2015 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 the Station) and Rhode Island Cooperative Extension (RICE or Extension). These are collectively referred to as the land-grant programs at the University of Rhode Island (URI). RIAES and Extension 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 Dean for Research and the Associate Dean for 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 on solid university research; research that depends on appropriate, modern infrastructure, the cutting edge tools of science, and multi-disciplinary, multi-state, problem-based approaches. URI's land-grant programs are focused around a portfolio of five programs that current 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).
RIAES and Extension are integral components of the mission of the College and the 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: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	36.0	0.0
Actual	18.6	0.0	16.0	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
- Expert Peer Review

2. Brief Explanation

The Land grant programs at the University of Rhode Island used several merit review processes during FY 2015. All new Hatch projects are reviewed by external-university or external-non university expert peers. The selection and solicitation of external peer experts is made by the Associate AES Director. The Associate Director uses the nationwide network of Experiment Station Directors to assist in the identification of prospective reviewers. The Associate Director then contacts a minimum of two reviewers who then assess the project based on a defined rubric and provide comments to the Associate Director. The Associate Director then provides comments to the faculty that wrote the project. Faculty then revise the project narrative and submit the project for approval to USDA-NIFA through REEPort.
Faculty who join multi-state projects may submit a project initiation through REEPort. That's dependent upon the level of the participation of a faculty scientist and the budget to be associated with that effort. Prior to initiating a project, the Associate Director assesses the prospective work for fit within the defined objectives of the multistate project. If the fit is sound, a project is initiated in REEPort by a faculty scientist. After the project is undertaken, we assess the faculty scientist's contributions to the project with an expectation that our investment in the project (an investment beyond travel to the project's annual meeting) yields academic products like publications, presentations and the like.
Frequently, new Hatch projects are undertaken by faculty that have just joined the University of Rhode Island. For these individuals, there is an initial merit review of the research (prior to development and submission of a Hatch project proposal) made by an internal university panel of disciplinary experts. For instance, if we were seeking a water expert, the panel of internal experts might include a natural resources hydrologist, a civil engineer, a resource economist and an environmental planner.

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
- Survey of traditional stakeholder individuals
- Survey specifically with non-traditional individuals
- Other (Interviews with "key thinkers")

Brief explanation.

Stakeholder input is captured through a variety of mechanisms throughout the year. Stakeholder feedback is sought after most Extension workshops and meetings to ensure that our programs are meeting their needs. Research faculty routinely present the results of their work to interested industry and community groups (as well as the academic community) and use feedback from those groups to inform their future research directions. In addition, URI Cooperative Extension has begun a strategic planning process that will, over time, seek input from a large group of external partners and stakeholders. To date, Cooperative Extension is working with a Strategic Planning Committee comprised of sixteen URI faculty/staff and external partners in roughly equal numbers. That group has met twice and will meet another six to eight times into the fall of 2016. As part of the Strategic Planning Process, our consultant has conducted one-on-one interviews with 15 "key thinkers" around the state to gather their ideas about how Extension can better address RI's needs.

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 Surveys

Brief explanation.

CELS hosts three committees that play a role in identifying individuals and groups who are stakeholders and in collecting input from them. Two of those committees, the Research Committee and the Cooperative Extension and Outreach Coordinating Committee, are responsible for advising and assisting the Dean and Associate Deans in planning and reviewing programs for the college. A combination of faculty/staff and external partners serve on these committees and are expected to consider the needs of a broad set of stakeholders in formulating their recommendations. The third committee, the Agricultural Industry Advisory Group, advises the Dean on a wide range of issues related to CELS, including its land-grant programs. The College also utilizes Rhode Island's CARET representatives for stakeholder input.
Currently, a third committee, the URI Cooperative Extension Strategic Planning Committee, is actively assisting CELS in identifying relevant stakeholder groups and stakeholder individuals and bringing input from those groups and individuals into the strategic planning process.

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
- Survey of selected individuals from the general public

Brief explanation.

As was stated previously, stakeholder input is captured through a variety of mechanisms throughout the year. These include discussions and surveys of participating stakeholders at Extension workshops and meetings, as well as discussions before, during, and after faculty presentations of their research to interested industry and community groups. Input was also collected through the discussions and work of the Research Committee, the Cooperative Extension and Outreach Coordinating Committee, and the Dean's Agriculture Industry Advisory Group. The College utilizes input Rhode Island's CARET representatives. RI's CARET representatives are from the green industry and the agricultural community.

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.

Stakeholder input is used to inform a number of decisions throughout the year, including priority setting and action planning. Our researchers and extension experts incorporate stakeholder input into their thinking, planning, and program/project development over time. The Dean and Associate Deans use stakeholder input to inform decisions related to budget development and staffing. All parties use stakeholder input to identify emerging issues, which can result in the redirection of research and extension programs, and the acquisition of extramural resources when available.

Brief Explanation of what you learned from your Stakeholders

Although we have not completed our stakeholder input process, it is clear that sustainable agriculture and local/regional food systems is very important in Rhode Island and in all of New England. The 50 x 60 goal described in a report entitled "A New England Food Vision" calls for our region to produce at least 50% of its food by the year 2060. This report has generated a lot of interest across New England and all states are taking steps to address it. One important response from the University of Rhode Island is the launch of a new undergraduate degree program in sustainable agriculture and food systems. We will begin accepting students into the program this fall.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1133542	0	1547780	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	1226594	0	1786510	0
Actual Matching	1136809	0	1589569	0
Actual All Other	0	0	0	0
Total Actual Expended	2363403	0	3376079	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	558914	0	627447	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
702	Requirements and Function of Nutrients and Other Food Components	0%		20%	
703	Nutrition Education and Behavior	20%		40%	
704	Nutrition and Hunger in the Population	20%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	30%		20%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	30%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	1.5	0.0	2.5	0.0
Actual Paid	0.9	0.0	1.4	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**
65248	0	228550	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
45863	0	120743	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 implement HACCP training for RI school food service operations.
- Provide HACCP and sanitation education programs to a variety of food processors.
- Host an annual Food Safety Conference for public and private stakeholders.
- Maintain a Good Agricultural Practices (GAP) Program for commercial growers of fruit and vegetables.
- Maintain RI Food Safety Manager courses.
- Develop internet-based training on Food Safety issues.
- Develop Food Safety Curriculum materials for Special Needs students (ages 16-21).
- Evaluate the molecular biology of food borne pathogens.
- Outreach on non-thermal technology to shellfish and produce producers.
- Update and maintain website and listserve.
- Develop and implement food preservation classes for consumers.
- Outreach education to farmer market managers.

Nutrition:

- Data collection.
- Fitness testing and body composition analysis.
- Survey and questionnaire completion.
- Blood analysis and dietary intake calculations.
- 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.
- Seek external funds to support program goals.

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; parents over the age of 18 who have or are currently participating in EFNEP and who have children between the ages of 2-8.

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

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4080	238962	7607	1530

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	3	8	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed publications

Year	Actual
2015	8

Output #2

Output Measure

- Abstracts

Year	Actual
2015	9

Output #3

Output Measure

- Professional training sessions

Year	Actual
2015	18

Output #4

Output Measure

- Volunteer training

Year	Actual
2015	5

Output #5

Output Measure

- Conferences hosted

Year	Actual
2015	2

Output #6

Output Measure

- School based training sessions

Year	Actual
2015	43

Output #7

Output Measure

- Website development and refinement

Year	Actual
2015	3

Output #8

Output Measure

- Student training

Year	Actual
2015	57

Output #9

Output Measure

- Intervention studies

Year	Actual
2015	3

Output #10

Output Measure

- Workshops

Year	Actual
2015	108

Output #11

Output Measure

- Scientific/professional presentations

Year	Actual
2015	10

Output #12

Output Measure

- Thesis/dissertation

Year	Actual
2015	8

Output #13

Output Measure

- Public service announcements
  Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Social marketing
  Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Fact sheets, bulletins and newsletters

Year	Actual
2015	52

Output #16

Output Measure

- Video productions

Year	Actual
2015	2

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.
2	Commercial growers of fruit and vegetables, food industry producers, processors, and school personnel foodservice will participate in appropriately directed food safety.
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 older women.
5	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.
6	Revise, as necessary, and implement food safety education for consumers, school educators, students and volunteers in Rhode Island and within the US.
7	Assess and address individual and environmental factors that influence eating behavior of young adults.
8	Improve parent and child dietary, physical activity, and feeding behaviors in low-income, Hispanic populations. Indicator is number of people reporting improved practices.

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food safety issues concerning a variety of foods keep evolving and information to target audiences require continuous revision and updating. Therefore new training and resource materials need development/revision, evaluation, and implementation. In addition, new regulatory requirements targeting food systems require outreach efforts.

What has been done
The food safety program has been updated and continues to undergo review. Farmer listserves and seafood mailing list updates are ongoing. Preservation workshop, GAP, meat/poultry and seafood workshop updates are on-going to reflect updated information and better presentation. There were 6 new programs/resources created and/or implemented: 1) interactive, hands-on curriculum targeting elementary/middle school students focusing on food safety and school gardens; 2) risk management workshops (collaboration w/UConn) value added processed foods produced in farmers home kitchens; 3) Farmers' Market Manager Food Safety training; 4) small entrepreneurial training (collaboration w/UMass) for food safety; 5) food preservation workshop targeting high school students; 6) seafood cook-off for RI Vo-Tech schools.

Results
Websites, listservs and mailing lists updated. Curriculum for students reached 194 students grades 1-5, 10 classes (sessions) and the preservation workshop for high school students had 8 participants. There were three, 2-day workshops (CT and RI) reaching 93 participants for the risk management workshops. Market Manager presentation reached 16 managers. The seafood cook-off had 4 regional vocational high schools participating (2-3/school) and 100 audience participants. Finally, the food safety website resulted in over 80,000 sessions (as documented by google analytics).

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.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

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 and 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/producers for potential implementation or compliance with buyer requirements. Participation in voluntary food safety programs is either becoming mandatory or an expectation for businesses and non-profits. This program has a regional impact for training.

What has been done
Training sessions and workshops have been offered to RI farmers for the RI GAP initiative, to seafood and meat/poultry processors for regulatory compliance, to small entrepreneurs of value-added products, and to CT and RI farmers regarding food safety issues and business concerns associated with value added products in home kitchens. In addition, food service personnel have attended GAP training.

Results
In collaboration with regional academic partners and RI state agencies, this program successfully offered or participated in 13 professional training sessions (e.g. workshops, training sessions) that

have been highly evaluated. Over 280 processors/farmers in RI and across the region/country have attended workshops related to seafood, meat/poultry or produce, and collaborated with University of CT on many occasions. Over 1000 seafood processors are reached by a yearly newsletter. In addition, there are 40 RI GAP certified farms. All ongoing programs are routinely updated to reflect new information and mandates.

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
2015	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 in regards to risk for coronary heart disease. Young adults are presenting abnormal lipid profiles because of abnormal lipoprotein metabolism more frequently - this results in increased risk of metabolic syndrome and coronary heart disease. Because the lifestyle habits, especially dietary intake, can impact this increased risk, determining what barriers and motivators college students deal with when making food choices is critical for designing successful dietary interventions for this population.

What has been done
In Fiscal Year 2015 (Academic Year of fall 2014 and spring of 2015) we performed Cholestech screening on approximately 180 URI students.

Results

Students received individualized health information including what their blood lipid concentrations are - including the standard lipid profile which includes traditional coronary heart disease risk factors such as total cholesterol and low density lipoprotein cholesterol.

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 older women.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Saropenia is the age related lean muscle loss (Rosenberg, 1989; Delmonico & Beck 2015) public health problem in older adults due to associated adverse health outcomes as well as health care costs (Janssen, Shepard, Katzmarzyk, & Roubenoff, 2004). A healthy diet and appropriate exercise have the least amount of associated risk and can be used to prevent or slow progression of sarcopenia (Kortebein, Ferrando, Lombeida, Wolfe, & Evans, 2007), thus have a postive effect on health. However, no resistance exercise training (RT) studies have been done in women, who have been identified as having symptoms based on new criteria.

What has been done
During this report time period (10/1/14-9/30/15), we focused mainly on data analyses, manuscript writing and disseminating our previous research results through presentations at local communities, and regional and national conferences as our intervention phases are complete. Our group submitted one unfunded grant proposal to the Global Cashew Council (10/2014). Additionally, we conducted a randomized pilot study to test the efficacy of a periodized RT intervention in a group (n=25) of community-dwelling older (65-84 yrs) women who by self-report

were healthy and not involved in a regular, vigorous exercise program. The study was funded by the Dean of the College of Human Science and Services.

Results
Baseline data were collected in September 2015 and post intervention data were collected in December 2015. Data reduction and entry are ongoing. A baseline analysis of all women screened (n=61) aged 71.9 ±4.6 years was done to determine sarcopenia status based on definitions established by the European Working Group on Sarcopenia in Older People (EWGSOP), the International Working Group (IWG), and the Foundation for the National Institutes of Health Sarcopenia Project (FNIHSP). Participants were tested under standardized conditions using established cut points of grip strength, gait speed, and appendicular lean mass (ALM; via multifrequency bioelectrical impedance analysis) to define sarcopenia status. Descriptive statistics were used to evaluate prevalence and a Fisher's exact test was used to analyze the distribution frequency of sarcopenia categories from the different organizations. In this sample, 19.7% met EWGSOP sarcopenia criteria, 6.6% met FNIHSP sarcopenia criteria, and 3.3% met IWG sarcopenia criteria. There was a significant difference in distribution frequency for sarcopenia classification status when defined by EWGSOP guidelines vs. IWG guidelines (p=0.036). No other significant differences in distributions between definitions were observed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #5

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

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In Rhode Island, poverty and health-related problems are high. Sixteen percent of the population are on SNAP benefits, 63% of those are adults. As of 2013, 27.3% of adults, 10.7% of high

school aged youth and 13.2% of 10-17 year old youth were classified as obese. When examining health behaviors, only one in five adults consumed the recommended 5 cups of fruits and vegetables per day and 26.9% were physically inactive. A needs assessment conducted with the Department of Human Services staff in 2015 confirmed the need for nutrition education with the low-income population of Rhode Island. Budgeting skills, cooking skills and knowledge of healthy food options - diet quality - are warranted.

What has been done
The University of Rhode Island has been the recipient of federally funded programs to address these issues. Through EFNEP, SNAP-Ed, and CYFAR, we have had face-to-face direct teaching contacts with 7,752 Rhode Islanders and 4,592 indirect contacts. We have worked with over 80 partner organizations and presented over 900 community based presentations. Our primary objectives are to increase fruit and vegetable consumption, maintain appropriate calorie balance, increase physical activity and reduce time spent in sedentary behaviors, increase food resource management and food safety skills.

Results
Concerning the youth component of EFNEP, we have had positive improvements in diet quality, physical activity food safety, and food resource management with an increase of 77%, 32%, 58% and 51% respectively. Concerning the adult component of EFNEP, we have shown an increase(n=245) of 83% in knowledge and skills relating to diet quality and a 90% improvement in general in one or more core areas including diet quality, food safety and physical activity. In addition, results indicate a 700 mg reduction in sodium consumption. In regards to SNAP-Ed families, results show an improvement in two or more child feeding practices (n=100 including parent participants and caregivers in professional development who completed pre and post assessment). Results from a 6-week parent program showed an increase in children's dietary behavior: parents reported an increase from 58.4% to 77.8% of children who ate vegetables 5 or more days a week and an increase in children who consumed less than 1 soda/week from 81.8% to 100%. Concerning nutrition education for seniors (USDA Eat Smart, Live Strong curriculum n=50), results indicate an increase in the percentage of seniors that meet the recommendation of at least 2 fruits and 2 vegetables/day rose from 63% to 69.4% and 69.5% to 78.9% respectively. Results also showed a decrease in the percentage of seniors who did not eat more than one kind of fruit and vegetables in a day from 20.2% to 11.5% and 12.5% to 3.2% respectively and an increase in the percentage of seniors who often or always ate 2 or more vegetables at their main meal from 36.1% to 45.2%.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #6

1. Outcome Measures

Revise, as necessary, and implement food safety education for consumers, school educators, students and volunteers in Rhode Island and within the US.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

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 related local production and preservation should be addressed. School educators and volunteer workers continue to require professional development and food safety training, respectively. Finally, students in public and secondary schools also require food safety information.

What has been done
The preservation program workshops were ongoing and have resulted in 4 demonstration workshops and one hands-on workshop for 71 participants. Manager certification, online training oversight, and other food-service related training was offered to 114 participants - all URI college students. 79 students in two Nutrition and Food Sciences classes were taught. An interactive, hands-on curriculum targeted elementary/middle school students focused on food safety and school gardens, and food preservation workshops targeted high school students; 6) Seafood cook-off for RI Vo-Tech schools was offered to 194 and 8 students, respectively. Working with the Master Gardener Program, produce-related food safety information was presented at farmers markets' tables/kiosks for consumers, and food safety training for MG volunteers regarding home gardens were presented at two workshops reaching 137 participants. Finally, there were a variety of on-line and newspaper postings to reach consumers with a potential reach of over 142,000 people in the state.

Results
As stated, there were 3 food safety manager certification and other food service-related trainings offered (114 trained). Home preservation reached 71 consumers at 5 workshops. 212 students, 194 elementary and 8 high school were targeted with food safety for gardens and home preservation, respectively. Master Gardener (MG) volunteer training workshops were offered (137 participants), training MG volunteers by using produce and home gardening food safety information at farmers markets.

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 #7

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Improve parent and child dietary, physical activity, and feeding behaviors in low-income, Hispanic populations. Indicator is number of people reporting improved practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There are clear disparities in the prevalence of childhood obesity with low-income, Hispanic populations being at a higher risk. Federal nutrition programs such as the Expanded Food and Nutrition Education Program (EFNEP) serve as an important platform to reach these low-income populations yet most current curricula mainly address dietary intake. Including other target behaviors such as physical activity and screen time may be beneficial to help curb the obesity epidemic. In Rhode Island (RI), a qualitative study found that parents who previously participated in RI-EFNEP wanted to learn about other topics, beyond diet, related to childhood obesity prevention.

What has been done
We evaluated three additional modules of the RI-EFNEP curriculum related to parental and child health behaviors associated with obesity risk (feeding practices, physical activity and screen time behaviors). Five RI-EFNEP classes with parents of children ages 2-12 years (n=42) participated in this pilot. To evaluate the modules, process evaluation; fidelity, lesson observations, and participant feedback (post lesson surveys and focus groups) were used. Analysis included frequencies for quantitative data and content analysis for the qualitative data.

Results

Results revealed positive participant feedback regarding the new lessons and hands-on activities. Participants expressed wanting more age specific information related to activities and feeding, hands-on activities during the lesson related to feeding their children, and information related to how food advertisements tailor to parents and children. Fidelity for the modified curriculum was high except for goal setting, which occurred only 58.8% of the time. This pilot study showed the value of using participant feedback and other evaluation techniques to improve the modified RI-EFNEP curriculum. Future studies can benefit from program participant feedback to improve interventions that target obesity-related health behaviors in low-income families."

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- 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

Outcome #1 -

We used a 3 point Likert scale (3=agree, 2= undecided, 1=disagree) to reflect the understanding of key concepts. RME workshops were rated 2.82 ± 0.29 and higher. The evaluation of elementary and middle schools regarding food safety and school gardens used a 10 question pre/post test for knowledge changes and a visual evaluation tool (smiley face= liked very much, neutral = okay or frowning face = did not like) to assess acceptance (like or dislike of the activities). Knowledge scores of students in all grades significantly increased their knowledge at $p<.05$, with absolute percentage changes from 18 to 31% increases. The student rating of the 6 activities was very high with ranges of 62%-83% and 19-30% rating the activities as liking them very much or as okay, respectively. Both projects had extramural funding from USDA.

Outcome #2 -

All programs were rated very highly. Using a 5-point Likert scale (1=strongly disagree, 5=strongly agree with statements of understanding), seafood, GAP and entreprenuer workshops were evaluated for key areas of understanding that were addressed in the workshops. Overall the results obtained from participants showed a high degree of self evaluation for understanding. For example, in seafood HACCP class it was 4.4, for RI GAP-

related classes it was 4.5, and for small processsor entrepreneur it was 4.5. Using a 3-point Likert scale (3= agree, 1=disagree) for risk management of value added processing for farmers workshops, the results had average ratings of 2.9. Meat and poultry workshops were rated highly at good or excellent for key components.
Outcome #5 -
Evaluation of the SNAP-Ed fresh fruit and vegetable program presented to 3rd and 4th grade students(n=2230) in the Providence School District: results showed that providing the SNAP-Ed nutrition education curriculum in addition to the Fresh Fruit and Vegetable Program of USDA resulted in increased fruit and vegetable consumption. These findings reinforce the need for nutrition education to compliment the provision of foods in governmental programs. This study validates our FFVP curriculum as an evidenced based curriculum. FFVP + students increased intake by 0.89±1.75 pieces of fruit/day and the frequency of consuming vegetables increased 0.81±1.8 times/day but students in the FFVP- did not change significantly. Evaluation of CYFAR Nutrition Education and Technology curriculum on 3rd grade students in a low-income urban school district indicated that the CYFAR nutrition education utilizing "Body Quest" was effective in decreasing unhealthy food choices in schoolchildren: a significant difference was found in consumption of sugar sweetened beverages (F=8.7). The number of times students consumed sugar sweetened beverages the previous day declined from 3.2+/-1.7 to 2.2+/-1.2 in the treatment group while the control mean was unchanged at 2.5+/-1.2pre and 2.5+/-1.4 post. There was a significant within-group decrease in the consumption of energy dense snacks in the treatment group but no change in the control group.
Outcome #6 -
Four of the five preservation workshops were evaluated and resulted in scores of 4.7-4.9 reflecting high self-assessment for understanding the key concepts taught. The Master Gardener general volunteer training for incoming volunteers resulted in a score of 4.4 out of 5 reflecting a variety of food safety-related issues relating to home gardening.

Key Items of Evaluation

We are achieving consistent, positive impact from our extension programs in food safety and nutrition.

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%		9%	
112	Watershed Protection and Management	16%		15%	
123	Management and Sustainability of Forest Resources	15%		9%	
131	Alternative Uses of Land	9%		9%	
132	Weather and Climate	9%		5%	
133	Pollution Prevention and Mitigation	15%		5%	
135	Aquatic and Terrestrial Wildlife	9%		15%	
136	Conservation of Biological Diversity	9%		9%	
605	Natural Resource and Environmental Economics	3%		9%	
608	Community Resource Planning and Development	3%		5%	
721	Insects and Other Pests Affecting Humans	3%		5%	
722	Zoonotic Diseases and Parasites Affecting Humans	3%		5%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	3%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	15.0	0.0
Actual Paid	2.9	0.0	3.5	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**
278811	0	720139	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
189907	0	477415	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

• Use web-based crowdsourcing tools to collect tick encounter data, track seasonal and spatial tick trends across America, and provide personalized risk and prevention messages.
• Develop decision support tools to help a wide range of stakeholders use appropriate best tick bite protection strategies for their level of risk.
• Evaluate the effectiveness and safety of wearing long-lasting tick repellent clothing by outdoor workers.
• Study the salivary glands of ticks to find compounds from ticks with potential pharmacological value, formulate novel vaccination strategies to prevent tick-transmitted infections, develop biomolecular assays for tick-borne pathogens, elucidate transmission dynamics of pathogens among tick vectors and vertebrate hosts, and discover and evaluate natural enemies of ticks.

Climate Change

• Research investigations focus on watershed pattern, processes and management techniques that affect water borne contaminants and environmental flows. Research methods include lab and field studies as well as geospatial analyses.
• Extension programs create locally relevant programs focused on land and community management. In cooperation with stakeholders and partner agencies, we will identify needs and build upon successful local programs to create and disseminate new materials, tools and curricula in RI and New England. Our water quality programs will continue development, delivery, training and application of proven water quality management tools and techniques such as:
• Develop curricula and training on best management practices (BMPs) for conventional and alternative and innovative onsite waste water treatment
• BMPs for agricultural producers with lands that generate overland runoff to streams
• Stormwater management public outreach and training
• Watershed protection and restoration public outreach and training
• Development of curricula and training regarding private wells
• Enhanced public engagement in watershed stewardship through 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.
• 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

• Technical assistance to state energy policy office and utility for pilot energy efficiency public sector project.
• Municipal energy trainings provided to municipal officials, school district administration and employees on energy management practices and tools related to public sector building operations and management.
• Energy research lecture series offered to highlight ongoing research on energy-related topics across all academic departments and URI Extension.

2. Brief description of the target audience

Vector Borne Diseases

• The target audience will be diverse and will represent all Rhode Islanders as well as citizens of the other United States and Canada, 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, outdoor workers, 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?

no eXtension used

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	10256	1029089	525	1202

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

Patent Applications Submitted

Year: 2015

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	1	12	17

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed publications

Year	Actual
2015	16

Output #2

Output Measure

- Books and monographs

Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Abstracts

Year	Actual

2015	67

Output #4

Output Measure

- Conference proceedings

Year	Actual
2015	14

Output #5

Output Measure

- Fact sheets, bulletins and newsletters

Year	Actual
2015	56

Output #6

Output Measure

- Training manuals (includes instructional CD?s)

Year	Actual
2015	18

Output #7

Output Measure

- Scientific/professional presentations

Year	Actual
2015	105

Output #8

Output Measure

- Workshops (including short courses)

Year	Actual
2015	82

Output #9

Output Measure

- Conferences hosted

Year	Actual
2015	3

Output #10

Output Measure

- Website development and refinement

Year	Actual
2015	76

Output #11

Output Measure

- Public presentations

Year	Actual
2015	84

Output #12

Output Measure

- Public service announcements

Year	Actual
2015	15

Output #13

Output Measure

- Student training

Year	Actual
2015	79

Output #14

Output Measure

- Thesis/dissertation

Year	Actual
2015	8

Output #15

Output Measure

- Postdoctoral training

Year	Actual
2015	2

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	Increase 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.
5	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.
6	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.
7	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.
8	Increased understanding by wildlife biologists and managers through publications and talks of how habitat quality and management practices affect populations of migrating song birds.
9	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.
10	Increased (%) forest and conservation geospatial information resources, and increased usage of these resources by government organizations, NGOs and the public.
11	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.
12	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.
13	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.
14	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.
15	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.

16	Through the development of a RI State Energy Plan, conduct research regarding topics of greatest concern to stakeholders and understand ways in which stakeholders want and need to access renewable energy information.
17	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.
18	Increased understanding by scientists and decision makers through publications and presentations of the management implications related to how populations may respond to ongoing climate change.
19	Increased understanding by scientists and decision makers through publications and presentations of the management implications related to plant genome size influences competitive ability and susceptibility to herbivory.
20	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
21	Increased understanding of the private and public sector and scientists of economic valuation of air quality and greenhouse gas emissions through publications and presentations
22	Increased understanding by scientists and decision makers through publications and presentations of the management and risks of watershed nitrogen delivery.
23	Increased understanding by scientists and decision-makers through publications and presentations of the management implications of how amphibian and reptile populations respond to the impacts of forest loss and pollution.
24	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.
25	Improved region-wide understanding of the soils and hydrology of vernal pools.
26	Improved understanding of risk for vector tick encounters and tick-borne disease. Indicator is number of tick adverse moisture events (TAMEs) each year.
27	Improved public understanding of how to prevent tick bites and reduce risk of tick-borne illness. Indicators include number of unique users of the TickEncounter website; number of email inquiries responded to; and number of views on TickEncounter's Youtube channel.

Outcome #1

1. **Outcome Measures**

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

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Create tick surveillance database

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Increase 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
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Approximately 30% of Rhode Islanders rely on OWTS to treat wastewater. Rural and suburban communities, lacking municipal sewers, rely on them entirely. As a result of climate change, the humid northeast US is expected to experience wetter and warmer climatic conditions which 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; resulting in a reduction in

treatment potential, and an expected reduction in ground and surface water quality. RIDEM 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 2015 URI researchers made 10 presentations about climate change and OWTS at four regional and national conferences reaching approximately 300 scientists, 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. During the reporting period approximately 30% of all OWTS applications that these designers submitted to the RI Department of Environmental Management were 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 #5

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

2015 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Seasonal droughts, rising nutrient levels, nuisance & harmful algae blooms (HABs) and the spread of invasive aquatic plants have increased awareness that water quantity and quality is a concern for the public, 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. Monitoring for HABs, and in particular, cyanobacteria (blue-green algae) blooms have become a hot-button issue both because of their potential harmful health effects on recreational users and their seeming intractability.

What has been done

URI Watershed Watch is 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 trainings for new and returning volunteers. This year approximately 350 citizen scientists conducted ecological monitoring on ~270 locations primarily in RI, sponsored by more than 45 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, salt ponds. We co-hosted the NE Lakes conference to educate lake and watershed organizations about lake and watershed ecology. We are the invited speaker at Land Trust and Citizen Science conferences. This year we finalized creation of our relational database which house the decades of data, and 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. We recruited existing volunteers from 9 sites with documented cyanobacteria blooms to conduct supplemental monitoring as part of EPA NE efforts and also helped assess monitoring procedures and equipment.

Results

Because of Extension-led volunteer monitoring, an unparalleled, long term record of water clarity, temperature, oxygen content, nutrients and bacteria levels now exist in most NE states, with more than 27 years worth 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 documenting poor water quality, and helping to 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 home owner 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. We have been funded by RI Airport Corp. to run a multi-year winter monitoring program on an urban Buckeye Brook to

document airport de-icing runoff. This second year showed a significant decrease in glycol, despite a near doubling in snow, documenting results of airport stormwater improvements.

4. Associated Knowledge Areas

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

Outcome #6

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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 and 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 for the state's private well owners.

What has been done

Total number of clientele contacts (workshops, face-to-face interactions): 1,265 including: 10 community workshops and 2 professional workshops (one for realtors and one for RI Building Officials)held across the state; one-on-one with well owners at community events and the RI Home Show. We continue to facilitate well water testing at the RI Dept. of Health during community workshops by distributing and collecting water test kits from participants. During this reporting period we distributed 96 kits at well water programs, of those 83 kits were returned to the Dept. of Health for analysis 86%). 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, March 5 - 8, 2015. Spoke with hundreds of private well owners. Implemented and continued to pilot an intercept campaign at RI Farmers' Markets in a continuing effort to meet private well owners in their own community. URI Coastal Fellows were hired and trained to attend 22 events around the state during the summer and fall of 2015. Completely updated program website web.uri.edu/safewater. Annually the website receives 40,000 hits. The Program's quarterly newsletter is sent to 758 private well owners. Technical assistance is also provided via phone and email. Completed a new addition to our tip sheet series for private well owners, Tip Sheet 28, Buying a home with a private well? Test the water before you buy. As all the other tip sheets in this series, #28 was also audience tested in its preparation as approved by URI's IRB.

Results

Post workshop evaluations conducted annually show workshop participants are taking action to protect their private well, most notably, 75% of workshop participants had their water tested. This is an increase in the percentage of workshop participants who had their water tested as a result of attending a workshop since we began facilitating testing at the RI Dept. of Health lab. In addition, 68% of workshop attendees inspected their wellhead area for possible pollution problems. Published: McCann, A., S. Stableford. (2015). Know Your Audience, Ask Your Audience. [Articlel No. 2TOT4] Journal of Extension [on-line], (53)2. Available at http://www.joe.org/joe/2015april/tt4.php

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #7

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
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Stormwater 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 stormwater pollution. To demonstrate compliance, the municipal programs must address several minimum standards including: education and outreach to the public about stormwater pollution and actions citizens can take; and involving the public in local stormwater 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

Provided education and outreach to municipal officials, watershed groups, the public and educators on managing stormwater runoff. We organized 3 workshops on wetlands protection and gave presentations on other stormwater management topics for local officials and environmental professionals. Helped develop a new Emergency Response Planning Guide dealing with flooding and other storm events, and assisted in conducting training in use of this guide through 5 workshops. Worked with agency partners to make new tools available to municipalities, including: new small scale subwatershed maps for use in stormwater management planning; updated soils database with new fields useful in project review; and co-created a database of wetland buffer ordinances. Continued to make educational materials available to stormwater managers and watershed groups that are freely available to use directly or customize. Responded to requests for information and technical assistance. Launched a new version of the RIStormwaterSolutions.org website with new look and improved navigation.

Results

RI municipalities throughout the state used or customized URI educational materials to educate residents about stormwater pollution using flyers, town hall notices, adding content to their own websites or linking to ours, posting stormwater cartoons and other notices in newspaper, and sponsoring educational events and cleanups, enabling them to develop effective stormwater 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.

4. Associated Knowledge Areas

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

Outcome #8

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
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
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. 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.

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. In addition, one graduate student completed his dissertation, and a new graduate student began her research program.

Results
Graduate and undergraduate students and research technicians conducted field experiments that determined (a) how variation in refueling rates of migratory birds at different coastal New England sites is related to fruit resource abundance, (b) the fruit preference of birds during migration, and (c) how body condition of migratory birds affected their movements at stopover sites that differed in the abundance of fruits. Awareness about the relationship between forest management and wildlife habitat has been increased for many landowners as a result of the outreach activities.

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 #9

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.

Not Reporting on this Outcome Measure

Outcome #10

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
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The University of Rhode Island Renewable Resources Extension Act Program (URI RREA) promotes and supports the use 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 volunteer and non-profit organizations, and businesses.

What has been done
Conducted six instructor-led classes. Continued hosting and maintaining the RIGIS online data clearinghouse and the URI GPS Base Station. In partnership with the Conservation Stewardship Collaborative, supported the development of a statewide protocol for forest stewardship plans, and assisted with developing new forest stewardship programming for implementation during the next fiscal year. URI RREA scientists gave 8 presentations, authored 4 blog posts, and even facilitated the production of a television episode that was broadcast to over 120 million homes nationally. PI August was also appointed by the Governor of Rhode Island to Chair the RI Executive Climate Change Coordinating Council Science and Technical Advisory Committee.

Results
Approximately 60 people attended our instructor-led classes. The RIGIS online data clearinghouse distributed 4.5 TB of data, and 18 GB of correction files were downloaded from the URI GPS Base Station. The 115 map services affiliated with the Rhode Island Digital Atlas responded to 1.6 million requests. 256 copies of the Natural Heritage Areas dataset and 316 copies of the Ecological Communities Classification datasets were downloaded from RIGIS. Our program resulted in at least 800 direct and 5,000 indirect contacts with individuals who took advantages of the services and events led 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 #11

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 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Eastern hemlock is a 'foundation species' in our forests whose role (creating shady microclimates that cool headwater streams and provide essential wildlife habitat) is appreciated by hikers, birders, fishermen, etc. From a nursery perspective, eastern hemlock is valuable as the only native shade-tolerant conifer in the Northeast. This means that it is the only native tree species that, when hedged, does not lose its needles in low-light areas, thus providing a visual barrier from the bottom to the top of the hedge.

What has been done
We have talked to nursery professionals, state and local foresters, and an array of scientists regarding our work and its potential applications. We have been guided by their suggestions in developing and testing a number of hemlock saplings derived from adelgid-resistant parent material (using both grafting and rooted propagation).

Results
After growing these saplings out to a size suitable for outplanting, we have distributed many of them to state and local foresters who are outplanting them alongside control trees in multiple east coast forests for long-term evaluation of their survival and vigor.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity

Outcome #12

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
2015	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 RI homeowners, small businesses, municipalities, and state agencies with the need to manage energy and costs. 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
We conducted research on available new media, improved format and framing, and surveyed energy topics that would be most beneficial to our audience for upcoming workshops and trainings. This research resulted in the formation of URI's first energy research lecture series: 'Plugged into URI Energy Research' held in November of 2015. We booked 11 faculty, staff and graduate student speakers to educate our audience on the energy research and extension programs currently being conducted at the University over the course of three lectures: 'Energy and the Ocean', 'Energy and Transportation', and 'Energy and URI Extension'.
We also hosted two residential workshops to showcase the energy efficiency initiatives of local municipalities through the EPA Climate Showcase Communities Program to show how residents can adopt similar initiatives in their homes. These workshops would allow an opportunity for residents to learn what actions their municipal officials have made to achieve energy reductions, sign up for energy efficiency programs offered by utility companies, and participate in an energy efficient light bulb exchange.

Results
URI Energy Fellows and Extension Outreach Center staff managed two educational workshops for residents in the Town of South Kingstown and the City of Warwick to showcase the achievements these communities have made during the EPA Climate Showcase Communities Program. As a result of these workshops, 57 residents learned about their town's energy projects and how to duplicate efforts in their homes, 19 residents signed up for National Grid's EnergyWise Assessment to receive their free home energy audit, and 69 LED lightbulbs were offered to residents in exchange for their traditional inefficient bulbs.
We also scheduled three nights of the 'Plugged into URI Energy Research Lecture Series' for November 2015 and will report the results of this series in our FY16 reporting period. We also have a packet of research and resources to make more strategic decisions regarding the future energy workshops and trainings we plan to offer.

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 #13

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
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many students enrolled at our university are passionate about sustainability and are interested in renewable energy and energy efficiency topics. They're looking for opportunities outside of the classroom to explore that interest 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 2014 program year graduated ten Energy Fellows engaged in projects with staff at the URI Extension Outreach Center, Commerce RI, RI Office of Energy Resources, and Ocean State Clean Cities. Our 2015 program welcomed eleven Energy Fellows working on projects with staff at the URI Extension Outreach Center, Commerce RI, and a new partnership with RI Army National Guard. These students, from a variety of majors, were afforded the experience of working 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.
During the program year, we also evaluated the soft skill development and energy training we currently provide to our Fellows and held several meetings with the URI Center for Career and Experiential Education to plan ahead for necessary improvements to our 2016 program that would allow us to have the greatest impact on our future Fellows.

Results
Our 2014 Energy Fellows graduated from the program with an understanding of current energy issues in the State of Rhode Island and their potential role of taking part in managing those issues

in the energy field. Our students were prepared with professional skills and training needed to succeed in that workforce.

Of the six 2014 Energy Fellows that graduated from their studies at the university, four received jobs with energy companies and organizations in the State of Rhode Island, one received a sustainable marketing job with a company in California, and one Fellow was accepted to a challenging graduate program at URI.

Of the four Energy Fellows who have not yet graduated from the university, two were accepted to a second year of the Energy Fellows Program, and two earned internships at another RI energy company.

4. Associated Knowledge Areas

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

Outcome #14

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.

Not Reporting on this Outcome Measure

Outcome #15

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 #16

1. Outcome Measures

Through the development of a RI State Energy Plan, conduct research regarding topics of greatest concern to stakeholders and understand ways in which stakeholders want and need to access renewable energy information.

Not Reporting on this Outcome Measure

Outcome #17

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
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Coastal wetlands are being degraded and lost worldwide, yet they perform valuable roles in trapping and storing carbon dioxide (a potent greenhouse gas). Coastal managers need tools for predicting how much carbon a wetland can store, and for identifying threats to those long-term carbon pools.

What has been done
New methods for measuring greenhouse gas fluxes (including carbon dioxide, methane, and nitrous oxide) have been developed and applied in the field. Data have been collected to compare gas fluxes in a suite of marshes that vary across a range of salinity levels and nitrogen loads (from human impacts). Different plant-defined zones were also contrasted to better understand which communities are associated with the largest carbon sinks. These data were used in testing a pilot version of a carbon model for coastal managers that is currently under revision.

Results
We found high rates of carbon dioxide uptake in Phragmites-australis invaded marshes (and low emissions of other greenhouse gases: methane and nitrous oxide) across a salinity gradient. This was published in the journal Wetlands and presented at multiple regional and national scientific meetings (New England Estuarine Research Society, Coastal and Estuarine Research Federation). We also completed a study that found lowest carbon dioxide uptake in inundated marsh zones, which indicates that sea level rise can stall and even shift marshes from sinks to sources. We also found that the carbon model thus far can predict carbon dioxide fluxes based on below ground plant biomass but that other data are needed (particularly climate data) to predict methane emissions from coastal marshes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #18

1. Outcome Measures

Increased understanding by scientists and decision makers through publications and presentations of the management implications related to how populations may respond to ongoing climate change.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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 three undergraduate students. First, we continued our 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, thermal tolerances and thermal preferences. Second, to continue to explore the evolutionary dynamics of species invasions, we conducted a population-genetic study to determine whether introduced green anoles from Cuba are hybridizing with native green anoles in South Florida. Undergraduates participated through URI's Coastal Fellows and Science and Engineering Fellows programs.

Results

For the first study, we found substantial differences in the thermal microclimates available for lizards, and consequently, lizard body temperatures differed. Natural forests were cooler and less variable than disturbed sites. These differences in thermal physiology likely limit the spread of Anolis cristatellus to relatively cooler microclimates in Miami. For the second study, we detected hybrids between native and invasive green anole lizards in Miami using mtDNA sequences and microsatellite genotypes. Introgression of genes from invasive green anoles into native green anole populations may be a cause for conservation concern.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
135	Aquatic and Terrestrial Wildlife

Outcome #19

1. Outcome Measures

Increased understanding by scientists and decision makers through publications and presentations of the management implications related to plant genome size influences 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
2015	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 below ground 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
We studied the relationship between genome size and ploidy level variation and plant traits for the reed grass Phragmites australis. Using a common garden approach on a global collection of populations, we investigated the influence of monoploid genome size and ploidy level on the expression of P. australis growth, nutrition and herbivore-defense traits and whether monoploid genome size and ploidy level play different roles in plant trait expression. We found that both monoploid genome size and latitude contributed to variation in traits that we studied for P. australis, with latitude being generally a better predictor of trait values and that ploidy level and its interaction with monoploid genome size and latitude also contributed to trait variation. We also found that for four traits, tetraploids and octoploids had different relationships with the monoploid genome size. While for tetraploids stem height and leaf water content showed a positive relationship with monoploid genome size, octoploids had a negative relationship with monoploid genome size for stem height and no relationship for leaf water content. As genome size within octoploids increased, the number of aphids colonizing leaves decreased whereas for tetraploids there was a quadratic, though non-significant, relationship. Generally we found that tetraploids were taller, chemically better defended, had a greater number of stems, higher leaf water content, and supported more aphids than octoploids.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
136	Conservation of Biological Diversity

Outcome #20

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 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Federal and state agencies (NRCS, DEM, EPA, USDA), conservation districts, water supply boards, land trusts and other nonprofits 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
1) We conducted an online survey to residents of the Pawtuxet River Watershed to understand preferences for improvements in water quality, freshwater fish habitat, carbon sequestration, and terrestrial habitat. Approximately 4000 randomly selected residents were invited by mail to take an online survey which asked detailed questions about preferences for these ecosystem services through a choice experiment. We received valid responses from over 200 residents (5% response rate). The data from the choice experiment along with other information have been cleaned and analyzed.
2) An ecosystem services simulation model was calibrated for the state of Rhode Island. We utilized the InVEST model, which is a platform developed by the Natural Capital Project to simulate multiple ecosystem services. During this study period, we collected and compiled parameters to simulate four ecosystem services (carbon, nutrient retention, two types of habitat for key species). We consulted a few stakeholders (RI Division of Planning, RI DEM and RI NRCS) to develop several land use scenarios in the future, and simulated the changes in each of the four ecosystem services to understand trade offs.

Results
1) Our major finding is that residents' willingness to pay for improvements in water quality is significantly higher than for the other three ecosystem services, reinforcing the view that water quality is a priority for the residents of the watershed. This result holds even when there was uncertainty in the delivery of the improved water quality while other ecosystem services delivery had no uncertainty. We also found that risk preferences of the subjects were correlated with willingness to pay for ecosystem services with uncertainty.
2) Through the InVEST model simulations, we found that large changes in land use in Rhode Island leads to worse water quality, but the extent of the impact on the habitat depends on the types of species. On the other hand, there is limited capacity for carbon sequestration in the state.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
605	Natural Resource and Environmental Economics

Outcome #21

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
2015	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 well-being. 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
Analyzed consumption patterns of 300 sample AC units in central California that participated in a Direct Load Control program. Analyzed the house price response to air quality improvements resulting from the 1990 Clean Air Act in order to assess the distribution of benefits across space and income groups and assess the timing of price responses. Acquired data on hydraulic fracturing and housing transactions in proximity and am building models to identify impact of drilling on housing prices. Downloaded Google trends data at media market level, matched with historical hurricane tracts and am striving to understand the relationship between hurricanes and climate change engagement.

Results
Results indicate that AC usage increases relative to normal before and after a curtailment event. Results suggest that housing prices positively respond to air quality improvements, and so rather quickly for owner-occupied homes, and lower income groups have benefited disproportionately from the improvements.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
605	Natural Resource and Environmental Economics

Outcome #22

1. Outcome Measures

Increased understanding by scientists and decision makers through publications and presentations of the management and risks of watershed nitrogen delivery.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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 geospatial tool, N-Sink, was developed for 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. Decision makers evaluated the tool. We continued to assess the nitrate removal capacity of intermittent streams by running a model to determine the transient storage within the stream. We also conducted the first quantitative synthesis of denitrifying woodchip bioreactors, a nitrate abatement system; the meta-analysis assessed nitrate removal across environmental and design conditions from 26 published studies, representing 57 separate bioreactor units. We submitted this paper to the Journal of Environmental Quality, and results will be shared with researchers and practitioners.

Results
Based on feedback from NRCS and NEMO programs, N-Sink's usability was improved. 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 and transient storage of intermittent streams is comparable to higher order streams; this function will be shared with other modelers. Results of the meta-analysis suggest improvements to denitrifying bed designs, especially extending the hydraulic retention time to

increase nitrate removal under low temperatures and high flow conditions. This practical information will be shared with researchers, designers, agricultural service providers, and NRCS.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #23

1. Outcome Measures

Increased understanding by scientists and decision-makers through publications and presentations of the management implications of how amphibian and reptile populations respond to the impacts of forest loss and pollution.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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 contributors. 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 have completed our final season of data collection on each of these studies, and we are currently analyzing our results. Based on preliminary analyses, we have determined that stream-breeding amphibians spend the majority of their time in adjacent forested landscapes suggesting that terrestrial habitats are essential for maintaining viable populations. Loss of 50% of forested terrestrial habitat adjacent to streams will cause extirpation of populations. Snake populations in partially developed areas exhibit high levels of mortality compared with those in undeveloped areas, because of human-wildlife conflict and road mortality. Finally, salt concentrations in wetlands appear to affect the distributions of amphibians on the landscape, but we suspect that distributions are more closely linked to road density and associated mortality than to pollution from road salt. Turtle distributions do not seem to be affected by road salt. We anticipate that 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
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #24

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
2015	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 and amphibians. 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. This project has been expanded to include amphibians. 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 finished our final year of field data collection this fall and are working on analyzing the data. We have given a number of presentations to scientists and land managers within the state and nationally, as well as to interested public groups. We developed a web site through which we can disseminate the results of this research to the public and to land managers. We leveraged this USDA funding and project against an internal URI grant and received funding to assess the effects of forest fragmentation on gene flow among turtle populations. Over 800 blood samples from two different turtle species were collected and genetic analyses are underway in the laboratory.

Results
Preliminary analyses indicate that forest fragmentation does not appear to impact distributions of most freshwater turtles species in Rhode Island, but there are clear affects on the most sensitive species. The turtle species most sensitive to disturbance has very limited distribution and disjunct populations in the state. Forest fragmentation has also affected the distributions of amphibians in the state and wetland size plays a role in the magnitude of the effect. We expect that land trust organizations and state agency personnel will be able to use the results generated from this study adjust the ways that turtle populations are managed in the state.

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

Outcome #25

1. Outcome Measures

Improved region-wide understanding of the soils and hydrology of vernal pools.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Vernal pools are one of the most ecologically valued types of inland wetlands. These ecosystems provide habitat for numerous rare and endangered plants and animals and provide numerous ecosystem functions within upland landscapes. Many of these functions are dependent upon the hydrology of the systems. Since hydrology is driven by climatic conditions, which may vary wildly from year to year, a tool that can predict typical hydrologic conditions would be instrumental in the conservation and management of vernal pools for a number of their related functions. Regional and national hydric soils regulatory groups, such as the National Technical Committee for Hydric Soils, will use this information to assess the need for additional hydric soil indicators for identifying jurisdictional wetland boundaries under Section 404 of the Clean Water Act.

What has been done
Eight vernal pools in southern Rhode Island have been selected and instrumented for determining hydroperiod. Four vernal pools have been instrumented to monitor hydrology, redox chemistry, and carbon accounting across three transects in each from the basin to the surrounding upland. Hydrology and hydroperiods have been measured since August. Samples have been collected along the transects to calculate soil organic carbon pools. These samples will be prepped and analyzed over the next 4 months.

Results
We have just established our hydrologic and hydroperiod stations. Our results are incomplete.

4. Associated Knowledge Areas

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

Outcome #26

1. Outcome Measures

Improved understanding of risk for vector tick encounters and tick-borne disease. Indicator is number of tick adverse moisture events (TAMEs) each year.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Centers for Disease Control estimates some 300,000 cases of tick-transmitted Lyme disease are contracted annually in the U.S., with hundreds of thousands more victims worldwide. Previous studies attempting to predict disease risk have produced inconsistent results but our recent work identified a critical environmental factor regulating tick vector population abundance, which likely impacts disease risk. More accurate predictability of within-season tick population trends could allow better-targeted public health action.

What has been done
Follow up studies being led by Dr. Howard Ginsberg are in progress to assess the impact of Tick Adverse Moisture Events (TAMEs) on nymphal blacklegged tick abundance at the landscape level. These studies are being conducted using data collected at 4 specific locations in WI, NJ, RI, and MA. The number of TAMEs that occurred and the number of nymphs collected are being analyzed in relation to landscape variables and canopy cover.

Results
Preliminary results suggest that environmental moisture (leaf litter relative humidity) and possibly the number of TAMEs occurring during the month of June is correlated with the abundance of nymphal blacklegged ticks collected by flagging, irrespective of geographic location. Moreover, it appears that degree of canopy cover may be correlated with the number of TAMEs that occur within a heterogenous patch of "tick habitat."

4. Associated Knowledge Areas

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

Outcome #27

1. Outcome Measures

Improved public understanding of how to prevent tick bites and reduce risk of tick-borne illness. Indicators include number of unique users of the TickEncounter website; number of email inquiries responded to; and number of views on TickEncounter's Youtube channel.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The high incidence of Lyme disease, estimated to infect 300,000 people each year in the US, along with other high morbidity tick-transmitted infections, is a critical problem especially for human populations residing in Northeastern, mid-Atlantic, and upper mid-Western regions. Nationally, peak incidence rates are seen in children aged 5-14 years and in adults aged 45-59 years. Lyme disease can be prevented through consistent use of personal protection, appropriate tick bite management, and environmental tick control interventions. Each of these disease prevention components plays a role in mitigating human tick encounters.

What has been done
We promote TickSmart "best practices" for preventing tick encounters and reducing tick-borne disease incidence using a multi-channel, technology-based approach. In addition to expanding the scope and reach of our TickEncounter website, we have increased efforts to engage tick bite victims and to educate and empower them. Specifically, through our TickSpotters program, we provide tailored (personalized) messages intended to lead to a higher level of persuasion for using one or more of 5 core TickSmart actions to reduce exposure to disease-carrying ticks.

Results
TickEncounter analytics revealed that the site posted 1,185,192 user sessions (28% increase) and 1,014,266 unique users (27% increase) in 2015 over 2014; there were 2,254,260 pages viewed, an increase of 26% over 2014. We distributed >45,000 tick identification magnets, >2,000 TickSmart Daily Tickcheck Reminder cards, and 6,000 "Just Found A Tick" cards to individuals and organizations across the United States. We responded to >5,000 e-mail inquiries generated through the web site channel in addition to 10,361 TickSpotters submissions. Our social media channels continued to grow with >2,000 new Facebook ?likes? in 2015 and >400 new followers on Twitter (@TickEncounter and @theTickGuy). The top three Facebook posts had views/shares

of 96,416/1,597, 16,792/278, and 15,031/212. TickEncounter?s Youtube channel had 1,143,181 new views during 2015. The three most popular videos included "How to remove a tick" (836,239), "Lifecycle of Babesia microti" (17,233), and "How do deer ticks become infected" (6,216).

4. Associated Knowledge Areas

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

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 (human behavior)

Brief Explanation

Outcome #5 -
Outcomes were generally as expected. It is proving more and more difficult to garner external grants. Program Director Linda Green reduced her hours from full-time to 0.8 FTE, partially due to this situation, and partly for personal reasons.
Outcome #6 -
We had one workshop cancellation in February 2015 due to weather. It was re-scheduled and cancelled again due to weather, so that workshop was never held. The weather last winter also prevented us from attending some of the indoor farmers markets.
Outcome #11 -
We would have liked to produce many more plants, but the techniques for propagating hemlocks are poorly described and we have had to learn via trial-and-error on how best to succeed.
Outcome #12 -
We would have liked to offer residential workshops in the other 2 communities that participated in the EPA Climate Showcase Communities Program. The lack of engagement from municipal officials prevented us from doing so.
Outcome #13 -
We were very successful in achieving the planned outcome of our 2014 Energy Fellows Program. Based on the number of applications we receive each year for the program, we could be more successful in exceeding our planned outcomes if we could place more students with staff at the university or with external organizations.
Outcome #20 -
We faced many technical challenges with InVEST modeling and took longer to calibrate the model to Rhode Island. The simulations are complete, and we are working to disseminate the results through a new website and manuscripts.
Outcome #26 -

Work on this project has been slowed due to a lack of specific funding. We are exploring future work on this project through collaboration and with the assistance of a new Multicultural postdoctoral fellow employed by the College of Environment and Life Sciences.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Outcome #4 -
Our outreach team delivered 7 design-related training classes reaching 117 practitioners; 3 classes to 149 practitioners (50 of them advanced system designers) on advanced OWTS to broaden their design choices; and, trained 659 wastewater practitioners in the New England region enabling them to gain a new wastewater license or retain their existing one. **Twenty-seven OWTS professionals took our wastewater inspector training classes, were tested and passed their exams**, and received OWTS Inspector Registrations which are required in order to conduct inspections in several Rhode Island communities having wastewater management programs.
Eighteen professionals took required classes, offered by our training program which are needed in order to receive RI or MA regulatory agency permission to design and install bottomless sand filters.
Twenty-two OWTS professionals took our septic system installer preparation course to prepare them for the RIDEM installer's licensing exam -**19 passed the exam and received an installer's license,** required to install OWTS in RI. Seven onsite wastewater professionals took the URI course to prepare them for the RIDEM designer licensing exam, of which **4 passed the exam** and received a designer's license, required to design OWTS in RI.
Approximately, 30% of all OWTS applications that designers submit to the RIDEM are for advanced OWTS. Use of nitrogen removal OWTS are now required in state-designated watersheds that are nitrogen sensitive. This has helped protect these watersheds and groundwater from further degradation.
Outcome #5 -
Although we did not conduct a formal evaluation, we do so informally. We tracked how many people attended our training sessions, becoming bona fide volunteer water quality monitors. It is 75-80%. Annually, we track the retention of our volunteers and know how many, and who, have been monitored for x years. We have an average retention rate of 66% for volunteers between their first and second years. It is 88% by their fifth year, 92% for their tenth year, 92% for their fifteenth year.
We have 25, twenty-plus year volunteers.
Outcome #6 -
Mail survey evaluation results indicate that workshop participants are taking action to protect their private well. Most notably:

1. Results for 2014 indicate that 75% of workshop participants had their water tested and 68% inspected their wellhead area for possible pollution problems. See impact summary here: http://web.uri.edu/safewater/files/Workshop_ImpactSummary.pdf

In 2014, we began to facilitate private well water testing at our educational workshops by arranging to pick up participant water samples a day or 2 after the workshop. We transported the samples to the RI Department of Health State Laboratories for the homeowner, thereby eliminating one of the identified barriers to testing. As a result, we have found an increase in testing among our workshop participants.
Outcome #7 -
Workshop attendees typically report satisfaction with workshops in the range of 4-4.5 on a scale of 1-5. The open and click through rate for E-news to municipal officials is very high.

The post-workshop survey response was 50% and results ranged from 4-4.7 on a scale of 1-5.
Outcome #13 -
From our student survey we determined that 38% of our program alumni went on to attend graduate school, 42% completed another internship, 46% secured full-time jobs in the energy sector, and 83% secured full-time jobs after graduation. Our alumni also reported an increase in their creative thinking, critical thinking, communication, networking, and professional development skills as well as increased knowledge in technical energy concepts and energy policy and decision-making.
From our mentor survey, we found that 100% of program mentors were completely satisfied with their Energy Fellow and would hire another Energy Fellow if funding were available. They feel that their student contributed to the principal mission of their organizations. Mentors reported that Fellows provided support with such tasks as: energy benchmarking, data analyses, policymaking, grant writing, project management, outreach and education support, event management, and program development.

Key Items of Evaluation

Evaluations provided evidence of good impact from our water-quality related programs. Our Energy Fellows program receives high ratings from program mentors; students participating in the program experience significant success in securing jobs after graduation.

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	30%		0%	
302	Nutrient Utilization in Animals	15%		20%	
304	Animal Genome	0%		5%	
305	Animal Physiological Processes	10%		10%	
307	Animal Management Systems	10%		20%	
311	Animal Diseases	10%		25%	
605	Natural Resource and Environmental Economics	0%		5%	
606	International Trade and Development	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: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	10.0	0.0
Actual Paid	5.9	0.0	0.7	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
321850	0	100526	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
334397	0	105002	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

Aquaculture and Fisheries

• Investigate causes of diseases of shellfish and the mechanisms of innate immunity, particularly matrix metalloproteinases in hemocytes..
• Develop technologies to reduce bycatch.
• Provide consumers, health care providers and fishing industry representatives with accurate information on the handling of seafood.
• Develop and share strategies to create sustainable fisheries.
• Conduct training programs for key stakeholder groups.
• Perform applied aquaculture research.

Health and Well-being of Livestock

• Research investigating the anti-parasitic efficacy of the forage birdsfoot trefoil and cranberry bush against the gastrointestinal nematode (GIN) Haemonchus contortus, the most pathogenic GIN of sheep and goats.

Community Gardening

• Outreach efforts to community decision makers, agricultural, residential and engineering/regulatory community were conducted.
• Outreach to school children and to the urban population center in the state.
• Demonstration sites established for use in Extension programs.
• Development and dissemination of publications, fact sheets, and websites.

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 gardeners emphasizing the use of plants that require less water, labor, nutrients, and pesticides.
• 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

- Evaluate the impacts of ecolabeling on consumer demand for frozen seafood.

2. Brief description of the target audience

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 producers, extension agents, scientists, undergraduate and graduate students

Community Gardening

- Community and public decision-makers (local, state and federal agencies); general public; agricultural producers; residential and engineering/regulatory community members; school-aged children; urban populations; municipal planners; private sector firms engaged in watershed management, landscaping, onsite wastewater treatment and private wells; 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

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	5	30	0	0

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

Patent Applications Submitted

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed publications

Year	Actual
2015	1

Output #2

Output Measure

- Books and monographs

Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Abstracts

Year	Actual
2015	1

Output #4

Output Measure

- Conference proceedings

Year	Actual
2015	6

Output #5

Output Measure

- Technical documents, fact sheets, bulletins and newsletters

Year	Actual
2015	13

Output #6

Output Measure

- Training manuals (includes instructional CD's)

Year	Actual
2015	4

Output #7

Output Measure

- Scientific/professional presentations

Year	Actual
2015	8

Output #8

Output Measure

- Workshops (including short courses)

Year	Actual
2015	34

Output #9

Output Measure

- Conferences hosted

Year	Actual
2015	4

Output #10

Output Measure

- Website development and refinement

Year	Actual
2015	4

Output #11

Output Measure

- Public presentations

Year	Actual
2015	100

Output #12

Output Measure

- Public service announcements

Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Student training

Year	Actual
2015	70

Output #14

Output Measure

- Thesis/dissertation

Year	Actual
2015	1

Output #15

Output Measure

- Biological control agent released

Not reporting on this Output for this Annual Report

Output #16

Output Measure

- Germplasm developed

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	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.

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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 2014, the US imported oysters in the value of more than $47 million, showing that the approximately $175 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. 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 Consortia, 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, including immunity.

What has been done

Many of the challenges and opportunities facing the bivalve shellfish industry can be addressed 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 joint efforts of this group with the shellfish industry has resulted in increased collaborative funding for the development of tools and resources for breeding and disease management in bivalve shellfish, including sequencing the genome of the Eastern oyster and research on the use of probiotics for disease management in shellfish hatcheries.

Results

Differences in disease resistance between oyster families and targeted challenge experiments continue to be exploited to investigate mechanisms of disease resistance and immunity in oysters. Our collaborative research involving oyster researchers and industry participants has shown that oysters have a complex innate immune response involving families of immune and stress genes that are highly diverse and expanded compared to other species. This complex immune response may have evolved in response to exposure to a highly complex environment with a high diversity of pathogens. Two review papers summarizing the potential of genetics and genomics to help the study of immunity in oysters and lead to the development of disease-resistant strains were published.

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 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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 2014, the US imported oysters in the value of more than $47 million, showing that the more than $175 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. Several diseases affecting adult shellfish have expanded in range

and increased in severity in the last decades, impacting production. Furthermore, shellfish hatcheries have also experienced an increase in bacterial outbreaks, leading to severe losses in larval production and affecting the availability of seed for planting. 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, including the impact of disease on production, 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 tools 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. Our collaborative research also involves investigating the use of probiotics to manage the impact of disease in shellfish hatcheries. We have also participated in the establishment of a pilot disease surveillance program for disease in oyster farms in Rhode Island sponsored by USDA APHIS, one of the first to include a molluscan species.

Results

We continue to work with the Rhode Island industry to find ways to manage disease through different mechanisms. 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. Our research has also led to the development of 2 probiotic strains that protect larval shellfish from mortality caused by bacterial pathogens. We have demonstrated that these probiotics protect larval oysters and bay scallops from disease challenge at both laboratory and commercial scales. However, these effects appear to be species-specific, since no protection was observed with hard clams, razor clams, or mussels. We have now obtained funding in collaboration with industry hatcheries to determine if the microalgae used as feeds in shellfish hatcheries could be used to improve probiotic delivery and efficacy. In addition, the results from the first pilot disease monitoring program by USDA APHIS have been obtained and shared with the farmers, and USDA APHIS is continuing funding for this program.

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 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There's no relief in sight for small ruminant producers in the battle against gastrointestinal parasites in the Northeast. Drug resistance to GI nematode worms (GIN), especially barber pole worms (Haemonchus contortus) continues to increase for all available dewormers. There is a toolbox of alternative methods of parasite control for small ruminant producers. One of the newer areas that has shown promise is the use of natural plant products with deworming activity - such as the pasture forage, birdsfoot trefoil as well as cranberry.

What has been done
Extension efforts focused on Integrated Parasite Control/FAMACHA© Training and Fecal Egg Counting workshops, as well as Field Days highlighting the research program focused on the use of birdsfoot trefoil and cranberry as alternative GI parasite control methods.

Results
Three Integrated Parasite Control/FAMACHA Training workshops were held in VT (2) and RI (1). Approximately 74 people participated in these workshops. One Field Day and one Fecal Egg Counting Demonstration were held on the same day as the RI workshop and there were 20 and

32 participants respectively, 36 total individuals over the 3 programs that day. In vitro assays assessing anthelmintic efficacy were conducted on an aqueous extract of 45 BFT accessions and 6 commercial varieties of BFT. Commercial varieties and cultivars of BFT differed in their antiparasitic efficacy. Cranberry powder was administered to parasite infected lambs. A slight reduction in fecal egg count and worm burden was found.

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
2015	0

3c. Qualitative Outcome or Impact Statement

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

What has been done
From January to April 2015, members of the general public participated in the 14-week Master Gardener Program core training course. Adult learners were trained as volunteer Extension

educators and taught to adopt environmentally-sound horticultural practices and utilize research-based resources when answering gardening questions. Once trained and up to date on continuing education, certified URI Master Gardener volunteers shared their knowledge with residents of Rhode Island, Massachusetts and Connecticut. Volunteers delivered educational workshops, staffed the Gardening and Environmental Hotline and email service, answered questions at kiosk booths at community events and provided a free pH soil testing service. They also educated residential gardeners and their families through educational events held at the over 60 Master Gardener demonstration and public gardens statewide. Additional volunteer service activities improved the gardening skills of special populations, including providing horticultural guidance to K-12 school teachers through the School Garden Mentor Program and serving as in-garden educators at community gardens statewide. Social media, print media, web articles in the Providence Journal, in-garden interpretive signage and plant tags, websites and fact sheets were all utilized to increase the educational reach of URI Master Gardener Program efforts.

Results

116 new URI Master Gardeners were trained, about 78% of whom began volunteering in the community as educators in 2015. Approximately 600 certified URI Master Gardener volunteers served a total of 57,517 hours (the equivalent of 28 full time employees) educating over 9,500 people statewide. Thousands of youth and families participated in community outreach events and symposia organized via the URI Master Gardener Program. 30 schools received individualized horticultural guidance and resources through the URI Master Gardener Program.

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
2015	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 seven educational gardens located in Providence, Coventry, Portsmouth and Kingston (Rhode Island) 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
6,900 pounds of food was donated to local food pantries within the reporting period. URI Master Gardener volunteers also worked one-on-one with thirty-five school and community gardens statewide (more than doubling our school and community gardener clientele from 2014), serving as horticultural 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
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Proficiency in science for the 5,134 students tested in the Providence school district in 2013 was 5.3%. This compares to 23.8% for the state (Rhode Island Department of Elementary and Secondary Education). To help boost science proficiency in Providence and other Rhode Island schools, the URI Outreach Center provides elementary schools with the opportunity to engage in hands-on environmental science explorations through the URI Learning Landscape Field Trip Program in Providence and Kingston, RI.

What has been done
The Learning Landscape Field Trip Program is an environmental education program for elementary school children that aligns activities with Common Core, Grade Expectations and on a limited basis in 2015, with Next Generation Science Standards. From February 3 - April 16, 2015, the URI Outreach Center implemented Winter Learning Landscape Field Trips for grades K - 5, at the Roger Williams Park Botanical Center in Providence. From May 6 - June 12, Spring Learning Landscape Field Trips were held at the URI Botanical Gardens. Learning Landscape is led by URI staff and students and URI Master Gardeners.

Results
URI staff, students and Master Gardener volunteers provided environmental education lessons and activities for 1,940 elementary school children participating in the URI Learning Landscape Field Trips Program in Providence and Kingston.

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

2015 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Compostable organic materials from backyards make up nearly 30% of the waste stream. Transporting and land-filling these materials is expensive from both an economic and environmental standpoint.

What has been done
Held Master Composter Core trainings.

Results
This year 43 RI residents received the Master Composter Core Training. This training allowed our stakeholders to receive the most up to date information on compost, and made resources available for them to learn hands-on skills on compost. This knowledge and information was then extended to more RI residents by participating in 22 community events throughout the state.The program currently manages 11 active volunteers who have volunteered at least once in the past year. Collectively they volunteered 48 hours hours over the course of one year. Compost workshops and tabling demos have been attended by over 600 participants across the state.

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

2015 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rhode Island's coastal regulatory agency is charged with maintaining the quality of habitat in coastal edge environments to preserve biodiversity and climate resiliency for future generations.

What has been done
URI Extension delivers the Invasive Plant Management Certification Program annually to educate green industry professionals on best invasive plant management practices on residential and commercial properties to preserve biodiversity and increase climate resiliency.

Results
In total, 15 permits were obtained and projects restored over 30 acres of coastal habitat.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant 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

Not Reporting on this Outcome Measure

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

2015 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Seafood ecolabel is a market-based tool to encourage sustainable production of seafood, both for captured fisheries and aquaculture. Many retailers and distributors in the US have publicly announced their commitment to promote ecolabeled seafood products, but previous studies suggest that US consumers are not necessarily demanding such products. So who is driving this trend and for what motives?

What has been done
A multistate and international research team was formed, representing RI, CA, ID, Norway, and The Netherlands. So far the team has conducted (1) an extensive literature review on the topic; (2) gathered available data on ecolabel schemes for seafood (e.g., fisheries improvement projects database available from Sustainable Fisheries Partnership's website); (3) held a special session in 2015 NAAFE Forum (academic conference for fisheries economists) on the topic; and (4) conducted total of 10 interviews with industry experts.

Results
Preliminary results show that, at least for the US market, it is the retailers, including Walmart, that are driving the trend for ecolabeled seafood products. The supply chain is responding to these requests from their customers (i.e., the retailers) by passing the demand for ecolabeled seafood up the supply chain - eventually up to end producers. We are currently taking a closer look at what is motivating these retailers to demand ecolabeled seafood when their customers - the consumers - are not necessarily asking for it.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
606	International Trade and Development
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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Outcome #5 -
We are undergoing a re-engineering process of the URI Master Gardener Program to increase the rigor and accountability of individual volunteers and service projects, with an overall goal of increasing the impact of the Program as a whole. In terms of the survey tool used to evaluate the URI Master Gardener Program, we received a 16% response rate, equaling a 90% confidence level with a margin of error of 6. Next year, we will make efforts to improve the response rate.
Outcome #8 -
A decrease in the number of active Master Composter Program participants has spurred the re-engineering of the program; we hope to identify the topics most requested and ramp up program engagement.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Outcome #4 -
Pre- and post- quizzes to measure changes in knowledge about integrated parasite management were completed by participants of the Integrated Parasite Control workshops. The pre- and post-test average of the two VT and one RI workshop was 52/81%, 53/79% and 60/77% respectively. Results from the field day indicate that 62% of participants were very likely to continue learning more about the outcomes of the BFT research with the remaining 38% somewhat interested. 23% of participants are very likely to start growing BFT for grazing/feeding on their farms, with another 54% being somewhat interested.
Outcome #5 -
96% (143 total people) of residents polled learned something new from URI Master Gardener volunteer educators in 2015. In terms of new behavior adoption, the URI Master Gardener Program was most successful in encouraging the use of research-based gardening resources. In addition, we were successful in encouraging residents to test and amend their soil for the first time, with 14% testing soil for the first time and 48% of respondents beginning, increasing or planning to amend their soil. The URI Master Gardener Program was also successful in increasing or encouraging continued environmentally sound gardening practices. After interacting with URI Extension Master Gardeners in 2015, 88% of residents reported that they were encouraged to increase, continue or planned to enhance the garden environment for birds and beneficial insects and 86% were engaged or planned to be engaged in using alternatives to pesticides whenever possible. Other increased, continued and planned behaviors included

composting or re-purposing yard waste (80% respondents) and increasing success with growing food plants (78% respondents). 25% of respondents planned to engage youth in gardening and outdoor exploration in the future as a result of the URI Master Gardener Program. Finally, a significant number of people adopted, continued or planned to adopt the following behaviors: using efficient irrigation methods and creating or enhancing the garden environment to protect water quality.
Outcome #6 -
Of all survey respondents, a majority (66%) began, increased or continued to increase their success with growing food plants, and 9% planned to increase their food growing efforts after interacting with URI Master Gardeners in 2015.
Outcome #8 -
On average, program participants reported that at least 60% of all the science-based material and information was new to them. Participants in community outreach events such as workshops, demos and hand-on trainings identified "strategies for waste management" and "how to organize community compost outreach projects" as the most valued skills that they learned at the outreach events.

Key Items of Evaluation

URI's extension efforts associated with this planned program are increasing knowledge in program participants and creating an intent to change behavior.

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
102	Soil, Plant, Water, Nutrient Relationships	25%		50%	
205	Plant Management Systems	25%		50%	
806	Youth Development	50%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.0	0.0
Actual Paid	3.1	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**
225142	0	2131	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
138068	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 Program

• Forge academic connections internally and with other land grants to strengthen 4-H curricula, provide undergraduate experiential learning opportunities, increase application of program research base and utilize evaluation results to measure impacts and improve programs.
• Connect target audience to 4-H educational programs through community events, workshops, web-based training, 4-H volunteer training and curriculum guides (train the trainer and 4-H SPIN Kits), and community-based agency/organization training (train the trainer or train the volunteers).
• Develop resources and information to connect youth and families to community and land-grant resources.
• Expand 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 improving the science based knowledge, skills and academic motivation among urban elementary and middle school students while instilling life skills focusing on science, healthy lifestyles and citizenship.

Sustainable Communities

• Study and promote commercial farm viability
• Promote responsible stewardship of agricultural lands
• Work with municipalities and community members to manage agricultural resources wisely
• Teach and promote sustainable development techniques and management to the agricultural community, and inform the public at large

2. Brief description of the target audience

4-H

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

Sustainable Communities

• Agricultural producers, agricultural organizations, agricultural service providers, land trusts, policy makers and municipal leaders, and the general public

3. How was eXtension used?

eXtension was not used

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3148	305507	3961	3835

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

Year:	2015
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Workshops (including short courses)

Year	Actual
2015	171

Output #2

Output Measure

- Volunteers trained

Year	Actual
2015	1014

Output #3

Output Measure

- 4-H record books

Year	Actual
2015	156

Output #4

Output Measure

- Youth reached through programs

Year	Actual
2015	2464

Output #5

Output Measure

- Community/family serving groups reached

Year	Actual
2015	57

Output #6

Output Measure

- Community service projects

Year	Actual
2015	89

Output #7

Output Measure

- Activities and programs

Year	Actual
2015	116

Output #8

Output Measure

- Students trained

Year	Actual
2015	289

Output #9

Output Measure

- Website development and refinement

Year	Actual
2015	6

Output #10

Output Measure

- Curriculum development and delivery

Year	Actual
2015	8

Output #11

Output Measure

- Professional training

Year	Actual
2015	8

Output #12

Output Measure

- Public presentations

Year	Actual
2015	48

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	Through 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.

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
2015	0

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 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 military 4-H youth and clubs.

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, rocketry and healthy lifestyles. Volunteer training in science curriculum and youth-adult workshops in science and healthy lifestyles provides youth with opportunities to increase their knowledge and skills and apply them in informal, adult-mentored settings where they receive positive feedback and reinforcement. In FY15, we promoted the use of 4-H Science and Healthy Lifestyles Kits in direct response to the success of the SPIN club concept promoted in FY14. These kits proved to be very popular with the public libraries, teachers and after-school providers.

Results
4-H Tech Wizards Fall program reached 60 additional at-risk urban youth weekly in SET and healthy lifestyles programming. Youth demonstrated an increase in KSA through teacher evaluations and end- of-year presentations. 48.5% of 4-H Club members (including after school and military clubs) participating in science and health projects/programs, competitions, education series and workshops demonstrated an increase in knowledge. Spin Clubs expanded from 16 in FY14 to 42 groups in FY15. Staff trained volunteers to use the Science and Healthy Lifestyles

Kits in underserved communities resulting in 1770 additional youth participating in 4-H project work. Animal Science Day Evaluation Results: 100% reported learning something new, 85% cited 3 new things that they learned, 85% stated they learned a new showmanship skill and 89% reported new knowledge on preparing an animal for show.

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
2015	0

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 listserv 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 4-H military programs. 4-Hers document their individual community service hours through their 4-H Record Books.

Results

4-H Club Leaders from approximately half (18/35) of registered, active 4-H clubs (average 18 members per club) reported their clubs completed 4 or more community service projects in FY15 resulting in 324 documented 4-H youth participating in four or more community service projects or a 51% (change in action) of the FY15 4-H club enrollment. This % only includes clubs who reported their end of year results. 156 4-Hers who submitted record books (24% of 4-H club enrollments) in FY15 reported 3945 community service hours or an average of 25 hours per 4-H member (no results are available on 4-Hers who did not submit record books to the State 4-H Office).

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #3

1. Outcome Measures

Through 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
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Many youth are lacking in-school and family-center 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 enables youth to develop confidence and incorporate these life skills into their school and community.

What has been done
4-H members are strongly encouraged to participate in the RI 4-H Public Presentations program at the club, district and state levels. 4-H volunteers and staff provide training, competitive and noncompetitive speaking opportunities for 4-H youth of all ages. Besides District and State competitions, 4-H members participate in local events to educate the public including 4-H

Foundation Events, District 4-H Fairs, Washington County Fair Farm School and local festivals. 4-H youth practice and improve their leadership skills in their 4-H clubs and at 4-H events and programs on the State level and at Eastern States Exposition.

Results
353 4-H youth or 55% of active 4-H club members 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 qualities by assuming major roles at 4-H Fairs, and at state and New England animal science programs. 4-Hers also actively participated in communication and leadership training. 4-H club volunteers from 51% of active clubs reported that in FY15, 57% of their youth exhibited increased leadership skills and 93% of the clubs reporting had active club youth officers. 156 4-H members who submitted recorded books reported a total of 4,231 4-H leadership hours.

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
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farmers care about the quality of their farm products to 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 in the following production sectors: vegetables, small fruit/berry, tree fruit, forage crop and pasture, nursery, and landscape, urban farms; educational meetings for farmers, Master Gardener and Master Composter trainings, Participate in committees updating New England Cooperative Extension Production Guides: Vegetable, Small Fruit, Tree Fruit, Weekly Pest Updates, Northeast Vegetable and Fruit Conference steering committee members. Working group participation: Small Fruit Working Group, Northeast IPM Pest Scouting Network, Spotted Wing Drosophila Working Group, Brown Marmorated stink Bug Working Group, iPiPE Crop Pest Coordinator. RI Farm Scavenger Hunt organizer. RI Nursery and Landscape Association Education Committee, RI Women in Agriculture planning committee, chair. Northeast SARE Forage and Weed ID Management Professional Development training. Participate in RI Ag

Partnership, RI Ag Council, RI Farm Bureau, Young Farmers Network, RI Fruit Growers Association, GAP Certification Advisory Committee, NRCS State Technical Committee. Continued expansion of our relationships with CE personnel from Pennsylvania, Maryland, Delaware, New York, and New England states, resulting in more shared information.

Results
We continue to grow the RI commercial production community's awareness of Cooperative Extension's support capability. We have deepened relationships with new and beginning farmers as well as urban immigrant farmers, and have provided important production assistance on numerous occasions. Further outreach towards RI Raised Livestock has resulted in more contacts with these producers. Weekly pest updates have resulted in more requests to be included on our email listserv.

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Outcome #1 -
The increase of knowledge (and skills) was documented through evaluations, observation and parent/leader/teacher surveys and feedback. The Tech Wizards Program measured increases in KSA (knowledge, skills and attitude) but was a limited sample due to the program ending. Learning Lab Evaluations were given to volunteers, librarians, teachers and other youth service providers who used 4-H Science Kits - these results were not used in calculating the % knowledge gained but are reported under evaluation results. Learning Lab Evaluations: (mainly SPIN groups) 90% reported the kit was effective and/or very effective at improving youth attitudes towards science, sparking an interest in science and increasing knowledge. 80% of the adult leaders/teachers reported an increase in their own knowledge gained from the training and use of 4-H kits.
Outcome #2 -
Of the 18 respondents to this set of Common Measures questions for Citizenship, 28% strongly agreed and 72% agreed to the statement "I enjoyed learning about people who are different from me." 44% strongly agreed and 56% agreed that "As a result of my experience in this 4-H program I can make a difference in my community through Community Service." When

asked "As a result of my experience in this 4-H program, I am encouraged to volunteer more," 78% responded definitely and 22% responded maybe.
Outcome #3 -
The post camp survey results, completed by military parents administered after the three-day URI 4-H Military Family Camp showed that 90% of the parents felt their children were more comfortable sharing their thoughts and feelings with others as a result of this camp and 100% reported the camp had workshops or activities that directly led to their children feeling a sense of belonging to a community with support. Qualitative measures of direct quotes from surveys equaled, "My kids love [family] camp, our whole team was like a little community, we all had to work together during tug of war and hula hoop races! My kids enjoyed the marble game with the pipes, they worked closely with everyone in our group and realized that we all needed each other to get the ball around!" Learning Lab evaluation 4-H Science Kits adult responses included 90% of respondents reported kits to be effective or very effective at improving teamwork and communication skills with youth.

Key Items of Evaluation

Evaluations of our youth development programs indicate good effectiveness in science learning, teamwork, communication, and appreciation of the importance of community service.

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
606	International Trade and Development	50%		50%	
611	Foreign Policy and Programs	50%		50%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	0.5	0.0	0.5	0.0
Actual Paid	0.4	0.0	0.4	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**
0	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
52593	0	52032	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 a demonstration nursery and associated practices for production and maintenance of saline tolerant landscape and food crop plants in Tianjin China and associated ecotone regions.
• Collaborate with Chinese colleagues in the water and wastewater management responsibilities in Tianjin on the potential development of agricultural grade compost from collected biosolids.
• Plan and implement programs for expanded phytoremediation applications to other disturbed soils and regions where foundry or manufacturing have added complex heavy metal and salinity environmental compromises.
• Develop and promulgate a shellfish sanitation program in African countries.
• Develop and promulgate a sustainable fisheries program in the Gambia and Senegal.
• Assist international fishers; increase value of fishing products in domestic foreign markets.
• Create scientist and student exchange programs with foreign institutions, countries, agencies and companies.
• Assist partners in international projects.

2. Brief description of the target audience

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

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	50	0	20	0

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

Patent Applications Submitted

Year: 2015
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	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
2015	2

Output #2

Output Measure

- Training manuals (includes instructional CD?s)

Year	Actual
2015	0

Output #3

Output Measure

- Scientific/professional presentations

Year	Actual
2015	3

Output #4

Output Measure

- Workshops (including short courses)

Year	Actual
2015	2

Output #5

Output Measure

- Conferences hosted

Year	Actual
2015	0

Output #6

Output Measure

- Website development and refinement

Year	Actual
2015	0

Output #7

Output Measure

- Public presentations

Year	Actual
2015	2

Output #8

Output Measure

- Student training

Year	Actual
2015	4

Output #9

Output Measure

- Thesis/dissertation

Year	Actual
2015	0

Output #10

Output Measure

- Postdoctoral training

Year	Actual
2015	0

Output #11

Output Measure

- Volunteer training

Year	Actual
2015	0

Output #12

Output Measure

- Intervention studies

Year	Actual
2015	0

Output #13

Output Measure

- Social marketing

Year	Actual
2015	0

Output #14

Output Measure

- Video productions

Year	Actual
2015	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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food supply adequate to need in both quantity and quality are somewhat universal concerns. Advanced desertification, erosion, saline soil impacts and increased food demands are particularly of concern in substantial parts of eastern China. Migration to urban and industrial zones for employment exacerbate the challenges to agricultural producers and land managers especially in communities and cultures focused on local and quality food products.

What has been done
Demonstration plantings, plant introductions and soil management programs have been executed. Training on maintenance and management practices to sustain the improved vegetation have been conducted on multiple occasions in field, site meetings and at local universities.

Results
Local partners have assumed management and direction of demonstrations. Demonstrations include salt tolerant vegetables with superior productivity to local land race or domestic varieties. Two clones of Zoysia grass materials will enter into advanced planting and will be further evaluated for consideration of submission of plant protection coverage in both US and China

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
611	Foreign Policy and Programs

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 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In West Africa, an estimated 1.5 million tons of fish are harvested annually from the region's waters, with a gross retail value of US$1.5 billion. In The Gambia and Senegal artisanal fisheries make up a majority of the fisheries landings and contribute significantly to income generation and local food security for coastal communities and for many communities inland where fish are traded. Some 200,000 people in the Gambia and 600,000 in Senegal are directly or indirectly employed in the fishing sector. Seafood products are a leading export of the region and generate as much as 20% of the gross value of exports. While the majority of seafood exports are destined for European Union (EU) markets, a growing volume of trade goes to the U.S. and other countries in the region.

Fish provides the main source of animal protein for the average rural family in the sub-region, where annual fish consumption can be as much as 25kg per capita. In many rural areas, fishing serves as a social safety net when farming turns unproductive due to depleted soil, drought, disease, or other factors.

The policy objectives of the fisheries sector are linked to key national development objectives that include: increased food self-sufficiency and security; a healthy population and enhanced employment opportunities for nationals; increased revenue generation and foreign exchange earnings; and the attainment of national social and economic development. They are designed to support key national development objectives as outlined in the Poverty Reduction Strategy Paper and The Gambia Incorporated Vision 2020, which are blueprints for national development and eradication of poverty.

At stake in a successful ecosystem-based approach to fisheries management is the ability of millions of people to sustain a resource-dependent existence while at the same time protect the overall ecological integrity and biodiversity of the region.

What has been done
Sustainable Fisheries Fund (SFF): A grant was received to hire a third party consultant to conduct a Marine Stewardship Council (MSC) pre-assessment for an ecolabel.

Rockefeller Foundation: A pilot study for using ice and ice boxes on-board vessels fishing for sole at two landing sites was conducted from August 1-September 15, 2015. The pilot was designed to determine if the use of ice and ice boxes on board fishing vessels will reduce post-harvest economic loss of sole at sea and lead to improvements within the sole value chain. The concept of traceability within the supply chain was introduced to all pilot participants, which included sole fishers, buyers and processors and traceability records were field tested for the duration of the pilot.

Results
SFF: The fishery has made progress against the MSC standard since the last pre-assessment with a number of initiatives improving the fishery management. By its very nature, an MSC pre-assessment tends to focus on the negative aspects of a fishery, rather than more positive aspects, so the fishery should persevere with its improvements since there has been clear progress in addressing gaps.
For Principle 1, clear progress has been made with the data collection, stock assessment, reference points and harvest strategy. These do not all meet the SG80 yet, but in some cases only a little more information could achieve SG80. Scoring may also be reduced because links between MSC requirements and what is being done are unclear, and therefore simply clarifying links may eliminate problems. However, it is important to note that the management unit includes the Senegal fishery and this fishery will also need to be addressed in a full assessment in Principle 1.
Principle 2 has undergone the most change under the CR v2.0. Although the standard itself remains effectively the same, the demands for evidence have increased, so that there is more onus on the fishery to show it is minimizing impact on the ecosystem. For small scale low-technology fisheries, this is difficult. The available qualitative and quantitative information continue to show that impacts are likely to be low, but more and better evidence that this is the case would improve the fishery performance in this regard.
The fishery continues to do well in Principle 3, with good co-management systems in place and functioning. Issues remain with compliance however, and these will need to be addressed.

Ice Pilot: The ice pilot is concluded. There were significant differences in post harvest loss between fish treated with ice or no ice that translated into increased income for the fishermen. Fishermen believed ice made a tremendous difference in their income. Training in icing technique conducted and murals outlining hygiene were developed. NASCOM constructing website to show progress made in the fishery.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
611	Foreign Policy and Programs

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- 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

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: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	8.0	0.0
Actual Paid	5.4	0.0	10.0	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**
335543	0	735164	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
375981	0	834377	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

- Land grant resources are distributed using a merit-based system and need-based strategy.
- Land grant resources support staff that assist faculty, scientists, extension personnel and students

that receive land grant funds for projects and programs.
- Land grant resources support the operation of University farms and field laboratories.
- Hatch project proposals are evaluated for merit by external university and non-university peer experts.

2. Brief description of the target audience

- Academic faculty (new and extant), university staff, graduate students, undergraduate students, university administrators, RIAES scientists, RICE personnel

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	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: 2015
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Proposal submissions

Year **Actual**

2015	193

Output #2

Output Measure

- Proposals funded

Year	Actual
2015	118

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	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**

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
2015	0

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

New faculty, University scientists, extant faculty and staff were allocated Land grant funds that supported the Rhode Island Plan of Work. Land grant funds were also dedicated to support staff and to agricultural infrastructure (e.g., University Farms and field laboratories). These investments were used to leverage external, competitively-funded grants.

Results

In the past year, scientists, faculty and staff, that were supported by funds in CELS CARES program, submitted 193 grant proposals and had 118 grant proposals funded from state, federal and private sources. These proposals were valued at $16,247,789. This constitutes a $6 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

- 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

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 and grants secured by CELS faculty, staff and students as the numerator, ROI is $6:$1 ($ external funding:$ all Land Grant).

Key Items of Evaluation

A $6 return on each Land Grant dollar allocated is an excellent return on the investment.

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	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.