2014 University of Rhode Island Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

In this report we describe the activities and impacts of programs associated with the Rhode Island Agricultural Experiment Station (RIAES or Station) and Rhode Island Cooperative Extension (RICE or Extension); collectively referred to as the Land Grant Programs at the University of Rhode Island (URI). RIAES and RICE are collaborative elements within the College of the Environment and Life Sciences (CELS) at URI. Administrative oversight of RIAES and RICE is provided by the Dean of CELS. Day-to-day management of the Land Grant programs is provided by the Associate Director for Research and the Associate Director of Cooperative Extension.

The programs and projects supported within URI's land-grant portfolio span a wide range of disciplines, from the natural sciences to the social sciences. Equally important, the solutions that we share with stakeholders are based upon solid university research; research that depends on appropriate, modern infrastructure; the cutting edge tools of science; and multidisciplinary, multistate, problem-based approaches. URI's land-grant programs are focused around a portfolio of six programs that currently include: 1) Food Safety and Nutrition; 2) Sustainable Energy, Climate Change and the Environment; 3) Food Production and Sustainability; 4) Youth, Families and Communities; 5) International Programs; and 6) CELS CARES (College of the Environment and Life Sciences-Community Access to Research and Extension Services).
The Station and Extension are integral components of the mission of the College and University. The collaborative relationship with our federal partner, NIFA, has enabled our scientists, staff and students to leverage additional resources that provide contemporary knowledge, essential services and innovative programming for all Rhode Islanders.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	30.1	0.0	28.6	0.0
Actual	13.8	0.0	36.0	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Internal University Panel
- External University Panel
- External Non-University Panel

- Combined External and Internal University Panel
- Expert Peer Review

2. Brief Explanation

RIAES and RICE use a Request for Proposals (RFP) strategy for the initiation of new projects/programs and the continuation of ongoing projects/programs. In short, a RFP solicits proposals in a specific target area (e.g., Equipment; Multistate Projects; Integrated Projects) that complements current areas of agricultural research and outreach or provides opportunities for expanding the scope and mission of the Land Grant Programs at URI. (Stakeholders assist in determining what needs are to be met by the RFP. See the Stakeholder Input section of this report.) Proposals are reviewed by an internal panel of experts comprised of Program Area Leaders (PALS); ad hoc university experts, a panel of three to four experts from outside the institution (i.e. an external university panel). Proposals are ranked according to an evaluation rubric. The highest ranking proposals are then selected for funding.

RIAES and RICE also utilize Land Grant and state funding to support new faculty outside of the RFP process. Selection of new faculty for support by Land Grant funding is done by the Director in consultation with a panel of internal university experts. This allows both the Station and Extension to attract the best and brightest to complement ongoing research and extension endeavors.

New faculty members supported by Land Grant funds are obligated to write Hatch, Hatch regional or Cooperative Extension proposals. The proposals are reviewed by external experts and input is sought from those experts. The input is utilized by the new faculty member/proposal writer to improve the quality of the proposed project. The proposal is then entered into REEPORT.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public

Brief explanation.

Diverse stakeholder input is solicited through robust, multi-level processes that provide opportunities for multiple channels of communication. These levels include: the project (typically sought by a principal investigator[s]), the program (sought by principal investigators or program leaders) and at an administrative level (sought by the Dean/Director). Additionally, at the administrative level, the Dean employs a variety of collaborative external groups including the

Agriculture Industry Advisory Group.
Although programs within the Rhode Island Plan of Work utilize different strategies for seeking stakeholder participation and input, the following were all used to encourage stakeholder participation: use of media to announce public meetings and listening sessions; targeted invitations to traditional stakeholder groups; targeted invitations to non-traditional stakeholder groups; targeted invitations to traditional stakeholder individuals; targeted invitations to non-traditional stakeholder individuals; targeted invitations to selected individuals from the general public; survey of traditional stakeholder groups; survey of traditional stakeholder individuals; survey of the general public; survey of non-traditional groups; and survey of selected individuals from the general public.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments
- Use Surveys

Brief explanation.

Identification of individuals and groups was facilitated by using advisory groups, internal focus groups, external focus groups, open listening sessions, needs assessments and use surveys. User groups also assisted in the identification of individuals. Examples of user groups that were solicited to identify stakeholders included the Rhode Island Agricultural Partnership (architect for Rhode Island's Five-Year Strategic Plan [http://www.farmland.org/documents/RI_agriculture_5yr_strategicplan.pdf]), the Rhode Island Department of Environmental Management's Division of Agriculture, Rhode Island Nursery and Landscape Association, the Rhode Island Natural History Survey, and municipal officials. One of the benefits of working in a small state is easy access to stakeholders.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public

- Survey of selected individuals from the general public

Brief explanation.

Each of the following methods was used to collect stakeholder input: meeting with traditional stakeholder groups; survey of traditional stakeholder groups; meeting with traditional stakeholder individuals; survey of traditional stakeholder individuals; meeting with the general public; survey of the general public; meeting specifically with non-traditional groups; survey specifically with nontraditional groups; meeting specifically with non-traditional individuals; survey specifically with nontraditional individuals; meeting with invited selected individuals from the general public; and survey of selected individuals from the general public. Additionally, the Dean/Director employed an advisory group, the Agricultural Industry Advisory group, to provide input and reflections on the mission of the Land Grant programs and the direction of the programs including state needs. Please note that each of the programs described in this report did not use all the methods listed above.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief explanation.

Input was collected from external audiences and assessed. Emerging issues as well as continuing needs drove priority setting, action plans, budgeting and resource allocation.

Brief Explanation of what you learned from your Stakeholders

Research and extension focused on strengthening the local and/or regional food system is an area of increasing interest in Rhode Island.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1128198	0	1559877	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	1080072	0	1740025	0
Actual Matching	1147876	0	1673993	0
Actual All Other	0	0	0	0
Total Actual Expended	2227948	0	3414018	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	321374	0	819557	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Food Safety and Nutrition

☑ 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
701	Nutrient Composition of Food	5%		5%	
702	Requirements and Function of Nutrients and Other Food Components	0%		20%	
703	Nutrition Education and Behavior	45%		35%	
704	Nutrition and Hunger in the Population	0%		25%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	25%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	25%		15%	
	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	2.6	0.0	2.5	0.0
Actual Paid	0.8	0.0	2.6	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**
57699	0	145559	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
52316	0	107319	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Food Safety:
Continue to provide HACCP and sanitation education programs to food processors (e.g. seafood, meat/poultry)
Host an annual Food Safety Conference for public and private stakeholders
Maintain the Good Agricultural Practices (GAP) Program for commercial growers of fruit and vegetables an d continue to update program materials
Oversee accredited online training and examinations for Food Safety Manager courses (e.g. non-profit agencies, NFS nutiriton and dietetics students)
Update and maintain website and listserv
Implement food preservation classes in a variety of formats for consumers (e.g. lecture only, hands-on and demonstration)
Outreach education to farmer market managers
Continue to provide volunteer food service food safety training
Develop and implement outreach program targeting food entrepreneurs
Continue community lecture series on marine-related topics
Continue collaboration with RIDOH and RIDEM on a variety of food safety outreach initiatives

Nutrition:
Collect Data on targeted audiences

Conduct Fitness testing and body composition analysis

Administer Survey and questionnaires

Conduct Blood analysis and calculate dietary intake

Facilitate partnership with diverse communities

Refine curriculum and teacher training programs

Test interventional modalities for health maintenance and obesity prevention

Analyze data and evaluate outcomes

Food Security

Assess the diet quality of targeted low-income, vulnerable populations.
Assess the food security status of targeted low-income, vulnerable populations.
Assess the food resource management and food safety practices of the target audience.
Develop and implement assessment tools, curriculum, print materials and social marketing campaigns.
Evaluate the effectiveness of interventions and materials related to behavior change.
Facilitate and strengthen community partnerships.

2. Brief description of the target audience

Food Safety:
Food industry and food service workers and managers, food processors, consumers, agricultural producers, home gardeners, school administrators, school-aged children and their caregivers, special needs students, teachers, community volunteers, Master Gardener volunteers.
Nutrition:
Lean and obese adults; ethnic men and women; low-income school age children and families

Food Security:
Low-income, Food Stamp eligible and participating families, children and older adults.

3. How was eXtension used?

na

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	8741	340880	11161	1822

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	1	12	13

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed publications

Year	Actual
2014	9

Output #2

Output Measure

- Abstracts

Year	Actual
2014	7

Output #3

Output Measure

- Professional training sessions

Year	Actual
2014	2

Output #4

Output Measure

- Volunteer training

Year	Actual
2014	6

Output #5

Output Measure

- Conferences hosted

Year	Actual
2014	3

Output #6

Output Measure

- School based training sessions

Year	Actual
2014	314

Output #7

Output Measure

- Website development and refinement

Year	Actual
2014	5

Output #8

Output Measure

- Student training

Year	Actual
2014	159

Output #9

Output Measure

- Intervention studies

Year	Actual
2014	3

Output #10

Output Measure

- Workshops

Year	Actual
2014	650

Output #11

Output Measure

- Scientific/professional presentations

Year	Actual
2014	11

Output #12

Output Measure

- Thesis/dissertation

Year	Actual
2014	14

Output #13

Output Measure

- Public service announcements

Year	Actual
2014	3

Output #14

Output Measure

- Social marketing

Year	Actual
2014	0

Output #15

Output Measure

- Fact sheets, bulletins and newsletters

Year	Actual
2014	57

Output #16

Output Measure

- Video productions

Year	Actual
2014	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Develop, implement and evaluate new health and food safety training and resource materials for targeted audiences such as consumers, educators, food industry personnel and health care providers (# of new programs).
2	Commercial growers of fruit and vegetables, food industry producers, processors, and school personnel foodservice will participate in appropriately directed food safety (# people trained).
3	Increase understanding of motivators and barriers of making healthy food choices and the impact these food choices have on lipoprotein metabolism and metabolic syndrome in young adults.
4	Increase understanding and behavior change with regard to decreasing dietary intakes and increasing physical activity level, and the impact of these changes on body fat mass, physical function, and coronary heart disease risk factors in obese older women.
5	To develop and test laboratory techniques, free-living methodologies, and interventions to assess and improve within-meal eating behaviors, in the interest of healthy, effective body weight management and obesity prevention.
6	EFNEP and FSNE Families and Older Adults will improve dietary practices from baseline in one or more domains (diet quality, food security, food resource management, or food safety) thus reducing future risk of disease and improving health and quality of life.
7	Revise, as necessary, and implement food safety education for consumers, school educators, students and volunteers in Rhode Island and within the United States (#of people)
8	Assess and address individual and environmental factors that influence eating behavior of young adults.

Outcome #1

1. Outcome Measures

Develop, implement and evaluate new health and food safety training and resource materials for targeted audiences such as consumers, educators, food industry personnel and health care providers (# of new programs).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Health and food safety issues concerning a variety of foods keep evolving and information to target audiences requires continuous revision and updating. Therefore new training and resource materials need development/revision evaluation and implementation. In addition, new types of communication efforts are important to reach audiences.

What has been done
The food safety program website has been updated in areas such as Good Agricultural Practices (GAP), preservation, and emergency preparation. Farmer listserve updates are ongoing. A RI GAP certified listserve was created. A new curriculum targeting elementary/middle school students was created (with outside funding) focusing on food safety and school gardens. Food service directors were targeted as part of the farm to school initiative. Preservation workshops were revised to include a new demonstration workshop format, adding to our food preservation outreach initiative to meet growing demand from consumers for preservation of locally grown food.

Results
Two new programs were launched and numerous website additions/revisions were implemented. A third program will be implemented in FY 2015. Extramural funds have been also secured to help support the program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources

712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

Commercial growers of fruit and vegetables, food industry producers, processors, and school personnel foodservice will participate in appropriately directed food safety (# people trained).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	228

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is need for food safety information throughout the diverse RI community of foodservice workers, food industry personnel, processors and commercial fruit and vegetable growers. Federal and state regulations mandate specific training so that the RI food industry is in compliance. In addition, new federal regulations require outreach efforts to prepare processors for implementation. Participation in voluntary food safety programs is either becoming mandatory or an expectation for business and non-profits. This program has a regional impact for training.

What has been done
In collaboration with regional academic partners and RI state agencies, this program successfully offered or participated in 15 professional training sessions (e.g. workshops, conferences) that have been highly evaluated. Approximately 180 processors/farmers, in RI and across the region, have attended workshops related to seafood, meat/poultry, and produce, collaborating with University of CT. Over 1000 seafood processors are reached by a yearly newsletter. Two professional conferences have attracted over 140 people. All programs are routinely updated to reflect new information and mandates.

Results
All programs are evaluated for effectiveness on a 5 point Likert scale (1 to 5) for usefulness and/or understanding of key information. In addition, a farmer survey was implemented to assess the impact of the RI GAP program. All programs are rated above 4.0 (e.g. 5=very useful, extremely understood). Of the RI GAP certified farmers responding (N=15), 100% indicated that the training and certification had a positive (N=12) or somewhat positive (N=3) impact on their business. Training resulted in: 52 GAP trained, 40 RI GAP certified farms, 34 Meat and Poultry HACCP trained, 90 Seafood HACCP trained, and 48 manager certified.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Increase understanding of motivators and barriers of making healthy food choices and the impact these food choices have on lipoprotein metabolism and metabolic syndrome in young adults.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Young adults (those 18-24 years of age) are a population of interest, as identified by the National Institutes of Health and the American Heart Association in regards to risk for coronary heart disease. These organizations feel that there should be more of an emphasis on primordial intervention. Young adults are presenting with abnormal lipoprotein metabolism more frequently. This results in increased risk of metabolic syndrome and coronary heart disease. Because lifestyle choices, especially dietary intake, can impact this increased risk, we are using various types of messaging to improve dietary intake to reduce coronary heart disease risk.

What has been done
To address this problem, we analyzed data collected for the Nutrition and Food Sciences 210 Introductory to Nutrition lab. For the course, students complete a Cholestech screening (standard lipid profile and glucose concentrations via standardized fingerprick) in order to assess their heart disease risk. We have received IRB approval to use these data for research purposes. We have approximately 250 participants with full lipid profiles.

Results
We found that low HDL-C and elevated triacylglycerols are the most common biochemical risk factors in this age group.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #4

1. Outcome Measures

Increase understanding and behavior change with regard to decreasing dietary intakes and increasing physical activity level, and the impact of these changes on body fat mass, physical function, and coronary heart disease risk factors in obese older women.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Saropenia, age related lean muscle loss becomes a major public health concern in older adults due to associated adverse health outcomes as well as increased health care costs. It can be problematic especially for obese older women. A healthy diet and appropriate exercise have the least amount of associated risk and can be used to prevent or slow progression of sarcopenia, thus providing a positive effect on health.

What has been done
During this report time period (10/1/13-9/30/14), we focused mainly on data analysis, manuscript writing and disseminating our previous research results through presentations at local community, and regional and national conferences, as our intervention phases are complete.

Results

The results from our recently completed study have shown participants in the behaviorally based diet education combined with exercise program (resistance & Tai Chi) not only became more physically active, but also improved their dietary quality and some measures of physical function.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

To develop and test laboratory techniques, free-living methodologies, and interventions to assess and improve within-meal eating behaviors, in the interest of healthy, effective body weight management and obesity prevention.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

EFNEP and FSNE Families and Older Adults will improve dietary practices from baseline in one or more domains (diet quality, food security, food resource management, or food safety) thus reducing future risk of disease and improving health and quality of life.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

With one of the highest unemployment rates in the country and a persistent poverty level especially among families with children, there continues to be an increase in RI households that are food insecure. A high level of households continue to receive SNAP benefits and these participants tend to make less than healthful consumer choices when compared to higher income purchasers. Food insecurity persists among our large population of seniors, and this economic insecurity, shaped with unique nutrition needs and learning preferences, complicates nutrition related diseased states in which nutrition plays a vital role. At the same time, obesity rates continue to increase among children and adults alike, indicating a more than likely increase in new cases of type 2 diabetes, heart disease, stroke, hypertension, arthritis and obesity-related cancers. Ethnically, more than 40% of RI low-income children are Hispanic. Children living in areas of concentrated poverty, who are more likely Hispanic or Black, face challenges above and beyond the burdens of individual poverty. Hispanic children are more than twice as likely to be overweight or obese than non-Hispanic children. Obesity is associated with low education and income levels.

What has been done

SNAP-Ed and EFNEP efforts were focused on increasing fruit, vegetable, and whole grain consumption and a plant-based diet among adult and youth participants, as well as emphasizing food resource management. Reducing sugar-sweetened beverages and energy dense snacks as well as increasing fruit and vegetable consumption has been the focus of our first year of CYFAR programming. An effort to improve child feeding practices among parents and caregivers has also been emphasized with a program focus on making healthy choices easier, trying new foods, modeling healthy food behaviors, decreasing non-productive screen time, and increasing time spent in physical activity. In addition, we have taken a more collaborative approach and have actively pursued partners with similar client bases in order to deliver similar messages and strengthen programming, while working towards a systems and environmental change.

Results

A quasi-experimental study evaluated fruit and vegetable consumption among third and fourth graders in three Providence schools. Results found that in students receiving an eight week nutrition curriculum plus the Fresh Fruit and Vegetable Program (FFVP), fruit consumption increased by .89 pieces per day and vegetable consumption increased by .81 times per day ($P < 0.001$) when compared to a control school that received the FFVP but no nutrition curriculum and a control school that received neither program. No significant change was found in either control school. Healthy Servings for Seniors (HSS), a program partnership with Farm Fresh RI, found a significant increase in the amount of fruit and vegetable consumption and in the variety of fruit consumed over a three month span by 96 senior participants. An increased consumption of one-half cup per day of fruit and one-half cup of vegetables was found. Day care providers (n=48) attended a two-part professional development series on infant feeding practices and division of responsibility. Post surveys given at six-weeks showed a 92% change in how and what foods were served. One hundred percent of day care providers shared program feeding information with parents. Ninety percent could better identify infant cues for hunger and fullness and 100% were able to practice the principles of division of responsibility at mealtimes. Eighty percent of EFNEP participants (n=353) improved in one or more nutrition practices (plan meals, make healthy food choices, prepare foods without adding salt, read nutrition labels). Twenty-nine percent of adult participants recorded a positive change in physical activity. Forty-two percent of EFNEP youth (n=1610) reported eating more vegetables on more days of the week.

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population

Outcome #7

1. Outcome Measures

Revise, as necessary, and implement food safety education for consumers, school educators, students and volunteers in Rhode Island and within the United States (#of people)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	532

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The "local" food movement continues to foster a revival of interest in home food preservation. Issues related to quality and safety of local production and preservation should be addressed. School educators and volunteer workers continue to require professional development and food safety training, respectively.

What has been done
The preservation program was expanded by developing a new demonstration format and will complement the hands-on workshop and lecture-only formats. The new "on the road" workshop will more easily offered to a larger state-wide audience and be more effective than lecture-style presentations. There have been two demonstrations and one hands-on workshop this year. Manager certification and online training oversight was offered to three groups and two volunteer food safety training sessions were completed. In addition, the food safety specialist oversaw a large fundraising event for a local daycare provider. She helped write and implement a food safety plan for the event.

Results
Most programs are evaluated for effectiveness on a 5 point Likert scale (1 to 5) for usefulness and /or understanding of key information. All programs are rated above 4.0, (e.g. 5=very useful, extremely understood). There were 62 participants in the food preservation workshops. There were 137 Master Gardener volunteers participating in the food safety and gardening outreach efforts. A community lecture series, jointly offered with RI Sea Grant reached 227 community

members and students.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #8

1. Outcome Measures

Assess and address individual and environmental factors that influence eating behavior of young adults.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Eating a largely plant-based diet is widely acknowledged as being more healthful and more environmentally sustainable. There is also a growing interest within the United States and especially among young adults in eating a diet containing foods that are locally grown and sustainably produced.

What has been done
We conducted a College Environment Behavioral and Perception Survey (CEBPS) to assess student behaviors and perceptions related to healthy eating. We also developed and tested a four-module Green Eating intervention to help students understand issues related to their personal environmental choices related to eating and to help them come to an awareness of how their own food choices affect the environment.

Results
The CEBPS has been completed by 404 students at URI and analysis of results is in progress. The Green Eating intervention was tested in 663 students. The experimental group improved

environmentally conscious eating behavior, knowledge and attitudes more than the control group over the 6-week study period.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

All food safety programs were evaluated for effectiveness on a 5 point Likert scale for usefulness and/or understanding of key information. In addition, questions were asked about intent to use the information presented. (See descriptions embedded within outcome descriptions.)

Key Items of Evaluation

All food safety programs were rated above 4.0, with 1= not useful, not understanding to 5=very useful, extremely understood.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Sustainable Energy, Climate Change and the Environment

☑ 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	3%		3%	
112	Watershed Protection and Management	11%		11%	
123	Management and Sustainability of Forest Resources	11%		11%	
131	Alternative Uses of Land	9%		9%	
132	Weather and Climate	9%		9%	
133	Pollution Prevention and Mitigation	11%		11%	
135	Aquatic and Terrestrial Wildlife	11%		11%	
136	Conservation of Biological Diversity	9%		9%	
605	Natural Resource and Environmental Economics	3%		3%	
608	Community Resource Planning and Development	11%		11%	
721	Insects and Other Pests Affecting Humans	8%		8%	
722	Zoonotic Diseases and Parasites Affecting Humans	3%		3%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	1%		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	5.5	0.0	11.0	0.0
Actual Paid	2.1	0.0	19.4	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**
250567	0	640597	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
163932	0	632829	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Vector Borne Diseases
Used surveillance data accumulated over 21 years to develop user-friendly tools to pinpoint risk, both spatially and seasonally.
Determined landscape patterns that present the greatest risk for encountering a tick bite.
Formulated landscape plans to reduce the chances of encounters between ticks and people.
Created a web-based decision support system. Using this system, people will compile a customized risk index and then follow links that will help them devise short- and long-term disease prevention action plans.
Studied the salivary glands of ticks to find compounds from ticks with potential pharmacological value, formulate novel vaccination strategies to prevent tick-transmitted infections, develop bio-molecular assays for tick-borne pathogens, and elucidate transmission dynamics of pathogens among tick vectors and vertebrate hosts.

Climate Change

Research investigations focused on watershed patterns and processes that affect the fate of nitrogen and environmental flows. Research methods included lab and field studies as well as geospatial analyses.

Extension programs created locally relevant programs focused on land and community management. In cooperation with stakeholders and partner agencies, we identified needs and built upon successful local programs to create and disseminate new materials, tools and curricula in RI and New England.

Our water quality programs continued development, delivery, training and application of proven water quality management tools and techniques such as:
o Curricula and training on best management practices (BMPs) for conventional and alternative and innovative onsite waste water treatment
o Public outreach and training on stormwater management
o Curricula and training regarding private wells
o Volunteer Water Quality Monitoring

The Environment and Adaptive Agro-ecosystems

Sustaining wildlife through habitat management is a critical issue for RI. Migrating song birds require

suitable food sources to complete their migration and coastal lands have undergone extreme changes in vegetation, potentially imperiling migration success and fecundity for many native species.
Ruffed Grouse are of particular concern in southern New England because they are a native game bird species that is currently too rare to sustain a hunting season and they serve as a "sentinel species" for the response of many species to the success or failure of management of early successional forests.
Although vernal ponds in forested watersheds provide essential habitat for a host of organisms, the fecundity of these organisms is highly linked to forest disturbance and management, requiring a careful understanding of the underlying ecology.
Invasive plants threaten the integrity of New England habitats and could affect biodiversity within the state. Research and extension programs are planned to assess invasives and develop strategies for mitigation.

Sustainable Energy
Promoted alternative fuel technologies and fuel economy measures at the individual and fleet level to decrease use of petroleum in the transportation sector.
Promoted completion of energy audits for increased energy efficiency and adoption of conservation behaviors for decreased energy consumption at the individual and small business level.
Energy audit and greenhouse gas (GHG) inventory in selected municipalities/businesses

Feasibility and implementation of energy efficiency and renewable energy technologies.

Municipal energy training:
- o Training for municipal officials and employees
- o Climate Showcase Community conferences

Residential Energy Education:
- o Participants pledge 10% energy savings
- o Trained volunteers conduct locally-based education and outreach

Outreach Activities:
- o Sustainable energy page on local websites
- o Community workshop

Traditional and web media

2. Brief description of the target audience

Target Audience
Vector Borne Diseases
The target audience will be diverse and will represent all Rhode Islanders, especially those at greatest risk of contracting vector borne diseases. This audience will include community members, grassroots agencies, municipal and state policy makers, home owners and educational institutions.

Climate Change
Public decision makers; policy makers; NRCS; local, state and federal agencies; municipal planners; private sector firms engaged in watershed management, landscaping, onsite waste water treatment and private wells; NGOs (land trusts, environmental organizations, etc), agricultural producers, the public

The Environment and Adaptive Agro-ecosystems
A mixture of public policy personnel (federal and state agencies as well as town conservation, planning and management officials), local nonprofit groups involved in land management, such as conservancies,

interested and involved citizens, and private landowners and high school students through training and participation in the Rhode Island Environthon.

Sustainable Energy
Municipal officials, building and utility managers, financial administrators, mayors/town managers, municipal employees, residential energy consumers, school systems

3. How was eXtension used?

An eXtension webinar was presented in the All Bugs Good and Bad webinar series (April 4, 2014). See https://learn.extension.org/events/1381

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	14688	506000	787	1000

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	2	17	19

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed publications

Year	Actual
2014	16

Output #2

Output Measure

- Books and monographs

Year	Actual
2014	2

Output #3

Output Measure

- Abstracts

Year	Actual
2014	40

Output #4

Output Measure

- Conference proceedings

Year	Actual
2014	17

Output #5

Output Measure

- Fact sheets, bulletins and newsletters

Year	Actual
2014	98

Output #6

Output Measure

- Training manuals (includes instructional CD?s)

Year	Actual
2014	22

Output #7

Output Measure

- Scientific/professional presentations

Year	Actual
2014	104

Output #8

Output Measure

- Workshops (including short courses)

Year	Actual
2014	97

Output #9

Output Measure

- Conferences hosted

Year	Actual
2014	8

Output #10

Output Measure

- Website development and refinement

Year	Actual
2014	254

Output #11

Output Measure

- Public presentations

Year	Actual
2014	87

Output #12

Output Measure

- Public service announcements

Year	Actual
2014	50

Output #13

Output Measure

- Student training

Year	Actual
2014	340

Output #14

Output Measure

- Thesis/dissertation

Year	Actual
2014	10

Output #15

Output Measure

- Postdoctoral training

Year	Actual
2014	2

Output #16

Output Measure

- Webinars

Year	Actual
2014	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Identify areas of high risk for vector borne diseases in Rhode Island
2	Create tick surveillance database
3	Create web-based decision support system to reduce risk to vector borne diseases.
4	Reduce tick abundance community-wide
5	Increased (%) of in the proportion of professionals and the public knowledgeable about maintenance, improvement and challenges of climate variability and climate change related to onsite wastewater treatment.
6	Increased (%) development of locally based water resource data for use by communities and the public that can assist in risk assessment and management related to watershed changes, climate variability and climate change.
7	Increase in targeted households and professionals gaining knowledge of testing, treatment and protection of private well water and management options related to land use, climate variability and climate change. Increase in targeted households and professionals gaining research-based knowledge of testing, treatment and protection of private well water.
8	Increase in the proportion of the public and professionals knowledgeable about management of storm water and options for addressing risks related to watershed changes, climate variability and climate.
9	Development of a rapid-response to public concerns about local HAB's. Increased development of locally based water resource data for use by communities and the public that can assist in risk assessment and management related to watershed changes, climate variability and climate change.
10	Increased understanding by wildlife biologists, NGOs, local and state officials through publications and talks on people's willingness to support ecosystems and conservation.
11	Increased understanding by wildlife biologists and managers through publications and talks of how habitat quality and management practices affect populations of migrating song birds.
12	Our proposed research would increase understanding of three critical issues: inadequate GIS-based information about the spatial extent of early successional habitat, inadequate use of the Adaptive Management Paradigm to evaluate past and present efforts to expand early successional habitat, and inadequate understanding of how certain forest management activities affect populations of key wildlife species. Our proposed research will directly strengthen outreach programs to promote better targeted and more effective forest management interventions in southern New England.
13	Increased development of new subaqueous soils interpretive approaches and dissemination of these approaches to other scientists and natural resource managers through publications, workshops or talks.
14	Increased (%) forest and conservation geospatial information resources, and increased usage of these resources by government organizations, NGOs and the public.

15	Increased awareness of the effects of human-induced land-cover change and provided insights into the extent and rate of land-cover changes in Rhode Island and the impacts of human activity on characteristics of forest landscape over the last four decades through generated data and maps.
16	Increased US state and federal regulators understanding of avian-wind turbine interactions. This information is also useful to conservation NGOs interested in protecting avian resources in the region.
17	Increased understanding and acceptance by the nursery industry, the general public, professional groups, and research scientists through patents, publications and talks of the occurrence and value of adelgid-resistant eastern hemlocks.
18	Master Energy Training will be conducted to educate RI residents, small businesses and municipalities so that they can make informed decisions that will reduce their consumption of fossil fuels and their carbon footprint through energy conservation, efficiency and use of clean energy resources.
19	Through the Energy Fellows Program, we will provide URI undergraduate and graduate students with the opportunity to gain invaluable experience addressing real-world energy issues.
20	NIFA energy programs at URI are coordinated with the DOE-funded Ocean State Clean Cities Coalition to provide a broader array of program and services for RI stakeholders concerned about energy issues.
21	Through the Renewable Energy Siting Partnership, a URI team of skilled professionals in the fields of energy, research and planning will develop tools, guidelines and data analysis that can be used by Rhode Island's cities and towns to site and manage this new activity. Additionally, the RESP project will make state and municipal energy information accessible to the public through the creation of a comprehensive online energy database.
22	Through a partnership with Rhode Island Department of Transportation we will capitalize on the wealth of both experience and funding available at the state and federal levels to accelerate and facilitate reduction of diesel pollution from work performed on projects managed by RIDOT.
23	Increased understanding by scientists and decision makers through publications and presentations of the management implications related to plant genome size influences on competitive ability and susceptibility to herbivory.
24	Increased understanding of the private and public sector and scientists of economic valuation of air quality and greenhouse gas emissions through publications and presentations
25	Advance understanding by scientists and decision makers of demand and supply of ecosystem services (ES) from watersheds in the rural-urban fringe at a policy-relevant scale by integrating information from hydrology, spatial science, and economics.
26	Models will be developed for coastal managers that will enable them to assess potential for coastal marsh restoration to enhance C sequestration in those ecosystems.
27	Increased understanding by scientists, conservationists, and land managers through publications and presentations of the management implications of forest fragmentation and creation of early-successional habitat on turtle populations.
28	Increased understanding of the management implications of how amphibian and reptile populations respond to the impacts of forest loss and pollution.
29	Increased understanding of the management and risks of watershed nitrogen delivery.
30	Increased understanding of how wildlife populations may respond to climate change.

Outcome #1

1. Outcome Measures

Identify areas of high risk for vector borne diseases in Rhode Island

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rhode Island possesses one of the most concentrated blacklegged tick populations in the United States affecting a majority of its citizens. Risk maps are useful in communicating relative levels of risk and changing risk patterns.

What has been done
A Rhode Island statewide TickEncounter Risk Survey has been conducted for 21 consecutive years to assess relative abundance of nymphal blacklegged ticks. Ticks have been sampled following a standardized protocol at the same 60 sites and the data are used to generate interpolated risk maps in a GIS.

Results
In 2014, for the third year in a row, nymphal blacklegged tick abundance was the highest recorded in the 21 year period, increasing 0.3% statewide when compared with the previous nymphal blacklegged tick record of 2013. In 2014, overall nymphal tick abundance was 62% higher than the previous 5 yr average, with significant increases noted in Cumberland, Portsmouth, and the western border of the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
721	Insects and Other Pests Affecting Humans
722	Zoonotic Diseases and Parasites Affecting Humans

Outcome #2

1. Outcome Measures

Create tick surveillance database

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The results of this work are being used to develop models predicting risk for vector tick encounters and tick-borne disease. The information will benefit citizens as well as public health planners. The long-term nature of this database also has demonstrated its utility in identifying potential climate and climate change impacts on tick-borne diseases in Rhode Island.

What has been done
The 21 year Rhode Island statewide TickEncounter Risk Survey database is stored on a local network share drive for ease of use for investigators, but is backed-up monthly in ESRI FileGeodatabase format. After new additions to the database are made, it is copied to a large raid array, and that is moved to a cloned raid array every 6 months. The data are also available in text file format for analysis in SAS. Field data are stored with UTM coordinates Zone 19 North American Datum1983.

Results
TickEncounter Risk Survey data collected between May - July 2014 were added to the database (see above). The database was used to assess long-term disease trends and to investigate climate/weather impacts on tick encounter risk. We showed that nymphal blacklegged tick encounter risk each year is determined by the number of tick adverse moisture events (TAME) occurring during June of the same year. A TAME is defined as a localized (tick habitat) relative humidity <80% lasting 8 hrs or more>. Eight or more TAMES in one season always resulted in a significantly lower nymphal tick population which was correlated with lower Lyme disease incidence rates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
721	Insects and Other Pests Affecting Humans
722	Zoonotic Diseases and Parasites Affecting Humans

Outcome #3

1. Outcome Measures

Create web-based decision support system to reduce risk to vector borne diseases.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Across America, 300,000 new cases of Lyme disease are diagnosed each year, and there are other dangerous tickborne diseases, too; but there are scant few expert resources for translating tick sciences to benefit the public. URI's TickEncounter Resource Center (TERC) is a national leader in linking the best of tick science to peoples' lived experiences. TERC's web site (www.TickEncounter.org) and its tools and content engage, educate and empower TickSmart actions to help people be TickSafe.

What has been done
Launched in 2006, TickEncounter is a unique web-based outreach and decision-support platform aimed at linking the best of tick science to people's lived experiences. TickEncounter distinguishes itself from most other tick resources by providing an engaging graphic interface with seasonally and geographically relevant messages empowering tick bite protection. Various tools are included but all attempt to conform to the 4 tenants of the Health Belief Model for behavior change. In 2014, TickSpotters was established as an interactive, crowd-sourced tick survey across America.

Results

TickEncounter analytics revealed that the site posted 927,909 sessions and 803,507 unique users in 2014; there were 1,792,107 pages viewed, an increase of 92.7% over 2013. In addition to this, we placed 15 guest blogs with 13 different web-based blog sites which generated a significant but unknown number of additional views of TickEncounter related decision support materials. We distributed >35,000 tick identification magnets and >2,500 TickSmart Daily Tickcheck Reminder cards to individuals and organizations across the United States, and responded to >1,500 e-mail inquiries generated through the web site channel. Our social media channels continued to grow with >1,500 new Facebook "likes" in 2014 and >600 new followers on Twitter (@TickEncounter and @theTickGuy). TickEncounter's Youtube channel has had 4,703,903 lifetime views with 656,351 views during 2014 and an estimated 531,716 minutes watched. Our popular "How to remove a tick" video was watched 611,411 times (467,730 minutes) in 2014.

4. Associated Knowledge Areas

KA Code	Knowledge Area
721	Insects and Other Pests Affecting Humans
722	Zoonotic Diseases and Parasites Affecting Humans

Outcome #4

1. Outcome Measures

Reduce tick abundance community-wide

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Increased (%) of in the proportion of professionals and the public knowledgeable about maintenance, improvement and challenges of climate variability and climate change related to onsite wastewater treatment.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Approximately 30% of Rhode Islanders rely on onsite wastewater treatment systems (OWTS) to treat wastewater. Rural and suburban communities, lacking municipal sewers, rely on them entirely. In the humid northeast US it is expected that wetter and warmer climatic conditions will result in poorer treatment potential in conventional OWTS. Sea level rise in densely developed coastal areas of RI also causes a rise in groundwater tables in those areas and will result in a reduction in separation distance between OWTS and water tables. This will result in a reduction in treatment potential, and an expected reduction in ground and surface water quality. RI Department of Environmental Management and local community decision makers need research data and outreach support to develop regulations and policy that will protect public and environmental health.

What has been done
In 2014 URI researchers made invited presentations at five conferences about climate change and OWTS reaching approximately 235 wastewater practitioners, board of health officials, regulatory decision makers and coastal resource managers. We continued our outreach efforts to promote advanced OWTS technologies as a best management practice to mitigate the expected loss of treatment potential in OWTS located in at-risk areas for climate change impacts.

Results
URI project staff educated wastewater practitioners about advanced OWTS, helping to raise the knowledge base and proficiency of these wastewater designers. Approximately 40% of all OWTS applications that these designers submit to the RI Department of Environmental Management are for advanced OWTS. Use of advanced OWTS that denitrify wastewater are now required in state-designated watersheds that are nitrogen sensitive. This has helped protect these watersheds from further degradation and may help to mitigate the impacts of climate variability and climate change.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation

Outcome #6

1. Outcome Measures

Increased (%) development of locally based water resource data for use by communities and the public that can assist in risk assessment and management related to watershed changes, climate variability and climate change.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Seasonal droughts, rising nutrient levels, nuisance algae blooms and the spread of invasive aquatic plants have increased awareness that water quantity and quality is a concern for the public and local, state and national decision makers. Agency resources, both staff and financial, to monitor water resources in New England have always been insufficient, while the need increases yearly. Monitoring is long-term, with best decisions based on at least 10 years of data. Detecting trends and threats to local waters is increasingly becoming the responsibility of local communities and watershed organizations. Even the simple measurement of water temperature has become recognized as valuable, not just in documenting climate change, but in its role in nutrient cycling, plant and algae proliferation, and potential and actual effects on people and animals.

What has been done
URI Watershed Watch has become the largest and premier long-term volunteer water quality monitoring and citizen science program in RI, and is a model for other states and organizations. We have held multiple training sessions for new and returning volunteers. Now approximately 350 citizen scientists conduct ecological monitoring on ~270 locations primarily in RI, sponsored by more than 40 local organizations, measuring water clarity, temperature, oxygen content, pH and alkalinity, processing samples for chlorophyll and collecting samples for lab analyses of nutrients and bacteria during the six month monitoring season. Sites are 1/3 lakes or ponds, 1/3 rivers and streams, 1/3 estuaries, bays, and salt ponds. Co-hosted NE Lakes conference to educate lake and watershed organizations about lake and watershed ecology. Invited speaker at Land Trust and Citizen Science conferences. This year we obtained significant grant funding to develop an easily searchable relational database to house the decades of data, which can be used by program volunteers, their program coordinators, environmental and agency professionals. We are active at the local to national scale in lake-related efforts. We are on the RI DEM-DOH Cyanobacteria Task Force, as well as the EPA-NE and NEIWPCC ones. Our Coastal Fellow has also participated in these meetings and implemented the inaugural EPA-NE effort in RI.

Results
Because of Extension-led volunteer monitoring an unparalleled, long term record of water clarity, temperature, oxygen content, nutrients and bacteria levels now exists in most NE states, with more than 25 years of data from the URI Watershed Watch program. Over 20,000 annual data points aggregated into site-specific monitoring results were posted on the URIWW website and

distributed to sponsoring organizations as well as RI DEM & US EPA in this fiscal year alone. Regulatory agencies have used the data to create regulations to protect excellent water quality as well as to document poor water quality, and to help best direct their resources. WW results are used for 303d listing. Extension has used monitoring results to target programs to specific geographic areas. Local groups have used the data to take action to enact local ordinances to promote farm and homeowner awareness and action to deal with local runoff and erosion issues. These data are also now being used to document surface water temperature changes and also track cyanobacteria blooms as well as deep water hypoxia and anoxia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation

Outcome #7

1. Outcome Measures

Increase in targeted households and professionals gaining knowledge of testing, treatment and protection of private well water and management options related to land use, climate variability and climate change. Increase in targeted households and professionals gaining research-based knowledge of testing, treatment and protection of private well water.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Protection of municipal drinking water receives increased attention as water suppliers are now required to test, report and treat for numerous water quality contaminants. Surprisingly, private wells, which serve 10% of the state's population, are not protected under the Safe Drinking Water Act or other federal programs. Private well owners are largely responsible for ensuring that their well water is safe for them and their families to drink. These residents need to be aware of contaminant risks to their drinking water sources and how to protect against such risks. Changing property laws and regulations in the state have increased demand for well water testing educational materials. Education and technical assistance about protecting private sources of

drinking water is critical to the health and safety of families relying on private wells. Audiences include private well owners, scientists and researchers, educators, federal, state, and local policymakers, and non-profit organizations. Given the large number of Rhode Islanders (100,000) who rely on private wells, this Extension program has used a variety of methods to educate and provide technical assistance to the state's private well owners.

What has been done
Total number of clientele contacts (workshops, face-to-face interactions): 583, including nine community workshops held across the state. In January, 2014 we updated the workshop presentation and format based on our review of workshop evaluations. In addition, in February 2014, we piloted an approach to increase the number of workshop participants who have their water tested. Two days after the workshop, we returned to the community to pick up test kits and take them to the RI Dept. of Health testing lab. To date, we have found that this has facilitated and increased private well testing. We participated in the RI Home Show at the RI Convention Center, April 3 - 6, 2014 and spoke with hundreds of private well owners. We implemented and piloted an intercept campaign at RI farmers' markets in a continuing effort to meet private well owners in their own community. URI undergraduates were hired and trained to attend these events. We launched a completely updated program website web.uri.edu/safewater. Annually the website receives 40,000 hits. The Program's quarterly newsletter is sent to 500 private well owners. Technical assistance is also provided via phone and email. Invited speaker at the National Ground Water Association's Annual Expo., Private Well Symposium, December 3 - 6, 2013. Invited presenter on the Center for Disease Control's National Private Well Working Group's quarterly webinar series, February 20, 2014.

Results
Post workshop evaluations conducted annually show that workshop participants are taking action to protect their private well, most notably, 67% of workshop participants had their water tested and 65% inspected their wellhead area for possible pollution problems. Our newly developed Private Well Tip Sheet series received a 2014 Clear Mark Award of Distinction for revised materials from the National Center for Plain Language. The tip sheet "Are you a smart well owner?" received a 2014 Clear Mark Award of Distinction and the best of category. We have an article accepted for publication in the Journal of Extension: McCann, A. & Stableford, S. "Know Your Audience, Ask Your Audience."

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #8

1. Outcome Measures

Increase in the proportion of the public and professionals knowledgeable about management of storm water and options for addressing risks related to watershed changes, climate variability and climate.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Storm water pollution is a major cause of impaired water quality in RI, leading to swimming beach closures, shellfishing bans, loss of recreational value, and degraded habitat. Most RI municipalities are at least partly urbanized and own storm sewer systems that contribute to the problem. Under EPA Rules and the RI Storm Water Discharge Permit program, municipalities are required to implement storm water management programs to reduce storm water pollution. To demonstrate compliance, the municipal programs must address several minimum standards including education and outreach to the public about storm water pollution and actions citizens can take; and involving the public in local storm water management programs. These requirements, while necessary, represent a significant burden for most municipalities already struggling with few staff, shrinking budgets, and in most cases, limited expertise in education and outreach.

What has been done
We have provided education and outreach to municipal officials, watershed groups, the public, and educators on managing storm water runoff. We organized three workshops on wetlands protection and gave presentations on other storm water management topics for local officials and environmental professionals. We helped develop a new Emergency Response Planning Guide dealing with flooding and other storm events and assisted in conducting training in use of the guide through five workshops. We worked with agency partners to make new tools available to municipalities, including new small scale sub-watershed maps for use in storm water management planning; an updated soils database with new fields useful in project review; and co-created a database of wetland buffer ordinances. We continued to make educational materials available to storm water managers and watershed groups that are freely available to use directly or customize. We responded to requests for information and technical assistance, and launched a new version of the RIStormwaterSolutions.org website with a new look and improved navigation.

Results
RI municipalities throughout the state used or customized URI educational materials to educate residents about storm water pollution using flyers, town hall notices, adding content to their own websites or linking to ours, posting storm water cartoons and other notices in the newspaper, and sponsoring educational events and cleanups, enabling them to develop effective storm water management programs. RI Department of Transportation also demonstrated compliance with public education and involvement requirements based on URI outreach. The local wetland ordinance database and literature review is being used by a legislative task force to recommend

more protective state buffer standards that address local concerns. Soil depth and quality standards developed by RI NEMO were incorporated into the updated 2014 RI Soil Erosion and Sediment Control Handbook, which will set the standard for all development regulated by State agencies and municipalities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #9

1. Outcome Measures

Development of a rapid-response to public concerns about local HAB's. Increased development of locally based water resource data for use by communities and the public that can assist in risk assessment and management related to watershed changes, climate variability and climate change.

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Increased understanding by wildlife biologists, NGOs, local and state officials through publications and talks on people's willingness to support ecosystems and conservation.

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Increased understanding by wildlife biologists and managers through publications and talks of how habitat quality and management practices affect populations of migrating song birds.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2014 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many forest owners, including private forest owners, land trusts, or NGOs, state and federal agencies, are interested in managing their forests to improve habitat for songbirds and other wildlife species. However, there are still many outstanding questions about the most effective methods for achieving this. Furthermore, there have been few attempts to date to assess the impact of forest management on wildlife

What has been done
A series of outreach events have been conducted to increase awareness of forest owners about how habitat quality and management practices affect populations of migrating song birds. Preliminary field studies have been conducted on how to create habitat for wildlife and assess various approaches to monitoring the quality of the resulting habitat.

Results
Awareness about the relationship between forest management and wildlife habitat has been increased for many landowners as a result of the outreach activities. Graduate and undergraduate students and research technicians have demonstrated that (a) using a robel pole is a promising approach to monitor the quality of habitat created through forest management; (b) locating small clear cuts near wetlands increases their habitat value for songbirds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #12

1. Outcome Measures

Our proposed research would increase understanding of three critical issues: inadequate GIS-based information about the spatial extent of early successional habitat, inadequate use of the Adaptive Management Paradigm to evaluate past and present efforts to expand early successional habitat, and inadequate understanding of how certain forest management activities affect populations of key wildlife species. Our proposed research will directly strengthen outreach programs to promote better targeted and more effective forest management interventions in southern New England.

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Increased development of new subaqueous soils interpretive approaches and dissemination of these approaches to other scientists and natural resource managers through publications, workshops or talks.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Seventy-five percent of the world's population lives within 50 miles of the coast. In the United States that number is predicted to be reached in the next 30 years. Coastal ecosystems are used for a myriad of purposes under the umbrellas of transportation, recreation, and livelihood. These ecosystems are under tremendous pressure from anthropogenic activities (i.e. pollution, dredging) and associated climate change responses (i.e. sea level rise and storms such as super-storm Sandy). Anyone trying to manage or conserve shallow subtidal systems can use our subaqueous soil maps and the associated use and management interpretations that we are developing. Users include federal agencies (USDA-NRCS, US-EPA, NOAA), state agencies (RI-DEM, RI-CRMC), nonprofits (TNC, Save the Bay), and producers (East Coast Shellfish Growers Association).

What has been done
In this project, we tested various subaqueous soil types to determine the most productive areas for shellfish aquaculture, evaluating which aquaculture method (on-bottom or suspended) may be the best approach depending on the soil type, and examining how soil type is related to coastal acidity. In our associated outreach efforts we coordinated with coastal managers, regulators, and aquaculture specialists to ensure that the results from our studies are delivered directly to the stakeholders and the general public via our website. We also presented our findings at several regional and national meetings.

Results
We found multiple factors that explained differences in oyster growth and survival among soil types including the type of seed, the year of the experiment, and time of year. There appears to be minimal difference between growth in on-bottom vs bag-and-rack (suspended) aquaculture. Younger oysters were more prone to predation on the bottom, but on-the-bottom oysters were of

higher quality. Our preliminary studies of water column/soil pH and shell dissolution suggest that coastal acidification differs significantly among soils and in some soils it may be impacting recruitment of oysters in the wild. We partnered with NRCS to develop ecological site data for subaqueous soils and partnered with TNC to support their investigations of oyster restoration and recruitment siting. As a result of these partnerships we expect to build a series of science-based aquaculture, restoration, and oyster recruitment site selection metrics. We delivered presentations at the national meetings of the Soil Science Society of America, the ACE/MAS/ISCR Conference, Groton CT, and the NEERS Conference, Block Island, RI. We have continued to increase the awareness of the utility of subaqueous soil data by supporting the release of updated soil data in partnership with the USDA NRCS and the RIGIS consortium.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
135	Aquatic and Terrestrial Wildlife

Outcome #14

1. Outcome Measures

Increased (%) forest and conservation geospatial information resources, and increased usage of these resources by government organizations, NGOs and the public.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The University of Rhode Island Renewable Resources Extension Act Program (URI RREA) focuses on extending and supporting the use of geospatial technologies to support natural resource management in our State. We work to meet our goals through a blend of online services, mentoring and advising conservation organizations, and traditional instructor-led training. Natural resource managers and local decision makers comprise our target audience. This audience typically consists of local and state government agencies, community volunteers non-profit organizations, and businesses.

What has been done
Five instructor-led classes were conducted. We continued hosting and maintaining the RI Geographic Information System (RIGIS) online data clearinghouse and the URI GPS Base Station. We supported the development of approximately 12 forest stewardship plans. We supported the publications of nine articles and blog posts. URI RREA scientists also collaborated with the Watch Hill Conservancy, Watch Hill Fire District, Northern Rhode Island Conservation District, Rhode Island Heritage Species (rare plants and animals) Database partners, and the USGS on four additional research and outreach initiatives.

Results
58 participants attended our instructor-led classes. The RIGIS online data clearinghouse distributed more than 6 TB of data. More than 5 GB of correction files were downloaded from the URI GPS Base Station. The 113 map services affiliated with the Rhode Island Digital Atlas responded to over 25 million requests. Our program resulted in at least 700 direct and 5,000 indirect contacts with individuals who took advantage of the services and events provided by our team over this reporting period.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #15

1. Outcome Measures

Increased awareness of the effects of human-induced land-cover change and provided insights into the extent and rate of land-cover changes in Rhode Island and the impacts of human activity on characteristics of forest landscape over the last four decades through generated data and maps.

Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

Increased US state and federal regulators understanding of avian-wind turbine interactions. This information is also useful to conservation NGOs interested in protecting avian resources in the region.

Not Reporting on this Outcome Measure

Outcome #17

1. Outcome Measures

Increased understanding and acceptance by the nursery industry, the general public, professional groups, and research scientists through patents, publications and talks of the occurrence and value of adelgid-resistant eastern hemlocks.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Hemlock is the only native shade-tolerant conifer on the east coast. Ecologically, it provides a year-round source of shelter for animals such as deer, and shades and cools headwater streams. This makes it a prime provider of habitat for trout and other cool-water aquatic species, which has led it to be dubbed a 'foundation species', i.e., essential to local ecosystems. Hemlock is currently under threat due to an insect pest called the Hemlock Wooly Adelgid (HWA).

What has been done
We have identified HWA-resistant trees. They were cross-pollinated and the seedlings were grown out in a controlled environment along with other seedlings from HWA-susceptible eastern hemlock. Last year, all plants were infected with HWA, and were monitored for infestation levels, survival, and growth. As would be expected for sexually-produced plants, seedling susceptibility varied, but the HWA-resistant seedlings were more vigorous despite the presence of the pest.

Results
We have confirmed the presence of HWA resistance in a small number of eastern hemlocks, and worked with both grafted and propagated cuttings (prior work) as well as sexually-produced seedlings (the current project) to demonstrate that resistance persists across multiple growth forms. While our seedling experiment is not yet complete, it certainly seems as if some of the HWA-resistant seedlings possess both HWA resistance and tolerance, making them a valuable resource for a range of future work.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

136 Conservation of Biological Diversity

Outcome #18

1. Outcome Measures

Master Energy Training will be conducted to educate RI residents, small businesses and municipalities so that they can make informed decisions that will reduce their consumption of fossil fuels and their carbon footprint through energy conservation, efficiency and use of clean energy resources.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Costly, non-renewable fuel sources such as natural gas, fuel oil and gasoline supply the vast majority of Rhode Island energy services to municipalities, businesses and homeowners. Energy prices in RI are also among the highest in the country, leaving homeowners, small businesses, municipalities, and state agencies with the challenge of managing energy costs and associated environmental impacts. By empowering individuals through education and access to science-based resources, widespread implementation of energy conservation behaviors and support and purchase of diverse and alternative sources of energy will follow.

What has been done
In response to feedback from previously held URI Master Energy trainings, we adopted and improved upon this train-the-trainer education model, offering two day-long educational "schools" aimed at facilitating behavior change toward energy efficiency and conservation behaviors and adoption of renewable energy technologies. Our team also designed, coordinated and executed URI Sustainability Week, a collaboration between the URI Office of Sustainability and the URI Outreach Center to raise awareness of departmental efforts and communicate the mission of Cooperative Extension externally, and the Sustainability Office internally, to the URI community and beyond. We also hosted event workshops to showcase the energy efficiency initiatives of municipalities through the EPA Climate Showcase Communities Program with the goals of encouraging residents to adopt similar initiatives on a residential scale.

Results
Home Energy School was attended by 52 RI residents, and Renewable Energy School was attended by 43 RI residents. The two municipal EPA workshops offered were attended by 75

people in total. Of these four education programs, over 75 individuals took action to implement efficiency measures and/or renewable energy in their homes by scheduling energy audits with the local utility and committing to a "Find Your Four" Campaign for adoption of conservation behaviors. URI Sustainability Week programming was attended by over 500 people on and off-campus.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #19

1. Outcome Measures

Through the Energy Fellows Program, we will provide URI undergraduate and graduate students with the opportunity to gain invaluable experience addressing real-world energy issues.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many students enrolled at URI are passionate about sustainability and interested in energy efficiency, conservation and renewable energy topics. Students seek opportunities outside of the classroom to explore their interests and gain professional experience. Rhode Island also has a growing need for a well-trained energy workforce, and energy companies are looking for new graduates with experience and training in the energy field.

What has been done
Our 2013 URI Energy Fellows Program graduated 14 Energy Fellows engaged in projects with staff at the URI Outreach Center, Commerce RI (quasi-state economic agency), the RI Office of Energy Resources, and the Ocean State Clean Cities Coalition. Our 2014 program welcomed 12

Energy Fellows in January 2014 from a variety of majors. This cohort of students was afforded the opportunity to work on real-world, current energy projects in interdisciplinary teams. Fellows received training in general energy topics through presentations from energy professionals, field trips, and conference attendance as well as specialized training in leadership and communications. Fellows actively participated in outreach events and presented their work to the University community and general public at an academic poster session at the end of the year.

Results
Our 2013 Energy Fellows Program graduates obtained an understanding of current energy issues in the State of Rhode Island and their potential role in managing those issues in the energy field. Our students were prepared with professional skills and training needed to succeed in that workforce. More than 75% of the students who graduated from URI following the completion of the program secured jobs at a variety of energy companies and organizations, while others were accepted to challenging graduate programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation

Outcome #20

1. Outcome Measures

NIFA energy programs at URI are coordinated with the DOE-funded Ocean State Clean Cities Coalition to provide a broader array of program and services for RI stakeholders concerned about energy issues.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Vehicle purchases are one of the more significant economic choices households make. The general public should have a greater understanding of the total cost of vehicle ownership, in particular in regards to fuel choices. Rhode Island citizens should also understand how their vehicle choices and driver behavior affect the environment and our demand for natural resources.

What has been done
In 2014, URI (as host of Ocean State Clean Cities Coalition) co-sponsored six fleet-focused outreach events and one consumer-focused outreach event (National Drive Electric Week) which has been reported to the US DOE.

Results
The Coalition displaced nearly 800,000 gallons of petroleum, which was reported to the US DOE

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #21

1. Outcome Measures

Through the Renewable Energy Siting Partnership, a URI team of skilled professionals in the fields of energy, research and planning will develop tools, guidelines and data analysis that can be used by Rhode Island's cities and towns to site and manage this new activity. Additionally, the RESP project will make state and municipal energy information accessible to the public through the creation of a comprehensive online energy database.

Not Reporting on this Outcome Measure

Outcome #22

1. Outcome Measures

Through a partnership with Rhode Island Department of Transportation we will capitalize on the wealth of both experience and funding available at the state and federal levels to accelerate and facilitate reduction of diesel pollution from work performed on projects managed by RIDOT.

Not Reporting on this Outcome Measure

Outcome #23

1. Outcome Measures

Increased understanding by scientists and decision makers through publications and presentations of the management implications related to plant genome size influences on competitive ability and susceptibility to herbivory.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Researchers who study weeds and invasive species are particularly interested in how the environment interacts with plant genome size. Global change has the potential to increase or decrease the range and success of species based on how it interacts with genome size. Therefore, researchers modeling range and expansions will benefit from these data. In addition, agricultural and natural area managers are interested in this information to help manage weedy species into the future. Finally, genome size may be a potential tool for biosecurity screening so this research is of interest to federal and state agencies.

What has been done
A global collection of Phragmites (from all 5 species in the genus) has been amassed and are currently being grown in three common gardens, including at URI. All plants have been screened for genome size. An experiment is currently underway comparing plant traits for unique clones across all phylogeographic groups, genome sizes and ploidy levels. Plant tissues are being analyzed for phenolics, CN, above and belowground biomass, herbivory, toughness, etc. In addition, the effects of phylogeographic group and genome size is being analyzed for microbial communities for a subset of the clones being examined.

Results
Significant differences in genome size have been found for the native, introduced and Gulf Coast lineages of Phragmites in North America. In addition, high levels of genome size and ploidy diversity have been found across the genus. Distinct microbial communities appear to be controlled by lineage as well.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
721	Insects and Other Pests Affecting Humans

Outcome #24

1. Outcome Measures

Increased understanding of the private and public sector and scientists of economic valuation of air quality and greenhouse gas emissions through publications and presentations

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Effective balancing of economic forces and unwanted byproducts of economic activity is critical for sustaining human health and wellbeing. Insights into the valuation of air pollution and greenhouse gas emissions will generate new understanding of how our economy should evolve and will evolve if left unchecked.

What has been done
Monte Carlo analysis extended to accommodate three-dimensional surface. Results are inconsistent with prior work. Currently striving to understand modeling assumptions that are critical to determining optimal spatial interpolation strategy. Estimated relationship between housing prices in Rhode Island and proximity to wind turbines. Downloaded Google trends data at media market level. Match with monthly temperature and precipitation records. Analyzed consumption patterns of 300 sample AC units in central California that participated in a Direct Load Control program.

Results
Results suggest no statistically significant relationship between turbines and house prices. Results suggest that weather fluctuations consistent with climate change projections cause people to seek information about climate change. Concluded that AC usage increases relative to normal before and after a curtailment event.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation

608 Community Resource Planning and Development

Outcome #25

1. Outcome Measures

Advance understanding by scientists and decision makers of demand and supply of ecosystem services (ES) from watersheds in the rural-urban fringe at a policy-relevant scale by integrating information from hydrology, spatial science, and economics.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Federal and state agencies (NRCS, DEM, EPA, USDA), conservation districts, Providence Water and conservation organizations are interested in ways to enhance ecosystem services, understand their benefits to the communities, and where their resources and efforts should be targeted.

What has been done
We conducted a field experiment where the suppliers of improved water quality and its beneficiaries of those services make decisions through a market-like process on both sides of the market. In this market process, consumers reveal their marginal willingness to contribute payment for improvements in water quality, which we then used to construct an average revenue curve to serve as a demand curve. We also conducted a reverse auction on the supply side, in which livestock owners bid for payments to adopt best management practices for manure management. We use the spatially-explicit Soil and Water Assessment Tool (SWAT) model to quantify the effect of on-farm management practices to the resultant changes in water quality. The information from the bids and the resulting changes in water quality from SWAT allowed construction of the supply curve for water quality improvements. The average revenue and supply curves were combined to determine a market clearing price. Upon consultation with the stakeholders, we made decisions to model three ecosystem services (carbon, nutrient retention, habitat for key species). We collected and compiled a number of spatial data sets and parameters to calibrate the InVEST model.

Results
Local livestock owners who participated and won experimental auctions in our supply side

experiments adopted new best manure management practices to prevent phosphorus input into water bodies nearby their farms. Nearly 100 residents in the watershed participated in the demand-side experiment to reveal their preference for water quality improvement. Quality of water in local waterways and ultimately in the Scituate reservoir is expected to improve although the degree of improvement is minimal.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife
608	Community Resource Planning and Development

Outcome #26

1. Outcome Measures

Models will be developed for coastal managers that will enable them to assess potential for coastal marsh restoration to enhance C sequestration in those ecosystems.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Coastal managers are interested in estimating functions such as carbon sequestration in marshes and knowing how those functions change in response to restoration, pollution, or rising sea levels. They aim to optimize these functions and need a cost-effective means of measuring them.

What has been done
Through collaboration, an empirical model for estimating greenhouse gas emissions from coastal marshes has been developed based on 4 sites in Waquoit Bay MA.

Results
The model (described above) can be used to estimate greenhouse gas emissions based on a few, relatively simple factors (such as surface soil temperature or salinity). This shows promise for this approach but more work is needed to validate the model in additional sites and to apply it to

longer term C sequestration rates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife
608	Community Resource Planning and Development

Outcome #27

1. Outcome Measures

Increased understanding by scientists, conservationists, and land managers through publications and presentations of the management implications of forest fragmentation and creation of early-successional habitat on turtle populations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is a need to create more early-successional habitat in southern New England for species dependent upon this habitat type, yet increased forest management activities may negatively impact wildlife species that require large contiguous patches of mature forest, such as some turtles. The objective of this project is to evaluate the impacts of forest fragmentation, caused by residential development and creation of early-successional habitat, on turtle populations. We will use the results of this study to help guide forest management in Rhode Island by working with natural resource agencies, land conservation trusts, and private landowners.

What has been done
We are examining the impacts of forest fragmentation on turtle populations in Rhode Island. Although we have one final year of field data to collect and are not able to publish this work yet, we have given many presentations to scientists and land managers within the state, as well as to interested public groups.

Results
We have one final year of data collection to complete but have preliminary results. We have made contact with many landowners, land trusts, other conservation organizations, and interested members of the public in Rhode Island to inform them about our research and ask for their participation. These contacts have laid the foundation for future strengthening of outreach programs based on the results of our field research.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
608	Community Resource Planning and Development

Outcome #28

1. Outcome Measures

Increased understanding of the management implications of how amphibian and reptile populations respond to the impacts of forest loss and pollution.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Globally, nearly 30% of amphibians and 40% of reptiles are threatened due to a number of factors, but forest loss and degradation are considered to be the greatest contributor. This study examines three important types of forest impacts, outright loss, partial development, and contamination by pollutants, for their effects on amphibian and reptile populations. These issues are important to the public, scientists, and land managers as they affect our ability to sustainably manage natural resources.

What has been done

We are examining the amount of forest needed to protect stream-breeding amphibians by studying their movements and habitat use adjacent to streams, as well as survival rates in each habitat type. We are studying how partial development of forest habitats affects snake populations by tracking their movements and survival in habitats impacted and unimpacted by humans. We are conducting research on how pollutants from roads impact wetland amphibians and reptiles by documenting transport of salts to wetlands and status of amphibian and reptile populations in those wetlands. As this work is still in progress we have not published it yet, but we have given presentations to multiple public groups, scientists at multiple universities, and land managers in the state.

Results

We are beginning our final season of data collection on each of these studies, but we have preliminary results. Stream-breeding amphibians spend the majority of their time in adjacent forested landscapes suggesting that terrestrial habitats are essential for maintaining viable populations. Snake populations in partially developed areas exhibit high levels of mortality compared with those in undeveloped areas. Finally, salt concentrations in wetlands appear to affect the distributions of amphibians on the landscape but not that of turtle populations. We anticipate that some of this work will be used by land trust organizations and state agency personnel to adjust the ways that amphibian and reptile populations are managed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #29

1. Outcome Measures

Increased understanding of the management and risks of watershed nitrogen delivery.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The export of nitrogen (N) from coastal watersheds can exert profound effects on the function and value of coastal estuaries. The goal of our research is to characterize the extent of in-stream nitrate removal in low gradient streams and identify stream attributes that relate to elevated nitrate removal rates. This will enable us to contribute to the scientific dialog and management that seeks to target site-specific nitrate control strategies to locales with high potential for export to coastal waters.

What has been done
A new geospatial tool, N-Sink, was developed by NEMO programs and USDA NRCS. It creates alternative scenarios in a watershed to help land use managers identify the best strategies to minimize watershed N export. We also conducted process-level studies in intermittent streams and beaver ponds and found them to be substantial watershed N sinks. These findings will be incorporated into N-Sink and transmitted to other models and tools through our regional network. We also elucidated watershed characteristics that impact the management of sustainable river flows.

Results
N-Sink's usability was improved and the tool was shared with NRCS and NEMO programs. It allows non-technical users to estimate watershed N removal from any watershed location. It is now available on many watersheds that drain directly to RI and CT coastal watersheds. The N processing function of intermittent streams is comparable to higher order streams. Forested intermittent streams have unique structures - pools, debris dams, and hyporheic flow - that enhance hydrologic retention and N removal potential. Mass balance mesocosm study of N cycling in beaver ponds demonstrates that these locations are important N sinks.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #30

1. Outcome Measures

Increased understanding of how wildlife populations may respond to climate change.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2014 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Global climate change is well documented and predicted to increase in severity and variability in the future. The impact of climate change on wildlife populations and agricultural systems is uncertain. Understanding the mechanisms by which populations may respond to climate change is critical for predicting future impacts. Whether populations have the capacity to respond through evolutionary adaptation or environmentally induced plasticity has important implications for population persistence over the long term.

What has been done
Two studies were conducted with the assistance of two graduate students and two undergraduate students. First, to gain insight into the evolutionary dynamics of species invasions, we conducted a population-genetic study that found invasive brown anoles were invading a portion of their native range occupied by a distinct evolutionary lineage. Second, we conducted a study comparing microhabitat use by lizards in natural forests and disturbed habitats to understand if these environments cause divergence in physiological traits, such as body temperature. Results from these projects were presented at the University of Rhode Island Coastal Fellows Symposium (Dec. 2014).

Results
For the first study, we detected genetically and phenotypically intermediate individuals within the "native" population. This suggests the transport of lizards from an established invasive population to a native population by humans, resulting in genetic mixing of invasive and native populations. For the second study, we found substantial differences in the thermal microclimates available for lizards. Natural forests were cooler and less variable than disturbed sites. Consequently, lizard body temperatures were cooler and lizards did not actively thermoregulate in forest. These differences in thermal physiology may limit the spread of these invasive lizards into some microclimates.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

None

Key Items of Evaluation

None

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Production and Sustainability

☑ 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
112	Watershed Protection and Management	25%		0%	
205	Plant Management Systems	38%		5%	
215	Biological Control of Pests Affecting Plants	6%		0%	
216	Integrated Pest Management Systems	13%		0%	
301	Reproductive Performance of Animals	6%		5%	
302	Nutrient Utilization in Animals	0%		15%	
304	Animal Genome	0%		5%	
305	Animal Physiological Processes	6%		15%	
307	Animal Management Systems	6%		20%	
311	Animal Diseases	0%		15%	
605	Natural Resource and Environmental Economics	0%		5%	
606	International Trade and Development Economics	0%		5%	
609	Economic Theory and Methods	0%		5%	
610	Domestic Policy Analysis	0%		5%	
	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	9.0	0.0	10.0	0.0
Actual Paid	5.5	0.0	3.1	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**
356632	0	114599	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
402730	0	147988	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The activities are described for the areas in the Food Production and Sustainability program.
Aquaculture and Fisheries

Investigate causes of diseases of shellfish and the mechanisms of innate immunity, particularly matrix metalloproteinases in hemocytes.

Research genetic factors controlling muscle growth in rainbow trout, a model species for aquaculture.

Develop and share strategies to create sustainable fisheries and enhance aquaculture in the state and region.

Conduct training programs for key stakeholder groups.

Perform applied aquaculture research.

Health and Well-being of Livestock

Examine the role of nutritional factors on the immune system function in livestock.

Community Gardening
Establish demonstration sites within existing community gardens to showcase best practices for edible production, pollinator habitat and resource conservation;
Utilize urban community garden sites as living laboratories to engage youth and adults in the urban food system;
Develop and disseminate fact sheets, websites and guidance documents for community leaders interested in starting community gardens in RI.

Horticulture

Identify, select or breed species and cultivars of plants that are better adapted for use in the landscapes and environment of Rhode Island and the Northeastern US.

Develop and deliver training for green industry professionals and volunteer garden educators to encourage the incorporation of plants that require less water, labor, nutrients, and pesticides into landscapes.

Expand markets for resource-conserving products.

Reduce pest-induced damage to horticultural and forest plants, while maintaining environmental quality by minimizing the use of agrochemicals.

Develop novel non-chemical methods of controlling invasive plant species.

Economics, Markets and Policy

Develop new risk-aware approaches to on-farm risk management via best practices for oysters and land based agriculture.
Improve the development of seafood markets by focusing on analyses of new marketing themes, market niches, and alternative seafood products.
Enhance fishery and aquaculture production by developing decision support tools to integrate management and marketing.

2. Brief description of the target audience

The target audiences are described for the areas in the Food Production and Sustainability program.

Aquaculture and Fisheries

The RI and New England aquaculture industry, RI State Aquaculture Coordinator, the fishing industry, producers and distributors, scientists and researchers, the RI Department of Environmental Management and Coastal Resource Management Council, and policy makers

Health and Well-being of Livestock

Livestock farmers in the Northeast, the livestock artificial insemination industry and 4-H youth

Community Gardening

General public; agricultural producers; residential and engineering/regulatory community members; school aged children; urban residents; various NGOs (land trusts, environmental organizations)

Horticulture

Agricultural producers of turf grass and ornamental plants (administered by a joint advisory committee of the Plant Sciences and Entomology department, the RI Nursery and Landscape Association (RINLA) and the New England Sod Producers Association; local nurseries; the RI Golf Course Superintendents Association; nurserymen, landscapers, tree farms and arborists; the Rhode Island Greenhouse Growers Association; the RI Farm Bureau; the New England Nursery Association and New England Floriculture, Inc; the New England Sod Producers Association (NESPA), and the New England Regional Turfgrass Foundation (NERTF); and individual golf course superintendents and sod producers throughout Rhode Island.

Economics, Markets and Policy

Fishers, environmental economists, and policy makers

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	18010	500000	7888	8000

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	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed publications

Year	Actual
2014	1

Output #2

Output Measure

- Books and monographs

Year	Actual
2014	0

Output #3

Output Measure

- Abstracts

Year	Actual
2014	1

Output #4

Output Measure

- Conference proceedings

Year	Actual
2014	2

Output #5

Output Measure

- Technical documents, fact sheets, bulletins and newsletters

Year	Actual
2014	12

Output #6

Output Measure

- Training manuals (includes instructional CD's)

Year	Actual
2014	22

Output #7

Output Measure

- Scientific/professional presentations

Year	Actual
2014	7

Output #8

Output Measure

- Workshops (including short courses)

Year	Actual
2014	36

Output #9

Output Measure

- Conferences hosted

Year	Actual
2014	3

Output #10

Output Measure

- Website development and refinement

Year	Actual
2014	6

Output #11

Output Measure

- Public presentations

Year	Actual
2014	77

Output #12

Output Measure

- Public service announcements

Year	Actual
2014	4

Output #13

Output Measure

- Student training

Year	Actual
2014	40

Output #14

Output Measure

- Thesis/dissertation

Year	Actual
2014	0

Output #15

Output Measure

- Biological control agent released

Year	Actual
2014	0

Output #16

Output Measure

- Germplasm developed

Year	Actual
2014	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increased aquaculture production in Rhode Island (both of current species and new species. An increase in technology and understanding of basic mechanisms of immunity and muscle growth that will ultimately enhance production.
2	Growth of Rhode Island's shellfish aquaculture industry (includes number of farms, number of farmers employed and farmgate value of the aquaculture crops)
3	Development of fertility assays for use in AI industry
4	Develop research-based strategies to modify animal feeds that which will improve the immune status and disease resistance of domestic livestock
5	The successful Master Gardener Volunteer Program will be maintained and enhanced to expand the impact of URI Extension and free up Extension staff time by recruiting, training, supporting, managing, recognizing and retaining volunteers
6	Master Gardener volunteers work with URI staff and students to establish and maintain demonstration gardens that serve as teaching centers for Rhode Islanders interested in growing their own food. Produce from the demonstration gardens is donated to local food banks.
7	Through participating in the Learning Landscape and other hands on youth environmental education programs, students in grades K-5 will demonstrate increased knowledge and skills about the environment, horticulture and science. Teachers' trainings offer supplemental environmental science tools for formal and informal educators.
8	URI will continue to enhance the Master Composter training program to extend the educational reach of the University by recruiting, training and managing volunteers to education and encourage Rhode Island citizens to compost. In addition to the core training compost workshops will be added throughout the year for the general public.
9	Through ongoing curricula development, workshop offerings to the general public and provision of certification opportunities for green industry professionals, the integration of native plants, landscape restoration principles, invasive plant management and low impact development practices will be promoted to increase business and consumer demand for ecological sustainable landscape services and general practice.
10	Growers in RI propagate and market native plants. Consumers (state agencies, municipalities and residential landscape managers) seek out native plants for use in landscape
11	Increase the understanding of private and public sector and scientists of economic and market factors in fisheries and aquaculture management through publications and presentations.
12	Increase the understanding of scientists and decision makers through publications and presentations of the outcomes of game theoretical models to identify fisheries where political intervention is likely based on the degree of heterogeneity among harvesters.
13	Increased use of native trees, shrubs, and grasses by homeowners.

Outcome #1

1. Outcome Measures

Increased aquaculture production in Rhode Island (both of current species and new species. An increase in technology and understanding of basic mechanisms of immunity and muscle growth that will ultimately enhance production.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Shellfish aquaculture in general, and oyster aquaculture in particular, is one of the fastest growing segments of United States agriculture. In 2012, the US imported oysters in the value of more than $27 million, showing that the more than $100 million in oysters landed in the US did not fulfill market demand. Furthermore, bivalve shellfish provide important ecosystem services. The bivalve shellfish industry experiences many challenges and opportunities, including impacts from disease and climate change. Stakeholders targeted in this research are the shellfish aquaculture, fishing, and restoration industries, represented by the East Coast Shellfish Growers Association and groups involved in bivalve shellfish restoration, such as the Nature Conservancy. Target audiences of this research include researchers in the East Coast Shellfish Breeding and Eastern Oyster Genome Consortiums, the Agricultural Research Services Laboratories in Shellfish Genetics, as well as researchers worldwide interested in improvement of shellfish aquaculture through genetics and increased understanding of physiological traits influencing shellfish performance.

What has been done

Many of the challenges and opportunities facing the bivalve shellfish industry can be achieved through selective breeding and improved understanding of traits of commercial and ecological interest. Many researchers working on these issues have established the East Coast Shellfish Breeding Consortium, and joined efforts of this group with the shellfish industry has resulted in increased collaborative funding for the development of tool and resources for breeding in bivalve shellfish, including sequencing the genome of the Eastern oyster.

Results

Collaborative research efforts focused on the development and testing of fast-growing disease-resistant strains of Eastern oysters have demonstrated that the environment influences the performance of existing strains, suggesting a need for the development of a family-based breeding strategy that involves testing the performance of these families in sites through the Atlantic and Gulf coasts of the US representative of the highly varying environmental conditions in which oysters are cultured. Differences in disease resistance between oyster families and targeted challenge experiments have been exploited to investigate mechanisms of disease resistance in oysters and the development of markers potentially associated with disease resistance. These results have been shared with stakeholders through different venues.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
304	Animal Genome
307	Animal Management Systems
311	Animal Diseases

Outcome #2

1. Outcome Measures

Growth of Rhode Island's shellfish aquaculture industry (includes number of farms, number of farmers employed and farmgate value of the aquaculture crops)

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Shellfish aquaculture in general, and oyster aquaculture in particular, is one of the fastest growing segments of United States agriculture. In 2012, the US imported oysters in the value of more than $27 million, showing that the more than $100 million in oysters landed in the US did not fulfill market demand. Furthermore, bivalve shellfish provide important ecosystem services. The bivalve shellfish industry experiences many challenges and opportunities, including impacts from disease and climate change. Stakeholders targeted in this research are the shellfish aquaculture, fishing, and restoration industries, represented by the East Coast Shellfish Growers Association

and groups involved in bivalve shellfish restoration, such as the Nature Conservancy.

What has been done

Many of the challenges and opportunities facing the bivalve shellfish industry can be achieved through selective breeding and improved understanding of traits of commercial and ecological interest. Many researchers working on these issues have established the East Coast Shellfish Breeding Consortium, and joined efforts of this group with the shellfish industry has resulted in increased collaborative funding for the development of tool and resources for breeding in bivalve shellfish, including sequencing the genome of the Eastern oyster. In collaboration with the industry, disease resistant families and strains derived from this research have been tested in selected commercial farm locations in Rhode Island, and information on performance, as well as samples from these oysters, have been used to inform further research.

Results

Collaborative research efforts focused on the development and testing of fast-growing disease-resistant strains of Eastern oysters have demonstrated that the environment influences the performance of existing strains, suggesting a need for the development of a family-based breeding strategy that involves testing the performance of these families in sites through the Atlantic and Gulf coasts of the US representative of the highly varying environmental conditions in which oysters are cultured. Differences in disease resistance between oyster families and targeted challenge experiments have been exploited to investigate mechanisms of disease resistance in oysters and the development of markers potentially associated with disease resistance. These results have been shared with stakeholders through different venues.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
307	Animal Management Systems
311	Animal Diseases

Outcome #3

1. Outcome Measures

Development of fertility assays for use in AI industry

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Develop research-based strategies to modify animal feeds that which will improve the immune status and disease resistance of domestic livestock

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Gastrointestinal parasites, particularly the barber pole worm, limit the ability of producers to raise grass-fed sheep and goats. Emergence of anthelmintic (dewormer) resistance in all species of gastrointestinal nematodes, particularly the barber pole worm, and growing concern over chemical residues in animal products and in the environment has made the development of alternative methods of parasite control for small ruminants vital. In recent years, plants containing compounds called condensed tannins have been shown to reduce parasite loads in sheep and goats. The potential of cranberry leaf and birdsfoot trefoil to suppress GIN infection in small ruminants is under investigation.

What has been done
During the project period, adult Haemonchus contortus worms were incubated with cranberry leaf extract, cranberry leaf powder or control and the effects of these treatments on structural changes to the adult worm are being assessed using scanning electron microscopy. Tissue samples from 48 birdsfoot trefoil accessions and 6 commercial cultivars were collected, and were freeze-dried in preparation for use in anthelmintic assays in either leaf form or as a condensed tannin extract. Additional land was planted with the 6 commercial varieties of birdsfoot trefoil for the production of hay that will be fed during the in vivo testing phase of these studies in sheep fitted with rumen fistulas.

Results
Results from the scanning electron microscopy studies and the testing of birdsfoot trefoil accessions and cultivars for anthelmintic efficacy are pending.

4. Associated Knowledge Areas

KA Code	Knowledge Area

302	Nutrient Utilization in Animals
305	Animal Physiological Processes
307	Animal Management Systems
311	Animal Diseases

Outcome #5

1. Outcome Measures

The successful Master Gardener Volunteer Program will be maintained and enhanced to expand the impact of URI Extension and free up Extension staff time by recruiting, training, supporting, managing, recognizing and retaining volunteers

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The URI Master Gardener Program serves to amplify the ability of Cooperative Extension to address community, environmental, and social challenges related to home gardening for the general public. The ability of URI Extension staff to directly work with the public is limited by staff size, funding and time constraints due to other projects and programs. This volunteer program trains qualified individuals to educate the public in science-based horticultural practices and connect them to the resources of Cooperative Extension.

What has been done
From January to April 2014, 120 members of the general public participated in the 14-week Master Gardener Program Core Training. This train-the-trainer program served to train the students as volunteer Extension educators and change their behavior to include environmentally-sound horticultural practices. In addition, approximately 600 veteran Master Gardener volunteers educated 9,700 people statewide by staffing the Master Gardener hotline, kiosk booths and free soil testing service, and by delivering educational workshops. They also educated home gardeners and their families through educational events held at Master Gardener demonstration gardens. Additional volunteer service activities improved the gardening skills of special populations, including the school garden mentor and community garden consultant programs. New in 2014, the Master Gardeners now have a bi-monthly educational radio show.

Results

The Master Gardener Core Training participants showed demonstrable changes in behavior as related to reducing pesticide use, adopting integrated pest management strategies, storm water-sensitive cultural practices, gardening for biodiversity, more efficient edible gardening techniques and environmentally-sound lawn care practices. 9,700 people were exposed to science-based horticultural information through the Master Gardener hotline, kiosk, soil testing and public workshop service activities. 7,000 people were encouraged to grow their own food, utilize science-based horticultural practices and spend more time outdoors through educational events held at Master Gardener demonstration gardens. About 50,000 listeners learn through the Master Gardener radio show which airs bi-monthly.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
205	Plant Management Systems

Outcome #6

1. Outcome Measures

Master Gardener volunteers work with URI staff and students to establish and maintain demonstration gardens that serve as teaching centers for Rhode Islanders interested in growing their own food. Produce from the demonstration gardens is donated to local food banks.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food security remains a problem in Rhode Island and nationally, with many residents lacking access to fresh, affordable food. This food insecurity is often concentrated in urban areas where growing food poses a unique set of challenges.

What has been done
URI Master Gardener volunteers grew fresh produce for donation at local food pantries in six educational gardens located in Providence, Coventry, Kingston and Wrentham, Massachusetts. In addition, targeted public educational workshops were held for food insecure populations to teach residents to grow their own healthy food. URI Master Gardener volunteers worked directly

with community gardeners and school gardens as mentors and consultants, bringing the resources and knowledge base of extension to those who require it.

Results
6,800 pounds of food was donated to local food pantries within the reporting period. URI Master Gardener volunteers also worked one-on-one with fifteen school and community gardens statewide, serving as horticultural mentors, educators and consultants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
205	Plant Management Systems

Outcome #7

1. Outcome Measures

Through participating in the Learning Landscape and other hands on youth environmental education programs, students in grades K-5 will demonstrate increased knowledge and skills about the environment, horticulture and science. Teachers' trainings offer supplemental environmental science tools for formal and informal educators.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rhode Island youth, particularly low income, urban youth, have limited access and understanding of the natural environment resulting in a 'nature deficit disorder.' The manifestation is seen in low science achievement at school resulting in few entering science, technology, engineering and mathematics (STEM) fields. Children ages 5 to 12 benefit from URI Outreach Center youth education programs through hands-on learning about the environment. Eco-exploration Camp engages children in environmental education day camp experiences at the URI Botanic Gardens in Kingston and the Botanical Center at Roger Williams Park in Providence. This provides families with a fun and educational opportunity for their children while school is not in session and promotes children's interest and engagement in environmental topics. This opportunity provides a foundation for further academic achievement.

What has been done

The URI Outreach Center implemented Learning Landscape Field Trips, Eco-Exploration Camp and other family and outreach events to engage youth ages 5 to 12 in hands-on environmental education activities. Learning Landscape was held at the Botanical Center at Roger Williams Park in Providence during the winter months and URI Botanical Gardens in Kingston during the spring. Topics addressed included seed starting, composting, native mammals and birds, and insects and pollination and ecology. Title 1 Providence schools received bus transportation scholarships and reduced admission for Learning Landscape to ensure that low-income urban youth were not excluded from the program due to financial restrictions. Also, the curriculum was reviewed to assure that it aligned with RI Grade Span Expectations for life science and earth science. The URI Eco-Exploration Camp connected children from Providence and environs to the natural environment through a day-long camp at the Botanical Center at Roger Williams Park for three weeks and URI Botanical Gardens for one week, led by Extension staff and URI Science and Engineering Fellows. In Providence, children engaged with URI Master Gardeners to harvest produce from the on-site community gardens, learned the ecology and natural history of the area and visited other facilities at the Park, including the Museum of Natural History. At URI, the children benefited from university facilities including outdoor investigations and recreational swimming in the URI pool. Camp programs in both locations fostered an increased environmental awareness and sensitivity.

Results

Through Eco-Exploration Camp, 52 children between the ages of 5 and 12 experienced nature investigation and learned ecological concepts through hands-on learning activities. Through Learning Landscape, URI engaged 2,336 elementary school children, nearly 50% of whom are students at Title 1 schools.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
205	Plant Management Systems

Outcome #8

1. Outcome Measures

URI will continue to enhance the Master Composter training program to extend the educational reach of the University by recruiting, training and managing volunteers to education and encourage Rhode Island citizens to compost. In addition to the core training compost workshops will be added throughout the year for the general public.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rhode Island's only landfill has a life expectancy of less than 25 years. Since RI is the smallest state, selecting a community as a host site for establishing a new landfill will be a challenging task. RI Resource Recovery Corporation, the quasi-state agency who manages the Central Landfill in Johnston, reports that at least 40 percent of what goes into the landfill is food scraps. These food scraps are taking valuable space in the landfill that could be used as a depository site for non-degradable and non-recyclable materials.

What has been done
In response to this space issue and in order to educate RI residents on compost and healthy soil practices, we offered two Master Composter Core Trainings, whereby participants received 16 hours of educational training on composting, large-scale compost operations, vermicomposting, urban composting and compost regulations. In order to educate a more advanced audience, we also hosted two Advanced Composting trainings where attendees enhanced their compost knowledge to include hot composting, hands-on compost operations and compost tea applications. To bring information and resources about compost to larger audiences, Master Composter volunteers at public and community events gave presentations, demonstrations and exhibitions related to waste reduction throughout the state.

Results
A total of 36 attendees received the Master Composter Core Training; Advanced Compost Training was attended by 29 attendees. These training afforded our stakeholders with the most up-to-date information on compost, and made resources available for them to learn hands-on skills related to composting. This knowledge and information was then extended to more RI residents by participating in 20 community events throughout the state. By educating a group of advocates to educate the public on this issue, we are able to extend the life of the landfill and at the same time promote land conservation and healthy soil practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
205	Plant Management Systems

Outcome #9

1. Outcome Measures

Through ongoing curricula development, workshop offerings to the general public and provision of certification opportunities for green industry professionals, the integration of native plants, landscape restoration principles, invasive plant management and low impact development practices will be promoted to increase business and consumer demand for ecological sustainable landscape services and general practice.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rhode Island is the second most densely populated state in the US, with 40% of land under development (the other 60% is privately owned and forested). The negative impacts of land development and poor landscape management practices in RI on water quality, habitat and resource conservation are profound.

What has been done
In partnership with state and local regulatory agencies and nonprofit organizations, Extension staff deliver training programs targeting green industry, and environmental and regulatory professionals engaged in landscape design and management in sensitive areas. Practical tips regarding landscape design and management that protect habitat and surface and groundwater quality are shared. This allows professionals to expand their portfolio of services to include storm water management and invasive plant management.

Results
25 professionals were trained in invasive plant management, with 5 submitting coastal buffer zone management applications to the state coastal regulatory agency, thereby increasing their portfolio of services to include coastal invasive plant management. Also, 75 Certified Invasive Managers were recertified through the program for an additional two year period. As a result, state regulations governing land management in sensitive coastal areas saw increased compliance through the program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #10

1. Outcome Measures

Growers in RI propagate and market native plants. Consumers (state agencies, municipalities and residential landscape managers) seek out native plants for use in landscape

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Biodiversity loss is increasingly apparent as productive ecosystems are converted to developed land. As the second most densely populated state, the way in which we manage our private land (backyards and garden spaces) affects the amount of species that are supported in urban and suburban areas. A classic chicken versus egg style conundrum exists in that native plants are desired by certain consumers, while garden centers are not aware of which plants are considered indigenous or what the demand for them may be. Consumers are often unsure of which garden centers supply native species.

What has been done
After three years of development, the Rhode Island Native Plant Guide was launched in September 2014. This online, interactive tool allows gardeners and green industry professionals to find the right plant for the right place and function, and also displays the plant photo. The most innovative feature of the guide is the dynamic availability listing, which can be updated by local nurseries and garden centers who are assigned log-in credentials for the purposes of updating plant availability, creating a direct link between producers and consumers.

Results
Over 20 local businesses have registered with the guide and provided their plant availability information. About 5000 residents, school gardeners, community gardeners and green industry professionals have accessed the guide since its launch.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #11

1. Outcome Measures

Increase the understanding of private and public sector and scientists of economic and market factors in fisheries and aquaculture management through publications and presentations.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Wild shellfish management in Rhode Island, as undertaken by the RI Department of Environmental Management (DEM), is focused on conserving naturally occurring shellfish populations in RI waters and managing public health outcomes due to water quality issues. Management is further complicated and made more challenging by economic factors. To a large extent, RI's shellfish management programs are driven by the economic interests of commercial harvesters. As such, an economic analysis of the Rhode Island shellfish market, and a better understanding of how the management interacts with the market, is essential to guide and support shellfish management policies in Rhode Island.

What has been done
This project set out to understand the market demand for wild-harvested clam species in Rhode Island to enhance the integration of its fishery management and marketing by estimating AIDS model to obtain own-price and cross-price elasticities among different shellfish species and/or market categories.

Results
We found several insights about the clam (quahog) market in Rhode Island. The elasticity value suggests that demand for cooked quahog is less vulnerable to price change than the raw quahog products. Scallops and clams were not found as a substitute product for cooked quahog, whereas the raw quahog was found to be a substitute. Our results suggest that cooked quahogs (market categories "cherrystone" and "chowder" in particular) are more in demand than the raw quahog

(ditto "little neck" and "top neck"). Moreover, the model also revealed that the cooked quahogs are preferred throughout the year with a higher demand during summer months whereas the demand for raw quahogs is confined to winter months especially February. Some of the key results were incorporated in the final draft of the Rhode Island Shellfish Management Plan, which was released in November 2014. Also, this study has become one of the dissertation chapters for a PhD student.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
606	International Trade and Development Economics
609	Economic Theory and Methods
610	Domestic Policy Analysis

Outcome #12

1. Outcome Measures

Increase the understanding of scientists and decision makers through publications and presentations of the outcomes of game theoretical models to identify fisheries where political intervention is likely based on the degree of heterogeneity among harvesters.

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Increased use of native trees, shrubs, and grasses by homeowners.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Trees, shrubs and turf grasses are not only a major economic driver in Rhode Island but constitute the primary agricultural land use. In addition, these commodities are used by all homeowners attempting to improve the aesthetic appeal and intrinsic monetary value of their property. As such, the establishment of inappropriate, environmentally damaging or potentially invasive species can quickly become a significant problem throughout the state. It is therefore extremely important to minimize the use of non-native and invasive materials and to identify more effective ways to manage and maintain native adapted plant species for use in the homeowner landscape.

What has been done

Work has been undertaken to identify low maintenance grass species that can be used in highway medians and in other locations where soil stabilization is necessary but maintenance costs must remain low. Additional work has been undertaken to select and breed Eastern Hemlocks that are resistant to the hemlock wooly adelgid and to identify and establish biological control agents capable of managing purple loosestrife, mile-a-minute vine, swallow-worts and Phragmites australis. Finally, work has been undertaken to identify alternative management strategies for root-feeding nematodes on amenity turf grasses.

Results

A number of potentially useful native grass species have been identified and successfully tested in marginal growing environments. These species could be used throughout the state to reduce labor and improve the quality of areas currently exhibiting very little herbaceous cover. Currently, no alternative pesticide to organophosphates has been identified which is effective at controlling turf grass nematodes. Purple loosestrife has come under successful biological control throughout much of the state and agents for mile-a-minute vine are also well established. We have released our swallow-wort agents in Canada where results look promising and we anticipate USFWS and USDA approval to release in the USA in 2015.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

None

Key Items of Evaluation

None

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Youth, Family and Communities

☑ 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
601	Economics of Agricultural Production and Farm Management	15%		0%	
602	Business Management, Finance, and Taxation	10%		0%	
605	Natural Resource and Environmental Economics	10%		0%	
608	Community Resource Planning and Development	15%		0%	
806	Youth Development	50%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	0.0	0.0
Actual Paid	2.7	0.0	0.0	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**
193365	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
131087	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

4-H Youth Development
Forge academic connections to strengthen 4-H youth education programs and events, provide undergraduate experiential learning opportunities, expand special interest 4-H groups through after-school and library programs, increase programmatic research base and utilize regional evaluation expertise to measure impacts and improve programs
Connect target audience to 4-H educational programs though community volunteer recruitment, workshops, and web-based promotions, 4-H volunteer training and curriculum guides (train the trainer), community-based agency/organization trainings (train the trainer)

Develop resources and information to connect youth and families to community and land-grant resources (4-H to serve as portal)

Expansion of the 4-H club system into currently underrepresented, urbanized areas of the state and creation of a state-wide network of 4-H science enrichment after school programs that serve as a catalyst for improve the science based knowledge, skills and academic motivation among urban elementary and middle school students

Sustainable Communities

Study and promote commercial farm viability
Promote responsible stewardship of agricultural lands

2. Brief description of the target audience

4-H Youth Development

Youth 5-18 years of age, parents of targeted youth, community-based family and youth-serving agencies and organizations, volunteers

Sustainable Communities

Farmers/ farm organizations, RI Department of Environmental Management (RI DEM) Division of Agriculture, RI Center for Agricultural Promotion and Education, Rhode Island Agricultural Partnership, other agricultural service providers, tourism councils and tourism businesses, land trusts, policy makers and municipal leaders, grassroots and community organizations

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	10203	606922	11416	3800

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	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Workshops (including short courses)

Year	Actual
2014	163

Output #2

Output Measure

- Volunteers trained

Year	Actual
2014	478

Output #3

Output Measure

- 4-H record books

Year	Actual

2014	155

Output #4

Output Measure

- Youth reached through programs

Year	Actual
2014	1968

Output #5

Output Measure

- Community/family serving groups reached

Year	Actual
2014	52

Output #6

Output Measure

- Community service projects

Year	Actual
2014	121

Output #7

Output Measure

- Activities and programs

Year	Actual
2014	132

Output #8

Output Measure

- Students trained

Year	Actual
2014	0

Output #9

Output Measure

- Website development and refinement

Year	Actual
2014	5

Output #10

Output Measure

- Curriculum development and delivery

Year	Actual
2014	0

Output #11

Output Measure

- Professional training

Year	Actual
2014	10

Output #12

Output Measure

- Public presentations

Year	Actual
2014	45

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Through project work and science and health enrichment programs, (%) 4-H club members and after school group members will demonstrate increased knowledge and skills that can be incorporated into their academic and personal lives.
2	% of enrolled 4-H youth who will demonstrate a commitment and understanding of their community and a sense of connectivity through increased delivery of community service programs to those in need.
3	Though training programs, club leadership activities and adult mentors, % of 4-H members who will develop leadership skills (e.g., public speaking, project leadership), gain confidence in their ability to lead and make a difference in their schools and communities and to incorporate these life skills into their daily lives.
4	# of parents, volunteers and adults serving youth and their families who will gain knowledge and skills that will foster positive youth development and family health and well-being.
5	# of parents who will learn and adopt more effective methods for parental discipline of children and better use of family time.
6	Pre-post measurement of educational activities, workshops to measure increases in knowledge and skills, focus groups and surveys to assess practice change and adoption, analysis of contact information and demographics to measure expansion of programs to currently underrepresented groups (urban, cultural-diverse communities, minorities, etc.) (Number of assessments per year)
7	Provide information and training to farmers and rural landowners on estate planning strategies and economic development opportunities.
8	Improve viability of agriculture in the state of Rhode Island and southern New England through farmer education/information and consulting concerning sustainable agricultural practices, value-added products and agri-tourism.
9	Provide information and training to municipal leaders and organizations on management of natural resources and community assets.

Outcome #1

1. Outcome Measures

Through project work and science and health enrichment programs, (%) 4-H club members and after school group members will demonstrate increased knowledge and skills that can be incorporated into their academic and personal lives.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	53

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Out-of-school educational programs provide youth with a safe, supportive environment for developing academic and life skills. Research shows that the structured learning, encouragement and adult mentoring that young people receive through their participation in 4-H plays a vital role in helping them achieve success in life. Research also shows that children of underrepresented audiences do not excel in math and science classes. Science and Healthy Lifestyles programming is a major focus of the RI 4-H club system, after school programming through SPIN (special interest) groups and Operation: Military Kids.

What has been done
A significant number of 4-H programs, workshops, activities and events focus on science and health enrichment programs including animal science, sustainability, horticulture, technology, robotics and healthy lifestyles. Volunteer trainings in science curricula and youth-adult workshops in science and healthy lifestyles provide youth with opportunities to increase their knowledge and skills and apply them in informal, adult-mentored settings where they receive positive feedback and reinforcement. New for FY14 was the expansion of 4-H SPIN (special interests) Clubs into the RI Public Libraries and Military Partnership Program.

Results
The RI 4-H Tech Wizards mentoring program entered its third year and reached 176 at-risk urban youth weekly in after-school SET and healthy lifestyles programming. Youth demonstrated an increase in knowledge, skills, and abilities through teacher evaluations and end of year presentations. 53% of 4-H Club members (including after school and military club enrollments) participating in science and health projects/programs, competitions, education series and workshops demonstrated an increase in knowledge and skills.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

% of enrolled 4-H youth who will demonstrate a commitment and understanding of their community and a sense of connectivity through increased delivery of community service programs to those in need.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	55

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many of today's youth lack opportunities to engage in positive out-of-school educational programs under the mentoring of caring adults who guide them in developing valuable life skills while aiding them in creating positive connections to the larger community and assisting them in successfully making the transition to productive, contributing young adults.

What has been done
RI 4-H Clubs and after-school programs are expected to plan and conduct at least one community service project during the 4-H year as part of the Citizenship mission mandate. 4-H volunteers are provided with community service opportunities through the 4-H listserve and connected to requests from citizens and community groups requiring assistance. 4-H groups may apply for financial support through the RI 4-H Foundation Club Grant program for their projects. Beyond serving their communities, 4-Hers also volunteer with Operation Military Kids. 4-Hers document their community service hours through their 4-H Record Books.

Results
Leaders of 47% of registered, active 4-H clubs (average of 25 members per club) reported that their clubs completed six or more community service projects in the FY14 4-H year resulting in 425 documented 4-H youth participating in six or more community service projects or 55% of the FY14 4-H club enrollment. This percentage only includes clubs who reported their end of year results. 155 4-Hers who submitted record books (20% of 4-H club enrollments) in FY14 reported

3074 community service hours or an average of 20 hours per 4-H member

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #3

1. Outcome Measures

Though training programs, club leadership activities and adult mentors, % of 4-H members who will develop leadership skills (e.g., public speaking, project leadership), gain confidence in their ability to lead and make a difference in their schools and communities and to incorporate these life skills into their daily lives.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	53

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many youth are lacking in school and family-centered opportunities and support to increase their communication and leadership skills. Youth need a safe and nurturing environment to test their abilities and receive constructive and supportive feedback. Encouragement by caring adults and positive peer support enable youth to develop confidence and incorporate these life skills into their school and community.

What has been done
All 4-H members are strongly encouraged to participate in the RI 4-H Public Presentations program at the club, district and state level. 4-H volunteers and staff provide training and competitive and non-competitive speaking opportunities for 4-H youth of all ages. Besides District and State competitions, 4-H members are encouraged to participate in local events to educate the public including 4-H Foundation Events, District 4-H Fairs, Washington County Fair Farm School and Tractor Supply Paper Clover Events and local festivals. 4-H youth practice and improve their leadership skills in their 4-H clubs and at 4-H events and program.

Results

266 4-H youth or 34% of RI 4-H club members (may be duplicates) participated in district and state public presentation programs, 4-H Farm School, Eastern States Exposition and other public events promoting 4-H. 4-H teens demonstrated their leadership ability by assuming major roles at 4-H Fairs, animal science workshops and events and Rhode Island and New England 4-H Animal Committees and events. 4-H members actively participated in communication workshops, public presentations training and record book and resume/interview workshops. 4-H club volunteers (43% of active clubs were documented) reported that in FY14 53% of their youth exhibited increased leadership skills and of these clubs reporting, 94% had active Club youth officers. 155 4-H members who submitted recorded books reported a total of 2869 4-H leadership hours. Forty six youth and teen leaders assumed leadership roles for RI 4-H at the Eastern States Exposition.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

# of parents, volunteers and adults serving youth and their families who will gain knowledge and skills that will foster positive youth development and family health and well-being.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

# of parents who will learn and adopt more effective methods for parental discipline of children and better use of family time.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Pre-post measurement of educational activities, workshops to measure increases in knowledge and skills, focus groups and surveys to assess practice change and adoption, analysis of contact information and demographics to measure expansion of programs to currently underrepresented groups (urban, cultural-diverse communities, minorities, etc.) (Number of assessments per year)

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Provide information and training to farmers and rural landowners on estate planning strategies and economic development opportunities.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Improve viability of agriculture in the state of Rhode Island and southern New England through farmer education/information and consulting concerning sustainable agricultural practices, value-added products and agri-tourism.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farmers care about the quality of their farm products and earning a living. Rhode Islanders care about farming being viable in the state. Consumers care about having the ability to obtain fresh, locally grown agricultural food and fiber products.

What has been done
On-farm consultations, educational meetings for farmers, Master Gardener trainings, updates to Cooperative Extension Production Guides: Vegetable, Small Fruit, Tree Fruit, Weekly Pest Updates, Northeast Vegetable and Fruit Conference steering committee member. Working group participation: Small Fruit Working Group, Northeast IPM Pest Scouting Network, Spotted Wing Drosophila Working Group, Brown Marmorated stink Bug Working Group. RI Farm Scavenger Hunt organizer. RI Nursery and Landscape Association Education Committee, Chair of RI Women in Agriculture planning committee. Northeast SARE Forage and Weed ID Management Professional Development.

Results

We maintain and continue to grow our presence in all aspects of Rhode Island agriculture to improve stakeholder awareness of our capacity to provide support. Our reach has recently expanded into the growing population of beginning, young, and urban farmers. We also are making more contact with the state's forage producers. Our Northeast IPM collaboration with UMass and UVM is dramatically increasing weekly indirect contacts through Pest Updates using our listserv.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #9

1. Outcome Measures

Provide information and training to municipal leaders and organizations on management of natural resources and community assets.

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The increase in knowledge and skills in science and health in 4-H club members was documented through evaluations, observation and parent/leader/teacher feedback. The4-H Tech Wizards program measured increases in KSA (knowledge, skills and attitude.

Key Items of Evaluation

53% of 4-H club members participating in science and health programs and events demonstrated an increase in knowledge. Programs used in the calculation included the 4-H Tech Wizards, the Horse Education Series, the Poultry and Rabbits Education Series the Eastern States Expo animal science participants and the military 4-H clubs.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

International Programs

☑ 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
601	Economics of Agricultural Production and Farm Management	75%		25%	
606	International Trade and Development Economics	25%		75%	
	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	2.0	0.0	2.0	0.0
Actual Paid	0.4	0.0	0.3	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**
2467	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
61959	0	52386	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Develop and promulgate a shellfish sanitation program in African countries.
Assist international fishers; increase value of fishing products in domestic foreign markets.

Create scientist and student exchange programs with foreign institutions.

Assist partners in international projects.

2. Brief description of the target audience

Foreign universities, governments, policy makers; international business collaborators and producers; international students; RIAES scientists; RICE extension agents; URI students

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	250	0	150	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	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Technical documents, fact sheets, bulletins and newsletters

Year	Actual
2014	25

Output #2

Output Measure

- Training manuals (includes instructional CD?s)

Year	Actual
2014	2

Output #3

Output Measure

- Scientific/professional presentations

Year	Actual
2014	5

Output #4

Output Measure

- Workshops (including short courses)

Year	Actual
2014	27

Output #5

Output Measure

- Conferences hosted

Year	Actual
2014	0

Output #6

Output Measure

- Website development and refinement

Year	Actual
2014	0

Output #7

Output Measure

- Public presentations

Year	Actual
2014	2

Output #8

Output Measure

- Student training

Year	Actual
2014	3

Output #9

Output Measure

- Thesis/dissertation

Year	Actual
2014	2

Output #10

Output Measure

- Postdoctoral training

Year	Actual
2014	0

Output #11

Output Measure

- Volunteer training

Year	Actual
2014	0

Output #12

Output Measure

- Intervention studies

Year	Actual
2014	0

Output #13

Output Measure

- Social marketing

Year	Actual
2014	0

Output #14

Output Measure

- Video productions

Year	Actual
2014	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Provide onsite knowledge and technology to an international collaborator to improve local food production, agricultural sustainability and environmental conditions.
2	Artisanal fisheries ecosystems in the Gambia and selected stocks shared with Senegal are being managed more sustainably.

Outcome #1

1. Outcome Measures

Provide onsite knowledge and technology to an international collaborator to improve local food production, agricultural sustainability and environmental conditions.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local foods are clearly favored but growing opportunities are limited. Lands that are immediately adjacent to major auto routes are used to produce leafy vegetables and root crops which when tested have significantly elevated Ca and Pb levels. Citizens health and wellbeing are questioned by both local leaders and party officials

What has been done
Several demonstrations have been successfully established. Vegetables have been produced with soil and moisture management changes and even more produce generated with introduced materials as potential substitutes for common materials. Adoption of introduced materials is slow with greater success when uses and substitutions for common crops are demonstrated. Soil erosion reduction with limited vegetated soil cover is being demonstrated with aggressive salt tolerant plant introductions. Salt tolerant grasses are now being vegetatively increased and one clone is being prepared for submission of a plant patent. A significant number of improved trees have been brought into the nursery in China and limited vegetative increases are underway.

Results
A number of new-to-region vegetable crops have been introduced and are now being produced in areas of high sodium salt impact. These 'new' vegetables have produced more biomass and are being used somewhat in the household and restaurant kitchens affiliated with project management in Tainjin. The planted demonstration areas have increased from less than an acre to approximately 10 acres. Regional growers are requesting seed from some introduced commodities after viewing plots during open house and field days. Grass plantings to demonstrate saline/sodic soil tolerance have expanded from one site and less than 4 acres to 3 sites and approximately 15 acres with pending requests to assist with planning on 1000 acres.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development Economics

Outcome #2

1. Outcome Measures

Artisanal fisheries ecosystems in the Gambia and selected stocks shared with Senegal are being managed more sustainably.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	27257

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The current food security crisis in The Gambia and The Sahel has increased pressure on fishing communities and ecosystems. In January 2012, the Government of The Gambia declared the 2011/12 agricultural season a failure, seriously affecting more than 409,000 people in rural areas and another estimated 192,850 people living in the poorest urban areas who are still recovering from floods in previous seasons. They are vulnerable to food insecurity, rising food prices and additional economic pressure from helping relatives in affected rural areas. In early May 2012, the US Ambassador declared The Gambia an emergency and USAID/OFDA gave $500,000 in emergency funding. The Gambia food security crisis is taking place in the context of the larger Sahel wide food security crisis. Senegal is also severely affected and the crisis will potentially increase migration from Senegal to The Gambia in general and to the artisanal fisheries sector in particular, where 60% of fishing units at the Atlantic Coast fisheries landing sites are Senegalese owned.

What has been done
The USAID/BaNafaa project focus in the first 2 years of project implementation has been on the oyster and sole fisheries. As of January 2012, a co-management plan for the sole fishery was adopted. The sole fishery is also now closer to meeting the sustainability criteria for certification by the Marine Stewardship Council, and may be the first artisanal fishery in sub-Saharan Africa to get an Eco-label. Other countries in West Africa including Morocco, Mauritania, Senegal and Ghana are interested in the work being done under this project and eager to learn from this experience. The oyster fishery activities are uniquely focused on women harvesters which are

typically neglected in fisheries development planning. The co-management plan for the oyster fishery, also approved in January 2012, gives exclusive use rights to the oyster fishery in the Tanbi wetland area to these women oyster harvesters who have now been organized into an area wide producer organization. Exclusive use rights to a fishery resource are rare in West Africa, let alone to women. This is the first case in sub-Saharan Africa where exclusive fishery harvest rights have been legally given to women harvesters.

Results
Two fishery management plans were approved for sole and oyster. Developed a successful co-management ecosystem based approach to the planning process that included many collaborative research and outreach projects.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development Economics

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

None

Key Items of Evaluation

None

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

CELS CARES

☑ 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
902	Administration of Projects and Programs	100%		100%	
	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	2.0	0.0	2.0	0.0
Actual Paid	2.2	0.0	9.3	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**
219342	0	839270	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
335852	0	733471	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

RIAES and RICE developed a request for application (RFA) process that encourages innovative, integrated proposals that meet the needs of state stakeholders.
Proposals are evaluated by internal university teams and external peers.

Resources are distributed using a merit based system.
Infrastructure needs are addressed by this program.
Seeking external funding is an expectation of all project team members.

2. Brief description of the target audience

Academic faculty
University staff
Graduate students
Undergraduate students
University administrators
RIAES scientists
RICE personnel
State stakeholders

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	0	0	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	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Proposal submissions

Year	Actual
2014	156

Output #2

Output Measure

- Proposals funded

Year	Actual
2014	90

Output #3

Output Measure

- Extramural funds supporting research and extension
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	New knowledge generated
2	Research and extension infrastructure built and adequately supported
3	Number of integrated research and extension projects increase
4	Cultures of research and extension merge
5	University of Rhode Island scientists, faculty and staff supported by CELS CARES will leverage the investment of Land Grant funds to attract extramural grant support.

Outcome #1

1. **Outcome Measures**

   New knowledge generated

   Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

   Research and extension infrastructure built and adequately supported

   Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

   Number of integrated research and extension projects increase

   Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

   Cultures of research and extension merge

   Not Reporting on this Outcome Measure

Outcome #5

1. **Outcome Measures**

   University of Rhode Island scientists, faculty and staff supported by CELS CARES will leverage the investment of Land Grant funds to attract extramural grant support.

2. **Associated Institution Types**

   - 1862 Extension
   - 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	8782000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
CELS CARES was developed as an administrative program for the competitive allocation of Land Grant funds within the University of Rhode Island. The expected outcome was to build human capital and research infrastructure to boost competitiveness for external funding and expand the scope of integrated activities.

What has been done
University scientists, faculty and staff responded to a request for proposals that supported the Rhode Island Plan of Work. These proposals were evaluated by an internal team and an external panel of experts. Proposals that were highly ranked were funded.

Results
In the past year, scientists, faculty and staff that were funded through the CELS CARES program submitted 156 grant proposals and had 90 grant proposals funded from state, federal and private sources. These proposals were valued at $8,782,000. This constitutes a $10 return for each Land Grant dollar invested.

4. Associated Knowledge Areas

KA Code	Knowledge Area
902	Administration of Projects and Programs

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Other (Federal research budget, inflation)

Brief Explanation

Reductions in the federal research budget has increased the competitiveness for grant funds while decreasing the success faculty and staff have in securing extramural

support. Uncertain state budgets and federal budget cuts continue to have a negative effect on service and program delivery. Last, the Land Grant allocation to the institution has not changed substantively in over 20 years. The buying power of this allocation has decreased 35% during the past two decades.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Using the success of scientists, faculty, and staff as the summative evaluation of the program, we conclude that CELS CARES is meeting the expectations of the Land Grant management team. If return on investment (ROI) uses the entire Land Grant allocation to the institution as the denominator, then the ROI is $4:$1 ($ external funding:$ all Land Grant). CELS CARES project team members secured $4 for each $1 of the entire Land Grant allocation to the University. If the denominator for ROI is the dollar investment in CELS CARES projects, faculty and staff that were associated with CELS CARES projects leveraged the investment $10:$1 ($ external funding:$ Land Grant allocation to CELS CARES projects).

Key Items of Evaluation

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
1610	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes whit climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.