2017 University of Rhode Island Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

In this plan we describe the activities, and expected outputs and impacts of programs associated with the Rhode Island Agricultural Experiment Station (RIAES or Station) and Rhode Island Cooperative Extension (RICE or Extension); collectively referred to as the Land Grant programs. RIAES and RICE are collaborative elements within the College of the Environment and Life Sciences (CELS) at the University of Rhode Island (URI). Day-to-day administrative oversight of RIAES and RICE is provided by the Associate Director-Research and Associate Director-Cooperative Extension, respectively. Fiscal management of the Land Grant programs is provided by a business manager and specialist in Land Grant Programs. The Associate Directors and business manager report directly to the Dean of the College of the Environment and Life Sciences, URI and the Director of RIAES and RICE.

The programs and projects supported within our Land Grant portfolio span a wide range of disciplines, from the natural sciences to the social sciences. Equally important, the solutions that we share with stakeholders are based upon solid university research; research that depends on appropriate, modern infrastructure; the cutting edge tools of science; and multidisciplinary, multistate, problem-based approaches. In FY 2013, we aligned our Land Grant programs with the institutes of NIFA. The realignment provides breadth to our programming as well as administrative and operational efficiency.

The programs in our current Plan of Work include: 1. Food Safety and Nutrition; 2. Sustainable Energy, Climate Change and the Environment; 3. Food Production and Sustainability; 4. Youth, Family and Community; 5. International Programs; and 6. CELS-CARES (College of the Environment and Life Sciences-Community Access to Research and Extension Services).

The Station and Extension are integral components of the missions of the College and University. The collaborative relationship with our federal partner, NIFA, has enabled our scientists, staff and students to leverage additional resources that provide cutting edge knowledge, essential services and innovative programming for all Rhode Islanders.

Please note: We are currently undergoing a strategic planning process, the results of which will be used to revise the structure of URI's Plan of Work to ensure that the planned programs reflect the strengths and priorities of Rhode Island's land-grant programs.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2017	20.0	0.0	36.0	0.0

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2018	20.0	0.0	36.0	0.0
2019	20.0	0.0	36.0	0.0
2020	20.0	0.0	36.0	0.0
2021	20.0	0.0	36.0	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

- Internal University Panel
- External University Panel
- External Non-University Panel
- Combined External and Internal University Panel
- Expert Peer Review

2. Brief Explanation

The Land grant programs at the University of Rhode Island will use several merit review processes during FY 2017. All new Hatch projects will be reviewed by external-university or external-non university expert peers. The selection and solicitation of external peer experts will be made by the Associate AES Director. The Associate Director will use the nationwide network of Experiment Station Directors to assist in the identification of prospective reviewers. The Associate Director will then contact 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 will assess 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. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?
All multistate and joint activities will address critical issues of strategic importance (e.g., economic impact; public good; unique geographical opportunities) including those identified by the stakeholders. Regional stakeholder input is an important driver of the direction of planned programs. Likewise, the rigors of our merit review process and the rigors of the merit review process associated with prior approval of ongoing multi-state projects that are part of this Plan of Work.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?
Wherever appropriate, multi-state and joint projects will focus on under-served, vulnerable and minority populations. These groups are identified in the audiences described in the planned programs herein.

3. How will the planned programs describe the expected outcomes and impacts?
The long-term impacts of these multi-state projects are to address salient and emerging issues of direct relevance to the quality of life of all Rhode Islanders. The priority programs in this plan are expected to improve personal health, improve the quality of fresh and marine waters, improve food access, promote sustainable communities, promote leadership and healthful lifestyles for youth, improve the health and well-being of agriculturally important livestock, reduce the incidence of vector borne diseases, promote economic vitality, and adopt sustainable agricultural practices.
The outcomes of the planned programs will be described in the three dimensions of the Plan of Work template. That is, will the program result in a change of knowledge (short term outcome), a change in action (mid-term outcome) or a change in condition (long term outcome)?

4. How will the planned programs result in improved program effectiveness and/or
All of the multi-state and joint-programs are fundamentally collaborative both within and outside of the University of Rhode Island. Given its small size and shared priorities with neighbors in New England, Rhode Island has a long history of collaborative research and extension.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages 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

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 will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

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

Brief explanation.

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.
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 will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals

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

Brief explanation.

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.

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.

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Food Safety and Nutrition

2. Brief summary about Planned Program

This program has three primary areas: food safety, nutrition and food security.

Food Safety: A secure food system is one that prevents contamination of food by any source, as well as facilitates a predictable and steady supply of high quality and safe foods. There is a need for food safety information throughout the diverse Rhode Island community of educators, consumers, food service workers, food industry personnel and processors, and commercial fruit and vegetable growers. Federal and state regulations mandate specific training that promotes compliance in the RI food industry. Program expertise will continue to provide regional support for a variety of educational activities. Significant funding has been secured to continue to support food safety initiatives across the state. This includes research (both applied and basic), training and extension relevant to the public and industry.

Nutrition: We investigate lipoprotein metabolism and metabolic syndrome in young adults. Additionally, we evaluate eating behaviors to understand means to maintain body weight. The University of Rhode Island is working with City of Providence and the City of Central Falls Public School systems to develop curricula for students (to be institutionalized within the school systems) and provide teacher training related to obesity prevention.

Food Security: Vulnerable populations across the state of Rhode Island will be reached through the Expanded Food and Nutrition Education Program and the Rhode Island/URI Food Stamp Nutrition Education Program. This population will be reached through face-to-face nutrition education in the community (workshops, demonstrations), distance information transfer (newsletters, newspaper, home mailings, radio and other mass media), and through state-wide social marketing campaigns in nutrition.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%		20%	
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%		40%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Food Safety: The Food Safety priorities for the State of Rhode Island will be to continue to implement HACCP training for Rhode Island School Food Service operations and residential childcare facilities, to provide HACCP and sanitation education to seafood, juice/cider and meat/poultry processors, to present an annual food safety conference for public and private stakeholders, maintain a Good Agricultural Practices (GAP) Program for commercial growers of fruits and vegetables, and to maintain the RI Food Safety Certification and Recertification courses targeting food service establishments. Additionally, food safety education will be ongoing for K-12 teachers, healthcare professionals and consumers. We have added a new dimension to our food safety program, the addition of a molecular biologist who will be working with the genomics of food borne pathogens. Research will contribute to our understanding of how bacterial populations multiply, which may be used to design new strategies and methods to combat microbial contamination and infections.

Nutrition: Obesity is an enormous public health issue for Americans of all ages. Like the nation, Rhode Island has experienced substantial increases in overweight and obesity among all groups of residents. Such increases have profound effects on our state's health care system, since obesity is strongly associated with several chronic diseases including type 2 diabetes, cardiovascular disease and asthma. According to NHANES data, 64% of U.S. adults exceed the "normal" range for BMI. In RI, 33% of adults are overweight and 17% of adults are considered obese; 25% of the state's children and adolescents are either overweight or obese, with minorities disproportionately affected. Additionally, adolescents from lower income families have an even greater prevalence of being overweight when compared with white adolescents from higher income families. Improved eating habits and food-related behaviors would have a significant impact on overweight and obesity. For example, only about one quarter of the state's adult population consumes the minimum of five daily servings of fruits and vegetables. Likewise, within meal behaviors also affect food intake and weight status.

Priorities in these knowledge areas will be to clarify the physiological role of lipoproteins in human health and to develop, test and refine culturally sensitive weight management interventions and materials for young adults.

Food Security: The poverty rate in RI is 12.0% for adults and 16.9% for children and Providence is the 3rd poorest city in the U.S. Six percent of working families had incomes below the federal poverty level, giving RI the second highest rate of poverty in New England. Not surprisingly, the number of food stamp recipients has increased to over 100,000.The need for nutrition education targeting economically disadvantaged families and older adults is greater than ever. It is the priority of the URI-RI Food Stamp Nutrition Education Initiative to assist households with limited resources in enhancing overall health through improved diet quality, resource management practices, shopping/budgeting skills and food safety practices. Intake of fruit and vegetables is markedly lower than Dietary Guideline recommendations and intakes are particularly low in the economically disadvantaged, those who live in urban areas, and older adults (65+ years of age). Poor families have many disadvantages that lead to sub-optimal food choices and limited access to physical activity. RI EFNEP data suggest that only 2.8% of targeted populations consume a diet consistent with the Dietary Guidelines. The plan for EFNEP in this Plan of Work is to reconfigure nutrition education delivery systems by introducing a vertical team model which includes traditional community para-professionals paired with graduate students from the Department of Nutrition and Food Sciences, and EFNEP Community Nutrition professionals and faculty. To support this part of the plan, we have recently hired a Community Nutritionist.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Food Safety:
The State of Rhode Island Department of Health will continue to partner with the College of the Environment and Life Sciences at URI on these efforts.
Food safety specialists will serve as catalysts for system changes in schools, on farms, and in industry around standards for food safety.

Nutrition:
Funding will be secured throughout the course of the projects.
People are open to learning about developing a healthy lifestyle.
Program participation will help clients maintain body weight.
Participants will change behaviors in order to achieve a healthy body weight and improve related health parameters.
Providence health and physical education teachers will use new curriculum

Food Security:
Funding for Food Stamp and EFNEP Nutrition Education will continue.
People will be motivated to learn and change.
Staff can be recruited and hired who possess the necessary skills and abilities.
Nutrition information leads to desired behavior change.
Community partnerships will be strengthened and expanded.

2. Ultimate goal(s) of this Program

Food Safety:
To reduce food borne illness and control food hazards within public and private sectors.

Nutrition:
To reduce the risk of overweight/obesity and the incidence of related diseases in ethnic and low-income populations.
To clarify the role of lipoprotein metabolism and metabolic syndrome in human health.

Food Security:
To improve the diet quality, food security, food resource management and food safety practices of low-income Rhode Islanders and decrease health risk vulnerability.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	1.5	0.0	2.5	0.0
2018	1.5	0.0	2.5	0.0
2019	1.5	0.0	2.5	0.0
2020	1.5	0.0	2.5	0.0
2021	1.5	0.0	2.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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.
- Extension on non-thermal technology to shellfish and produce producers
- Update and maintain website and listserve
- Develop and implement food preservation classes for consumers

Conduct research aimed at combat microbial contamination.
Extension 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 curricula 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, curricula, 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Volunteer training)	● Newsletters ● Web sites other than eXtension

3. Description of targeted audience

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Food Safety:
Food industry and food service workers and managers, food processors, consumers, agricultural producers, home gardeners, school administrators, school-aged children and their caregivers, special needs students, teachers, community volunteers, Master Gardener volunteers.

Nutrition:
Lean and obese adults; ethnic men and women; low-income school age children and families

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of peer reviewed publications
- Number of abstracts published
- Number of professional training sessions offered
- Number of volunteers trained
- Number of conferences hosted
- Number of school based training sessions completed
- Number of websites developed and/or refined
- Number of students trained
- Number of intervention studies implemented
- Number of workshops completed
- Number of scientific/professional presentations
- Number of theses/dissertations completed
- Number of public service announcements
- Number of social marketing activities
- Number of fact sheets, bulletins and newsletters
- Number of video productions
- Number of social media activities

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Improved awareness of safe food handling practices by consumers, students, educators, volunteers and/or health care providers. Indicators are number of training sessions offered and attendance at training sessions.
2	Improved knowledge of safe food handling practices among commercial growers of fruit and vegetables, food industry producers/processors, and/or food service personnel. Indicator is the number of training participants who report an increase in understanding of food safety concepts.
3	Increased 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. Indicator is number of publications and presentations.
4	Increased understanding and behavior change with regard to decreasing dietary intakes and increasing physical activity level, and the impact of these changes on body fat mass, physical function, and coronary heart disease risk factors in obese older women. Indicator is number of publications and presentations.
5	Improved dietary practices from baseline in one or more domains (diet quality, food security, food resource management, or food safety) in EFNEP and FSNE families and older adults. Indicator is number of people reporting improved practices.
6	Improved understanding of the molecular mechanism of bacterial cell division to improve food safety. Indicator is number of publications and presentations.

Outcome # 1

1. Outcome Target

Improved awareness of safe food handling practices by consumers, students, educators, volunteers and/or health care providers. Indicators are number of training sessions offered and attendance at training sessions.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

Improved knowledge of safe food handling practices among commercial growers of fruit and vegetables, food industry producers/processors, and/or food service personnel. Indicator is the number of training participants who report an increase in understanding of food safety concepts.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

Increased 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. Indicator is number of publications and presentations.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 702 - Requirements and Function of Nutrients and Other Food Components

4. Associated Institute Type(s)

- 1862 Research

Outcome # 4

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior

4. Associated Institute Type(s)

- 1862 Research

Outcome # 5

1. Outcome Target

Improved dietary practices from baseline in one or more domains (diet quality, food security, food resource management, or food safety) in EFNEP and FSNE families and older adults. Indicator is number of people reporting improved practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 704 - Nutrition and Hunger in the Population

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Improved understanding of the molecular mechanism of bacterial cell division to improve food safety. Indicator is number of publications and presentations.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Assessment and evaluation of projects within this program area occurs at a variety of levels. For instance, evaluation of projects takes place at the project, departmental, college and program levels. For projects within the program, formative assessments are used to revise and improve efforts, projects, and outcomes within the program. Likewise, summative assessment is used to evaluate

outcome achievement and project and program value. Nested within both the formative and summative assessment is an evaluation of the processes that lead to (or prevent) achieving activities, outputs and outcomes.

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Food Production and Sustainability

2. Brief summary about Planned Program

The program in Food Production and Sustainability includes the areas of aquaculture and fisheries, health and well-being of livestock, community gardening, horticulture, and economics, markets and policy. Each area is described below.

Aquaculture and Fisheries
Aquaculture is the technology of raising freshwater and marine organisms, including integrated farming with terrestrial agriculture, as well as the use of molecular methods to improve production. We work at both a local scale (to improve small-scale aquaculture) and at national and international scales, conducting research that can result in commercial products for worldwide use. Knowledge areas related to this work include 302, 304, 307 and 311.

In KA 302, utilization of plant proteins as substitutes for fish meal in diets for carnivorous fish is being investigated to reduce production costs and the harvest of forage fish from the ocean. In KA 304, genetic factors regulating muscle growth in rainbow trout are being researched to enhance growth rates and therefore reduce production costs. In KA 307, we work toward the optimization of shellfish aquaculture systems in Rhode Island, as well as assess the environmental impacts of shellfish aquaculture. More recently, industry-driven research has focused on understanding the effects of low oxygen conditions on the susceptibility of oysters to diseases. Likewise in KA 311, the causes of diseases of shellfish and the performance of disease-resistant strains are being investigated to improve profitability of local shellfish farms. RIAES and RICE scientists also work with the Northeast Regional Aquaculture Center Regional Extension project to provide key stakeholders with relevant, University-based research findings.

Our fisheries program is focused on gear technology transfer, fisheries management (including finfish and shellfish), and the quality and safety of seafood. The efforts in fisheries are integrated and have provided local key stakeholders and the fishing community with the knowledge and skill to ensure a sustainable future. Last, our extension efforts in fisheries stretch beyond the boundaries of Rhode Island as we implement a global fishing extension program. Elements of this are discussed in International Programs.

Health and Well-being of Livestock
This program seeks to improve animal production through research on the relationship between nutrition and immune function. In KA 302, we investigate the composition and biological availability of nutrients in feed as they relate to immune function of the organism.

Community Gardening
Gardening is the number one hobby in the United States. The URI Outreach Center uses this passion for gardening as an avenue for communicating a wealth of information on environmental issues directly tied to behaviors at home. The URI Outreach Center delivers a range of research-based horticulture and environmental programs for the general public, youth, the green industry and governmental agencies. At the Center we work closely with RIAES and RICE programs in agricultural systems management. These programs emphasize the green industries (turfgrass and environmental horticulture) of the state because of their relative importance to the economy here in Rhode Island. We also are working closely with RICE staff involved with sustainable agriculture as part of an effort to revitalize and strengthen

extension programs to the more traditional agricultural sector in Rhode Island. Our focus is to maintain an economically viable industry with environmentally benign practices.

Horticulture
RIAES research on integrated agro-ecosystem management promotes economically profitable and technologically progressive local agriculture that is 1) environmentally benign and 2) sensitive to the balance of scarce resources allocated among competing uses important to society. Rhode Island contains both agricultural production, predominantly of ornamental plants and sod, and extensive areas of managed urban and suburban landscapes. The sustainability of Rhode Island farms and managed landscapes is critical to the future of our green industry. Our research efforts seek to identify turf grasses and ornamental plant taxa that can tolerate the environmental stresses present in the landscape, both natural and man-made. As well, we are selecting and breeding amenity plants for management with reduced inputs, and native grass populations suited for use in low traffic/minimally managed areas and roadsides. Our horticulture and integrated pest management (IPM) programs, for example, seek to minimize the need for pesticides through promotion of resistant plant varieties, biological controls, and cultural alternatives to pesticides. We are actively engaged in developing successful biocontrol strategies against major plant-pest complexes and invasive plants species. Toward this goal we maintain a USDA-approved plant pest quarantine and biocontrol facility.

Similarly, through the URI Biotechnology Initiative, we seek to develop state-of-the-art strategies for plant improvement for a range of agricultural products. Approaches include modern genomic analysis for gene identification and functional characterization and transgenics for genetic modification and enhancement of a range of plant materials.

Our research efforts often target the green industries of Rhode Island (turf grasses and ornamental horticulture) because of their relative importance to the local economy (wholesale nurseries and turf grass production accounts for two-thirds of Rhode Island's 11,000 acres in agricultural production), but also encompass other important agricultural crops appropriate to RI agriculture. These farms face a wide array of pest problems and significant pressure for land development. Technological and market innovations are essential for this industry to remain regionally and nationally competitive in the new economy. Efforts to address the needs of farmers growing food are listed under the Sustainable Communities Program.

RICE reaches out to both green industry professionals, who develop and manage landscapes, and the gardening public (described in our Community and Gardening Program). We include them here because we are attempting to influence what is produced locally and how it is produced. While emphasizing ornamental horticulture, we also maintain a capability to respond to emerging problems in insect and disease management on the wide variety of crops grown in RI. We seek to better understand the market potential of products that result from identifiably more benign forms of agriculture.

Economics, Markets and Policy
An understanding of the economics of natural and environmental resources is key to effective management. RIAES expects to continue its work in this area with a focus on management of fisheries, aquaculture and agricultural resources.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 Economics	0%		5%	
609	Economic Theory and Methods	0%		5%	
610	Domestic Policy Analysis	0%		5%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

The situations and priorities are described for the areas in the Food Production and Sustainability program.

Aquaculture and Fisheries
The Rhode Island aquaculture industry is focused on oyster culture at present, but the industry could be expanded with the culture of new candidate species if the production costs for those species could be lowered. Locally in Rhode Island, priorities articulated by the aquaculture industry include: 1) Environmental impacts of aquaculture; 2) Disease management and quarantine issues; 3) Commercialization of non-traditional species; 4) Business management issues; 5) Permitting and multiple-use conflict issues in the public trust; and 6) water quality issues in the urban coastal zones. Projects in this plan address a number of these priorities. For instance, we are investigating species that might be suitable for culture in the state. Further, research toward the production of commercial products (e.g., improved genetic stocks, vaccines) that could be sold to aquaculture producers worldwide is being conducted. Finally, the success of aquaculture is integrally linked to seafood and commercial fishing and opportunities to exploit this relationship are being examined.

In fisheries, we focus on managing resources to ensure a sustainable future. The elimination or reduction of unwanted bycatch continues to be a driving force in fisheries management, and fishermen and gear specialists are modifying equipment to reduce bycatch, increase profit, and reduce their carbon footprint. While research has shown the extraordinary health benefits of seafood, those health benefits

mean nothing if seafood is not properly handled; improperly handled seafood can produce serious food-borne illnesses. In 1997, the Food and Drug Administration (FDA) Hazard Analysis and Critical Control Point (HACCP) program went into effect and requires both domestic and foreign seafood processors selling fish in the US to follow the food safety system. The HACCP Program is dynamic as the seafood hazards and the ways of controlling or eliminating those hazards are always evolving. Fisheries Cooperative Extension, working jointly with the Rhode Island Sea Grant program, is helping to ensure that all target audiences including general consumers, health care providers, and industry receive accurate information to make informed decisions. Those involved in fisheries are looking at alternative management solutions, including sector allocation, which is allocation of a fisheries quota to a group of fishermen to be fished in accordance with an approved plan.

Health and Well-being of Livestock
Research in health and well-being of livestock at URI includes work on nutrition and disease. Ensuring and improving the health of the world's livestock and subsequently the populations that they nourish has always been a priority for the world's scientists. The diseases that afflict livestock are many and varied but they all have one thing in common; immune compromised animals are more susceptible to disease. Research in health and well-being of livestock at URI includes work on nutrition and disease.

The nutritional status of an animal is becoming increasingly recognized as a contributing factor to an animal's susceptibility to disease. We are currently engaged in projects that evaluate immunological, biochemical and molecular factors that are important is assessing nutritional and health status of domestic livestock.

Community Gardening
Rhode Island is one of the most densely populated states in the country. Managed landscapes, including residential and other development in suburban areas, have a significant impact on the quality and quantity of the state's drinking water as well as on the water quality of Narragansett Bay. Other serious environmental problems can be traced to residential and developing landscapes including pollution from storm water runoff, loss of wildlife habitat, management of invasive plants, preservation of green and open space and waste management. Solving these problems entails working with local and state agencies to identify problems, providing research-based information to develop solutions and coordinating programs designed to influence the behavior of individuals. The URI Outreach Center is uniquely positioned to deliver educational programs on pollution prevention to key target audiences in the state by incorporating these programs into our well-established and highly successful extension efforts. The Center has developed a successful model for influencing the behavior of individuals in their own backyard. The model's success is based on the fact that gardening is the number one hobby in the United States. We are able to use this passion for gardening as an avenue for communicating a wealth of information on environmental issues directly tied to behaviors at home.

Horticulture
For agriculture to remain competitive in a global economy much is required beyond the ability of the system to produce adequate materials at affordable prices. Agricultural products (food, feed, fiber, other desirable plant and animal goods) must be safe for use and environmentally benign in their production. Alternative and more efficient uses for agricultural products or by-products should be developed. Agricultural production systems must conserve soil, ground water, fossil fuels and other nonrenewable resources. Farming practices should cause minimal harm to the environment. As global agricultural systems strain to meet ever-greater human needs, they threaten planetary carrying capacities. Agriculture must change to less energy-and-material-dependent plants and animals, and to energy-conservative management practices. This conservation of resources must not significantly raise production costs, which would price US products out of the international market. In addition, our agricultural products must possess attributes that make them attractive to consumers in the global marketplace.

Economics, Markets and Policy
Effective management of our fisheries resources is critical to maintaining the health of our oceans and sustaining our recreational and commercial fishing communities. However, the current system of overlapping federal, state and local bureaucracies is not producing effective policies. In the absence of management reform, many of our fisheries may enter ecological and economic crises. At present, there is little agreement on whether and how to reform fisheries governance institutions. Further, there exist alternative marketing approaches and approaches to negative publicity regarding seafood. Development of marketing strategies that maximize the value of seafood products will benefit both the consumer and the producer.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

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

Aquaculture and Fisheries
Analyses from an array of sources predict that consumption of seafood (both capture and culture) in the US will continue to rise making this an increasingly important area of research and outreach.

The ability of wild harvest fisheries to supply the growing demand will be hampered by the natural maximum sustainable yield of the wild harvest fisheries.

We assume that continued Hatch funding will be available for select projects and extramural grants (AFRI, SARE, etc.) for others.

This area assumes continued use and maintenance of our aquaculture facilities, including the Aquaculture Center at East Farm (freshwater) and Blount Aquaculture Research Lab (marine), continued participation of existing aquaculture and fisheries faculty, and replacement of technical staff who might vacate positions.

The program will continue to collaborate with the Rhode Island Sea Grant College Program.

NRAC will continue as a collaborator in our research and extension endeavors.

Health and Well-being of Livestock
Internal sources of funding will be available to support basic research and extension endeavors.

Additional funding from extramural sources (e.g., AFRI, NIH) will be obtained by RIAES and RICE personnel.

URI farm facilities will be maintained and improved.

Community Gardening
Protecting water quality and quantity, preserving green and open space, enhancing wildlife habitat and biodiversity will be challenges for southern New England.

Research conducted by scientists at the University of Rhode Island and by other scientists within the Land Grant system will help identify the most economically efficient and environmentally effective approaches to addressing the problems.

University extension programs can play a critical role in problem-solving by providing research-based information and working with clientele to apply the information.

Horticulture
The green industry in Rhode Island faces a wide array of pest problems and significant pressure for land development.

Technological and market innovations are essential for this industry to remain regionally and nationally competitive in the new economy.

The capacity for RIAES and RICE to significantly impact agriculture and public horticulture in Rhode Island is limited by the availability of federal and state funds supporting research and extension.

Economics, Markets and Policy
The efficient management of marine resources relies on developing policies that synthesize the biological structure of the resource with the decision heuristics employed by harvesting agents.

There is little agreement on whether and how to reform fisheries governance institutions. We believe that the lack of agreement and lack of substantive ideas for reforming our fishery management institutions are rooted in the lack of understanding of how fishery management policies are produced.

Developing decision support tools to integrate management and marketing and increase the efficiency of fishery governance by developing ideas and knowledge will support transition to market-based fishery management.

2. Ultimate goal(s) of this Program

The primary goals are described for the areas in the Food Production and Sustainability program.

Aquaculture and Fisheries
Provide research and expertise to expand the aquaculture industry in RI, including both small-scale production of finfish and shellfish, and companies generating products that can be sold on an international market.

Ensure a sustainable future for fisheries by providing practical information, technologies and policies for managing valuable renewable resources.

Bring the Rhode Island shellfish aquaculture industry into a more mature state of development with production approaching the estimated ecological carrying capacity for shellfish aquaculture in Rhode Island's coastal waters.

Health and Well-being of Livestock

Improve production of livestock in the Northeast and nation and to develop products and processes that improve health of livestock.

Community Gardening
Research: Establish a minimum of three collaborative research projects by faculty and staff in the College and with other Land Grant universities regarding sustainable landscapes, sustainable agriculture, invasive species, watershed patterns and processes and watershed management, emerging infectious diseases, and Integrated Pest Management.

Extension: Provide locally-relevant programs focused on individual actions and community management that can enhance community green and open space, protect and restore water quality in surface water ecosystems and in groundwater; conserve water and increase composting of organic materials.

Horticulture
RIAES research and RICE extension on integrated agro-ecosystem management promotes economically profitable and technologically progressive local agriculture that is environmentally benign and sensitive to the balance of scarce resources allocated among competing uses important to society.

Economics, Markets and Policy
We propose to develop a comprehensive model of fisheries policy making and to subject selected hypotheses to extensive testing thus resulting in a new political-economic tool that will provide techniques for improving the design of fishery management institutions.

We hope to expand and develop seafood markets by developing new marketing ideas, identifying market niches, and developing alternative seafood products.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	8.0	0.0	10.0	0.0
2018	8.0	0.0	10.0	0.0
2019	8.0	0.0	10.0	0.0
2020	8.0	0.0	10.0	0.0
2021	8.0	0.0	10.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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

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

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

Community Gardening
Extension efforts to community decision makers, agricultural, residential and engineering/regulatory community will be conducted.

Outreach to school children and to the urban population center in the state.

Demonstration sites will be established for use in such research and Extension programs.

Development and dissemination of publications, fact sheets, and web sites.

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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (Meeting presentations)	● Public Service Announcement ● Newsletters ● TV Media Programs ● Web sites other than eXtension ● Other 1 (Print media, popular press)

3. Description of targeted audience

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

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

Health and Well-being of Livestock
Livestock farmers in the Northeast and 4-H youth

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, 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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of peer reviewed publications
- Number of books and monographs
- Number of abstracts published
- Number of conference proceedings published
- Number of technical documents, fact sheets, bulletins and newsletters produced
- Number of training manuals (includes instructional CD's) produced
- Number of scientific/professional presentations
- Number of workshops (including short courses) completed
- Number of conferences hosted
- Number of websites developed and/or refined
- Number of public presentations
- Number of public service announcements
- Number of students trained
- Number of theses/dissertations completed
- Number of biological control agents released
- Number of new germplasms developed

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Increased understanding of immunity and muscle growth in aquacultured species. Indicators are number of presentations and publications.
2	Growth of Rhode Island's shellfish aquaculture industry. Indicators are number of farms, number of farmers employed and farmgate value of the aquaculture crops.
3	Improved strategies for parasite control in small ruminants. Indicator is new, sustainable non-chemical methods of parasite control.
4	Rhode Island citizens adopt sustainable gardening practices. Indicator is number of people reached through the URI Master Gardener program.
5	Food insecure populations in Rhode Island learn to grow their own food. Indicator is number of successful school and community gardens created and supported.
6	Students in grades K-5 increase their knowledge and skills about the environment, horticulture and science. Indicator is number of students trained.
7	Rhode Islanders implement best practices for composting at their homes. Indicators include number of people who complete URI Master Composter training; number of trained URI Master Composters who report intent to implement composting best practices; and number of public education hours completed by URI Master Composters.
8	Improved understanding of landscape management practices related to invasive plant removal for biodiversity and habitat protection in Rhode Island. Indicator is number of green industry, environmental and regulatory professionals trained.
9	Increased understanding of economic and market factors in fisheries and aquaculture management. Indicators are number of publications, presentations, and stakeholder meetings.
10	Rhode Island homeowners plant native trees, shrubs, and grasses. Indicator is number of native trees, shrubs and grasses identified and improved for homeowner use.

Outcome # 1

1. Outcome Target

Increased understanding of immunity and muscle growth in aquacultured species. Indicators are number of presentations and publications.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 2

1. Outcome Target

Growth of Rhode Island's shellfish aquaculture industry. Indicators are number of farms, number of farmers employed and farmgate value of the aquaculture crops.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Research

Outcome # 3

1. Outcome Target

Improved strategies for parasite control in small ruminants. Indicator is new, sustainable non-chemical methods of parasite control.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 4

1. Outcome Target

Rhode Island citizens adopt sustainable gardening practices. Indicator is number of people reached through the URI Master Gardener program.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

Food insecure populations in Rhode Island learn to grow their own food. Indicator is number of successful school and community gardens created and supported.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management

- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

Students in grades K-5 increase their knowledge and skills about the environment, horticulture and science. Indicator is number of students trained.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Rhode Islanders implement best practices for composting at their homes. Indicators include number of people who complete URI Master Composter training; number of trained URI Master Composters who report intent to implement composting best practices; and number of public education hours completed by URI Master Composters.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

Improved understanding of landscape management practices related to invasive plant removal for biodiversity and habitat protection in Rhode Island. Indicator is number of green industry, environmental and regulatory professionals trained.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

Increased understanding of economic and market factors in fisheries and aquaculture management. Indicators are number of publications, presentations, and stakeholder meetings.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 609 - Economic Theory and Methods
- 605 - Natural Resource and Environmental Economics
- 606 - International Trade and Development Economics
- 610 - Domestic Policy Analysis

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 10

1. Outcome Target

Rhode Island homeowners plant native trees, shrubs, and grasses. Indicator is number of native trees, shrubs and grasses identified and improved for homeowner use.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

Each of the factors above may affect the outcomes of the areas outlined in the Food Production and Sustainability Program. Specific external factors that may affect an area are included below.

Aquaculture and Fisheries
The state of the economy could impact the number of new entrants into aquaculture and government regulations (e.g., leases) will determine the number and size of new and existing operations seeking to expand. Additionally, changes in funding priorities could affect the amount of funds available to these projects.

Health and Well-being of Livestock
The state of the economy and changes in research focus could impact intramural and extramural funding available for conduct of research in this area.

Community Gardening
Use and management of various inputs to the working landscape will be impacted by weather events. Also, reduced funding for Extension programs will reduce the ability to conduct educational programs, demonstration sites and outreach to the community and stakeholders.

Horticulture
Despite the recent economic recession, the Rhode Island agricultural economy is as strong as it has been in recent years. There are 30% more farms than there were five years ago. Key limiting factors

include changes in AES and CE priorities and federal, state and university funding of faculty, staff and facilities.

Economics, Markets and Policy
The state of the economy and changes in research focus could impact intramural and extramural funding available for conduct of research in this area.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Assessment and evaluation of projects within this program area occurs at a variety of levels. For instance, evaluation of projects takes place at the project, departmental, college and program levels. For projects within the program, formative assessments are used to revise and improve efforts, projects, and outcomes within the program. Likewise, summative assessment is used to evaluate outcome achievement and project and program value. Nested within both the formative and summative assessment is an evaluation of the processes that lead to (or prevent) achieving activities, outputs and outcomes.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Energy, Climate Change and the Environment

2. Brief summary about Planned Program

This program has four primary areas: vector borne diseases, climate change, the environment and adaptive agro-ecosystems, and sustainable energy.

Vector Borne Diseases
This area uses a multi-pronged strategy to understand the biology and distribution of deer ticks and to reduce the transmission of diseases, especially Lyme disease, from deer ticks to humans. URI researchers continue to study the environmental factors, particularly humidity, that affect deer tick distribution and are developing a web-based information system so that the public can properly understand the risks associated with deer ticks and strategies that humans can take to avoid contact with them. Knowledge areas include 721 and 722. In KA 721, we are elucidating transmission dynamics of pathogens among tick vectors and vertebrate hosts, as well as improving methods of pest control through the use of 4-posters to apply pesticides to deer and evaluation of natural enemies of ticks. In KA 722, we are developing methods to prevent disease transmission from ticks to humans by educating the public about ways to avoid deer ticks, by developing novel vaccination strategies, and by developing bio-molecular assays for tick-borne pathogens. Stakeholders in this program literally include the entire U.S. population, who could contract Lyme disease either at home or on vacation, but most stakeholders are in the Northeast U.S., the hotbed of this problem. We assume that this program will continue to be funded primarily by extramural sources (e.g., USDA, NIH) and that the leader of the program will be able to continue to attract a multidisciplinary cadre of talented people to the program. The ultimate goal of the program is to provide the public with enough information and products that the incidence of Lyme disease will be significantly reduced. Outputs from the program include peer-reviewed publications, fact sheets, a web site, and on-site demonstrations of materials and techniques. Outcomes include changes in behavior of the public, so that they reduce the risk of contact with ticks, and a reduction in the incidence of Lyme disease.

Climate Change
Climate change in the Northeast U.S. is expected to influence hydrology and water resources through a host of drivers, including increases in temperature; greater severity of drought; wetter dormant seasons; more severe storms; and rising sea levels. These changes present great challenges for stakeholders who rely on the functions and values of the water resources within the region. The Executive Summary of the 2008 IPCC Report: Technical Paper IV: Climate Change and Water **(http://www.ipcc.ch/ipccreports/tp-climate-change-water.htm)** states, "Current water management practices may not be robust enough to cope with the impacts of Climate Change on water supply, reliability, flood risk, health, agriculture, energy and aquatic ecosystems." URI will address these challenges.

Rhode Island relies on its rural lands to provide safe drinking water and sustain the water quality of estuaries and freshwater systems that provide valuable opportunities for recreation and commercial use (e.g., fishing). But the compressed geography, population density, and lack of county government present major challenges for water quality protection. In addition, the historic approaches to private well development, un-sewered wastewater treatment practices, and agricultural waste management generate high risks for ground and surface water contamination. Research will focus on watershed patterns and processes that affect the fate of nonpoint contaminants and approaches to assess the effects of contaminants and disturbance on surface water ecosystems and groundwater. Research methods

include lab and field studies as well as inventories, remote sensing studies and GIS. Extension programs, in cooperation with stakeholders and partner agencies, identify needs and build upon successful local programs to create and disseminate new materials, tools and curricula for use throughout New England. We seek to deliver an integrated water quality program that educates, empowers, and engages agricultural producers, residents and communities throughout New England to become effective stewards of their local water resources.

Rhode Island relies on its coastal lands for agricultural production. Understanding local, regional, and global effects of sea-level change are important for coastal communities and coastal agriculture, as these areas are increasingly exposed to threat from instantaneous (e.g. storm, earthquake and tsunami) and long-term sea-level rise. Research will use geological evidence coupled to historical and instrumental records to evaluate the risks from coastal hazards to the coastal areas of the United States.

The Environment and Adaptive Agro-ecosystems
Presently, 60% of Rhode Island is forested. 80% of this forested land [303,000 acres] is privately owned by roughly 32,000 people. Approximately 80% (over 26,000 people) own forest parcels of less than 10 acres, which amounts to roughly 250,000 acres of forestland in RI. This trend is not unique to our small, densely populated state. Cumulatively, local land owners can have a significant impact on the Rhode Island landscape and their management decisions affect biodiversity, wildlife, the character of rural communities and forest health. Local governments also play an important role in forest and wildlife management within RI. Policy makers and professionals need information on which to base their land use decisions, including options for land preservation, identification of sensitive areas, and the management and protection of open space areas. In addition, invasive species threaten the sustainability of our forests and terrestrial ecosystems. Research will include the following areas: assessment of the impacts of urbanization on seasonal woodland ponds along a disturbance gradient, with special emphasis on impacts of groundwater withdrawal on pond hydrology and amphibian habitat suitability; investigation of habitat use through body composition and blood metabolites of songbirds; and economic analyses of willingness to pay for land conservation or ecosystem services, which will generate new knowledge in relationship to people's willingness to support ecosystems and conservation and to assess the potential for green markets.

Extension work will be designed to educate forest owners, local decision makers, NGOs and state officials about the value of RI's forest resources and to provide our audience with the tools and educational materials to make informed decisions that protect and enhance the state's forests. We will provide data and training to planners, conservation groups, and land trusts at the municipal level to increase awareness of vital natural resources and critical habitats, including forest resources throughout the state. We will focus on delivering training in GIS technology and provide access to a wealth of spatial data through the URI Environmental Data Center websites. We will also collaborate with the Rhode Island Natural History Survey to meet both our research and extension goals.

Sustainable Energy
Energy prices in Rhode Island are among the highest in the country. On average, Rhode Islanders pay 28% more per million Btu than the nation as a whole (RI State Energy Plan, 2009). Moreover, almost all of Rhode Island's energy supply comes from imported fuels; the money Rhode Island spends on energy flows out of the state's economy.

Rhode Island also faces major consequences from carbon dioxide and other greenhouse gases (GHGs) that are warming the planet at a rapid rate. Our coastal location puts the state at jeopardy from sea level rise, flooding, saltwater contamination of drinking water and extreme weather events such as hurricanes.

Under a business as usual scenario, energy use and GHG emissions in Rhode Island are projected to increase steadily, with a concurrent increased flow of dollars out of the state and a host of costly

environmental problems. To avoid this, Rhode Island has decided to move aggressively in pursuing energy efficiency through 'least cost procurement' and in developing renewable energy through a large offshore wind project.

Through this new program area, we propose to fast track implementation of several energy management strategies. The strategies include energy efficiency initiatives targeting public buildings and facilities, residential efficiency and energy supply and solid waste initiatives (RI Greenhouse Gas Action Plan, 2002). The program area will be managed by the URI energy group. The URI energy group includes a cross-disciplinary team of URI researchers, graduate and undergraduate students and extension educators who work in partnership with national, state and local governments, energy providers and the business community.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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%	
102	Soil, Plant, Water, Nutrient Relationships	0%		2%	
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%		6%	
133	Pollution Prevention and Mitigation	15%		5%	
135	Aquatic and Terrestrial Wildlife	9%		12%	
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 (Situation and Scope)

1. Situation and priorities

Vector Borne Diseases
Public awareness of tick-borne diseases is increasing in the coastal Northeast region, but there continues to be poor implementation and compliance with disease prevention strategies, despite the extraordinary prevalence of such diseases in this region. The deer tick becomes infected with and transmits a variety of infections including the Lyme disease bacterium, as well as the agents causing human babesiosis and granulocytic anaplasmosis. Populations of white-tail deer, found increasingly even in semi-urban settings, sustain and have served to increase deer tick populations. URI researchers are attempting to develop a health information delivery and decision support system intended to reduce the incidence of Lyme disease. The first step toward the establishment of a health information system involved identifying and prioritizing risk. Using surveillance data accumulated over a dozen years, URI researchers developed new tools to pinpoint risk, both spatially and seasonally. Using computer models to view disease patterns in Rhode Island, URI scientists determined which landscape patterns presented the greatest risk for encountering a tick bite. This will allow formulation of landscape plans to reduce the chances of

encounters between ticks and people. Another aspect of the project involves the creation of a web-based decision support system. Using this system, people can compile a customized risk index and then follow links that will help them devise short- and long-term disease prevention action plans. Also, attempts are being made to reduce tick abundance community-wide by using USDA-designed 4-posters, which are devices that attract deer with corn dispensed in small amounts. The deer must pass through a set of vertically mounted rollers that are treated with pesticide, which should reduce the deer tick population. Finally, URI scientists 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
The IPCC (2008) predicts that higher water temperatures, increased precipitation intensity, and longer periods of low flows will increase the risks of water pollution from watershed based nonpoint sources. Altered flow regimes can lead to changes in residence time and dilution capacity. Our aquatic ecosystems, both freshwater and estuaries, will be more susceptible to algal blooms, hypoxia and pathogen contamination, with consequences for local water supplies, recreation, biodiversity and human health. The activities of volunteer monitoring through Watershed Watch and watershed modeling through S-1042 have never been more important. Stakeholders need locally-relevant information to target and manage sensitive aquatic resources and to be able to identify and manage areas likely to be at increased risk of serving as pollution sources in the future. An increase in the length and severity of drought, rising sea level and increased storm intensity pose risks to rural water supplies, warranting information that targets these locations and management practices to protect and maximize existing water supplies. Advances in siting and design for on-site wastewater systems can mitigate the risks associated with intense weather extremes attributed to climate change. Advanced treatment systems offer the potential for reuse of treated wastewater that can conserve potable water supplies of a rural community, but this requires training of stakeholders in the proper use of these technologies.

Megathrust earthquakes and associated tsunami pose a risk to human populations and agriculture along the coasts of North America, from ground shaking, subsidence associated with the rupture, and the inundation by saltwater. Future earthquakes are of great concern to all who live, visit, or work in coastal areas in the United States. Such events during the 20th century have killed hundreds of people and destroyed infrastructure in these regions.

The Environment and Adaptive Agro-ecosystems
Presently, 60% of Rhode Island is forested. 80% of this forested land [303,000 acres] is privately owned by roughly 32,000 people. Approximately 80% (over 26,000 people) own forest parcels of less than 10 acres which amounts to roughly 250,000 acres of forestland in RI. This trend is not unique to our small, densely populated state. Nationally, there are 150,000 new forest owners each year who acquire between 1 and 10 acre parcels. These forest owners are obtaining some of the most productive forestland. Cumulatively, they can have a significant impact on the Rhode Island landscape and their management decisions affect biodiversity, wildlife, the character of rural communities and forest health. Local governments also play an important role in forest and wildlife management within RI. Policy makers and professionals need information on which to base their land use decisions, including options for land preservation, identification of sensitive areas, and the management and protection of open space areas.

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.

Sustainable Energy
Energy prices in Rhode Island are among the highest in the country. On average, Rhode Islanders pay 28% more per million Btu than the nation as a whole (RI State Energy Plan, 2009). Moreover, almost of all Rhode Island's energy supply comes from imported fuels; the money Rhode Island spends on energy flows out of the state's economy. The State of Rhode Island in collaboration with the Land Grant programs of the University of Rhode Island are committed to reducing energy consumption, exploring bioenergy strategies, and increasing energy efficiency and sustainability.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Vector Borne Diseases
This program area will continue to be funded primarily by extramural sources (e.g., USDA, NIH) and that the leader of the program will be able to continue to attract a multidisciplinary cadre of talented people to his outreach and research program.

Climate Change
Land use characteristics and anticipated changes create conflicts between the developed and undeveloped environment and between land managers and others. This situation is predicted to become exacerbated due to increased land use development patterns over the near term. The development and transmission of relevant information is needed to enable public and private decision makers to best manage this evolving situation.

The Environment and Adaptive Agro-ecosystems
Funding will be secured throughout the course of the projects.

The public and land managers continue their interest in managing invasive plant species.

Local, state, nonprofit decision makers and landowners continue their interest in preserving and managing open space for natural resource values.

Wetland restoration and preservation to sustain biological diversity continues to be a priority for the public.

State, local and federal decision makers and the public continue their interest in siting aquaculture and prioritizing restoration sites.

Sustainable Energy
The Sustainable Energy Program assumes that energy consumption and greenhouse gas emissions can

be reduced significantly by providing stakeholders with information and technical assistance regarding energy Best Management Practices. In many cases, cost savings will accrue immediately.

2. Ultimate goal(s) of this Program

Vector Borne Diseases
The ultimate goal of the program is to provide the public with enough information and products that the incidence of Lyme disease will be significantly reduced. To this end, URI researchers are attempting to develop a comprehensive health information delivery and decision support system addressing risk behaviors and awareness of Lyme disease.

Climate Change
A long term goal is to strengthen URI's capacity to deliver an integrated water quality program that educates, empowers, and engages agricultural producers, residents and communities throughout New England to become effective stewards of their local water resources and to address risks posed by land use, climatic variability and climate change.

Research will improve the capacity of land managers and community decision makers to understand and manage water quality and hydrologic risks associated with climate variability and climate change on rural and mixed use watersheds.

A second long-term goal is to improve our understanding of seismic hazard from sparse historical records along the coastlines of North America , thus improving our ability to manage the risk posed by large megathrust earthquakes.

The Environment and Adaptive Agro-ecosystems
Research: Improve Rhode Island's forest habitat and wildlife through:

Understanding how wildlife habitats, particularly vernal ponds and early successional forests can be maintained or restored to assure sustainable levels of indigenous species in the face of increasing pressures of population growth, urbanization, pollution, and inadequate public understanding.

Increased understanding about the role of coastal habitat for the long term survival of migrating song birds.

Enhanced understanding of the drivers and risks associated with invasive species on terrestrial and wetland habitats.

Increased understand of the public's willingness to pay for ecosystem services.

Improved understanding of the structure and functions of subaqueous soils to promote aquaculture, restoration and carbon sequestration.

Extension:
Increased use of geospatial information by local decision makers to improve the planning and stewardship of forested lands.

Sustainable Energy
Achieve on-going greenhouse gas reductions in Rhode Island.

Reduce energy consumption by RI municipalities; private sector stakeholders and residential consumers.

Reduce municipal spending / save taxpayer dollars; reduce private sector and residential energy bills.

Improve local air quality in RI communities.

Expand model throughout RI and US.

Achieve on-going greenhouse gas reductions in showcase.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	4.0	0.0	15.0	0.0
2018	4.0	0.0	15.0	0.0
2019	4.0	0.0	15.0	0.0
2020	4.0	0.0	15.0	0.0
2021	4.0	0.0	15.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Vector Borne Diseases
Use surveillance data accumulated over a dozen years to develop new tools to pinpoint risk, both spatially and seasonally.
Use computer models to view disease patterns in Rhode Island and to develop models for disease risk.
Determine landscape patterns that present the greatest risk for encountering a tick bite.
Formulate landscape plans to reduce the chances of encounters between ticks and people.
Create a web-based decision support system. Using this system, people will be able to compile a customized risk index and then follow links that will help them devise short- and long-term disease prevention action plans.
Reduce tick abundance community-wide by using USDA-designed 4-posters, which are devices that attract deer with corn dispensed in small amounts.
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 bio-molecular 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 patterns and processes that affect the fate of nitrogen 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:

- Curricula and training on best management practices (BMPs) for conventional and alternative and innovative onsite waste water treatment
- Public outreach and training on storm water management
- Curricula and training regarding private wells
- Volunteer Water Quality Monitoring

Use geological evidence to evaluate risks from coastal hazards. Primary tools are the records of inundation that are preserved in salt marshes and coastal freshwater marshes that enable us to identify when land-level changed due to earthquakes, when tsunami and storm sediments inundated the coastline, and how sea level has risen in response to past climatic changes.

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

- Energy audit and GHG inventory in selected municipalities/businesses
- Feasibility and implementation of energy efficiency and renewable energy technologies
- Municipal energy training for municipal officials and employees
- Climate Showcase Community conferences
- Residential Energy Education:
  - Participants pledge 10% energy savings
  - Trained volunteers conduct locally-based education and outreach
  - Sustainable energy page on local websites
  - Community workshops
  - Traditional and web media

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● Group Discussion	● Web sites other than eXtension
● One-on-One Intervention	
● Demonstrations	

3. Description of targeted audience

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

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

The Environment and Adaptive Agro-ecosystems
A mixture of public policy personnel (federal and state agencies as well as town conservation, planning and management officials), local nonprofit groups involved in land management, such as conservancies, interested and involved citizens, and private landowners and high school students (through training and participation in the Rhode Island Environthon).

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of peer reviewed publications
- Number of books and monographs
- Number of abstracts
- Number of conference proceedings
- Number of fact sheets, bulletins and newsletters
- Number of training manuals (includes instructional CDs)
- Number of scientific/professional presentations
- Number of workshops (including short courses)
- Number of conferences hosted
- Number of websites developed and/or refined
- Number of public presentations
- Number of public service announcements
- Number of students trained
- Number of theses/dissertations completed
- Number of postdoctoral scientists trained

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Improved understanding of risk for vector tick encounters and tick-borne disease. Indicator is number of tick adverse moisture events (TAME) each year.
2	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.
3	Increased capacity of practitioners to design, install, maintain and improve onsite wastewater treatment systems. Indicator is number of people receiving training.
4	Enhanced capacity to manage and protect local water quality. Indicators include number of data points added to the URI Water Watch database, data usage by regulatory agencies and citizen groups, and presentations to local organizations.
5	Private landowners adopt best practices in testing, treatment, and protection of private well water. Indicators include percentage of workshop participants that have their water tested; percentage of workshop participants who inspect their wellhead area for possible pollution problems.
6	Enhanced capacity in Rhode Island to effectively manage storm water. Indicators include number of people (public, professionals, municipal officials) attending workshops; number of municipalities using our content to educate residents; other actions taken to prevent storm water pollution.
7	Enhanced capacity to manage coastal lands and forested lands to improve habitat for song birds and other wildlife species. Indicator is number of people (wildlife biologists, land managers, the public) who attend presentations; number of people who view, download or cite reports produced by the project.
8	Natural resource managers use vernal pool soil maps for management and restoration. Indicators include number of publications, workshops, and presentations. Integrated: NE-1438
9	Geospatial information is used by government organizations, NGO's and the public for natural resource management and conservation. Indicator is number of contacts (hits) and the amount (Tb) of geospatial data downloaded from RREA-supported online data services.
10	Increased understanding of resistance and tolerance to hemlock wooly adelgid (HWA) in eastern hemlock. Indicator is number of publications, presentations, and procurement of external funding to continue/expand the work.
11	Increased adoption of energy conservation behaviors and implementation of efficiency practices by RI residents, small businesses, municipalities, school districts, water suppliers and state agencies. Indicators are number of energy audits scheduled with the local utility; number of implemented efficiency projects.
12	Upon completion of the Energy Fellows program, URI undergraduate and graduate students demonstrate increased capacity to address real-world energy issues. Indicator is number of students completing the programs.
13	Improved capacity for coastal managers to predict greenhouse gas emissions resulting from changes in nitrogen loading and coastal marsh restoration. Indicator is number of research discussions held with coastal managers and peer-reviewed publications.

14	Increased understanding of how wildlife populations may respond to ongoing climate change. Indicator is number of publications and presentations.
15	Increased understanding of how plant genome size influences competitive ability and susceptibility to herbivory. Indicators are number of publications and presentations.
16	Advance understanding of demand and supply of ecosystem services from watersheds in the rural-urban fringe at a policy-relevant scale. Indicator is number of publications and presentations.
17	Increased understanding of the economic valuation of air quality and greenhouse gas emissions. Indicator is number of publications and presentations.
18	Enhance capacity of land use managers to identify effective strategies for minimizing watershed nitrogen export. Indicator is number of publications and presentations.
19	Enhanced capacity of land trust organizations and agency personnel to manage and protect amphibian and reptile populations from the effects of forest loss and pollution. Indicators are number of peer-reviewed scientific publications and presentations to conservation organizations and at scientific meetings.
20	Enhanced capacity of land trust organizations, government agencies, and private landowners to manage and protect turtle populations from the effects of forest fragmentation. Indicators are number of peer-reviewed scientific publications and presentations to the public and conservation organizations and at scientific meetings.
21	Improve understanding of seismic hazards along the coastlines of North America to improve assessment of this hazard to coastal environments, including coastal communities and coastal agriculture.

Outcome # 1

1. Outcome Target

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

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 721 - Insects and Other Pests Affecting Humans
- 722 - Zoonotic Diseases and Parasites Affecting Humans

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

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. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 722 - Zoonotic Diseases and Parasites Affecting Humans
- 721 - Insects and Other Pests Affecting Humans

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

Increased capacity of practitioners to design, install, maintain and improve onsite wastewater treatment systems. Indicator is number of people receiving training.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 101 - Appraisal of Soil Resources
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Enhanced capacity to manage and protect local water quality. Indicators include number of data points added to the URI Water Watch database, data usage by regulatory agencies and citizen groups, and presentations to local organizations.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 5

1. Outcome Target

Private landowners adopt best practices in testing, treatment, and protection of private well water. Indicators include percentage of workshop participants that have their water tested; percentage of workshop participants who inspect their wellhead area for possible pollution problems.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 6

1. Outcome Target

Enhanced capacity in Rhode Island to effectively manage storm water. Indicators include number of people (public, professionals, municipal officials) attending workshops; number of municipalities using our content to educate residents; other actions taken to prevent storm water pollution.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

Enhanced capacity to manage coastal lands and forested lands to improve habitat for song birds and other wildlife species. Indicator is number of people (wildlife biologists, land managers, the public) who attend presentations; number of people who view, download or cite reports produced by the project.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 136 - Conservation of Biological Diversity
- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 8

1. Outcome Target

Natural resource managers use vernal pool soil maps for management and restoration. Indicators include number of publications, workshops, and presentations. Integrated; NE-1438

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 101 - Appraisal of Soil Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 9

1. Outcome Target

Geospatial information is used by government organizations, NGO's and the public for natural resource management and conservation. Indicator is number of contacts (hits) and the amount (Tb) of geospatial data downloaded from RREA-supported online data services.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 10

1. Outcome Target

Increased understanding of resistance and tolerance to hemlock wooly adelgid (HWA) in eastern hemlock. Indicator is number of publications, presentations, and procurement of external funding to continue/expand the work.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 136 - Conservation of Biological Diversity
- 123 - Management and Sustainability of Forest Resources

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 11

1. Outcome Target

Increased adoption of energy conservation behaviors and implementation of efficiency practices by RI residents, small businesses, municipalities, school districts, water suppliers and state agencies. Indicators are number of energy audits scheduled with the local utility; number of implemented efficiency projects.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

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

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 12

1. Outcome Target

Upon completion of the Energy Fellows program, URI undergraduate and graduate students demonstrate increased capacity to address real-world energy issues. Indicator is number of students completing the programs.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate
- 133 - Pollution Prevention and Mitigation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 13

1. Outcome Target

Improved capacity for coastal managers to predict greenhouse gas emissions resulting from changes in nitrogen loading and coastal marsh restoration. Indicator is number of research discussions held with coastal managers and peer-reviewed publications.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife
- 101 - Appraisal of Soil Resources
- 605 - Natural Resource and Environmental Economics
- 608 - Community Resource Planning and Development

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 14

1. Outcome Target

Increased understanding of how wildlife populations may respond to ongoing climate change. Indicator is number of publications and presentations.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 136 - Conservation of Biological Diversity
- 135 - Aquatic and Terrestrial Wildlife
- 132 - Weather and Climate

4. Associated Institute Type(s)

- 1862 Research

Outcome # 15

1. Outcome Target

Increased understanding of how plant genome size influences competitive ability and susceptibility to herbivory. Indicators are number of publications and presentations.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 136 - Conservation of Biological Diversity

4. Associated Institute Type(s)

- 1862 Research

Outcome # 16

1. Outcome Target

Advance understanding of demand and supply of ecosystem services from watersheds in the rural-urban fringe at a policy-relevant scale. Indicator is number of publications and presentations.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Research

Outcome # 17

1. Outcome Target

Increased understanding of the economic valuation of air quality and greenhouse gas emissions. Indicator is number of publications and presentations.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate
- 605 - Natural Resource and Environmental Economics

4. Associated Institute Type(s)

- 1862 Research

Outcome # 18

1. Outcome Target

Enhance capacity of land use managers to identify effective strategies for minimizing watershed nitrogen export. Indicator is number of publications and presentations.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 19

1. Outcome Target

Enhanced capacity of land trust organizations and agency personnel to manage and protect amphibian and reptile populations from the effects of forest loss and pollution. Indicators are number of peer-reviewed scientific publications and presentations to conservation organizations and at scientific meetings.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 136 - Conservation of Biological Diversity
- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 20

1. Outcome Target

Enhanced capacity of land trust organizations, government agencies, and private landowners to manage and protect turtle populations from the effects of forest fragmentation. Indicators are number of peer-reviewed scientific publications and presentations to the public and conservation organizations and at scientific meetings.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 21

1. Outcome Target

Improve understanding of seismic hazards along the coastlines of North America to improve assessment of this hazard to coastal environments, including coastal communities and coastal agriculture.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 132 - Weather and Climate
- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (human behavior)

Description

Each of the factors above may affect the outcomes of projects in this program area. Specific external factors that might affect outcomes are listed.

Vector Borne Diseases
Weather extremes affect deer tick populations. Further, the appropriation of competitive funding will largely determine the progress that is made in this area. Last, the success of the project will be determined by the degree with which Rhode Islanders change their behavior to reduce risk of the disease.

Climate Change
Use and management of various inputs to the working landscape will be affected by various weather events. Also, reduced funding for Extension programs will reduce the ability to conduct educational programs, establish and showcase demonstration sites, and provide outreach opportunities to identified stakeholders.

The Environment and Adaptive Agro-ecosystems
Economic conditions may negatively affect land owners' willingness to implement stewardship plans or towns to implement urban forestry programs. Likewise, competing public priorities may affect outcomes in this area.

Sustainable Energy
Competing programmatic challenges may affect the outcomes in this area.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Assessment and evaluation of projects within this program area occurs at a variety of levels. For instance, evaluation of projects takes place at the project, departmental, college and program levels. For projects within the program, formative assessments are used to revise and improve efforts, projects, and outcomes within the program. Likewise, summative assessment is used to evaluate outcome achievement and project and program value. Nested within both the formative and summative assessment is an evaluation of the processes that lead to (or prevent) achieving activities, outputs and outcomes.

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Youth, Family and Communities

2. Brief summary about Planned Program

Areas of activity in this program include:

4-H

The Rhode Island 4-H program's primary audience is Rhode Island youth (primarily but not limited to children 8-18 years of age) and their parents. The RI 4-H youth development component will align its educational efforts with the three national mission mandates: science, engineering and technology; healthy lifestyles; and citizenship. Programming partnerships will be forged with other RICE/RIAES program areas to insure that a broad spectrum of researched-based information, curricula and academic-based learning opportunities are utilized in expanding the opportunities for RI youth "to learn how to think, plan and reason" thus empowering them with the knowledge, skills and abilities to achieve their academic and individual potential. The second educational component focuses on the family unit's well being through programs and research-based information presented at the community level connecting community-based organizations serving at risk youth and families with land-grant-based educational resources, training and referrals. By working as a team, this program area will be able to extend its 4-H educational resources and learning opportunities to currently under-represented youth in at-risk communities throughout the state. In addition, the evaluation skills and measurement tools of the youth and families-at-risk specialists will provide the 4-H component with the necessary expertise to develop and implement measures for program outcomes.

Sustainable Communities

Between 1964 and 1997, USDA estimates that Rhode Island lost approximately half of its farmland. Loss of farms and rural lands often heralds new residential development, traffic, and associated negative impacts of human activity on the environment. High land values can also stifle expansion of existing farms and make purchasing farmland prohibitive for aspiring farmers. Pressures such as zoning and regulatory issues, conflicts between farmers and homeowners, water supply, and estate settlement, have prompted the RI Division of Agriculture to designate "sustaining and providing for viable agriculture" as its foremost priority. This program will work closely with the RI Division of Agriculture to improve local and grassroots decision making related to economic and environmental sustainability, creating a model that will be available to benefit all of Rhode Island's communities, and in addition, will enhance tourism venues within the state.

3. Program existence : Mature (More then five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)

1. Situation and priorities

4-H Youth Development
Programming in 4-H addresses a complex array of issues confronting Rhode Island families. The major challenge is in identifying where best to target limited resources that will have a significant impact on key issues facing today's youth and families and result in measurable outcomes for these target audiences. Key issues impacting today's families include the increasing number of children in poverty in all RI cities and towns; family structures that are stressed by poverty; and a decreasing community connection that creates weakened environments for child rearing. There is limited access to social programs for youth and families, and links between service providers and families are weak. Youth lack opportunities for involvement in positive outside-of-school social and educational programs that provide them with a safe, supportive environment for developing life skills and interacting with peers and positive adult role models.

The program staff through diverse partnerships within and outside of the land grant system can serve as a catalyst and provide the integration of people and resources needed to address these critical issues facing Rhode Island's youth and families.

Sustainable Communities
Rhode Island's rural and urban fringe communities are undergoing rapid change and face increasingly complex planning and development issues. The impact of residential and commercial development on rural areas has increased costs of municipal services and driven property tax rates higher. Poorly planned growth is also creating sprawl pattern development in rural areas. This trend has resulted in the loss of farm and open space and has placed increased pressure on soil and water resources. Loss of rural character and diminishing quality of place are concerns voiced by rural residents and municipal leaders with increasing frequency and urgency.

Loss of farmland is particularly troubling. Between 1964 and 1997 USDA estimates that Rhode Island lost approximately half of its farmland. Loss of farms and rural lands often heralds new residential development, traffic, and associated negative impacts of human activity on the environment. High land values can also stifle expansion of existing farms and make purchasing farmland prohibitive for aspiring farmers. In its current Plan of Work, Rhode Island's state Division of Agriculture states, "...urban sprawl, and related pressures and problems, continue to threaten the long-term existence of agriculture in Rhode Island. Prime agricultural land continues to be lost to development; farmland values in Rhode Island are the highest in the nation and consequently farmland real estate taxes are higher than in any other state." These and other pressures cited in the plan, such as, zoning and regulatory issues, conflicts

between farmers and homeowners, water supply, and estate settlement, have prompted the RI Division of Agriculture to designate "sustaining and providing for viable agriculture" as its foremost priority.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

4-H
Youth will gain valuable life skills and develop self-confidence in their ability to engage in the larger community and successfully make the transition into productive, contributing adults through positive life choices.
Ongoing and caring relationships, both within and outside of the family are essential to positive youth development.
Through out-of-school learning opportunities in science and healthy lifestyles, youth will develop the knowledge, skills and self-directed ability to improve academic performance, set long-term career goals, refine leadership and decision-making skills and demonstrate the ability to make positive choices.
Sustainable Communities
Through the addition of new and reassigned staff and the formation of resource partnerships, Extension has been building its capacity to conduct programs in sustainable communities and farm viability.

Our program will be leveraged by staff and operating resources of our strategic partners: RI Agricultural Partnership and the RI Division of Agriculture as well as other state agencies and key collaborators including USDA/NRCS, and regional Extension systems.

Our ability to develop and deliver sustainable tourism programming will be enhanced through collaboration with local, state and national research, education and extension resources.

2. Ultimate goal(s) of this Program

4-H
Through collaboration and partnership, the 4-H program will serve as the portal for Rhode Island families to connect with the vast research-based resources and educational opportunities of the land-grant institution resulting in improved youth and family health, life skills and emotional and academic well-being.
Sustainable Communities
Our long term goal is to strengthen the capacity of state and local organizations, municipalities, citizens and farmers/agriculturalists to make informed decisions and plan economically and environmentally sustainable communities and farms, and to manage natural resources and community assets wisely.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	3.0	0.0	0.0	0.0
2018	3.0	0.0	0.0	0.0
2019	3.0	0.0	0.0	0.0
2020	3.0	0.0	0.5	0.0
2021	3.0	0.0	0.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

4-H
Forge academic connections to strengthen 4-H curricula, provide undergraduate experiential learning opportunities, increase program research base and utilize evaluation expertise to measure impacts and improve programs.
Connect target audience to 4-H educational programs though workshops, web-based training and newsletters, 4-H volunteer training and curriculum guides (train the trainer).
Develop resources and information to connect youth and families to community and land-grant resources (4-H to serve as portal).

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

Sustainable Communities
Study and promote commercial farm viability.

Promote responsible stewardship of agricultural lands.

Work with municipalities and community members to manage natural and economic resources wisely.

Teach and promote sustainable development techniques and management to communities.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods

● Education Class ● Workshop ● Group Discussion ● Demonstrations ● Other 1 (4-H Clubs/Groups) ● Other 2 (Displays/Exhibits)	● Newsletters ● Web sites other than eXtension ● Other 1 (Fact sheets, bulletins) ● Other 2 (Web-based curriculum)

3. Description of targeted audience

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

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of workshops (including short courses)
- Number of volunteers trained
- Number of 4-H record books
- Number of youth reached through programs
- Number of community/family serving groups reached
- Number of community service projects
- Number of activities and programs
- Number of students trained
- Number of websites developed and/or refined
- Number of curricula developed and delivered
- Number of professional training sessions completed
- Number of public presentations

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	RI 4-H club members demonstrate increased knowledge and skills related to science and health. Indicator is percentage of 4-H club members participating in science and health projects who demonstrated increases in knowledge and skills.
2	RI 4-H club members demonstrate increased commitment to, and understanding of, their communities. Indicators are number of 4-H club members participating in community service projects and number of community service hours completed by 4-H club members.
3	RI 4-H Club members apply leadership skills (e.g. public speaking, project leadership) to make a positive difference in their schools and communities. Indicator is percentage of 4-H club members who exhibited increased leadership skills.
4	Viability of agriculture in the state of Rhode Island and in southern New England is strengthened. Indicators are number of training sessions conducted that address issues related to sustainable agriculture, value-added products and/or agri-tourism and percentage of participants that report intent to implement new ideas, behaviors or practices.

Outcome # 1

1. Outcome Target

RI 4-H club members demonstrate increased knowledge and skills related to science and health. Indicator is percentage of 4-H club members participating in science and health projects who demonstrated increases in knowledge and skills.

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

RI 4-H club members demonstrate increased commitment to, and understanding of, their communities. Indicators are number of 4-H club members participating in community service projects and number of community service hours completed by 4-H club members.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

RI 4-H Club members apply leadership skills (e.g. public speaking, project leadership) to make a positive difference in their schools and communities. Indicator is percentage of 4-H club members who exhibited increased leadership skills.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 806 - Youth Development

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

Viability of agriculture in the state of Rhode Island and in southern New England is strengthened. Indicators are number of training sessions conducted that address issues related to sustainable agriculture, value-added products and/or agri-tourism and percentage of participants that report intent to implement new ideas, behaviors or practices.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect 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.)

Description

We exist in turbulent times nationally, regionally, locally, and institutionally. Appropriations budgets are

being cut dramatically on many fronts, resulting in fewer resources for increasing need areas. As finances and personnel change, it is likely our programs and outcomes will have to shift to accommodate them.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Assessment and evaluation of projects within this program area occurs at a variety of levels. For instance, evaluation of projects takes place at the project, departmental, college and program levels. For projects within the program, formative assessments are used to revise and improve efforts, projects, and outcomes within the program. Likewise, summative assessment is used to evaluate outcome achievement and project and program value. Nested within both the formative and summative assessment is an evaluation of the processes that lead to (or prevent) achieving activities, outputs and outcomes.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

International Programs

2. Brief summary about Planned Program

International Programs are an important segment of the Rhode Island Land Grant portfolio. This area will provide opportunities for RIAES researchers and RICE specialists to extend knowledge, expertise, technologies, intellectual property and other skills to international stakeholders. We are currently engaged in fisheries and aquaculture projects in Africa, South America and Asia. Likewise, we have specialists providing expertise to a soil reclamation project in China and are providing opportunities for training Chinese agricultural scientists here at the University of Rhode Island.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 Economics	50%		50%	
611	Foreign Policy and Programs	50%		50%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

Agriculture is a global endeavor. As such, the advancement of agriculture, food production and environmental sustainability is dependent on international partnerships. Addressing critical issues related to food production, agricultural sustainability, natural resource management, food safety, and disease prevention are not only national priorities, they are global priorities. Likewise, our communities are becoming progressively diverse. An understanding and appreciation of cultural differences are essential to global cooperation, and successful international trade and development.

2. Scope of the Program

- Multistate Research
- Multistate Extension

- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The United States farm sector is increasingly dependent on international trade.
Agricultural sustainability requires international cooperation.
International partnerships are required to address issue related to food production, agricultural sustainability, natural resource management, food safety, and disease prevention.
An appreciation of diversity is important for preparing our students, faculty, and community members for the 21st century economy.

2. Ultimate goal(s) of this Program

To assist international partners in the development of strategies for food production, agricultural sustainability and global trade cooperation.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	0.5	0.0	0.5	0.0
2018	0.5	0.0	0.5	0.0
2019	0.5	0.0	0.5	0.0
2020	0.5	0.0	0.5	0.0
2021	0.5	0.0	0.5	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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 responsible for water and wastewater management 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 programs 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. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Education Class	● Public Service Announcement
● Workshop	● Newsletters
● One-on-One Intervention	● Web sites other than eXtension
● Demonstrations	● Other 1 (Print media)

3. Description of targeted audience

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

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of technical documents, fact sheets, bulletins and newsletters
- Number of training manuals (includes instructional CDs)
- Number of scientific/professional presentations
- Number of workshops (including short courses)
- Number of conferences hosted
- Number of websites developed and/or refined
- Number of public presentations
- Number of students trained
- Number of theses/dissertations completed
- Number of postdoctoral scientists trained
- Number of volunteers trained
- Number of intervention studies
- Number of social marketing actions/activities
- Number of video productions

☑ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Chinese farmers apply new knowledge and technology to improve local food production. Indicator is number of new salt-tolerant vegetables and grasses grown by local farmers.
2	Artisanal fisheries ecosystems in the Gambia and selected stocks shared with Senegal are managed more sustainably. Indicator is number of new sustainable fishery management plans.

Outcome # 1

1. Outcome Target

Chinese farmers apply new knowledge and technology to improve local food production. Indicator is number of new salt-tolerant vegetables and grasses grown by local farmers.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 611 - Foreign Policy and Programs
- 606 - International Trade and Development Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Artisanal fisheries ecosystems in the Gambia and selected stocks shared with Senegal are managed more sustainably. Indicator is number of new sustainable fishery management plans.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 611 - Foreign Policy and Programs
- 606 - International Trade and Development Economics

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy

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

Description

Each of the factors above has the potential to affect the outcomes of international programs. The most important limiting factor will be funding for international travel.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Assessment and evaluation of projects within this program area occurs at a variety of levels. For instance, evaluation of projects takes place at the project, departmental, college and program levels. For projects within the program, formative assessments are used to revise and improve efforts, projects, and outcomes within the program. Likewise, summative assessment is used to evaluate outcome achievement and project and program value. Nested within both the formative and summative assessment is an evaluation of the processes that lead to (or prevent) achieving activities, outputs and outcomes.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

CELS-CARES

2. Brief summary about Planned Program

CELS-CARES (College of the Environment and Life Sciences-Community Access to Research and Extension Services) is a program that enables the academic community to respond to community needs. As the acronym indicates, this program provides a means for stakeholders to access the resources of RIAES and RICE. The program fosters integration of research and extension and the development of infrastructure critical to the Station's research mission and Extension's outreach endeavors.

3. Program existence : Intermediate (One to five years)

4. Program duration : Medium Term (One to five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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 (Situation and Scope)

1. Situation and priorities

RIAES and RICE require a systematic process to respond to the needs, problems, and challenges of key stakeholders. This program area provides the administrative support to respond to needs and provides resources in key areas.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension

- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Capacity funding for the experiment station and extension will continue.
Integration of station and extension activities is valued.
Identification of the needs of stakeholders is important for determining the direction of RIAES and RICE activities.
There is need for the strategic and systematic distribution of land-grant resources.

2. Ultimate goal(s) of this Program

Provide the administrative support to respond to needs and provide resources in key areas.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2017	3.0	0.0	8.0	0.0
2018	3.0	0.0	8.0	0.0
2019	3.0	0.0	8.0	0.0
2020	3.0	0.0	8.0	0.0
2021	3.0	0.0	8.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Infrastructure needs are addressed by this program including administrative support personnel, facilities, and farms.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
● Group Discussion ● One-on-One Intervention ● Demonstrations	● Web sites other than eXtension

3. Description of targeted audience

Academic faculty, university staff, graduate students, undergraduate students, university administrators, RIAES scientists, RICE faculty and staff.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
  - Direct Adult Contacts
  - Indirect Adult Contacts
  - Direct Youth Contacts
  - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- Number of proposals submitted
- Number of proposals funded

☐ Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	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 Target

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. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 902 - Administration of Projects and Programs

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Reductions in the federal research budget have increased the competitiveness for grant funds while decreasing the success of faculty and staff in securing extramural funds. Uncertain state budgets and federal budget cuts continue to have a negative effect on service and program delivery. The land-grant allocation to the university has not changed substantively in over 20 years. The buying power of this allocation has decreased 35% during the past two decades.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Summative assessment is used to evaluate outcome achievement and project and program value.