University of Rhode Island
Agricultural Experiment Station
And
Cooperative Extension

Annual Report Of Accomplishments and Results

2000

For the reporting period October 1, 1999 through September 30, 2000.

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.

- 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 2001. 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 FY2001, 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.
- We have appended an administrative **Strategic Plan for an Office of the Director of Land Grant Programs**, developed by the Director. In setting out its 5-year Plan, Rhode Island recognized that a decision made in 1995—to separate the administration of Extension from that of the Station by positioning them under separate vice-provosts (the Station under a Vice-Provost for Marine and Environmental Affairs, Extension under the Vice-Provost for Research, Graduate Education, and Outreach)—was inappropriate as a structure to promote programmatic integration and management efficiency. As the 1998 Farm bill and subsequent administrative guidelines made clear, there was a need for system-wide change, a need that certainly applied to Rhode Island. Given the need for on-going changes in project management, including the need for integration and a commitment to outcome funding (see above), the Director developed the strategic assessment presented here. Subsequent response to the administrative strategic plan is discussed in the appendix.
- Finally, we have added a closing section on **Administrative Accomplishments and Results** to provide a chronicle of a significant period of rapid evolution in the Rhode Island land grant programs.

Annual Report of Accomplishments and Results
Rhode Island Agricultural Experiment Station & Cooperative Extension
FY2000

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. Also, with limited resources, 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.

A highlight of this program was our response to Invasive Species (see next). This began at a stakeholder listening session with the RI Nursery and Landscape Architecture Association, which expressed concern both with invasive problems in production, but also with fear of overreaction by state regulators. Following up, RICE organized a major forum, attended by 146, to discuss the issue. Nursery industry, conservation groups, state and private land managers, and homeowners attended. The outcome of the meeting was the formation of an advisory council. Subsequent work by the council has led to great progress on developing regulatory policy, and has also stimulated new research initiatives within the Station.

Another highpoint was a daylong workshop conducted in conjunction with the RI Slater Center of Excellence in Environmental Biotechnology. The Center and AES are tied together by the appointment of the AES Director to the Center's Board of Directors. The April conference brought together several of the leading Turfgrass research companies from across the country to present areas of contemporary interest and research. The new (4th day on the job) Center Director and the AES Director each presented their agency interests in Turfgrass. The latter talk was attended by the RI Commissioner of Higher Education, who commanded a repeat performance for the Board of Governors for Higher Education the following June. Two of the companies attending the workshop have subsequently established near-campus research laboratories, with projects involving URI faculty and, at years end, three plant science graduate student interns.

Key to the longterm future of the Program is the progress of the University's Environmental Biotechnology Initiative, an ambitious, faculty-led effort to secure core state-of-the-art facilities for plant and animal genomics, transgenics, imaging, and bioinformations. Here, progress was mixed. A search for a plant genomics faculty remained open at years end, after several months of continued negotiations. Progress on advancing a building toward a State Bond Referendum on the 2002 bond issue has been slow and uncertain: despite statements that the building is the University's highest priority for new construction, the project remains 15th on a long list of capital projects and is yet completely unfounded.

Key Theme–Invasive Species:

Activities in this area include establishing a new statewide council on invasive species (described here) and a series of programs on biological control of invasive species (described under integrated pest management/biological control, below).

Milestones:

- February 2, 2000: We held a forum, Invasive Plants in Rhode Island: Issues and Concerns, attended by 115 people, representing educational, environmental, regulatory, planning, transportation, recreational, and agricultural interests in the state. This meeting led to the establishment of the Rhode Island Invasive Species Council, under the umbrella of RI Cooperative Extension and RI. Agricultural Experiment Station, focusing on identification and impacts of invasive plants and animals.
- The Council has met 4 times as a full council and the separate plant and animal subcommittee have each met several times to develop lists of invasive species.
- The council sponsored a seminar on Feb. 7, 2001 by Chris Mattrick of the New England Wild Flower Society who spoke on Management of Invasive Plant Species: the Consequences of Control. ~60 people attended.
- On January 24, 2001, Lisa Gould of the Invasive Species Council participated in a panel discussion of Invasive Plant & Sustainable Plants Issues the annual meeting of the Rhode Island Nursery and Landscape Association.

Outputs/Outcomes/Impacts:

- The plant committee has developed a discussion list of plants with five categories: 1) that all parties agree are invasive in Rhode Island; 2) that fit many of the criteria but for which we need more information within the state; 3) species for which we need more information about the invasiveness of their cultivars; 4) species that are "weedy" [thriving in disturbed edges, but which do not appear to spread into minimally managed habitats]; 5) species which we are beginning to see spread in the state and need to be monitored. The plant committee also decided to develop fact sheets on invasive species, and lists of alternative, non-invasive species for landscaping.
- The animal committee has developed lists of non-native birds, amphibians', fish, beetles, and butterflies. It is eliciting the help of experts to help to formulate additional lists and then begin to assess them for invasiveness. This committee is also looking at state regulations regarding the importation of animals into the state (e.g., involving the pet and aquarium trades.

Source of funds: AES, CE, grant

Scope of Impact: state specific

Key Theme–Biotechnology:

Biotechnology is pervasive throughout our research portfolio. The critical overall issue is to make progress in development of core infrastructure for genomics, transgenics, imaging, and bioinformatics. We did open a search (still open at this writing) for a plant genomics position, but have little to report on progress toward establishment of facilities, as we wait for University administration (President and Board of Governors) to respond to faculty proposals. Accordingly, we defer discussion until next year.

Key Theme–Emerging Infectious Diseases (See also, below Program 3):

Our projects on zoonotic disease surveillance and management and on biological control of *Ixodes scapularis* represent an indepth capacity for research and outreach on vector-borne diseases of animals and humans. We maintain close ties with the Rhode Island Office of Mosquito Abatement, and collaborate through the operation of an arthropod-borne disease research laboratory (BSL3) which is primarily focused on tick and mosquito vectors, and on lyme, EEE, WNV and other diseases of major public concern. Note that we include another area of investigation under Goal 2, Program 3, below..

Milestones:

- We continued surveillance throughout RI for ticks and tick-transmitted infections including Lyme disease, granulocytic ehrichiosis, and babesiosis.
- We maintained statewide surveillance for mosquito-borne viruses including West Nile (WNV) and Eastern Equine Encephalitis (EEE).
- We developed and implemented molecular diagnostic testing for WNV, EEE, and Highlands J (HJ) virus.
- We discovered that the incidence of human babesiosis increased for the second consecutive season with 30 documented cases and 1 fatality in RI.
- A fatal human case of granulocytic ehrlichiosis was also recorded – only the second recorded case east of the Mississippi.
- West Nile Virus was detected in 79 of 321 birds tested and Eastern Equine Encephalitis was found in 4.
- We recovered a previously undescribed rhabdovirus in 2 pigeons.
- Through laboratory and field testing, we determined that *Metarhizium anisopliae* caused 50% deer tick mortality, indicating some potential for field use of this pathogen in controlling deer ticks.
- Engorged ticks were found to be more susceptible to *M. anisopliae* than unfed ticks.

Outputs/Outcomes/Impacts:

- Mosquito surveillance results were used to direct mosquito vector suppression programs in RI for the 2000 season. There were no reported cases of EEE or West Nile among humans in RI in 2000.
- Eight years of tick surveillance results are being examined in relation to climate variation with a goal of developing disease forecasting models.

Source of funds: AES, CE, grant

Scope of Impact: state specific

Key Theme–Ornamental/Green Agriculture:

Here, we have several projects addressing the owners, designers, and managers of landscapes as well as those producing ornamental plants. These include research projects RINE009 (Conservation and Utilization of Plant Genetic Resources), RI00S187 (Turfgrass Project), and RI00S290 (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 raining for green industry professionals and together the two groups work to provide scientifically-based horticultural information to the gardening public.

Milestones

- We evaluated container production systems using copper-treated films to prevent root circling in pots. We installed a 4-acre pot-in-pot production system at a cooperating nursery.
- We completed a series of experiments on deer control in nursery and landscape settings.
- We collected cold-tolerant germplasm to replace hemlock-adelgid Canadian hemlocks that are rapidly dying from this pest.
- From Bristol's Veterans Home to Hope High School to Roger Williams Park to South County Museum; 215 URI Cooperative Extension Master Gardeners contributed over 13,000 volunteer hours this year at 45 URI Master Gardener projects while spreading the Cooperative Extension message of environmentally-sound home and garden practices.
- This year, 2700 school children learned about Rhode Island's soils, plants, wildlife and water through hands-on activities while attending the Cooperative Extension Education Center's Learning Landscape Environmental Education Program and the Eco-exploration Program held in the URI gardens and greenhouses.
- URI Cooperative Extension Master Gardener volunteers answer over 10,000 calls each year from Rhode Island citizens through the toll-free URI CE Gardening and Food Safety Hotline. In 2000, this Hotline was selected as"Best Of Rhode island" for gardening advice by Rhode Island Monthly.
- 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.
- Growing Green, a monthly URI Cooperative Extension GreenShare horticultural column in the Providence Journal, reaches over 175,000 Rhode Island households.
- 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 eleventh year, the festival has become an eagerly awaited event each year.
- Conducted /coordinated TURFGRASS FIELD DAY with 500+/- participants and the NE Turfgrass Conference and Show with 2,800+/- participants. Participants collectively manage over 30,000 acres of landscape.

Outputs/Outcomes/Impacts
- We propagated and distributed more than 50 shrub accessions to cooperating nurseries and arboreta for evaluation and possible distribution to the public.
- During the 2000 gardening season, over 400 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 350 samples of turf from around the country for disease diagnosis and control recommendations, including recommendations for disease-resistant species.
- Both commercial nurseries and homeowners are now getting much more effective deer protection of landscape plants.
- We provided Pesticide Applicator Training to over 300 landscape practitioners through categories 3a and 3b Turfgrass and Ornamentals Certification training.

Source of funds: AES, CE, grant

Scope of Impact: state specific

Key Theme–Plant Genomics:

Milestones
- Nine up-regulated cDNA gene clones were identified that exhibit strong senescence-associated patterns of expression.
- The regulation of expression of senescence up-regulated genes is not identical in senescing cotyledons and leaves.
- The expression pattern of genes represented by gene clones are regulated differentially in response to different genetic backgrounds.
- Some factors generated during pod formation and seed development may regulate the expression of senescence up-regulated genes in the leaf senescence program.

Outputs/Outcomes/Impacts
- These results suggest that multiple inducible pathways for the senescence program are regulated differently and induced by different factors or different combinations of factors.

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

This includes the RI IPM program (also covered under the Ornamental/Green Agriculture theme) as well as research projects on Biological Control in Rhode Island and multistate project NE171 (Biologically Based IPM Systems for Management of Plant-Parasitic Nematodes.)

Milestones

- We demonstrated that the addition of glucose to saturated soil controlled plant parasitic nematodes through the action of fermentative bacteria.
- We initiated experiments with butyric acid and parasitic fungi (*Rhizoctonia fragariae*) as a preplant treatment for plant parasitic nematodes.
- Purple loosestrife at Roger Williams Park Zoo was defoliated for the third consecutive season by biological control agents we released and native plants are returning to the site.
- Cypress spurge has been brought under complete control at one farm in RI we have redistributed biological control agents to 8 additional farms in RI.
- We have discovered 6 European parasitoids of the lily leaf beetle and released one of them (*Tetrastichus setifer*) in Boston, MA against this pest.
- We have identified key natural ememies of *Phragmites australis* in both the US and Europe
- We released *Pseudoscymnus tsugae*, the Japanese predator of the hemlock woolly adelgid on infested trees in a landscape setting.
- We scouted 10 commercial apple orchards and disseminated pest management information to these and all other growers through recorded telephone messages and an apple IPM website.
- We organized 4 grower meetings and a summer tour to highlight effective IPM practices.

Outputs/Outcomes/Impacts

- Both glucose and butyric acid hold promise as biorational alternatives to synthetic fumigants.
- It appears that the biological control agents that we have released against purple loosestrife and Cypress spurge have locally controlled these pests and they are well established and spreading.
- If the high level of parasitism that we measured last season results in a successful overwintered population of *T. setifer*, lily leaf beetle problems may decline over the next few seasons.
- Apple growers are increasingly interested in participating in our program and 15 additional growers have asked to participate next season.
- Our Plant Protection Specialist made over 200 site visits to farmers in Rhode Island to advise them on IPM practices for various pest problems.

Source of funds: AES, CE, grant

Scope of Impact: Massachusetts and Rhode Island

PROGRAM 2: AQUACULTURE BIOTECHNOLOGY AND FISHING.

AES and CE-supported projects are beginning to spawn externally funded companion projects, including successful projects under the Northeast Regional Aquaculture Center (NRAC), and collaborations with the private sector. 2000 saw continued investment in building laboratory capacity for physiological stress and disease studies, and the completion of a major retrofitting project to allow us to work on vaccine development and disease challenges. Progress is slowed by a continued delay in

construction of a new USDA-funded marine aquaculture facility at the Narragansett Bay campus, for reasons that are beyond the scope of this report.

As we develop this program area, we are focusing on growing outward from past strengths in fish and animal stress physiology, which emphasized molecular and structural understanding. We are attempting to develop appropriate biotechnological approaches to two areas of concem—fish and shellfish genomics and transgenics for stock improvement and disease recognition and vaccine development. This growth requires new physical plant, including the new marine aquaculture facility planned for the Narragansett Bay campus (a mixed salt and fresh-water facility), and retrofitting of older facilities at URI's East Farm for disease work. While the latter has gone forward with relatively little delay (and at relatively low cost), the former has been slowed by University inefficiencies, and is only this year scheduled for construction (after nearly 10 years).

An encouraging aspect of this effort is the success of private companies that are now moving into Rhode Island for research or production, affiliations that began with University ties. Cape Aquacultural Technologies has signed an agreement with the Rhode Island Economic Policy Council, through the Samuel Slater Center of Excellence in Environmental Biotechnology, to collaborate in an on-campus research project on fish genomics, and is now setting up. CAT was attracted to Rhode Island by collaborations with Dr. Terry Bradley, whose work is outlined below. Great Bay Aquaculture is expanding its New Hampshire production into Rhode Island by setting up a flounder facility at Quonset Point. Great Bay has established research and outreach ties with Dr. David Bengtson and other URI researchers.

Key Theme–Aquaculture:

Milestones

- Heat shock proteins in Atlantic salmon were induced by hyperosmotic stress (e.g., transfer from fresh to salt water), but not by routine hatchery procedures (e.g., crowding, handling, etc.). Thus, these proteins are probably not good markers of hatchery stress.
- Laboratory tank experiments demonstrated that oysters in an aquaculture-like setting altered the phytoplankton composition of the water and increased deposition of organic material on the bottom. This suggests that oyster aquaculture might help to clarify near-shore waters in places like Narragansett Bay that receive too many nutrients.
- The fish physiology laboratory at URI's East Farm was retrofitted for use as a vaccine challenge facility. Holding tanks to treat effluent from tanks used in the lab were partially installed, to be completed in 2001 for use in a new project on vaccine development to begin in 2001.
- We evaluated the competitiveness of aquacultural versus traditional fishery products in the world market and analyzed implications of trade liberalization and subsidy reduction on both seafood trade and the use of fisheries.
- We continued research on seafood ecolabeling, comparing the U.S. and Norway, as a means toward promoting sustainable fisheries.
- We developed reports on markets for bluefin tuna and shark fins.

Outputs/Outcomes/Impacts

- Extension personnel met with several organizations representing commercial and recreational fishing interests in Rhode Island state waters to get them to identify their primary usage areas by marking nautical charts. These charts will be put into GIS format to assist aquaculturists in identifying open areas and/or potential user conflicts in siting new aquaculture facilities.
- Extension personnel contributed to teaching the annual Shellfish Aquaculture course for prospective aquaculturists in the state. RICE co-sponsored the 1st Annual Southern New England Aquaculture Conference (held coincidentally as the 5th Annual Rhode Island Aquaculture Conference) in Newport, RI, with over 140 participants.
- Industry officials, policy makers, and environmental organizations have necessary information to develop ecolabeling programs.

Source of Funds–mixed.

Scope of Impact–state specific.

Key Theme – Emerging Infectious Diseases

{see next section, Goal 3, Program 3)

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. We thus comment briefly on a limited number of milestones and anticipate greater progress in subsequent reports.

PROGRAM 3: HEALTH AND WELL BEING OF FISH AND ANIMALS

This program has made progress in the area of aquaculture-related diseases (see program 3, above), by developing preliminary results and facilities for fish vaccines against bacteria. We have approved a new project on three such studies (i.e., 3 pathogens) and expect to be showing more substantial progress in subsequent reports. Animal health work has moved ahead but not at the rate we had hoped. Slowed by inability to hire permanent faculty with veterinary backgrounds, we were further set back by loss of the Peckham Farm animal caretaker two years ago, and the Extension farm manager in 2000, both without replacement to date. While animal science remains a substantial part of the academic curriculum, shortages in faculty are 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 using tick hemocytes as antigens for an anti-tick vaccine are still ongoing. The anticipated response was observed in mice, but experiments on target deer are incomplete.
- Experiments on development of a vaccine for summer flounder against a bacterial pathogen are still ongoing.

Outputs/Outcomes/Impacts

- Cooperative Extension – Dr. Gomez-Chiarri conducted a workshop on shellfish diseases, attended by approximately 25 people.

Source of funds: AES, CE, grant

Scope of impact – Northeast region

PROGRAM 4: FOOD SAFETY

The future of the research component of the food safety program depends on academic hires in the Department of Nutrition and Food Science and the Department of Biochemistry, Microbiology, and Molecular Genetics. Four retirements in the mid 1990's are only now being addressed with limited hiring. As with most components of the Station's research portfolio, resumption of an active research capacity will be strongly tied to establishment of core biotechnology facilities. In the meantime, we continue to offer outreach programs in food safety, with accomplishments as outlined here.

Key Themes–Food Safety and Foodborne Illness

Milestone:

- **Education-Educators and School-aged children**: Extension specialists developed a food safety curriculum entitled "The Food Safety House – Preparing Food Safely" designed for grades 1-3 and 4-6. This curriculum, a self-standing unit with highly visual graphics and colorful design, contains the entire curriculum for teachers. The curriculum is also accompanied by teachers guides (1-3 or 4-6) containing optional activities and additional **food safety** information. However, all the curriculum information is contained in the "easel-like" curriculum and can be used by teachers without the guides if desired. 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. The curriculum was designed with the input of health instructors and its content was developed to meet the RI Educational Frameworks that called for key food safety principles to be taught through health initiatives in RI schools at grades K-12.

Outputs/Outcomes/Impacts:

- Two workshops were conducted to 36 teachers representing 31 schools in 15 Rhode Island districts. These teachers will be piloting the curriculum in their classes to approximately 900 students over the next year. Since the workshops,

other curriculums have been distributed to other RI teachers and educators in other states and countries. The potential impact in the state of RI could be approximately 74,000 students in grades 1-6.

- Presentations have been delivered at professional meetings.

Source of funds: AES, CE, grant and external funding (Team Nutrition Institute at Kids First ($26,180) and FDA ($5,000).

Scope of Impact: State specific

Milestone:

- **Annual food safety conference**, September 27, 2000. The target audience was individuals who were responsible for developing and implementing food safety training for consumers, students or employees. The title of this year's conference was "Are You Doing It Right?: Food Safety Training 2000". Speakers covered information concerning the food safety issues in RI, and information concerning organic produce and biotechnology. The keynote speaker, Robert J. Howard, Special Assistant for Strategic Health Communication, NCID/CDC, addressed methods of how to communicate with your audience in a talk entitled "Train to Gain – Getting It Right". The entire conference was rated highly.

Outputs/Outcomes/Impacts:

- Approximately 100 regulators, school teachers, health service educators and dietitians, consultants and others were at the conference. Overall, the conference evaluations indicated that information presented was very useful and the meeting met or exceeded participants' expectations.

Source of funds: Smith Lever, state match, and external funding (participants, USDA competitive POW grant)

Scope of Impact: State specific

Milestone:

- **School Food Safety Partnership,** a collaboration with the RI Department of Education (RIDE), Team Nutrition Institute at Kids First, and the RI Department of Health (RIDOH). Building on the on-going school food safety policy project from the RI food safety specialists and the programs in place at RIDE, Team Nutrition and RIDOH, this partnership wrote a grant entitled "RI Healthy Schools! Healthy Kids! School Food Safety Partnership" as submitted it the CDC for funding. Through this two-year grant, this partnership will be formalized to identify existing school food safety education programs, activities, curricula and assets, and to recognize and close gaps throughout Rhode Island.
- A long-term **strategic plan** is being developed at the state-level for the development of a coordinated school food safety and serve as a model for other states.

Outputs/Outcomes/Impacts:

- The grant was funded and the partnership is now formalized to work on food safety education in schools.

Source of funds: State match, Smith Lever and external funding (CDC).

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.

Milestone:

- **Overseas study for staff improvement:** The food safety specialist participated in the National Environmental Health Association/Chartered Institute of Environmental Health England Exchange Program. The objective of the program is to provide environmental health professionals with opportunities to study this topic in England as a means of enriching their own programs here in the US and to share their knowledge and expertise with their British counterparts. The specialist spent six weeks in England examining their food safety system and their process of food safety education of targeted audiences-consumers, school age children and their caregivers and the food industry. The experience included meetings where information and resources were shared, observations and participation in food safety events.

Outputs/Outcomes/Impacts:

- Presentation at the NEHA Annual Meeting in June, 2000.
- Article on NEHA website and in the June, 2001 journal.
- Planned changes in curriculum delivery method and promotion.

Source of Funds: State match and external funding (NSF International, Rhode Island Environmental Health Association)

Scope of Impact: State specific

Key Theme–HACCP

Milestone:

- **HACCP** and sanitation education was offered to seafood and meat/poultry industry personnel to help them comply with FDA and USDA, respectively, food safety regulations. Knowledge of these regulations and how to effectively design HACCP and sanitation programs will help keep the participants in business. Seafood HACCP courses were offered – in Connecticut (2/16/00 – 2/16/00) and Providence (5/1/00-5/3/00).
- The sanitation control procedures (SCUP) course, developed by the Seafood HACCP Alliance was introduced at two train-the-trainer programs for the New England region – one in Providence RI (3/1/00) and one in West Boothbay ,Maine (2/28/00).
- A SCP course was offered (9/19/00) to industry and regulators
- Two issues 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 was developed to help keep people up-to-date on any changing regulatory interpretations, new information and emerging issues in the seafood industry.
- Finally, the seafood/food safety specialist is available to the industry an informational resource whenever needed.

Outputs/Outcomes/Impacts:

- The HACCP courses (two meat/poultry and two seafood) had 103 participants while the SCP train-the-trainer and following one-day SCP workshop had 35 and 28 participants, respectively.
- The newsletter was produced two times during the reporting period and each newsletter was distributed to over 500 people that had participated in the CT and RI courses.
- All courses were evaluated and rated as very good to excellent.
- Work done in print and voice media has increased industry awareness of food safety issues.

Source of funds: Smith-Lever and external funding (Sea Grant Extension)

Scope of impact: Multistate – **Connecticut**: Nancy Balsam, Diane Wright Hirsch, Cameron Faustman. Collaboration included organization of courses and teaching, and writing and production of newsletter. **Massachusetts**: Linda Sporandio (Mass Food and Drug). Collaboration included organization of SCP courses. In addition, **Delaware** (Doris Hicks) and **New York** (Ken Gall) participated in the SCP train-the-trainer courses.

Milestone:

- **Manager certification and recertification** were offered to the foodservice industry as required by the state regulatory authority. The ServeSafe (National Restaurant Association) certification exam was administered. All certification and recertification resource materials were revised and updated.
- This program is also offered in Spanish
- In addition, 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 help educate foodservice personnel in safe principles of food handling and preparation and comply with the RI state regulations and, therefore, stay in business. The 15-hour certification course had 166 participants and 176 students participated in the six-hour recertification course offered through the URI College of Continuing Education's Office of Special Programs. These courses, 6 certification and 4 recertification, were taught by the food safety specialist and other state approved instructors. The pass rate for the certification courses was 96% and the pre- and post-tests showed a 75% increase in knowledge.
- There were two certification courses offered in Spanish impacting 35 participants. Due to language/literacy problems, despite individual tutoring, the pass rate for these sections was only 50%. Students are allowed to retake the examination three times. Ninety nine percent of the students, who fail the first examination, receive a passing grade on the reexamination. Pre and post test scores for participants in the recertification courses show an 80% knowledge gain. Student evaluations indicate they undertake changes in food safety practices at their establishments even during the course and plan major changes in the three months following the course.

- 20 students in three high school family and consumer sciences programs took the certification course. In addition, work done in print and voice media has increased the foodservice industry awareness of food safety issues.

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

Scope of impact: State specific

Milestone:

- **Good Agricultural Practices (GAP)** programming for the small producers of fruits and vegetables in RI was begun by the food safety extension specialists, in coordination with the RI Division of Agriculture and RI Center for Commercial Agriculture (RICCA).
- To accomplish this new direction, an informational **pamphlet** was developed and sent to the target audience. In addition, food safety questions and knowledge about GAP practices were also included in a **survey** done by RICCA with a selected number of farmers.
- This information was used to help write a New England regional grant proposal for USDA competitive grant 406 funds directed toward implementing GAP food safety principles on small farms. The RI food safety specialists were coordinators and principle investigators for the grant project. The GAP grant entitled "Using Good Agricultural Practices (GAP) to Integrate Food Safety Principles Into Small Farm Production" was an integrated outreach/research undertaking that reflected the New England food safety partnership and the efforts of all the six states' food safety specialists and others.

Outputs/Outcomes/Impacts:

- Over 1,000 pamphlets were distributed and results of the survey helped write future grants.
- The USDA competitive grant was successfully funded and impact in FY 2001/2003 will be New England wide. The start date of the project was September 15, 2000.

Source of funds: State match and Smith Lever

Scope of impact: State specific and multistate. The GAP grant has impact scope as multistate integrated research and extension for the six New England states participating: RI (lead state), CT, NH, MA, ME, and VT. 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 (not on the CSREES list)

Milestone:

- **Consumer education on seafood safety and quality**: The extension seafood specialist developed a free consumer lecture series, offered monthly for June-September, 2000. The four lectures focused on the marine environment. The first lecture featured a well-known RI chef who presented a cooking demonstration and focused on correct seafood purchasing, handling and

cooking to maximize quality and safety. In addition, an extension specialist was invited to deliver a lecture for the saltwater anglers association on the proper handling of fish caught by recreational fisherman to maintain quality and safety. As part of consumer education for seafood safety, the URI Extension program was involved in a RI Career and Technical School Cook-off. The cook-off included points for sanitation, and safety issues as well as taste and appearance.

Outputs/Outcomes/Impacts:

- The consumer lecture series attracted 140 people, while the lecture delivered to the Anglers Association had over 100 participants. The seafood cook-off involved 12 students from three vocational schools in RI.

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. In addition, food safety specialists are available as an informational resource whenever needed.

Outputs/Outcomes/Impacts:

- Over **2000** food safety-related calls from consumers have been answered. Two training sessions were completed educating **20** volunteers. Increased consumer awareness as to food safety through print and voice media.

Source of funds: State match, Smith Lever.

Scope of impact: State specific

Milestone:

- The food safety education specialist has continued the program for **food safety education for home day-care providers**. These workshops cover the basic food safety principles of food handling, preparation and storage and how they would apply in a home day-care setting. Workshops are given upon request.

Outputs/Outcomes/Impacts:

- One workshop was given in June, 2000 to over 75 participants.

Source of funds: State match

Scope of impact: State specific

GOAL 3: A HEALTHY, WELL-NOURISHED POPULATION.

PROGRAM 5: NUTRITION

Overview: In contrast to the Food Safety Program (4, above) faculty depth for nutrition programs remains relatively strong within the Department of Nutrition and Food Science. Here, the research agenda is largely following 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. In addition to

ongoing programs under EFNEP, the following reflects progress in implementing research results (from two multistate research projects) through outreach.

Because the University is limited in its capacity to fill vacated positions, we are looking for creative alliances between departments. One recent opportunity for research collaborations that we are exploring has to do with assessment of the nutritional ecology of migratory song birds (see next Program), and the analysis of food composition (particularly lipid analysis). Thus, we can bring some analytic focus on nutritional analytic capacity, albeit from a novel perspective (ornithology).

Key Theme–Human Nutrition

Rhode Island nutrition efforts focus on research and outreach to increase the consumption of fruits, vegetables and grains among young adults and the elderly, through two multistate research efforts.

Milestones:

- 187 (51% or 367 surveys) eligible subjects (age 18-26) were surveyed and a strong relationship was found between motivational readiness to change based on perceived intake of these foods and intake measured using a food frequency questionnaire.
- A technique to estimate carotenoid intake was evaluated on 200 elderly Rhode Islanders as part of a study of fruit and vegetables as sources of antioxidants.

Outputs/Outcomes/Impacts:

- Young adults were at different stages of motivational readiness to meet dietary guidelines and were more willing to eat fruits than vegetables
- Young adults who smoked cigarettes, ate breakfast less then 4 times a week, ate fast food three or more times a week, or lived in urban areas were least likely to eat the minimum number of servings for fruit.
- ~200 seniors from low-income housing participated in focus groups to identify benefits and barriers to fruit and vegetable consumption. Educational materials on increasing carotenoid intake in seniors are being developed.
- Interventions to increase fruit and vegetable consumption in young adults should be tailored to motivational readiness to change for fruit and vegetables separately.

GOAL 4: GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT

PROGRAM 6: NATURAL RESOURCES AND THE ENVIRONMENT

Overview: There is considerable overlap between Goal 1 and Goal 4 in Rhode Island's research and outreach projects due to the heavy emphasis on low-input (including low-pesticide) agriculture, especially on the role of biological control for pest management of insects, ticks, and invasive plants. Second only to the Narragansett Bay, Rhode Island's greatest natural resource is its abundance of high quality ground water. Our programs and projects share a common concern of protecting this resource from pollution and overuse.

Nowhere else in our portfolio is the relation between research, outreach, and academics so tightly integrated as in this Program. In part, this is because the core projects are all

well supported by mature staffs, most of them full of veteran research associates with 10-15 or more years experience. Also, it is in this program area that we have the greatest degree of faculty commitment to integration between research and outreach: Here, the commitment is fully two-way. That is, not only are the researchers dedicated to seeing that their results are incorporated into active outreach projects, but also the extension staff are dedicated to basing their programs on the latest science and technology.

We do not anticipate staffing problems with these programs. Academic departments have been able to fill faculty slots and to allow adequate time for faculty to develop and maintain successful research and outreach programs. We also have attained and are able to maintain through outside grants a vital core of research associates, professional staff who make it possible to sustain programs year after year.

A significant development in 2000 was the staffing of the Office of the Director of the Coastal Institute. This position is dedicated to fostering more effective working relations between campus entities—including RIAES, RICE, Sea Grant, various environmental research centers—and government and private environmental agencies and organizations. Even in its first year, this office has been able to help facilitate important discussion forums, and to highlight successful efforts such as the CE Water Quality groups launching of the New England Water Quality Consortium through a successful 406 4-year grant.

We report in somewhat greater detail in what follows (compared to other program areas), a reflection of the significant productivity of this program area, but also to illustrate the degree of integration of the research, outreach, and teaching components of this program.

Key Theme–Water Quality

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 (Gold et al., 1988; Gold and Groffman, 1993), sources and sinks of nitrogen in the New England landscape (Morton et al., 1988; Gold et al., 1990) pollution abatement technologies for on-site wastewater systems (Lamb et al., 1990; Gold et al., 1992), analyses of spatial databases and GIS for watershed management (Gold et al., 1989; Gorres and Gold, 1996) and recent research on the role of riparian

areas for pollution control (Nelson et al., 1995; Gold and Kellogg, 1997; Gold et al., 1998).

Along with our connections to research, URI CE has been a leader in linking extension to undergraduate education. We (Gold et al.) received an USDA Higher Education Challenge Grant "Melding Undergraduate Education to Extension", in 1996. As a result of this grant we mentored 12 undergraduate interns in our various programs and established an approved CE WQ apprenticeship program for undergraduates in the Natural Resources Science Department at URI. The link to undergraduates has provided us with an infusion of helpful, dedicated staff and increased our capacity to deliver our programs. In addition we have contributed to the training and competitiveness of our students – several of whom have already gone on to employment with our partners within the state and region.

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.

URI On-Site Wastewater Training Center:

The URI On-Site Wastewater Training Center, a program focusing on field training and educational demonstrations of alternative 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 eight regional centers nationally. The goal of the program is to provide 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. The field training center, located on the URI Kingston campus, consists of nineteen innovative and alternative full scale systems constructed above ground for hands-on learning. Each of the demonstration septic systems are based upon proven technologies that minimize nutrient and/or microbial loading to ground and surface waters. The OWT is a major resource for RI and for Extension programs throughout New England.

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.

URI Watershed Watch:

Watershed Watch is a scientist-led volunteer water quality monitoring and education program. The goal of Watershed Watch is 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.

Outputs/Outcomes/Impacts:

- It is the largest scientist-led volunteer water quality monitoring program in the State.
- It consists of 250 trained volunteers, investing 12,500 hours each year on over 100 stream, pond, and estuary sites, providing 90% of the State's lake water quality data.
- Watershed Watch works in partnership with over 30 local sponsors, including one third of RI towns, to provide annual volunteer training and technical support, laboratory analysis, an EPA certified QA/QC program, data analysis, and reporting.

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.

RI Home*A*Syst Residential Pollution Prevention Program:

RI 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:

- The Rhode Island Home*A*Syst Program conducts an annual volunteer training program and outreaches to municipal officials from conservation commissions and wastewater management boards to participate. These municipal boards typically have a public education role in their community and can partner with Home*A*Syst to meet their public education goals.

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, and several other local agencies and citizen groups.
- During the 1999 training program, three municipal officials from two different Rhode Island communities participated in the volunteer training program.

Following the program, in 2000 Home*A*Syst partnered with the towns of Glocester and Lincoln, RI to develop and deliver educational programs.

Municipal Watershed Management Training:

URI Municipal Watershed Training Program is a NEMO-based (Nonpoint Education for Municipal Officials) program using GIS-based watershed assessment tools. It provides 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:

1. Statewide and regional training

Outputs/Outcomes/Impacts:

Organized two statewide workshops for municipalities on local wastewater management:

- Incorporating Alternative Wastewater Treatment Systems in Town Management Programs. Presented in cooperation with the Charlestown Wastewater Management Commission. This evening workshop provided an introduction to alternative treatment systems and elements of a comprehensive wastewater management program. 25 attendees.
- Establishing a Community Wastewater Management Program. This program consisted of a four-hour workshop on elements of a local wastewater management program, selecting advanced treatment systems for critical areas, and successful examples of local management programs. A companion full day field tour of URI Onsite Training Center and Demonstration systems was held the in the Green Hill Pond Watershed. 45 attendees.
- These workshops were led by Extension staff, in cooperation with local officials, state agency partners and consulting professionals. Presentations delivered included: Introduction to alternative treatment systems, elements of municipal wastewater management programs, and overview of the Block Island /Green Hill Pond watershed demonstration project..
- Methods to identify wastewater needs. Presented at the New England Interstate Water Pollution Control Commission workshop for local officials, Protecting Your Community's Water Resources.
- A local approach to Source Water Assessments. Presented at the Ground Water Protection Council Annual Forum. Newport, RI.

2. Community-based workshop series

Conducted multi-session community-based workshops for communities in priority watersheds. These focused on increasing constituent knowledge on watershed and water quality principles and nonpoint pollution issues related to existing and future watershed land use. In each case, we developed extensive local case studies of site-specific water resources and local approaches to BMPs for water quality protection.

Milestone:

Wickford Harbor Watershed Assessment

This six-session program was conducted in partnership with the Town of North Kingstown and the non-profit group Save the Bay. This watershed is a state priority for eelgrass restoration and maintenance of shellfishing. Aquatic habitat quality is considered threatened due to nonpoint pollution impacts. Participants included the full Conservation Commission and members of the Wastewater Management Commission, Planning Board, Zoning Board, Harbor Management Commission, Town Council, town planning staff, and interested citizens.

Outputs/Outcomes/Impacts:

Products developed for local resource-based decision making included:

- Development of GIS-based natural /community features inventory with land use and pollution source information updated by the Conservation Commission.
- Digital map coverage of property boundaries (parcels) linked to town database for central Wickford Harbor.
- Preliminary parcel-based analysis of wastewater needs for Wickford Village (Wickford Cove and Mill Cove South) identifying numbers of occupied dwellings, number pre-dating 1970 RIDEM ISDS standards, and number of repair permits with approximate locations mapped by address matching.
- Land-use based build out analysis for Wickford Harbor watershed and subwatersheds, based on RIGIS land use coverage.

Outcomes of Wickford Harbor Assessment Project.

- Town officials are seeking to expand bacterial monitoring in Wickford Harbor to fill identified data gaps.
- The Town applied for a received a RI nonpoint management grant to remediate stormwater discharge problems identified by the assessment.
- The Town is using results of the assessment to select priority subwatersheds and preliminary sites for stormwater retrofit locations under the nonpoint grant.

Milestone:

Burrillville Aquifer and Wellhead Assessment Workshops

This five-session program was conducted in partnership with the Town of Burrillville using site-specific examples developed from the town's aquifer and five priority wellhead protection areas. Participants included water supply board staff, members of the economic development commission, Planning Board, Zoning Board, and RI Department of Health. Burrillville is within the Blackstone River Watershed, a state and national priority due to the River's status as a National Heritage River.

Outputs/Outcomes/Impacts:

Products developed for local resource-based decision making included:

- Development of GIS-based natural /community features inventory with land use and pollution source information updated by the advisory group.
- Parcel-based buildout analysis for the town and separate analyses specific to each study wellhead area.
- Preliminary parcel-based analysis of town wastewater needs identifying number of occupied dwellings, number pre-dating 1970 RIDEM ISDS standards, and number of address-matched repair permits with approximate locations mapped by address matching.

Outcomes:

- As a result of progress made in assessing groundwater pollution sources under this project the Town of Burrillville was chosen as a pilot community for the RI HEALTH Source Water Assessment Program.
- The town strengthened the Groundwater Overlay Protection Zone to include wellhead protection areas.
- Results of the assessment are being used to develop a townwide groundwater protection plan and performance standards for commercial development in the aquifer overlay zone.
- Natural features inventory maps and other assessment results were used to evaluate proposals for expansion of commercial development in the aquifer.
- Members of the project advisory group attended additional training on creative options for commercial development under the Technical Planning Assistance Project in the south county area of RI, a project in which URI Extension is a partner.
- Town staff have initiated in-house discussion with other local decision makers to develop a town wastewater management program.
- The Town, with technical assistance from the URI Onsite Wastewater Training Center, is seeking community development block grant funds to remediate septic system failure for low-income homeowners using alternative treatment systems.

Milestone:

Training Program for Glocester Town Officials

Conducted a three-session program *Roles and Responsibilities of Boards and Council in Community Development* as a follow up to a five-session program conducted in the Scituate Reservoir Watershed in the previous year. The target audience was council members, volunteer board members and town staff involved in land use decisions. This series was developed in partnership with the RI Office of Statewide Planning and Providence Water – the manager of the Scituate Reservoir watershed, the source of supply for 60% of the state.

Outputs/Outcomes/Impacts:

Town staff and land use attorneys volunteered their services to help design and deliver training. The focus was on review of special use permits for disturbance of wetland buffers under town jurisdiction. Over 40 local officials – all from the town of Glocester, attended at least one, and in many cases, each session.

3. Follow-up training and technical information on nonpoint pollution control methods.

Milestone:

The Municipal Watershed Training Program routinely responds to requests for information. Our priority is to provide continued assistance to communities who have participated in community-based workshops and are actively implementing pollution controls.

Outputs/Outcomes/Impacts:

- Assisted five towns to develop proposals for State funding of nonpoint source pollution control projects. This assistance ranged from early discussion of nonpoint control options and project scoping, identification of qualified consultants to assist

the towns, and development of a detailed scope of work and cost estimates. All five towns were successful in obtaining funds. These projects include: Tiverton On-site wastewater management plan, Jamestown watershed assessment, wastewater management plan and ordinance, development of a regional wastewater management plan for Foster and Scituate, focusing on village centers and GIS training for board members, and development of a feasibility study and remediation of failed systems in Chepachet Village.

- Coordinated a three-town effort to develop a national wastewater demonstration project showcasing development of risk-based onsite wastewater management. The application was completed and approved by USEPA.
- Assisted the Scituate Water Study Committee to evaluate pollution sources and risks to local wells. We analyzed and mapped Dept. of Heath monitoring data for elevated levels of nitrogen and detects of bacteria, selected organic chemicals, pesticides, and other contaminants. These results and basic information on groundwater flow and pollution risks were presented to the Water Study Committee.
- Using results of the Wickford Harbor watershed assessment workshops, supported development of an EPA block grant to provide incentives for septic system repair and upgrading by funding the differential between the replacement of individual septic systems with conventional technology and the installation of systems employing advanced technologies (or up to 50% of the cost of installation of advanced systems subject to financial need) to reduce nitrate and potential bacteria contributions to harbor and cove waters which are harmful to habitat and human health.

Outcomes:

- The five towns awarded nonpoint source control funds are undertaking assessment, planning and construction projects to improve local wastewater management. The total project value is over $286,000.
- The Towns of New Shoreham, South Kingstown and Charlestown, in partnership with the URI Cooperative Extension, were awarded $3,000,000 to develop a national onsite wastewater demonstration project. This is one of six projects nationally and the only project where small communities are leading a watershed-approach to wastewater management.
- The Town of North Kingstown has received preliminary approval for $300,000 in incentive grants for septic system upgrading in the Wickford Harbor watershed.
- We provide computer generated maps and other forms of local information that permit officials to evaluate pollution risks from watershed land use activities, identify and compare various nonpoint BMP pollution control options, and develop water quality protection strategies tailored to community needs. Municipal education programs are conducted as a joint effort with the RI Department of Administration Division of Planning, Office of Municipal Affairs. Our joint programs provide the *only source* of regular watershed training for volunteer board members and are the primary source of education on nonpoint pollution controls. To address local officials' varied interests we rely on partnerships to bring together a multi-disciplinary team of professionals to assist in outreach.

Critical Habitats Program:

The Critical Habitats Program provides training, database development and internet access for local-decision makers and the public to use spatial analyses to protect lands critical to sustain the health and environmental quality of Rhode Island. The program is the major source of GIS training within the State and offers semi-annual courses in ARCVIEW (a desktop computerized mapping and information system) to local and state decision makers. The program also provides training in GPS for resource management. The Critical Habitats Program is the leader in the state of Rhode Island for web-based spatial data. The Critical Habitats Program coordinates closely with the RI Natural History Survey to enhance the extent of locally relevant data available to environmental resource managers and the public

Milestone:

Extension worked closely with RI HEALTH to develop the RI Source Water Assessment Plan. This included:

- Serving as an active member of the technical committee developing the plan
- Developing methodology to identify and rate pollution threats, and to rank the status of source water watersheds and wellheads
- Providing technical support to RI HEALTH in applying the methodology in small community supplies, development of a methodology to incorporate active participation by both Home*A*Syst volunteers and community leaders in the assessment process, and URI support in conducting the assessments in the State's major water supplies

Because most source water protection areas are privately owned and subject to local land use plans and development regulations, local management is considered the most, if not the only effective long-term protection strategy.

Outputs/Outcomes/Impacts:

- With Extension support the RI has adopted a unique community-based approach to source water assessments that involves citizen volunteers and local community leaders in all phases of the assessment. This approach relies on local partners to direct the assessment with State and EPA support, leading to selection of local management.
- Citizen volunteers and community leaders are participating in assessment projects in pilot communities.

Milestone:

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;
- Analyze cumulative impacts of land use decisions to water quality.
- Evaluate effectiveness of alternative land use scenarios and nonpoint BMPs to reduce pollution risk.
- Identify locally acceptable and realistic management options.

Outputs/Outcomes/Impacts:

- Extension is working in partnership with the under a grant sponsored by The US Forest Service. The project is referred to as **Error! Hyperlink reference not valid.** Working with committees in each of the local communities, the project will identify critical resource areas for conservation and management. 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.
- Introduction to ArcView offered four times each year. This 24-hour short course provides training to approximately 100 people per year in the use of ArcView and accessing the Rhode Island GIS database for environmental management and protection.
- Developed and delivered new training program – Strategies for Implementing a Municipal GIS – April 10, 12, and 14, 2000. This 9 hour short course is designed to provide municipal officials with the information and resources for implementing GIS within their municipality.
- Developed and delivered new GIS technical training program – Introduction to Spatial Analyst. This advanced GIS course provides training in the use of ESRI's Spatial Analyst for natural resource management and protection. This 6 hour short course was offered February 22 & 24, 2000.

Milestone:

- Educate and provide scientific support to volunteer water quality monitors to increase local knowledge and stewardship of community water resources.

Outputs/Outcomes/Impacts:

- URI's Watershed Watch Program has over 200 volunteers, who spent over 625 hours monitoring 153 sites throughout the state.
- Five types of volunteer training programs were held:
  - The standard URI Watershed Watch volunteer training consisting of a classroom and field training components (2 sets of training sessions were offered but each volunteer required to attend only one of each – total time approximately 6 hours per volunteer).
  - Pawcatuck stream training consisting of 2 classroom and two field training sessions, including stream flow measurement and habitat assessment (total time approximately 10 hours per volunteer).
  - Salt Pond Watchers training consisting of 1field session on dissolved oxygen, water clarity and salinity monitoring (total time approximately 3 hours per volunteer).
  - Stream macroinvertebrate assessment training offered through the New England Regional Monitoring Collaborative of which URI Watershed Watch is a founding member. All day session included half-day in a classroom and half-day in the field (total of approximately 7 hours per volunteer).
  - Training was also provided to URI Watershed Watch and Wood-Pawcatuck Watershed Association Coastal Fellows on stream hydrology, flow and habitat assessment (approximately 4 hours each).
- URI Watershed Watch provides summaries of monitored data:
  - 1999 data provided as Excel files to RI DEM in spring of 2000, and upon request to local organizations.
  - 1999 and 2000 data to be published as a two year report by spring 2001.

- During 1999 – 2000, URI Watershed Watch has worked closely with a number of organizations to address water quality concerns identified through volunteer monitoring efforts. These include:
  - RI DEM development of a list of impaired waters for the State (303 (d) list).
  - Stafford Pond Technical Advisory Board to help facilitate implementation of best management practices, and a public watershed education strategy.
  - Narrow River Preservation Association, RI DEM and CRMC in the development of a special area management plan and total daily maximum loads assessments.
  - Portsmouth Conservation Commission addressing aquatic vegetation and nutrient loading concerns in Upper Melville Pond.
  - Trout Unlimited Narragansett Chapter in an effort to acquire protection of native brook trout habitat.
  - Narragansett Indian Tribe efforts to protect water quality throughout their tribal lands.
  - Save the Bay technical assistance in developing a tributary sampling program in the Wickford Harbor watershed.
  - Other communities and organizations as requested.

Milestone:

- Target local officials in underserved communities for educational programs to identify and evaluate pollution risks to their water resources associated with local land use decisions and select community-based management strategies and BMPs.

Outputs/Outcomes/Impacts:

- Programmatic efforts were targeted in the following identified underserved communities: Woonsocket, Pawtucket, Providence, Charestown, Newport, South Kingstown, Burrillville, and Tiverton, Rhode Island.

Milestone:

- Educate citizens to identify environmental risks in and around the home and to take personal actions to protect or restore water quality in the home environment through RI Home*A*Syst.

Outputs/Outcomes/Impacts:

- The Rhode Island Home*A*Syst Program works closely with URI's On-Site Wastewater Training Center to conduct community workshops on private well protection and septic system operation and maintenance in partnership with local community organizations and municipalities. Protecting Water Quality and Septic System Operation and Maintenance Workshops – The RI Home*A*Syst Program. These workshops address private well water protection and septic system operation and maintenance. We typically offer these programs in partnership with local organizations and municipalities throughout the state.
  - Scituate Community House, Scituate, RI. November 17, 1999.
  - URI's On-Site Wastewater Training Center. October 7, 1999, June 13, 2000.
  - Lincoln Conservation Commission, Lincoln, RI. Three part series for community on November 15, 1999 February 17, and March 23, 2000.
  - Annual Master Gardener Training. University of Rhode Island Cooperative Extension. February 9, 2000.
  - Rhode Island Realtors Association, March 9 and April 13, 2000.
  - Tiverton Conservation Commission. May 2, 2000 and June 5, 2000.
  - North Kingstown Water Dept. and Groundwater Commission. May 25, 2000.

- With funding from the Cooperative State Research, Education and Extension Service, Rhode Island Home*A*Syst has developed a risk assessment model focused on public drinking water supplies and services. The model addresses consumer concerns (water quality testing, contaminants in drinking water, what the drinking water standards and concentrations mean) as well as the issues surrounding source water protection in urban and residential areas. The model will be used to create new programs and to enhance source water protection efforts that already exist in Rhode Island. The target audience for this new model Home*A*Syst Program is underserved communities. We developed and piloted the program in Pawtucket and Woonsocket, RI and are now outreaching to other underserved communities as well as incorporating educational materials into the Rhode Island Source Water Assessment Program.

  The risk assessment model includes a publication entitled "Your Guide to Public Drinking Water," that is available in English and Spanish. The publication thoroughly answers consumers' questions about their water. It also provides consumers with recommendations for strengthening ties with their public water supplier and taking actions to protect water supplies in their community. Also developed were an educational display, slide show and web page.
- Expanded community outreach to urban audiences, applying methods used in a recent Brownfields project in Providence, RI funded by the Agency for Toxic Substances and Disease Registry and the RI Department of Health.
- Developed partnership with Pawtucket Water Supply Board, Woonsocket Water Department and strengthened partnership with Providence Water Supply Board.
- Worked with the Rhode Island Department of Health to isolate additional uses for the public water materials such as educating primary care physicians, pediatricians and nursing home administration and staff.
- The RI Department of Health incorporated a Home*A*Syst volunteer training component into the State's Source Water Assessment Program. *Your Guide to Public Drinking Water* and other materials are used as tools at our volunteer training workshops.
- The Lincoln Conservation Commission hosted a Home*A*Syst Public Water Workshop at the Lincoln Public Library.

Displays, Web page updates, and new educational materials developed.

<u>Displays</u>

- The Rhode Island Home*A*Syst Program general display.
- Public Water Protection Educational Display. Used at training programs for public water project.
- Stafford Pond Education Project. Protecting and Restoring Stafford Pond.
- Developed as part of multi-agency Stafford Pond Project and to be used at workshops and displayed around the community.
- Protecting Drinking Water Resources in West Greenwich. Developed as part of multi-agency Wellhead Protection Project and to be used at workshops and displayed around the community.

<u>Web page updates:</u>

The RI Home*A*Syst web page has been updated to include program information on: septic care for renters and vacationers to Rhode Island, public water supplies and their protection, and community involvement in brownfield restoration.

Written educational materials

- McCann, A., A. Lang, and A. Gold (2000). Your Guide to Public Water. URI Cooperative Extension Publication. University of Rhode Island College of Environment and Life Sciences, Contribution number 3780. This publication is printed in both Spanish and English.
- Zarcadoolas, C., E. Anderson, M. Rojas, and A. McCann. Brownfields: Turning bad spaces into good ones; how communities get involved. (1999). Funding for this project provided by ATSDR and RI Dept. of Health.

Milestone:

- Educate local officials, state agency regulators, septic system designers and installers, homeowners, and other groups to identify and apply appropriate on-site wastewater technologies to reduce pollution risks to local water resources. In addition to programs for the residential and municipal audiences, URI's On-Site Wastewater Training Center provides training and education to professional audiences.

Outputs/Outcomes/Impacts:

- The URI Onsite Wastewater Training Center provided training and support to the RI DEM Individual Sewage Disposal System program to promote proper design, siting and management of onsite systems by developing and delivering two classes for wastewater professionals.
- Coordinating with Arnold Lumber Company delivered a slide presentation on alternative and innovative septic systems, as part of their homebuilder education series. 30 homeowner attendees
- Participated in monthly Rhode Island Department of Environmental Management Technical Review Committee meetings for innovative system reviews. Provided technical advise to committee in the review of eight technologies, that are now included in the Rhode Island septic system regulations and are now available for use.
- Provided technical oversight to Rhode Island Department of Environmental Management in their development of Class IV Designer - Soil Evaluator License program. Provided soils review and expertise in field and written examinations of professionals seeking soil evaluator license. To date 19 individuals have passed the Class IV Designer exam.
- Developed the curriculum for training and testing septic system inspectors; provided training for private sector inspectors. The purpose of this program is to establish a group of qualified (registered) practitioners trained in the use of a standardized State-sanctioned septic system inspection procedure. These inspectors would be qualified to do inspections in municipalities with established inspection programs.

  Classes run during reporting periods:
  Oct. 6, 1999 – 27 attendees passed and registered
  May 10, 2000 – 26 attendees passed and registered

Educational materials

- RI Home*A*Syst in partnership with the Salt Pond Coalition developed new approaches to educating people about septic system maintenance in the coastal area. Working in partnership with two realty companies, we developed and distributed a wall sticker for rental properties on septic system care and maintenance for the many seasonal visitors along Rhode Island's south coast. Also developed was a folder of information distributed via building officials to new homeowners and those needing to upgrade their septic system. These materials will be updated and used in future projects and for on-going training programs in the area.
- Guidelines for the design and use of sand filters in Rhode Island (Loomis, G. W. and D. B. Dow. 1999) were developed The URI Onsite Wastewater Training Center. This document was approved and adopted as State policy by the Rhode Island Department of Environmental Management Technical Review Committee. RI DEM. Providence, RI 46pp.

Milestone:

- Educate local officials, public works staff, state resource managers, and other audiences to identify and apply site-appropriate stormwater management BMPS.

Outputs/Outcomes/Impacts:

- Participated in the RIDEM/ RI Rural Lands Coalition Technical Planning Assistance Project to compare environmental benefits of creative design alternatives for residential development scenarios in the Pawcatuck Watershed. This work, conducted in partnership with a broad-based advisory group of planners, builders and realtors, applied the MANAGE assessment method to conventional and creative design alternatives in the Locustville Pond watershed, Hopkinton Rhode Island. This assessment focused on site design to minimize increased runoff and reduced impervious cover.
- Presentation to the Hopkinton Planning Board of GIS-based site assessment.
- Development of a draft GIS-based site assessment methodology for pre-application and concept review of land development projects. Emphasis is on use of readily available GIS coverages, thorough site analysis to identify primary and secondary lands for protection, and review of more than one concept-level road layouts early in the site review process.

Outcomes

- The towns of Charlestown and Richmond applied for and were awarded a Community Development Block Grant to support revitalization of Shannock village. This village is located on the banks of the Pawcatuck River and overlies a wellhead protection area that straddles both towns. This project will seek to implement a creative design for village expansion developed under the Technical Planning Assistance project.
- URI leverage design work under the Technical Planning project to obtain funds to support Shannock revitalization efforts by identifying wastewater management alternatives that will remediate existing septic system failures and support more intensive development "smart growth" development in the village while preserving surrounding open space.

Milestone:

- Educate local officials, homeowners, and other watershed stakeholders to identify riparian stream buffer location and functions, evaluate impacts to these areas, and select appropriate buffer management and restoration BMPS.

Outputs/Outcomes/Impacts:

- The RI Home*A*Syst Program published an educational brochure – Landscaping for Water Quality Protection, developed a website for the information, and an educational program with a slide show. This program has been presented in several communities to date to provide training on riparian protection strategies in residential areas.
- Municipal workshops incorporate use of local examples to describe wetland buffers and relationships of these areas to high water table soils in extended drainage networks. Percent wetland area is used as a measure of watershed health in comparing pollution threats.

Milestone:

Build new and lasting relationships among local watershed stakeholders and public and private experts for improved communication and effectiveness in managing local water resources.

Outputs/Outcomes/Impacts:

- The CE Water Quality conducts programs with input from broad-based local advisory groups. Several examples include:
  - Rhode Island Home*A*Syst Program working in conjunction with the Stafford Pond Education Committee in Tiverton, RI to deliver educational training programs for the protection and restoration of the Stafford Pond drinking water supply.
  - Local advisory groups were formed for the Source Water Assessment Program in Burrillville, RI where the pilot program was initiated. Twelve people worked on the advisory group for the assessment and inventory process including the Town Planner, representatives from the planning board, conservation commission, and water suppliers. This advisory board is continuing its efforts with results from the assessment to develop a town-wide wellhead protection project.
    Currently, we are working on the Source Water Assessment Program on Aquidneck Island, which includes the communities of Newport, Midddletown, and Portsmouth. This committee was formed in May 2000 and we will continue efforts with them until at least September, 2000. Work is in progress to develop advisory committee for the next Source Water Assessment Project to take place in the towns of Lincoln, Cumberland, and Pawtucket.
  - State agency representatives, consulting professionals, and others participate in a variety of CE educational programs, including programs in GIS training, watershed assessments, use of the MANAGE model, and training programs at URI's On-Site Wastewater Training Center.
  - URI takes an active role in several watershed partnership groups, including the Blackstone River and Woonasquatucket River Partnerships, the Pawcatuck Watershed Partnership, and the South County Watershed Partnership.

Milestone:

- Maintain or strengthen coordination and communication with federal and state agencies in delivery of community-based education and development of a watershed-based approach to State water resource management.

Outputs/Outcomes/Impacts:
To maintain and strengthen strategic partnerships, the URI CE Natural Resources and the Environment Program works with and participates in many interagency activities aimed at community-based natural resource protection. Including:

- Pawcatuck Partnership Water use Sub-committee; Volunteer Monitoring Steering Committee
- New England Regional Monitoring Collaborative
- New England Chapter of the North American Lake Management Society
- Pawcatuck Watershed Action Team
- Coventry Conservation Commission
- Woonasquatucket Watershed Coalition
- Association of Southern Regional Conservation Commissions; Data Use Working Group, Water Use Sub-Committee
- Blackstone/Woonasquatucket American Heritage Rivers federal partners
- National Water Quality Monitoring Council – volunteer monitoring representative
- Wood-Pawcatuck Watershed Association Monitoring Re-design Committee
- Executive Board, Northeast Watershed Roundtable
- Public Advisory and Technical Committees of the RI Source Water Assessment Program
- Partners in Resource Protection
- RIDEM
    - Watershed Approach Writing Team
    - Technical Review Committee on Alternative Wastewater Technologies
    - Septic System Maintenance Policy Forum
- Volunteer Monitoring Network

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:

The Station has particular 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.

Milestone:

- 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 completed studies of 44 forest wetlands and prepared publications on bird community characteristics in Red Maple swamps and adjacent forests.

Outputs/Outcomes/Impacts:

- 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.
- 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

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.
- A recreation demand analysis, using survey-based data for almost 1000 respondents, employed an ordered logit approach to estimate the link between objective measures of water quality (nitrogen, fecal choliform, secchi depth, and Brown Tide cell counts) and subjective measures and behavior by beach users.
- A hedonic analysis employed data for all property transactions for a beach front town to estimate the effect of amenities (including open space, farmland, and large-lot zoning) on property values, using a GIS framework to organize the data.
- A contingent choice analysis was carried out, using a survey developed and then administered by intercept survey, convenience sampling, to over 1000 respondents. This analysis was used to examine public preferences for restoring and preserving five major resources of concern in the study area (farmlands, open space, eelgrass, wetlands, and unpolluted shellfish grounds).

Outputs/Outcomes/Impacts:

The results of the project provided previously unavailable information. The work was developed in collaboration with resource managers and the public, and have been incorporated into the decision making process.

Source of Funds–AES and external grants.

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." We have not completed such a dichotomy (which we would document via a revised Plan of Work), but are progressing toward greater cohesiveness within the two components.

In 2000, Extension was key to completing eight years of effort in Rhode Island to establish a Rural Development Council ("the Council"). We entered into an understanding with the RI Economic Development Corporation, which was overseeing State efforts to establish the Council, and completed final agreements and required paperwork to obtain State fiscal support, Governor's approval and appointments to the Council, and to complete required federal paperwork. The approval of the Council, which implies release of federal and state funds sufficient to hire a director and partial staff, creates a new focal point for community outreach activities related to growth management, environmental and economic planning, housing, and water quality. We have assigned to a program leader responsibility to develop a more focused plan for these activities, and this exercise is underway.

We have also made some headway in linking Extension youth programs to a proper academic and research base in our College of Human Science and Services, Department of Human Development and Family Studies. A key milestone was to enlist the new chair of the Department as a Program Leader to concentrate on Children, Youth, and Families. Efforts to align Extension staff with the Department, building on a history of collaborative teaching and field experiential learning opportunities, date back at least 5 years, but have been thwarted by too frequent turnover in Extension leadership (5 Directors between 1996 and 2001). Nevertheless, we progress and are again poised to effect such a realignment, pending approval by a new Extension Director (see Administrative Accomplishments, below).

Children, Youth, and Families Programming: In Rhode Island, the child poverty rate is increasing in many communities. Despite a period of economic prosperity, credit card debt is increasing, savings are inadequate, and many individuals and families are facing defaults on mortgages and credit cards. Violence is an issue of grave concern, with children and youth being both victims and perpetrators. The majority of working parents with infants and school age children express concern about the lack of affordable, quality childcare, and the growing unmet need for before- and after-school care. The increasing stressors of poverty, coupled with growing workplace demands, rising costs of housing, and the lack of an adequate network of accessible youth and family services place many Rhode Island families at risk. The Rhode Island AES and CE have identified the following issues to address Goal 5 within the program area of Children, Youth, and Families.

Family or community approaches to ameliorate poverty-induced stress in youth and methods to improve access to social programs for youth and families, including development of parental skills to teach children limits and how to avoid violence.

Methods to improve youth and adult financial literacy and studies of public policies and private practices to enhance family-run small businesses.

URI's Cooperative Extension activities addressed these issues by identifying communities at special risk, assessing community needs, and delivering programs to meet those needs. Programs that are highlighted in this report focus on staff development and training in child care and youth development; parent and family life education; youth leadership and development; and improving the financial literacy of working adults. The quality and scope of the programming is especially noteworthy given the very limited staff devoted to these efforts.

Sustainable Communities Programs: As we work on improving our plan for sustainable communities, we are working in parallel with University efforts to define additional programs under the same label. For example, the University Honor's Colloquium for the academic year 2001-2002 has the theme "Sustainable Communities!" There is also an on-going faculty and administrative group attempting to define an In itiative, the University's label for a focused collection of research and curricular developments that reflect one of the University's areas of current or future strengths.

We are also attempting to bring 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 which 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.

Key Theme–Community Development

Milestone:

- Researchers worked to define variables that increase the use of policy relevant knowledge in the public policy-making process. This was done by choosing a set of counties in the coterminous U.S. that were designated as "non-metro adjacent to metro areas" using the ERS Beale Code system for case studies as representative of metropolitan areas in five regions of the country. These counties were also selected because they had completed economic development projects supported by the Economic Development Administration. A questionnaire was prepared based on theories of knowledge transfer and administered in each county.

Outputs/Outcomes/Impacts:

- Develops the basis for further study of policy-making in rapidly growing rural counties adjacent to metropolitan areas. The results point to ways that federal agencies, especially EDA and USDA Cooperative Extension can improve the outcomes of public policy relevant to economic development.

Source of Funds–Hatch

Scope of Impact–national

Key Theme–Promoting Housing Programs

(No report this year.)

Key Theme–Youth Development/4H

Milestones:

- RI 4-H Youth Development Programs emphasize 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. Of special focus this year was a leadership development emphasis focusing on decision-making, problem solving, and life skills. Students attended a 4-H leadership Camp, attended a state 4-H Teen Conference, participated in a state 4-H Teen Council, and participated in a New England 4-H Teen Conference where they received training in peer leadership and planning.
- Another new educational experience was the 4-H Communications Congress. Here, teens aged 12- 18 learned about public speaking, communication skills, and strategies for mentoring younger teens. Some 4-H members attended a national technology conference and then formed the State 4-H Tech Team. This group has been working on building the new state 4-H web site.

Outputs/Outcomes/Impacts:

- Youth Development programs reached 1100 youth in 98 neighborhood, community, school and agency-based 4-H clubs in rural, suburban, and urban communities. 300 adult and teen volunteers worked with 4-H groups. 4-H members demonstrated or reported increases in skill and knowledge in leadership, communications, and skill mastery.
- 70 teens participated in the creative arts weekend and the communications congress.
- 120 teens demonstrated writing, organizational, and presentation skills at the public presentation programs.

Source of Funds–RI 4-H Club Foundation, 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 subcontracted to the University of Rhode Island's Urban Field Center to identify the Rhode Island cities and towns considered to be at high risk for declining social and economic conditions. 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.
- The program FACE IT (Families and Communities Engaged in Issues Together) was developed and delivered in five Rhode Island communities. The project is a collaborative effort between University of Rhode Island, community

agencies, and community volunteers. It involves 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; and 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.

Outputs/Outcomes/Impacts:

- Since 1996, over 53,000 volunteer hours have been contributed to the activities of the project. In post-workshop evaluations, 90% of participants indicated that the information was practical, 72% reported that they learned at least three new concepts of practices for working with their respective clients, and 92% rated the workshops as excellent.
- Six of the seven communities involved are participating in an Electronic Connectivity Component of the project.
- In FY 2001, 663 teens and adult staff have been trained; 600 parents attended parenting education classes; and two community advisory boards were formed which have carried out their own needs assessments to address community-based needs.
- URI undergraduate interns have worked as mentors at community sites each semester.

Source of Funding–CSREES CYFAR, in-kind state match.

Scope of Impact—state specific.

Key Theme–Child Care/Dependent Care

Milestones:

- Cooperative Extension Educators developed training programs to improve the quality of child care and youth programs for infants and toddlers, preschoolers, school age children and youth in out-of-school time. Programs were based on a strong theoretical and research foundation to assist child care providers to address the social and educational issues faced by children, and to continue their own professional development. Sample training topics included: Professional Staff Development and Independent Living Skills; Communicating with Parents; Positive Discipline Techniques; Kindergarten Readiness; Working with Special needs Children; The Defiant Child; and a one-day workshop on School Age Child Care.

Outputs/Outcomes/Impacts:

- 2,000 adult and teen child care providers participated in the programming this year.
- 103 RI child care providers attended the special one-day program on School Age child Care.
- Child care sites in 20 communities that received support from Cooperative Extension Educators enrolled 4,000 children.
- Overall evaluation of training by those who attended was 4.5 on a 5 point scale.

Source of Funding–Smith-Lever.

Scope of Impact–state specific.

Key Theme–Other: Financial Literacy

Milestones:

- In a collaborative project between the Cooperative Extension and the Consumer Credit Counseling Services of Southern New England (CCCS-SNE), an innovative curriculum was developed focusing on financial education for adult workers. Nine educational modules, each with three evaluation instruments embedded within, were developed and formatted for CD delivery. Each module is accompanied by a trainer's guide. The intention is to provide work-place financial education in order to improve financial well-being of adult workers and reduce financial stress. Each module has been carefully designed by subject matter experts, and field tested.
- In a collaborative initiative between Cooperative Extension and AES, the educational units are being incorporated into an experimental study of the impact of workplace financial education on financial behavior, and employee productivity.

Outputs/Outcomes/Impacts:

- The workplace financial education programming will take place first on the URI campus, followed by delivery at worksites across the state.

Source of Funding–CE, AES; grant from CDNE Foundation; support from CCCS-SNE.

Scope of Impact–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.

Our best illustration of effective *new* stakeholder process is the grower-originated request for CE and AES programming on invasive species (see above), which involved a well-attended forum to describe issues, with extensive follow-up activity to form a statewide advisory council to link the nursery industry, conservation groups, state and private land managers, and homeowners, all of whom are all now at work developing regulatory policy for invasive plants *and* animals.

We also continue extensive exchanges with myriad water quality and conservation groups, including active coordinated projects in 2000 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 CRMC and the Water Resources Board.. 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 th e private sector, local and state government, citizen groups, and research scientists from the RI AES.

The establishment of an active Program Leader group, which replaced an interim management team in September 2000, was a further improvement in stakeholder listening, bringing direct faculty and educator representation to bear on the Director's decision-making (see Administrative Accomplishments, below).

Attempts to form a parallel external program advisory council (see Plan of Work) were interrupted by an unexpected administrative consolidation at the end of 2000. We had contacted representatives from the aquaculture, horticulture, economic development, and environmental communities as candidates for this council, but stopped these efforts when it was announced that the Director would be replaced in July 2001 with a combined dean / director (see preface to Appendix 3). This should be a high priority for the new administration.

Program Review Process

Program review, including project merit and peer review, are the responsibility of the Director and six 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 from 2 to 5 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 current Station request for proposals (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. The FY01 is essentially the same as that used for FY00 (see the cover note in appendix A).

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, 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 relatively short time that we have had (the Station evolution took over 3 years), and 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. This is now the top priority for Extension administration, i.e., to review all current Extension assignments and budgets in light of merit review (augmented by external analysis), and in light of mandates to integrate with research and across state lines.

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 2000, and that changes in administration in 2000 will make this yes even stronger in 2001. 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 vary 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. And 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 2nd year of a substantial change for our organization, and in light of an extraordinarily austere budget at the University. Procedural adjustments in 2000 have effected a virtually complete reorientation of the Station to outcome-based funding, and have committed the land grant programs in Rhode Island to substantive management changes to keep projects on track toward specified performance targets.

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 develops 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 the multistate nutrition projects.

In September 2000, the Directors of the six New England Extension programs met at Amherst, Massachusetts (part of a twice-annual Consortium agreement that has operated for several years), and discussed extensively the need for additional development of regional extension collaborations. As annual chair for this group (i.e., chair for the fall 2000 and spring 2001 meetings), the RI Director proposed development of one or more multistate extension projects with a process that would use the NERA project management database to submit a new project that followed the essential guidelines approved by the NERA research committee (i.e., the new national multistate research manual approved in late 2000), to establish a regional coordinating committee or project that would be submitted through the existing CRIS mechanisms. While there was divided opinion on the desirability of this course of action, three states agreed to proceed with one or more pilot efforts, focused on any of a half-dozen themes (e.g., water quality, integrated pest management, apple IPM, etc.). This effort was interrupted by the announcement in December of a major reorganization within the RI system, but it remains an idea for further feasibility study within the region.

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 FY01/02, 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, RIAES currently exceeds the 25% requirement. However, given existing CSREES guidance on mechanisms for accounting, we are reporting a conservative 25% estimate of integration at this time.

To a lesser extent, an increasing number of RICE outreach projects are now committed to full integration with research, including all IPM, horticultural, aquacultural (emerging diseases), and Water Quality activities. Full integration of food safety and nutrition programs is inhibited by weakness on the research side, linked to inability of the academic departments to gain University approval to fill food science positions vacated within the past 5 years. Full integration of community development and youth programming is retarded by organizational weaknesses within the community development group (being vigorously addressed now) and by inability to complete a realignment of Extension youth and community programs with the proper academic / research home, which in turn continues to be aggravated by perpetual University administrative shuffling. We cannot at this time guess the impact of administrative changes on 7/1/01 on youth programs, but at least we have established a precedent of approving an outcome-oriented RIAES project on family finance that stems from an existing outreach effort.

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 had been attempting to provide regional (at least, New England) leadership in this area, and may elect to continue to do so under its new administration.

Administrative Accomplishments and Results

A transitional 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. 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

Guidelines for RIAES projects were to conform to AREERA in January 2000, with further refinements in August 2000 and April 2001. A competitive RFP replaced an open-application procedure for FY01 (Appendix A). All projects approved for FY01 funding conformed to the new guidelines.

A joint publication with RI Sea Grant was initiative in November, 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).

The Director assisted in drafting a bill to provide for line-item match for RIAES and RICE, developed an extensive folio of information on programs, and testified before the RI House Finance Committee. Support from the University was otherwise weak and the bill died in Committee. It was reintroduced in 2001 with a promise of more active University support.

All RIAES projects are now incorporated into an Access database, including project descriptions, full project proposals, reviewer data and reviews, and related publications and external grants. Traditional paper copies are also on file as required by regulations.

A complete Strategic Plan for an integrated Office of the Director of Land Grant Programs was submitted to University administration in November 2000. A response is still pending.