to tell a story of Indian-White land relations significant to local history.

Susan Murry: Susan is a Graduate Research Assistantship working in the Coweeta Information Management Laboratory, and with Barrie Collins (Coweeta Information Manager) she rendered a Native Garden plan for the Memory Lane Park, a small urban park in Franklin, NC adjacent to the Macon County History Museum. The rendered plan highlights native plants of Western North Carolina based on work at Coweeta and the region to create a place of repose as well as an educational exhibit that extends the museum's displays outdoors.

3. Products: What has the project produced?

As in the past, the greatest single achievement of individuals involved with the Coweeta LTER program is the significant number of publications. This year we have also developed significant web-accessible databases.

What have you published as a result of this work? Over the past year, Coweeta investigators and their students have published 31 journal articles and/or book chapters, two M.S. theses and two Ph.D. dissertations. Following are some of the most salient publications; a complete listing is available at http://cwt33.ecology.uga.edu/coweeta_publications.php.

Clark, James S.; Mohan, Jacqueline; Dietze, Michael; Ibanez, Inez. Coexistence: How to identify trophic trade-offs. *Ecology* 84(1): 17-31.

Coleman, David C.; Hunter Mark D.; Hutton, John; Pomeroy, Steven; Swift, Lloyd, Jr. 2002. Soil respiration from four aggrading forested watersheds measured over a quarter century. *Forest Ecology and Management* 157: 247-253.

Elliott, Katherine, J.; Boring, Lindsay, R.; Swank, Wayne, T. 2002. Aboveground biomass and nutrient accumulation 20 years after clear-cutting a southern Appalachian watershed. *Canadian Journal of Forest Research* 32: 667-683.

Grossman, G.D.; Rincon, P.A.; Farr, M.D.; Ratajczak, R.E. Jr. 2002. A new optimal foraging model predicts habitat use by drift-feeding stream minnows. *Ecology of Freshwater Fish* 11: 2-10.

Hicks, Norman, G.; Pearson, Scott M. 2003. Salamander diversity and abundance in forests with alternative land use histories in the Southern Blue Ridge Mountains. *Forest Ecology and Management* 177: 117-130.

HilleRisLambers, Janneke; Clark, James S.; Beckage, Brian. 2002. Density-dependent mortality and the latitudinal gradient in species diversity. *Nature* 417: 732-735.

Hutchens, John, J., Jr.; Wallace, J. Bruce. 2002. Ecosystem Linkages between Southern Appalachian Headwater Streams and Their Banks: Leaf Litter Breakdown and Invertebrate Assemblages. *Ecosystems* 5: 80-91.

Kloeppel, Brian D., Clinton, Barton D.; Vose, James M.; Cooper, Aaron R. 2003. Drought impacts on tree growth and mortality of southern Appalachian forests. In *Climate Variability and Ecosystem response at Long-Term Ecological Research Sites*, David Greenland, Douglas G. Goodin, and Raymond C. Smith, Eds. Pp. 43-55. Oxford: Oxford University Press.

Qualls, R.G.; Haines, B.L.; Swank, W.T.; Tyler, S.W. 2002. Retention of soluble organic nutrients by a forested ecosystem. *Biogeochemistry* 61: 135-171.

Turner, Monica G., Collins, Scott L.; Lugo, Ariel E., Magnuson, John J., Rupp, T. Scott, Swanson, Frederick. 2003. Disturbance dynamics and ecological response: The contribution of long-term ecological research. *BioScience* 53(1): 46-56.

Vose, James M.; Ryan, Michael G. 2002. Seasonal respiration of foliage, fine roots, and woody tissues in relation to growth, tissue N, and photosynthesis. *Global Change Biology* 8: 182-193.

Wyckoff, Peter H.; Clark, James S. 2002. The relationship between growth and mortality for seven co-occurring tree species in the southern Appalachian Mountains. *Journal of Ecology* 90: 604-615.

Yeakley, J. Alan; Coleman, David C.; Haines, Bruce L.; Kloeppel, Brian, D.; Meyer, Judy L.; Swank, Wayne T.; Argo, Barry W.; Deal, James M.; Taylor, Sharon F. 2003. Hillslope nutrient dynamics following upland riparian vegetation disturbance. *Ecosystems* 6(2): 154-167.

What Web site(s) or other Internet site(s) reflect this project? The Coweeta LTER program subscribes to the philosophy that the future of scientific research is tied to the free and efficient exchange of research and ideas in the scientific community. We have accordingly invested heavily in supporting emerging worldwide standards for research and GIS data and metadata, and the Coweeta LTER website (http://coweeta.ecology.uga.edu) was completely overhauled during Year 1 to reflect this approach. All information holdings were inventoried to determine that relevant parts (i.e., data, metadata, GPS, coverages, etc.) were complete; the missing information was either collected or key-coded. EML-compliant metadata was then developed for our tabular data legacy to provide machine-readable information for data harvesters. We simultaneously developed Coweeta Data Set Summaries to provide human-friendly metadata. The Coweeta Data Summaries incorporate the information contained in the EML-compliant metadata, but also provide access to geographic coordinates as well as data. An example can be found at http://cwt33.ecology.uga.edu/summaries/summary1005. For our GIS data legacy we adhere to the Federal Geographic Data Committee (FGDC) Geospatial Standards format (http://cwt33.ecology.uga.edu/fgdc_overview.html).

The single most important accomplishment of the overhaul of the Coweeta LTER website was the move to Open Source Software to develop a relational database management system. This provides complete access to the entire Coweeta data legacy in a recursive fashion from anywhere in our website. The architecture is based on MySQL and PHP. MySQL is a powerful, flexible and efficient database management system, while PHP is a CGI program with a built-in scripting language that dynamically accesses MySQL and outputs to an HTML browser. In contrast to a Google search that is static and only as good as the meta-tagging on individual web-pages, the Coweeta GLOBAL Data Search gives access to all holdings of any kind anywhere in the archives from anywhere on the site. First access to this search engine is available in the "Data & Research" section of the Coweeta LTER homepage, http://coweeta.ecology.uga.edu/webdocs/1/index.htm.

What other specific products have you developed? The foremost reason for developing the Coweeta MySQL-PHP relational data management system was to give us complete control over our data legacy. The tabular data legacy now consists of nearly 200 data sets fully described and accessible according to the NSF LTER Type I and Type II criteria as implemented at Coweeta (http://coweeta.ecology.uga.edu/webdocs/3/static/datapolicies.html). However, the relational data structure also allowed us to assemble, manage and deliver many other types of information including species lists, biographical sketches, and a comprehensive bibliography of publications, thesis and dissertations that we are in the process of converting to downloadable PDFs. Following are the most significant online resources available from the "Data & Research" section of the Coweeta LTER homepage:

- Publications - 1214 citations dating from 1928, 62 publications available online.
- Thesis/Dissertations - 195 theses and dissertations online, dating from 1937.
- Researcher's Biographical Sketches - formatted biographies of all 27 PIs.

- Sample Archives - 93 collections featuring 17,000+ archived samples.
- Species Lists I, GMNH Mammal/Amphibian Collection - 20,000+ vouchered specimens for southern Appalachia from 1905 onward held at the Georgia Museum of Natural History.
- Species Lists II - Observed and collected species at Coweeta Hydrologic Laboratory.
- Digital Elevation Model (DEM) Catalog - raster contour maps for the southern Appalachian study region.
- Digital Raster Graphic (DRG) Catalog - DRGs for the southern Appalachian study region.
- Digital Orthophoto Quadrangle (DOQ) Catalog - DOQs for the greater Coweeta area.
- Demographics – US Census block-level data for the southern Appalachian study region.
- Monthly Climate Data (NOAA/NCDC) – Geo- and temporally-referenced records for 123 stations in the southern Appalachian study region. (Daily climate data will soon also be available.)

4. Contributions: How has the project contributed?

The 1996-2002 Coweeta research effort revealed surprisingly strong effects of land-use history on the current state of terrestrial and aquatic ecosystems in the southern Appalachian Mountains. Natural disturbances and human land use interact with steep environmental gradients to produce complex spatial patterns and temporal dynamics at the individual, population, community, ecosystem, and landscape levels. This research positioned us for significant advances in the scientific understanding of the spatial, temporal, and decision-making components of land use and land-use change in the southern Appalachian Mountains during 2002-2008. Particular contributions not already mentioned above are noted next.

To the development of the principal discipline(s) of the project? While the principal discipline of the Coweeta LTER research is ecosystem ecology, the 27 investigators span a wide gamut of contributory subdisciplines. Publications this year contributed to our understanding of many key ecological concerns: trophic trade-offs; aboveground biomass and nutrient accumulation; an optimal foraging model for drift-feeding stream minnows; salamander diversity and abundance; density-dependent mortality and the latitudinal gradient in species diversity; leaf litter breakdown and invertebrate assemblages; retention of soluble organic nutrients in a forested ecosystem; seasonal respiration of foliage, fine roots, and woody tissues in relation to growth, tissue N, and photosynthesis; and hillslope nutrient dynamics following vegetation disturbance.

To other disciplines of science or engineering? Our contributions are not limited to ecosystem ecology, but penetrate other science disciplines as well. David Leigh is applying geomorphological techniques to the "Hazards Project" that will document the response trajectory of streams to changing land use patterns in southern Appalachia over the next 30 years. In the process he is comparing two widely used yet divergent physical stream survey parameters – USGS and USEPA – to develop a standardized methodology for use in the Appalachian Highlands. Seong Cho along with David Wear and David Newman are conducting an economic analysis of the site-specific factors of land development in the French Broad and Little Tennessee River Basins. In the process, they are advancing the nascent field of spatial econometrics.

To the development of human resources? Although already noted in other categories, the Coweeta LTER program provides numerous opportunities for the development of human resources. We have three post-doctoral fellows working on research projects in the southern Appalachian study region. There are 31 graduate students, both M.S. and Ph.D. level, assisting with, participating in, or conducting their own research in the Coweeta LTER program. Finally, with NSF supplemental funds to the Coweeta LTER program we sponsored three REU students in summer 2003. Following are three additional contributions to the development of human resources.

James Clark will run a 2004 summer school with NSF funding on statisical computation, which is a direct outgrowth of his Coweeta LTER research on trophic dynamics, density-dependent growth and mortality of Appalachian tree species. Students will work in groups guided by the course instructors; they will select data sets for analysis, develop models, write and execute code, produce predictive distributions, and write case studies for publication as a volume. Topics to be covered in the course include: principles of Bayesian inference; graphical modeling for complex processes; hierarchical modeling; data, process, and parameter models; the Gibbs sampling framework; robustness and sensitivity to stage-wise specification; and model adequacy/validation/model selection.

Brian Kloeppel & Susan Steiner direct the Coweeta Schoolyard LTER program that provides exposure to science and technology for students and teachers from grade school through college. As part of this effort, they direct and organize on and off-site data collection and discussion in association with ongoing Coweeta LTER studies. These efforts contribute to the needs of students at all levels, as well as the needs of visiting scientists of all kinds, ecosystem managers, and the public at large.

Phaedra Scarborough, a student researcher working with Dr. Kitti Reynolds, learned basic microarthropod taxonomy in sorting microarthropods from Coweeta soil samples. She also participates in the decision-making of setting up new off-site research plots associated with experiments on climate and site controls of forest form and function (a component of Coweeta LTER Research Initiative 2).

To physical, institutional, and information resources that form the infrastructure for research and education? One of the most significant contributions in the first year of the Coweeta LTER research cycle is the development of a true relational archive for our data legacy. Not only is this a critical component to the success of our activities in the years to come, but it is a significant contribution to the infrastructure for research and education. Not to be overlooked, however, are the complete renovation of the Analytical Laboratory and the Residence, and the construction of the Conference Center at the Coweeta Hydrologic Laboratory. This achievement was made possible by funds and inter-institutional collaborations by the USFS, the NSF, and the University of Georgia. The facilities meet the day-to-day research, communication, and residential needs of Coweeta investigators and students, as well as many other research collaborators. In some of the most practical ways imaginable, these three facilities make the Coweeta LTER program possible.

To the public welfare beyond science and engineering? Understanding the causes and consequences of land-use change is a critical research challenge at both national and global

scales. Our current research addresses ecological and socioeconomic aspects of land-use change while continuing our studies of environmental gradients and natural disturbance regimes. This will produce a comprehensive understanding of ecological dynamics in the southern Appalachian Mountains and make possible the development of reliable forecasts of its future ecological state. Such forecasts offer the opportunity to formulate policies and management objectives with increased chances of success.

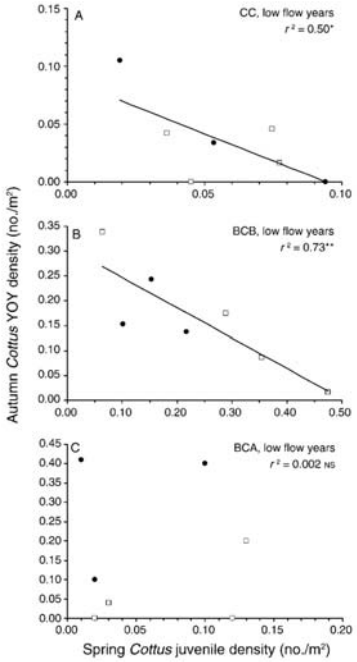
Population Dynamics of Mottled Sculpin (Pisces) in a Variable Environment: Information Theoretic Approaches

G. D. Grossman et al. (*Ecological Monographs* 2006 76(2): 217–234)

Quantifying the dynamics of natural populations has interested ecologists for centuries although there are still few studies that document the processes responsible for fluctuating abundances in natural populations. In general, the processes capable of determining population abundance can be classified as either density dependent or density independent. Density-dependent forces act through negative feedback (typically intraspecific competition or predation) between abundance and demographic traits such as growth, reproductive success, dispersal, or survivorship. Density-dependent processes appear to be the only forces capable of generating populations with stable abundances (i.e., those with relatively stationary long-term mean abundances and stable and low variance. Density-independent processes, by contrast, typically affect populations either via mortality produced by environmental disturbances (e.g., hurricanes, floods, droughts), or through high survivorship facilitated by unusually favorable environmental conditions (e.g., year-class phenomena). Consequently, long-term abundance values for these populations can best be described as a statistical random walk, with the variance increasing with time.

Stream-dwelling organisms are good subjects for investigating population regulation because they are commonly subject to substantial environmental variation in the form of both seasonal and annual changes in mean flows as well as extreme events such as floods and droughts. Hence, stream organisms may frequently experience density-independent sources of mortality in addition to the density-dependent factors already operating within these populations. Streams also tend to exhibit high spatial and temporal patchiness in their physical and biological characteristics, which may contribute to smallscale population differentiation. In this study, the strong inference approach was applied along with Aikaike's Information Criterion (AIC), to evaluate a series of ecologically realistic, a priori models potentially capable of explaining long-term variation in per capita rate of increase data for mottled sculpin (*Cottus bairdi*, right bottom). Long-term trends in abundance were monitored (1984–1995, 3–4 mottled sculpin generations) in three sites along a longitudinal gradient in the Coweeta Creek drainage (right, top) to determine if these trends were consistent with the patterns produced by both separate and combined models of density dependence, density independence, and recruitment limitation. Finally, short-term effects of intraspecific competition for space between adults and juveniles (i.e., a density-dependent process) were directly evaluated by conducting a field removal experiment.

Adult population size is dependent on both the amount of suitable habitat available for young-of-the-year (YOY, or juvenile) territories in a given year combined with the total number of YOY produced in that year. Sculpin displayed high stability in both population and adult densities, a phenomenon likely produced by mortality or low-level emigration of juveniles. In addition, density dependence was the most parsimonious explanation for **r** for most adult and all juvenile lifehistory classes. Given the differences in density-dependent interactions identified in both this and previous studies, it is clear that density-dependent interactions within stream fish populations may take a variety of forms. The figure shows correlation (i.e., density-dependent relationships between YOY density and juvenile density in (A) Coweeta Creek, (B) Ball Creek Below, and (C) Ball Creek Above during low flow years (i.e., those with <10 high flow events). Solid circles represent data for the drought years of 1985–1988 (N 5 4). *P < 0.05; **P < 0.01.



The mottled sculpin is a widely distributed species that is frequently the most abundant fish in North American streams (Grossman et al. 2002). While stream fish populations have been extensively studied by resource managers there have been relatively few attempts to delineate the processes determining population size. Results from this study indicate that simple density dependence is the most likely mechanism affecting the per capita rate of increase of sculpin populations in the Coweeta drainage. The removal experiment coupled with results from prior studies (Petty 1998, Petty and Grossman 2004) suggests that intraspecific competition for profitable microhabitats may have produced the observed density dependent relationships. These findings add support to the growing body of evidence documenting the importance of density dependence to a variety of taxa including mammals, birds, reptiles, amphibians, fishes, and invertebrates. Nevertheless, population regulation of sculpin in the Coweeta drainage was a complex phenomenon including minor density-independent effects, a density-dependence X density-independence interaction for young-of-the-year, and small-scale spatial differences in population processes. These findings argue for a multitiered approach to the study of population variation that encompasses long-term monitoring, spatial variation, and experimental testing of potential mechanisms.

Grossman, G. D., K. McDaniel, and R. E. Ratajczak, Jr. 2002.Demographic characteristics of female mottled sculpin, Cottus bairdi, in the Coweeta Creek drainage, North Carolina. Environmental Biology of Fishes 63:299–308.

Grossman, G. D. R. E. Ratajczak, Jr., J. T. Petty, M. D. Hunter, J. T. Peterson, and G. Grenouillet. 2006. Population Dynamics of Mottled Sculpin (Pisces) in a Variable Environment: Information Theoretic Approaches. Ecological Monographs, 76(2): 217–234.

Petty, J. T. 1998. Mottled sculpin in a dynamic landscape: linking environmental heterogeneity, individual behaviors, and population dynamics in a southern Appalachian stream. Dissertation. University of Georgia, Athens, Georgia, USA.

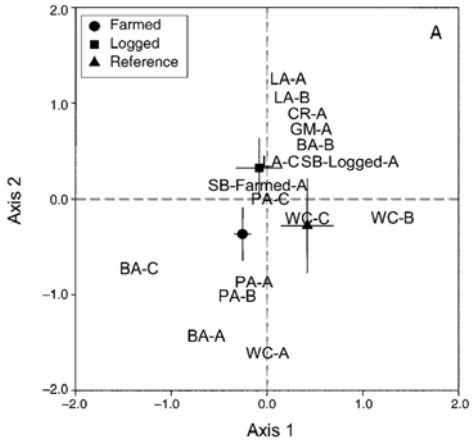
Petty, J. T., and G. D. Grossman. 1996. Patch selection by mottled sculpin (Pisces: Cottidae) in a southern Appalachian stream. Freshwater Biology 35:261–276.

Microbial Community Variation and its Relationship with Nitrogen Mineralization in Historically Altered Forests

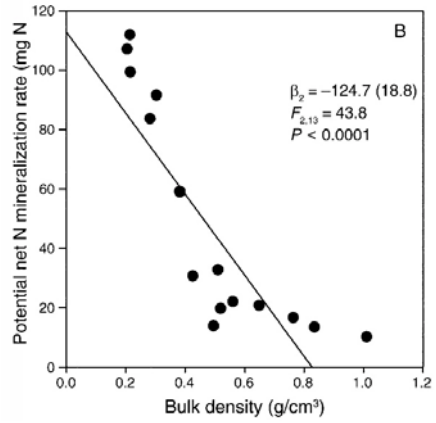
J. M. Fraterrigo et al. (*Ecology* 2006 87:570-579)

Past land use can impart soil legacies that have important implications for ecosystem function. Although these legacies have been linked with microbially mediated processes, little is known about the long-term influence of land use on soil microbial communities themselves. Coweeta research examined whether historical land use affected soil microbial community composition (lipid profiles) and whether community composition was related to potential net nitrogen (N) mineralization rates in forest stands abandoned from agriculture or logging and reforested >50 yr ago. Microbial community composition was determined by a hybrid procedure of phospholipid fatty acid (PLFA) and fatty acid methyl ester (FAME) analysis.

Results indicate that community composition varied significantly with past land use. The two-dimensional nonmetric multidimensional scaling solution explained 97% (axis 1 = 34%, axis 2 = 63%) of the variation in the microbial community and indicated that the profiles of historically farmed, logged, and reference plots were distinctly different (Pillai's trace $F_{4,24} = 4.06$, $P = 0.01$).



Communities in formerly farmed stands had a higher relative abundance of markers for gram-negative bacteria and a lower abundance of markers for fungi compared with previously logged and reference (i.e., no disturbance history) stands. Potential net N mineralization rates were negatively correlated with fungal and gram-negative bacterial markers in both farmed and reference stands, and fungal abundance and soil bulk density effectively predicted mineralization rates in all stands. Soil bulk density and the relative abundance of fungal biomarkers 18:2ω6c and 16:1ω5c explained 91% (adjusted $R2$) of the variation in potential net N mineralization rate ($P < 0.0001$).



This is the only study to investigate the long-term (>50 years) legacies of land use in microbial community composition in temperate deciduous forests, and one of the first to relate microbial legacies to ecosystem processes. In southern Appalachian cove-hardwood communities, conditions are highly conducive to vegetation reestablishment and nutrient re-accumulation following disturbance. The warm and moist climate, prolific sprouting ability of hardwood species, and abundance of N-fixing species, as well as the high productivity of vegetation once it is established, all contribute to a relatively rapid invasion of abandoned lands and subsequent accrual of nutrients in live biomass (Elliott et al. 2002), and suggest that legacies of land use in belowground soil communities should be minimal.

These results indicate that the alteration of microbial communities by historical land use may influence the ecosystem processes they mediate, which is in contrast to typical expectations about microbial community resilience to change. The decrease in fungal abundance observed from disturbance appeared to result in decreased nitrogen mineralization over the long term. The observed patterns are consistent with the results of previous work investigating the short-term effects of land management on soil microbial communities. Cultivation and tillage substantially disrupt the soil by breaking up soil aggregates, increasing soil compaction, exposing previously protected organic matter, and mixing soil horizons. These changes cause significant declines in microbial biomass, reducing the abundance of fungi, aerobic microorganisms, and facultative anaerobes, while increasing the relative abundance of Gm- bacteria (Fraterrigo et al. 2005). Such information may be critical for the accurate prediction of ecosystem response to global change, and will be necessary if land-use change is to be effectively integrated into broad-scale biogeochemical models.

Elliott, K. J., L. R. Boring, and W. T. Swank. 2002. Aboveground biomass and nutrient accumulation 20 years after clear-cutting a southern Appalachian watershed. Canadian Journal of Forest Research **32**:667–683.

Fraterrigo, J. M., M. G. Turner, S. M. Pearson, and P. Dixon. 2005. Effects of past land use on spatial heterogeneity of soil nutrients in southern Appalachian forests. Ecological Monographs **75**:215–230.

Fraterrigo, J. M., T. C. Balser and M. G. Turner. 2006. Microbial community variation and its relationship with nitrogen mineralization in historically altered forests. Ecology 87:570-579.

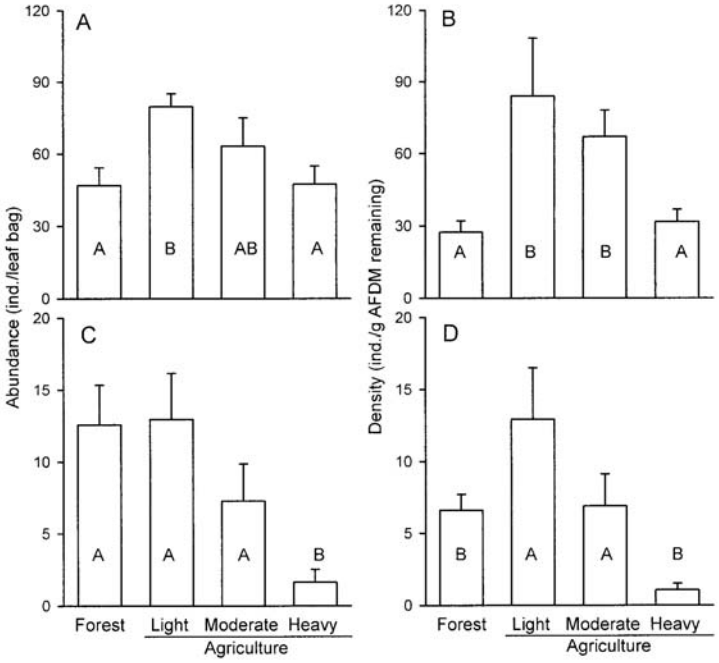
Are Leaf Breakdown Rates a Useful Measure of Stream Integrity?

E. M. Hagen et al. (*J. N. Am. Benthol. Soc.* 2006 25(2):330–343)

Allochthonous inputs of organic matter such as leaves from surrounding riparian vegetation are an important source of energy to forested streams (Wallace et al. 1997), while the breakdown process of leaves (Webster and Benfield 1986) can be altered by the conversion of forested land to agriculture. Agriculture often leads to reduced riparian vegetation and reduced allochthonous inputs, as well as increased sedimentation through soil erosion and bank instability that buries leaves reaching the stream. Since allochthonous inputs are an important energy source for macroinvertebrates in stream food webs (Benfield et al. 2001), leaf breakdown rates may provide a sensitive, integrated measure of community- and ecosystem-level processes including allochthonous input, microbial and macroinvertebrate activity, and chemical and physical conditions.

This study determined leaf breakdown rates in 12 streams in southern Appalachia (North Carolina and Georgia) under varying conditions from forested to heavy agriculture. The purpose was to assess the effects of anthropogenic disturbance on stream ecosystem integrity defined as the deviation from a desired historic ecosystem state. The hypothesis was that streams with intermediate levels of agriculture (light and moderate) would have faster breakdown rates than reference streams or those with heavy levels of agriculture. The difference would result from the combined effects of elevated water temperature, high nutrient concentrations, and the presence of shredding macroinvertebrates. Although forested streams have higher shredding macroinvertebrate counts, breakdown rates are expected to be slow because of cool temperatures and low nutrient concentrations. A second prediction was that heavy-agriculture streams would have slow breakdown rates in response to high sedimentation rates and a paucity of shredders.

Leaf breakdown rates are faster in light- and moderate-agriculture streams than in forested and heavy-agriculture streams (fig right). However, they are not a useful indicator of stream integrity along an agricultural landuse gradient because differences between individual landuse categories are not significant. On the other hand, total macroinvertebrate and shredder density and abundance were significantly related to landuse category. This was true for macroinvertebrate abundance (A), macroinvertebrate density (B), and shredder density (D) which are generally higher in light- and moderate-agriculture streams than in forested and heavy-agriculture streams. Total macroinvertebrate abundance ranged from 34.7 to 85.2 ind./leaf bag.



Macroinvertebrate density, shredder density, and macroinvertebrate richness were the only significant predictors of leaf breakdown rates along the agricultural landuse gradient. This result is consistent with several studies showing the importance of macroinvertebrates and shredders to leaf breakdown (e.g., Benfield and Webster 1985; Sponseller and Benfield 2001; Hutchens and Wallace 2002). The positive effect of agricultural land use on shredder abundance in light and moderate-agriculture streams was probably a response to increased light, elevated water temperatures, high nutrients, and adequate food supplies and habitat associated with intermediate levels of agricultural land use. This study suggests that agricultural land use has both positive and negative effects on leaf breakdown and must be interpreted in the context of other structural and functional variables associated with the stream category being studied.

Benfield, E. F., And J. R. Webster. 1985. Shredder abundance and leaf breakdown in an Appalachian Mountain stream. *Freshwater Biology* 15:113–120.

Benfield, E. F., J. R. Webster, J. L. Tank, And J. J. Hutchens. 2001. Long-term patterns in leaf breakdown in streams in response to watershed logging. *International Review of Hydrobiology* 85:467–474.

Hagen, E. M., J. R. Webster, AND E. F. Benfield. 2006. Are leaf breakdown rates a useful measure of stream integrity along an agricultural landuse gradient? *Journal of the North American Benthological Society* 25(2):330–343

Hutchens, J. L., And J. B. Wallace. 2002. Ecosystem linkages between southern Appalachian headwater streams and their banks: leaf litter breakdown and invertebrate assemblages. *Ecosystems* 5:80–91.

Sponseller, R. A., And E. F. Benfield. 2001. Influences of land use on leaf breakdown in southern Appalachian headwater streams: a multiple-scale analysis. *Journal of the North American Benthological Society* 20:44–59.

Wallace, J. B., S. L. Eggert, J. L. Meyer, And J. R. Webster. 1997. Multiple trophic levels of a forest stream linked to terrestrial litter inputs. *Science* 277:102–104.

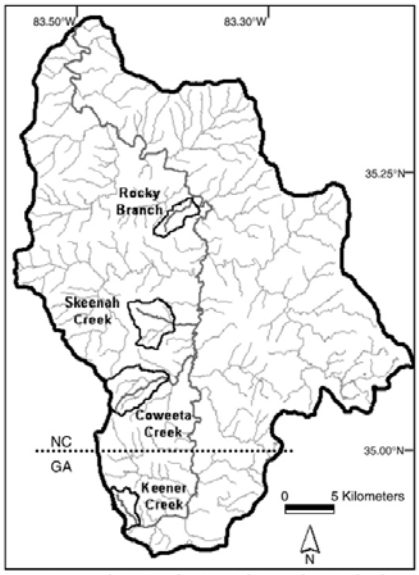
Webster, J. R., And E. F. Benfield. 1986. Vascular plant breakdown in freshwater ecosystems. *Annual Review of Ecology and Systematics* 17:567–594.

Morphological and Sedimentological Responses of Streams to Human Impact

Katie Price and David S. Leigh (*Geomorphology* 2006 78: 142-160)

This study considers the effects of forest clearance on streams of the southern Blue Ridge Mountains, a region that has received little attention with respect to human impact on stream channels. The Blue Ridge facilitates the analysis of stream response to relatively modest levels of deforestation as opposed to the widespread and complete conversion of native forests to agricultural or urban landscapes that has been the predominant focus of prior research. Development pressures in mountainous regions are typically lower than in low-relief areas in part because of access-difficulties and the higher likelihood of landscape protection on public lands.

Four tributary streams to the upper Little Tennessee River, comprising two pairs with contrasting levels of deforestation, were selected for comparison of whether the morphology and sedimentology of streams respond to moderate basin-scale impact (forest conversion). The presence of protected and unprotected smaller basins within the upper Little Tennessee drainage provides a unique opportunity to assess the response of streams to modest levels of human impact in the southern Blue Ridge. Most of this region has historically experienced episodic, short-lived disturbance (forest clearing), punctuated by periods of reforestation and potential recovery. Many areas within the unprotected, private land portion of the upper Little Tennessee River basin are now facing rapid development and low- to medium-density urbanization pressures that lower relief areas like the adjacent Piedmont have been experiencing for several decades to centuries. This allows for assessment of human impact on streams at a stage of disturbance that has long passed in many regions (Leigh & Webb 2006).



DRAINAGE NETWORK AND STUDY SUB-BASINS

Results show that human impact has resulted in an overall fining of bed texture, but few conclusions can be drawn regarding morphological responses of the streams to the levels of impact affecting the upper Little Tennessee River basin. The majority of the morphological parameters measured either failed to demonstrate significant differences at the 0.01 probability level between lightly and moderately impacted streams in both pairs, or exhibited inconsistent direction of difference among the pairs. Differences in sedimentology metrics of the stream bed, however, all differed significantly between lightly and moderately impacted streams. Data for suspended sediment support the trend suggested by the data for bed sedimentology.

These results indicate that highland land use, involving modest changes in forest cover (70–80% forest) at the basinscale, may cause significant differences in the sedimentology of stream beds. (I.e., they demonstrate lower bankfull width/depth ratios, narrower wetted widths of baseflows, and finer texture of the stream bed.) Whereas the sedimentology of these streams is clearly different, few conclusions can be drawn regarding morphological differences. Many common assessment methods for streams call for collection of data for a wide variety of sedimentological and morphological parameters (e.g., U.S. EPAEMAP and USGS-NAWQA), which are time consuming and perhaps unnecessary. By comparison, this study demonstrates that particle size and embeddedness on riffles are linked with the biotic integrity of streams and prove to be highly sensitive to external disturbance in the southern Appalachian Highlands (Price & Leigh in press). These parameters are among the best indicators of stream response to human impact since the levels of impact affecting the upper Little Tennessee River tributaries is below the thresholds of morphological sensitivity or have not persisted long enough to induce response.

Sedimentology descriptive statistics

		Coweeta (L)	Skeenah (M)	Keener (L)	Rocky (M)
Dominant phi class in thalweg* (interval data)	mean	−6.3	−3.7	−4.8	−4.6
	std. dev.	1.4	2.9	1.6	1.1
	range	12.0	13.0	13.0	7.0
Dominant phi class at random points* (interval data)	mean	−5.1	−3.7	−4.1	−3.6
	std. dev.	2.5	2.9	2.1	1.7
	range	9.0	12.0	13.0	7.0
Individual particle size at random points* (mm)	mean	64	42	32	21
	std. dev.	65	49	46	28
	range	37	210	375	224
Individual particle size at random points*,[a] (ϕ)	mean	−4.6	−3.5	−3.7	−3.5
	std. dev.	2.7	3.1	2.6	1.8
	range	8.6	12.2	13.1	7.8
Riffle particle size** (mm)	mean	61	45	35	9
	std. dev.	51	51	28	8
	range	290	215	146	34
Riffle particle size**,[a] (ϕ)	mean	−5.1	−3.4	−4.5	−2.3
	std. dev.	2.4	3.9	1.7	1.7
	range	12.7	12.2	7.2	5.1
Riffle fraction of random points survey*** (mm)	mean	90.4	64.7	34.0	30.4
	std. dev.	77.1	47.3	27.3	18.2
	range	373.0	166.0	120.0	71.0

L=lightly impacted; M=moderately impacted.
*n=81 per stream; **n=100 per stream; ***n=19–35.
See Section 4.2.4 and Table 4 for descriptions of sedimentology data collection methods.
[a] ϕ units were derived from individual particle measurements (mm).

Leigh, David S. and Paul A. Webb. 2006. Holocene Erosion, Sedimentation, and Stratigraphy at Raven Fork, Southern Blue Ridge Mountains, USA. *Geomorphology* 78: 161–177.

Price, K., Leigh, D.S., in press. Comparative Water Quality of Lightly and Moderately Impacted Streams in the Southern Blue Ridge Mountains, USA. *Environmental Monitoring and Assessment*.

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