

V(A). Planned Program (Summary)

Program # 3

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
102	Soil, Plant, Water, Nutrient Relationships	0%		22%	
104	Protect Soil from Harmful Effects of Natural Elements	0%		3%	
112	Watershed Protection and Management	0%		3%	
123	Management and Sustainability of Forest Resources	0%		30%	
125	Agroforestry	0%		12%	
131	Alternative Uses of Land	0%		6%	
132	Weather and Climate	16%		1%	
133	Pollution Prevention and Mitigation	52%		14%	
205	Plant Management Systems	0%		1%	
601	Economics of Agricultural Production and Farm Management	15%		6%	
602	Business Management, Finance, and Taxation	17%		0%	
801	Individual and Family Resource Management	0%		1%	
903	Communication, Education, and Information Delivery	0%		1%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.4	0.0
Actual Paid	0.6	0.0	1.9	0.0
Actual Volunteer	0.2	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
44930	0	319821	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
75553	0	317078	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
144011	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Invasive Pests - Monitoring of the Asian Long Horned Beetle & Hemlock Woolly Adelgid; interception and prevention if possible, mitigation through work with bioactive fungi and natural enemy species; work with the US forest service, US-ARS, and the maple industry.

Forest Education: Work with landowners and next generations to deal with forest fragmentation and management and usage.

Maple Production - research and extension efforts at the Proctor Maple Center are directed at extending the sugaring season, maximizing yield, and minimizing disease to trees.

Monitoring of the Eastern Forests - Species change and demarcation levels are being observed, documented and modeled for northern forests through remote sensing and on-the-ground observations.

Invasive Plants - research will continue on the genetic and physiological basis for "invasiveness" of problem plant species and introductions.

Greenhouse Gas Emissions - research has been initiated to evaluate microbial population dynamics in ruminant farm animals in an effort to control/minimize the production of methane and other greenhouse gases. Parallel efforts are underway to understand soil processes that affect the carbon cycle, and that may sequester carbon in soil sinks.

Climate Change Adaptation - working with farmers on irrigation and drainage to address major storm events and extended wet/dry periods through workshops, newsletters, and research.

Sustainable Transportation Project - working with the transportation industry promoting the use of transportation options that: Reduce greenhouse gas and other harmful emissions, increase energy efficiency, and utilize alternative fuels and new technologies. Education and information are delivered through consultation, social media, on-line courses and certification, and vehicle certification programs.

Research to Identify key genes in crop yields that could predict how plants will react to climate change.

2. Brief description of the target audience

- Agriculture: Farmers
- Agriculture: Produce Growers
- Agriculture: Service Providers
- Agriculture: Government Agency Personnel
- Extension: Faculty/Staff
- Public: Business / Commercial transportation industry
- Agriculture: Maple Producers

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3000	1700	0	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	6	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of research projects focusing on climate change management practices on Vermont farms that aid in climate change adaptation.

Year	Actual
2014	3

Output #2

Output Measure

- Number of research projects on invasive plants in Vermont

Year	Actual
2014	2

Output #3

Output Measure

- Consultations

Year	Actual
2014	27

Output #4

Output Measure

- Workshop series

Year	Actual
2014	7

Output #5

Output Measure

- Mass Media: Blog post/Social Media/Web Page/Internet site updating

Year	Actual
2014	2

Output #6

Output Measure

- Publication - Newsletter

Year	Actual
2014	3

Output #7

Output Measure

- Field/demonstration Research project/sites

Year	Actual
2014	5

Output #8

Output Measure

- Surveys conducted

Year	Actual
2014	2

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of identified or mitigated invasive species threat to the environment
2	Number research results published regarding the generation of greenhouse gas emissions from farm animals and through soil processes
3	Number enterprises who implement recommended environmental behaviors to meet or exceed terms to have vehicles certified through the eRating program
4	Number of ecological and evolutionary factors identified that influence invasive grass in Vermont.
5	Number of climate change management practices on Vermont farms that aid in climate change adaptation.

Outcome #1

1. Outcome Measures

Number of identified or mitigated invasive species threat to the environment

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number research results published regarding the generation of greenhouse gas emissions from farm animals and through soil processes

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number enterprises who implement recommended environmental behaviors to meet or exceed terms to have vehicles certified through the eRating program

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

More than 25 percent of carbon dioxide (CO₂) emissions in the United States can be attributed to transportation activities, with 73 percent of these emissions coming from passenger transportation. In August of 2012, UVM Extension launched the Certification for Sustainable Transportation (CST) Program promoting the use of transportation options that: Reduce greenhouse gas and other harmful emissions, Increase energy efficiency, and Utilize alternative fuels and new technologies.

What has been done

The CST has developed and runs a vehicle based certification and labelling program called the 'eRating' as well as driver certification programs to help drivers reduce and eliminate unnecessary idling and adopt fuel efficient driving practices. Currently the CST is primarily working with privately owned bus and motor coach operators located in 48 states and 3 Canadian provinces. We have had in excess of 2,200 drivers, shop mechanics, and administrative staff go through our 'Eco-Driver' and 'Idle Free' certification program.

Results

Anecdotal evidence from companies report savings of 2-8% on fuel and wear and tear on equipment. We are currently collecting data to quantify these results. To date 25 companies' have completed certification and training with another 20 close to completion. There are 520 vehicles, 420 of which are buses or motor-coaches, which are eRating certified with >3000 to be certified next year. Other results include companies greater use of pro-environmental behaviors such as implementing recycling programs. President and CEO of Coach USA, Coach Canada, and Megabus, in a November 15, 2013 Article of Bus and Motorcoach News Stated: 'He said his company has saved 'hundreds of thousands of dollars per year' since it began participating in the program's pilot phase four years ago. Efforts are continuing to expand to other companies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
602	Business Management, Finance, and Taxation

Outcome #4

1. Outcome Measures

Number of ecological and evolutionary factors identified that influence invasive grass in Vermont.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Invasive grass species can decrease native species diversity and alter ecosystem processes.

What has been done

Researcher carried out field and greenhouse experiments on both native and invasive species in both native range in Europe and invasive range in North America showing that some invasive populations are very aggressive.

Results

Continued introduction of different variants for horticultural or agronomic plant species can increase the invasive potential of these species and increase the grass ability to spread into new areas. Changes in key traits like C-N content of leaves can result in increased aggressiveness of reed canary grass making it more likely to take over wetlands.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #5

1. Outcome Measures

Number of climate change management practices on Vermont farms that aid in climate change adaptation.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Climate change is expected to impact farming through precipitation increases, changes in crop suitability (e.g. apples) and decreases in milk productivity capacity

What has been done

The researcher has sampled greenhouse gases on farms, photo-documented dozen different farms, created five sets of photo simulations illustrating existing conditions

Results

Researcher has interfaced project with a related project to create a list of climate change best practices. The researcher has made connections with several farms and will sample greenhouse gases for the next two years. Researcher has disseminated results at a number of workshops

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
125	Agroforestry
132	Weather and Climate

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}