Annual Report of Accomplishments and Results 2002

Rhode Island
Agricultural Experiment Station
and
Cooperative Extension

Dr. Jeffrey R. Seemann, Director

A report to USDA-CSREES on progress under the Joint Plan of Work for FY2000-2004

Contents

WHAT IS COVERED IN THIS REPORT

This Report corresponds to the 5-Year Joint Plan of Work for FY2000-2004 ("the Plan") for the **Rhode Island Agricultural Experiment Station** (RI AES; "the Station") and for **Rhode Island Cooperative Extension** (RI CE; "Extension"), administrative units of the **University of Rhode Island** (URI, "the University"). It is organized following the format prescribed in the **Guidance for the Annual Report of Accomplishments and Results**, with the following modifications.

- Dr. Jeffrey R. Seemann became the Dean and Director of the Station and Extension on July 1, 2001, and Dr. Cathy Roheim became the Associate Director of the Station and Extension on Oct. 15, 2001.
- We have appended the current **Call for Proposals** for the Station to document the procedures used for merit and peer review for all projects begun in fiscal year 2003. These guidelines were originally adopted in January 2000. (See additional comments under Program Review Process).
- We have appended a **Portfolio of Current Projects** for the Station, providing brief outlines for all projects approved for FY2002, to illustrate the pervasive adoption of the current outcomes-orientation for all projects. The identification of specific target audiences and external linkages and explicit outcomes demonstrates a commitment to further integration with Extension.

Annual Report of Accomplishments and Results
Rhode Island Agricultural Experiment Station & Cooperative Extension
FY2002

PLANNED PROGRAMS

GOAL 1: AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY.

PROGRAM 1: LANDSCAPE HORTICULTURE AND TECHNOLOGY FOR SUSTAINABLE AGRICULTURE.

Overview: Rhode Island's AES and CE programs in agricultural system management emphasize the green industries (turfgrass and ornamental horticulture) of this state because of their relative importance. It is possible for us to address the needs of the state in a coordinated program of research and outreach that covers plant production, landscape design, landscape use, installation, and maintenance. Thus we have the potential to directly impact the green industry professionals, the homeowners, and all citizens and visitors utilizing managed landscapes (parks, ball fields, and golf courses) throughout the state. Our focus is to maintain an economically viable industry with environmentally benign practices. This program includes specific regional efforts such as organizing New England GROWS, and the New England Turfgrass Conference and Show.

As with Program 6, Natural Resources and the Environment, this program does a superb job of integrating research and outreach. Research/extension faculty work very closely with CE educators and staff to provide the basis for the outreach efforts in Invasive Species, Emerging Infectious Diseases, Ornamental/Green Agriculture and Integrated Pest Management.

Key to the future of the Program is the progress of the University's Environmental Biotechnology Initiative, an ambitious, faculty-led effort to secure core facilities for plant and animal genomics, transgenics, imaging, and bioinformatics. Progress on advancing a new state-of-the-art biotechnology building toward a State Bond Referendum on the 2004 bond issue has been extremely positive, with $200,000 in planning money from the State and $600,000 in planning money allocated in FY03

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Key Theme–Invasive Species:

Research into the area of invasive species is covered by Hatch project RI00663 'Biological Control of Invasive Plants and Insects in Rhode Island.' The Rhode Island Invasive Species Council serves in education and in an advisory role. The Rhode Island Natural History Survey is jointly funded by URI AES/CE and private funds from foundations and non-profit organizations such as the Nature Conservancy. RINHS is an important component of the program in invasive species, along with URI AES/CE Program 6, in Natural Resource Management, Critical Habitats, and Wetlands Restoration and Protection, Forest Management.

Milestones:

Lily Leaf Beetle Biological Control. Over the past 8 years, we have studied the biology, distribution, and potential for biological control of the lily leaf beetle, a new pest of lilies in the Northeast. We have found four species of parasitoids that regulate populations of this insect in Europe. In the past season our lily leaf beetle research program has made significant progress in all four of our research objectives. First, we have established *Tetrastichus setifer* in our research plots near Boston. Secondly, we completed host specificity and competition tests to a point where we have applied for and received release permits for two additional parasitoids *Lemophagus errabundus* and *Diaparsis jucunda*. Third, we conducted chemical ecology tests in Europe that support our host specificity testing. Lastly, the 2002 season of surveying and collecting in Europe has provided us a better understanding of the ecology of the parasitoids in their native range as well as providing us material to study and release in North America. We are presently preparing for field-releases of additional parasitoid species next season.

Cypress Spurge Biological Control. In 1995 we released 5 species of *Aphthona* beetles to control cypress spurge, *Euphorbia cyparissas* at two locations in Rhode Island. We have monitored the progress of the insects since then and we have outstanding results with two of the *Aphthona* species. By 2000, Cypress spurge was completely controlled at one farm and most of another farm had been also been rid of this pest. Since then, beetles have been distributed to 8 other results with similar promising results. In 2002 we published a book chapter on this work in http://www.invasive.org/biocontrol/.

Phragmites australis. We have indentified key natural enemies of this invasive plant both in the USA and in Europe where our invasive strain apparently originated. We have identified native *P. australis* on Block Island in Rhode Island. All other R.I. populations appear to be exotic.

Outputs/Outcomes/Impacts:

AES, CE and the Rhode Island Invasive Species Council:

- Trained volunteers for the Invasive Plant Atlas of New England (IPANE). The purpose of this program is to define the extent of the spread of invasive plants in New England, in partnership with the New England Wild Flower Society and the University of Connecticut. This program consisted of 2 day-long workshop to train 40 volunteers [May 4-5, 2002], then these volunteers worked from May-October to map locations and the extent of invasive species in Rhode Island. The data gathered by these volunteers will be entered into the IPANE databases. Another Rhode Island training session is scheduled for April 5, 2003.

- Provided information to the students and teachers involved with the Rhode Island 2002 Envirothon (via a lecture, production of an informational packet, and development of the "special topic" situation for the 2002 Envirothon) on the issues surrounding invasive species.

- In 2002 the RI Natural History Survey received a grant of $2000 from the US Fish & Wildlife Service, $1000 from the URI Coastal Institute, and pledges of $500 each from RIAES and the RI Wild Plant Society to produce a poster and brochure on invasive plants in

Rhode Island. Representatives from RINHS, US Fish and Wildlife Service, and RI Wild Plant Society have formed a committee to produce the poster and brochure, which is scheduled for publication in summer 2003

Source of funds: AES, CE, industry groups, Nature Conservancy, other private funding
Scope of impact: New England

Key Theme–Emerging Infectious Diseases:

Overview: The vector-borne and zoonotic diseases program includes our projects on zoonotic disease surveillance and management and on biological control of tick and mosquito vectors. Key elements of the program continue to focus on i) enhancing surveillance, ii) improving diagnostics, iii) gaining knowledge on vector-pathogen interactions, and iv) developing and implementing vector control strategies that are appropriate for communities. They represent an important capacity for research and outreach in vector-borne and other zoonotic diseases that is critical for protecting animals and humans in Rhode Island and throughout the northeastern region. Moreover, ongoing surveillance for disease agents and continued development and implementation of rational vector-borne disease management plans are key elements for a public health approach to bioterrorism preparedness.

We maintain close ties with the Rhode Island Office of Mosquito Abatement Coordination and the Rhode Island Department of Health, and collaborate by providing specialized pathogen testing facilities in our BL-3 laboratory, and by maintaining a statewide tick surveillance effort. We provide expertise and capacity for a wide variety zoonotic diseases, including Lyme disease, Babesiosis, human ehlichiosis (HGE), West Nile Virus, EEE, and other diseases of major public concern.

Hatch projects focused on infectious diseases includes RI 00664 'Developing Vector-borne Disease Watch-Warning Systems and Responses for the Northeastern U.S.' Additional funding complementing Hatch investment is an NIH grant RI01 AI37230 "Role of tick saliva in Lyme disease and vaccine strategy."

Milestones:

- Continued surveillance of ticks and tick-borne pathogens throughout RI. Vector abundance was 51.4% higher than during the previous reporting period (2001)
- Found a close correlation between June-July precipitation amounts and nymphal tick abundance.
- Developed and validated a climate-based model predicting summer-time soil moisture levels in Rhode Island forests.
- Improved the predictive capacity of a model that generates seasonal tick risk maps by integrating within-season May-July forecast data with precipitation data from the 12-month period preceding summer.
- A human serological survey conducted in southern Rhode Island indicated that people being tested for a tick-borne disease (Lyme disease) also showed evidence of exposure to

mosquito-borne West Nile virus. 1.3% of 600 samples tested from South County Hospital (SCH) were positive for WNV exposure, while just 0.2% of 624 tested from Kent County were positive. There were no reported WNV cases in 2001 in RI. These data are consistent with information collected from dead bird surveillance, showing a significantly higher incidence of dead birds from communities serviced by SCH than Kent. This finding also highlights the occurrence of subacute, undiagnosed WNV infection, which may contribute to contamination of the stored blood supply through blood donation.

- Recovered WNV from 37% of 53 dead birds collected in Kent County; 89.3% of 341 birds collected in Washington County. Crows and blue jays made up 98.6% of all WNV positive birds.
- Mosquito Barrier®, an all natural, garlic oil-based compound, was evaluated as a potential area-wide mosquito repellent. No differences in mosquito trap counts were detected between treated and untreated properties over a 7-week trial.
- Surveyed mosquito species and viral infection at 16 national park sites in the eastern U.S.
- Provided technical advice on mosquitoes and West Nile Virus to the National Park Service, U.S. Fish And Wildlife Service, the Nature Conservancy and for the State of Rhode Island (DEM/DOH West Nile Virus Advisory Committee).

Outputs/Outcomes/Impacts:

- Mosquito surveillance results were used to direct mosquito suppression efforts in RI for the 2002 season. There was one human case of WNV reported in RI during 2002.
- Human exposure, albeit subacute, has occurred in RI residents at a relatively high rate suggesting the potential for contamination of the blood supply through blood donation. WNV should be included along with other tick-transmitted infections in differential diagnostic testing for summer-time fever and flu-like illnesses.
- The correlation between summer precipitation amounts and tick abundance suggests the possibility of developing a weather-based predictive model for tick-borne disease region-wide.
- We are unable to recommend Mosquito Barrier® for area-wide mosquito repellency in Rhode Island residential and recreational sites.
- Station research findings presented the RI Department of Environmental Management with crucial data used to determine tick and mosquito abatement needs, such as spraying needs and locations most needing abatement.

Source of funds: AES, CE, National Institutes of Health, private foundations

Scope of impact: state and regional

Key Theme–Biotechnology:

Overview: Biotechnology is pervasive throughout our research portfolio. The critical issue is to make progress in development of core infrastructure for genomics, transgenics, imaging, and bioinformatics. NRI Equipment grants, RI00200103137 'Confocal Scanning Microscopy for

Environmental Biotechnology,' and RI-2000-001142 'Equipment Request to Strengthen Basic Infrastructure for Plant Biology Research at URI,' have furthered this important research area. In addition, there is a growing body of USDA-funded research projects involved in this area, including NRI grants RI001999901385 'A Genetic Dissection of the Sex Determination Pathway in Maize,' RI-2000-01228 'Enhancing Kentucky Bluegrass Forage Quality Through Physiological and Molecular Approaches,' and RI002001-00966 'Stable Expression of Yeast FLP Site Specific Recombinase in Rice.'

Milestones:

- USDA funding of a controlled environment growth chamber (Conviron plant growth chamber model PGR15) was obtained, and this machine was purchased during 2002 to strengthen the infrastructure at URI for plant biology research. The chamber will be used to maintain turfgrass plants that are part of a Station research program to enhance important traits of turfgrass species using modern gene transfer technologies based on microprojectile bombardment and *Agrobacterium tumefaciens*.

- Reliable transformation protocols using *Agrobacterium*-mediated gene transfer have been established for several species of turfgrass including creeping bent grass, perennial rye grass, tall fescue, colonial bent grass, velvet bent grass, Kentucky blue grass, and *Poa annua*. Hundreds of stably transformed plants expressing foreign genes for herbicide and fungal resistance have been successfully regenerated and are being evaluated for commercial product applications.

- Gene constructs have been developed and introduced into rice to disperse *Ds* transpositions throughout the rice genome where each event contains an independent, dispersed insertion of a genetically engineered *Ds* transposon at a defined chromosomal site. Efficient protocols for developing transgenic rice have been generated using *Agrobacterium*-mediated transformation. The objective of this collaborative study is to develop the necessary trangenics to establish a library of randomly dispersed *Ds* elements throughout the rice genome.

- The gene encoding the site specific recombinase, FLP, from yeast has been introduced into transgenic rice. Expression of FLP activity has been demonstrated and is now being evaluated in a project that will utilize this technology for hybrid rice production.

- Promoters useful for driving efficient foreign gene expression in transgenic rice and turfgrass have been analyzed and screened by transient and stable expression using a variety of GUS reporter gene constructs. These promoters are now being evaluated for directing expression of foreign trait genes in transgenic crops.

Source of funds: AES, USDA
Scope of impact: state, regional, national

Key Theme–Ornamental/Green Agriculture:

Overview: We have several projects addressing the owners, designers, and managers of landscapes as well as those producing ornamental plants. These include multi-state research projects NE-009

'Conservation and Utilization of Plant Genetic Resources,' NE-187 'Best Management Practices for Turf Systems in the East,' NE-169 'Integrated Turfgrass Management for Environmental Enhancement and Resource Conservation,' and S-290 'Technical and Economical Efficiencies of Producing, Marketing, and Managing Environmental Plants.' The URI Cooperative Extension GreenShare Program is a partnership between the University and the green industries. URI CE faculty and staff provide training for green industry professionals and together the two groups work to provide scientifically-based horticultural information to the gardening public.

The URI Cooperative Extension Education Center is a one-stop facility for the latest research-based, environmentally-sound home and garden practices. Situated in the beautiful URI Learning Landscape Gardens, the Center is home to the URI Master Gardener Program, the URI GreenShare Program and the URI Environmental Education School Program. Through this facility one can also access the URI Plant Protection Clinic, the URI Food Safety Education Program, the URI Master Gardener Association and the RI Center for Commercial Agriculture.

Milestones:

- Conducted 50 site visits with nursery and landscape firms, processed over 100 foliar and soil samples, and initiated research projects to address grower issues including: poor flower color development on Hydrangea, pH/nutrient problems on 5 crops, poor drainage of potting medium, and effects of planting depth on landscape plant survival.

- Two web sites were maintained and expanded. One of these, the "Sustainable Plant List" www.uri.edu/research/sustland/ exceeded 55,000 visits. Nearly 600 hard copies of the sustainable plant list were distributed, and 750 copies of the revised "Rhode Island Nursery Stock Source List" were distributed to green industry professionals.

- We continued to develop and use the URI Learning Landscape Demonstration Gardens for outreach programming. These gardens showcase sustainable plants and practices. Programs in 2002 included GreenShare Field Day (3,000 people), Spring Into Action With The Gardening Experts - an all-day workshop for the gardening public (130 people), URI Master gardener training sessions (100 people), Learning Landscape Environmental Education school enrichment program (over 3,000 elementary children) and numerous educational tours for the public.

- URI Cooperative Extension Master Gardener volunteers answer over 11,000 calls each year from Rhode Island citizens through the toll-free URI CE Gardening Hotline.

- We developed a web site on IPM to complement our Learning Landscape Environmental Education program. The web site allows teachers to introduce their students to the principles of IPM prior to attending the Learning Landscape program in the gardens at URI. Teachers are informed about the web site in the introductory materials sent out after they register for the program.

- We continued to update our web site including on-line fact sheets giving up-to-date recommendations for managing insects, diseases, and other aspects of the home landscape. Over 250 factsheets are on the web at: www.uri.edu/ce/factsheets/sheets/.

- In February, 2002 we worked with URI Landscape Architecture and Plant Science students to design and install a major garden exhibit at the Rhode Island Flower Show. The 2002 exhibit demonstrated a sustainable home landscape, featuring insect and disease resistant plants. It also showed how to minimize use of water and invasive plants. This exhibit was one of the most popular in the show with over 40,000 visitors over a period of 5 days. Docents, URI Master Gardeners, were on-hand throughout the event to answer questions.

- Train the Trainer Programs: URI Master Gardeners are important partners with URI faculty and staff in our efforts to disseminate IPM information to backyard gardeners This year we conducted a five session IPM training program for 35 Master Gardener volunteers. The training included hands-on sessions on garden problem diagnosis and insect and disease identification as well as an overview of IPM. Having attended the class, this group of Master Gardeners next will be trained to present IPM presentations to garden clubs, environmental groups and other relevant organizations in Rhode Island. These Master Gardeners then used this information in planting and maintaining their demonstration vegetable garden which was on display all season long in the Learning Landscape and was featured in a Master Gardeners Vegetable Garden open house in August, 11 2002. The open house was quite successful with an estimated audience of 500 touring the garden and attending the 10 workshops – all run by Master Gardeners.

- We also instituted a "Top Ten Backyard Pest Problem" training program for the Master Gardeners who staff our toll-free gardening hotline. The hotline receives over 11,000 calls each year. The purpose of the training program was to insure that the volunteers are up-to-speed on the most current recommendations for managing key landscape management problems. Over 35 Master Gardeners attended and the training will be continued annually.

- Over 100,000 Rhode Islanders each week tune into URI Cooperative Extension's "Plant Pro" segments on WJAR News Channel 10. Filmed in the URI Learning Landscape and Greenhouses, the segments emphasize environmentally-friendly gardening tips for both backyard and professional gardeners. Over 100 URI "Plant Pro" segments were produced this year. The noon segments have an average viewership of 55,000 households and 45,000 households watch the Saturday shows. We estimate 7 million homeowner contacts annually.

- From Roger Williams Park Botanical Gardens in the heart of RI's urban center to the Cross Mills Historical School House in rural South County, 275 URI Cooperative Extension Master Gardeners contributed over 24,000 volunteer hours this year at 50 URI Master Gardener projects while spreading the Cooperative Extension message of environmentally-sound home and garden practices.

- Each year, 3,000 school children, grades K-6, increase their knowledge and awareness of the environmental issues relating to Rhode Island's soils, plants, wildlife and water through hands-on activities while attending the Cooperative Extension Education Center's Learning Landscape Environmental Education held in the URI gardens and greenhouses.

- In 2002, 53 "Ask a Master Gardener" booths, staffed by URI Master Gardener volunteers, answered over 2,500 of the RI gardening public's questions through participation at fairs, the

RI Flower Show and other public events around the state throughout the year. During these events, the booth promotes environmentally-sound gardening practices and increases the public's knowledge regarding the use of sustainable, non-invasive plants in the home landscape.

- Two newspaper columns, Growing Green, a URI Cooperative Extension GreenShare horticultural column in the *Providence Journal*, and *Green Source*, a URI Master Gardener monthly column in several weekly papers reach over 200,000 households with our sustainable practices message.

- Each fall, over 3,000 Rhode Islanders attend the URI Cooperative Extension GreenShare Field Day, a horticultural and environmental festival held in the URI Learning Landscape Gardens. The field day features garden tours, demonstrations, activities for kids, food and music. Now in its twelfth year, the festival has become an eagerly awaited event each year.

- Annually, 130 Rhode Islanders complete a 16-week URI Master Gardener basic training program. Classes are taught by faculty, staff and members of the Green Industry. After successfully completing the course, approximately 50% of the participants go on to complete a 50-hour internship and become certified URI Master Gardener volunteers.

Outputs/Outcomes/Impacts

- Located and increased germplasm of cold-hardy and salt-tolerant conifers to replace existing populations threatened by insect and disease problems and distributed germplasm to cooperators for evaluation in 5 sites along coastal R.I.

- In August 2002 the URI Master Gardener Program was selected as one of several site visits by a British Broadcasting Corporation (BBC) team exploring the idea of starting a Great Britain Master Gardener Program. In September the URI program was notified that the BBC had chosen the URI Master Gardener Program as the model and invited a team from Rhode Island to assist them in a kick-off conference for the U.K.. On October 2 URI staff and 3 URI Master Gardener volunteers traveled to England and participated as presenters at this Kingdom-wide conference that brought together colleges, universities, the Royal Horticultural Society and the BBC to explore the idea of starting a UK Master Gardener program. As a result of this conference - the BBC, with the Royal Horticulture Society, will pilot Master Gardener programs in several university/college locations throughout the UK. Each of the programs will include the philosophical base of the URI program - the respect and empowerment of volunteers as valued outreach educators.

- During the 2002 gardening season, over 300 Rhode Islanders submitted plant and insect samples to the URI Cooperative Extension Plant Protection Clinic for diagnosis and appropriate treatment recommendations. We also processed over 250 samples of turf from around the country for disease diagnosis and control recommendations, including recommendations for disease-resistant species.

- Through the delivery of educational programs (workshops, talks, public exhibits and open houses) by highly trained URI Master Gardener volunteers, over 5,000 RI homeowners

increased their awareness of sustainability issues and knowledge of how to implement environmentally-sound home and garden practices.

- Both commercial nurseries and homeowners are now getting much more effective deer protection of landscape plants.

Source of funds: AES, CE, industry-sponsored grants, MG volunteer in-kind contribution
Scope of impact: state, regional

Key Theme–Integrated Pest Management

Overview: This program overlaps somewhat with Ornamental/Green Agriculture theme. Research projects on Biological Control in Rhode Island, a multi-state project NE-171 'Biologically Based IPM Systems for Management of Plant-Parasitic Nematodes,' NRI grant RI00-2000-04129 'Parasitoid Evaluation: A New Paradigm," RI00665 "Phyllophaga Pheromone Traps and Biodegradable Spheres to Reduce Pesticide Use in Nurseries and Blueberries,' RI00666 'Effects on Coastal Ecosystems of Methoprene and Microbial Larvacides used for Control of Mosquitoes and West Nile Virus,' and the Interregional Research Project No. 4 (IR-4).

Milestones:

- **Flowering crabapple variety disease resistance** was evaluated in our trial block and data were integrated into database that is distributed annually. We updated our website on annual flowering crabapple evaluations and open house: http://www.uri.edu/ce/crabapples

- **Inter-regional Project #4 (IR-4).** Rhode Island's IR-4 contribution of 20 different plant-cultivar projects was performed and data were submitted to the national program in 2002 and reported at the Rhode Island Nursery and Landscape Association (RINLA) annual meeting.

- **Sudden Oak Death (S.O.D.).** Basic biology studies on a new pathogen (attacking numerous hosts and posing a substantial danger to the oak forests nationally) were performed.

- Field experiments were begun to demonstrate the efficacy of organic acids as preplant nematicides. Applications of butryic acid and propionic acid were shown to be extremely effective at reducing population levels of *Meloidogyne hapla* and *Pratylenchus penetrans* at concentrations as low as 0.1M. Future experiments will explore the use of even lower concentrations.

- For Apple IPM we worked with 27 growers and made 218 orchard visits (35 orchard visits in April, 49 visits in May, 56 visits in June, 57 visits in July and 21 visits in August.) We provided weekly recorded pest messages for a period of 16 weeks. We received 162 calls or an average of 10 per week (up from 7.7 calls per week last year.)

- The RI Fruit Growers' Annual meeting was March 21 and 45 growers attended. There were three twilight meetings, two in Rhode Island and one in Massachusetts: April 11 in Little Compton with 35 growers, May 16 in Glocester with 40 growers and June 13 in Westport, MA with 40 growers. We also organized a summer tour for the growers. Twenty-five growers went to Lymans Orchard in Middlefield, CT on June 27.

- We maintained the RI Apple IPM website, making at least twice weekly updates on current pest status, April through August. We also maintained the RI Fruit Growers website with general apple growing techniques for homeowners.

Outputs/Outcomes/Impacts:

- In 2002 cooperating RI apple growers used 30% fewer fungicides, 29% fewer insecticides, and 73% fewer miticides than is recommended in the New England Apple Pest Management Guide. These totals man be compared to 2001 when RI growers used 17% less fungicide, 37% less insecticide, and 50% of the miticides recommended in Northeast Recommends. The hot, dry summer may account for decreased fungal problems.

- Pesticide applications have been reduced as disease-prone cultivars of crabapple trees have been replaced with disease-resistant trees.

- Screening various nematode species and pathogenic fungi for sensitivity to butyric acid continues to show promise.

Source of funds: AES, CE

Scope of impact: Massachusetts and Rhode Island

Key Theme - Farm Safety:

Overview: Extension in farm safety is funded by USDA/CSREES. Of the 735 farms in Rhode Island, 276 are nursery and greenhouse operations and 75 farms are in fruit production. By focusing on the nursery/greenhouse industry as well as fruit growers, we can provide farm safety services to 48% of Rhode Island farmers.

Milestones:

- Presented farm safety information to Rhode Island Nursery and landscape Association members at their two-day annual meeting.
- Presented farm safety information to Rhode Island Fruit Growers Association members at their annual meeting and twilight meetings.
- Provided information to general public during National Farm Safety and Health week at GreenShare field Day. This year's theme was "Farm safety and health ... Not just for farmers anymore."
- Provided safety manuals for Pesticide Applicators Training sessions.

- Participated in the regional farm safety meeting in Boston, MA in August.
- Purchased tractor safety videos to be view by student workers at URI farms.

Outputs/Outcomes/Impacts:

- Approximately 400 people attended the RINLA meeting in January, 2002. Provided information on Roll-Over-Protection-Structures and farm tractor safety. Also promoted plastic pesticide jug recycling program sponsored by the Agricultural Container Research Council.
- Handed out information on the plastic pesticide jug recycling programs to all participants at the RI Fruit Growers Annual meeting. Throughout the growing season met with fruit growers individually and discussed farm safety practices.
- After talking to several growers and asking for a show of hands at a twilight meeting, determined that not many growers are interested in the pesticide jug recycling program.
- At the regional meeting in Boston in August, met with other farm safety extension workers as well as national organizers. This meeting provided new ideas and contact people for continuing the work of promoting farm safety.

Source of Funding: CSREES

Scope of Impact: State

PROGRAM 2: AQUACULTURE BIOTECHNOLOGY AND FISHING.

Overview: The aquaculture outlook in Rhode Island received a significant boost in 2002 on several fronts. First, Senator Jack Reed obtained federal funds for the Rhode Island Aquaculture Initiative. Although these funds came to the RI Coastal Resources Management Council (the lead aquaculture agency in the state) via the U.S. Department of Commerce, URI AES and CE personnel have been heavily involved in the planning and execution of the Initiative. Drs. David Bengtson and Michael Rice serve on the Executive Committee for the Initiative. The Initiative is providing $150,000 over three years for the continuation and expansion of a previously CE-funded effort at GIS mapping of RI state waters, by the RI Environmental Data Center, in order to assist aquaculture planning and siting. The Initiative also funds several competitively awarded research grants, including one to AES researcher Dr. Marta Gomez-Chiarri for work on disease in hard clams (quahogs). In addition, funds from the Initiative are being matched by CE funds and Sea Grant Extension funds to hire a new finfish aquaculture extension specialist for Rhode Island. This position fills a void that has existed for three years and comes at a propitious time. In 2002, the search to fill this position was initiated.

Another positive development has been the interest of the USDA Natural Resource Conservation Service office in Warwick, RI, in aquaculture. Dr. Bengtson spoke to the NRCS State Technical Team in September, 2002, to discuss the current status and future prospects for aquaculture in RI. A number of terrestrial farmers have expressed interest in aquaculture, especially freshwater fish culture, to USDA and state agencies. The new finfish aquaculture extension specialist will be a great help in this regard.

Another boost is that the construction of the new USDA-funded Aquaculture Research Facility at the Narragansett Bay Campus of URI. After many years of planning, ground-breaking occurred in the fall of 2002, with an expected completion date of July 1, 2003. This facility will provide state-of-the-art facilities for our faculty to work on pathogens and transgenics related to fish and shellfish.

Two new AES projects were initiated in 2002. The first of these examines the protein and lipid requirements of summer flounder raised in waters with flowing currents and also examines the use of relatively inexpensive plant proteins as substitutes for more expensive fish meal in summer flounder diets. The second involves work with a private company to determine the effect of myostatin in fish, in order to improve growth of aquacultured fish.

The new effort that was begun in 2001 to examine the use of waste material from squid processing in diets for fish has been successful in obtaining extramural funding for the expansion and completion of this project.

Key Theme-Aquaculture:

Overview: Research in this theme area is a result of NRI grants RI0019903421 'Molecular Mechanisms of Osmoregulation in Salmon,' RI00199903266 'Improving Flounder Productivity Through Enhanced Growth,' RI-2000-01264 'Feed-Based Delivery of Recombinant Anti-microbial Peptides for Shellfish Aquaculture,' RI0019903421 'Microbial Ecology of the Salmon Gastrointestinal Tract: A Molecular Approach'. Hatch projects include RI00401 'Vaccine Development for Bacterial Pathogens: The Nutrient Approach,' RI00886 'Bivalve Aquaculture to Control Estuarine Eutrophication,' RI00894 'The role of myostatin (GDF-8) in muscle growth of rainbow trout', RI0085 'Comprehensive Utilization of Squid Processing Waste for Aquaculture Feed Development' and RI00891 "Increased efficiency of summer flounder aquaculture through nutrition'. An Animal Health project, RI00AS882 'Vaccine Development for Bacterial Pathogens: The Nutrient Approach,' was also begun. One grant from the Northeast Regional Aquaculture Center also began in 2002: 'Development of Diets and Rearing Conditions for Commercial Aquaculture of Black Sea Bass', in conjunction with GreatBay Aquaculture, LLC. Finally, the University received a special research grant 'Environmental Biotechnology at the University of Rhode Island', of which 40% is for work on aquaculture fish and shellfish genomics.

Milestones:

- Diets made from hydrolyzed squid waste were compared to control commercial diets in experiments with Atlantic salmon sac-fry and juveniles. Both survival and growth of fish were improved with the squid diets.
- Diets with varied protein:lipid ratios were fed to summer flounder (experiment not completed until 2003)
- Transiently transfected rainbow trout were created to examine the effect of the myostatin gene, as a first step toward development of a knockout mutant for myostatin.
- Demonstration that bacterial mutants defective with respect to growth in intestinal mucus, both in *Vibrio* and *E. coli,* could be excellent candidates for live-avirulent vaccines.

- Demonstration that hard clams (quahogs) exhibited stunted growth when raised in experimental upweller systems.
- Genes involved in adaptation of salmon to hyperosmotic stress have been identified and are being characterized.
- Molecular techniques are being employed to characterize the microbiota of the fish gastrointestinal tract
- Optimum rearing densities and the maximum concentration of environmental ammonia tolerated without effect on black sea bass were determined

Outputs/Outcomes/Impacts:

- CE personnel offered a Shellfish Aquaculture Training Course for the 7th consecutive year. Seven of the 16 commercial shellfish aquaculturists currently operating in RI have gone through this course.
- Dr. Gomez-Chiarri offered her annual Shellfish Disease Workshop.
- RICE co-sponsored the 2nd Southern New England (6th RI) Aquaculture Conference at the University of Rhode Island. In addition AES and CE personnel were heavily involved in planning the first Northeast Aquaculture Conference and Expo, to be held in November 2002.

Source of Funds: AES, CE, Northeastern Aquaculture Center, Sea Grant
Scope of Impact: state, regional, national and international

GOAL 2: A SAFE AND SECURE FOOD AND FIBER SYSTEM.

Overview. The Rhode Island Plan of Work includes its Program 3, Health and Well being of Fish and Animals, under Goal 2. We reasoned in the Plan that "animal husbandry practices that promote the health and well-being of animals and fish will often simultaneously create safer and higher quality food products…" We report here under the Key Theme, "Emerging Infectious Diseases," which we found included under Goal 1 in the listing of Keywords and Themes.

We report limited progress on both programs 3 and 4. We have improved physical capacity to meet the goals of program 3 by constructing or improving facilities for fish and shellfish vaccine work and are now beginning these studies under a new AES project. We have encountered greater than anticipated delays in hiring food science faculty, which we see as vital toward bolstering the research component of our food safety program.

PROGRAM 3: HEALTH AND WELL BEING OF FISH AND ANIMALS

Overview: This program has made progress in the area of aquaculture-related diseases (see program 2, above), by developing preliminary results and facilities for fish vaccines against bacteria. We have

approved a new Hatch project for three such studies (*i.e.*, 3 pathogens), RI00401 'Vaccine Development for Bacterial Pathogens: The Nutrient Approach.'

Animal health research and outreach has been slowed by shortages in faculty, forcing scientists to concentrate on classroom duties to the restriction of AES and CE activities. If this situation cannot be reversed in the next year, the animal health component of this program will have to be seriously reconsidered. In the interim, limited progress is reported, as follows:

Milestones:

- Experiments on development of a vaccine for summer flounder against a bacterial pathogen are still ongoing.

Source of funds: AES

Scope of impact – Northeast region

PROGRAM 4: FOOD SAFETY

Overview: The research component of the food safety program has diminished as academic hires have not been made in the food safety area in either the Department of Nutrition and Food Science and the Department of Cell and Molecular Biology. Current research in the food safety area lies with an NRI grant, RI00199902902 'Optical Biosensor Detection of Food Pathogens Based on Direct Measurement of Antibody/Antigen Binding,' and 406 funding RI200005389 'Using Good Agricultural Practices to Integrate Food Safety Principles into Small Farm Production.' We continue to offer excellent and extensive outreach programs in food safety, with accomplishments as outlined here.

Key Theme – Food Safety and Foodborne Illness

Milestone:

- **Food Safety Education - Educators and School-aged Children:** The food safety curriculum, entitled "The Food Safety House – Preparing Food Safely" designed for grades 1-3 and 4-6 completed in 2000, continues to be distributed both in-state and out-of-state. This curriculum is a self-standing unit with highly visual graphics and a colorful design and is accompanied by a teacher's guide (1-3 or 4-6) containing optional activities and additional food safety information. The Food Safety house focuses on five areas or "floors" critical to understanding foodborne illness prevention – sanitation, food choices, food storage, food preparation and food reuse. It also contains a unit on the microworld and a concluding/review lesson. An in-depth evaluation of the curriculum will be undertaken in January of 2003. The curriculum was originally designed through a financial partnership with Team Nutrition Institute at Kids First Inc. and distribution has been the responsibility of this agency.

Outputs/Outcomes/Impacts:

- One thousand (1000) Rhode Island students in grades 1 – 6 were taught all or components of "The Food Safety House-Preparing Food Safely". Since the initial release of the curricula in early 2000, approximately 270 curricula have been distributed to schools, universities and professional associations throughout the country (NE, MN, CO, IL, ID, MI, WI, GA, DC, FL, CA, SD, WA) and Geneva, Switzerland. Arkansas Cooperative Extension received two hundred of the curricula for distribution to schools and extension personnel. National impact data is not yet available.

Source of funds: CE
Scope of impact: State and national

Milestone:

- **The 9th Annual Food Safety Conference** entitled " Food Security the "Dark" Side of Food Safety. was held in conjunction with the Rhode Island Food Safety Task Force in early October. The goal of the half-day conference was to increase participant's understanding of the issues of food biosecuity in the food industry and suggest possible solutions to these issues. Conference topics included communication for food security issues to the public and food biosecurity perspectives from industry, and federal (USDA and FDA) and state regulatory agencies. The entire conference was rated highly.

Outputs/Outcomes/Impacts:

- Approximately 80 dietitians, food safety educators, teachers, food processors and directors of foodservice facilities in schools, industry and health care facilities, consultants and others were in attendance at the conference.

Source of funds: Smith Lever, state match, and external funding (participants, USDA competitive POW grant, FDA)
Scope of impact: Regional and State

Milestones:

- Collaboration with the RI Department of Education (RIDE), **Team Nutrition Institute at Kids First**, and the RI Department of Health (RIDOH) in the **School Food Safety Partnership** continues. During the second year of this partnership, six pilot schools including two elementary, two middle and two high schools in both rural and urban areas of the state were selected to participate in the project activities. These activities included the formation of a school-based steering committee, development of an action plan which includes establishing goals which, if achieved will establish the school as a "Food Safe School".

Outputs/Outcomes/Impacts:

- Six schools completed and have implemented their action plans at a variety of levels.

- One middle school developed a food safety policy utilizing the "Developing School Food Safety Policies Guidebook" developed by the URI Food Safety Specialists. This policy is in the process of being adopted by the district school committee and will be included in their policy handbook
- The Food Safety Education Specialist taught two sessions of the food safety manager certification course for 30 school lunch workers, teachers and support staff in two of the schools in the pilot project. All participants achieved a passing score on the certification examination. Evaluations indicate that positive changes in food safety practices and behaviors were implemented during the course and will continue after the course was completed.
- The Food Safety Specialists conducted Food Safety Policy Workshop for the Rhode Island School Nurse Teachers Association. In attendance were 90 school nurse teachers.
- Six pilot schools have developed food safety policies utilizing the URI CE Guidelines for Food Safety Policy development. The policies have been adopted by the district school committees and are included in the district handbook. Ninety-nine percent of school food service people enrolled in the Manager Certification course achieved a passing school on the examination.
- The results of inspections by the Division of Food Protection of the RI Department of Health show that prior to Manager Certification School 1 had 15 violations, 3 critical and School 2 had 5 violations. After training, School 1 had only 5 violations and none critical and School 2 had 2 violations.

Source of funds: CE, USDA, and Centers for Disease Control
Scope of impact: Initially, state specific. However, this partnership grant is only one part of a larger national initiative. Eventually, the work in RI will serve as a nationwide model.

Key Theme: Food Safety Education- Industry

Milestones:

- HACCP and sanitation education was offered to seafood and meat/poultry industry personnel to help them comply with FDA and USDA food safety regulations. Knowledge of these regulations and how to effectively design HACCP and sanitation programs will help keep the participants in business. Seafood and Meat/Poultry HACCP courses were offered in Connecticut and Rhode Island. One issue of a "Seafood Savvy " newsletter, jointly produced by the Universities of Connecticut and RI, was distributed to all those who participated in the CT and RI HACCP courses. The newsletter is designed to provide the industry with current information, regulations or other pertinent information. This is an ongoing project between the two state programs.

- The seafood specialist was part of the Seafood Science and Technology Theme Team. This team was responsible for helping to write and review a white paper, which describes a long-range plan for outreach and research in seafood safety, quality, processing, value-added products and seafood supplies/markets.

Outputs/Outcomes/Impacts:

- The HACCP courses (one meat/poultry and two seafood) had 46 participants. Participants rated the course as excellent.
- Approximately 1200 copies of a joint publication concerning notification of new state regulations was issued by RIDEM, RIDOH and URI and distributed to all RI shellfish dealers and harvesters. A joint newsletter was distributed to over 500 recipients in both CT and RI.
- Comparison of pre- and post-testing scores indicate a 50% increase in knowledge of food safety principles.
- Eighty percent in the Manager Certification source have made at least one positive food safety practice in their food service establishments.

Source of funds: CE, Sea Grant, RI State Department of Environmental Management
Scope of impact: Multistate – *Connecticut*. Collaboration included organization of courses, teaching, writing and production of a newsletter. Also, state and national impacts.

Milestones:

- Manager certification and re-certification were offered to the foodservice industry as required by the state regulatory authority. The Serve Safe (National Restaurant Association) certification exam was administered. All certification and re-certification resource materials were revised and updated. This program is also offered in Spanish.
- The food safety specialist is available as an informational resource to the industry and family and consumer science teachers who offer the course to high school students in the state.

Outputs/Outcomes/Impacts:

- These courses must be offered to foodservice personnel in order for them to be in compliance with RI state regulations. The 15-hour certification course had approximately 150 participants. Twenty students participated in the six-hour re-certification course offered through the URI College of Continuing Education's Office of Special Programs. These courses, 5 certification and 4 re-certification, were taught by the food safety specialist and other state approved instructors. The pass rate for the certification courses was 95%.

- Two certification courses were offered in Spanish to 40 participants.

- Twenty high school students in family and consumer sciences programs enrolled in a certification course.

Source of funds: State match and Smith Lever, and external funding (Registration fees of participants - courses are self-supporting)
Scope of impact: State specific

Milestones:

- **Good Agricultural Practices (GAP) for to Integrate Food safety Principles Into Small Farm Production** ended the second year of a three-year USDA funded project. This New England regional project was an integrated outreach/research effort and the state food safety extension specialists have completed all of the first and second year objectives outlined in the timeline. Meetings and/or conference calls have been on going with the state project directors as well as with state advisory group. GAP program guidelines, audit forms, fact sheets and power point presentations have been reviewed and finalized. Post-GAP microbiological testing (strawberries, leafy greens, apples and/or tomatoes) has begun in all states but has not completed due to weather conditions and problems with delays in the educational programming.

Outputs/Outcomes/Impacts:

- Results from this study have the following impacts: 1) all small farmers of fruits and vegetables in the region will learn more about Good Agricultural Practices and incorporate it into their techniques; 2) consumers will benefit because they will recognize and understand the meaning of their produce being grown on GAP-certified farms; and 3) the public as a whole will gain from decreased foodborne illness incidents associated with microbial pathogens now found on farms that do not practice GAP.

- In Rhode Island, an educational session for potential participants in the grower certification program was held in March 2002. Of those attending, six growers choose to participate in the certification program that includes an on-site audit conducted by the Division of Agriculture, RI Department of Environmental Management. All six growers successfully completed the audit and were certified. They received promotional materials including a plaque, stickers for their produce, a sign and a brochure describing GAP for distribution to consumers at their roadside stands. The certification must be renewed every three years

- Two presentations about the project were made at professional meetings.

- Six RI growers received GAP certification from RI DEM.

Source of funds: CE, USDA Food Safety Funds (406 funds)
Scope of impact: State specific and multistate including all six New England state. All states are involved in a variety of educational programming and crop sampling for microbiological assessment pre- and post- GAP.

Key Theme: Food Safety Education – Consumers

Milestone:

- The extension seafood/food safety specialist is involved in a continuing consumer program targeting seafood safety and quality issues. A free consumer lecture series was developed and offered once per month during June-August of 2002. The four lectures focused on the marine environment.

Outputs/Outcomes/Impacts:

- The consumer lecture series attracted over 350 people.

Source of funds: Smith-Lever and external funding (Sea Grant Extension).
Scope of impact: State specific

Milestone:

- Consumer food safety hotline continues to be supported by the Food Safety Specialist. Volunteers, recruited and trained from the Master Gardner Program have been critical in the success of the hotline.

Outputs/Outcomes/Impacts:

- Approximately 1500 food safety-related calls from consumers have been answered
- Increased consumer awareness about food safety through print and voice media.
- The RI Department of Health Division of Food Protection report fewer violations during inspections of facilities run by community-based organizations that have participated in URI training.

Source of funds: State match, Smith Lever.
Scope of impact: State specific

Milestone:

- The food safety education specialist presented two food education programs to senior groups. These workshops covered basic food safety principles of food handling, preparation and storage and how they would apply to home settings.

Outputs/Outcomes/Impacts:

- Presented to approximately 200 people. Well received by audiences.

Source of funds: State match
Scope of impact: State specific

Key Theme- Food Safety Training for Volunteer Foodservice Workers:

Milestone:

- The food safety education specialist was part of training team, which conducted a session for inspectors. The goal of the training is to aid food inspectors in the inspection of temporary food establishments such as fairs, field days, concerts and other community based events.

Outputs/Outcomes/Impacts:

- Training program presented for RIDOH Division of Food Protection inspectors.

Source of funds: State match, Smith Lever and external funding (FDA).
Scope of impact: National

Milestone:

- The food safety education specialist in cooperation with specialists in other New England states revised the "Looking for a Safe" Harbor Volunteer Food Service Worker" Training curriculum. Four workshops, attended by representatives from 40 community-based organizations, were training in this curriculum. Workshops were also conducted for 4-H volunteers and the RI Community Food Bank.

Outputs/Outcomes/Impacts:

- More than 100 individuals participated in a two-hour food safety education training in-service. On-site evaluations indicated participants had knowledge of basic food safety principles in a temporary food event setting, but planned to make some improvements based on the knowledge acquired in the training. .

Source of funds: State match, Smith Lever and registration fees
Scope of impact: Local

Key Theme – Food Safety Education for All Target Audiences

Milestone:

- A **URI Food Safety Website** is now online and linked to the URI Cooperative Extension and RI Department of Health websites. The website contains fact sheets and ordering information of food safety education curriculum developed by the URI food safety specialists. This site provides food safety information useful to consumers, industry and educators.

Outputs/Outcomes/Impacts:

- No direct information of the number of website "hits."

GOAL 3: A HEALTHY, WELL-NOURISHED POPULATION.

PROGRAM 5: NUTRITION

Overview: Faculty depth for nutrition programs has become relatively strong within the Department of Nutrition and Food Science. The research agenda follows largely from outreach programming, complementing regional research programs on eating habits of both young and elderly adults, in both cases emphasizing behaviors determining consumption of fruits and vegetables, and on attending health benefits. Two multi-state projects NE-172, 'Nutritional Risk and Antioxidant Status in the Elderly,' and NC-219 'Using Stage Based Interventions to Increase Fruit and Vegetable Intake in Young Adults,' provide the basis for much of the outreach program. The Department also houses the state of Rhode Island's USDA Food Stamp Nutrition Education Program (FSNEP). The focus of this program is to provide food stamp eligible or participating elderly and families with relevant information related to improving diet quality, ensuring food security and safety and managing food resources. (Senior Nutrition Awareness Project and Good Food Gives Life Project). In addition to ongoing programs under EFNEP, the following reflects progress in implementing research results (from two multistate research projects) through outreach.

Key Theme–Human Nutrition

Overview: The goal of nutrition outreach and education is to help individuals of all ages increase the quality and years of healthy life through improved diet quality. The research program has been strengthened with the hire of an additional faculty member in Nutrition. The ever-strong outreach program provides science-based information to help individuals gain the knowledge, motivation and opportunity they need to make informed decisions about food and nutrition. In addition, the program is designed to encourage local and state leaders to develop community and statewide efforts that promote healthy behaviors and create healthy environments.

Milestones:

- A technique to estimate carotenoid intake is being evaluated regionally as part of a study of fruit and vegetables as sources of antioxidants.
- Instruments to assess Decisional Balance and Processes of Change for 2 servings or more of fruits and 3 servings or more of vegetables were developed and validated in collaboration with 10 other states from NC 219.
- Stage-tailored educational materials promoting consumption of fruits and vegetables were developed supported by funding from IFAFS.
- NFS Department received 3 sub-contracts (Wisconsin and Connecticut funded by IFAFS, Nebraska, funded by NRI) to develop and deliver interventions with young adults.

- Applied research on the food and nutrition needs of food stamp eligible elderly was published in the *Journal of Nutrition Education and Behavior, Journal of Nutrition and the Elderly* and *Healthy Weight Journal.*
- Seventy-one different agencies in thirty states have requested and are currently adopting educational techniques and materials developed through FSNEP.
- The USDA National Agricultural Library favorably reviewed FSNEP educational and outreach materials.
- A new social marketing "Food Budget Too Small" campaign was launched and featured low cost healthy food spilling forth from a small wallet. A short text message promoting consumption of these foods, free information, and a more prominent toll-free number was incorporated into the panel.
- *Creating Readers* Reading Kit programs in collaboration with the Providence Public Library System were expanded by the addition of four new kits targeting audiences not previously served.
- A nutrition education needs assessment for "Women in Transition" was developed and used to survey 55 women transitioning out of the RI Correctional Institute and into mainstream society.
- Content and design for a RI FSNEP website was developed. The site, currently in production, will house both SNAP and the Family Nutrition Program.

Outputs/Outcomes/Impacts:

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- Six hundred eighty two low income, homebound elderly received a home-delivered nutrition newsletter for thirteen months (FSNEP nutrition education effort). At the end of this period, 339 of these clients returned a survey that was developed to assess changes in nutrition knowledge, attitude and behavior as a result of reading the newsletter. Results indicate that there were significant improvements in nutrition knowledge and attitudes, and that those practicing poor food-related behaviors prior to exposure to the newsletter content improved those behaviors significantly, particularly men. Those with the lowest nutrition knowledge prior to reading the newsletter also showed significantly more total change in healthful food behaviors, indicated that the newsletter format is an effective behavior change method for this hard-to-reach, high-risk population.

- Qualitative studies of young adults conducted in collaboration with NC219 found that young adults prefer colorful educational materials with graphics and minimum text; for example, bullets with short phrases are preferred over paragraphs (formatting preferences).

- Economically disadvantaged young adults prefer to learn from personalization of messages through characters resembling themselves, however young adult college students thought that these characters were "stupid".

- Young adult college students are more accurate in assessing their intake of fruits and vegetables as separate food groups than assessing them as a combined food group.
- The Expanded Food and Nutrition Program (EFNEP) reached 439 families, 1028 individual clients, and 3,564 youth reached through intensive small group workshops and individual counseling within EFNEP for a 4-6 month period.
- At program exit, 61.2% of surveyed EFNEP adult participants followed a 3-1-1-1-1 food pattern as opposed to 35.2% at program entry; 94.1% recorded a positive change in any food group at exit (BC,F,V,Ca,Mt);
- RI Public Transportation Nutrition Education "Food Budget Too Small" campaign placed 440 posters (11"x28") in bus interiors, 60 on exterior taillight bus posters (21"x72") for a 3-month period. One hundred and thirty-six calls requesting nutrition information were recorded from individuals and social service agencies.
- Eleven culinary workshops were held at Food Stamp offices, health centers and food pantries demonstrating low-cost, healthy recipes to approximately 650 food stamp eligible individuals.
- Nine thousand limited income elderly are reached through the quarterly nutrition newsletter.
- Four thousand limited income elderly are reached through the monthly nutrition newsletter.
- Face-to-face programming reached 2,404 high-risk elderly
- Newspaper and video production efforts reach thousands of families and elderly each month.
- The cumulative impact of these programs has not been explicitly measured, however, it should be presumed that at least a portion of the stakeholders involved developed better nutrition habits. Anecdotal feedback from recipients of program activities has been positive.

GOAL 4: GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT

PROGRAM 6: NATURAL RESOURCES AND THE ENVIRONMENT

Overview: Without a doubt, this is the strongest Land Grant program at URI, because of its strength of linkages between AES and CE, and for the strength of the individual research and

extension programs. Faculty and staff in this area are among our most productive and well-respected nationwide. Our program in Natural Resources and the Environment is built on the recognition that protecting and restoring the quality of land and water resources in Rhode Island requires close coordination between efforts that work with a wide spectrum of audiences and topics. Our efforts are directed towards water quality, since water quality protection and restoration can integrate a wide variety of land management efforts. Other themes include: Critical Habitats; Wetlands Restoration and Protection; Forest Management and Natural Resources Management. We also coordinate our efforts with aspects of Goal 1, particularly research and outreach projects on sustainable (including low-pesticide) agriculture, with emphasis on the role of biological control for pest management of insects, ticks, and invasive plants.

Central to the Natural Resources and Environment program is our focus on land management to protect and restore water quality at the local and watershed scale. The water quality program reaches from private well supplies, to community water sources and from local ponds and streams to the watersheds that control the quality of our estuaries and bays. Our programs and projects share a common concern of protecting this resource from pollution and overuse.

Key Theme–Water Quality

Overview: URI Cooperative Extension's community-based natural resources and the environment education program targets municipal officials, local organizations, professionals, and individuals. Our goal has been to educate audiences to recognize, assess, and effectively minimize pollution risks to local water resources and to protect critical habitats within the State. Our approach implements the capabilities of the University of Rhode Island (URI) Cooperative Extension (CE) Natural Resources and the Environment Program, an integrated outreach program that educates, empowers and involves Rhode Islanders to become effective stewards of the State's natural resources.

Multiplied Impacts of Research–Teaching–Extension linkage:
The URI CE Water Quality Program is founded on a robust exchange with URI research programs that provides CE with new insights for nonpoint education management and provides Rhode Island Agricultural Experiment Station researchers with new research challenges. Examples of URI research efforts directed to our CE program include: research that centered on understanding fate of agrichemicals in home landscapes; pollution abatement technologies for on-site wastewater systems; analyses of spatial databases and GIS for watershed management; and recent research on the role of riparian areas for pollution control.

Performance Goals:

- Develop and deliver education programs to increase public knowledge of their local environments to improve community-based management of local water resources and critical habitats.
- Develop and deliver educational programs that increase the knowledge of municipalities, community groups, and the public on site-specific best management practices needed to address locally-identified resource protection issues.
- Maintain and strengthen effective partnerships with federal, state, local, public, and private organizations for more effective and sustained solutions to long-term watershed and critical habitat issues through community-based education.

The research agenda is driven by faculty and staff who are prodigious in securing competitive grants. In conjunction, the faculty have various USDA-funded projects, including: Hatch project RI00321 'Control of Nitrate in Watersheds Affected by Unsewered Residential Development,' RI00703

'Fingerprinting Sources of Bacterial Input into Small Residential Watersheds,' NRI grants RI0019991119 'Subsurface Riparian N Removal: The Role of Landscape Setting,' a Fund for Rural America grant, RI-9704767 'New Tools to Guide Land Use Change in Rural Watersheds,' a 406 grant RI0-2000-05493 'New England Regional Water Quality Program', and a 406 grant 00-51130-9717 "National Facilitation of CSREES Volunteer Monitoring Efforts.' The faculty are also involved in complementary research projects that increase and extend the depth and breadth of our watershed studies to address the effects of conversion of agriculture and open space to urban sprawl. Examples of such projects include an EPA project, 'Quantifying the Effects of Ecosystem Restoration,' assessing riparian groundwater nitrate removal capacity along restored streams in conjunction with the Urban LTER in Baltimore County, MD and a RI Sea Grant project, 'Nitrate removal from groundwater at Rhode Island's coastal margins: Consequences of coastal enrichment," examining the effects of coastal development on groundwater nitrogen cycling.

Milestones:

- The National Water Quality webpage has been launched, modeled after The New England Water Quality web site. The model was presented recently at the National Water Quality Coordinators' meeting in Tuscon, Arizona in January 2003. The page is located at www.usawaterquality.org. The website serves as the portal to the National Water Quality Program and to Regional Water Quality Programs throughout the country.
- In May 2001, the Project Steering Committee met with EPA Region 1 representatives in Boston to begin coordination with EPA New England. Regional coordination is underway with EPA to address private drinking water well protection. In September 2002, EPA New England provided funding to URI CE through the Regional Water Quality Program to develop and distribute materials addressing private well water protection throughout the New England region.

URI Watershed Watch:

Overview: Watershed Watch is a scientist-led volunteer water quality monitoring and education program, which has just celebrated its fifteenth year. The goals of Watershed Watch are to promote active citizen participation in water quality protection, educate the public about water quality issues, obtain multi-year surface water quality information both to determine current conditions and to detect trends. Watershed Watch encourages community-level and personal stewardship of local watersheds and serves as the steppingstone for increased community involvement by the volunteers themselves. Activities take place locally, regionally, and nationally.

Milestones:

- URI Watershed watch has volunteers monitoring water quality in 13 out of 14 major RI watersheds.
- There was significant local support for Watershed Watch, with more than 30 local sponsors, including one third of RI towns, providing financial support that stabilized the program and provided funding for experimental learning by URI undergraduates.
- Watershed Watch is a founding member of the New England Regional Monitoring Collaborative (NERMC.) NERMC is now a part of the Volunteer Monitoring theme of the CSREES New

England Regional Water Quality Program, enabling more comprehensive and targeted training to volunteer monitoring groups throughout New England.

- URI Cooperative Extension/Watershed Watch and University of Wisconsin Extension received one of the first four USDA-CSREES National Facilitation Grants. This facilitation grant was the one not supporting an existing effort.
- URI Watershed Watch program director Linda Green represents the nationwide volunteer monitoring community as a member of the National Water Quality Monitoring Council, co-chairs the Collaboration and Outreach Workgroup, and co-chaired and convened its 2002 national conference in Madison, Wisconsin, May 2002.

Outputs/Outcomes/Impacts:

- It is the largest scientist-led volunteer water quality-monitoring program in the State as well as the most comprehensive. Data produced from field monitoring and laboratory analyses are incorporated into the State's 305(b) report to EPA, and is also used to determine eligibility for the State's listing of impaired waters (303(d)) list. These monitoring efforts were and are used to provide baseline data, and supplement existing monitoring and track success of BMP and TMDL implementation efforts. Few states in the country accept volunteer monitoring data as comparable to professionally collected data. Because of strict quality assurance procedures the URI Watershed Watch data is accepted and used as readily as professionally collected data in Rhode Island. In fact the program provides the State with approximately 90% of its lake water quality data. The ten-plus year data records on a number of sites are the only such longterm compilation in Rhode Island.

- The 300+ trained volunteers provided more than 12,500 hours each in volunteer qater quality monitoring. At the 2001 rate of $16.05/hr (www.independtsector.org) this is equivalent to over $200,000 in value.

Source of Funds: All of our programs exist through a combination of formula funds and external funds. We submit proposals to competitive grant programs through CSREES, EPA, the State of Rhode Island, and others.

Source of Impact: state

URI OnSite Wastewater Training Center:

Overview: The URI OnSite Wastewater Training Center, a program focusing on research and field training and educational demonstrations of alternative onsite wastewater BMPs for system installers and designers, municipal officials, regulators, and residents.

Milestone:

- The URI CE On-Site Wastewater Training Center (OWT) was established in 1994. It is now recognized as the premier demonstration and field training center for alternative septic system technologies in the Northeast, one of twelve regional centers nationally. The goal of the program is to provide research based training and technology transfer on septic system design, operation, and maintenance to protect and restore local water quality.

Outputs/Outcomes/Impacts:

- The OWT operates in partnership with state and federal agencies, municipalities, and over 40 private sector contractors. Since 1996, the Onsite Wastewater Training Center has established a network of 44 alternative and innovative research and demonstration systems. These systems were installed under the auspices of several State and federally funded projects to replace failed septic system at actual homes in priority watersheds, and these systems form the foundation for the OWT Center's research based outreach education efforts. The physical field-training Center, located on the URI Kingston campus, consists of twenty-one innovative and alternative full-scale systems constructed above ground for hands-on learning. Each of the research and demonstration septic systems is based upon proven technologies that minimize nutrient and/or microbial loading to ground and surface waters. This research information has also helped support important regulatory policy changes concerning the design and use of alternative and innovative septic system technologies in Rhode Island. The OWT is also a major information resource for Extension programs throughout New England and nationally.
- Annually, the OWT Center staff along with State regulatory and private sector partners, runs a series of over twenty professional development classes. These one and two-day classes provide continuing education opportunities for several hundred Southern New England onsite wastewater practitioners who need to maintain professional licenses. During this reporting period, Onsite Wastewater Training Center staff has delivered seven invited talks at national and regional conferences about the ongoing URI onsite wastewater research program.
- The following workshops have been held: two workshops for municipal officials and homeowners and two separate workshops for real estate agents on inspection, operation and maintenance, and alternative and innovative septic systems in June and July 2002; Technical assistance was provided to six Rhode Island communities and US Fish and Wildlife Service concerning wastewater management and alternative and innovative systems.

Source of Funds: All of programs exist through a combination of formula funds and external funds. Proposals are regularly submitted to competitive grant programs through CSREES, EPA, the State of Rhode Island, and others.

Source of Impact: state

URI Home*A*Syst Residential Pollution Prevention Program:

Overview: URI Home*A*Syst is a residential pollution prevention education program that provides an action-oriented approach to protect water quality. The program is a voluntary residential pollution prevention program that trains residents to protect their health and environment. Home*A*Syst, or Home Assessment System, offers a procedure to assess environmental risks around the home and take actions to correct any identified problems.

Milestones:

- In September 2002, URI Home*A*Syst received funding from USDA CSREES 406 National Water Quality Program for a three year project entitled *Protecting Water Quality in Rural Landscapes: A Comprehensive Community Nonpoint Source Education Program.*
- In partnership with the Rhode Island Department of Health's Capacity Development Program and local municipalities, URI Home*A*Syst is conducting Protect Your Private Well Workshops monthly throughout the state. These workshops focus on well maintenance and testing and good housekeeping practices for protecting your private well. As part of the Capacity Development Program, Home*A*Syst is updating is private well water factsheet series, which consists of 26 factsheets and creating a new series on pollution prevention consisting of 7 new publications.

- In September 2002, URI Home*A*Syst completed its final draft of *Today's Forest Tomorrow's Legacy: A guide for Small Acreage Woodland Owners*. This publication is currently being designed and then will go to press. This publication was produced in cooperation with the Southern New England Forest Consortium with funding from the USDA Forest Service and the RI Department of Environmental Management, Division of Forest Environment.

- Through the efforts of the New England Regional Water Quality Program, coordinating efforts with EPA-New England on a private well initiative for the region. EPA funds have been provided to New England Regional Water Quality Program.

Outputs/Outcomes/Impacts:

- We continue to provide educational programs on private well protection, septic system maintenance, wetland buffer landscaping, and other pollution prevention topics with the RI DOH, RI Department of Environmental Management, US EPA - New England Region, and several other local agencies and citizen groups.

URI Nonpoint Education for Municipal Officials:

Overview: URI NEMO, part of the National NEMO Network provides outreach to municipal officials on controlling effects of changing land use on local water resources. The program focuses on use of GIS-based watershed assessment tools to provide local decision-makers with the knowledge and educational resources to identify local water quality problems and to adopt effective pollution controls within a watershed context.

Milestone:

- Through the Municipal Watershed Training Program, Cooperative Extension offers three levels of outreach to local officials on local control of nonpoint source pollution: training on nonpoint pollution topics, GIS-based watershed assessments conducted in partnership with communities, and follow-up support implementing pollution prevention measure.

Outcome/Output/Impacts:

- Source Water Assessments of Major Water Supplies: In partnership with RI HEALTH and RI communities, URI NEMO is completing GIS-based pollution risks assessments for all major community water supplies in Rhode Island. Each assessment includes GIS database development, pollution risk analysis using the MANAGE model, coordination with local advisory groups, and presentation of results. Multi-session programs have been organized and delivered in seventeen communities for major suppliers serving approximately 75% of the state's population.
- Block Island/Green Hill Pond Watershed National Wasterwater Treatment Demonstration Project: Provided training and technical support in developing local wastewater management program in the towns of South Kingstown, Charlestown and New Shoreham as a model for other communities. Includes development of educational materials, training and GIS-based analysis supporting development of wastewater treatment standards.
- Board Member Training: Assisted in developing basic training manual for new board and commission members developed by Grow Smart Rhode Island and RI Statewide Planning. Currently developing manual and workshop on site plan review. Formed partnership RI HEALTH to develop new series of workshops and educational materials using results of RI Source Water Assessments to build municipal capacity for drinking water source protection.

Research integrated into Municipal Watershed Management Training

In 2002, our research was covered in *Buffer Notes*, a publication of the National Association of Conservation Districts. This article, 'Finding the Best Place for Buffers,' (http://www.nacdnet.org/buffers/02Oct/buffer.htm) highlighted how research is helping target riparian restoration and protection on stream reaches with combinations of hydrology and soils that generate a high potential for nitrate removal. Of equal importance, our research targets stream reaches and subwatersheds with minimal riparian zone nitrate removal capacity - emphasizing the value of source controls in upland portions of these areas.

In addition, we continue to seek opportunities to link our research to GIS to translate our results to local, state and regional decision makers. We presented the Plenary Talk at the 2002 Maine Water Conference in Augusta, ME on "Extending GIS for Coastal Watershed Protection.

Critical Habitats Program:

Overview: The Critical Habitats Program provides training, database development, GIS analysis, and internet access for local decision makers and the public to use spatial data to protect lands critical to sustain the health and environmental quality of Rhode Island. The Program can be conceptualized in three components. The first is a data distribution component. Using the World Wide Web, we provide geospatial data to users, including the Rhode Island Geographic Information System (RIGIS) data and Global Positioning System (GPS) base station files. To enhance the use of these technologies for natural resource management, the second component of the Program is to provide hands-on technology training programs that allow resource managers to use and access GIS software, data, and tools. The third component of the Program is to conduct demonstrations and pilot projects on the use of the technology and data to resource managers. The objective of this program is to continue to provide technical information and training through which the best available natural resource data are made available to municipalities, professionals, and environmental and state organizations and agencies.

Milestones:

Educate local decision makers in the use of Geographic Information System (GIS) to:

- Identify areas of critical resource protection in communities for the purpose of conservation and management.
- Incorporate use of multiple spatial databases for water resource impact assessment and protection.
- Identify high-risk pollution areas.
- Using GIS data and the MANAGE model, analyze cumulative impacts of land use decisions to water quality and evaluate effectiveness of alternative land use scenarios and nonpoint BMPs to reduce pollution risk.
- Identify locally acceptable and realistic management options.

Outputs/Outcomes/Impacts:

- Conduct *Introduction to ArcView* professional training courses on GIS technology and its use in natural resource management. Expansion of course offerings to include *Introduction to ArcGISI*, the most current version of the ESRI GIS software. These courses are offered 3 – 6 times per year.
- Update the RIGIS Web database to incorporate the most current GIS and aerial image data available for natural resource protection. Providing access to geospatial data (GIS, orthophotography, GPS Base Station Correction files, digital maps) via the world wide web 24 hours a day, 365 days a year.

- As an extension to the The Critical Lands analysis developed and piloted within Narragansett, South Kingstown, and West Greenwich in 1998, a similar analysis was conducted for all towns located in Washington County. The extension of the analysis is being directed and funded by RI DEM under a grant sponsored by The US Forest Service and is referred to as The South County Greenspace Project. There will be cooperation from various agencies in Rhode Island including: The Coastal Resources Center, URI/Sea Grant Program, Grow Smart Rhode Island, Washington Regional Planning Council, and the South County Watersheds Partnership.

- In partnership with the Rhode Island Office of The Nature Conservancy, developed and held a short course in the use of ArcView for the Rhode Island Land Trust community.
- Continued work with Project One, Two, Tree in cooperation with the RI Geographer's Alliance to develop and deliver new training component targeted towards Rhode Island school teachers. Project One, Two, Tree is a year-long pilot educational program working with teachers from 8 Rhode Island middle and high schools. The project trains teachers in using GIS software and incorporating it into their classroom by participating in a community tree inventory project. Students present their work to their town councils and other community members at the close of the project. As an extension to this project, developed and delivered 8-week GIS training to Chariho Regional School District in the use of ArcView with their students. January – March, 2002.
- Block Island/Green Hill Pond Watershed National Wastewater Treatment Demonstration Project provides GIS-based analysis to the Towns of Block Island, Charlestown, and South Kingstown supporting development of wastewater treatment programs and standards.
- Source Water Assessments of Major Water Supplies: In partnership with RI HEALTH and RI communities, URI NEMO is completing GIS-based pollution risks assessments for all major community water supplies in Rhode Island.
- URI was selected to participate in special pilot project (June 2001 – December 2002) with Orton Family Foundation's Community Viz software, a visualization software that runs inside ArcView to help communities weigh the impact of various decision making options. Project consists of pilot study site, training, and feasibility to determine use of software for target audiences. Our project achieved a number of important and tangible results. (1) It provided a neutral opportunity for the Town and the University to study the implications of a dorm complex on the Peckham Farm site. (2) The negative impacts associated with a Peckham Farm site prompted, in part, the University to explore other options. They now have a new plan that embeds the dorms within the campus mosaic (in a villlage-center concept rather than sprawling out beyong the edges of campus, such as the Peckham option). (3) It created an excellent opportunity to work with CommunityViz and demonstrate its potential to the land use planning community in Rhode Island.

Source of Funds: All of our programs exist through a combination of formula funds and external funds. We submit proposals to competitive grant programs through CSREES, EPA, the State of Rhode Island, and others.

Source of Impact:: state

Key Theme–Integrated Pest Management (including Biological Control):

(see Program 1, above)

Key Theme–Sustainable Agriculture

(see Program 1, Key Themes Invasive Species, Ornamental/Green Agriculture, Integrated Pest Management)

Key Themes–Wetlands Restoration and Protection, Forest Resource Management:

Overview: The Station has strength in its wildlife faculty, who are united in their focus on understanding the role of forest wetlands in the ecology of local and migratory wildlife. Vernal pools in particular are an object of interest to hydrologists, entomologists, herpetologists, and ornithologists. We are thus interested in developing predictors (hydrologic and geologic) of groundwater abundance, links to periodicity of temporary pools, and the corresponding distribution and abundance of insects, amphibians, and birds in the forest habitat. USDA projects include Hatch projects RI 00318 'Land Cover Change in Rhode Island from 1972 to 2002 and the Impact on Forest Ecosystems,' RI00319, 'Habitat Characteristics of Pond Breeding Amphibians in Rhode Island,' RI00315 'Subaqueous Soils and Shallow-Subtidal Wetlands in Rhode Island,' and RI00316 'Land Management and the Population Dynamics of Ecology, and Physiology of Migratory Songbirds in Coastal Southern New England,' and McIntyre-Stennis project RI00MS970 'Predictors of Hydroperiod in Southern Rhode Island Vernal Pools.'

Milestones:

- We undertook a major study to quantify population sizes, seasonal movement and calling phenology, and reproductive rates for pond-breeding amphibians in southern New England.

- We evaluated the impact of forest fragmentation and suburbanization on frogs and salamanders.

- We are exploring the value of our amphibian research work with developers (golf courses), non-government conservation agencies, and state conservation agencies concerned with threatened species.

Outputs/Outcomes/Impacts:

- Research results show that even very small (<1 ha) swamps may provide significant habitat, as long as the surrounding upland is heavily forested, with a minimum of paved roads.

- We demonstrated that swamp size was the most important landscape variable in determining species richness of the bird community. For forest-interior birds, we showed that overall landscape composition (i.e., the amount of forest available to the birds) may be more important than swamp size for the most common species (Veery, Northern Waterthrush, Black-and-white Warbler, and Canada Warbler).

Key Theme–Natural Resources Management

Overview: We have brought on line a new physical facility dedicated to public policy decision making using economic simulations and visual and virtual reality tools. This facility is part of a Coastal Institute Building that opened at the end of 2000, collectively referred to as the Economic Policy Simulation Laboratory. Here we will extend our traditional strengths and interests in valuation methodology and public policy, allowing us to take studies such as those outlined in what follows to a new level of scholarship and impact.

The USDA-funded research program includes Hatch project RI00198 'Managing Coastal Marine Ecosystems: Siocioeconomics, Environmental Science and Policy,' and Fund for Rural America project RI-9704783 'Decision Information and Support Structures to Sustain Farm, Forest and Open Space in Rural Communities in Southern New England.'

Milestones:

- Researchers developed and applied economic valuation methods to address coastal resource management issues in the Northeast region. A wide range of valuation methods was applied to a variety of coastal issues.

- The Orton Foundation awarded the University software that the Foundation developed, called Community Viz, which is based on GIS data and allows for 3D visualization of development.

- The Policy Simulation Laboratory is now fully equipped and operational after significant Station investment in computers and programming support. The SimLab is a state-of-the-art facility for carrying out decision research that ranges from basic research on decision making to highly applied work to help communities make wise policy choices on resource management.

Source of Funds–AES, USDA, EPA, NSF

Scope of Impact–Northeast region.

GOAL 5: ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS

PROGRAM 7: SUSTAINABLE AND NURTURING COMMUNITIES

Overview: Since setting out our Plan for Program 7, we have been exploring the desirability of dividing this Program into two components, "Sustainable Communities" and "Children, Youth, and

Families." Over the past year, the strength of the Sustainable Communities theme has been entirely on the research front. Cooperative Extension involvement was reduced significantly with the necessary move of an educator from this program to the Children, Youth and Families program. With retirements, the CYF programs have suffered, and so to make sure that everything we do is done well, and discontinue that which we do not do well, human resources were shifted.

Key Theme– Sustainable Communities

Overview: Rhode Island has a very strong research program in land use change, environmental values and decision-making. Researchers work and cooperate with the Stephan Goetz, Director of the Northeast Regional Center for Rural Development. Some of the research is conducted with the following USDA-funded projects: Hatch projects RI00103 'A Policy Simulation System for Economic Science and Policy Analysis,' RI00199 'Decision Support Tools to Manage Coastal Development,' RI00104 'Ecosystem-Economics of Land Use Change and Environmental Values,' and RI00101 'Forecasting the Spatial Dispersion of Rhode Island Population and Employment;' and other projects such as the Fund for Rural Development Grant RI-9704783 'Decision Information and Support Structures to Sustain Farm, Forest and Open Space in Rural Communities in Southern New England,' and NRI project RI002001-00527 'Ecosystem Economics of Rural Landscapes and Land Use Change.' In the case of the latter two projects, the research is interdisciplinary, joining ecologists with economists and the projects are strengthened as a result.

Milestones:

- A database of socio-demographic and environmental indicators and employment levels in major industry categories for each town in Rhode Island, Connecticut and Massachusetts has been created for 1990 and 2000.
- Assessed the relationship of experts to public policy, applied to case studies involving economic development policy in rural counties adjacent to metropolitan areas. Factors that appeared most frequently to be related to increased knowledge transfer between experts and policy maker were: goal consistency, entrepreneur/facilitator roles, strong private sector participation and high levels of support for the project.
- Identified characteristics of growth management packages that maximize public support and provide effective incentives for land preservation, growth management, and maintenance of productive farms and forests; and land parcels that maintain ecologically unique and valued biodiversity attributes within rural communities.
- Through land-use modeling based on environmental factors and socio-economic models using historical population and employment data, research findings suggest that containment of sprawl will be increasingly difficult unless new techniques are found to encourage higher-density development in established villages.
- Community-based workshops were held in several rural communities to examine alternative management schemes for watershed protection. A GIS based decision support model was refined and tested at the community level to help rural community decision makers identify and protect farmland and open space that would pose high environmental risk if residential development replaced current land use.

Outputs/Outcomes/Impacts:

- Furnishes local towns and the state with date regarding public preferences for land use and land conservation.
- Furnishes the State and local communities with information about the patterns of employment and household growth around the region over the past decade.

Source of Funds: AES, USDA, EPA, NSF

Scope of Impact: local, regional

Key Theme–Youth Development/4H

Milestones:

- Arrangements were made for the Governor to issue a proclamation honoring the 100 anniversary of the start of the 4-H program. Since that time RI 4-H has expanded to Youth Development Programs emphasizing experiential learning in research-based curricular units focusing on science and technology, animal and veterinary science, fishing and aquaculture, foods, nutrition, and health, environment education, communications and creative arts, leadership development, and community service.

- For 2 decades 4-H has supported children's arts education by holding the Rhode Island 4-H Photo and Fine Arts Fair. Four-H members are given the opportunity to exhibit their artwork to the public and compete for awards. Creative Arts workshops, funded by a grant by the RI Council of the Arts, provided learning experiences at 4 locations in all 3 districts of the state. Over 150 art works were displayed at the RI Photo and Fine Arts Fair at Warwick Mall. Participants learned to appreciate art, and about careers in the arts, as well as explore their creativity and develop their own skills and abilities.

- Rhode Island had 229 4-H members in the horse and pony projects, 127 with rabbits/cavies, 107 with dog care and training, 86 with dairy cattle, 61 with birds and poultry, 58 with sheep, 49 with beef, and additional children with other animals. Rhode Island 4-H is taking advantage of children's love for animals and enrolling them in 4-H to help them develop life skills. The children gained skills and knowledge with and about animals, and developed social and leadership skills through 4-H club activities, quiz bowl, hippology, judging, general knowledge tests, and putting together public presentations, exhibits, and learning stations. This learning and skill development took place at 4-H meetings, workshops, district and state activities, events, and contests, and interstate events like the Eastern States Exposition, and the Eastern National 4-H Horse Roundup.

- Four-H Clubs from all 3 Cooperative Extension Districts were involved in training 4-H Club members in public speaking, visual presentations, demonstrations, and creative communication (skits, dance, music, story telling, etc.) using materials prepared by University staff. Four-H members had the opportunity to have their presentations evaluated by teams

of judges, and those who scored over 90% were invited to the state 4-H contest on the University of Rhode Island campus. There were 132 4-H members making presentations, and 106 made the level of excellence qualifying for the state contest.

- 4-H Conservation Field Day involved 137 children and 40 4-H volunteers in a day of hands-on learning activities and demonstrations on birds, whales, Native Americans, wilderness skills, marine explorations and coastal investigations. Four-H clubs occupied the facility and grounds of the Audubon Society's newly completed Environmental Education Center and utilized the entire staff of RI Audubon for the day.

Source of funds: RI 4-H Club Foundation, District Cooperative Extension Boards of Directors, Southern RI All-Stars, state funds, formula funds.

Scope of impact: Primarily State specific – Rhode Island. Multistate involvement with Universities of Maine, New Hampshire, Massachusetts, Vermont, and Connecticut; National 4-H Council, National 4-H Congress.

Key Theme–Children, Youth, and Families at Risk

Milestones:

- Cooperative Extension educators submitted a new proposal to secure funding for the three neighborhoods in Providence with the highest risk factors. Once identified, the Cooperative Extension educators then developed a programmatic needs assessment to identify subject matter and training needs in the areas of children, youth, and family life, and community development. The new project, FACE IT Providence was funded in May 2002.

- The original program FACE IT (Families and Communities Engaged in Issues Together) was sustained and delivered in the original four Rhode Island communities. The project continues its collaborative effort community agencies, and community volunteers. Cooperative Extension(CE) Educators continue to provide: professional staff development and training for those working in child care and in-school and after-school settings; parenting education classes and parent-to-parent support groups. Additionally, CE Educators continue to support: community asset building through formation of community advisory boards, an interactive web site, and opportunities for participants to earn college credit through the Office of Special Programs at the URI Providence campus.

- Cooperative Extension educators and paraprofessionals continued to maintain the 4 community advisory boards established in at-risk communities through the FACE IT grant. The community boards, which include professionals, parents and teens, focus on assessing community strengths and needs, and identifying resources to meet those needs.

- CE Educators and faculty from the University of Rhode Island secured new CYFAR funding to address the needs of three of the most at risk neighborhoods in Providence. A

total of nine new agencies were recruited to participate in the new FACE IT Providence project.

Outputs/Outcomes/Impacts:

- Educators, in the CYF program, have provided training to community professionals working with pregnant and parenting teens. They have developed curricular materials and offered education focusing on basic parenting education, independent living skills, and strategies for strengthening parent-child communication.

- In post-workshop evaluations, 92% of participants indicated that the information was practical, 75% reported that they learned at least three new concepts of practices for working with their respective clients, and 97% rated the workshops as excellent.

- As a result of the FACE IT Providence grant, workshops are being offered in Spanish in the three Providence neighborhoods targeted by this grant.

- Through the Electronic Connectivity component of this grant, parents, teens and professionals in under-resourced communities have developed skills at finding information about resources on the Internet and communicating electronically with board members in other communities. Computer literacy and access to the Internet have been important new resources for youth and families in these communities.

- An additional 6 computers have been placed in the three neighborhoods in Providence to expand the Electronic Connectivity component.

- In FY 2002, over 600 teens and adult staff have been trained; over 300 parents from at risk communities attended parenting education classes; four community advisory boards were formed which have carried out their own needs assessments to address community-based needs. One new advisory board is being formed to address the needs of the three new Providence neighborhoods.

- URI undergraduate interns have worked as mentors at community sites each semester.

Source of funding: CSREES CYFAR, CE

Scope of impact: state specific.

Key Theme–Child Care/Dependent Care

Milestones:

- High school teens were involved in the Teen Child Care Providers Initiative, a service-learning project that focuses on the mastery of childcare principles and practices. Through this project, teens gained a new level of understanding of principles of child development, child guidance, and developmentally appropriate practices.

Outputs/Outcomes/Impacts:

- 1,248 adult and teen childcare providers participated in the programming this year.
- Childcare sites in 23 communities that received support from Cooperative Extension Educators applied knowledge gained to an additional 1,000 children.
- Teens participated as classroom assistants in childcare settings in these communities, thus improving quality of care and staff resources for the young children in these programs.

Source of Funding– CE

Scope of Impact–state specific.

Key Theme - Parenting and Family Life

Milestones:

- CE Educators developed and implemented over 80 parenting and family life education classes to address the need of parents to develop positive parent-child relations.

Outputs/Outcomes/Impacts:

- 90% of parents attending CE CYF Parenting and Family Life education reported in post workshop evaluations that information was practical and easy to use and provided new insights into developing positive parent-child relations.
- Over 400 parents participated in parenting and family life education workshops.

Source of Funding: CE
Scope of Impact–state specific.

Key Theme – Financial Literacy

Overview: An integrated program of research and outreach on family and consumer economic issues will improve the financial knowledge and practices of families in Rhode Island and nationwide. Research on-going in this area are the USDA-funded Hatch projects RI00711 'Impact

of Workplace Financial Education on Employee Personal Financial Behavior and Productivity,' and RI00712 'Applying the Transtheoretical Model of Change to Financial Behavior.' Two other initiatives impact the financial literacy of college students and school-age youth.

Milestones:

- A joint venture between Rhode Island Cooperative Extension and the Consumer Credit Counseling Service of Southern New England (CCCS-SNE) has led to the creation of the Center for Personal Financial Education. In 2002, the Center was moved to its new home at the University of Rhode Island in Kingston.

- In a collaborative initiative between Cooperative Extension and the Agricultural Experiment Station, an experimental study of the impact of workplace financial education on financial behavior and employee productivity is being conducted. In FY 02, the second year of the grant, the educational programming, research methodology and assessment instruments were pilot tested during delivery of nine workshops to University of Rhode Island union members.

- In preparation for the pilot testing phase of the research project, nine educational modules were edited and updated. The revised components of the nine modules included PowerPoint presentations; participant materials; and the pre-test, post-test and long-term follow-up research instruments. These materials were initially prepared at the Center for Personal Financial Education in fulfillment of a grant to develop a personal financial workplace education program.

- Thirty-seven high school teachers and credit union professionals were trained to deliver the NEFE High School Financial Planning Program to students in the southern New England region. A print newsletter, *Focus on Youth, Money Matters*, was developed and distributed to 2,500 teachers in the region. The newsletter provides updates about the NEFE High School Financial Planning Program, information about new financial literacy teaching resources and teacher training events, and summaries of recent research related to teens and money. During FY 02 the first online edition of the *Focus on Youth, Money Matters* newsletter was created. Over 260 teachers requested subscriptions to the newsletter which is also available to the general public via the internet.

- An online credit education program taught 83 first-year college students to compare contract terms and clauses in credit card agreements, to recognize the warning signs of credit abuse, to implement a resolution process when credit problems arise, to periodically review their own credit reports, to set financial goals, and to develop and monitor a personal financial plan. Data from this project is being analyzed and will be reported during FY 03.

Outputs/Outcomes/Impacts:

- Financial literacy training of youth in school settings and adults at the workplace will help to reduce the bankruptcy rate and create individuals and families with better fiscal decision-making tools.

- Data for the USDA-funded research project is being collected on employees' personal financial behavior and workplace productivity.

Sources of funding:
CE, AES; grant from CDNE Foundation; grant from National Endowment for Financial Education; support from Consumer Credit Counseling Service of Southern New England; administrative support from the Department of Human Development and Family Studies at the University of Rhode Island.

Scope of impact: Regional and national

Stakeholder Input Process

Stakeholder input is derived by a suite of different venues. The Plan of Work attempted to classify these under eight categories. In general, we rely on existing statewide organizations to provide input on our plan-of-work, cooperative approaches and our educational priorities.

We continue extensive exchanges with myriad water quality and conservation groups, including active coordinated projects since 2001 with RI Partners for Resource Protection, RI Grow Smart Education Subcommitee, RI Chapter of the American Planning Committee, RI Dept. of Health Source Water Assessment Committee, RI Natural History Survey, Natural Resource Conservation Service, Rhode Island Builders Association, Soil Scientists of Southern New England, Rhode Island Independent Contractors Association, RI Chapter of the American Water Works Association.

Similarly, our water quality program coordinates closely with a host of state agencies and commissions including the RI Departments of Administration, Environmental Management, Transportation and Health and the RI Coastal Resources Management Council, and the Water Resources Board. Other programs coordinate with the RI Department of Health – Food Protection, Department of Health and Human Services, Providence Head Start, and Providence Community Health Centers.

At the Federal level we work closely with EPA Region I, the Department of the Interior and USGS.

At the local level we rely on focus groups, watershed councils, project specific committees of town officials, Soil Conservation Districts and citizen groups for stakeholder input. Local organizations include: RI Chapter of Nature Conservancy, Audubon Society of RI, local land trusts, Save the Bay and the Environment Council of Rhode Island.

Within our programs that use volunteers (i.e., Home-A-Syst and Watershed Watch) we host gatherings throughout the year to listen to stakeholder needs and to receive feedback on our programs. All of our programs have program specific steering committees that consist of representatives from the private sector, local and state government, citizen groups, and research scientists from the RI AES.

In industry, we continue to work closely with the RI Nurserymen and Landscape Architecture Association, the RI Golf Superintendents Association, and New England Golf Superintendents Association, Ocean State Aquaculture, the RI Seafood Council and the RI Apple Growers Association.

In 2002, the Director and Associate Director began a rebuilding process for the former RI Cooperative District Boards, similar to other state's county boards. One of the outcomes of this process is expected in 2003 to be the formation of a URI CE Advisory Board.

Program Review Process

Program review, including project merit and peer review, are the responsibility of the Director and five Program Leaders (see Administrative Accomplishments, below).

Projects are awarded through a competitive, outcome-oriented annual request for proposals. Project proposals are peer reviewed by scientists external to URI and by the program leaders. They are prioritized based on anticipated outcome (merit), as well as goodness of fit to the program areas, quality of science, integration with extension, and multistate collaboration. Projects normally run 3 years, and funding normally includes support for graduate students, a small operating budget, and travel. Station funds also support a limited number of support staff for agricultural operations as well as partial support for other research associates and assistants.

We include the request for proposals used in FY 2002 for projects to be funded as of FY 2003 (appendix A) to provide details of the entire process, including statements of priority research areas (based on the Plan Programs), and the specific instructions on target audience and outcome orientation. The RFP also includes complete documentation of procedures used for project review in the Station.

In addition to federal formula funds, all of our programs depend in part on external funds. We submit proposals to competitive grant programs primarily through CSREES, EPA, NIH, NSF, DOC, and the State of Rhode Island. These proposals are generally peer reviewed and funding is merit based. We gain insights into the merit of our work from the feedback and assessment we obtain from the proposal process, along with the reviews we receive from annual and final reports that are required by the granting agencies.

While we have moved relatively far in repositioning the approach used by the Station—from a near entitlement, curiosity-driven research approach with an annual disbursement of research funds to academic departments, we have moved to a program and project based, outcome-oriented competitive process—we have not made as much progress on the Extension side. This is due in part to the high percentage of Extension funds devoted to long-term personnel (the average length of employment of current RICE educators is over 27 years). The clear reorientation of the Station's portfolio toward outcomes realized by specific target audiences provides an equally clear set of opportunities and needs for extension to respond.

Evaluation of the Success of MultiState, Multi-institutional, and multidisciplinary activities, and Joint research and extension Activities

Did the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?
We believe the answer to be yes to activities conducted in 2002. We have clearly completed a reorientation of AES funding to outcome-based, with a clear focus on target audiences. We now require further management refinements to follow-up on this commitment, to verify that intended milestones are addressed on a project-by-project basis, and that target audiences remain involved through greater extension involvement.

Did the planned programs address the needs of under-served and under-represented populations of the state?
To the best of our abilities, yes. We have attempted to develop a full range of programs that serve all segments of society, without regard to community, economy, or scale. Our agricultural programs provide benefits to all through the success of new biological control releases and the development of improved plant and animal strains. Aquaculture research and outreach affect large industry leaders, but also respond to very small-scale producers with equal intensity. Food safety and nutrition continues to be aimed at populations in greatest need, particularly in economically challenged communities and among the elderly. Water quality and natural resource management affect all Rhode Islanders. Our sustainable communities initiatives are particularly sensitive to addressing the needs of our 22 (of 39) rural towns.

Did the planned programs describe the expected outcomes and impacts?
We believe that we have made substantial progress in doing this, particularly considering that we are in the 3nd year of a substantial change for our organization, and in light of an extraordinarily austere budget at the University.

Did the planned programs result in improved program effectiveness and/or efficiency?
It is too early to tell, but the number of outputs, outcomes, and impacts listed above suggests that we are productive and generally on track with CSREES objectives and the intent of the RI POW.

Multistate Extension Activities

Most of our programs coordinate and develop programming with sister programs in other states.

The presence of a USDA-APHIS approved insect quarantine on campus serves as a regional focal point for biological control efforts involving new species, with particular and nationally unique emphasis on invasive plants and pests of ornamental plants. Programs in horticulture, turfgrass management, and aquaculture are all increasingly multistate, with focus on regional annual meetings, as highlighted under the key themes statements, above.

URI Watershed Watch cooperates with Extension Programs from the University of New Hampshire and the University of Maine through the New England Regional Monitoring Collaborative. Watershed Watch also works closely with the UNH CE in the coordination of regional lakes conferences and regional and national volunteer monitoring conferences. The URI Municipal Watershed Management Program coordinates with the NEMO (Nonpoint Education for Municipal Officials) program from Cooperative Extension of the University of Connecticut. The URI Home-A-Syst program develops training materials in conjunction with CE programs from across the Northeast**.** In addition, the URI Onsite Wastewater Training Center participates in the Consortium of Institutes for Decentralized Wastewater Treatment. The Consortium has twenty-two member institutions throughout the US and Canada, these are listed in Section A: Multi State Extension section. In August, 2000, URI was awarded a regional "406" multi-state, 4-year project. URI is lead institution on the project, which unifies water quality research and outreach programs at the six New England land grants.

Our outreach efforts in food safety, nutrition, and youth programs all benefit from annual conferences, presentations made across state lines, and multistate USDA 406 projects.

Integrated Research & Extension Activities

To the fullest extent possible, all RIAES research projects are now committed to full integration with extension. That is, all projects are funded on the basis of outcomes, which are expected to occur when specified target audiences use the outputs of research to accomplish specific performance goals. We have attached the project guidelines for FY02/03, which were adapted with minor changes from those established in January 2000, to document the extent of this commitment to full integration and full outcome-based funding. We have also attached the FY01 RIAES project portfolio (continuing or new projects that have completed RI review and approval procedures and are now approved or awaiting approval through CRIS) to document the complete identification of target audiences, specified outputs, and outcomes, which form the basis for Station funding decisions. The expenditure data for Integrated Activities (Hatch Act Funds) (attached) reflect less than 100% integration due to the continuation of projects begun before implementation of AREERA. We have refocused those projects that will continue beyond 2001 to move them toward full identification of target audience, outcome, and performance goals, such that we believe the Station will approach 100% integration within the lifetime of the current plan.

Certainly, the within-state integration of AES and CE projects would be advanced by greater success in implementing research-related integrated multistate projects in obvious areas such and water quality, IPM, land-use planning, aquaculture, apples, dairy, etc. Rhode Island is providing regional leadership in this area, and will continue to do so under its new administration.

Administrative Accomplishments and Results

A management team consisting of seven program-area advisors and the Director was organized in September 1999, to guide overall changes required by AREERA. It refined guidelines for AES projects, incorporating all aspects of the new AREERA requirements, and issued a formal revision in January 2000.

Six Program Leaders replaced the transitional team in September 2000 and remain in place currently. Given the distribution of research and outreach activities, the Program Leaders were assigned responsibilities as follows:
Goal 1: An agricultural system that is highly competitive in the global economy.
Program Leader 1: Sustainable agriculture.
Goal 2: A safe and secure food and fiber system.
Program Leader 2: Animal Health & Aquaculture
Goal 3: A healthy, well-nourished population.
Program Leader 3: Food Safety & Nutrition
Goal 4: Greater harmony between agriculture and the environment.
Program Leader 4: Natural Resources
Goal 5: Enhanced economic opportunity and quality of life for Americans.
Program Leader 5: Sustainable communities
Program Leader 6: Children, youth, and families

The Program Leaders serve a very important role as an advisory body to the Director and Associate Director regarding virtually every facet of the Land Grant Programs at URI.

A joint publication with RI Sea Grant has continued success, with both a print and a web version (see www.uri.edu/41N). The RIAES web site was updated to include an on-line description of current research programs and projects (see www.riaes.org).

With the entrance of the new Director and Associate Director in late 2001, 2002 was a year of introspection for RI AES and CE. Each department in the College of the Environment and Life Sciences completed strategic plans, which included planning for research and outreach activities. As a result of the strategic planning process, opportunities for more multi-disciplinary research was obvious, as were increased opportunities for outreach.

The CE program areas also completed strategic plans. As a result of all the strategic planning, Cooperative Extension is slowly changing structure, where the goal is to strengthen the programs we do well and move away from the programs for which there are either no depth or no resources. An example of that was the removal of the CE sustainability program by shifting those resources to the CYF program. CE can only change slowly due to state-required mandates due to the high percentage of Extension funds devoted to long-term personnel but we believe there are many ways to strengthen RI CE. This process will be furthered and more apparent in our revision of the 2000-2004 Plan of Work.