

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources			4%	
102	Soil, Plant, Water, Nutrient Relationships			11%	
112	Watershed Protection and Management			13%	
123	Management and Sustainability of Forest Resources			21%	
133	Pollution Prevention and Mitigation			5%	
135	Aquatic and Terrestrial Wildlife			9%	
136	Conservation of Biological Diversity			8%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			17%	
204	Plant Product Quality and Utility (Preharvest)			3%	
211	Insects, Mites, and Other Arthropods Affecting Plants			3%	
212	Pathogens and Nematodes Affecting Plants			3%	
213	Weeds Affecting Plants			3%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.0	0.0
Actual Paid Professional	0.0	0.0	3.2	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	171676	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	249632	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	386373	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct scientific research. Publish peer-reviewed journal articles and other publications. Present findings at professional and public meetings and at other venues. Educate undergraduate and graduate students.

2. Brief description of the target audience

Maine natural-resource-based industries, Cooperative Extension staff, other scientists, state and federal policymakers, regulators, and legislators, classroom teachers

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	0	14	14

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of other publications

Year	Actual
2013	16

Output #2

Output Measure

- Number of research projects completed
- Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Total \$ amount received in extramural funding

Year	Actual
2013	1596337

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Development of new knowledge and technologies and the transfer of these to clientele to address the effects of climate variability and change
2	Enhance adaptive capacity of production and natural systems to reduce exposure and vulnerability to climate change
3	Improve mitigation strategies for the reduction of greenhouse gas emissions and increase carbon sequestration in production and natural systems and communities

Outcome #1

1. Outcome Measures

Development of new knowledge and technologies and the transfer of these to clientele to address the effects of climate variability and change

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Studying the way nutrients, carbon, water, and energy flow through forested ecosystems will provide a better understanding of the underlying mechanisms that control the form and function of these ecosystems. This understanding is essential to determine the effects of environmental perturbations at the global (e.g., climate change), continental (e.g., acid deposition), regional (e.g., biomass harvesting), and local (e.g., biosolids land spreading) scales. The ecosystem process research helps us to design better environmental-monitoring systems, as well as better predictive models to all us to determine the future effects of the present and emerging environmental stressors of today.

What has been done

This research has conducted intensive studies of biogeochemical processes at the plot- and small-watershed-level in forested watersheds of Maine and elsewhere. The project has directly involved 12 undergraduate student researchers, five graduate students, one postdoctoral fellow, four technicians and at least six senior scientists including the project PI. In addition, six high school science teachers and 200 K-12 students were involved in the 2012-2013 school year, and a similar number are involved in a new project on snowmelt and watersheds in 2013-2014.

Results

Over the past year the science of watershed biogeochemistry has progressed with the involvement of a wide group of participants. The science has been distributed to local, national and international community through presentations at meetings and through scientific publications. The development of curricula materials resulted in teachers and K-12 science students in three states becoming aware of the influence of management, air pollutants, and climate change on the health of our forested landscape. Some of the science in this project supports outreach efforts by the lead PI that includes the development of climate adaptation initiatives in Maine, testimony to the Maine Legislature in the spring of 2013, and involvement in

regional science synthesis efforts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources

Outcome #2

1. Outcome Measures

Enhance adaptive capacity of production and natural systems to reduce exposure and vulnerability to climate change

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Improve mitigation strategies for the reduction of greenhouse gas emissions and increase carbon sequestration in production and natural systems and communities

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluations are currently conducted at the project and program levels. At the project level, all projects are reviewed by an internal research council and external peer reviewers when initiated and again at completion by the research council. During the research council final evaluation, the focus is on determining if terminating projects met their stated objectives, secured extramural funding, and produced peer-reviewed publications. For FY13, no projects went through the review process in this program area. As for other measures of successful research programs, faculty in this program area published 14 peer-reviewed articles and secured more than \$1,596,337 in extramural funding.

Researchers use a variety of methods to evaluate their own research projects including evaluations retrospectively, before-after, and during the life of the project; case studies; and comparisons between treatment/intervention and nontreatment/nonintervention.

At the program level, external NIFA review teams are asked to review the research programs of schools/departments. These teams provide input on the impact and productivity of research programs supported through the station. The station is working to develop a standard program-level evaluation process, which will be used to evaluate each station program area. Our current plans include an approach based on use of expert panels as recommended by the federal Government Accounting Office with individual program evaluations occurring every four to five years on a staggered time table.

Key Items of Evaluation

Faculty in this program area published 14 peer-reviewed articles and secured more than \$1,596,337 in extramural funding.