

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Supporting Rural Economies

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
102	Soil, Plant, Water, Nutrient Relationships			4%	
111	Conservation and Efficient Use of Water			4%	
112	Watershed Protection and Management			4%	
131	Alternative Uses of Land			3%	
134	Outdoor Recreation			15%	
311	Animal Diseases			8%	
315	Animal Welfare/Well-Being and Protection			8%	
605	Natural Resource and Environmental Economics			17%	
608	Community Resource Planning and Development			21%	
609	Economic Theory and Methods			4%	
610	Domestic Policy Analysis			4%	
723	Hazards to Human Health and Safety			8%	
	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	6.4	0.0
Actual Paid Professional	0.0	0.0	6.7	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	327085	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	462568	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	313184	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

Scientists, economists, state and local policymakers, extension specialists, green/horticulture industry, tourism planners, land use commissions, and commercial fishermen

3. How was eXtension used?

eXtension was not used in this program

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	32	32

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Output #2

Output Measure

- Number of other publications

Year	Actual
2013	25

Output #3

Output Measure

- Total \$ amount of extramural funding received

Year	Actual
2013	1508412

Output #4

Output Measure

- Maine Futures Community Mapper: websites.greeninfo.org/ccgis/mainefuture

Year	Actual
2013	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Improve knowledge of, or strategies and tools for, sustaining Maine's rural economies and communities
2	Adoption of strategies/tools for sustaining Maine's rural economies and communities
3	Enhance sustainability, diversity, and resiliency of Maine's rural economies and communities
4	Improve tools for sustaining Maine's rural economies and communities

Outcome #1

1. Outcome Measures

Improve knowledge of, or strategies and tools for, sustaining Maine's rural economies and communities

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)

The quality of rural life both affects and is affected by the movement of people into and out of rural communities, the evolution of agriculture and industry, local social organization, and public policy. An understanding of attributes and forces that enhance or detract from community quality of life is important for guiding decision-making on policy.

What has been done

MAFES economists, as part of multistate project NE1049, are attempting to increase knowledge about the forces affecting rural communities in terms of labor markets, industry, governance, and quality of life. Their research focuses on long-run socio-economic sustainability and the ability of communities to respond to changes and to grow. The challenges that communities have faced, and will continue to face, have come from natural disasters such as floods, hurricanes, and tornados. Communities also face what might be called human-made disasters. While the term disaster may overstate some instances, all have some component of human caused transformation. Although this covers the well known topics of the changing public revenue streams, industrial restructuring, major recessions, and environmental challenges, it may can also include the more exotic such as terrorism.

Results

Over the course of the year, the researchers conducted Retail Trade Area Analyses for rural Maine communities. These studies educate economic development professionals and other stakeholders about the health of the local retail sector. Researchers also analyzed the economic impacts of big-box stores on Maine's retail sector. During the past year, researchers examined the economics of Maine's forest products industry, film production and photography, and popular music concerts held in the Bangor region. They have also examined issues related to productivity, human capital and workforce skills?with an analysis of the differences in skills across the U.S. rural-urban hierarchy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
609	Economic Theory and Methods

Outcome #2

1. Outcome Measures

Adoption of strategies/tools for sustaining Maine's rural economies and communities

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Limited fresh water supplies and severe drought experienced in some areas of the United States have made it increasingly important for farmers and growers to use water efficiently. Recent advances in water sensor technology have made it possible for greenhouse growers to use sensor-automated irrigation systems to efficiently water plants. In these systems, plants are irrigated only as they use water. However, there are still many basic questions about plant water use that must be answered for growers to irrigate efficiently. We understand very little about how plant water use of greenhouse crops is impacted by changing light levels, relative humidity, and temperature.

What has been done

MAFES scientists have helped develop protocols for irrigation that maximize water-use efficiency while maintaining crop growth and quality. The researchers collaborated with researchers from Georgia and the USDA to develop models that predict how plant water use is affected by the greenhouse environment. This information will be integrated into the USDA's 'Virtual Grower' model by Jonathan Frantz. Growers may use the information in this model regardless of the irrigation system they are using to determine how irrigation practices should be adjusted for changes in the weather.

Results

Based on their findings, the scientists provided irrigation guidelines for greenhouse growers for economically important herbaceous perennials. The amount of water needed to grow these crops was previously unknown. With this information, greenhouse growers may grow higher quality crops using very little water. For example, the researchers found that it was possible to produce the popular shade perennial, alumroot with as little as 3 to 6 liters of water during a 56-day growing season. Throughout the project, the researchers determined that other perennials grown in a sensor-automated irrigation system consistently used very little water. The adoption of sensor-automated irrigation systems by commercial horticulture industry has the potential to conserve a great deal of water. This irrigation system is also a closed irrigation system, which means that so little water is applied at one time that none is lost from containers as leachate. Using sensors in container irrigation would greatly reduce or eliminate leaching of nitrates and phosphates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #3

1. Outcome Measures

Enhance sustainability, diversity, and resiliency of Maine's rural economies and communities

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maine has one of the highest rates of asthma incidence in the U.S. Asthma can be induced or exacerbated by certain environmental agents. MAFES scientists are assessing whether various environmental or occupational chemicals found in Maine's rural communities, including some associated with agriculture, may contribute to asthma incidence in Maine.

What has been done

The researchers are attempting to determine whether previously untested environmental

chemicals found in Maine's rural communities (particularly, endocrine disruptors) can affect mast cells. Mast cells are a type of immune cell found in most bodily tissues. In response to the presence of allergens, mast cells release histamines and other substances into body tissues. The process is known as degranulation and it is responsible for inflammation, swelling, redness and pain. But degranulation also triggers the healthy deployment of white blood cells and supports the innate immune response that helps prevent infection and tumor growth. The scientists have been working with a mammalian mast cell model to test the effects of several chemical on the final outcome of allergic signaling, degranulation, using a fluorescence microplate experiment.

Results

Triclosan, a common antibacterial agent found in many hand soaps and other products, is known to have the added benefit of alleviating allergic skin conditions such as eczema. The MAFES scientists have found that this anti-inflammatory effect may be caused by triclosan's inhibitory effect on mast cells, which are implicated in allergies and asthma but which also are key components of a healthy immune system. Testing rat mast cells with triclosan at much lower concentrations than those found in household products, the researchers found that triclosan strongly inhibits degranulation and other mast cell functions, possibly accounting for its therapeutic effect in treating eczema and other allergic skin disorders. These findings support clinical evidence that triclosan could be an effective targeted treatment for such conditions. But the researchers call for further investigation into the unintended effects of triclosan's widespread availability in consumer products, including recent separate reports that triclosan may function as an endocrine disrupter. Additionally, other immune cell types that are biochemically similar to mast cells could potentially be adversely affected by triclosan.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

Outcome #4

1. Outcome Measures

Improve tools for sustaining Maine's rural economies and communities

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Alternative futures modeling (AFM) has proven to be an effective way to improve understanding of existing land use, and the intricate and dynamic connections between human and natural systems. In Maine, AFM is particularly relevant given the close economic and social ties between the state's forests and its people—both culturally and economically. Ensuring the health of these systems is not only important to quality-of-life, but also the sustained viability of the tourism and forest products sectors.

What has been done

In the past year, MAFES researchers have made significant progress on land suitability modeling efforts in the 2.5-million-acre Lower Penobscot River Watershed (LPRW), and the 1.9-million-acre Casco Bay Region (CBR). They have engaged over 70 stakeholders via focus groups to create Bayesian network-based land suitability models. Stakeholder land use categories include foresters, developers, agriculturalists, and conservationists.

Results

The researchers have leveraged the impact of this “futures” research through: (1) the Maine Futures Community Mapper (MFCM) grant funded by the Elmira Sewall Foundation; (2) Northern States Research Cooperative funding that examines the effects of changing land use scenarios on future timber supplies; (3) a 30-minute public television special on their research; and (4) the Acadian Internship in Regional Conservation, where in the summer of 2013 the scientists gathered 12 students from five countries to study and apply landscape conservation tools through a series of case studies. The new mapping tool, MFCM, will be released in early 2014. As the scientists engaged select stakeholders during the initial website testing, the early results were promising, with users expressing interest in the models and applications.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
131	Alternative Uses of Land
608	Community Resource Planning and Development

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
- Populations changes (immigration, new cultural groupings, etc.)

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, three projects went through the review process in this program area. As for other measures of successful research programs, faculty in this program area published 32 peer-reviewed articles and secured more than \$1,500,000 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 32 peer-reviewed articles and secured more than \$1,500,000 in extramural funding.