Connecticut Annual Report of Accomplishments FY 2003

Connecticut Cooperative Extension System
Storrs Agricultural Experiment Station

This certifies that the University of Connecticut has submitted their Fiscal Year 2003 Annual Report of Accomplishments.

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Goal 1 - An Agricultural System that is Highly Competitive in the Global Economy

The Connecticut program was particularly active and successful in this area with a wide variety of plant and animal agricultural efforts conducted during the reporting period.

Plant research efforts in rhododendron disease control, a critical concern to this very valuable ornamental crop, addressed the development of transgenic rhododendrons that show resistance to Phytophthora (root rot), and a diagnostic assay employing PCR.

Plant research efforts resulted in increased capability in improved tolerance of plants toward abiotic stresses like high salinity and droughts. Three patents supported the impact of such findings.

Animal research efforts saw the successful development of a recombinant DNA vaccine for Infectious Bronchitis virus, a highly contagious respiratory and urogenital disease of chickens. Trials are currently under way in chickens.

Cloning highlights included major research work in the areas of reproductive physiology and animal biotechnology, particularly cloning and transgenic technology to improve animal reproductive efficiencies. Emphasis was placed on improving cloning techniques and understanding of various mechanisms in nuclear-cytoplasmic interactions and genetic reprogramming during nuclear transfer. This work received considerable national and international financial support and media coverage.

Public understanding of milk pricing problems in New England and New York were enhanced through the application of exhaustive investigations of retail milk pricing in the region, resulting in extensive and intensive interactions on various public policy fronts.

Extension efforts to deal with poultry pests through reduced fly and pest populations were found to be effective, with cost savings realized by many producers. Surveillance programs to monitor poultry and other birds' diseases resulted in control of ILT and infectious bronchoitis infection control. 3.5 million birds were protected from IBVD spread.

Involvement by College faculty in a major lobster mortality event in Long Island Sound enabled researchers to identify the impact of transient exposure to relatively low concentrations of malathion can have on defense mechanisms, possibly making them more susceptible to infections.

Development of an internet-based plant database resulted in thousands of contacts and use of information for landscape design by professional and residents alike.

Benefits to clientele and stakeholders who participated in this goal area were many; including the development of new vaccines for testing, introduction of new and valuable ornamental crops for production and marketing in the state, development of factual information to better describe the collapse of the lobster industry in western Long Island Sound, and world-leading cloning efforts.

In summary, our assessment of accomplishments is considerable, and is measurable in terms of the previously submitted 5-year Plan of Work. Total expenditures, by source of funding, and full-time equivalents for this goal are:

Goal 1		
Funding Source	Expenditures	FTEs
Smith-Lever	123,619	2.14
Hatch	22,241	0.75
Multi-state research		
State funds	4,821,135	93.85
Competitive grants	870,444	22.90
Animal health		
Total	6,420,247	120.64

Key Theme - Economics/Risk Management Education

a. Activity - The Agricultural Risk Protection Act of 2000 provided funding through the USDA Risk Management Agency (RMA) for education and outreach programs on crop insurance and other risk management topics. The Extension Risk Management team developed and implemented an educational program covering agricultural crop insurance and risk management issues for more than 550 agricultural producers and professionals in Connecticut. The program was developed using a community-based approach involving UConn Extension, CT Dept. of Agriculture, USDA Risk Management Agency and the state's agricultural community represented by the Agricultural Risk Management Advisory Group.

b. Impact – Short-term impacts included increased awareness by Connecticut farmers of crop insurance programs covering selected crops grown and insured within the state. USDA/RMA and CT crop insurance agents indicated significantly increased participation in crop insurance programs by Connecticut producers as a result of these programs. The total amount of crop insurance liability (maximum amount payable to farmers in the event of total crop loss) increased from $68,292,029 (2001) to $75,119,008 (2002) and the total amount of crop insurance liability (maximum amount payable to farmers in the event of total crop loss) increased from $68,292,029 (2001) to $75,119,008 (2002). At the Statewide Outlook Conference, Assoc. Admin. of USDA, RMA Byron Anderson and Educational Director Craig Witt indicated they were very pleased with the Connecticut program and viewed it as a model for other states' programs. From the 2001 to 2002 growing years acres insured in Connecticut increased from 27, 607 (2001) to 28,372 (2002).

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Economics/Marketing

a. Activity - Farmers trust the experience and knowledge of other farmers who are in situations similar to their own. Their desire to meet and talk with each other has spurred the formation of informal groups. The Connecticut Farmer-Learner Group Association plans workshops, tours, and kitchen discussions based on the direct marketing of livestock meat, dairy, and fiber products. The Connecticut Farmer-Learner Group conducted farm tours and discussions, and milk marketing consultants presented ideas for the northeast Connecticut dairy farmers to begin gaining premiums through direct marketing of milk.

b. Impact – Fourteen farmers gained knowledge about direct marketing through involvement with the Farmer-Learner Group Association. Highlighted short-term outcomes and impacts include one sheep owner put off development of a wool enterprise until retirement from current job, a dairy goat farm finished stage one facility development of a cheese processing facility, a new dairy cow operation has completed first stage construction, a dairy sheep farm increased the flock size and prepared for cheese production, a diversified livestock farm owner planned construction of an on-farm cheese and sausage processing facility for on-farm market sales, an established dairy cow farmer started construction of cheese/sausage making facility, a pastured swine operation started selling piglets, and a turkey processor/retailer will begin labeling turkey carcasses sold to customers with food safety information.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Economics/Northeast Dairy Compact and the New England Fluid Milk Marketing Channel

a. Activity - During the fall of 2002 farm level milk prices in New England had dropped 50 cents per gallon; however the retail price dropped only 10 cents per gallon. Normally in a competitive market channel we would expect retail prices to be more in line with farm level milk prices. The failure of the New England milk channel to behave in a competitive fashion was particularly egregious because a year earlier opponents of the Northeast Dairy Compact had presented research that claimed any drop in farm prices would produce almost twice as large a drop in retail prices. A more exhaustive investigation of retail milk pricing in southern New England and neighboring areas of New York was undertaken.

A meeting at the University of Connecticut for farmers, interested dairy processors, and government personnel from State Departments of Agriculture generated a flood of media coverage for the issue of high retail milk prices and low farm milk prices and brought in

Connecticut Attorney General Richard Blumenthal, who announced he was seeking milk price gouging legislation from the legislature to rein in unconscionably excessive pricing of milk.

The Connecticut Legislature's Committee on the Environment held a full-scale hearing and received testimony documenting the need and a way to proceed to produce such a law. Our reports documented that farm level milk prices in the Northeast are, if anything, lower than farm level prices in the Midwest. This is contrary to basic economics of the geographical production and competitive distribution of raw milk in the United States. Consequently farmers in New England as well as consumers are facing prices that are not in line with the performance of a competitive market channel. Consumers' prices are too high and the farmers' prices are to low.

b. Impacts – This research/outreach effort contributed to increased short-term public understanding of milk pricing problems in New England and New York and contributed to current and possible future legislation in Connecticut and other states. There is a distinct possibility that the milk regulation board will propose pricing regulation along the line of those that we have developed. A copy of our proposed price regulation is available on the Food Marketing Policy Center website.

The need for a change in milk pricing rules in New England will persist. The alternative is the demise of dairy farming and a substantial portion of what remains of fluid milk processing in New England.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Economics/Competition and Productivity Growth in U.S. Food Processing

a. Activity - The link between imperfect competition in U.S. food processing and total factor productivity growth was examined by bringing together the frameworks of the New Empirical Industrial Organization (NEIO) literature and the TFPG model of Good, Nadiri, and Sickles (1999). Particular attention is paid to economies of scale, pricing behavior and demand growth in addition to physical technological change. A paper was presented at the European Association for Research in Industrial Organization meeting in Madrid, Spain, one paper posted on the web site of the Food Marketing Policy Center in Storrs, CT, one paper posted in the web site of the Center for Agricultural and Food Industrial Organization in Lincoln, Nebraska, and one paper submitted to the Journal of Productivity Analysis.

b. Impacts - This research project generated considerable external interest, with many requests received from agribusinesses, especially about the role of demand growth and consumer income changes in determining productivity changes in the food industries.

c. Source of Federal Funds - Hatch

d. Scope of Impact – National

Key Theme - Economics/Structural

Changes in Agriculture Analysis

a. Activity - The changing trend of the contribution of agriculture to the total Connecticut economy was assessed using inputs from the detailed Regional Input-Output Modeling System (RIM II) of the Bureau of Economic Analysis for 2000 and the related aggregated data. Outputs measured the contribution of agriculture to the total economy in Connecticut. Development of a new approach is being constructed to use aggregate data following the Markov chain methodology.

b. Impacts - The Markov program posted on the Internet received several requests from many countries including Columbia, Korea, Turkey, Australia, and China, plus Columbia University, Arizona State University, and University of Tennessee. When the new aggregate approach is successful in tracing the annual changing impacts of agriculture to the total economy, it will have a better understanding of how the economy is changing and it will be a good reference to policy makers.

c. Source of Federal Funds - Hatch

d. Scope of Impact – National

Key Theme - Animal Disease/Surveillance Programs for Animal Diseases

a. Activity - In cooperation with the CT Department of Agriculture (DoAg), the CT Department of Public Health (DPH) and USDA APHIS New England Regional Office, a multifaceted effort has been made to increase animal disease surveillance and improve the capabilities of the Connecticut Veterinary Medical Diagnostic Laboratory (CVMDL) to conduct diagnostic and

surveillance testing. USDA homeland security funds have been used to increase the ability of the State to respond to animal /zoonotic disease emergencies. Our role in this endeavor is to provide necropsy for animals that exhibit unusual or unexplained clinical disease or death to identify newly emerging or bioterrorist diseases before they have become widespread. Our laboratory has been successful in identification of West Nile Virus and Avian Influenza outbreaks, among others. Funds have been utilized to develop a Johnes disease education, testing and management program, in conjunction with the CT DoAg. Johnes disease can cause severe weight loss and debilitating disease in cattle, sheep, and goats. It shares similarities with Crohn's disease of humans. Our role in this program is to improve CVMDL's ability to conduct large scale testing of dairy and small ruminant herds for Connecticut as well as other southern New England states. We have implemented antibody screening testing, and are initiating fecal culture and PCR (DNA detection) testing for this disease. Our laboratory has also been instrumental in providing laboratory support for the recent Avian Influenza outbreak in Connecticut and Rhode Island. In cooperation with CT DoAg, and USDA APHIS New England Regional Office, we have conducted live and dead bird surveillance testing for most of the New England states, and will play a major role in the upcoming live bird market surveillance program for this disease. Lastly, through a cooperative agreement with CT DPH and CT DoAg, we are able to conduct equine WNV surveillance. Horses, humans and crows are among the species most likely to suffer illness from this disease; early detection of the disease in horses can help alert public health officials of increased risk for human infection. The overall goal is to improve our capacity to detect new animal and zoonotic diseases before they become widespread. A highly contagious disease, such as Foot and Mouth Disease could spread quickly and be devastating to the economy. Other diseases (such as anthrax, tularemia, plague) which affect both humans and animals could be intentionally introduced or arise naturally. They may show up in the animal population prior to being recognized in the human population.

b. Impacts - These efforts have integrated our laboratory resources and capabilities with other state and regional efforts to detect emerging animal diseases in a timely manner, and to assist in the response to epizootics of disease. Enhancing our ability to actively participate in animal disease surveillance and improve our technical testing capabilities improves our likelihood of detecting and responding to an emerging disease in a timely way. This could result in faster control of the disease outbreak with a decrease in loss of life (both human and animal) and a smaller impact on the economy.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

<u>Key Theme - Animal Diseases/Infectious Diseases</u>
a. Activity - Research on the study of the molecular mechanisms of pathogenesis of mycoplasmas. The primary mycoplasmas studied are *Mycoplasma gallisepticum*, an avian pathogen which causes chronic respiratory disease in chickens. We investigate the means of attachment; cytadherence molecules and host cell receptors, as well as control mechanisms of variably expressed cell surface proteins involved in cytadherence and/or evation of the host immune response. We have completed the sequencing and annotation of the *M. gallisepticum* genome and have made this data available through GenBank and in print, *Microbiology*, 9/1/03.

We are currently utilizing the genomic data to study gene expression and functional genomics. Having this genome data in hand we have sought out experts in specialized fields to expand our research capabilities. We have subcontracted to Dr. Steve Djordjevic and The Australian National Proteomics Institute to collaborate with us to analyze the protein expression and utilization (proteomics) of *M. gallisepticum*. We participate in a 3-institute consortium comprised of The University of Missouri's Program for the Prevention of Animal Infectious Diseases (PPAID) and the USDA Plum Island Animal Disease Center. This creates tremendous strength in the areas of infectious diseases, microbiology, immunology and molecular biology.

b. Impacts - These collaborations have now set the necessary framework for the development of improved vaccines, therapeutics and diagnostic tests to control infectious diseases that threaten the United States food animal industry. It has also enabled us to seek funding for larger projects that were unattainable for any single laboratory to pursue successfully. Significant progress has been achieved in funding and advancing the Center of Excellence for Vaccine Research (CEVR). The research focus and strength of the CEVR is the elucidation of the mechanisms of pathogenesis of, and the immune responses to, viral and bacterial pathogens with the goal of developing safe and effective vaccines.

c. Source of Federal Funds - Hatch

d. Scope of Impact - Multi-state

Key Theme - Animal Disease/Immunotoxicology of Lobsters

a. Activity - Lobsters represent an economically important fisheries in New England. In the fall of 1999 a massive die-off resulted in reduction of lobster landings in western Long Island Sound that reached 99.9%. Research at UConn revealed a new pathogen, a paramoeba, that caused lesions to the nervous system of lobsters that could explain the death of those animals. It is nevertheless not known if this paramoeba represents a newly introduced, virulent pathogen of lobsters or if it represents a pathogen that was always present in the environment and would have infected and killed lobsters. The die-off also coincided in time with the application of pesticides to control mosquitoes carrying the newly discovered West Nile virus. Research was conducted to understand the effects of those pesticides on lobsters, particularly on their defense mechanisms, which could have predisposed the animals to new infections such as paramoeba.

We developed a system to experimentally expose lobsters to pesticides in controlled conditions. Our studies allowed us to evaluate for the first time the dose of malathion, one of the pesticides used for the control of mosquitoes, that killed lobsters. Furthermore, we evaluated the effects of concentrations of malathion much lower than those that killed lobsters and found that they reduced the immune functions of lobsters several days after exposure. At that time, malathion could not be measured in tissues of the affected lobsters. Similar experiments demonstrated the relative lack of toxicity of methoprene on adult lobsters.

b. Impacts – Short-term outcomes to the broader environmental policy debate over Long Island Sound management issues are significant as this work demonstrates that transient exposure of adult lobsters to relatively low concentrations of malathion, but not to methoprene, can affect the defense mechanisms of lobsters and possibly make them more susceptible to infections, thereby impacting potential future control strategies.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Animal Disease/Recombinant DNA Vaccine for Infectious Bronchitis Virus (IBV):

a. Activity - Infectious bronchitis is an acute, highly contagious respiratory and urogenital disease of chickens. The highly transmissible nature of the disease suggests that use of a vaccine is necessary to prevent outbreaks. Both live attenuated and inactivated vaccines have been used in the vaccination and have greatly reduced the economic losses caused by IBV infections. However, the continued emergence of new variant strains of IBV posses great concerns in the control of IBV infections. Attenuated live IBV vaccines have been used for more than 50 years, despite the evidence that the vaccine is not safe and may play a significant role in the establishment of endemic IBV, especially when multiple strains of IBV live vaccines are used together. Therefore, using the traditional vaccines to control and further eradicate the disease becomes impossible. New concepts for developing novel vaccine are needed. Spike protein 1 (S1) has been demonstrated to be the major inducer of protective immunity, although other structural proteins also play a role. We have taken the approach to develop IBV recombinant fowl pox vaccine. We have cloned a S1subunit of spike protein sequence of IBV Massachusetts's serotype in the attenuated Fowlpox virus vector for possible vaccine against IBV infection. Similarly we were able to clone a whole Spike gene in the plasmid for DNA vaccine. Scientists from universities in New York, Delaware, Maryland, North Carolina, Ohio, Georgia, Illinois and Iowa are involved.

b. Impacts - We have successfully developed recombinant DNA vaccines for Infectious Bronchitis virus; trials are under way for the efficiency of the vaccine against infectious bronchitis virus infection in chickens.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Animal Disease/Avian Respiratory Disease
a. Activity - We have successfully developed PCR for reovirus, adenovirus and a multiplex PCR for avian pathogenic mycoplasmas. A multiplex PCR was also developed for serotype Massachusetts and Arkansas infectious bronchitis virus (IBV).
A multiplex PCR for respiratory avian pathogens was developed. This multiplex PCR can detect and simultaneously differentiate six respiratory pathogens in one test.

b. Impacts - Development of a Multiplex PCR for avian respiratory diseases that can detect and simultaneously differentiate six respiratory pathogens in one test that will be rapid and cost effective. Other short-term outcomes include establishment of an international cooperative research program with a research institute in China (Dr. Yoashan Pang) that has successfully completed research on the development of a multiplex PCR for avian respiratory diseases. This technique is being used in China.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Animal Disease/Molecular Characterization of *Salmonella enteritidis* (SE) attachment proteins
a. Activity - Egg-borne *Salmonella* enteritidis infection has emerged as a major public health problem in the United States and several other countries during the past decade. An essential event in the pathogenesis of SE is the attachment to the host intestinal mucosa through specific receptors on the host cell surface. Identification and characterization of SE specific attachment proteins (adhesions) would help to design effective control measures. We are in the process of molecular characterization of the mechanism of attachment by identifying and studying the adhesion molecules expression during attachment of SE to host cell receptors.

b. Impacts – Short-term research outcomes included identification of four SE proteins of approximate size 85, 75, 50, and 36 Kda newly synthesized when incubated with Int-407 cells (human intestinal cells). We also recognized three SE attachment proteins with approximate size 38, 32, and 6 Kda whose expression were up regulated when incubated with Int-407 cells. Further studies are in progress.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Animal Disease/Poultry
a. Activity - Food-borne pathogen contamination of poultry eggs and products is concerned with a *Salmonella enteritidis* reduction and control program at the poultry farm level. A continuing education program on biosecurity and disease surveillance by blood tests against AI are in place in Connecticut. Surveillance program to include surveillance of regulatory disease were reported to public health, Agriculture, and APHIS Salmonella enteritidis (SE) reduction program. Actively involved in the environmental monitoring of SE in poultry farms. Provide information, how to control SE contamination by thorough cleaning, biosecurity, pest management and possible SE

vaccination programs. Avian Influenza outbreaks, to include surveillance and control of low path AI were addressed through presentations at the Connecticut Poultry Association meetings and New England Round Table Conference.

b. Impacts – Outcomes from this continuing effort saw outbreaks of ILT and infectious bronchoitis infection successfully controlled by proper diagnosis and biosecurity and vaccination programs. Total eggs laying commercial flocks of 3.5 million were protected from the spread of IBVD, Coryza, Colibacillosis and Pasteurellosis. Grandparent broiler breeder flocks of 8,000 birds were protected from ILT and Mycoplasma outbreaks. No outbreaks of Salmonella food-borne outbreaks related to eggs and egg products from the Connecticut commercial egg farms. Spread of low path AI has been stopped from infected farms to others in Connecticut

c. Source of Federal Funds – Hatch, Smith-Lever

d. Scope of Impact – State

Key Theme - Animal Disease/Crohn's Disease

a. Activity - Research continues to try to identify the cause of Crohn's disease of man, a chronic disease of the small intestine that appears to have no counterpart in our animal species. The pathologic lesion has some similarities to intestinal tuberculosis, Yersinia infection, and chronic salmonellosis. Therefore, there is the suggestion that an infectious agent may be responsible. To try to understand the origins of a communicable bacterium or virus, families with multiple cases of Crohn's disease have been the subject of investigation. An inordinate number of families with multiple cases occur in the north of France and in Belgium. Interviews have been conducted, with the aid of an extensive 171-point questionnaire, in order to probe food and water consumed, childhood vaccinations and diseases, contact with persons with other illnesses, trips abroad, etc. Twenty-one families with multiple cases have been interviewed, along with ten matched control families, and four simplex families (defined as families in which single cases of Crohn's disease occur). The extensive data from this study have been entered into SAS and await statistical analysis. In addition, clues generated through these interviews have been followed by molecular techniques, in search of recurrent or persistent viruses, in surgically resected tissues from patients.

b. Impacts – Short-term outcomes of this continuing research effort suggest that comparisons between affected and unaffected siblings and between affected and control families will lead to significant information regarding currently held hypotheses; for example, regarding a relationship to breast-feeding, tobacco smoking, and appendectomy. New associations may be forthcoming. Longer term outcomes may include molecular techniques yielding significant findings that can be tested by immunohistochemistry and serology.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Animal Science/Poultry Pest Management

a. Activity - Poultry pests increase the risk of disease in poultry and thus need to be controlled. Flies and rodents from farms may enter neighboring properties and cause nuisance or health problems for the non-farm community. Poultry pests reduce profitability by contamination of feed, spreading of disease and destruction of property, and are therefore necessary to control. As insecticides and pesticides are added and removed from the marketplace producers need to know about the products and how to safely use them. Our focus is to educate poultry farmers about proper pest management. The integrated pest management approach is used. This includes natural, social, physical and chemical pest control methodologies. The major thrust of the program is through the Poultry Pest Management Workshop held each May and brings together people from Canada, New England, New York and Pennsylvania.

b. Impacts – Ongoing impacts of this continuing program saw summer fly and pest populations reduced due to better pest management by CT and New England poultry producers. Savings ranging from $100 to $5,000 were reported by farmers resulting from decreased loss due to pests. Meeting outcomes indicated that 30 poultry farmers/workers/ allied industry personnel said they learned new information on pest control and safe use and handling of pesticides. Five (5) allied industry people said they increased their knowledge about poultry pests and IPM as a result of Extension Programming. Extension and other educators from Connecticut, Maine, New York, and Pennsylvania participated in the IPM effort.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

<u>Key Theme - Animal Science/Livestock Production Efficiency</u>

a. Activity - If the production efficiency could be improved then the production of meat and animal protein could be improved. This improvement would culminate in lower cost of production and reduced food costs to the consumer. Research to increase growth rate or efficiency of nutrient utilization of cattle and swine with augmentation of somatotropin release or function focused on determining the concentration of insulin like growth factor binding proteins in young beef cattle after somatotropin injection.

b. Impacts – Short-term outcomes from this project determined that there is a difference in the concentration of IGFBP in males and females. The outcomes from this research can be interpreted to show why to some extent male calves grow faster then female calves. Longer term, if a system could be developed to cause the same changes noted in male calf concentration of IGFBP to occur in female calves it may be that the female calves would grow more efficiently.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Animal Biotechnology/Production of transgenic swine for xeno-transplantation

a. Activity - Currently there are not enough organs and tissue available for the number of patients needing them. Also when tissue from two divergent species is mixed the host usually destroys the donor tissue. Therefore there is a place and a need for tissue from a species such as swine to be engineered to allow transplantation into humans. The focus of this project is to produce swine that possess and express human genes that will help allow swine tissue to be transplanted into humans. The objective was to produce transgenic swine by breeding swine that are known to possess human genes (H-transferase and human complement inhibitor CD 59). Fifty swine have been produced that possess at least one of the three constructs.

b. Impacts – These short-term outcomes may lead the way to longer term outcomes such as the treatment of Parkinson's disease and regeneration of injured nerve tissue.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Animal Biotechnology/Animal Cloning and Biotechnology

a. Activity - Basic and practical research in the areas of reproductive physiology and animal biotechnology, particularly cloning and transgenic technology is conducted to improve animal reproductive efficiencies by developing and optimizing various reproductive biotechnologies. Research focus has been on improving cloning techniques and understanding of various mechanisms in nuclear-cytoplasmic interactions and genetic reprogramming during nuclear transfer.

b. Impacts – Short-term outcomes included over $7,000,000 extra-mural supports from the USDA, NIH, the State of Connecticut (CII), the Rockefeller Foundation, and the pharmaceutical industries, such as Alexion Therapeuticals, Inc., Evergen Biotechnologies, Inc., Biotechnology Research and Development Corporation (BRDC), PPL Therapeutics and Genzyme Transgenic Corporation. Our success in cloning research has resulted in a University of Connecticut investment of over $10 million to build a state-of-the art Center for Regenerative Biology and a hiring of 5 new faculty members.

More than 80 peer-reviewed papers including 15 papers published in 2002-2003. We have successfully recruited five new faculty members to study various aspects of regenerative biology. Over $2.5 million of extramural funds were brought to UCONN as a result of these recruitments. The success of our research has been widely reported around the globe including The CNN Headline News, BBC News, NPR News, The New York Times, The Washington Post, The Wall Street Journal, The Chicago Tribune, The Boston Globe, London Times, Associated Press, Reuters, Agency France Press, China Press and Xinhua News Press etc. Achievements in research have been widely recognized by many awards and honors, including the most recent Science and Technology Innovation Award (2002) from China and the Asian American Achievements Award (2003) from the Asian American Heritage Council (NJ).

The publicity on our research places UCONN on the national and international map. The new recruitment of the five new faculty members will make UCONN the second to none institution in the US in the area of Regenerative Biology research in just a few years. This work will lead to numerous long-term impacts.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Animal Science/Ontogeny of Somatotropic axis in beef cattle

a. Activity - This is work is focused on identifying changes in several components of the somatotropic axis, including growth hormone (GH), insulin-like growth factor (IGF) I, and the IGF binding proteins (BP), in growing beef cattle from birth to one year of age. This works couples with our previous work on using exogenous somatotropin to stimulate growth rate in growing beef cattle. Our goal is to more clearly define changes in the somatotropic axis with age to utilize exogenous somatotropin more efficiently. To date we have shown that exogenous somatotropin can increase growth rate 7 to 15% in growing cattle depending on the age, body weight and nutritional plane of the animals. We have also shown changes in GH, IGF and IGFBP from birth to one year of age in males and females.

b. Impacts – This short-term outcome more clearly identifies age-related changes in the axis, we can reduce the variation in response to exogenous somatotropin and increase the potential for economic success of beef producers that may utilize somatotropin.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Internet Access to Landscape Plant Information

a. Activity - The nursery industry is the most significant component of Connecticut's agriculture. A recent survey of the New England ornamental plant industries determined that ornamental horticulture in Connecticut was valued at $855 million, with 1,549 businesses that employ over 25,000 workers. Nursery and landscape businesses have recognized the need to seek out employees with a good working knowledge of the vast array of landscape plant species used in the Northeast. A labor force that is knowledgeable in landscape plant material identification and use is essential for the continued success of Connecticut's nursery and landscape industry.

Computer technology has been identified as one way that information can be made available to a large audience at all times when personnel are limited. The public is

adopting the Internet and the World Wide Web at an exponential rate and people view these new media as the vehicles through which information will be accessed now and in the future. The objective was to provide a free, online resource that allows users to access information and photographs of ornamental trees, shrubs and vines so they can make informed decisions regarding the use of plant material.

The UConn Plant Database currently contains information about 450 ornamental trees, shrubs, and vines, with over 2000 cultivars and over 5,000 photographs. It also features a "plant selector, online glossary, virtual campus plant walks and a dichotomous key. Information for web pages of 300 new herbaceous ornamental plants was compiled and herbaceous plants will soon be added to the website.

b. Impacts - Nurseries have access to employees with superior ornamental landscape plant knowledge. Nurseries, landscapers and homeowners can easily find information on ornamental landscape plants and make choices and decisions regarding their use that are most appropriate. Homeowners have free, continually available access to photographic and textual information on landscape plants. The UConn Plant Database receives over 87,000 web page views per day from over 1,800 persons. Numerous inquiries have been received requesting use of the information and photographs for a variety of purposes. Landscape design firms are using the pictures and text as part of their design presentations, commercial nurseries and garden centers are linking to the pages, and homeowners send many questions in about plants after they have used the website. The United States government has even used some images for their publication. The website generates about 100 email plant material questions per month. Email feedback on the site has all been glowing and surveys of undergraduate students using the website as a resource in their plant materials courses has all been positive. A sample of user comments about the UConn Plant Database follows: “your website is one of the best online resources”, “it’s a favorite now – I think it is just wonderful!”, “Fantastic site! – by far the best”, “Best resource I could find either online or in print”, “better than the USDA plant web site”, “your site is easy to use and quite complete”, “I consider you site one of the plant ‘Bibles’”.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Plant Biotechnology/Biotechnological Solutions to

Rhododendron Root Rot

a. Activity - The rhododendron crop produced in Connecticut may be valued at as much as $75 million. A root rot disease caused by the fungus Phytophthora cinnamomi causes significant plant death and requires application of fungicides to control disease incidence. Costs associated with Phytophthora root rot may exceed $10 million annually in Connecticut. More efficacious, cost effective and environmentally-friendly ways of controlling rhododendron root rot are needed. We are creating transgenic rhododendrons carrying an antifungal gene that should make plants resistant to the root rot disease, as well as other common rhododendron diseases. In addition, we are developing a diagnostic assay employing the polymerase chain reaction (PCR) that will accurately determine if plants are infected with Phytophthora cinnamomi.

We have developed a system for regenerating and transforming rhododendron tissue using microprojectile bombardment (gene gun). We have also forged an agreement with Sanford Scientific, creators of the gene gun, which allows us freedom to operate with gene gun technology and gives us access to a substantive portfolio of trait genes and genetic components. This legal agreement allows us to readily distribute and market disease resistant rhododendrons created with patented genes and transformation processes. We have created several transgenic rhododendrons that have shown resistance to Phytophthora in vitro and in the greenhouse. We are in the process generating data on the risk of horizontal gene flow from transgenic rhododendrons to wild rhododendrons via pollen. This effort is toward obtaining USDA-APHIS approval to release the plants to the nursery industry and public. Two DNA regions have been identified that are useful at accurately detecting Phytophthora fungus collected from rhododendron leaves of plants suspected or being infected with the root rot pathogen. We are currently working to simplify the PCR test to make it easy and cost effective for routine testing of dying rhododendrons.

b. Impacts - Although it is still too early to bring either root rot resistant rhododendrons or a phytophthora diagnostic assay to the nursery industry, short-term outcomes from our progress to date have been encouraging and suggests that we will succeed. The ability to accurately test a crop of rhododendron for phytophthora will allow growers to apply chemical control measures in a cost effective and environmentally sensitive manner. Long-term outcomes from resistant plants could nearly eliminate the need for chemical controls for root rot in rhododendron. Significant dollar savings would be realized by commercial growers as well as homeowners. The research was written up in articles in the New York Times and in the UConn Advance. An Invention Disclosure was submitted and a trademark was applied for the “Raise the Roof” rhododendrons with licensing of the trademark to Monrovia Nurseries, Inc. and Prides Corner Farms a likely outcome.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Plant Biotechnology/Genetic manipulation of a pyrophosphate-driven vacuolar H^+-pump

a. Activity - Arabidopsis plants engineered to overexpress the vacuolar H^+-pyrophosphatase AVP1(*AVP1-OX*) have enhanced tolerance to salinity and drought stress. The enhanced tolerance is most easily explained by an enhanced uptake of ions into vacuoles. Presumably, greater AVP1 activity in vacuolar membranes provides increased H^+ to drive the secondary active uptake of cations into the vacuole. A compensatory transport of anions is expected in order to maintain electroneutrality. The resulting elevated vacuolar solute content would allow for greater osmotic adjustment capacity, permitting plants to survive under conditions of low soil water potential. Transport studies consistent with the above hypothesis show that tonoplast vesicles from roots of *AVP1-OX* Arabidopsis and tomato plants have higher PPi-dependent Ca^{2+} uptake than controls. Further more, these *AVP1-OX* tomato plants are also drought tolerant. Arabidopsis *AVP1-OX* plants are capable of growing in the presence of toxic levels of Mn^{2+} and Cd^{2+}. Interestingly, the ectopic overexpression of AVP1 in Arabidopsis also improves growth in limiting K^+ and PO_4^{3-} media. Preliminary data show that roots of *AVP1-OX* plants acidify the medium more than controls when grown on limiting K^+. This enhanced capability to acidify the medium could be the result of an extended root hair area present in the *AVP1-OX* roots. Turgor-dependent cell expansion relies on water uptake that follows solute accumulation in the vacuole. Interestingly the ectopic over-expression of *AVP1* results in enlarged shoot organ size due to enhanced cell proliferation. Furthermore, incubation in shoot induction medium of cotyledons, true leaves, inflorescence stems, hypocotyls and root explants from the *AVP1-OX* lines results in a dramatic enhancement of their *de novo* organogenesis capacity. The differential expression patterns of key molecular marker genes in control and transgenic explants are consistent with a central role of AVP1 in the early events leading to *de novo* organogenesis. The pleiotropic effects that the overexpression of this vacuolar H^+-pump triggers are consistent with the key role that H^+-gradients play as the driving force for a plethora of physiological and developmental processes in plants.

We are interested in improving the tolerance of plants towards abiotic stresses like high salinity and drought. We are currently working with the model plant *Arabidopsis thaliana*. We are up-regulating pumps and transporters that endow these plants to enhance their capability to accumulate solutes in their vacuoles. This increased accumulation capability helps the plant to sequester more efficiently toxic cations, such as sodium. Furthermore, the enhanced net accumulation capability improves the water retention capability of the plants making them more tolerant to water deficit stresses.

The other major research area deals with the regulation of plant growth. We have achieved, via transgenesis, an increased capability of our transgenic plants to make cells. This engineered capability renders larger plants. We are currently characterizing the molecular basis of this new phenotype. This characterization is providing very interesting data that point out that there is a common link between all the above

phenotypes, namely plant nutrition. We are testing the universality of this phenomenon by analyzing transgenic tomato plants. In the near future will also generate transgenic rice and wheat plants that overexpress a monocot homologue of AVP1 that we recently cloned from a wheat cDNA library.

b. Impacts - There are three patents that support the impact of our findings:
Drought/Freeze Resistant Transgenic Plants by Roberto Gaxiola
August 17, 2000. Attorney's Docket No: 883933.0029
Stress Resistant, Oversized, Transgenic Plants Capable of Growing in Salinized Soil by Roberto Gaxiola August 22, 2000. Attorney's Docket No: 0399.2004-001
Enhanced Meristematic Activity by Overexpression of Tonoplast Pyrophosphatase by Roberto Gaxiola March 24, 2001. Attorney's Docket No: 883933.0057

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Sustainable Agriculture

a. Activity - Commercial greenhouse growers face a number of issues that impact environmental quality and sustainability. Applied research and grower recommendations to improve crop management, crop productivity, and to create new production opportunities were conducted with over 3,100 grower contacts through a multi-pronged dissemination effort, including cultivar trials, pesticide applicator recertification, Perennial Plant Conference, Theme Garden Conference, and grower recommendations on aspects of pest management, crop nutrient management, or crop cultural management. In addition, The Yankee Grower: The University of Connecticut Journal for Profitable Horticulture, was made available to commercial growers via the internet. (www.yankeegrower.uconn.edu). Regionally, growers in Connecticut tallied 2202 contact hours of instruction at the 3-day New England Greenhouse Conference.

b. Impacts - New England Greenhouse Conference participants were polled to determine how much they would reduce business costs based on knowledge gained. The average response was $2391.67 among people that gave a dollar amount (10.6% savings). When asked how much they anticipated increasing sales based on knowledge gained the average response was $14,000 (12.4%). One patent pending (Li Y., C. O'Donnell, H. Duan, Y. Wu R. McAvoy, Y. Pei , D. Zhao., K. Luo. Methods for Controlled, automatic excision of heterologous DNA from

transgenic plants and DNA-excising gene cassettes for therein. International Patent Office March 5, 2003. (Application Number 01956026.7-2405-US0123794), and one invention disclosure filed (Richard J. McAvoy, Mariya Khodakovskaya, Yi Li. Cold-temperature inducible fusion genes used to extend the storage life of plants or plant parts under cold, dark conditions. Feb. 28, 2003).

c. Source of Federal Funds – Smith-Lever, Hatch

d. Scope of Impact – State

Key Theme - Plant Science/Nutrient Status of Organic Vegetable Farms

a. Activity – Most organic vegetable producers use composts and manures to maintain the fertility and tilth of their soil. Composts and most manures are believed to slowly release a good portion of their nitrogen and phosphorus during the year of application and for a number of years after application. This slow release of nutrients is thought to provide a steady supply of nutrients for optimum crop growth. Many organic growers believe that the slow-release nature of organic amendments, especially compost, minimizes or eliminates the problem of nutrients escaping their fields in leachate or runoff. A survey of the nutrient status of 153 organic vegetable fields across 31 farms in five states in the Northeast measured soil nitrate concentrations, pH, soil organic matter, and extractable P, Ca, Mg, and K concentrations. The results from the first year show that organic growers need to manage their nutrients better. About one-third of the soils had excessive amounts of extractable and greater than 40% of the fields had excessive amounts of Ca. About 25% of the fields were deficient in extractable P.

b. Impacts – Short-term outcomes from preliminary results from research performed at the Rodale Research Institute and from soil samples collected from compost-amended farmers' fields suggest that only relatively small applications of compost can cause excessive amounts of extractable P and possibly soil nitrate. Continued research may lead to significant long-term outcomes for organic vegetable production practices as related to P loss to surface waters.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Plant Science/Adsorption of phosphatase on goethite

a. Activity - Generally, organic P is not very mobile in soils when the soil organic matter (SOM) is insoluble. However, phosphatase, a naturally occurring enzyme, will degrade the SOM and release inorganic P (generally as phosphates) into the mobile liquid phase. Accordingly, the availability of organic P in soils is closely tied to the activity of phosphatase in soils. Its activity is dependent on the soil pH and on the lack of retention of the enzyme by the solid minerals present. We seek to elucidate the impact of these two parameters on the availability of phosphatase in the environment for subsequent reactivity with organic P.

b. Impacts - We found that the enzyme adsorbs onto goethite at low pH values and inorganic C (carbonates) does not interfere with this adsorption behavior. This short-term outcome may lead to better understanding of organic P and its potential for mobility, especially as related to water quality.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Plant Production/Master Gardeners

a. Activity - There is a strong public support to protect and enhance the natural, historical and developed environment. Actions taken at the individual level can have positive environmental and community consequences. The Master Gardener Program is designed to address these sorts of actions. 183 students enrolled in the statewide Master Gardener program and 325 Certified Master Gardeners enrolled in Advanced classes.

b. Impacts – On a short-term outcome level, 86% of 183 students successfully became certified Master Gardener’s after completion of 65 hours of in-class instruction and at least 60 hours as interns in Extension Centers and/or community settings. Master Gardeners volunteered over 6,000 hours to 67 outreach projects, and made 5,439 in office contacts with members of the public that resulted in diagnosis of a wide variety of plant problems (insects, plant ID, etc). Historical assessments have indicated significant changes by individuals following education by trained Master Gardeners in the areas of reduced pesticide fertilizer and water usage, and improved plant selection, pest management and quality of product.

Mid-term community–based outcomes include: In Windham County a teaching program for secondary students about soil fertility and plant nutrition was incorporated into a working garden at the schoolyard that enabled parents to adopt the gardens with their children; in New Haven County youth groups and seniors citizens in the neighborhoods around Yale New Haven Children's Hospital developed community gardens for hospital use as therapeutic gardens for patients as well as an educational tools for the neighborhood residents; in Middlesex County establishment of community gardens enabled residents to raise production levels in the gardens thereby allowing the gardeners to provide over 100 pounds of produce for distribution to two food pantries.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Plant Production/Urban Gardening

a. Activity - The urban gardening program is an educational program focusing on the empowerment of the limited-income people by giving them the opportunity to grow part of their own food in an inner-city environment. Program participants share land, garden tools, seeds and seedlings, gardening skills, and most importantly educational information on gardening. Without this program, many low income families and individuals in Bridgeport would not have this opportunity. Bridgeport is one of the poorest cities in the nation. Based on percentage of residents living in poverty, it ranks as the third poorest city among the 169 cities and towns in Connecticut. Many of its citizens suffer from poor nutrition, and are unable to secure nutritional food at reasonable prices.

The Bridgeport urban gardening program receives funds and has a collaboration relationship with the city and many local agencies such as the Bridgeport Housing Department, Bridgeport Neighborhood Fund, Bridgeport Public Works, Bridgeport Police Community Services and Neighborhood Organizations. These agencies contributed $16,000 in the form of garden tools, topsoil, fencing, equipment, seeds and seedlings, and other goods and services. American the Beautiful Fund contributed free vegetable and flower seeds that worth about $750.

The success of the urban gardening program largely depends on how to organize and involve as many different agencies, organization, neighborhoods, and the local government. Considerable

efforts are directed toward establishing and maintaining strong working relationships with the local government, many local agencies, community leaders and other organizations and institutions. These relationships are extremely important during the transformation of vacant littered lots into community gardens.

b. Impacts - Program impacts include: Creation of a good working relationship with Yale New Haven Lead Program and Regional Treatment Center, New Haven Land Trust, and New Haven Christian Community Action enabled establishment of community gardens which enabled 16 volunteers and two Master Gardeners to help organize, promote, and teach gardening skills. These community gardens provided fresh vegetables to 554 poor families and individuals that helped them to secure nutritional food at reasonable prices.
Gardeners used less chemical products due to fact that they have learned different methods and ways to combat with pest problems such as planting healthy plants, resistant plants, physical control, biological control and rotation. Application of knowledge gained included improved ability by gardeners to prepare soil, select plants, and combat pests.
Additional outcomes included community gardens able to foster a spirit of cooperation, sharing, and good will, a safe environment for the children and the whole neighbor hood.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Aquaculture/New Aquaculture Species and Gear

a. Activity - In Connecticut, the aquaculture industry cultures predominantly two species: hard clams (quahogs) and Eastern oysters. In 2001, sales of these two species contributed over 13 million dollars in revenue to the State. Although the demand and value of these products have continually increased in recent years, commercial harvest of oysters has decreased steadily and tremendous fishing pressure on hard clams has left the shellfishing industry dependent on a single species.

The goal is to determine new species for culture in Connecticut in order to alleviate fishing pressure on traditional aquaculture species. In each individual project, the objectives are to (1) investigate new species for culture, (2) develop new methods for cultivation, and (3) implement the technology commercially.

Cultivation methods were investigated and determined for the most recent IEPRPs (blue mussels and razor clams). The objective (on-going) is commercial implementation of each method, which will be a collaborative effort among extension faculty and industry members. Other partners for this extension program include representatives from the Connecticut Department of Agriculture, Bureau of Aquaculture, regional extension agents from New England, and researchers within the Marine Sciences Department at the University of Connecticut.

b. Impacts - The project may alleviate some fishing pressure on traditionally harvested shellfish. In response to the success of some of the razor clam grow-out projects, a commercial hatchery, Aquaculture Research Corporation – Dennis, MA, has added razor clams to their list of shellfish seed that they plan to provide to the industry in the future. In response to the interest in commercial grow-out of razor clams, aquaculture equipment suppliers have designed new or modified grow-out equipment (trays, cages, etc.) for the industry. Additional growers in Connecticut and the Northeast Region have asked to become part of the IEPRPs to investigate other species and methods for cultivation.

Outcomes included successful growth of blue mussels to market size in nine months, which is half the time necessary for the major producers of mussel consumed in the United States, Maine and Canada. Technology adapted from Maine and Canada was utilized successfully in Long Island Sound and is now being tested through the State's new permitting system for aquaculture. A prominent Connecticut Seafood Buyer tested shellfish from one IEPRP project (blue mussels) relayed to industry member that his local product was competitive with the products he was purchasing from the major producers of mussels in Maine and Canada. Existing company, American Mussel Harvesters – Point Judith, RI, have offered to collaborate, as they have a similar project on blue mussel aquaculture. The Connecticut Department of Agriculture, Bureau of Aquaculture, is interested in expanding shellfish aquaculture in the state and thus, they have provided the services of their pathologist to assist us on our project. Inke Sunila, State Shellfish Pathologist is working on a timeline for reproduction of the blue mussel in Long Island Sound, which will aid industry members in their cultivation practices.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Goal 2 - A Safe and Secure Food and Fiber System

The Connecticut program was successful in this area with a variety of efforts conducted during the reporting period.

Extension education programs in food safety targeted to 156 school food service personnel in conjunction with Kentucky and New Mexico saw 98% of teachers recognizing the importance of food safety in their curriculum. Strong support for web-based education was a positive outcome.

Extension and research efforts in the Hazard Analysis Critical Control Point (HACCP) systems saw cheesemakers completing prerequisite programs to develop HACCP programs.

In summary, our assessment of accomplishments is measurable in terms of the previously submitted 5-year Plan of Work. Total expenditures, by source of funding, and full-time equivalents for this goal are:

Goal 2		
Funding Source	Expenditures	FTEs
Smith-Lever	58,827	0.85
Hatch	-	-
Multi-state research	-	-
State funds	506,809	7.55
Competitive grants	-	-
Animal health	-	-
Total	565,636	8.40

Key Theme - Food Safety/Farmstead Cheese

a. Activity - Cheese making is a New England tradition. New England cheese products are widely distributed at fine retail establishments throughout the region and nationwide. Cheese was originally developed as a means of preserving raw milk in times of excess production and is generally considered to be a relatively 'safe' food. However, there have been several reported cheese-associated outbreaks of foodborne illness. Cheeses made with unpasteurized milk appear involved in the majority of reported outbreaks. It is recognized that in cheese manufacture, post-pasteurization contamination can occur.

The project focused on helping cheesemakers increase their adoption of recommended food handling practices as it pertains to cheese and to use HACCP-based approaches to cheese manufacturing practices and processes and to increase their knowledge of risks and responsible practices in relation to cheese and microbial contamination.

The target audience included farmstead and artisanal cheesemakers in New England, including state regulators responsible for the cheese industry, and those considering a food processing business. A food safety risk reduction manual, "Food Safety in Farmstead Cheese Making," was developed. Eleven participated in the project.
b. Impacts – Short-term outcomes included six of the eleven cheesemakers (55%) completing the prerequisite programs and the first step of developing a HACCP program. They developed some of the initial skills needed to improve the safety of their final product, including the ability to identify the food safety hazards associated with their product. In addition, after completing the Hazard Analysis, the processors realized the inadequacy of their sanitation programs and went back to review them and improve them.

State regulators fostered additional communication between the project and partner states. Most regulators came away with a sense that HACCP principles could be practicable on a small farmstead operation.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – Multi-state/New England

Key Theme - Food Safety/Good Agricultural Practices
a. Activity - During the last two decades, the consumption of fresh fruits and vegetables has increased in the United States. At the same time, public health officials have documented an increase in produce related foodborne illnesses. A variety of fresh produce has been implicated in these outbreaks with cases attributed to many different bacteria, viruses, and protozoa. Since fresh produce does not undergo a "kill" step (such as cooking) when eaten raw in salads or out of hand, they must be considered "ready-to-eat" foods. Food safety hazard prevention practices must be implemented at every step of the food distribution chain, starting at the very beginning with food safety basics at the farm. This project addresses the need to integrate safe food handling practices in on-farm operations. This project focuses on how to meet the needs of smaller New England fruit and vegetable producers for safe food handling training. Presentations on GAP to the Apple Industry and Small Fruits and Vegetables growers reached approximately 120 producers, along with a series of fact sheets, an article in CT Farm Bureau newsletter, and development of a GAP farm audit form. Follow up microbiological testing was completed on four (4) apple orchards in Connecticut.

b. Impacts – Short-term outcomes included eight persons responded to a questionnaire re: changes they plan to make as a result of attending the GAP workshops. They indicated that they would provide food safety training to employees, improve record keeping, test water sources used for irrigation, add hand washing facilities, and clean harvest bins. A more complete survey of participating farms will be conducted after this growing season. In New England farms tested, there were 3 samples that tested positive for listeria and 2 for salmonella out of approximately

1500 samples. These results were less than have been found on national surveys. Generic E. coli and coliform counts were relatively high on many of the samples. The second round of testing (after training) showed no pathogens present in apples.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – Multi-state/New England

Key Theme - Food Safety/Nutrition

a. Activity - The Centers for Disease Control (CDC) considers food borne diseases to be a major health risk in the United States. Food safety impacts both the food industry as well as the consumer. Many states have regulations stating food service establishments must employ a Qualified Food Operator (QFO). The American Dietetic Association and the American Medical Association state that 40% of school-aged children in the United States purchase food for themselves or their families regularly and prepare an average of 13 meals/week putting them at an increased risk for contracting foodborne illnesses.

Five food safety courses directed to school food service personnel reached 156 individuals. A distance education course in food safety was developed for food service personnel. A USDA Integrated Food Safety Competitive Grants titled "Is the Internet an Effective Means of Teaching Food Safety to High-Risk Students?" is in its second year. Web based games have been developed to teach and supplement food safety education in the classroom. They include an interactive board game, word jumbles, cross word puzzles, and scenario-based action games.

Posters presented and abstracts printed for the American Dietetic Association annual meeting, American School Food Service Association and "Thinking Globally, Working Locally: A Conference on Food Safety Education", Orlando, FL.

b. Impacts – All individuals have taken a nationally recognized food safety test. The course, "Food Safety & Sanitation: A Distance Education Course" was tested with 50 subjects finding that distance education was as effective as traditional education with this course. The course is available for purchase. It comes with a CD-ROM, course manual, and on-line quizzes and instructor interaction. It is available in English, Spanish and Vietnamese. The course has been sold to individuals throughout the United States and internationally (http://www.team.uconn.edu/foodsafety_course/index.htm), through NCES, and Nasco. The American Dietetic Association and the American School Food Service Association have approved continuing education credits for the curriculum. This is a multi-state project with University of Kentucky and New Mexico State University. Surveys were sent to family and consumer science teachers in all three states. Ninety-four to 98% of teachers find it important to include food safety in their curriculum. Educators rated all food safety topics as "important" to "very important." Teachers indicated web based games, especially interactive games, would enhance the understanding and interest of this material to their students. Teachers indicated a strong need for additional materials to augment the curriculum and generate excitement in the classroom. Pilot tests of some of the games have been conducted in Connecticut and New Mexico. The feedback was very positive.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Goal 3 - A Healthy, Well-Nourished Population

The Connecticut program was particularly active and successful in this area with a wide variety of efforts conducted during the reporting period. A number of research and Extension efforts were implemented in the area of human nutrition.

Docosahexaenoic acid (DHA) research designed to assess the role of foods with DHA on sleep patterns of newborns demonstrated that infants born to women with gestational diabetes mellitus (GDM) have a less mature central nervous system (CNS). There has been broad interest internationally since the data provides the basis for exploring mechanisms and intervention

Research on the effects of exercise on protein utilization in healthy, non-obese children versus obese children was conducted. Results will help to characterize the relationship between energy intake and protein metabolism in obese and non-obese children, thereby providing for the development of guidelines for management of pediatric obesity.

The Expanded Food and Nutrition Education Program (EFNEP) provided community outreach and education to 1,110 EFNEP homemakers representing 3,301 family members including 1,597 children. Program participants realized significant improvements in diets and food-related behavior, with reduced allocation of funds for food purchases.

Limited resource families with special dietary needs benefited from educational programs through increased skill in managing their children's special diet and making appropriate food choices such that children showed improved nutritional status and health outcomes.

Husky Nutrition Program work with parents and families to solve nutrition-related anemia among children in Hartford resulted in increased awareness of providers and caretakers of the problem, development of a statewide coalition, and re-evaluation of delivery of Women Infant Children Service by the Hartford Health Department.

Benefits to clientele and stakeholders who participated in this goal area were many; including improved opportunities for newborn infants, and better knowledge of nutrition needs by low income inner-city residents.

In summary, our assessment of accomplishments is considerable, and is measurable in terms of the previously submitted 5-year Plan of Work. Total expenditures, by source of funding, and full-time equivalents for this goal are:

Goal 3		
Funding Source	Expenditures	FTEs
Smith-Lever	278,466	5.98
Hatch	40,000	1.00
Multi-state research	-	-
State funds	861,798	10.27
Competitive grants	354,561	8.49
Animal health	-	-

Total	1,535,104	25.75

Key Theme - Nutrition/Expanded Food and Nutrition Education Program

a. Activity – In 1999 61% of adults in the United States, 13% of children aged 6 to 11 years and 14% of adolescents aged 12 to 19 years were overweight. This prevalence has nearly tripled for adolescents in the past two decades. The increases in overweight and obesity cut across all ages, racial and ethnic groups, and genders. 300,000 deaths each year in the United States are associated with obesity. Overweight and obesity are associated with heart disease, certain types of cancer, type 2 diabetes, stroke, arthritis, breathing problems, and psychological disorders, such as depression. The economic cost of obesity in the United States was about $117 billion in 2000.

Expanded Food and Nutrition Education Program (EFNEP) provided nutrition education and community resources to families and youth, who live in poverty and face barriers to balanced nutrition which include limited resources to buy food, poor access to supermarkets, limited food preparation and storage facilities. EFNEP collaborated with 130 agencies and community organizations to serve families according to their needs. Over 1,110 families and 3,301 individuals (including 1,597 children) were educated through the EFNEP program in four major urban areas and one rural region of the State.

b. Impacts - Evaluation of the diets of adult homemakers (24 hour dietary recall) before and after nutrition education showed an overall improvement by 96.2% of the participants. The mean number of servings in all of the food groups increased, while the numbers of individuals consuming no food from the various food groups decreased. For example, for vegetables: the average number of servings increased from 2.7 to 3.3 percent per day. Those eating no vegetables remained at 17.0%, and those eating the recommended 3 or more servings of vegetables increased from 39.6% to 52.8%. For dairy foods, the average number of servings increased slightly,1.6-3.4. However, those eating no dairy foods decreased from 34% of the participants to 22.6%, and those eating the recommended 3 or more servings increased from 24.7% to 2.69%. Nutrients such as dietary fiber, iron, calcium, and several vitamins also showed positive change. For example, before EFNEP education, almost 7.5% of the homemakers had diets containing 4 grams or less of fiber, while after EFNEP, only 1.9% had such low fiber levels. Before EFNEP, 7.5% of the homemakers were getting 51% or less of the Recommended Dietary Allowance of 6 key nutrients. After EFNEP, only 1.1% had low levels of all key nutrients. Intakes of Vitamin A showed the most improvement, indicative of eating more vegetables and fruits.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Nutrition/Healthy Lifestyles Workgroup

a. Activity - Healthy People 2010 endorses support of health promoting policies in schools, work sites and other settings using traditional and innovative approaches to help Americans achieve the targeted goals. Increasing the quality and years of healthy life and eliminating health disparities are Healthy People 2010's overarching goals. Obesity, sedentary lifestyle and inadequate consumption of nutrient dense foods are some of the health concerns for today's youth. African Americans, Hispanic Americans, women and adolescents from poor households

are proportionally higher at risk for obesity than Caucasians, men and adolescents from middle to higher income households. Poor nutrient dense foods are the major sources of energy, fat and carbohydrates among American children. Adolescent barriers to eating more healthily include a sensed urgency about personal health in relationship to other concerns and taste preferences for other food. According to the latest Census, New Haven's poverty rate for the overall population (21.3%) is three times the statewide rate (6.1%). The 2000 economic status report for New Haven County revealed higher poverty levels for female single headed households with children less than 18 (31%) and with children less than 5 years old (42%). The New Haven Department of Social Services 2001 fiscal report identified 31,715 Food Stamp recipients for New Haven County. The 2001 –2002 CT State Department of Education Report (Strategic School Profiles for the City of New Haven) shows a range of 54 – 100% eligibility of youth and teens for free and reduced meals. According to surveys conducted by New Haven Family Alliance, which manages food stamps cases for New Haven, low-income housing residents expressed strong interest in nutrition information for themselves and their children. Preliminary data from a Yale School of Nursing Study shows 40% of middle school students and 60% of high school students to be at risk for Type II diabetes. Conclusions of the study revealed that there was a higher risk of glucose intolerance for severely obese children and adolescents.

The City of New Haven Board of Education funded seven 4-H SNEP Youth facilitators for an after school year round program. Through collaboration with the City Wide Youth Coalition, an additional five SNEP Youth were also funded. These youth participated in health fairs to distribute nutrition and food stamp information in urban and limited resource neighborhoods, community agencies and faith-based agencies. The SNEP Youth named designated their name as "The Nutrition Commission", designed a logo for uniform shirts and have written and performed skits, raps and other activities related to health and nutrition.

A healthy lifestyle was promoted through eating a variety of nutrient dense foods and through the promotion of regular exercise and physical activity for youth enrolled in 4-H Youth Programs. The 4-H Double Dutch Youth curriculum and the 4-H Summer Nutrition Education Program (SNEP) served as the focus of this promotion.

A training program about healthy snacks was presented to low-income, limited-resource youth in New Haven were reached through various agency partnerships via summer camp and after school nutrition programs. Census at camps: 553 total reached, 52% female and 48% male (ethnicity: 85% African American, 13% Hispanic. 1% Caucasian, 1% Asian. Fifteen youth workers and two adult supervisors were trained and participated in the Summer Nutrition Education Program. A joint application was written and submitted with Meriden Boys and Girls, Club to the General Mills Corp. Youth and Fitness Grant.

b. Impacts – Short-term outcomes as shown by pre and post questionnaires revealed an increase in knowledge of nutrition and food safety for summer nutrition youth workers. Two 4-H SNEP youth have led discussions in public forums about the program and other youth discussion groups. Two youth were ambassadors for 4-H Conference in Washington. Youth workers also became more open and willing to try new healthy snacks; the program coordinator weekly stocked the refrigerator at the school based SNEP site; youth began eating yogurt/granola combinations as a regular snack break.

Congresswoman Rosa Delauro wrote a letter of congratulations to the SNEP youth for their program successes. SNEP Youth were featured in an article and picture in the New Haven Register. Through partnership with Harris Tucker Kids TV, Nutrition PSA aired on New Haven Citizen Cable TV to market 75,000 households in New Haven, West Haven and Hamden. Meriden Boys and Girls Club girls participated in workshops about Double Dutch and nutrition. Interest generated by workshops and information presented, resulted in the Girls Director starting a double Dutch league with little or no experience for either herself or the youth. The youth won state championships in Double Dutch and will compete at national level for the sport.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Family Nutrition Program/Children with Special Dietary Needs Project

a. Activity - Children with special health care needs now comprise approximately 10% of the pediatric population, given better survival rates due to technological advances in medicine. These children are afflicted with physical and/or mental disabilities that can range from mild to severe. Nutritional concerns among this population are significant: underweight, overweight, dehydration, constipation, micronutrient deficiencies, aspiration risk, feeding difficulty, and behavioral problems concerning food.

Among multi-ethnic, low-income groups, rates of certain birth defects and conditions are higher than the general population. These include children with low birth weight, fetal alcohol syndrome, spina bifida, Down syndrome, asthma, HIV, and others. Because of the specialized training required, families of children with special health care needs in Connecticut have limited access to pediatric nutritionists who are qualified to screen and monitor their child's nutritional concerns. Through linkages between the University of Connecticut Cooperative Extension System and CT. Children's Medical Center and UCONN Health Center, this project focuses on providing limited resource families of children with special health care needs and their providers access to targeted nutrition and feeding information. The project provides educational programs, workshops, and technical expertise with the goals to improve dietary adherence and health outcome for medically at-risk infants and children.

b. Impacts - Limited resource families who attended nutrition programs developed increased skill in managing their child's special diet and making appropriate food choices. Children showed improved nutritional status and health outcome with a better understanding and adherence to dietary restrictions. Health care providers who attended trainings gained greater knowledge of nutrition and feeding problems among this population, and were able to better guide families to appropriate services and resources for managing their child's special diet.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Nutrition/Husky Nutrition Iron-deficiency Anemia

a. Activity - The Husky Nutrition Program works with parents and families to solve nutrition related problems. The major focus of our work is the reduction of anemia among children 1-3 in the City of Hartford. Because iron deficiency is associated with adverse developmental outcomes in young children, early detection, effective treatment, and prevention are critical. In high-risk populations, where the factors contributing to anemia and iron deficiency are complex, conventional models of diagnosis and treatment have limited potential for success. By promoting early detection, caretaker empowerment, and better communication within the health care system, this research will help promote normal child development and will provide a new model for nutrition education in the context of well-child preventive care.

Iron deficiency is the most common cause of anemia in children aged 3 years and younger. Clinicians generally diagnose anemia by testing hemoglobin or hematocrit, which are easily measured but have the disadvantage of being indicators of the final stages of iron depletion. Randomly selected medical charts reviewed by our research group showed that 33% of children in Hartford develop anemia at least once between 18 and 36 months. Because the symptoms and negative consequences of anemia are apparent while body iron stores are being depleted and before red blood cell development is severely compromised, our group, with the help of the Weicker General Clinical Research Center at the University of Connecticut Health Center, tested for iron deficiency in a sample of children enrolled in the Women, Infants, and Children (WIC) Program. Two of the 43 children studied (5%) were anemic, but 31% of the non-anemic children were iron-deficient by CDC guidelines. Dietary iron intakes met or exceeded recommended amounts, but the bioavailability of the iron ingested was questionable.

Caretakers of toddlers served by city health clinics reported that they felt detached from the advice given by health care providers concerning child feeding, nutrition, and management of anemia. Detachment was compounded by "desensitization" to anemia among providers, who were frustrated that efforts to prevent anemia often failed. Neither caretakers nor providers felt that effective communication was achievable within the constraints of the current health care system. Preliminary results of subsequent interviews suggest that some of these families experience isolation profound enough to negatively impact the quality of parent-child interactions.

b. Impacts – Short-term outcomes of increased awareness of providers and caretakers of problem and development of a state-wide (with Hartford focus) coalition lead to a mid-term outcomes associated with re-evaluation of delivery of Women Infant Children Services by the Hartford Health Department.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Nutrition/Gestational Diabetes Mellitus

a. Activity -Diabetes, which occurs during pregnancy, gestational diabetes mellitus (GDM), is one of the most common abnormalities of pregnancy, occurring in up to 10% of all pregnancies. Infants of women with GDM

often have developmental complications. Our research group is the first to report that infants born to women with GDM have lower levels of a fat, called DHA, or docosahexaenoic acid. The importance of

DHA to the developing fetus is that large amounts of it are incorporated into the brain during development in utero. This points to the importance of the mother's supply of DHA during pregnancy, as DHA is transferred

across the placental barrier from mother to the developing fetus; the fetus is essentially totally dependent on the mother's supply of DHA for development of the central nervous system (CNS). Lower levels of DHA, as is the case we have reported

for infants born to mothers with GDM, may be associated with impaired development of the brain and CNS of her infant. This is important, because it in turn relates to behavior and learning ability. We are able to assess the development of the

CNS by measuring how the baby sleeps. We do this by measuring periods of sleep and wakefulness.

b. Impacts - We have demonstrated that infants born to women with GDM have less mature CNS. These data provide the basis for exploring mechanisms and intervention.
There has been broad interest internationally regarding the findings, and the project received best poster award at the American Oil Chemists' Society Meeting.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Nutrition/School Nutrition
a. Activity - Research has identified a strong need for the promotion of healthy eating and increased physical activity initiatives in US children. Children are becoming increasingly at risk for chronic diseases such as heart disease and diabetes, primarily as a result of their being overweight and sedentary. The Department of Nutritional Sciences has partnered with the Connecticut State Department of Education, Office of Child Nutrition for five consecutive years to receive USDA Team Nutrition (TN) funds that emphasize a healthy school nutrition environment.

The goal of Connecticut's grant is to improve schools' ability to impact children's healthy eating and physical activity habits through a statewide Healthy School Nutrition Environment (HSNE) Initiative. The HSNE Initiative focuses on USDA's action kit, *Changing the Scene: Improving the School Nutrition Environment.* The kit helps communities to effectively evaluate their school environment and assess areas in need of improvement while offering strategies to achieve these improvement goals.

A *Tools for Schools* workshop, with a speaker from the National State Boards of Education, on nutrition policy development at the local level was offered to 39 people from various Connecticut communities. Ten *Changing the Scene* (CTS) workshops were presented to over 90 people representing many school disciplines (health educators, school food service directors, Board of Education members, PTA/PTO members, family and consumer science teachers, elementary teachers, physical educators, nurses, business managers, assistant principals, dietitians and community members). Gave several HSNE presentations emphasizing the importance of the HSNE initiative to allied associations in Connecticut including the CT Association for Health, Physical Education, Recreation & Dance Teachers, the CT Association for Family & Consumer Science Teachers, The Connecticut Dietetic Association, CT Association of Boards of Education, The CT School Nurses Association, and The CT School Food Service Association. Developed and implemented "Connecticut at PLAY", a physical activity challenge for schools across the state in March and April 2003. Over 130 schools signed up to participate. Final count for children participating and receiving prizes was approximately 13,000. Collaborating agencies for this project included the CT State Departments of Education and Public Health, Central CT State University, New England Dairy and Food Council and the Governor's Committee on Fitness. Continue to maintain website (www.team.uconn) content and updates with training opportunities, monitoring of Rate Your Plate evaluations, posting monthly recipes and current resources.

b. Impacts - The HSNE initiative, a summit for school health teams focusing on promoting a healthy school nutrition environment, resulted in mid-term outcomes where many Connecticut towns have developed nutrition policies in their schools to impact the nutritional status of the children. Some of these success stories include:

-improvement in vending machine choices in Stamford public schools
-development of a "Health Club" for students at the University of Hartford Magnet School who are at risk of long-term obesity.
-development of "Get Healthy Hartford" to improve the wellness of the parents and staff in the Hartford schools.
-change in lunch and snack offerings at Windham public schools to feature more fruits, vegetables and healthy menu items.

c. Source of Federal Funds - Smith-Lever

d. Scope of Impact - State

Key Theme - Nutrition/Connecticut

Family Nutrition Program

a. Activity - According to recent data from USDA, about 8% of Connecticut households experience food insecurity, while almost 4% experience hunger. About 157,000 people or 82,000 households, participate in the Food Stamp program. The average monthly benefit per person is about $70 while the Thrifty Food Plan for an adult costs around $120 per month. Food Stamps are not supposed to be enough to buy all of a person's food, but because incomes are so low for many people, they rely on Food Stamps to pay for their food. Participation in the Food Stamp program has decreased significantly during the past few years, so more people turn to emergency food programs when they run out of food. Over 300 food pantries, soup kitchens and shelters provide thousands of pounds of foods each year to families who cannot afford to feed themselves without this assistance. Findings from the 2000 hunger study conducted by America's Second Harvest show that emergency food programs of the two major food banks in CT provided food for about 102,000 people, reaching over 31,000 different people in any given week.

The Food Security component of the CT Family Nutrition Program is designed to provide food and nutrition education to Food Stamp recipients, or potential participants, who also receive food from emergency food programs such as soup kitchens, food pantries, and homeless shelters. In order to have a greater impact on the quality of food and food choices of recipients, FNP staff also conduct workshops with staff and/or volunteers of participating agencies and organizations.

Publications developed during this time, "Simply Soup" and "Cooking with Bread", were designed to help participants use foods from food pantries for nutritious meals and snacks. Several publications were put on the FNP/Food Security web page, including *Turkey Safety, How Much Fat? , How Much Salt?, How Much Sugar?, Bean Magic, and a lesson plan, "Food Attitudes."*

b. Impacts - On going mid-term FNP Food Security impacts saw strengthened working relationships with emergency food providers, regional food banks and hunger outreach program staff to provide expertise and training on food safety and nutrition. Staff and recipients have learned new ways of using foods traditionally found in food pantries, plus ways of increasing the variety and nutritional value of the foods served or provided to families. Staff worked with over 60 agencies in 13 towns and cities reaching 256 staff and volunteers, over 900 clients in hands-on workshops, and over 2181 at farmers markets, demonstrations, exhibits and agriculture and health fairs. They also distributed over 13,350 copies of educational materials ranging from information on turkey safety and recipes to the USDA Food Guide Pyramid and a food and nutrition calendar.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Nutrition/Senior Nutrition Awareness Project, SNAP
a. Activity - Southeastern Connecticut's senior population faces complex issues affecting their nutritional status. Relocation from a home to a senior housing site, loss of a spouse, changes in health status, reduced functional ability and independence, transportation and food access issues, and insufficient income are some of the many factors that have a negative impact on nutrition.

Assessment of the nutrition needs and issues related to optimal nutrition for SNAP clients (n=206) indicate that this group is similar to other national samples of elderly (CSFII data). As with the national sample, SNAP clients are consuming sub-optimal amounts of fiber, calcium, B-12, and carotenoids, as well as many other key nutrients. In addition, these older adults suffer from multiple chronic health conditions that often result from over consumption of calories. However, underweight has also been detected as a serious indicator of risk for almost 25% of these SNAP clients. The heterogeneity of the older population with regard to health status, functional ability and medical nutrition regimens, require that nutrition education and information be tailored to the specific needs of many sub-groups within the population.

The URI/UConn Regional Senior Nutrition Awareness Project (SNAP) develops client-centered programs, informational pieces and newsletter topics based on client feedback, key-informant interviews (agency personnel), dietary and behavioral assessments (verbal and written), and the current published literature. Focus areas for nutrition education delivered via the mass media, distance information transfer and directly in the community include diet quality, food safety, food security and food resource management.

Approximately 900 seniors participated in 50 face-to-face programs with SNAP staff.
An additional 56 seniors participated in 8 video programs presented by senior service providers, using SNAP videos, teaching curriculum and support materials and handouts.
SNAP staff have participated in activities related to the New London Food Coalition (a city wide community coalition consisting of social service agencies and churches providing city residents (including seniors) with improved access to food pantries and hot meals), the Ledge Light Health District's Healthy Groton Heart Challenge and the Uncas Health District's Heart Health Campaign. 5,000 materials were distributed at face-to-face programs and through inquiries made by telephone; materials distributed were also related to face-to-face program follow up and the video-lending program. Every three months, 5,800 Connecticut seniors receive the *Good News Café* (four-page nutrition newsletter) by mail or through social and health service networks. Each month, 250 seniors participating in the Groton elderly nutrition program (congregate meals/home delivered meals) receive a copy of *Nutrition to Go* (two-sided, nutrition fact sheet); 85 of these seniors are homebound. The Resource Book, *Recipes and Food Programs for Seniors* was revised and distributed to 750 low-income seniors living in New London, Groton, Norwich and Montville, CT.

b. Impacts - Collectively, there are hundreds of comments made by senior participants that indicate either behavior change or intent to change as a result of participation in SNAP nutrition programming. Agency partners (professionals) consistently praise the educational approaches employed through the SNAP nutrition education program. Many of these agencies use SNAP as

their primary source of nutrition information, and as their primary resource when making nutrition related referrals for their low-income clients. SNAP appears to be filling a gap for these social service and health service agencies that would not otherwise be able to address nutrition issues for high-risk, low-income seniors.
Following participation in SNAP programs, an older female stated she previously would eat tea and toast for breakfast but now chooses and eats whole grain cereals and other nutrient dense foods for breakfast (behavior change). Immediately following a SNAP community based program, one senior participant indicated that she was heading directly to the grocery store to purchase foods needed to make the SNAP recipes that were part of the demonstration (intent to change). A senior woman was reading NTG on Heart Health and Weight Loss after a program. She informed me that she could make these changes and that the next time SNAP has a program at her housing site she will have lost weight (intent to change).

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Nutrition/Connecticut Family Nutrition Program for Infants, Toddlers, and Children (FNP-IT)

a. Activity - Provide nutrition and food safety education to Hispanics and other low-income groups in Connecticut and South Western Massachusetts. Target individuals are reached through mass media, school based education, health fairs and community agency presentations. This fiscal year FNP-IT reached over 200,000 Hispanic through a weekly nutrition and food safety consumer education radio station. The radio station originates in Hartford and is listened to by 80% of the target community.

Over 8,000 children were reached through approximately 200 puppet shows at schools, day care centers and health agencies. These puppet shows have been developed by FNP-IT throughout the years and address the following topics: a) The Five Food Groups, b) the link between food, nutrition and agriculture, c) heart disease prevention through good nutrition, adequate physical activity and smoking prevention, d) food safety, and e) diabetes prevention through healthful eating and weight loss along with exercise.

Approximately 3,000 families with children were reached with food safety and nutrition education information through health fairs, community agency presentations, and breastfeeding counseling services.

The Diabetes Prevention Fotonovelas in English and Spanish have been completed and will be printed in a pilot edition this summer. The diabetes prevention needs assessment has completed 99 interviews. Data collection for the Breastfeeding cost-effectiveness study has been completed. Breastfeeding mothers will be receiving follow-up phone interviews until their babies are 6 months old. Data collection has begun on the Exclusive Breastfeeding study. Approximately 40 pre-natal women have been recruited. Results from FNP-IT research and evaluation projects have been presented at 3 major national meetings (ADA, EB, and Texas Tech School of Medicine with Pharmasoft Publishers sponsored breastfeeding conference). Also 2 international meetings, (II Congreso Espanol de Lactancia Materna and ISRHML). In addition,

Dr. Pérez-Escamilla was invited to speak at a Northeast CSREES Regional meeting, a FNS Regional conference, a WIC training Conference, a UNICAMP research conference, a PAHO presentation, as well as other invited sessions while on a teaching sabbatical in Campinas, Brazil.

b. Impacts – Short-term and mid-term outcomes found that: a) a high proportion of the target community has been reached, b) the target community likes the format and finds the culturally competent materials useful, c) the target community improves nutrition and food safety knowledge and is capable of applying this knowledge to improve their food choices. One book chapter and 7 publications have been published or are in press in scientific peer reviewed journals. Also, 16 presentations at different national and international meetings have been presented focusing on FNP-IT research and evaluation. FNP-IT educational materials continue to be sent on a sample basis to other Extension services and nutrition education staff in the country, as well as to international requests from persons interested in the materials.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Nutrition/Weight Loss and Coronary Heart Disease Risk

a. Activity - Obesity adversely affects morbidity and mortality. At least 40 % of the population in the U.S. is currently overweight and many have co-morbid conditions including hypertension, diabetes, lipid disorders, and coronary heart disease (CHD). The American College of Cardiology has recently stated that the scientific evidence is now overwhelming demonstrating that obesity alone is an independent risk factor for CHD. A body mass index (BMI) between 25 and 30 kg/m^2 increases the risk of fatal or non-fatal myocardial infarction in men by 72%. In women, the risk of fatal and non-fatal myocardial infarction is increased by 42% even at a BMI of 23 to 25 kg/m and mortality risk increases exponentially above these BMI levels. Conducted a human study to evaluate the effects of a weight loss program on plasma lipids and body composition. Invitation to present data from this study in a conference in Centro de Investigación en Alimentos y Desarrollo (CIAD) in Hermosillo, Mexico.

b. Impacts - Following a 10-week intervention, subjects who participated in this study had significant decreases in plasma cholesterol and triglycerides and increases in HDL cholesterol (the good cholesterol) compared to baseline. Participants also presented significant decrease in body fat mass and increases in lean tissue. All these changes in plasma lipids and body composition result in a healthier profile associated with decreased risk for coronary heart disease.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Nutrition/Mechanisms of plasma LDL cholesterol lowering by an ileal sodium co-dependent bile acid transporter inhibitor

a. Activity - Coronary heart disease is the leading cause of death in the United States and elevated levels of plasma cholesterol are related to increased risk for coronary heart disease. Diet and changes in lifestyle, including exercise and cessation of

smoking are the primary recommendations to lower plasma cholesterol. However, when dietary treatment does not help, drug therapy should be recommended. There are many drugs that are being developed to decrease plasma cholesterol concentrations. Bile acids are part of the micelles needed for the absorption of dietary lipids including dietary cholesterol. A disruption of micelle formation by increasing direct elimination of the bile acids will decrease cholesterol absorption. Elevated levels of plasma LDL cholesterol are associated with increased risk for cardiovascular disease. Dietary interventions is the first recommendation to lower plasma cholesterol levels, however, for certain individuals who have hyperlipidemia associated with hereditary factors, it is necessary to use drugs to achieve significant decreases in plasma cholesterol.

b. Impacts - Understanding the mode of action of this drug will permit long-term outcomes associated with recommendations to patients with familial hypercholesterolemia or other hyperlipidemias where there is no response to dietary interventions. Of these drugs, ileal sodium co-dependent bile acid transporter inhibitors show some promise.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Nutrition/Dietary Cholesterol and Eggs

a. Activity - During the last two decades, a large number of clinical studies and epidemiological surveys have investigated the relationship between dietary cholesterol and the risk of cardiovascular disease (CVD) and have shown that there is no relationship whatsoever. It is clear that eliminating foods with a high content of cholesterol from the diet –such as eggs- has very few beneficial effects in the risk of CVD and in fact can have a negative impact in the nutritional quality of the diet.

It is of the utmost importance to know which factors in our diets influence our lipoprotein profile and reduce the risk factors for CVD. When an individual decides to change his/her diet in order to lower plasma cholesterol concentrations, there are important recommendations that need to be followed. A diet must be chosen in such a way that intake of saturated fat is limited, but we must keep in mind that unsaturated fats favor the lipid profile. An important recommendation is not to eliminate foods such as eggs from the diet just because they have a high content of cholesterol and to remember that there is no association between dietary cholesterol and CVD risk. Conducted two human studies in the Department of Nutritional Sciences to evaluate the effects of gender on the response to dietary cholesterol. Invitation to give a written evaluation of the book “Eggs and Health Promotion” edited by Ronald Ross Watson.

b. Impacts - Invitation to present epidemiological data and current studies that support the nutritional benefits of eggs and the lack of association between egg consumption and risk for coronary heart disease in Lima, Peru. The seminars were presented to a large audience including 4 Universities, one hospital and one Cardiology Congress for a total of 1200 participants in Lima Peru, in Veracruz, Mexico to the Asociación Nacional de Especialistas en Ciencias Avicolas (ANECA) (400 participants), two published manuscripts, and four abstracts.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Nutrition/Cardioprotective Effects of Grape Polyphenos in Pre- and Post-menopausal Women

a. Activity - Antioxidants present in grapes may have an important role in reducing coronary heart disease risk. Oxidized LDL has been associated with increased atherosclerotic lesions. The oxidation of LDL probably takes place in the arterial wall where LDL particles result in lipid deposition and lesion involvement. Therefore grapes have the potential to decrease atherosclerotic lesions by retarding the oxidation process of LDL. Menopause is associated with increased risk for heart disease due to elevated plasma LDL cholesterol and triglycerides, which have been associated with age and lack of estrogen. It has also been demonstrated that after menopause LDL may have increased susceptibility to oxidation. The inclusion of fruits and vegetables rich in polyphenols (antioxidants) to the diets of postmenopausal women may help to reverse hyperlipidemia and alter the atherogenicity of the LDL particles.

b. Impacts - Since the formation of foam cells has a central role in the development of atherosclerosis, the consumption of fruits and vegetables such as grapes containing significant amounts of antioxidants may help prevent the events leading to atherosclerosis. In our guinea pig model for menopause, we demonstrated that grape polyphenol intake resulted in lower concentrations of plasma triglycerides decreases susceptibility of LDL to oxidation and less atherosclerosis formation compared to guinea pigs fed a control diet.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

<u>Key Theme - Nutrition/PEPCK</u>

a. Activity - In order to understand the role of diet in promoting health, it is imperative to delineate the role of specific nutrients in the human body. To this end, we are seeking to further define the numerous effects of vitamin A on gene expression by examining a specific model gene, the gene encoding phosphoenolpyruvate carboxykinase (PEPCK). The PEPCK gene was one of the first metabolic genes to be isolated, therefore, it serves as a prototype in the study of genes involved in carbohydrate metabolism. These studies are conducted in the mouse model that serves as a mammalian Homologue of the human condition. We have shown that vitamin A deficiency results in a decrease in PEPCK gene expression in liver and that vitamin A supplementation returns

expression of the PEPCK gene to normal. To determine the metabolic effects of vitamin A deficiency and supplementation, we assess liver glucose metabolism using a recently developed method. We are also examining the cellular vitamin A signaling pathway, to determine how the vitamin A message is sent to the nucleus of the cell and is transmitted to the DNA and target genes residing there. We examine the nuclear vitamin A receptors and their binding to specific regions of the DNA in target genes. Additionally, co-activators and co-repressors, which are recruited by vitamin A receptors to the transcriptional machinery of target genes, are measured. As the final objective, we also examine the vitamin A requirements for the correct differentiation of the liver in the developing mouse fetus.

b. Impacts - Overall, our research will determine the need for vitamin A for the correct differentiation and function of the liver and endogenous glucose production by this tissue. Potentially, this will increase our understanding of the metabolic dysfunction that occurs in liver in Type II diabetes, a syndrome that is characterized by over-secretion of glucose by the liver. The studies will outline a new direction for gene studies in the liver. In addition to examining the detailed mechanism of vitamin A regulation of a model liver-specific gene, such as the PEPCK gene, we have expanded our investigation to include a large population of genes in the liver. We revealed there were 30 genes that were inhibited and 18 genes that were stimulated in the vitamin A deficient mouse liver. This is the first such comparison of the differential expression of genes in response to vitamin A-sufficiency and -deficiency using microarray analysis.

Genes not involved in vitamin A transport or metabolism were also affected by changes in vitamin A status in vivo. The PEPCK gene, which is a prototype vitamin A-responsive gene, is inhibited with vitamin A deficiency, as are a series of metabolic genes. These genes include those encoding key enzymes of hepatic intermediary metabolism. Interestingly, vitamin A deficiency down-regulates genes of both gluconeogenesis and glycolysis and, therefore, does not appear to be involved in the counter-regulatory mechanisms that respond to blood glucose levels in the body. It is more likely that vitamin A deficiency causes an overall de-differentiation of liver cells, as indicated by the inhibition of expression of genes encoding numerous metabolic enzymes. Surprisingly, expression of a few of metabolic genes is increased in the vitamin A deficient liver. These genes include those encoding enzymes of fructose metabolism, as well as a series of genes involved in insulin signaling. In conjunction, we also find that livers of vitamin A deficient mice have increased levels of stored fat (in the form of increased triglycerides). This is potentially caused by increased fructose metabolism that will channel the excess carbons into fatty acid synthesis. Overall, our microarray analysis indicates there are numerous changes in gene expression induced by vitamin A deficiency. Documenting these changes at the level of gene expression provides a basis for examining the subsequent metabolic and physiologic changes caused by vitamin A deficiency in the whole organism. We newly identified the link between between vitamin A deficiency and changes in carbohydrate and lipid metabolism in liver. We anticipate that we will be able to conduct genomic, proteomic (measurement of the proteins products of differentially expressed genes), and metabolic analysis of the changes induced by vitamin A deficiency.

The results of this research will provide a global picture of the effects of this vitamin deficiency on critical metabolic pathways in the liver. The results of this basic research have implications in

human populations suffering from overt vitamin A deficiency or subclinical vitamin A deficiency. These individuals are likely to suffer from disturbances in both carbohydrate and lipid metabolism, such as depleted glycogen and increased fat storage in liver.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Protein utilization in healthy obese and non-obese children

a. Activity - The increasing prevalence of pediatric obesity in the United States is associated with risk factors (hypertension, diabetes, hypercholesterolemia) that track into adulthood. A number of federal initiatives are currently underway in support of research directed at managing this epidemic. Recent efforts have focused on characterizing differences in protein utilization subsequent to participation in exercise programs between healthy lean and obese boys and girls aged 8 to 10 years. This program focuses on differences in protein utilization in young, healthy non-obese children. A number of studies have been conducted to investigate the effects of exercise and diet interventions on protein use by young healthy obese and non-obese children in an effort to characterize nutritional needs of young boys and girls when routine exercise is coupled with growth. Differences in protein-related metabolic responses at rest and in response to exercise were noted between obese and non-obese children. Characterization of the relationship between energy intake (diet), energy expenditure (exercise), and protein metabolism in obese and non-obese children is complete.

b. Impacts - This work has direct impact on long-term outcomes associated with the development of appropriate guidelines for exercise program development coupled with appropriate nutrition recommendations for obese and non-obese children.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Nutrition/Exercise training and protein utilization

a. Activity - Historically, nutrition for exercise performance has focused on dietary carbohydrate and fat since these are the primary fuels used during physical activity. However, aerobic exercise of moderate or high intensity, as well as resistance exercise, causes changes in the synthesis and breakdown of protein, particularly skeletal muscle, in the body. While the nutrition supplement market boasts a variety of protein-based products, the role of dietary protein improving protein use by the body in physically active men and women has not been thoroughly studied.

It is necessary to measure skeletal muscle metabolism along with whole body protein turnover to fully characterize protein utilization in healthy men and women who exercise regularly. We measured use of protein by the muscle as well as the body to gain insight regarding the use of protein in healthy men and women who exercise regularly. This work is of significance because current dietary recommendations for protein do not consider the impact routine exercise might have on protein needs. Therefore, clarification of the relationships between dietary protein, exercise, and protein utilization is necessary to further substantiate recommendations regarding protein intake for physically active men and women.

Characterization of these protein related metabolic responses will help to determine whether habitual consumption of an energy-adequate diet supplying the current RDA for protein (~ 50 and ~60 grams/day for women and men, respectively) is sufficient to maintain or improve lean body mass in individuals routinely participating in an aerobic and/or strength training exercise program.

b. Impacts - The results from this work will directly apply to long-term outcomes associated with recommendations for protein intake in healthy, physically active men and women. Findings will enlighten scientists, nutritionists, athletes, and the public regarding the actual effects of high protein diets on protein utilization by the body and by skeletal muscle. This information will ultimately provide a foundation for nutrition education materials on appropriate protein intake for individuals involved in habitual exercise programs. Execution of the protocols described in this project will contribute to the ongoing discussion regarding appropriate protein intake for physically active men and women.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Goal 4 - Greater Harmony Between Agriculture and the Environment

The Connecticut program was particularly active and successful in this area with a wide variety of efforts conducted during the reporting period

Extension education programs for agricultural producers resulted in participating farms reducing their pesticide and nutrient usage in significant ways through nutrient management planning and Integrated Pest Management programs.

Integrated pest management (IPM) research and education programs were targeted at most major crops in Connecticut. IPM programs resulted in significant reductions in usage of various pesticides and/or use of less toxic materials or approaches in pest management.

Research and extension efforts in the area of invasive plant species resulted in the development of a statewide invasive species educational web page and a biological control project on purple loosestrife – a plant species that invades wetland areas. Purple loosestrife control is being realized across regions of Connecticut, and the public is demonstrating considerable interest in the overall issue of invasive species and means to manage the problem within the regional and local landscape.

Municipal land use officials participated in an innovative program, the Green Valley Institute (GVI), designed to address the critical issue of natural resource conservation and land use planning in the Quinebaug-Shetucket National Heritage Corridor. Outcomes were many, including the creation and revitalization of several conservation commissions, incorporation of natural resource inventory data in town master plans, and the adoption of new conservation subdivision regulations designed to protect over 50% of project land as private open space.

Programs were focused on both the national and local level through the nationally acclaimed NEMO program (Nonpoint Education for Municipal Officials). National leadership resulted in NEMO adaptations now underway in 30 states across the United States. NEMO efforts in Connecticut resulted in programs delivered to representatives from virtually all Connecticut towns; with communities revising their comprehensive plans and/or taking other important public policy actions to better protect water resources.

Results from a joint research/extension paired watershed residential water quality project saw numerous changed landscape management practices and significant reductions in bacteria and nitrate-nitrogen leaving the targeted watershed.

Benefits to clientele and stakeholders who participated in this goal area were many, including improved public policies at the local and regional level which will enhance wildlife management efforts, improvements in water quality, enhanced agricultural operations that are economically viable and environmentally protective, and more attractive and functional communities.

In summary, our assessment of accomplishments is considerable, and is measurable in terms of the previously submitted 5-year Plan of Work. Total expenditures, by source of funding, and full-time equivalents for this goal are:

Goal 4		
Funding Source	Expenditures	FTEs
Smith-Lever	591,083	9.12
Hatch&Mc-Stennis	70,560	0.85
Multi-state research	-	-
State funds	2,044,114	29.87
Competitive grants	402,605	8.91
Animal health	-	-
Total	3,108,362	48.75

Key Theme - Land Use/Northeast Applications of Useable Technology In Land Planning for Urban Sprawl

a. Activity - Landscape characterization is not a single thing. It consists of a complex set of goals, objectives, analyses, information extraction, visualizations, and many other sub-components. There is no single definition of landscape characterization. In fact, there are likely as many definitions as there are applications. Further, there is no single recipe for performing landscape characterization, yet there are numerous and diverse tools and data types that can be brought together synergistically in a process that we might label landscape characterization. Land use planning requires many forms of landscape characterization. Focus was to examine and develop improved methods for landscape characterization as they pertain to land use planning, in particular advanced methods of land use and land cover information extraction from remote sensing data, direct estimation of impervious surfaces as input to non-point pollution models, and forest fragmentation and urban growth models by which changes in the landscape over time can be visualized and quantified.

Land use and land cover change maps have been developed for the State of Connecticut for the period 1985 to 2002. Derived from those data are temporal forest fragmentation and urban growth maps. In a parallel effort, several methods for extracting percent impervious surface cover have been developed, and are being applied to the same 17-year period. Multiple publications, both peer reviewed and conference proceedings, have been produced from the results of the research. Further, the models developed in this research are made freely available for use by managers and decision makers. Especially notable is the “Impervious Surface Analysis Tool”, co-developed with colleagues from NOAA’s Coastal Services Center.

b. Impacts - Research results are being incorporated into a number of ongoing land use education projects, including NEMO, GTP, and GVI. We are beginning to see mid-term outcomes in changes in the way local decision makers assess their natural resources and development plans, and we are being increasingly requested to participate in state, regional, and local remote sensing and GIS-related applications. Research results have contributed to our ability to develop educational tools for use at these several jurisdictional levels.

The quality of the research being conducted in the RESAC has been recognized by peers through the receipt of the ASPRS ESRI Award (1st Place) for Best Scientific Paper in GIS: Civco, D.L., J.D. Hurd, E.H. Wilson, C.L. Arnold, and S. Prisloe 2002. Quantifying and Describing Urbanizing Landscapes in the Northeast United States. PE&RS 68(10): 1083-1090.). In fact, the

NAUTILUS project has won this award twice in the past three years, the first in 2001 for Arnold, C.A., Jr., D.L. Civco, S. Prisloe J.D. Hurd, and J. Stocker. 2000. Remote sensing-enhanced outreach education as a decision support system for local land use officials. PE&RS 66(10):1251-1260.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Land Use/The Center for Land Use Education And Research (CLEAR)
a. Activity - Land use information is used to help answer questions dealing with who, what, when, and where. The Center for Land use Education and Research (CLEAR) is committed to ensuring the highest land use information is available to all people for effective decision-making and better understanding to improve their quality of life. The Center for Land use Education and Research (CLEAR) integrates the missions and capabilities of the Land, Sea and Space Grant College systems to focus on advancing the knowledge and understanding of the effects of land use on natural resources. To achieve its goal of helping communities balance growth and natural resource protection, CLEAR conducts remote sensing research, develops geospatial tools and applications, and develops and delivers outreach education programs.

The combined, synergistic inputs to CLEAR consist of its constituent, founding programs including the Nonpoint Education for Municipal Officials (NEMO) Project, The Community Land Use Planning Program, The Green Valley Institute, The Earth Grant Geospatial Technology Extension Program, The Forest Resources Management Program, and the Northeast Regional Earth Science Applications Center (RESAC). Perhaps the most significant input to this Center is the expertise brought together in the form of its core members and its research and education assistants.

b. Impacts – Short-term outcomes are represented by CLEAR quickly becoming recognized as a functioning center and gaining national attention. CLEAR's programs and publications have contributed tremendously to the visibility of the land use and geospatial data programs in the College. Funding opportunities have grown, proposals totaling more than $8 million have been submitted to NASA, NSF, EPA, and USGS over the past year under the CLEAR banner (http://clear.uconn.edu). We have received approval for more than $100,000 for an EPA LISS project, and we are awaiting decisions on the remainder of the proposals at this point. Further, CLEAR was invited to submit a white paper for possible Congressional initiative funding; this proposal, requesting $3 million over three years, is under review in Washington.

c. Source of Federal Funds – Hatch, Smith-Lever

d. Scope of Impact – State

Key Theme - Land Use/Rural Community Decision Information and Support Structures

a. Activity - The objectives of this project were: (1) identify growth management tools consistent with the goals and characteristics of rural communities in New England; (2) identify characteristics of growth management packages that maximize public support and provide effective incentives for land preservation and maintenance of productive farms and forests; (3) identify land uses that maintain valued biodiversity attributes within rural communities; (4) develop decision support materials to help communities maintain rural quality of life, sustain productive farms and forests, maintain biodiversity, and provide for other community goals.

Activities included 12 focus groups with community residents, meetings with 15 policymakers in Southern New England Rural Communities, 3 peer reviewed publications, two publications in non-reviewed mass media (e.g., newspapers), and 6 presentations at scheduled academic and policymaker conferences

The project provided previously unavailable information to rural communities of Southern New England regarding residents' preferences for development and conservation outcomes, and the potential correspondence among these preferences and residents' support for growth management tools. It further provided information regarding the implications of landscape changes for local wildlife habitat and biodiversity.

b. Impacts – The mid-term outcomes of this effort will allow rural communities to develop growth management policies that better reflect the preferences and values of rural residents, and the potential impacts of development on valued elements of biodiversity.

c. Source of Federal Funds - Hatch

d. Scope of Impact – Multi-state

Key Theme - Water Quality and Land Use/Nonpoint

Education for Municipal Officials (NEMO) Project

a. Activity - The impacts of poorly planned land use on the natural resources, economic vitality, and local character of our nation's communities are well documented. Local land use decision makers in Connecticut's municipalities need information and tools to assist them in planning the growth of their communities while protecting natural resources, particularly water resources. For the past three years, UConn CES has implemented a new educational model, called the Municipal Initiative, which is built on long-term relationships between the project and select Connecticut communities. Five (5) new municipalities are enrolled each year in the program, one from each of the state's major watershed areas. A NEMO task force is formed in each town, to work with UConn staff toward specific changes to local land use policy and practices, as supported by Extension educational programs.

Over 80 educational workshops for local officials were conducted by request, on a variety of topics. 5 regional workshops were conducted as part of a state-supported effort. A new Connecticut NEMO Update newsletter was developed, and the first issue published in both electronic and hard copy formats. Several portions of the Middlesex County Extension Center demonstration site were implemented, including: a rain garden that was constructed in concert with an educational workshop run by the Natural Resources Management and Engineering Department; a "green roof" demonstration, and; a two-stall retrofit of pervious parking system in the front parking lot. Presentations were given at 2 nacional conferencies, including the nacional conference of the American Planning

Association. A special workshop on low impact development for UConn consultants and contractors was conducted, in partnership with the Office of the Chancellor.

b. Impacts – Mid and long-term outcomes include almost every town participating in the Municipal Program making changes to land use plans and regulations, development design criteria and building procedures, or other items related to natural resource based community planning. Some examples include: The Central Naugatuck Valley Council of Governments is preparing an agricultural resources map of their region, and has completed an impervious surface build-out analysis for the Pomperaug River watershed towns; East Haddam has created a subcommittee to study and recommend new open space subdivision regulations for the town; Old Saybrook is rewriting its road design ordinances to reduce the impacts of road runoff on water quality; Old Saybrook built its first "green" subdivision, which uses NEMO-recommended methods for reducing stormwater runoff (swales, rain gardens, etc.); Old Saybrook is updating their Plan of Conservation and Development to include an analysis of impervious surfaces and their potential impacts on the town's water resources; the Candlewood Lake Authority Action Plan contains zoning overlays and development design criteria to better protect Lake water quality.

The Clean Water Act's "Stormwater Phase II" regulatory program, going into effect this year, brings regulation of stormwater runoff to smaller communities and smaller development sites across the country. The Phase II permit contains six "minimum management measures" that towns and other applicants must meet, before the permit is approved by state authorities. Because of the demonstrated quality of the NEMO Project's work over the past decade in Connecticut, and the high regard that the Connecticut Department of Environmental Protection has for NEMO, NEMO has been listed as a "qualifying program" under the state's stormwater general permit. What this means is that Municipal Initiative towns seeking a permit from the state need only list their relationship with NEMO, and the various items of the six management measures that their work with NEMO addresses, to have those portions of their permit approved. This not only attests to the status of the program, but also will save many towns in Connecticut considerable time and money that would otherwise be needed in completing the permitting process.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Water Quality and Land

Use/National NEMO Network

a. Activity - Many national agencies and organization have recognized that better land use practices are needed to protect our nation's natural resources, particularly given the fact that nonpoint source pollution, or polluted runoff, is the number one source of water pollution in the United States. USDA's Water Quality Program, NOAA's Coastal Ecosystem Health Initiative, and EPA's Smart Growth and Water Strategies all call for the problem of nonpoint source pollution to be addressed. The Nonpoint Education for Municipal Officials (NEMO) Project of the University of Connecticut Cooperative Extension System is a national award-winning program that educates local officials on the links between land use and water quality. NEMO has become a national model for those groups in other states wishing to target land use officials for water resource education. Since 1998, the Connecticut NEMO Project has served as the coordinating "Hub" of the National NEMO Network, a group of affiliated projects patterned after the original UConn project. The Network exists to share information, and educational tools and models, to the betterment of all the participating projects. The Connecticut Hub provides training, advice, and a wide range of communication services to the Network, from web-based services to the organization of the annual "NEMO U" Network conference.

Twelve out-of-state training workshops were conducted, to initiate or assist NEMO Network projects. Six regional, national, or international presentations were made about the National Network, including the first national meeting of the NASA Geospatial Technology Program and the World Watershed Summit. The third National Network conference, "NEMO University 3," was held on the Avery Point campus of UConn in May 2003. 55 representatives from 23 NEMO projects attended. The National Geospatial Dataset web page was created, in concert with the Connecticut NEMO Project and the Geospatial Technology Program. The first National Network Progress Report was compiled, written, researched and published. Two issues of a Network Newsletter were written and issued (both electronically and in hard copy). A National NEMO Network list serve was created. Major partnerships were established with both the EPA Smart Growth office and the NOAA Coastal Management Program.

b. Impacts – Mid-term outcomes are many as reflected in the fact that 30 NEMO projects now exist, in 28 states and territories. Funded programs include: Ohio, Indiana, Idaho, Oregon, Maryland, Washington, Texas, Delaware, Kansas, New York, Georgia, Alabama, South Carolina, North Carolina, New Jersey, Massachusetts, Missouri, New Hampshire, Maine, Virgin Islands, Tennessee, and Pennsylvania (3 projects), Louisiana, Arizona, Colorado and California. These projects, in addition to involving a long list of state and local partners, leverage resources for NEMO programs from a number of funding sources.

Bottom-line impacts in local communities are occurring. These impacts are beyond the scope of what can be reported here, but a representative list includes:

- Innovative stormwater management site design in Ohio, South Carolina, and Alabama;
- Changes to land use plans and regulations in Alabama, South Carolina, Ohio, Indiana, Connecticut, New Hampshire, and Rhode Island;
- Watershed management plans and regulations in Ohio and Connecticut;
- Initiation of new planning activities such as community resource inventories, open space planning, and master planning in Minnesota, South Carolina, Connecticut, New Hampshire, Maine and Indiana; and
- Use of geospatial information in community land use decision-making in South Carolina, Minnesota, Maine, Connecticut, and Wisconsin.

During 2002-2003 a unique partnership was created between the National NEMO Network and the EPA Office of Policy, Economics and Innovation, Division of Development, Community and Development, also know as the "Smart Growth" Office. Through the *Smart Growth through Open Space Planning* partnership, selected NEMO Network projects from around the country are educating and assisting communities to develop plans for open space conservation. These open space plans will be implemented as part of a resource-based planning process that helps communities determine what areas to preserve, and where to direct growth. The plans will provide the framework for long-term, locally driven open space conservation efforts. To initiate the project, representatives from 14 NEMO projects in 13 states attended the Network's first "Open Space Boot Camp," held at the University of Connecticut marine campus in the summer of 2002. Attendees were trained on educating local officials on two key processes necessary to local open space preservation: creating an open space plan and conducting a natural resource inventory. Participating Network projects were tasked with preparing "game plans" for working with specific communities in their state on initiating open space planning. Targeted areas, several located in some of the most rapidly growing areas in the country, include: Knox County, Tennessee; Nissequogue River watershed, Long Island, New York; Town of Northport, Maine; City of Lewes, Delaware; Scott County, Minnesota; Ogeechee River watershed, Georgia; Beaufort County, South Carolina; Hendricks County, Indiana, and; City of Fairhope, Alabama. As these projects get underway, National NEMO and EPA Smart Growth staffs are participating in open space planning events organized by Network projects and their local partners. Many of these communities are already beginning the open space planning process.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – Multi-state

Key Theme - Water Quality/Nutrient Management Planning

a. Activity - Farmers are being subjected to ever increasing environmental regulation. New regulations being written for Concentrated Animal Feeding Operations (CAFOs) would require farms to apply manure according to strict phosphorus standard. This would mean that phosphorus levels in the soil would be used to determine the amount of manure and fertilizer that could be applied to a crop. Connecticut farmland soils are high in phosphorus from decades of animal agriculture and application of generated manure. This project was implemented through the federal EQIP cost-sharing program. The program pays farmers to implement nutrient management plans before the regulations are adopted. We are compiling and analyzing the data to estimate the effect of the new regulations on the financial viability of CT farms.

Farms sign a 5-year contract to follow the nutrient management plan developed by CANR faculty and staff based on USDA Natural Resources Conservation Service guidelines. Farms are paid $10,000 per year for the first 3 years through the USDA FSA/NRCS EQIP Program as an incentive. Farms agree to sample soil, and crops, and crop residues according to the management plan and to follow as closely as possible the recommendations for fertilizer and manure spreading rates and locations. The CANR Nutrient Management Planning Team has developed an Excel Worksheet that collects field-specific information for each crop field. The spreadsheet allows the calculation of the amount of manure that can be applied and a fertilizer recommendation, if commercial fertilizer is needed to supplement the manure.

b. Impacts - Eleven farms representing 5389 cattle produced 30,938,856 gallons of manure. Nutrient Management Plans were written for 248 acres of alfalfa, 4807 acres of corn, 1889 acres of grass hay, and 675 acres of pasture. The farmers drove 32,880 miles to spread the manure compared with the planned mileage of 46,209. Farmers are not able to implement these pans 100 percent for a variety of reasons. As a consequence they realized a fertilizer replacement value of the manure of $20,536 rather than the projected $56,600. Manure hauling costs were reduced from the planned $148,728 to $95,824 because farmers didn't travel as far as the plan recommended to spread the manure. Farmers needed to purchase an additional 962,724 pounds of N, 203,894 pounds of P_2O_5, and 837,483 pounds of K_2O to meet crop nutrient needs. Had the plans been followed more closely an additional 595,400 pounds of N, 67,670 pounds of P_2O_5, and 550,281 pounds of K_2O would have been needed. Farmers did not apply all of the fertilizer that was needed to meet yield goals after manure nutrients were accounted for. Instead they applied 434,313 pounds of N, 5,850 pounds of P_2O_5, and 42,283 pounds of K_2O.

Even though farmers spent 14,505 dollars on fertilizer they still needed an additional 376,976 worth of fertilizer to meet their desired yield goals. This is more than all of the fertilizer they would have needed had they followed the plan.

Farmers are making manure spreading and fertilizer decisions on something other than a strict yield goal and economic analysis. Efforts are currently under way to determine what factors are having the most influence on the farmer's ability - or willingness to follow a nutrient management plan. Hopefully we will be able to identify barriers to adoption so that we can develop strategies to remove the barriers and get farmers to adopt nutrient management plans.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Water Quality/Jordan Cove Section Watershed Monitoring Project

a. Activity - Nonpoint source pollution is the primary cause of water quality problems in the U.S. and Connecticut. Agriculture is the leading source of impairment in the Nation's waters contributing to impairment of 25% of river miles and 19% of lake acres. Urban runoff contributes to impairment of 5% of river miles, 8% of lake acres, 18% of estuaries, and 7% of wetlands. There is need to reduce nonpoint source pollution to the Nation's water bodies to meet the goals of the Clean Water Act.

The effectiveness of both agricultural and urban management practices to reduce nonpoint source pollution is largely unknown. Design of a paired watershed subdivision project in Waterford resulted in development of a residential environment intended to maintain water quality at pre-development levels. Monitoring was conducted to study the effectiveness of urban best management practices. Monitoring of pollutants is in the sixth year, one full year after all 12 houses and road were built. Plantings in bioretention areas are established. Tenants and

homeowners association are maintaining all the facilities. Surveys were conducted of residents in the neighborhoods.

b. Impacts – Actions undertaken by residents have created various mid and long-term outcomes as these actions have resulted in positive reductions in pollutants compared to both the adjacent study area and an existing subdivision. There is a great deal of national and statewide interest in the project.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Water Quality/Evaluation and Development of Best Management Practices for Turfgrass

a. Activity - Turfgrass represents one of the largest agricultural commodities in the Northeastern U.S., and the industry is growing rapidly in response to increasing urbanization of the region. Best management practices for turf need to be developed and implemented to minimize the threat of water pollution from turfgrass fertilizers. Fertilization timing studies indicate that turf quality can be maintained by earlier fertilization of turfgrass in the fall than what is currently practiced, and this results in less nitrate loss to ground water. This research program is evaluating new technologies that will improve N fertilizer recommendations for turfgrass. The results will be of use to homeowners and municipal workers, and to turf professionals such as golf course superintendents, grounds keepers, sod producers, and sports turf managers.
Ongoing studies indicate that hand held light meters hold promise for turf quality determinations that traditionally are done visually. Our work suggests that readings from the light meters can guide nitrogen fertilization of turf that will decrease the threat of nutrient enrichment of water resources. Another new technology being evaluated are anion exchange membranes that can predict the amount of available nitrate needed in a turfgrass system to produce maximum response without over-supplying N that is susceptible to leaching and runoff loss.

b. Impacts – Short-term outcomes from work with these membranes and light meters are reflected by the great potential to refine nitrogen fertilization rates on turfgrass. This work will result in significant long-term outcomes associated with decreased water pollution as the research will help to reduce excess application of nitrogen to turf areas, thereby decreasing the amount of nutrients that pollute receiving waters.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme -Water Quality/Sustainable Landscaping

a. Activity - Nonpoint source pollution is a leading source of pollution to the nation's waters, and residential properties are a major contributor. A variety of techniques and approaches are available to address this issue, ranging from regulatory to volunteer. The Residential Water Quality program addressed ways to minimize nonpoint source from residential landscapes using sustainable landscaping practices to create attractive landscapes while reducing the need for excessive amounts of fertilizer, pesticides, and water. A multi-faceted educational approach was undertaken in select locations in Connecticut to advance this long-term educational effort.

b. Impacts – Short and mid-term outcomes included multiple town actions. East Hampton efforts to develop educational programs encouraged residents to preserve a key water quality resource in the community, with 80% of surveyed residents in one neighborhood demonstrating changed practices over a one year period. In Branford, endorsement of an educational program by town officials enabled the Director of Parks and Recreation to cut fertilizer frequency and application rates on over 50 acres of town recreational property by 50%. In Haddam, a train-the-trainer sustainable landscape program for Advanced Master Gardeners saw an average 13% increased level of knowledge about key turf management aspects and a 22 % knowledge gain in septic system management and rain garden placement by participating students. Five 40-second TV vignettes, created for Connecticut Public Television (CPTV) with the basic tenant of sustainability within the suburban landscape, were shown and placed on their website (www.cptv.org) for viewing. CPTV reaches an estimated audience of three hundred thousand viewers in Connecticut.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Economics/Sustainabl

e Management of Dams

a. Activity - Many of the world's dams and reservoirs are losing their storage capacity due to sedimentation. This process can be slowed down by upstream watershed management or reservoir level sediment removal. Interdisciplinary research (involving civil engineers and economists) was carried out to determine sediment management strategies for any given dam that would be optimal from an economic perspective and meet technical feasibility criteria.

b. Impacts - Two books published by the World Bank and computer software were outcomes of the research along with three papers at professional conferences.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Economics/Angling Management Organizations

a. Activity - The project explored approaches to more fully integrating the recreational sector into the management of fisheries, with an application to the red snapper fishery in the Gulf of Mexico to initiate a dialog among all stakeholders – a dialog on alternative paths to sustainability, to fewer conflicts, and to greater benefits for all who have a stake in this valuable fishery. Actions included three consecutive days of meetings with policymakers and fishery stakeholders in Gulf of Mexico Red Snapper fishery; one publication submitted for peer review; three white papers to Environmental Defense, two presentations at scheduled academic and policymaker conferences, four conference calls with representatives of stakeholders and users.

b. Impacts - This research has created a strategy and outline for an entirely new management structure for recreational fisheries. The potential benefits of this new management method are being publicized in the policymaker, stakeholder, and academic community, with the ultimate goal of influencing on-the-ground management of recreational fisheries. The Gulf of Mexico red snapper fishery will be the first fishery for which this new management paradigm will be formally proposed.

c. Source of Federal Funds - Hatch

d. Scope of Impact - Multi-state

Key Theme - Economics/Estimating Non-Use Values for Fish

a. Activity - This research assisted the Environmental Protection Agency in assessing the net economic benefits of the proposed US EPA 316b Rule, which would reduce allowable entrainment and impingement of fish in power plant cooling structures. Specifically, it assisted in the assessment of non-use values of fish and shellfish whose mortality would be prevented by the proposed rule. Two technical reports to the Environmental Protection Agency, and three conference calls in which findings were reported to the Office of Management and Budget (OMB) and to EPA.

Impacts - This research provided the economic analysis necessary for OMB to approve the posting of the 316b Rule NODA (Notice of Data Availability) in the Federal Register—a necessary precursor to ultimate approval and implementation of the 316b Rule. Without the results and presentations provided as a result of this work, OMB would not have approved EPAs economic analysis as suitable for moving forward with the NODA for the 316b Rule. Hence, the results provided by this outreach effort had a direct and critical implication for policy development. As a direct result of the analysis presented to EPA, OMB allowed the 316b Rule NODA to go forward in the Federal Register.

c. Source of Federal Funds - Hatch

d. Scope of Impact - Multi-state

Key Theme - Economics/Interactions between Environmental Policy and Trade:
a. Activity - Traditional environmental polices, if costly for firms, should alter international competitiveness. More recent consumer-oriented policies implemented as new standards on consumer products, whether mandatory standards or voluntary programs, could also affect competitiveness and trade. The focus of this project was to investigate the impacts of such policies on trade and provide guidance to researchers in developing countries to evaluate issues of relevance for their countries. The refillable container standards imposed on beverage products in the 1991 German Packaging Ordinance is one example of environmental product standards implemented as mandatory regulations.

b. Impacts - Using data developed for seven beverage product categories for 1980 to 1998, econometric results suggest that home-bias is present in the German market and that the packaging ordinance significantly affected the degree of vertical differentiation of domestic and foreign products. In sum, the policy significantly reduced the competitive position of imports for product categories with reuse quotas. The trade impact of the reuse-requirements in the packaging ordinance was estimated to be about $500 million between 1993 and 1996. A manual was also developed that has been used by the United Nations Economic and Social Commission for Western Asia to train governmental analysts (about 50) from several countries to estimate the impact of changed environmental regulations on trade. A journal article, a training manual, an article submitted in a peer-review journal, and presentations of the research at invited seminar and one international conference are results.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Economics/Poverty and the Demand for Improved Water Services in Developing Countries

a. Activity - Expanding access to safe drinking water is one of the "Millennium Development Goals" developed at the UN Millennium Summit in September 2002. While a substantial portion of investments in improved water supplies will need to be self-financed by governments and cities in developing countries through revised water price policies, little is known about household demands for improved water services and the effect of poverty on such demands. Using a primary data set collected during the fall of 2000 in the city of Fianarantsoa, Madagascar, this research project investigated existing patterns of water use, determinants of such patterns, and the demand for improved water services.

About 82% of households report household incomes that are less than US$1 per day per capita. Given such low-income levels, and the likely affect such poverty has on expectations, most households have few water quality complaints. At the same time, however, most households boil water due to health risk concerns. Poverty clearly conditions access to and quantity of water used by households. Water use is seven times larger for the highest income category of households as compared to the poorest category.

b. Impacts - Regarding the current structure of demand, econometric results show that water demand is significantly related to income levels, travel time to source, household size, and education levels. Regarding service improvements targeted toward public taps, demand for such improvements is significantly related to the cost of the improvement, travel time to source, waiting time at source, income, and household size. Improved knowledge of water demand issues in developing countries. Future analysis needs to focus on evaluating the social impacts of alternative water pricing arrangements to support cost-recovery in the supply of water services while working to achieve the Millennium Development goal of expanded access.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Air Quality/Atmospheric Transport of Biological Active Aerosols

a. Activity - Studies of transport processes in the atmosphere, especially of those materials that are biologically active, are critically important to our homeland security as well as to the scientific advancement in the fields of air pollution, applied meteorology, and environmental modeling. Up to date, our understanding of the transport processes is limited in distinct fields of climate, hydrology, and biology. Problems in each field are studied within a major medium (such as air, water, soil, and canopy) with closed pre-defined boundaries. Interactions with other systems are treated as known input parameters or simple boundary conditions. Research focuses on integrating the transport processes of air borne biologically active materials across soil, water, plant canopy, and the atmosphere. The main objective is to develop a holistic model that is useful in examining the causation of multi-media environmental problems.

b. Impacts - Our study on air toxics in Connecticut has improved our understanding on the impact of geographical location and land use characteristics on air quality in the State. USEPA and other research institutions for mercury studies have adopted a regional scale air quality model developed by our research group. The preliminary data from the gene flow study has related gene drifting to atmospheric stability and winds. The study on agricultural structures has drawn international interests, especially from China where agriculture is heavily dependent on resources (water in particular) inputs.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Pesticides/Pesticide Safety Education Program

a. Activity -The objective of this program is to provide information and education about the safe use and handling of pesticides. Pesticides are poisons and as such they pose a potential threat to human health and the environment. The Pesticide Safety Education Program focuses on the safe use and handling of pesticides and provides information about pesticides and their uses. The Federal Insecticide Fungicide and Rodenticide Act, FIFRA directs the EPA to cooperate with the USDA and use the services of the Cooperative Extension System to inform and educate pesticide users about the accepted uses and other regulations made under the Act.

Educational programs focus on such issues as: pesticide exposure and personal protective equipment, environmental fate of pesticides and ground water protection, calibration and equipment maintenance, signs and symptoms of pesticide poisoning and first aid, storage of pesticides and homeland security, pesticide laws and regulations.

The PSEP Coordinator serves on a workgroup for the Certification and Training Advisory Group for EPA. This group is making long and short-term recommendations for revising pesticide regulation and eventually federal legislation, is working with a group of occupational health physicians and toxicologists from Hartford Hospital, the UCONN Health Center and the CT Poison Control Office to develop a pesticide bio-monitoring program.

b. Impacts – Short-term outcomes reflected by pre and post-test scores for 26 individuals in one class indicated an increase of 15 points in the mean test scores. Of 115 individuals who participated in the Ornamental and Turf Short Course, 82 took the written portion of the state certification exam immediately following the courses and 37 (45%) passed the state exam. These individuals will take oral exams and upon passing their orals will be certified as supervisory pesticide applicators that will allow them to open their own businesses or provide them with the certification they need to advance their careers.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - IPM/Plant efficacy and intraguild

interactions of pea aphid predators

a. Activity - There is a growing need to develop and implement integrated pest management (IPM) systems that depend on biologically based tactics. The sole reliance on chemical tactics is troublesome. For instance, more than 500 insect pests, 270 weed species and 150 plant diseases have become resistant to one or more pesticides (EPA, 1996). Moreover, concerns for human and environmental health and the cost of pesticide regulation stress the need for the switch to biointensive pest management systems. Such IPM systems rely on tactics such as host-plant resistance, biological control, and cultural controls. Understanding of how plant traits influence natural enemies can lead to ways of improving their effectiveness. Initial research to ascertain the effects of plant morphological on two insect predators (the ladybird beetle *Coccinella septempunctata* and the green lacewing *Chrysoperla rufilabris*) commonly used in biological control efforts indicated that plant morphological complexity hinders efficacy and that aphid consumption by coccinellid larvae is increased when plants have small stipules. Further examination indicated that predator movement on plants with smaller stipules is less obstructed thus resulting in increased predation. Larval coccinellids on afila plants also consumed more aphids than when they foraged on normal leaf peas.

b. Impacts - This research should contribute to our understanding of how plant traits influence biological control agents. The increased understanding of the interaction between plants and insect predators will allow us to better determine release rates of a given natural enemy or even seek modifications to plant structures that could enhance natural enemy effectiveness.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Key Theme - Integrated Pest Management

a. Activity - The general public is demanding safe food and water and an environment protected from contamination. Methods are needed to minimize the potential problems associated with pesticides and fertilizers without adversely affecting the economic viability of Connecticut agriculture, the green industries and our quality of life. The University of Connecticut Cooperative Extension System (CES) in conjunction with the Department of Plant Science has developed and implemented the Integrated Pest Management (IPM) Program to address these concerns. The goal of IPM is to reduce the dependence of agricultural producers, homeowners and schools on pesticides while maintaining or improving productivity, crop quality and quality of life.

b. Impacts – Long-term impacts from this ongoing program have included more than 80 tons of pesticide not being applied to Connecticut crops and landscapes by over 590 commercial growers and grounds keepers who manage 37,000 acres. The Connecticut IPM Website, which offers on-line training on more than 325 topics in 13 program areas was accessed 453,915 times during the period April 1, 2002 through March 31, 2003 and 6,306 people registered for courses between April 1, 2002 and March 31, 2003 for ten self-paced, self-grading, non-credit courses on IPM for homeowners and gardeners.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Invasive Plants/Biological

Control of Purple Loosestrife

a. Activity - Purple loosestrife (Lythrum salicaria) is an invasive non-native perennial plant that is a serious ecological threat to wetlands in Connecticut. As purple loosestrife takes over wetlands, native plant species are lost and the quality of these important wildlife habitats is reduced. Control methods for this invasive include hand-pulling plants, cutting or mowing, applications of herbicides, and biological control. In established populations, physical and chemical controls are not always effective and may be cost-prohibitive. Biological control is recommended as a low-input, sustainable management strategy for purple loosestrife. Thirty-one presentations on purple loosestrife and invasive plants, 30 field demonstrations, workshops and training sessions and three newspaper articles were written. More than 250,000 purple loosestrife biological control agents have now been introduced into 37 locations in the state.

b. Impacts - Monitoring results for two purple loosestrife biological control study sites established in 1997 have shown that the biological control agents are making a significant impact on reducing populations of this invasive non-native plant. Long-term outcomes are reflected by purple loosestrife stem density beginning to decline in 2001 and continuing at a greater level in 2002. Plant height in several quads was significantly lower in 2002 in comparison with previous years. Inflorescence and bud development also began to decline during 2001 and was most apparent in 2002. *Galerucella* adult and larval feeding injury has increased steadily since 1999 and reached 100% in several quads by 2002. Egg and larval densities increased during the last two years of the study.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Invasive Plants/Giant

Hogweed, an Invasive Non-native Plant

a. Activity - Giant hogweed is a biennial or perennial herbaceous plant that can grow up to 15 feet tall with leaves 5 feet long. The hollow stems of the plant are 2 to 4 inches in diameter. Large numbers of small white flowers are borne on the umbel-shaped flower head that can grow to 2.5 feet across. The many seeds produced by Giant Hogweed can live in the soil for up to seven years and can float on water for three days, further spreading the plant to new areas. Giant Hogweed is a poisonous plant. The sap may cause skin to be more sensitive to sunlight and produce large painful blisters and scarring.

Program accomplishments were disseminated through 22 presentations and demonstrations on invasive plants. Fact sheets on giant hogweed were prepared and posted on the web or provided to the public upon request. A 3-panel display on giant hogweed was prepared, 14 newspaper articles were published based on interviews with the author and others regarding giant hogweed.

b. Impacts – Mid-term outcomes are reflected in the extremely high amount of media coverage provided to giant hogweed information that lead to the distribution, description, poisonous traits and control options for this invasive poisonous plant resulting in the first confirmed site of Giant Hogweed. Additional locations brought the number of locations with this Federal Noxious Weed to 11 sites in six counties. Numerous other individuals and agencies across the state fielded calls relating to giant hogweed during the summer and fall.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - IPM/The Connecticut Curriculum

a. Activity - Through partnerships with Connecticut teachers and other educators, increase the knowledge of Connecticut citizens on environmental concerns in the state, on the principals of

Integrated Pest Management (IPM) and impacts on IPM on environmental problems, and IPM methods that are available to them to restore and preserve the environment.

During the second year of the five-year project, IPM curriculum for 7th and 8th grade students went through a final revision process. The printing of the curriculum is ready to go out to bid. The curriculum focuses on various aspects of IPM that include pest identification, (biology of insects, weeds and diseases), pest impacts (economic, ecological and social) and methods of pest control (mechanical, biological, chemical and regulatory). The curriculum units were developed to be included in science programs but also contain strands that link the subject areas to social studies, math, language arts, and technology. The curriculum was promoted to middle school science teachers, home school families and 4-H leaders at the Science Expo, which was held in April 2003 in Hartford, Connecticut. The Science Expo was attended by approximately 25,000 middle school students and teachers, home schooled children with their parents, 4-H groups, and families. Partners included Connecticut public school teachers; science coordinators and curriculum specialists.

b. Impacts - The project is in the second year of a five-year effort. The developed curriculum will have wide application, not only for public and private schools but also for youth of all ages in 4-H, Scouting programs, science clubs, and campers.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - IPM/Vegetable Crops

a. Activity - There are many risks associated with the use and misuse of pesticides in commercial vegetable production. Some of these risks include, creation of new secondary pest species or resurgence of primary pest(s) populations due to a reduction of natural enemies, resistance, adverse impacts on crop growth, regulatory expenses, pollution of ground and surface waters, unwanted food residues, reduced farm profitability, inadvertent chemical exposure of the public or farm workers, and land devaluation due to real or perceived hazards. Growers participating in the vegetable IPM program learn to combine cultural, mechanical, genetic, physical, and biological control techniques to prevent pest problems and to only use chemical pesticides when absolutely necessary, as a last line of defense.

Weekly on-farm IPM training throughout the growing season was conducted for nine (9) commercial vegetable producers. These growers owned/managed family farms that produce 25 to 800 acres of vegetables. Weekly field educational efforts were targeted at family members and managers that were involved in the daily decision making process of crop production and pest management. These key individuals were taught how to optimize crop health, through proper soil and nutrient management, so that plants were more competitive and resistant to weeds, diseases, insects and other problems.

b. Impacts - IPM training and increased farm profitability helped growers maintain a cleaner environment, provide a source of safe food production and maintain open space Nine growers that participated in the full-season field training reduced the number of pesticide applications

they made to 118 acres of sweet corn, peppers and summer squash by 10% and the amount of active ingredient they used by 2.1 pounds of A.I./acre or 38%. They increased their crop yields by 7%, 12%, and 20% on sweet corn, peppers, and summer squash respectively, and saved $59,063 ($501/acre) by reducing pest damage.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - IPM/Herb Bedding Plants

a. Activity - Bedding plant growers are producing more specialty crops to provide a diverse product mix for their customers. Herbs are one of the fastest growing segments of the bedding plant industry. However, it is very difficult for growers to find information on how to safely and effectively manage pests on herbs. Integrated pest management (IPM) offers a practical way to effectively manage pests on herbs. Using regular monitoring, accurate problem identification, and timely implementation of appropriate management strategies can grow high quality herbs.

Herbs are marketed for their culinary, medicinal and ornamental uses. However, the EPA considers herbs to be a minor or specialty food crop. As such, there are very few insecticides or fungicides registered for use on them. Most herbs are fall into the crop category "herbs and spices", but a few are considered to be "leafy vegetables." Specific information on what insecticides or fungicides are registered for use on herbs is not available in either the New England Greenhouse Floriculture Guide or in the New England Vegetable Management Guide.

A publication, "Pest Management for Herb Bedding Plants Grown in the Greenhouse" was jointly developed the University of Massachusetts, discusses disease management, sanitation, the use of biological fungicides, and how to monitor for specific key diseases. It also includes information on insect and mite management including cultural and biological controls as well as how to scout for key insect and mite pests.

b. Impacts - Growers are now able to easily find information on effective and safe ways to manage pests on herbs in their greenhouses in order to produce high quality crops.
Five hundred copies of this publication were made available to greenhouse growers throughout New England. This publication, is available on the UConn IPM web site and had over 10,000 downloads of either the manual or tables, ranging from 100 to over 1700 per month.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - IPM/Greenhouses

a. Activity - In Connecticut, the greenhouse industry is a significant part of the agricultural industry. Over 260 commercial greenhouse growers produce greenhouse crops in the state with a wholesale value of over $82 million dollars (NASS, May 2003). The majority (81%) of the plants produced fall into the category of bedding and garden plants. Connecticut residents purchase more flowers and plants per capital than any other state in the US.

There are many concerns related to the use of pesticides in the greenhouse industry. Some of these concerns include worker safety, development of resistant insect and disease populations due to overuse of pesticides, adverse impacts on crop growth including phytotoxicity (plant damage), and pollution of ground and surface waters. IPM is the use of a variety of pest control methods designed to protect public health and the environment and to produce high quality crops with the most judicious use of pesticides.

Participants in the Greenhouse IPM program included family run and corporate businesses ranging in size from small 7,000 square feet greenhouse operations (i.e. mom and pop operations) to wholesale greenhouse businesses with 12 acres of production. Participants included both spring seasonal businesses that grew bedding plants and garden mums to year-round producers of spring bedding plants, herbaceous perennials and poinsettias.

Greenhouse crops are very high value crops that are grown for their ornamental and cosmetic value. Gardeners have a very low tolerance for any signs of insect pests or diseases. Because of this, growers must produce a very high quality, pest-free crop. In the enclosed greenhouse environment, pest populations can develop rapidly so there is a need for timely up to date information to make pest management decisions. To address this need, a bimonthly update on cultural and pest issues is placed on the Greenhouse IPM Web site at http://www.hort.uconn.edu/ipm/ipmghse.htm

Fifty growers received direct diagnostic advice via grower visits and walk-in consultations. Additional growers were reached via four articles in the national trade magazine with a circulation of 7,000 readers.

A spring bedding plant meeting was held at two locations across the state. Topics covered included symptoms of pesticide overexposure, using biological fungicides, nutrient management,

managing root health and an update on worker protection standards. Sixty growers attended these workshops. At the Tolland Extension office meeting, over 50% of the growers who attended said they would regularly monitor their growing media pH and adjust their fertilizer usage. Three growers stated that they would use biologically based fungicides to improve root health, and four growers stated they would follow worker protection standard more closely to safe guard their workers health. Seven growers stated that they would more closely monitor for insects and viruses in their crops.

b. Impacts - Whenever possible, growers selected more environmentally friendly products with shorter reentry levels, lessening worker exposure to pesticides. They also used a microbial product, spinosyn, to manage the western flower thrips. All participants increased their adoption of IPM practices and all growers said they would recommend the program to other growers. For the nine participating growers, insecticide use increased by 2.7 pounds of insecticide active ingredient due, primarily, to two operations that had significant problems with both thrips and impatiens necrotic spot virus.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - IPM/Coastal Education and Demonstration Project

a. Activity - There are many problems and concerns related to the use of pesticides. Some of the concerns include overuse and misuse of pesticides, pollution of ground and surface waters, unwanted residues on food and feed, drift to non-target areas, hazards to beneficial and other non-target organisms, resistance of pests to pesticides, and public and pesticide applicator safety. Integrated Pest Management (IPM) is the use of a variety of pest control methods designed to protect public health and the environment and to produce high quality crops and other commodities with the most judicious use of pesticides. When IPM methods are used, pesticide risks are minimized.

The primary goal was to reduce the use of pesticides in agricultural crops located in coastal towns in Fairfield and New Haven counties. In-depth educational training programs offered to participating fruit and vegetable growers accomplished meeting the primary goal while maintaining the quality of the crops. Other educational IPM programs (e.g. meeting presentations) were offered for greenhouses, turfgrass, and weed IPM. A second goal of this project was to conduct educational programs for home gardeners and garden centers. This education was provided primarily by on-line Internet courses and through the University of Connecticut Home and Garden Center newsletter. During the growing seasons of 2000-2002, 7 growers from 6 farms participated in Full-Season Integrated Pest Management (IPM) training programs in two commodity areas, fruit crops (apples, pears, and strawberries) and vegetable crops (sweet corn, peppers, and cabbage). A total of 142 in-field IPM training sessions were conducted in this area throughout three field seasons.

b. Impacts – The seven cooperators reduced pesticide applications by 41% (7,893 pounds of active ingredient=A.I.) on 316 acres of crops in coastal towns of New Haven and Fairfield counties. The project succeeded in reducing the use of 24 of the 36 pesticides reported by the cooperators and eliminated the use of 8 products entirely. The growers in the program reported a net reduction in use of 3,590 pounds A.I (54%) for 18 insecticides, 4,155 pounds (36%) for 13 fungicides, and 148 pounds (17%) for 5 herbicides.

Another impact of the project was to reduce the use of pesticides with moderate to severe leaching potentials by 59% (1,439 pounds A.I.). All five chemicals rated as high leachers had reduced use. Non-chemical alternatives and pesticides with less detrimental characteristics were substituted wherever possible.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Long Island Sound Lobster Extension Program

a. Activity - The commercial lobster fishery in Long Island Sound has suffered and continues to suffer tremendous economic hardship as a result of this mortality event. The total number of lobster licenses for the Sound issued by Connecticut and New York in 2002 dropped to about half of nearly 1,800 issued in 1994. The lobster harvest has decreased from a high of more than 11 million pounds in 1997 to about 8 million pounds in 1999 to 2.5 million pounds in 2002.

This extension program was initiated in 2000, following the massive mortality of lobsters in Long Island Sound during the fall of 1999. Fall landings of lobsters dropped as much as 90%, particularly in the western portions of the Sound. In the eastern Sound, the incidence and extent of lobster shell disease was increasing at the same time, reducing the value of the lobsters and rendering them unsuitable for the live market. Pathologists at the University of Connecticut discovered a parasitic paramoeba engulfing the nervous tissues of the lobsters examined, but were unable to determine if it was the primary or secondary cause of death. During about the same timeframe in 1999, various mosquito control pesticides were applied in New York and Connecticut to combat the newly arrived West Nile Virus, which killed seven people in New York. After a disastrous fall, the commercial lobster fishery was declared a marine resource disaster by then Secretary of Commerce Dailey in late January 2000.

The lobster extension program serves as the liaison between the research community and the lobster industry, facilitates the activities and actions of the Lobster Mortality Research Steering Committee, and keeps the public informed as to the status of the lobster resource and the progress of the lobster research efforts. One unusual twist to the whole situation is that the lobster industry has filed a lawsuit against the manufacturers of several mosquito control pesticides, and CT industry rep to the steering committee is one of the named plaintiffs. Several researchers have also served as paid consultants to the plaintiffs' lawyers. Several researchers, state resource managers, and extension employees were subpoenaed and deposed.

The primary audiences of the lobster extension program have been the lobster industry, the Lobster Mortality Research Steering Committee, the research community, law firms, and the general public. It is difficult to describe their key characteristics, as they are quite varied.

b. Impacts - The lobster extension program has been serving an important coordinating role among the Steering Committee, research teams, lobstermen, resource managers, and other interested parties. It has provided a variety of opportunities for sharing research updates and discussing the status of the lobster resource. No definitive cause of the lobster mortality event has been determined. Preliminary results seem to be pointing to a combination of factors. For Long Island Sound, answers are being sought simultaneously in the universities and courts, and everyone is frustrated at the amount of time both avenues are taking. The on-going class action lawsuit has brought new challenges and experiences to the extension program.

The stark reality is that the socio-economic status of Long Island Sound lobstermen has diminished greatly over the past four years, and many fishermen have left the industry altogether. Others are financially strapped, but hanging on in the hopes that the lobster resource will start showing signs of recovery soon.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Coverts Project in Connecticut

a. Activity - Connecticut's 1.8 million acres of forest provide raw material for over 350 forest products processing and manufacturing firms, which employ 3,600 citizens and contribute over $450 million annually to the state's economy. They also clean our air and water, provide habitat for wildlife, and provide recreational opportunities for nearly a million citizens each year. Almost 85% of Connecticut's forest is privately owned. Research shows that Connecticut is losing some 6,000 acres of commercially harvestable forest annually to development and fragmentation, and that the average forested parcel size has declined 34% over the past 20 years.

This program targeted Connecticut's 115,000 private forest landowners. Its goal was to enhance their knowledge about good forest stewardship, and to increase the forested acreage under long-term stewardship plans by moving as many owners as possible through the stages of stewardship planning practice adoption. The underlying educational model draws on diffusion of innovations principles by seeking out, training and supporting opinion leader volunteers who lead by example in their communities, and who assist with local educational efforts.

Thirty (30) new volunteers were trained at the Yale Forestry Camp on Great Mountain Forest, 5,475 people attended a total of 80 forest and wildlife stewardship workshops, and 3,037 attendees participated in outdoor forest & wildlife tours.

b. Impacts – Short and mid-term outcomes are reflected by 16,757 acres of stewardship plans updated or developed, habitat and timber stand improvements implemented on 1,111 acres, and knowledge and information gained by 11,307 individuals, including at least 1,659 forest landowners.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - The Green Valley Institute

a. Activity - The Quinebaug-Shetucket National Heritage Corridor (QSHC) is a 35-town region in eastern Connecticut and south-central Massachusetts, officially recognized by the National

Park Service as having natural, cultural and historic resources of national significance. The region has been nicknamed “The Last Green Valley” because nighttime satellite images clearly show it as the last dark spot in the Boston to Washington DC coastal megalopolis.

The Corridor’s population grew 4% between 1990 and 2000, and is projected to grow an additional 20% by 2020. The rate of growth in rural communities was more than triple that of the urban areas. Preserving environmental quality and viable agriculture in the last green valley, in the face of these pressures, will require unprecedented inputs of education and information to several key audiences. Chief among them are: 1) private farm and forest owners, who control 80% of the Corridor’s land, and 2) municipal officials and commissioners, to whom virtually all authority to plan for and regulate land use has been delegated. This latter audience is overwhelmingly populated by lay volunteers who are in chronically short supply and often poorly supported with education and technical support.

CANR and the QSHC have partnered to fund a full-time land use educator in the Corridor, and to create a comprehensive educational initiative called The Green Valley Institute. UMass Extension became a full partner in 2002. The Institute is dedicated to improving the knowledge base, at every level from the individual to the Corridor as a whole, from which land use and natural resource decisions are made. 37 volunteers who provide counsel on a joint natural resources and agriculture committee of the Corridor. Several educational events included a flexible workshop module and accompanying materials for private landowners on protecting family lands. An enhanced Corridor-wide G.I.S. database on natural and agricultural resources was made available to Corridor towns on request for planning purposes; a weekend-long training module called “A New Introduction to the Natural World”, was offered to new community volunteers who seek a stronger natural resource background and/or a rewarding volunteer opportunity; a volunteer recruiting, training and placement system in the Corridor - Green Valley Brush Brigade – improved and maintained trails and other open spaces; a series of seminars designed for municipal commissioners, planners and others interested in community growth patterns and land use issues; skill building workshops for municipal officials - 1) Land Use Commissioner's Orientation, 2) Legal Requirements and Process, 3) Planning for Our Future including the Process of Community Planning and the Development Review Process were offered; community design workshops including commercial development and rural character, municipal build out, fiscal implications and historic and archaeological protection.

b. Impacts – Short-term outcomes are reflected by program evaluations. The Protecting Family Lands workshop was offered to 109 participants owning an estimated 3,920 acres. On a scale of 1 (no value) to 7 (tremendous value), participants rated the overall workshop a 5.8. As a result of the workshop, 67% plan to define their land protection goals more specifically and discuss their land protection plans with appropriate family members, 45% plan to contact a local land trust, and 28% plan to consult with an attorney and/or land protection specialist. Follow-up, lag-time surveys to measure actions are in process. Weekend retreat for conservation volunteers rated the overall program a 6.3 in terms of knowledge gained and usefulness of the knowledge. Sixteen of the 19 participants (84%) who were not active volunteers at the time of the training are now active in volunteer community positions and have donated an estimated 930 hours since the retreat, valued at some $14,830. Skill Building workshops received a 4.1 for amount of knowledge gained and a 3.9 for how useful that knowledge will be and land use seminar

attendees rated the sessions 4.4 for the amount of knowledge gained and 4.3 for how useful that knowledge will be.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – Multi-state

Key Theme - Development Alternatives Workshop

a. Activity - The Quinebaug-Shetucket National Heritage Corridor (QSHC), located in northeastern CT and south central MA, is facing many issues relating to its growth and future development. In the last decade, 14 of the QSHC's 35 towns grew more than 10% and a few towns grew more than 25%. Many of the communities in the region have no professional staff to help them address community planning issues. These rural communities are run almost entirely by volunteer boards and commissions, who are looking for new ways to accommodate community growth. Most Corridor communities understand the need for appropriate economic and residential development. They often, however, are not aware that there are alternative development options that can accommodate new growth while protecting important community and natural resources.

Alternative development patterns were also identified as the number one topic of interest in a Needs Assessment Survey of municipal officials in the QSHC. The Development Alternatives workshop is presented in cooperation with municipal commissions from the communities involved.

b. Impacts – Short-term outcomes from program evaluations reveal that, on a scale of 1 to 5, participants rated the amount of knowledge gained as 4.3; usefulness of the knowledge as 4.7; and the value to your community in planning for its future as 4.5. 96% of participants at the workshops said they would support alternative development options in their communities.

Mid-term outcomes include adoption by the Town of Scotland of new conservation subdivision regulations as a direct result on this workshop and approved its first two subdivisions under these

new regulations. About 50 percent of each project site has been permanently protected as open space as a result. Two additional communities are currently working on implementing similar regulations.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Natural Resource Inventory Projects

a. Activity - The Quinebaug-Shetucket National Heritage Corridor (QSHC) includes 35 towns in northeastern CT and south central MA. Many communities in this primarily rural region have no professional staff to help them address natural resource and land use issues. The Green Valley Institute (GVI), a partnership between the University of Connecticut College of Agriculture and Natural Resources and the QSHC, was formed to help communities address these issues. One of the primary goals of the GVI is to improve the knowledge base from which land use and natural resource decisions are made, with emphasis on municipal land use boards and commissions.

A community Natural Resource Inventory (NRI) is a critical tool for improving this knowledge base. NRIs provide a key foundation for a town's Plan of Conservation and Development, enable more thorough analysis of the true environmental impacts of proposed subdivision and other land uses changes, and allow communities to geographically focus both pro-active land protection and economic development efforts. Although NRIs are an important planning tool, many communities in the QSHC do not have them or have very out dated versions.

To address this need, the GVI developed a process for educating and assisting multiple communities in the development of up-to-date digital NRIs. The process encourages communities to think of and view themselves in a regional context. Simultaneously, GVI began an aggressive outreach program designed to teach towns the value of establishing separate, non-regulatory Conservation Commissions, which would have the time, knowledge and ability to manage and promote the effective use of the natural resource data.

Eight towns have sent representatives to the week-long Geographic Information Systems training course offered in the LERIS lab, and are gradually assuming primary responsibility for managing their own NRI data.

b. Impacts – Short-term outcomes from program evaluations show that of the 15 course participants, 100% rated the course "Very Good" or "Excellent"; 87% agreed, "I now feel confident I can work with GIS technology"; and 93% "will recommend the course to others".

Mid-term outcomes are related to adoption of public policies. Three towns have created separate Conservation Commissions, one has resurrected a previously inactive Commission, two have active Conservation Task forces that hope to become permanent Commissions, and one is exploring the development of a new Commission through its Board of Selectmen.

Four towns are in the process of incorporating the NRI data into their Open Space Plans and/or POCD's. Five have institutionalized a process for utilizing this information to review new

development projects. Ten adjacent towns are now working cooperatively with the GVI to standardize methods and criteria for refining the NRI process and prioritizing natural resource protection areas. Future outreach will focus on the use of Arc View Spatial Analyst and other cutting edge digital tools to streamline this process.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Connecticut Tree Warden School and Certification Program

a. Activity - For nearly a century Connecticut state law has mandated that each city and town appoint a Tree Warden and that this public official is then responsible for all municipal trees. However, Connecticut state law does not specify what skills and knowledge Tree Wardens must posses. To protect both the public and the urban forest resource, Tree Wardens need knowledge of tree biology, tree care, hazard tree assessment, public participation, tree law, and meeting management. An annual Tree Warden School and Certification Program was created to provide Tree Wardens with a voluntary educational opportunity to acquire this knowledge through participation during five half-day sessions, one day per week in the fall. An annual event, the Tree Warden School each year provides up to 30 Tree Wardens, Deputy Tree Wardens, chief elected officials, tree board members and others with the knowledge and skills required to perform and/or understand Tree Warden duties and responsibilities. Partners include DEP and TWACT.

b. Impacts – Short-term outcomes from program evaluations show that, on scales of 0 (poor) to 4 (excellent), Tree Warden School participants rated the school program 3.6 in terms of knowledge gained, with 3.8 in the applicability of the information to their Tree Warden duties. All participants found the final exam to be difficult, yet fair. In four years, 110 Tree Wardens and Deputy Tree Wardens have gained new knowledge concerning Tree Warden duties and responsibilities through the Tree Warden School. This means that Certified Tree Wardens are now better able to make informed and responsible decisions about the care and preservation of public trees while protecting the public from hazardous ones. A significant, yet unanticipated,

outcome of this program is that chief elected officials have begun appointing more qualified people to the Tree Warden position. These people often are foresters or arborists who then attend the Tree Warden School to fill-in gaps in their expertise and obtain certification. Mid-term outcomes include the program serving as a model for the urban and community forestry program efforts in Maine and Vermont. Both these states have laws that, like Connecticut, require the appointment of Tree Wardens in municipalities but do not require any minimum qualifications.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Connecticut Urban and Community Forestry Volunteer Initiative

a. Activity - Connecticut is the fifth most densely populated state yet retains fifty-nine percent forest coverage. This extreme population density causes factors that not only shorten the lives of municipal trees (along streets, in parks, around schools, for example) but also creates hazardous ones. In spite of being a wealthy state, Connecticut municipalities typically do not adequately fund municipal forestry/tree care operations thereby undermining the health of public and jeopardizing public safety. Volunteers who receive quality and timely community forestry education and training are able to augment community forestry efforts. The Meskwaka Tree Project is one of the more important facets of the urban and community forestry initiative and was created to provide such necessary urban and community forestry educational opportunities and programmatic support. Volunteers were educated in urban and community forestry including tree biology, tree care, fundraising, media relations, community affairs, meeting management, tree law, and marketing. An annual event of the Meskwaka tree Project is designed to provide municipal volunteers with basic educational background and contacts to either initiate new or support existing urban and community forestry programs, either in their municipality or on a state-wide basis. Partners include USFS, DEP, and Connecticut College Arboretum.

b. Impacts - In the twelve years of the existence of the Meskwaka Tree Project, all participants said they would recommend the program to other community forestry volunteers. Participants are required to return to their communities and perform community or state based urban and community forestry volunteer programs. Since 1992 over 185 urban and community forestry volunteers have been trained. Participants have come from 63 Connecticut communities and three states. Numerous mid and long-term outcomes have been recorded since 1992 where it is seen that volunteers have been the initiator or participant in the following example outcomes: 38 communities have written and passed shade tree ordinances; 28 shade tree commissions have been established; about 2,930 new public trees have been planted; eighteen towns have conducted volunteer organized shade tree inventories; two nonprofit community forestry organizations have been founded; and seven municipal memorial tree programs have been created. The Maine Community Forestry Program has created an urban and community forestry program modeled after the Meskwaka Tree Project and will be launched in the spring of 2001.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Conservation of Early Successional Wildlife and Habitats

a. Activity - Early successional habitats (primarily croplands, grasslands and shrublands) are essential for sustaining biodiversity, biological productivity, and human quality of life. Early successional habitats and associated wildlife species have been declining throughout the eastern United States, particularly in Connecticut, since the 1960s. Urbanization and forest re-growth are thought to be major causes of the decline. Connecticut landscapes were more open and diverse prior to European contact with Native Americans in the 1600s than is true today. Declining early successional species include American Woodcock, Ruffed Grouse, Northern Bobwhite, Upland Sandpiper, Killdeer, American Kestrel, Whip-poor-will, Yellow-breasted Chat, Chestnut-sided Warbler, Blue-winged Warbler, Grasshopper Sparrow, New England Cottontail, and other species linked to loss and deterioration of early successional habitats. The International Association of Fish & Wildlife Agencies appointed a Woodcock Task Force in 2001 to address the decline in American Woodcock populations with a goal to restore the species to 1980 levels.

b. Impacts – A consensus statement on conservation of American woodcock and other early successional wildlife and their habitats was approved and published in the Mar-Apr'03 issue of Connecticut Wildlife Magazine. The statement provides a general early successional wildlife conservation blueprint for individuals, agencies, and organizations throughout Connecticut. Some of the activities recommended have begun, and other initiatives are expected. One response to a Consensus Statement recommendation has been the formation of the Connecticut Woodcock Council (CWC), organized to receive donations, grants and other resources as matching or startup support of habitat management, landowner assistance grants, demonstration sites, public information, college scholarships, and research. The CWC will strive for a balanced focus on woodcock, ruffed grouse, and other early successional species and their habitats in keeping with other conservation programs and priorities in the state. The CWC is now incorporated in Connecticut, is filing for IRS 501(c) 3 tax exempt status, and has held its first official meeting of the board of directors.

c. Source of Federal Funds - Hatch

d. Scope of Impact – State

Goal 5 - Enhanced Economic Opportunity and Quality of Life for Americans

The Connecticut program was active and successful in this area with a wide variety of efforts conducted during the reporting period.

Extension efforts in leadership development through the People Empowering People Program (PEP) were designed to work with adults and older youth with limited financial resources to enhance their ability to help themselves and their communities. Over 70% of the 97 adults and teenagers who graduated from the program showed improved communications skills, and a like number showed increased knowledge of community resources, shared new skills and increased awareness of positive parenting practices.

Parenting education programs were designed to enhance healthy family functioning through positive parent-child interactions, communications and discipline techniques. Of the 85 parents who participated, all felt better about their parenting practices, with 81% improving their parenting skills.

Extension programs in family resource management focused on issues related to increased debt and personal bankruptcies. Educational programs reached numerous audiences, including single females and low-income individuals. Increased money management skills resulted, according to survey responses.

Another program highlight included a workforce preparation program for 4-H youth that offered youth entrepreneurship programs and work to 100 youth. The program integrated workforce participation into existing programs to foster the development of skills needed for entrance into the workforce. Youth demonstrated improved workforce readiness skills in business organization, money management and other relevant skills, with in-school attendance and teamwork skills improved.

Benefits to clientele and stakeholders who participated in this goal area were many; including improved family relationships, improved skills by youth entering the workforce, better actions by individuals and families to manage financial matter and enhanced parenting techniques.

In summary, our assessment of accomplishments is considerable, and is measurable in terms of the previously submitted 5-year Plan of Work. Total expenditures, by source of funding, and full-time equivalents for this goal are:

Goal 5		
Funding Source	Expenditures	FTEs
Smith-Lever	714,712	13.01
Hatch	-	-
Multi-state research	-	-
State funds	788,003	11.79
Competitive grants	118,633	3.10
Animal health	-	-
Total	1,621,348	27.90

Key Theme - Family Functioning/School Success

a. Activity - A community needs assessment of parents, children and families in the Greater Danbury area identified parent involvement as a priority need. As a result of this need, CES was asked to develop an educational program for parents entitled *Children and School Success: What You Should Know*. The program blended research on parent involvement and early literacy to help parents understand their important role in their child's education and to assist them in developing the skills necessary for them to be successful. Programs were conducted involving 40 parents and/or providers.

b. Impacts – Short-term outcomes as reflected by evaluation results indicated that 100% of responding participants learned about positive family attitudes related to learning, literacy and school behavior; 100% learned new skills to help children develop positive study habits; 90% increased their involvement in their child's school; and 100% reported learning about the various types of involvement. In addition, several state and community groups adapted the curriculum for use with their clientele, including the Center for School Change in partnership with the Commission on Children and the Connecticut Policy and Economic Council, Danbury Public Schools, New Fairfield Public Schools, Hartford Public Schools, and Hartford Parents Trainers Network.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Family Functioning/ Teacher Training

a. Activity - According to many teachers and school administrators, there are not specific educational opportunities for teacher trainings in areas of behavior management. Two schools, one in Danbury and one in West Haven, requested staff training that would provide staff with a variety of skills to use with hard-to-manage children. Most of these children are diagnosed with ADHD (Attention Deficit and Hyperactivity Disorder) and many have stressful home lives.

b. Impacts – Short-term outcomes as reflected by evaluation results indicated that of 36 teachers who participated in these workshops, 100% reported they met learning goals for the workshop, 85% learned how to deal with difficult behavior in a more positive way, 95 % learned different labels for behavior, 98% learned the importance of intervening before a situation becomes out-of-control, and 85% learned the importance of reframing and labeling behavior as a tool to help children control their own behavior.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Family Functioning/The People Empowering People (PEP) Program

a. Activity - The need to help families with limited financial resources is not new. In the past, educators, and others worked at fixing what was wrong with poor families. Within the last decade, the trend has been away from viewing these families as having weaknesses or deficits toward helping them to see their strengths. PEP embodies this empowerment model of looking at individuals' and families' strengths.

PEP is an innovative program designed to build on the strengths of adults and adolescents with limited financial resources. PEP recognizes the unique gifts, life experiences and capacities of each person and emphasizes the connection between individual and community action. Individual change is encouraged through ten two-hour training sessions followed by bi-monthly or weekly follow-up sessions. 76% of program participants were female, 24% were male, 19 % were teenagers (most were youthful offenders or teen moms), 20% Caucasian, 34% Black, 43% Hispanic, 4% were Asian, and 90% low income.

The program was also conducted in three additional states. In Albuquerque, New Mexico a facilitator conducted PEP with a group of Hispanic parents and in Bernalillo, New Mexico a facilitator used the youth PEP curriculum with a group of teen parents. Also, the program was implemented with several groups in Massachusetts. An Extension Educator from the University of Maine CE conducted PEP with incarcerated youth in Maine.

b. Impacts – Short-term outcomes as reflected by evaluation results indicated that of 97 adult graduates, 47% attended the ten training sessions; 93% had improved communication skills; 81%had improved problem solving skills; 83% developed positive parenting practices; 87% worked as a team to accomplish project goals; 85% completed at least one community project; 79% increased knowledge of community resources; 81% recognized new strengths or skills; 35% took steps toward economic self- sufficiency; 50% became socially active. It is estimated that these adults donated approximately 290 hours and reached approximately 1272 people.

At the Gates Correctional Institution, eight men, ranging in age from 20 –50, graduated from PEP. The facilitator reported the following results: 100% showed improved communication skills; 100% developed improved problem solving skills; 50% developed positive parenting practices; 100% conducted at least one project; 100% increased their knowledge of community resources and 75% recognized new strengths or skills. As a result of PEP, the Deputy Warden at Gates CI donated $900 toward three more PEP programs.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

<u>Key Theme - Financial Management/Income Tax School</u>
a. Activity - To provide Connecticut tax practitioners with high quality, up-to-date tax law information, an annual Income Tax School is held in cooperation with the Internal Revenue Service, Connecticut Department of Revenue Services, and private attorneys and accountants. Participants receive up to 16 hours of CPE credits from the University of Connecticut.
b. Impacts - The school is a primary source of tax information for many Connecticut practitioners that serve individuals and small business clients in the state. For eleven years this program has been fully enrolled, expanding to a maximum capacity of 235 practitioners. These practitioners use the information in this tax school to prepare tax returns for over 10,000 Connecticut residents each year. Sample quotes from recent participants:
“The seminars and speakers were really tops and the material as before, relevant, up to date and interesting. Thanks.”

"The conference was well organized and efficient flow of people and food for such a large group. A job well done."
"A cost effective seminar with excellent subjects covered."
"This is a great seminar. It's the best of the year, far surpassing the CSCPA courses."

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Financial Management/Managing Your Money

a. Activity - Connecticut's economic climate and welfare reform have increased the number of families seeking financial assistance and counseling from social service agencies. The target audiences for whom these programs were provided were limited resource families and individuals enrolled in programs sponsored by agencies working with at-risk families. Some of these families are also challenged by the dynamics of managing their money as they enter the workforce and are faced with purchasing services that were formerly entitlements under the welfare program, such as health care and childcare. The objectives are to provide program participants with the skills necessary to manage their money and to give parents the skills necessary to teach their children about managing money.

Social service agency staffs also need training in money management as they assist their clientele with the challenges presented by the economy and the entrance of their clientele into the marketplace purchasing goods and services for the first time. Train-the-trainer programs were conducted for staff representing 12 statewide agencies. These agencies included the Danbury Regional Commission of Child Care, Rights and Abuse; AIDS Project Greater Danbury; The Family Counseling Center, Employment Success Program; Municipal Social Workers; Catholic Charities/Family Service; TBICO (a job training program); and New Opportunities/REACH program (energy assistance). The objective of this training program is to give the participants the skills necessary to help them teach their clientele about basic money management practices.

Managing Your Money program series were conducted as part of the Communication of Parent Effectiveness Skills program (COPES) at the Danbury Regional Commission on Child Care, Rights and Abuse. One group was composed of English-speaking parents and one group was composed of Spanish-speaking parents. The Commission provided a translator for the Spanish-speaking groups. A total of 30 parents participated. Series topics included setting family financial goals; planning a budget; credit and debt management; reducing expenses; children and money; and resolving consumer problems.

A manual was developed for use with Managing Your Money train-the-trainer program. The manual contains reproducible worksheets and exercises that can be used in newsletters and for distribution to clientele.

b. Impacts - Short-term outcomes as reflected by evaluation results indicated that as a result of participating in the Managing Your Money Series, 95% of participants indicated, on post-program surveys, that they felt better about communicating about money with their partners/spouses. Seventy percent indicated that they had begun to teach their children about

money through the use of allowances. Twenty-five percent have set financial goals and have begun savings accounts to reach these goals. In post-program interviews participants indicated that they would now save for big-ticket items, such as television sets or furniture, rather than use rent-to-own options.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Financial Management/Milford Housing Authority Family Self-Sufficiency Program

a. Activity - The successful transition from welfare to the workforce requires that families overcome a myriad of obstacles from childcare and transportation issues to job readiness and managing family resources. In Connecticut, these issues are exacerbated by the high cost of living here. A person must earn at least $17.03 per hour to afford a two-bedroom apartment in Connecticut, according to a recent National Low-Income Housing Coalition (NLIHC) report, Out of Reach - America's Growing Rent Wage Disparity 2002.

The FSS program is a voluntary program for Section 8 participants that require that the head of household enter a five-year contract with the local housing authority. During this period, the family receives supportive services such as education and job training so they can get off the welfare roll and become full-time employees. While on the program, the local housing authority establishes an escrow account for the family. When an FSS family pays a higher rent due to a higher income, the difference in increase between the old rent and the new rent is credited to the family's escrow account. The Milford Housing Authority Family Self-Sufficiency Program is a Housing and Urban Development Program that helps residents of public housing obtain employment that will lead to economic independence and family self-sufficiency.

b. Impacts - Short-term outcomes as reflected by evaluation results indicated that approximately 34 people, mostly women whose ages ranged from 20s to 40s, participated in the series during this time period. 84% (11 of 13) of participants indicated that their knowledge level on family resource management topics had increased greatly, including increasing their savings in their escrow accounts, attending college, saving for and buying cars, completing their GED, dealing with credit issues, finding suitable childcare, pursuing scholarships to assist in furthering their education and that of their children as well as finding a job with better pay and/or benefits. During this time, at least three people purchased their own homes and one started a business.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Consumers/Identity Theft Prevention

a. Activity - Identity theft emerged as the major financial crime in the 1990s with the increased ability to collect, compile, analyze and disseminate information. The increase in this white-collar crime continues. According to the Government Accounting Office testimony before a U.S. Senate Subcommittee in February 2002, two national credit reporting agencies reported that

consumers placing fraud alerts involving identity theft increased 36 percent and 53 percent respectively in two recent years. The Federal Trade Commission Identity Theft Clearinghouse's calls increased from and average of 445 calls per week in November 1999 to an average of 3,000 calls per week in December 2001. It has been reported that 700,000 people become identity theft victims annually. One in four Americans will is a victim of this crime according to Federal Reserve Bank of Boston.

A train-the-trainer program, *Preventing Identity Theft: Protecting Your Privacy and Your Good Name,* provided social service providers with the skills necessary to teach their clientele about avoiding identity fraud and what they should do if they are victimized. A workshop was also offered to adults. Program materials include a training manual and four fact sheets: Strategies for Protecting Your Privacy; Protecting Your Privacy Online; Identity Theft: What to Do If You Become a Victim; Protecting Children Online; and Protect Your Privacy. Participants are encouraged to reproduce these and distribute them to clientele and to also include them in their own newsletters. Train-the-trainer workshops were conducted for 65 program participants, including social service agency staff and volunteers who work with senior citizens; housing authority personnel; assisted living facility staff; and municipal employees.

b. Impacts - Short-term outcomes as reflected by evaluation results indicated that post-program surveys indicated that 91% increased their knowledge related to consumer privacy rights, and 94% increased their knowledge about ways to minimize the risks of identity theft. One hundred percent intend to share the information with their clientele and other agency staff members. Thirty percent plan to conduct identity theft prevention programs for their clientele. Seventy-seven percent plan to share the information gained with co-workers and 65% will reprint fact sheets in their agency newsletters. Fifty percent indicated that they intend to share the information with professionals at other agencies.

For 625 adult participants at senior groups, parenting programs, grandparents raising grandchildren programs, and social service agency coalitions, post program surveys indicated that as a result of this training participants planned to change the way they disposed of personal identifying information; teach their children/family members about protecting personal information; protect their personal information by questioning the collection and use by those who request such information; and place their names on opt-out lists and no-call lists for telemarketers.

Media response was positive as consumer reporters from the ABC-affiliate, WTNH News Channel 8 and the CBS-affiliate, WFSB interviewed staff for stories on identity theft following a major identity theft crime in Connecticut.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

<u>Key Theme - Family Functioning/Parenting</u>

a. Activity - Parent education is a high priority need throughout Connecticut. Parents have many stresses in their lives – cultural, social, emotional, economic, and even balancing their time

between work (or looking for work), and family. Families come in many forms, from those headed by teenage parents, single or divorced parents, foster parents, grandparents, or blended families. Some families are at high risk and have experienced homelessness. As a result, many children are not raised in a nuclear family, and children are faced with many challenges. Parents worry about the impact of these stressors on their children – especially when parents are away from their children. Increasingly, regardless of family form, parents also express concern for their children's safety when they are apart. Spending meaningful time with children is very important to parents as it gives them an opportunity to develop better quality relationships, and teach and guide their children. Parents and children both benefit when parents learn new parenting skills and become more confident.

CES developed the Parenting People: Strategies for Effective Parenting program in response to community needs for an effective and usable program. This educational program focused on teaching parents about themselves, their children and the dynamics that are involved with successful parenting and child rearing. Since CT is a state with a diverse population, Parenting People was been translated into Spanish and Portuguese.
Nine (9) Parenting People program series were completed. These sessions were held in various locations throughout Danbury and conducted in English, Spanish or Portuguese. Approximately 80% of participating parents were Department of Children and Families (DCF) referred. Therefore, these programs are reaching parents and children who are at highest risk for abuse and neglect in CT. Other workshops were offered in various communities throughout targeted areas of Connecticut.

b. Impacts - Short-term outcomes as reflected by evaluation results indicated that in the Parenting People

program, 25% of attendees improved their parenting skills substantially, 15% did not change their parenting skills, and 60% improved their parenting skills somewhat. 90% felt better about their parenting practices,

with 10% not sure. Most parents were practicing positive communications and discipline strategies upon the completion of the classes. Some decided to try family meetings; others indicated they realized some behaviors were a

matter of the child's developmental stage and that the parent was not alone. Several noted they wanted workshops for parenting teenagers.

In the School Success program, 100% participants learned about positive family attitudes related to learning, literacy, and school behavior, helping children develop positive study habits, and the importance of parent involvement. 75% of participants intend to increase their involvement in their child's school. Parents commented they would monitor their children's homework efforts more and praise them for completion, eliminate distractions at home, and offer to help at school more. In Westbrook, the elementary school principal asked to have a needs assessment designed for parents of elementary school children so Cooperative Extension can provide parent education in the upcoming school year.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Family Functioning/Parenting Apart

a. Activity - Divorce is a traumatic event for the entire family. Children are affected in many ways depending on their age, gender, and the conflict in the home at the time their parents separate. When children receive support and validation from caring adults they can recover

more successfully from the trauma of divorce. Family Courts have implemented court-connected educational programs for divorcing parents (Blaisure & Beasler, 1996). Connecticut was the first state to legislate mandatory programs of parent education for all couples with minor age children for a legal separation or divorce. Sixteen “Parenting Apart” workshops were conducted.

b. Impacts – Short-term outcomes as reflected by evaluation results indicated that 80% of 122 parents who participated in the court ordered program improved their parenting skills.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Workforce Preparation

a. Activity - Involvement in workforce preparation projects provide youth with challenges, experiences, support and help that promote positive and realistic outlooks on the world of work. It also fosters the development of skills (SCANS) recognized as critical for entrance into the workforce. Youth entrepreneurship programs worked to integrate workforce preparation skills into existing programs and activities, with the "R.I.S.E. (Respect and Integrity Through Skills and Education): A Workforce Readiness Program for Youth" a focus.

b. Impacts - 100 youth improved their workforce readiness skills in business organization, money management, record keeping, entrepreneurship, interviewing, application writing, getting along with others, public speaking, decision making, problem solving, personal responsibility, time management, customer service, and other basics skill such as reading, math, and listening. Through a program survey, youth thought being in the Youth Entrepreneur Club taught them the importance of cooperation and teamwork (95%), taught them how to develop and run a business (94%), encouraged them to attend school (96%) and gave them self- confidence (97%). By participating in this program, individual youths earned from $2-$215. Individual youth comments included that they learned:

" . . . how to work together with people that you don’t like"
" . . . a company can really make money if you do it right"
" . . . owning a business is hard work"
" . . . that I have talent and can make money"
" . . . to take time and do a good job"
" . . . to work as a team, and take responsibility for my job"
“ . . . you have to be flexible to what your customers want”

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Coastal Management

a. Activity – A workshop, Explorations in Ocean and Marine Sciences, coordinated by Extension staff with Connecticut Sea Grant, collaborated between the marine sciences community based at the Avery Point campus and the Johns Hopkins University (JHU) Center for Talented Youth to host one of JHU's daylong workshops for 130 gifted and talented 7^{th} – 9^{th} graders, and their parents. These workshops are held annually at selected universities nationwide as a means for building and maintaining young students' interest in mathematics and the sciences.

b. Impacts - Short-term evaluations from the workshop indicated that the evaluations from UConn were excellent and was one of the strongest evaluations received among the institutions hosting "Explorations in Oceans" workshops. Comments included:
"Most of the sessions were interesting and easy to understand. I felt involved in the lesson and felt comfortable in the settings."
"I learned a lot today and now I know I want to be a biologist."
"It was a lot of fun. Made me think more seriously about this field of study."
"Very fun. Everything was very interesting and different than anything I've done before."
"I liked it and will keep following the marine biology science."
"Very well organized and extremely varied programs throughout the day."
"Good opportunity for my child to learn about research in general at the university level and specifically coastal studies."
"Very enjoyable. The fact that my son got to experience it on his own was good."

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Wildlife Conservation

a. Activity - Public interest in sustaining wildlife resources is widespread. However, human pressures upon wildlife populations and habitats continue to escalate. Issues such as exotic wildlife diseases and invasive species are likely to become more frequent in the future. Wildlife conservation education is necessary for improving public awareness of wildlife values and the ecological principles that govern sustainability of productive environments. A Leader's Manual, wildlife conservation curricula, and examples of activities by age group have been developed and are being provided to adult leaders, camp counselors and county 4-H staff.

b. Impacts - The Connecticut Department of Environmental Protection Master Wildlife Conservationist Program now accepts participation in 4-H wildlife assistance as fulfilling time requirements of the MWP program. All four county 4-H camps have agreed to instruct and evaluate new groups of campers.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Science and Technology

a. Activity -The City of New Haven is an urban city with isolated pockets of under- served populations with critical high-risk needs. Access to technology is out of reach for many under-served and economically disadvantaged families. The goal is provide transferable techniques to youth that will teach children, parents or grandparents how to use and access technology. Youth received training that will help them develop and strengthen life skills for academic and workforce preparedness through this After School Computer Program.

b. Impacts – Short-term outcomes included 75% of the teen participants showing increased self-esteem, as evidenced by their willingness to present power point presentations and other public speaking engagements. In collaboration with the Dixwell Newhallville Mental Health Clinic, an Internet café is pending completion with youth facilitators trained through the agency and collaborating partner agencies. Youth will then teach internet/computer basics to agency clientele in the Dixwell Newhallville Neighborhood.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - State 4-H Horse Program

a. Activity - Connecticut ranks second per capita in horse density with one horse for every 65 people. Over $333 million is generated each year by 400 horse shows. There are over 1,000 4-H horse projects members in Connecticut, representing the largest single project area enrollment, with 801 girls and 258 boys between the ages of 7 and 19 enrolled and 127 adult volunteers active. The 4-H Horse Program helps initiate and educate 4-H participants to all aspects of horse involvement. Academic endeavors are stressed, and responsible horsemanship practices are reviewed.

b. Impacts - The 2003 State 4-H Horse Contests had over 200 participants, a 10% increase in attendance from 2002. The contests increased all participants' knowledge of the subject matter, promoted friendships between 4-H members from all over the state, and provided members with feedback on how their studies were proceeding. Many contestants commented on how studying for state contest greatly improved their ability to retain information for other school subjects.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Poultry Projects and Non-Commercial Poultry Rearing

a. Activity - A large number of poultry are being reared for non-commercial use in New England. In the spring of 2003 an average of 8,350 baby chicks (meat type, layer type and fancy fowl) were being shipped each week to small flock owners. Small flock owners are generally less experienced in the management of poultry and are more likely to mismanage the birds under their care, relative to proper nutrition, health care, humane treatment, breeding, transporting, and other management issues. As a result of the Avian Influenza outbreak in commercial flocks in CT and RI, all public gatherings of poultry for show or sale have been cancelled. The focus was to educate poultry owners about proper management, including health care and rearing of poultry.

43 adult volunteer leaders and 78 schoolteachers were involved in incubation and embryology projects. Also 11 UConn Poultry Science Club members were involved in volunteer work in setting up and running the annual CT State 4-H Poultry Show and Showmanship program. Two small poultry flock web sites were developed (www.sp.uconn.edu/~mdarre/4-hpoultry and www.sp.uconn.edu/~mdarre/poultrypages).

b. Impacts - The small flock oriented web sites have put the University of Connecticut in the forefront of educating the public about poultry issues. As a result of Youth and Non-Commercial Poultry Programs, there has been an increased interest in poultry rearing. An estimate is a 2.0 - 4.0% increase during the past two years. This resulted in 120 4-H youth involved in the 2003 State 4-H Poultry Show and Showmanship contest, a 21% increase over 2001 and a 81% increase over 1998. As more youth become involved, more networking is occurring and more become interested.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Supporting Family Involvement in Children's Learning

a. Activity - Research suggests that family involvement has a positive effect on children's academic achievement, behavior in school, and attitudes about school and work. When programs are designed to fully involve parents, students achieve more, regardless of their socioeconomic, ethnic, or racial backgrounds or their parents' levels of education. In fact, with full family involvement, disadvantaged children achieved at the same levels as did middle-class children. Family involvement is considered to be so important that federal legislation, called the No Child Left Behind Act, now requires that schools develop formal programs to increase family involvement.

The Children, Youth, and Family Education and Research Network (CYFERnet), recognizing a national need for increasing the level of family involvement in nonformal educational settings, contracted with the University of Connecticut to design resource materials which could be used by state specialists and county educators. These materials would allow them to conduct in-service training programs for staff employed at all of the Children, Youth, and Families-At-Risk (CYFAR) funded 'State Strengthening' and 'New Communities' projects. Packaged into a training program called, *Supporting Family Involvement in Children's Learning*, these resource

materials help professional and volunteer workers to use and support their best resources – the families of children and youths – through family involvement.

b. Impacts - Developed materials have been nationally reviewed and accepted for inclusion into the national CYFERnet database. A national train-the-trainer program for Extension specialists and county faculty engaged in State Strengthening or New Communities projects was held at the 2003 National Children, Youth, and Families-At-Risk conference in Minneapolis, MN. These 60 participants have been trained to conduct statewide programs on family involvement for staff employed by schools and community agencies. They were also trained to recruit and train others to use the Supporting Family Involvement in Children's Learning materials. The training program has been printed and will be distributed to 354 CYFAR funded programs. It is posted on the College of Agriculture's web page, www.canr.uconn.edu/bestpractices and will be included in and accessible via the CYFERnet database.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Camp Resource

a. Activity - In order for youth to develop into adults of integrity who are coping, caring, competent and contributing members of society, they need the opportunity to interact with youth and adults who are role models in a variety of settings. A safe, quality educational camp experience enables youth to develop skills such as decision making, cooperation with others, self reliance and leadership. Many youth who do not flourish in traditional school settings find success and feelings of accomplishment in the more informal camp setting. As the structure of the family has changed, parents need a place where they know their children are getting what they need.

Many young adults of college age have the enthusiasm and desire to work with youth. When they receive experientially based training to develop an understanding of the needs of youth and skills to create programs which meet their needs, they most often develop into effective camp counselors.

Volunteers who serve on 4-H camp boards are extremely dedicated and interested in doing what is best for youth and camp. Most often they lack the skills needed to serve effectively on a volunteer board and the knowledge of camping standards. With training and support they can run exceptional camp programs.

100 CT 4-H camp staff completed a comprehensive training conference program increasing their skills in working with youth and demonstrating that throughout the summer, 52 Camp Staff at the Windham-Tolland 4-H Camp received training in Diversity, Teambuilding and Conflict Resolution, 135 Counselors at the Hartford County 4-H Camp received training in Conflict Resolution, 22 Counselors at the Middlesex County Camp received training in Conflict Resolution and Diversity.

129 staff from municipal recreation departments in 14 towns or cities were trained and used new skills with more than 7500 youth. Skills were learned and practiced in conflict resolution, teambuilding, and goal setting. This program enhances the training provided by the towns and provides for better prepared staff to work with the children. The towns participating included Stamford, Brookfield, Woodbury, West Hartford, Rocky Hill, Fairfield, Windsor, Portland, Hamden, Haddam-Killingworth, Ivoryton, Columbia, Clinton, North Branford. 72 Camp Professionals from throughout the United States learned more about best practices in the area of staffing from presentations on current research at the American Camping Association National Conference in Denver and the New England Conference in Sturbridge.

A series of fact sheets was developed on issues identified in a study conducted on the unique impacts of the camp staff experience. These articulate best practices for camp directors and topics of interest in the youth camp field. These include: "Positively Impacting the Community Where Your Camp Is Located", "Hiring the Staff You Want", "Everything I Needed to Get Ahead in the World of Work I Learned at Camp", "Friendships that Last a Lifetime", "Training that Really Prepares Your Staff for the Summer", and Opportunities for Staff Personal Growth". An article on the "Unique Contributions of the Camp Staff Experience" was submitted for publication in the American Camping Association "Camping Magazine", May 2003.

In cooperation with the American Camping Association, the Basic Camp Directors Course was co-taught to 16 new camp directors.

b. Impacts - Ninety seven percent (97%) of camper parents of 3,734 youth who attended a CT 4-H resident camp for at least a week last summer reported that their child's camp experience was excellent or good. Several stated that camp made a positive impact on their child's life. (i.e. gained confidence in meeting new people, able to better make decisions, improved self esteem, more self sufficient and responsible, shared cultural and ethnic identities, grew in maturity, experienced a sense of belonging and acceptance, increased patience and cooperation). Also, a group of 20 representatives from all four 4-H camp foundations demonstrated increased networking skills as evidenced by the increase in calls they have made to each other, requests they have made to the Extension Educator, and practices they have adopted from other camps.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Farm Interdistrict Cooperative Program

a. Activity - The population of Connecticut represents a predominantly African American and Hispanic population in the cities and a predominantly white population in the surrounding towns. This separation by race, culture and ethnicity is also a separation of economics. The primary effect is on the quality of education that is provided to the less wealthy urban schools and a secondary effect is the long-term continued separation of people by minority/majority status.

The State of Connecticut recognized the 4-H Farm Resource Center's ability to provide quality science and diversity education and collaborated to provide an opportunity to lessen the divide. Children from Bloomfield, a predominantly African American populated school system with a

poor performance record, partnered with children from West Simsbury the highest-ranking school system in the state. 240 students from both schools met three times and subsequently shared time off the farm by doing homework assignments together with a curriculum that allowed students to be more knowledgeable in the use of modern technology in agriculture and environmental factors involved in food production.

b. Impacts - Short-term outcomes as reflected by evaluation results indicated that of students pre and post tested for information learned, 75% of the 232 raised their post test score by 20 points. Participating schools asked to repeat the experience for the following school year and a major funding source suggested submission of a proposal for continued programming.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Farm City
a. Activity - The Hartford School System has scored last on the state mastery tests. Poor scores have also affected the curriculum in other school systems within the Hartford region. In order to improve these skills there has been a focus on math and reading skills. In order to provide an opportunity for the students who are from schools within targeted areas with a minimal science program, the curriculum of the Farm City program was offered as a 4-H Farm Resource Center Program. The program was designed to work with science skills for children in the middle grades. 500 middle school youth from poor performing middle school (5-8 grades) participated in 6 hands on lessons: Biotechnology, Integrated Pest Management, Farm Wildlife Ecosystems, Soils, Dairy Production, and Nutrition.

b. Impacts - Short-term outcomes as reflected by evaluation results indicated that pre- and post-tests of 50% of the classes showed more than a 20-point increase in knowledge learned.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth /Leadership Education
a. Activity - Involvement in a program of Leadership Education fosters important skills, knowledge and confidence required of all effective leaders. Being an educated and experienced leader will help youth make the best decisions for themselves and others and will prepare them for the adult roles they will assume in the home, community, workplace, state, and nation. In Waterbury, *Opening Doors*, a collaborative effort with the Waterbury Youth Services and Waterbury Regional Workforce offered 16 teens of limited resources training in leadership education, workforce preparation and animal science as well as public presentation, conflict management, employability, team building and teaching skills. Teens participated in community service activities and taught 200 youth in other community agencies about animal science.

b. Impacts – Short-term outcomes as reflected by evaluation results indicated that one hundred youth learned and practiced skills in communication, working with difficult people, appreciating the

difference of others and planning and organizing activities by participating in the three-day conference on Teen Leadership in November. Participants hold leadership positions on local program committees, fair boards, agency youth groups and advisory committees. Youth demonstrated skills learned through increased effective participation on these committees.

Four hundred and forty youth and adults learned and practiced leadership skills conducting 4-H programs for over 1400 Citizens. (Males – 765, Females – 984, Minorities – 260). Roles included program delivery, program management (used to manage other volunteers), and CES organizational support. These volunteers gave an estimated 2873 hours of service during this time. Ten agency personnel who participated in workshops on working with groups and youth development reported using techniques learned in these sessions with their clients. This group works with over three hundred youth from three to fifteen years. Over 70 Teen Leaders practiced and improved leadership skills planning and conducting programs for youth and adults.

Opening Doors participants reported success in their ability to perform in school and speak before groups – something that they were very fearful of before participating in this program. They also felt more comfortable in coping with daily life crises (avoiding peer and gang pressure to get involved in illegal activities). One youth who attended the CYFAR conference told the audience "if it were not for this program, he was sure that he would be dead". A second youth felt comfortable speaking about the death of her mother and the abuse she had seen her mother get at the hands of her pimps and clients. She also was able to speak about her feelings and the abuse she had received during her 14 years. She stated that she would probably be pregnant or a mother by now, if it were not for this program. Many of the other participants expressed similar feelings in group sessions during the program year.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 4-H Youth/Teen Leadership

a. Activity - 4-H club work is the foundation of the University of Connecticut's 4-H Youth Development Program. Involvement in an informal educational program, with a variety of subjects, provides youth with challenges, experiences, support and help which foster a positive attitude towards their futures and provides them with coping skills to be successful in today's world. Leadership development especially for teen-aged 4-H members has been a focus for this programming year.

b. Impacts - The effectiveness of the 4-H program to reach groups of children was enhanced through the 4-H junior leadership concept. Twenty teens serve in that capacity, assisting volunteer leaders in club programming and educational activities, giving more youth one-on-one attention and acting as mentors while doing project work.
100 youth are currently serving as officers in 4-H clubs. Two teens are full board members of the Litchfield County Extension Service Association (an advisory committee for Cooperative Extension). Three teens applied for and now serve as members of the state teen ambassador group. Ten teens planned the week long agenda, helped coordinate the activities and hosted the Interstate Exchange delegates from Winnebago County, Wisconsin as the second half of an

interstate exchange experience. Another teen is a full board member of the Litchfield County 4-H Foundation, the first to serve in this capacity. One teen received training in youth and adult partnerships and is CT's representative to the National 4-H Youth Directions Council. One teen had the opportunity to shadow Secretary of Agriculture Ann Veneman, when she visited Litchfield County as part of an agricultural forum. Seven teens took the initiative to apply for state 4-H awards, based on their leadership experiences. This is an increase over previous years. As a result, the seven of them earned state recognition as representatives to the Citizenship Washington Focus Program.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Stakeholder Input Process

The stakeholder input process was developed to follow upon efforts that had been initiated prior to the submission of the Plan of Work for 2000-2004. The college-wide stakeholder input process included both research and extension with the key event being the Leaders' Forum. Other efforts this year included the CSREES and University program review for the Department of Nutritional Sciences and the Department of Extension. Other efforts conducted outside of the College include the Citizen Panel on the Future of Food in New England, New Direction for Agricultural Policy in Connecticut, and the Blue Ribbon Commission on Property Tax Burdens and Smart Growth Incentives.

Leaders' Forum

On November 5, 2003, the College hosted its fourth annual Leaders Forum. Each year, Dean Kirklyn Kerr invites leaders or delegates from a variety of state and federal agencies, nonprofit organizations, and commodity groups to give their thoughts and suggestions about issues important to them and about how the College is doing in addressing them. The event's invitation list reflects the wide range of subject areas covered in the College, including nutrition, food safety and security, land use planning, production agriculture, natural resources management, animal health, and agricultural biotechnology. The leaders of many of these groups change annually, so each year many new people attend. And, new groups are continually added to diversify the points of view represented.

Over dinner, faculty members at each table use prepared questions to facilitate informal discussions. Each year's questions are based on input from earlier forums.
What follows is a digest of the participants' statements and observations at the 2003 forum. Says Dean Kerr, "We are grateful that these busy people took the time to come talk to us. This process is very helpful to us as we plan for the College's future."

Results from the 2003 Leaders' Forum were published in the October/November/December edition of the College of Agriculture and Natural Resources Journal distributed free to over 18,000 citizens.

What issues do you see in your community of interest concerning water quality?
Issues

- The general public does not see the effect of individuals on pollution problem and how individuals can be producers of water pollution.
- More than just fertilizers influence water … both surface and ground water.
- Is it that people don't care or people don't know about water quality impacts?
- Water quality must be good coming onto farmland and good coming off.
- Farmers are trying to be good stewards of the land.
- Non-farmers often don't understand problems farmers are facing in trying to prevent run-off from their farmlands.

- Farmers have a special interest in keeping good water quality because many rely on their own water supply (wells) for their operations.
- Farm manure alternatives – involving people who have the problem in developing the solution.
- Correctional institutions' treatment plants; another result of overcrowding is water impacts.
- Runoff from Christmas tree farm fertilization.
- Problems with "big-boxes" and potential non-point urban runoff are common in Connecticut towns.
- Contractors have potential to pollute waters; education for this group is important. Inland wetland commissions are often at odds with contractors because of their inattention in preventing runoff.
- Continued concern about non-point source pollution.
- "Culture" of suburbia is an issue.
- Education is key in getting people to take responsibility; in all new neighborhoods grass is perfect but the wells are polluted.
- Mosquito-born diseases.
- Water quality changes with the season.
- Need set backs from wellheads and open space is important to protect aquifer protection zones. It's easier to get industry to comply than the public.

Cost concerns

- Cost of water treatment infrastructure must be factored in.
- Local solutions are less expensive and more successful.
- Not enough funds to do conservation practices on farms.
- Train-the-trainer approach is best with limited resources.

Education needed

- Education for public on how to prevent water pollution.
- What about standing water in rain barrels and rain gardens?
- Two areas to target: established homeowner and new developments.
- Is water quality an issue in your neighborhood?
  "I don't know if my yard is an issue."
  "My development designed poorly."
  "Big problem."
  More development nearby compounds problem.
- No "regulation" in "neighborhoods" so education is best bet.
- Educating the public is really key – runoff is not something people think about in their neighborhood.
- How can communities be proactive?
- Could entice people to test their soils by combining with nurseries so people can get soils tested when they go to the nurseries.
- Homeowners often over-apply fertilizer but still eat tonight; they must be made aware that they are major contributors to pollution. Farmers are more willing to listen to Extension recommendations than homeowners.

- How will research information on water quality be packaged and delivered to the community to improve water management?
- Painted sign on catch basins effective at raising awareness of consequences of dumping.
- Students learn about current issues with, for example, water quality, but how do we get updated practices out to those who have not used new practices?
- American Groundwater Trust has institute for science teachers interested in groundwater; they teach children how to respect groundwater.
- Need to further publicize the availability of soil testing at UConn.

Research needed
- Holistic approach needed in water quality management. Is it better to wash car on pavement or on grass?
- Technology development and more research needs to be done to minimize amounts of manure spread on fields to minimize non-point runoff.
- We need more study of auto impacts in non-point source pollution.
- Inland wetland regulations and agricultural use of land: we need scientifically based models—can the College create this? We need model regulations. There used to be some—what happened to them?

What issues do you see in the communities of interest to your organization or agency related to the influence of globalization or international work?

Economic issues
- Foreign products are undercutting American producers; American farmers are so regulated they can't compete with foreign farmers who aren't regulated.
- Some foreign countries sometime use science against U.S. farmers. U.S., Brazil and Argentine products are discriminated against because they use GMOs.
- Small farms are not viable.
- Affects trade and commerce of food products particularly.
- Labor is key to the success of farming, but it needs to be low-cost labor and immigration policies may detrimentally affect the low-cost labor force; this can affect all types of agriculture.
- Migrant labor is perhaps an issue; it's a growing issue in the dairy sector. There is a lack of local labor at reasonable wages.
- All poultry breeding began in New England, but now all those companies are located elsewhere.
- Globalization is more important every day, especially in terms of world markets and the influences it has on agricultural production in the U.S. Some biotechnology products are not permitted in some markets.
- Imported food can be more expensive and can have a negative impact on local farmers; it can perhaps increase disconnect between farmers and consumers.
- Local forestry exporting to Canada

Safety issues

- Whenever products cross international boundaries problems can occur. What pests are being brought in? Imports can bring in pests that attack plants, animals and humans. Globalization has increased pests coming in from abroad.
- Many species of trees are being hurt by foreign pests coming in.
- Globalization obfuscates food's origin.
- When the possibility of animal diseases is present, some nations will ban imports of these species.
- Food production might not have met our standards.

Education issues
- How can we educate each other about each culture's agricultural policies?
- International exchange of students is good.
- Every department should have the opportunity for international interaction; our students study abroad, other students come here to assist or learn.
- Try to teach tolerance to youth. Hopefully they become more aware of others. International agriculture helps make the world smaller.
- Global education can be a two-way street; we can learn from them.

What issues or concerns do you have concerning the production of food in outer space? How might we attract more undergraduate students to the College of Agriculture and Natural Resources who would be interested in food production in space? [Note: several faculty members in the Department of Plant Science are engaged in research related to growing plants in space.]

Research value
- If space travel has funny impacts on plants, what are the impacts on humans?
- This type of research is very expensive.
- What are the vitamin and mineral contents of plants in space?
- Everyone said this was really the first time they ever thought about this subject. Seed viability … How many calories can they grow in a capsule?
- Plants in space is interesting research; NASA's research leads to innovation.

Educational value
- Like to see more of a connection with 4-H clubs.
- Tying it into the early learning experiences of children will probably carry over to interests in college.
- Web sites on this material may be an effective outreach and recruiting device to bring students to the College.
- Teachers would love to have information on the seed program in space; the sooner students are aware of their environment the better.
- The College should do a better job of publicizing that it is doing such exciting research in space. Students need more information to decide to go into that as a career field. Possibly working with teacher curriculum development at lower levels may get students excited about it so they start asking about it and considering it.
- Youth are interested in space/plants/rocketry.

What are areas or topics or issues that you see need additional attention and focus by the College in the areas of teaching, research or extension? Are there legislative actions needed? What might be your suggestions for such action?

Food and nutrition

- Kids in the inner city don't understand that hamburger comes from beef cattle, french fries come from potatoes, milkshakes come from cow.
- We need education for grade-school children. Even their parents sometimes don't know where their food comes from.
- Research and education on effects of specific foods on human health.
- Consumer education on proper food handling for chickens, eggs.
- Health care people (nurses, doctors) don't know enough about nutrition.
- Local board of health won't let owner of local bed and breakfast serve food grown on the owner's property because the food is not from an "approved source." Education for board of health members is necessary.
- Connecticut is an affluent market, as is the Northeast as a whole, and consumers want to know where their food is coming from and want high quality.

Agriculture

- Keeping farms economically viable.
- Niche agricultural products and marketing of these products.
- There is not enough secondary education on basic knowledge in agriculture (animals, plants, food processing, nutrition).
- Every student at UConn should be required to take one basic agriculture course. "Where does your food and fiber come from?" should be the basis for the course.
- Continual technology improvement to remain competitive.
- Forestry/agritourism: important cash crop.
- How to encourage young farmers to stay in farming in Connecticut?
- Waste management and environmental impact of agricultural processes.
- Agricultural runoff and environmental impact.
- Older farmers want to retire, younger ones want to enter farming; they need education.
- People do not value farms because they "don't get their food from a farm anyway."
- Dilemma is that some solutions result in a near-inability to run agricultural businesses
- Agricultural community is not lobbying effectively with government; need to improve perception; "second class" industry in the eyes of Connecticut legislature.
- Dairy farmers have the largest land base. Since milk prices are fixed by the feds, what can we do to diversify, become more efficient? New products? Organic farming?

Land use/environment

- The College's big challenge is the world of agriculture bumping into the world of the environment. The greatest contribution the College can make is building bridge between agriculture and the environment.
- Sprawl: loss of forests, loss of farmland.
- Educate on differences between "open space" and farmland.

- People may not know how to manage open space or think farmland and open space are the same.
- Zoning within towns causes a wasting of land; 3-acre lots versus smaller.
- Fragmentation of open space.
- No pattern or plan for the space.
- College research can give a focus or provide local leaders with a plan of action as to how the land can be used and managed in a way for it to continue to be a viable piece of land (not just sitting unattended—but how do the towns effectively manage the land).
- Build-out analyses to show people how sprawl does affect them.
- For future employees we need people with the skill sets to do effective field detection work. We need better field ecologists, so they can go out collect information and come back and work with the data. Also, we need training of municipal officials so they are making better decisions … Extension and University step out and do more, i.e. strengthen the Green Valley Institute.
- Land trusts are mainly concerned with open space, most people in communities seem to be interested in development. To put money in open space is looked down on as wasteful, but it is important.

Legislative action
- The Connecticut Department of Agriculture is being merged with the Connecticut Department of Consumer Protection. Is the College at risk?
- The Connecticut Department of Agriculture will fight for the farmer; the Connecticut Department of Consumer Protection will not.

Undergraduate education
- More hands-on and outreach projects for the students rather than just in the insulated university community; outside of UConn in "real world" situations; more internships working with towns/farmers.
- K-12 unexploited opportunity; incorporate in science curriculum.
- Applying knowledge to a specific problem; make it real.

Communication
- College needs to do a better job bringing their research and findings to the legislature—go out and demonstrate or "show and tell" for the legislature, agencies or towns about their findings (don't expect them to read the research in journals).
- Need better communication between researchers and policymakers.
- Need for better extension services with outreach that interacts with production personnel directly and brings concerns back to the academic community.
- Change name of Cooperative Extension System; take "cooperative" out—people don't understand the name.
- Knowledge of specialized programs in the College is necessary to get students involved; students do not know of the opportunities that exist.
- College has great opportunities but they are not advertised in a way that gets the information to the students.

What challenges is your organization or agency facing in regard to developing leadership among members or employees? Are there some specific topics on organization development or management on which you would like some additional training?

- Develop 4-H youth-adult partnerships.
- Many students are not involved in outside experiences that give leadership experience.
- Vo-Ag educational experience provided relevance—seems missing in many schools "these days."
- Clubs and sports are the only place kids are learning leadership roles.
- Some organizations promote from within, and promotees don't get proper preparation or assessment.
- How do you create "initiative" in a person?
- There is a difference between leading, and getting something done.
- Tremendous loss of institutional knowledge … I'm oldest in my area at 52 … The next line that comes up, don't have the same knowledge base and contacts. Then there's a big drop down to the staff level … they may not be planning to stay long enough to learn enough to become management. How do we bring the young workers along to climb the ladder on the inside?
- Need for project management skills … they're really lacking. Can the College work with employees in this area … to help them develop new skills? There is no loyalty to a company or agency these days. In high school they are teaching kids to stay with a job for at least two years … that change is their friend.
- Why do people move on after 5-7 years? There are opportunities … they see a limiting salary, challenge ... they are more aware of what else is out there.

What suggestions would you have for ways in which we, as a College, might collaborate with you to improve how we operate? What suggestions do you have for ways in which we can better inform the people of Connecticut?

- The College does many things and has many models to share, but its needs to get the word out outside of journals.
- How can partners help the College? We can publish information about pertinent issues in partners' newsletters
- Put information on the Web regarding things like GIS or other technologies.
- Take this presentation tonight on the road … Need to talk to K-12. Master Gardener program, public radio, public TV. Collaborative work between University and the agencies … should be strengthened.
- College should have a K-12 Web site that provides information for science projects and teaching aids and materials
- Is there a central electronic database for educational opportunities, scholarships, job opportunities? It would be good to have

What questions or additional issues would you like to raise?

- Why do we need genetically modified foods when food is plentiful here? Other countries may need them although infrastructure may be a bigger issue.

- Genetic engineering—We will have pigs and chickens with less fat, now we're pumping them up with steroids. Our food supply doesn't respond to antibiotics. Each antibiotic has withdrawal time. While animals are confined they are using more ventilation, more cooling; we don't get more product when animal is stressed
- How do you quantify the impact of volunteers?
- The Green Industry has not been regulated much--suddenly there are moves to regulate … Connecticut is starting to ban plants … Plants to be banned are a threat to the environment, but some invasive plants to be banned are worth a lot of money to the economy ... What's the threat? Choked lakes--if you plow a field, Russian olive will grow up. Invasive plants have changed everything.
- If we had a choice we wouldn't want to do factory farming. There's a point when science won't solve all our problems.

What other suggestions might you have for us to gather input from organizations?

- Extension is in a perfect position to gather information on specific issues
- Structured mechanism for Extension personnel to provide feedback on client needs and issues directly to administration of University and College

Invitees

Fourth Annual Leaders' Forum
Wednesday, November 5, 2003

Bernard Dzielinski
Fairfield Co. Agricultural Extension Council Inc.

Christine Burr
Litchfield Co. Ext. Service Assn. Inc.

Lynn Brown
Tolland Co. Agricultural Ext. Council Inc.

John Breakell
Farm Service Agency

Ed Platt
Farm Service Agency State Committee

Jonathan Bishop
New Haven/Middlesex FSA County Committee

John Ennis
Windham County FSA Office

John Guszkowski
Eastern CT Resource Conservation & Dev. Area

Patty Sansone
Hartford Cooperative Ext. Council Inc.

Judy Aldrich
Middlesex Co. Extension Council Inc.

Patricia Weingart
New London Co. Agricultural Ext. Council Inc.

Charlie Hurd
Windham Co. Agricultural Ext. Council

Tim Potter
Litchfield/Fairfield County FSA Office

Peter J. Charter
Hartford/Tolland COC Members

Lincoln Chesmer
New London County FSA Committee

Margo Wallace
Natural Resources Conservation Service

James Sippery
King's Mark Resource Conservation & Dev. Area

Milton S. Natusch
Agriculture Science & Tech. Education Center

John F. Anderson
CT Agricultural Experiment Station

Bruce Gresczyk
CT Department of Agriculture

Donald H. Smith
CT Department of Environmental Protection

CT Future Farmers of America Alumni Assoc.

Wendy Drenga
CT Master Gardener's Association

Arthur J. Rocque
CT Dept. of Environmental Protection

Roy V. Hajek
Middlesex County Camp Foundation

Jim Logee
Windham County 4-H Foundation, Inc.

Mark Winne
Hartford Food System

Kenneth Couture
CT Association of Agricultural Educators

Grace Nome
CT Food Association

David H. Carey
Dept. of Aqualculture

Ed Huff
CT School Food Service Association

Susan Bailey
Litchfield County 4-H Foundation, Inc.

Donald R. Beebe
New London County 4-H Foundation, Inc.

Elaine Matulis
Hartford County 4-H Camp, Inc.

Jim Cropley
UConn Agricultural Alumni Association

William Peracchio
Central CT Coop. Farmers Association

Kathryn Caruso
CT Farm Fresh Coop. Association, Inc.

Bonnie Burr
CT Farm Bureau Association

Erica Fearn
CT Farm Bureau Association

Brad Nicholson
Hartford County Farm Bureau

Joseph Greenbacker
Middlesex Co. Farm Bureau, Inc.

David Smith
New London County Farm Bureau

John Bennett
Windham County Farm Bureau

Bill Van Wilgen
CT Greenhouse Growers Association

Steven Rickenbacher
First Pioneer Farm Credit, ACA

Len Baginski
Association of Connecticut Fairs Inc.

Randolph Blackmer
CT Farm Bureau Association

Frank G. Hufner
Fairfield County Farm Bureau

Judy Chase
Litchfield County Farm Bureau

New Haven County Farm Bureau

Bill Syme
Tolland County Farm Bureau

Andrew Caporossi
CT Florists Association

Carla Koch
CT Orchid Society

Anne Harper
CT Audubon Society

John Olsen
CT Christmas Tree Growers Association

Jeff Perkins
Eastern CT Forest Landowners Assoc.

Fred Borman
Forest Stewardship/RC&D Forestry Committee

Tom Ettinger
Ruffed Grouse Society, CT Chapter

Steven Volweiller
CT Vineyard and Winery Association

Donna Anderson
CT Dairy Goat Association, Inc.

Sharon Lawson
American Saddle Horse Association

Johnna Chenail
CT Morgan Horse Association

Amanda Amundsen
CT Christmas Tree Growers Association

Richard Whitehouse
CT Forest and Park Association, Inc.

Luke Williams
CT Tree Protective Association, Inc.

Ray Katulitas
Maple Syrup Producer's Assoc. of CT

Marcia Wilkins
Sierra Club, CT Chapter

Brian Kelliher
CT Pomological Society

Peter Rothenberg
Northeast Organic Farming Assoc. of CT

Russell Gray
CT State Grange

Debra Reinhardt
CT Dressage Association

Betty Roden
CT Horse Show Association

Marge Miller
Southern CT Horseman's Association

H. David Christensen
CT Grounds Keepers Association

Dave Goodwin
CT Nursery & Landscape Assoc.

Gail Magaldi
The Federated Garden Clubs of CT, Inc.

Louis van der Heide
CT Poultry Improvement Association, Inc.

Susan Harlow
Northeast Farm Communicators' Association

Mark Russell
CT Sheep Breeders' Association

Amy L. Crockett
CT Veterinary Medical Association

Kaye Harvey
Hill Cooperative Youth Services

Herbert Isaacson
CT Horticultural Society

Robert Heffernan
CT Nursery & Landscape Assoc.

Jim Rock
CT Poultry Association

Erin Sepe
CT Agriculture and Natural Resources Association

Bill Scott
CT Rabbit Breeders' Association, Inc.

Charles Rowland
CT Pork Producers' Association

Nick Smith
Wine Development Council

Janice Gruendel
CT Voices for Children

Charlene Perkins Cutler
Quinebaug-Shetucket Heritage Corridor, Inc.

Gloria McAdam
FOODSHARE

Grace Damio
END HUNGER CONNECTICUT! Inc.

Diane Hnat
Roche Holding Ltd.

Curtis Read
Litchfield Co. Soil & Water Cons. District

Margaret Maunder
New Haven Co. Soil & Water Cons. District

Jack Collins
North Central Soil & Water

Enid Oresman
The League of Women Voters of CT

John Hibbard
CT Rural Development Council

Peter Bergen
CT Tree Farm Program

John Collins
Hartford Co. Soil & Water Cons. District

Thomas Odell
Middlesex Co. Soil & Water Cons. District

Larry Davis
New London Co. Soil & Water Cons. District

Norma O'Leary
Windham Co. Soil & Water Cons. District

Rosemarie Hice
Council for Ag. Research, Ext., & Teaching

Sarah Faulkner Leff
Rivers Alliance of Connecticut, Inc.

Starling Childs
The Great Mountain Forest

Lise Hanners
The Nature Conservancy - CT Chapter

Curtis Nelson
Trout Unlimited - Connecticut Council

Jeannette Dejesus
Hispanic Health Council, Inc.

Ned Schankman
CT Veterinary Medical Association

Linda Cardini
CT Rural Dev. Council, c/o Northwest CT Co

John Filchak
Northeastern CT Council of Governments

Jim Finely
CT Conference of Municipalities

William Braman
Central CT Coop. Farmers Association

Al Cowan
Animal Science - Tolland Farm Bureau

Herman Weingart
New London County Farm Bureau

Norma Gyle
CT Department of Public Health

James T. Fleming
CT Department of Consumer Protection

Ken Elkins
Connecticut Audobon Society

Diane Miller
Woodstock Agriculture Producers

Ken Pauze
Central CT Coop. Farmers Association

Mathew Freund
Litchfield County Dairy Committee

Peter Jacquier
Canaan Valley Manure Cooperative

Patricia Estill
CT 4-H Development Fund

David Leff
CT Department of Enviromental Protection

Steve Fish
CT Department of Enviromental Protection

Karl Wagener
CT Council on Enviromental Quality

Kitty Stalsburg
High Hopes Therapeutic Riding, Inc.

Maryan Wainwright
CT Dietetic Association

Rick Lynn
Litchfield Hills Council of Governments

Virginia Mason
Central Naugatuck Valley Council of Governments

Linda Krause
CT River Estuary Regional Planning Agency

Christine Murtha
Mohegan Tribal Council

Robin Chesmer
Very Alive Farmer Group of Eastern CT

Joyce Yoakum
American Assoc of Family and Consumer Sciences

Jim Robertson
Quinebaug-Shetucket Heritage Corridor, Inc.

Bill Toomey
The Nature Conservancy - CT Chapter

Suellen McCuin
Council on Soil and Water Conservation

Lee Townsend
CT Space Grant Consortium

Ed Monahan
CT Sea Grant College Program

Donald Strait
CT Fund for the Environment

MaLinda Chase
CT Farmers Learner Group

Barry Kapplan
CT Farmers Learner Group

Andrew Brand
Connecticut Butterfly Association

Ken Graham
American Rhododendron Society, CT Chapter

David Carter
Eastern States Exposition

Nathan Cushman
Very Alive

Susan Fridy

Sharon Mierzwa
CT Nutritional Council

Hugo Thomas
Water Resources Board

Jack Hale
Knox Parks Foundation, Inc.

Mavis Collins
N.E. Dairy Industry Council

Mark Grillo
Ag in the Classroom

Joan Russoniello Goba
FRC Alliance

Susan Kelley
CCCS
Pat Dolan
Education Connection

Sara Manning
Education and Outreach
Western CT AAA

Lislie Brett
Permanent Commission on the Status of Women

Bob Jacquier
New England Green Pasture Committee

Dottie Jacquier
CT Dairy Promotion Board

Enid Oresman
League of Women Voters

Adam Bowles
Norwich Bulletin

Mark Brown
The Mohegan Tribe

Lori Brown
CT League of Conservation Voters

Tony Inch
Fairfield Co. Soil and Water Cons. District

Bud Gavitt, Jr.

Judd Smith
CT Association of Golf Course Superintendents

Karl Reichle
Tree Wardens' Association of CT, Inc.

Joseph Ryzewski
CT Urban Forest Council, Inc.

B. Harrison Griffin
Suffield Regional Agriscience Center

Adam Moore
CT Forest and Park Association, Inc.

Julie Belaga
CT League of Conservation Voters

Russell Brenneman
CT League of Conservation Voters

Joel Rosenberg
AHM Youth Services, Inc.

Kelly Cronin
Watebury Youth Services, Inc.

Elizabeth Brown
Commission on Children

Barbara Buddington
Windham Region Council on Governments

Beverly Goulet
City of Norwich, Dept. of Social Services

Dawn Gagne

Sylvia Dorsey
New Haven Land Trust

Brad Cheney
Windham Co. Soil & Water Cons. District

Carrie Gallagher Sussman
Keep America Beautiful, Inc.

Vera Peterson
New Haven County Extension Resource Council

Albert Boyer
TAC Board

Patricia Wilson-Coker
Department of Social Services

W. Campbell Hudson, III
Connecitcut Fund for the Environment

Angelo Callis
Norwich Youth and Family Services

Dave Petersen
CT Grounds Keepers Association

Jerry Srednicki
Yankee Chicks, Inc.

Alan Eddy
Connecticut Green Industries Group

Sandra Bundy
Department of Correction

Kathy Archambault

Mary Ann Poinelli
Department of Children and Family Services

Pam Langer
Parents as Teachers Program, United Way

Peter Palermino
CT Department of Social Services

Devon Conover
Div of Community Based

Dawn Cook
Time Out for Parents

Michael Pascucilla
UConn Environmental Health

Lucy Nolan
Working Lands Alliance

Ron Cretaro
Connecticut Nonprofit Information Network

Paul Johnston
Agri-Mark

Bob Kennedy
Genex Cooperative, Inc.

Jerry Kill
Kofkoff Egg Farms, LLC

Sally Ann Hinkle
Mystic Valley Hunt Club

Hal Vita
Shallowbrook Equestrain Polo Center

Peter Alpert
Red Oak Farms

Julie Tully
National Cattlemen's Beef Association

Suzanne Sankow
Beaver Brook Farm

Samuel Mirabito
Pfizer

Serge Martinoud
Smart Drug Systems, Inc.

Alice Wilkinson
Watson Foods

William Emery
Cadbury Schweppes

Dan Tegolini
Guidas

Bob Ross
Nestles

Lisa Mazzaro

Mystic Marinelife Aquarium

William Trask
North East Rabbit Growers Association

Wayne Hansen
Connecticut Organic Associated Growers

Barbara Hood
FRC Alliance

Gary Proctor
CT Poultry Association

William Bell
New England Grain and Feed

David P. Hunt
New York Farmers

Peter Orr
Very Alive

Joseph Voboril
Tolland County Farm Bureau

Catherine Worthley
Haddam Land Trust

CT Marketing Authority

CSREES and University program review for the Department of Nutritional Sciences
An external review committee comprised of 5 members made the following recommendations related to research and graduate programs that included: train students with a broad range of knowledge and skills with specialization in one area; develop a comprehensive and well scheduled curricula; provide for continuous funding for graduate students; and develop a rational basis for division of resources. Outreach related issues identified included the need for a clear definition of outreach with a clear organizational structure. Discussion included limiting the audiences targeted for outreach programs.

Team members included Melvin M. Mathias, CSREES, USDA; Etta Saltos,CSREES, USDA; Kenneth Allen, Colorado State University; Mark A. Kantor, University of Maryland; Jean R. Harvey-Berino, University of Vermont.

CSREES and University program review for the Department of Extension
The six-member Assessment Review Team included: Terry Meisenbach, Team Leader CSREES, William Hoffman, CSREES, James Finley, Pennsylvania State University, Deborah Maddy, Oregon State University, Mary Jane Willis, Rutgers University, and Ted Yungclas, Fine Arts, University of Connecticut.

The 154-page Department of Extension Self Study Document provided an overview of change during the past 10 years, and will serve as a valuable reference gauge to help measure progress over the coming years.

Some of the review team's comments expressed during the exit report included: high quality department; quality program; high quality staff; offer numerous programs and excellent programs; collective work is impressive; faculty/staff are working hard; people are passionate about what they do; volunteer involvement in programs is outstanding; programs are community based; great relationships have been developed, and grantsmanship is outstanding.

Likewise, there are areas for improvement on which the Department needs to work. Some of the review team's exit review comments included: greater use of needs assessments needed; consistent and increasing levels of program evaluation and more up-front evaluation planning are needed; all faculty members need to be involved in scholarship; greater understanding of impacts needed in some programs; department has an aging faculty – plans are needed for replacement; better balance between internal support and grants is needed.

Citizen Panel on the Future of Food in New England, New Direction for Agricultural Policy in Connecticut, and the Blue Ribbon Commission on Property Tax Burdens and Smart Growth Incentives

The University of New Hampshire Office of Sustainability Programs and Cooperative Extension sponsored the Citizen Panel on the Future of Food in New England. The panel included participants from Connecticut. The report included

findings and recommendations related to building a regional approach, economic development of the food system, farm profitability and long-term viability, resource conservation, food security and food safety, and consumer behavior and citizen action.

New Direction for Agricultural Policy in Connecticut was a document developed by the Connecticut Food Policy Council, a state council working under the Department of Agriculture. This report was done in conjunction with the Northeast Sustainable Agriculture Working Group and the Hartford Food System. The report identified five strategies that included:

- Improve coordination on agricultural policy and programs between CT state agencies, encouraging collaborator for agricultural promotion and development.
- Enhance the capacity of CT's Department of Agriculture through increased funding, staffing, and overall strengthening for improved program effectiveness.
- Build enthusiasm among stakeholders and policy makers while developing consumer awareness and appreciation for CT agriculture.
- Exploit Connecticut's unique potential to develop a market for CT-Grown agriculture directed toward buyers along the New York/Boston corridor.
- Recognize the mutual importance of promoting agricultural economic viability and farmland presentation for the development of CT agriculture.

This report was then followed by a conference on the Economic Viability of Agriculture in Connecticut.

The General Assembly commissioned the *Blue Ribbon Commission on Property Tax Burdens and Smart Growth Incentives* Report. This document relied heavily on the Center for Land-use Education and Research (CLEAR), a joint research and extension center within the College, and included a recommendation related to land use education. The recommendation specifically mentioned CLEAR and the Cooperative Extension System.

Extension Volunteers

Extension volunteers comprise the state Extension Partners group that meets at least twice a year. The group is comprised of representatives of Extension Councils and other affiliated organizations such as 4-H camp boards, IFYE, and master gardener association. The Partners group has focused this year on contacts with legislators. With the cancellation of the National Leadership Seminar, Connecticut volunteers organized their own trip to D.C. as well as have initiated plans for the first Legislative Reception at the Capital.

Program Review Process

There are no changes in the program review process compared to the original Plan of Work.

Merit Review for Smith Lever Funds

The merit review process for Connecticut continues to consist of the four components identified in the Plan of Work for 2000-2004 (page 228). This year two departments conducted external reviews of programs including teaching, research, and extension. The nutritional sciences and the department of extension consisting of the eight extension centers were reviewed. This completes the external review process of all departments. Results from this process will be used for the development of the next college-wide five- year plan of work.

These components included: planning by all faculty and staff on three levels, a university wide review of the plan, a review by our peer institutions, and a review by our stakeholders.

Peer Review for Hatch, Mcintire-Stennis, And Animal Health Projects

The peer review procedure is designed to ensure that the highest quality research projects consistent with identified priorities are eventually approved. In brief, the review involves obtaining the objective opinion of other scientists, and/or administrators usually within the University of Connecticut, and users of research results when appropriate, to research proposals or completed projects. The general goal of peer review is to subject every project to a rigorous and systematic evaluation for both its appropriateness and quality.

The process is conducted within the framework of predetermined criteria whose objective is to assess whether each Storrs AES research project (1) is guided by state, regional, and national priorities, (2) is of high scientific merit and quality, (3) incorporates a state-of-the-art scientific approach to the topic investigated, (4) is likely to successfully meet the goals of the project, and (5) whether it is complete and prepared according to the Storrs AES guidelines. It is expected that the peer review process will afford the Principal Investigator(s) the benefit of the best counsel the system can provide.

The appropriate Department Heads serve as the focal point for the peer review process and suggests 2-3 faculty, usually within the University, as qualified reviewers for a given project. The Director of the Storrs AES (or his Associate Director) is the ultimate authority to finally approve projects once they have been critically reviewed and been endorsed by the Department Head.

Evaluation of the Success of Multi and Joint Activities

Evaluation of the success of multi-state, multi-institutional, and multidisciplinary activities, and joint research and extension activities, in addressing critical agricultural issues identified in the Connecticut 5-Year Plan of Work was conducted in the context of the four evaluation criteria identified in the Guidelines for State Plans of Work. Comments are offered as follows:

Did the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

Activities conducted by Connecticut faculty and staff addressed the critical issues identified in the FY 2000-2004 Plan of Work and those subsequently identified by stakeholders.

In the area of a *Competitive Agricultural System* (Goal 1) considerable success was realized in the animal biotechnology arena through successful development of a recombinant DNA vaccine for Infectious Bronchitis virus, a highly contagious respiratory and urogenital disease of chickens. Cloning highlights included major research working in the areas of reproductive physiology and animal biotechnology, particularly cloning and transgenic technology to improve animal reproductive efficiencies. Plant biotechnology efforts saw the development of disease-resistant rhododendrons and improved tolerance of plants toward abiotic stresses like high salinity and droughts. Issues related to land use development and agricultural preservation were addressed through a variety of studies and outreach efforts.

In the areas of a *Safe and Secure Food System* (Goal 2) research and extension programs addressed important issues to maintain product quality, including HACCP education programs for food businesses and processors.

Work in the area of a *Healthy and Well-Nourished Population* (Goal 3) saw a number of activities. Research efforts included effects of exercise on protein utilization in healthy, non-obese children versus obese children. Docosahexaenoic acid (DHA) research was designed to assess the role of foods with DHA on sleep patterns on newborns. Extension activities addressed nutrition educational programs designed to reach inner city Hispanic residents and EFNEP programs reached low-income residents in targeted areas of the state.

A number of projects were implemented in the area of *Greater Harmony Between Agriculture and the Environment* (Goal 4). The projects addressed the important issues of pesticide management through IPM, residential water quality, nutrient management for producers and land managers, land use and water quality protection for municipal decision-makers, and forestry development and management for land owners.

Efforts in the area of *Enhanced Economic Opportunity and Quality of Life for Americans* (Goal 5) were many and varied. Included were financial management programs for a variety of audiences, leadership programs for lower income adults and older youth, and youth entrepreneurship programs.

Did the planned programs address the needs of under-served and under-represented

populations of the State(s)?

Many of the programs that were implemented addressed the needs of under-served and under-represented populations. Included were the *People Empowering People* (PEP) program targeted to low income adults and older youth to develop leadership skills, lower income Hispanic residents in nutrition education, lower income residents through the EFNEP nutrition program, and lower income and minority youth and adults through parenting and child care programs. In addition lower income and minority populations benefited through an anemia program for health care providers, lower income agricultural producers benefited from risk management education programs, and decision-makers in less affluent municipalities increased public policy decision-making as a result of natural resource/land use protection programs.

Did the planned programs describe the expected outcomes and impacts?

Planned programs reached varying stages in meeting expected outcomes as described in the 2000-2004 Plan of Work. The nature of research and educational programs are such that implementation strategies and program impacts occur at varying rates depending upon number of faculty and staff involved, resources available, audiences involved, partnerships required, and outcomes expected (short-term, mid-term, long-term). In general, Connecticut programs are on track in meeting the anticipated outcomes and impacts. Continued progress is expected toward outcomes in subsequent reporting periods. It must, however, be strongly emphasized that in many instances continued progress toward meeting many of the above cited issues of critical state, regional and national importance will be dependent upon increased levels of funding from federal and state sources.

Did the planned programs result in improved program effectiveness and/or efficiency?

Improved effectiveness and/or efficiency results were seen in many instances. For example, many nutrition education programs, such as EFNEP, saw improved diets and reduced financial allocations for purchased food items. Land use education programs saw improved decision making to protect natural resources and develop viable communities through better decision-making. Agricultural producers saw reduced pesticide usage, combined with increase product quality through IPM programs adoptions.

The New England Consortium is an additional effort to improve effectiveness and efficiency. This agreement among New England Extension Directors allows faculty and program staff to move across state lines without administrative oversight. Faculty members worked across state lines to plan conferences such as the EFNEP in-service, the New England Grows, and the Fruit and Vegetable Conference. Limited attempts have been made to jointly hire faculty members. The process appears to work well when we share resources are already on board.

Plant Science and Extension faculty work across the twelve northeastern states to provide plant diagnostic services for the greenhouse, nursery and ornamental industry and in the area of integrated pest management.

(NE-164) Decision Support for Design and Control of Plant Growth Systems,

R. McAvoy
Transgenic ornamental plants that this display reduced internode elongation and increased branching will require less plant growth regulator treatments to maintain a desirable form.

(W-171) Germ Cell and Embryo Development and Manupulation for the Improvement of Livestock, Yang X., Riesen, J.
The efficiency of fusion for bovine nuclear transfer was improved b the combination of various membrane modifying reagents. The application of these improvements to the nuclear transfer technique will enhance the success rate of somatic cloning which at the current level from 0 to 5%.

(NE-172) Nutritional Risk and Antioxidant Status in the Elderly
Lammi-Keefe, C., Ferris, A.
Insulin resistance and docosahexaenoic acid (DHA dietary intake and status were studied in the gestational diabetes mellitus model.
To assess the completeness of food frequency data for low income minority household, 32 participants allowed three home visits over the course of one month. The first phase of analysis confirmed that a scanning device using UPC symbols correctly identified 92% of the >19,5000 food items noted in the home inventory.

(NE-127) Biophysical Models for Poultry Production Systems, Darre, M.J.
The use of red CF lamps may reduce blowouts and cannibalism of commercial layers in the cages near the source of illumination, thereby reducing the mortality rate and increasing the production efficiency of the poultry house. Energy efficient CF lamps help reduce electrical load and increase energy savings and reduce overall cost of producing eggs.

(NE-1009) Mastitis Resistance to Enhance Dairy Food Safety, Andrew, S. M.
These results emphasize the importance of screening milk for antibiotic residues when antibiotic treatment is initiated prior to parturition. Fat content of milk was positively related to an increase in false positive rates for the CITE Snap test. Milk should not be tested for antibiotic residues prior to the sixth milking after parturition to avoid high rates of false positive outcomes.

(NE-1007) NE-1007, Ovarian and Environmental Influences on Embryonic/Fetal Mortality in Ruminants
Impaired reproductive performance is one of two major caused of reduced productivity for dairy cattle and represents the major cause of reduced profitability for meat animal species. The economic impact on dairy profitability is significant. It is proposed to study mechanisms by which nutritional, management and environmental factors impact ovarian activity and the subsequent effect on pregnancy and calving rates. Advantages of performing this work as a multi-state effort include the ability to commit larger numbers of animals under similar, but different management systems to the research effort, overlapping approaches with collaborative efforts and technologies can be directed toward several objectives simultaneously, and shared experience and data analysis make the interactions more beneficial. Outcomes or projected impacts:

- Development of herd management strategies to minimize the effects of nutritional and heat stress on herd fertility.

- Further refine current estrous synchronization protocols to enhance embryo survival.

(NC-228) Avian Respiratory Diseases: Pathogenesis, Surveillance, Diagnosis and Control
Respiratory diseases afflicting poultry in modem commercial production operations are complex entities. The continued need for research to address the complex interactions of disease factors, develop and improve methods for the rapid diagnosis and control of respiratory disease is a paramount importance to the poultry industry as it transcends into the 21st century. Our overall goal of this project is to develop an effective, safe broad spectrum vaccine for the presentation and control of AI.

(NE-1000) Improved Weed Control through Residue Management and Crop Rotation, R Ashley
Long-term rotations were established to determine the effect of a crop/weed management rotation on weed population. Weed counts by species were taken to establish a baseline.

(NE-187) Best Management Practices for Turf Systems in the East, K Guillard
Anion exchange membranes can predict the amount of available nitrate needed in a managed turfgrass system to achieve maximum quality without over-supplying N that may be susceptible to leaching and runoff losses.

(W-1002) Nutrient Bioavailability--Phytonutrients and Beyond, S. Koo, R. Clark
Almost 70% of Americans use a complementary or alternative medicine therapy during their lifetime. It is critical to know if the botanicals affect nutrient absorption in general. This project is quite unique because it focuses on the effects of phytonutrients on the ADME of calcium, iron, B-carotene, lutein and vitamins A, E, B6 and folate. It is also unique because state of the art developments in isotope technology, molecular biology, and biochemistry are used. Without question, the information derived from the proposed research and the proposed dissemination of information to both the specific community and lay public will provide part of the framework on which future nutrient recommendations can be based.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multi-state Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution University of Connecticut
State Connecticut

Check one: X **Multi-state Extension Activities**
___ **Integrated Activities (Hatch Act Funds)**
___ **Integrated Activities (Smith-Lever Act Funds)**

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY2004

Assessments		**11,230**	**14,715**	**12,417**	**6,242**	
	Food & Food Safety		***2,675***	***2,992***	***2,843***	***2,843***
	Natural Resources		***14,176***	***15,464***	***16,194***	***16,194***
Family, Youth & Community		***24,131***	***47,826***	***49,660***	***49,660***	
Dairy & Livestock		***395***	***0***	***0***	***0***	
Sustainable Agriculture		***2,732***	***1,461***	***1,695***	***1,271***	
Horticulture		**301**	**336**	**357**	**357**	
Total		***55,640***	***82,794***	***83,166***	***76,567****	***463,667***

*The decrease in this investment is due to an early retirement program.

Director

3/1/04
Date

Form CSREES-REPT (2/00)

Multi-State Extension Activities – Brief Descriptions

Multi-state Extension activities evolved from a Connecticut base where an integrated program approach was followed through the context of small groups and college-wide teams. This approach allowed for the development and implementation of a variety of Extension, research and integrated Extension/research programs both within the state and on a multi-state basis, where appropriate. Research and Extension programs are based on needs identified by stakeholders.

The Connecticut Family Nutrition Program for Infants, Toddlers and Children (FNP-IT) reached over 200,000 Hispanic adults in Hartford by disseminating the USDA FIGHT BAC! campaigns through television, radio and newspapers.

Extension and research efforts in the Hazard Analysis Critical Control Point (HACCP) systems continued to evolve as surveys of consumers, producers and farmers were undertaken, and education programs directed to cheesemakers, as part of a long-term research and education effort in this area.

Extension efforts to deal with poultry pests through reduced fly and pest populations were found to be effective, with cost savings realized by many producers. Surveillance programs to monitor poultry and other birds' diseases resulted in control of ILT and infectious bronchoitis infection control. 3.5 million birds were protected from IBVD spread.

Extension activities addressed the emerging issues of land use and water quality protection. Programs were focused on both the national and local level through the nationally acclaimed NEMO program (Nonpoint Education for Municipal Officials). National leadership resulted in NEMO adaptations now underway in 30 states across the United States. NEMO efforts in Connecticut resulted in programs delivered to representatives from virtually all Connecticut towns, with many communities revising their comprehensive plans and/or taking other important public policy actions to better protect water resources.

Results from a joint research/extension paired watershed residential water quality project saw numerous changed landscape management practices and significant reductions in bacteria and nitrate-nitrogen leaving the targeted watershed.

Extension efforts in leadership development through the People Empowering People program (PEP) were designed to work with adults and older youth with limited financial resources to enhance their ability to help themselves and their communities. 97 adults graduated from the program and showed improved communications skills, and a like number showed increased knowledge of community resources, shared new skills and increased awareness of positive parenting practices. The program was expanded to New Mexico, Massachusetts, New Hampshire and Maine.

Integrated pest management (IPM) research and education programs were targeted at most major crops in Connecticut. IPM programs resulted in significant reductions in usage of various pesticides and/or use of less toxic materials or approaches in pest management. Vegetable and

greenhouse producers benefited from a number of New England-wide programs, conferences and publications.

Supplement to the Annual Report of Accomplishments and Results
Multi-state Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution University of Connecticut
State Connecticut

Check one:
___ **Multi-state Extension Activities**
_X_ **Integrated Activities (Hatch Act Funds)**
___ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY2004**
Total	***258,111***	***354,081***	***354,081***	***350,000***	***354,081***

Director **3/1/04**
Date

Form CSREES-REPT (2/00)

University of Connecticut
College of Agriculture and Natural Resources

Office of Dean and Director

Cooperative Extension System

Agricultural Experiment Station

Ratcliffe Hicks School
of Agriculture

February 25, 2003

Jim Goodwin
% USDA-OIG-Audit
101 South Main, Room 324
Temple, TX 76501

Dear Mr. Goodwin:

I am writing in respond to a telephone conversation between you and Dr. Nancy H. Bull, Associate Dean, Outreach and Public Service. This conversation was a follow-up to a question raised by Sam Burnett of your office. The question raised was part of an audit of the AREERA audit process regarding Integrated Activities (Hatch Act Funds) and the potential under-reporting of our commitment to expend 25% of the funds. This commitment allowed the waiver of submission of Form CSREES-BASE.

Mr. Burnett originally called on Friday February 21, 2003 to question the under-reporting. After careful analysis of expenditures against what we had reported, Dr. Bull determined that we had accurately reflected the 25% expenditure. Dr. Bull then realized that the USDA-OIG-Audit Office might not know that, in Connecticut, the Hatch funds are equally divided between the Connecticut Agricultural Experiment Station, housed in New Haven, Connecticut and the Storrs Agricultural Experiment Station at the University of Connecticut. Two separate reports are submitted.

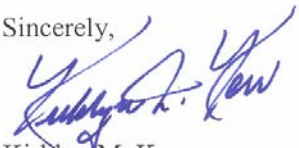
A conversation with you on February 24, 2003 confirmed that your records indicate only a total for Hatch funds for the State of Connecticut. Therefore, by this letter, we are confirming that for the 50% of Hatch Funds allocated to Connecticut that are received by the Storrs Agricultural Experiment Station, we have documented that 25% were expended for Integrated Activities (Hatch Act Funds).

1376 Storrs Road Unit 4066
Storrs, Connecticut 06269-4066

Telephone: (860) 486-2918
Facsimile: (860) 486-5113
web: www.canr.uconn.edu/

Please notify us should you need additional information.

Sincerely,



Kirklyn M. Kerr
Dean and Director

Cc: Sam Burnett
Nancy H. Bull
Ian Hart

Integrated Research and Extension Activities – Brief Descriptions

Integrated research and Extension activities as related to Hatch Act funds evolved from a Connecticut base where an integrated program approach was followed through the context of small groups and college-wide teams. This approach allowed for the development and implementation of a variety of Extension, research and integrated Extension/research programs both within the state and on a multi-state basis, where appropriate. Research and Extension programs are based on needs identified by stakeholders.

Animal research efforts saw the successful development of a recombinant DNA vaccine for Infectious Bronchitis virus, a highly contagious respiratory and urogenital disease of chickens. Trials are currently under way in chickens. .

Extension efforts to deal with poultry pests through reduced fly and pest populations were found to be effective, with cost savings realized by many producers. Surveillance programs to monitor poultry and other birds' diseases resulted in control of ILT and infectious bronchoitis infection control. 3.5 million birds were protected from IBVD spread.

Involvement by College faculty in a major lobster mortality event in Long Island Sound enabled researchers to identify the impact of transient exposure to relatively low concentrations of malathion can have on defense mechanisms, possibly making them more susceptible to infections.

Research work on docosahexaenoic acid (DHA) was designed to assess the role of foods with DHA on sleep patterns of newborns demonstrated that infants born to women with gestational diabetes mellitus have a less mature central nervous system. There has been broad interest internationally since the data provides the basis for exploring mechanisms and intervention.

Supplement to the Annual Report of Accomplishments and Results
Multi-state Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution University of Connecticut
State Connecticut

Check one:
___ **Multi-state Extension Activities**
___ **Integrated Activities (Hatch Act Funds)**
_X_ **Integrated Activities (Smith-Lever Act Funds)**

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY2004
Assessments	**11,230**	**14,715**	**2,417**	**6,242**	
Food & Food Safety		***16,085***	***18,825***	***21,846***	***21,846***
Natural Resources		***72,542***	***79,592***	***83,367***	***83,367***
Dairy & Livestock	***41,214***	***3,951***	***41,654***	***41,654***	
Sustainable Agriculture	**19,228**	**20,869**	**24,219**	**18,164**	
Horticulture	**30,158**	**33,601**	**35,667**	**35,667**	
Publications	**55,941**	**72,818**	**66,428**	**56,360**	
Economic Viability	**19,640**	**20,938**	**20,938**	**20,938**	
Total	***266,038***	***265,309***	***306,536***	***284,238****	***472,036***

**The decrease in this investment is due to an early retirement program.*

Director **Date** **3/1/04**

Form CSREES-REPT (2/00)

Integrated Research and Extension Activities – Brief Descriptions/Smith-Lever

Integrated research and Extension activities as related to Smith-Lever funds evolved from a Connecticut base where an integrated program approach was followed through the context of small groups and college-wide teams. This approach allowed for the development and implementation of a variety of Extension, research and integrated Extension/research programs both within the state and on a multi-state basis, where appropriate.

The Connecticut Family Nutrition Program for Infants, Toddlers and Children (FNP-IT) reached over 200,000 Hispanic adults in Hartford by disseminating the USDA FIGHT BAC! campaigns through television, radio and newspapers.

Integrated pest management (IPM) research and education programs were targeted at most major crops in Connecticut. IPM programs resulted in significant reductions in usage of various pesticides and/or use of less toxic materials or approaches in pest management.

Extension and research efforts in the Hazard Analysis Critical Control Point (HACCP) systems continued to evolved as surveys of consumers, producers and farmers, with particular emphasis on cheesemakers and cider makers, were undertaken as part of a long-term research and education effort in this area.

Extension efforts to deal with poultry pests through reduced fly and pest populations were found to be effective, with cost savings realized by many producers. Surveillance programs to monitor poultry and other birds' diseases resulted in control of ILT and infectious bronchitis infection control. 3.5 million birds were protected from IBVD spread.

Recommendations to improve crop pest management/crop productivity, and to create new production opportunities for the greenhouse industry were developed and disseminated through a variety of educational methods. 1,200 growers at the New England Greenhouse Conference showed that knowledge gained during the conference will enable growers to reduce projected business costs by $2,392 for the year and sales were anticipated to increase by $14,000.