

Connecticut Annual Report of Accomplishments FY 2004

Connecticut Cooperative Extension System
Storrs Agricultural Experiment Station

This certifies that the University of Connecticut has submitted their Fiscal Year 2004 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.

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 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 bronchitis 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, the 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	229,997	4.52
Hatch	-	-
Multi-state research	119,549	2.35
State funds	6,676,762	106.12
Competitive grants	1,072,059	25.08
Animal health	-	-
Total	8,098,367	138.05

Key Theme - Transgenic Swine for Xeno-Transplantation

a. Activity – 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 of this particular project 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. Impact – The outcomes of this project could lead the way to treatment of Parkinson’s disease and regeneration of injured nerve tissue. Several manuscripts have been published pertaining to these projects.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Tissue Reprogramming

a. Activity – The research focus is to study nuclear reprogramming and the return of a differentiated somatic cell to a totipotent stage so that these cells can be differentiated for tissue regeneration.

b. Impact –Working with collaborators at the University of Illinois and INRA in France, 11,241 expressed sequence tags were published in the GenBank. Collaborations were established with scientists within the university as well as the University of Illinois, Cornell, Missouri-Columbia, and Rutgers and in other countries such as Brazil, Japan and Thailand. Successful attraction of funding research of over \$1.2 million, publication of 12 peer-reviewed papers and 8 conference abstracts.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Animal Cloning and Biotechnology

a. Activity –The research goal is to improve animal reproductive efficiencies by developing and optimizing various reproductive biotechnologies, with a focus on improving cloning techniques and understanding of various mechanisms in nuclear-cytoplasmic interactions and genetic reprogramming during nuclear transfer.

b. Impact – Approximately 100 peer-reviewed papers including more than 20 papers published in 2003-2004 including two high-profile Nature/ Nature Biotechnology papers. The success of the 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.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Ontogeny of Somatotropic Axis in Beef Cattle

a. Activity – The goal is to more clearly define changes in the somatotropic axis with age to utilize exogenous somatotropin more efficiently. The focus is 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 previous work on using exogenous somatotropin to stimulate growth rate in beef cattle.

b. Impact – To date results show 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. Changes in GH, IGF and IGFBP from birth to one year of age in males and females have been shown. By more clearly identifying age-related changes in the axis, the variation in response to exogenous somatotropin can be reduced and the potential for economic success of beef producers that may utilize somatotropin in the future increased.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Animal Diseases Surveillance Programs/Potential Bioterrorist Agents

a. Activity – The goal is to identify newly emerging or bioterrorist diseases before they have become widespread. 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. The lab is an active participants in the National Animal Health Reporting System, which monitors animal diseases in the United States. Federal (USDA) funds have also 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. The goal is to improve CVMDL's ability to conduct large scale testing of cattle and small ruminant herds for Connecticut as well as other southern New England states. Antibody screening testing, and fecal culture have been implemented and PCR (DNA detection) testing for this disease will be used. The laboratory has also become a USDA approved laboratory for Avian Influenza and Exotic Newcastle disease surveillance program testing. In cooperation with CT DoAg, and USDA APHIS New England Regional Office, live and dead bird surveillance testing for most of the New England states is conducted. The lab will play a major role in the upcoming live bird market surveillance program for this disease. A cooperative agreement with CT DPH and CT DoAg will be able to again conduct equine WNV testing will be conducted. 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.

b. Impact – The laboratory has been successful in the identification of West Nile Virus and Avian Influenza outbreaks, among others. These efforts have integrated the 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.

c. Source of Federal Funds – Animal Diseases

d. Scope of Impact – Regional/New England

Key Theme - Virus Research/Virus Vaccines

a. Activity –Efforts are targeted to vaccines for PRRS - a swine disease affecting severely the industry. The areas of research at present include vaccine design and testing of protective immunity. DNA vaccines encoding the pseudorabies virus and porcine reproductive respiratory virus genes have been constructed and tested. The use of cytokines such as IL-2 and IL-4 as vaccine adjuvants is an area of active research. Cytokine bioassay development is another area of current emphasis in the laboratory. The applicability of swIL-2 and sw IL-4 as adjuvants for vaccines is currently being tested in swine in the context of protective immunity against PRRS. More recently, West Nile virus (WNV) has become an important area of interest both at the diagnostic and research levels. A BSL-3 laboratory facility now in place enables the handling of WNV under proper containment. A rapid fluorescent antibody test to detect WNV antigen in avian tissues has been developed. A grant proposal has been submitted to NIAID-NIH for work

on persistence of WNV in avian species. A grant proposal has been submitted to the Department of Homeland Security for work on vaccines and immunomodulators for exotic viral diseases. A specific Cooperative Agreement (SCA) was started with scientists of Plum Island Animal Disease Center ARS, USDA to work on improved methods for control of FMDV, VSV and PRRS.

b. Impact –A replication defective adenovirus vaccine carrying ORF4 of PRRSV was constructed and it is currently under evaluation. Experimental DNA vaccines for PRRSV have been improved and were administered to swine in a vaccine trial using swIL-2 and swIL-4 as adjuvants. Two DNA vaccine carrying PRRSV ORFs 5 and 7 which are functional were constructed. Two constructs expressing swine IL-2 or swine IL-4 respectively have been completed. PRRSV ORF-5 and ORF-7 and the swine IL-2 and IL-4 genes were transferred to a plasmid that yields a higher expression of protein. These new constructs were shown to be functional in swine in a vaccination and challenge trial. A replication defective adenovirus vaccine carrying ORF4 of PRRSV was constructed and it is currently under evaluation. Through the SCA a series of monoclonal antibodies that recognize swine IFN- β were produced. These antibodies are currently under characterization. Vaccination/challenge trials in swine with DNA vaccines and swIL-2 and swIL-4 co-administration were completed. Thus far the data shows a positive effect of IL2 on the onset of the cellular immune response to the DNA vaccine. The SCA has resulted in a series of monoclonal antibodies against swine IFN β and a recombinant PRRSV vaccine. The SCA is a joint effort between UConn and PIADC and has yielded a series of monoclonal antibodies against swine IFN β and a PRRSV recombinant vaccine. A rapid fluorescent antibody test for detection of WNV in tissues of avian species has been developed. Anti-WNV monoclonal antibodies have been developed and await characterization. The SCA with investigators of Plum Island Animal Disease Center in the area of swine immunology and vaccinology to achieve improved control for FMDV, VSV and PRRSV is now in place.

c. Source of Federal Funds – Animal Diseases

d. Scope of Impact – State

Key Theme - Diagnostic Virology

a. Activity – The diagnosis of disease allows prompt decision making in terms of treatment and or control. The focus is viral diseases. The objective is to recover and identify viruses causing disease. Diagnostic work involves pathologists, virologists, and bacteriologists, support personnel. This is done through the Connecticut Veterinary Diagnostic Laboratory. Material is obtained from necropsies and processed for histopathologic or microbiologic testing. Since the West Nile virus outbreak started in August 1999, The lab has been involved in necropsies, processing of tissues for recovery and identification of, interviews with the press and public in general, submission of requests for funds for research on West Nile virus and preparation and

submission of manuscripts for publication. A series of monoclonal antibodies (mAb) mAbs against West Nile virus were developed. These mAbs await characterization and have good potential for application in diagnostic virology. A rapid fluorescent antibody test for detection of WNV antigen in avian tissues has been developed.

b. Impact – The development of a rapid fluorescent antibody test for detection of WNV in avian tissues provides a complementary test for diagnosis of WNV. The availability of a series of anti-WNV monoclonal opens an opportunity to develop diagnostic tests. A rapid fluorescent antibody test for detection of WNV antigen in avian tissues has been validated and can be applied readily as a tool in the surveillance of WNV. The development of monoclonal antibodies against West Nile virus for use as tools in rapid diagnostic tests. Contacts have been established with scientists at the Bronx Zoo, Bronx, New York, and USAMRIID, Fort Dietrick, Frederick, Maryland, Vermont, Illinois. A collaboration for future animal studies with West Nile virus was started with Plum Island Animal Disease Center.

c. Source of Federal Funds – Animal Diseases

d. Scope of Impact – State

Key Theme - Immunotoxicology of Pesticides in Lobsters

a. Activity – Lobsters represent an economically important fishery 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, which 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, at once, 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. Laboratory work focused on understanding the effects of those pesticides on lobsters, particularly on their defense mechanisms, which could have predisposed the animals to new infections such as paramoeba.

b. Impact – A system to experimentally expose lobsters to pesticides in controlled conditions were developed. Studies allowed the evaluation for the first time of the dose of malathion, methoprene and resmethrin, the three pesticides used for the control of mosquitoes in 1999, which killed lobsters. Furthermore, the effects of concentrations of those pesticides much lower than those that killed lobsters were evaluated and found that they reduced the immune functions of lobsters several days after exposure. At that time, only methoprene could not be measured in tissues of the affected lobsters. Results demonstrated the relative toxicity of the different pesticides compared to each other. The work demonstrates that transient exposure of adult lobsters to relatively low concentrations of pesticides can affect the defense mechanisms of lobsters and possibly make them more susceptible to infections. When coupled with ongoing modeling efforts to quantify the range of possible concentrations of the different pesticides in Long Island Sound in 1999, results will allow the determination of the likelihood that pesticides were involved in the die-off.

c. Source of Federal Funds – Hatch, Animal Diseases

d. Scope of Impact – State

Key Theme – Pathogenesis of Mycoplasmas

a. Activity – Research is focused 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. Investigated were the means of attachment; cytoadherence molecules and host cell receptors, as well as control mechanisms of variably expressed cell surface proteins involved in cytoadherence and/or evasion of the host immune response.

b. Impact The sequencing and annotation of the *M. gallisepticum* genome and published it in the journal, *Microbiology*. The genomic data is being utilized to study gene expression and functional genomics.

c. Source of Federal Funds – Animal Diseases, Hatch

d. Scope of Impact – State

Key Theme - In Vivo Expression of IBV-S Gene in Chicks

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. The IBV-S gene of Mass41 into the plasmid pTracer CMV containing the Green Fluorescence Protein (GFP) gene was cloned. Findings indicate that the DNA vaccine containing IBV-S was expressed in these organs. From these images, RT-PCR and immunoassay, one may conclude that there should be a population of IBV-sensitized T and B-lymphocytes in the hatchlings

b. Impact – With the successful 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. The development of a recombinant vaccine that contains the S gene and its use in-ovo will be more practical for protecting the chicks before hatching. Scientists from universities in New York, Delaware, Maryland, North Carolina, Ohio, Georgia, Illinois and Iowa are involved.

c. Source of Federal Funds – Animal Diseases, Hatch

d. Scope of Impact – State

Key Theme - Development of Molecular Diagnostic Techniques

a. Activity – PCR for reovirus, adenovirus and a multiplex PCR for avian pathogenic mycoplasmas were successfully developed. A multiplex PCR is also developed for serotype Massachusetts and Arkansas infectious bronchitis virus (IBV). A multiplex PCR for respiratory avian pathogens were developed.

b. Impact – This multiplex PCR can detect and simultaneously differentiate four immunosuppressive avian pathogens in one test. This test will be rapid and cost effective by using one test to diagnose several pathogens. An international cooperative research program

was established with the research institute in China. Dr. Zhiqin Xie (visiting scholar from China) has successfully completed the research on the development of a PCR for avian encephalitis virus. This technique is being used in China.

c. Source of Federal Funds – Animal Diseases, Hatch

d. Scope of Impact – State

Key Theme - Diagnosis, Therapy and Surveillance of Poultry and Pet Bird Diseases

a. Activity –Active involvement in the environmental monitoring of Salmonella enteritidis (SE) in poultry farms is essential to prevent the spread of diseases. Activities included providing information on how to control SE contamination by thorough cleaning, biosecurity, pest management and possible SE vaccination programs. Conducted postmortem, histopathological and bacteriological examinations of poultry and pet birds at the veterinary diagnostic laboratory. Provided recommendations on treatment and vaccination programs. Visited poultry farms to discuss health and poultry management with poultry producers to prevent further losses due to diseases.

b. Impact – Total egg laying commercial flocks of 3.5 millions were protected from the spread of Avian influenza, Infectious Bursal Viral Disease, Coryza, Colibacillosis and Pasteurellosis. Low Path H7N2-Avian Influenza was control by a successful vaccination program in Connecticut. About 4 million egg laying chickens were saved due to vaccination. No outbreaks of Salmonella food-borne outbreaks related to eggs and egg products from the Connecticut commercial Egg farms.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme – 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 animal species. 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.

b. Impact –Significant differences in environmental factors, such as diet, life style and diseases, between patients and controls were found, which may be etiologically relevant.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Protein Modeling and Biotechnology

a. Activity – Much of the public, including students in secondary school as well as undergraduate students, perceives agricultural biotechnology as either animal cloning, or genetic engineering of

plants. However, use of molecular genetics, bioinformatics, and other tools of ‘biotechnology’ have the ability to inform and educate all of us; scientists, the public, and ‘stakeholders’ alike, in the area of how humans affect the biological world and how the environment affects humans. Therefore, the objective of the outreach program is to inform the public about the power of biotechnology to provide a better understanding of the biological world. The focus of the effort is to educate citizen groups, students, teachers, etc. about how molecular biology provides the tools to gain an insight into how protein structure is related to protein function, and how an understanding of protein functions provides a basis to improve the quality of life.

b. Impact – Lectures were presented to student and citizen groups this year; many 4-H students were acquainted with the College’s programs, and educated as to how molecular biology is relevant to their future education. Secondary school teachers were educated about how important an understanding of protein function is to insights in all fields of biology. Legislators were educated about the power of biotechnology to enhance quality of life for all citizens. A training program is being developed to better prepare high school biology teachers to educate students in this area. Linkages were developed with several local secondary schools.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme – Dairy Production Management

a. Activity – Mastitis is the most costly disease to animal agriculture in the U.S. One of the greatest challenges facing dairy farmers today is successfully managing high producing cows for diseases such as mastitis during the transition period. While there have been great improvements in mastitis prevention and control, there are still large gaps in the knowledge of this complex problem. A greater understanding of the intimate relationship between body condition, negative energy balance, the immune system, and periparturient diseases such as mastitis will allow for the development of better management practices and the potential to develop intervention strategies that reduce the need for antibiotic use on dairy farms. The goal of this research project is to analyze the relationship between negative energy balance, ketosis, immune system function and mastitis during the transition period in high producing dairy cows.

b. Impact – The results from this study will be used for mid-term development of Extension programs to disseminate information on management practices to promote animal health and reduce mastitis.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Improving Production Efficiencies in Livestock

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 has focused to increase growth rate or efficiency of nutrient utilization of cattle and swine with augmentation of somatotropin release or function. One objective for the current effort in this focus was to determine the concentration of insulin like growth factor binding proteins in young beef cattle after somatotropin injection.

b. Impact –It has been determined that there is a difference in the concentration of IGFBP in males and females. This information may help determine why male calves grow more efficiently than female calves.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - 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. The 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. This brings together people from Canada, New England, New York, Delaware and Pennsylvania. Case studies are presented and through lecture, hands-on demonstrations, and discussions people are educated and trained in the proper methods of Integrated Pest Management and use of pesticides.

b. Impact – Fly and pest populations were stable 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 results indicated that 18 poultry farmers/workers/ allied industry personnel 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.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Non-Commercial Poultry Rearing/ Youth Poultry Projects

a. Activity - Many types of poultry are being reared for non-commercial use in New England, including chickens, turkeys, ducks, geese and gamebirds. In the spring of 2004 an average of

8,650 baby chicks (meat type, layer type and fancy fowl) were being shipped each week to small flock owners throughout the New England states. 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. The focus was to educate poultry owners about the proper management, including health care and rearing of their poultry.

b. Impact – As a result of these programs there has been steady interest in poultry rearing. An estimate is a 1.5 - 3.5% increase during the past 2 years. This resulted in 121 4-H youth involved in the 2004 Southern New England 4-H Poultry Show and Showmanship contest. Due to the success of the poultry show another 2 4-H clubs in CT and MA have been started or added a poultry interest over the past year. As more youth become involved, more networking is occurring and more become interested. There was also a slight increase in adults involved with poultry projects since last year. Of the 243 plus contacts by phone or email, about 31 of these are new to poultry within the past year, seeking advice on purchasing, rearing, managing, etc. of small egg, meat or show bird flocks. The economic impact on CT and New England is considerable. Small flock owners purchase 50 to 100 lb bags of feed at \$10 to \$20+ per bag. This is equivalent to \$400 per ton of feed, which in bulk sells for about \$160 to \$180 per ton. This increased profitability to businesses carries through to other products for poultry rearing.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Crop Insurance and Risk Management

a. Activity – There is a need to improve the viability and profitability of Connecticut agricultural enterprises. The Agricultural Risk Protection Act of 2000 has provided funding through the USDA Risk Management Agency (RMA) for education and outreach programs for Connecticut producers and their advisors on crop insurance and other risk management topics. The overall objective of this project is to improve the viability and financial health of Connecticut agricultural producers through crop insurance and risk management education.

b. Impact – USDA, RMA and CT crop insurance agents indicate significantly increased participation in crop insurance programs by Connecticut producers as a result of these programs. Also preliminary feedback indicates that producers as well as advisors were very satisfied with the one-on-one sessions and found them to be mutually beneficial.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - New England Fluid Milk Marketing

a. Activity - Survey results indicate that there continues to be a persistent exercise of market power in the channel by supermarket retailers in New England. Research generated considerable interest in milk pricing questions in several state houses and also at the federal level. Extension programming focused on providing information on the milk pricing problem and testifying

before legislative bodies. Connecticut legislators formally requested that the University organize a meeting to bring together research on the various aspects of the milk pricing problem. Conference attendees reacted in two diametrically opposed ways to the presentation of detailed information on costs, prices, and policy options. One group, most notably the dairy processors and the Agri-mark Cooperative, recommended that state level regulatory solutions focused primarily on the Pennsylvania Milk Board minimum pricing approach. Others suggested a more activist regulatory approach by state government. Connecticut Attorney General Richard Blumenthal provided a formal legal opinion stating that price collars in fact are legal and do not violate the interstate commerce clause. As a result of this effort a substantive economic report was produced.

b. Impact – Contributed to increased public understanding of milk pricing problems in New England and New York. Contributed to current and possible future legislative initiatives in Connecticut and other states. The Connecticut legislature did report a bill out of committee empowering the Connecticut Milk Regulation Board to regulate prices and margins in the fluid milk marketing channel. That bill passed the House of Representatives 147-1 in of May 2004. Retailer and processor opposition to wider regulatory authority, however, killed the bill in the Senate. A significant outcome from the research and involvement in the public policy process is the documented need for continued research on milk pricing and state and federal dairy policy initiatives.

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

d. Scope of Impact – State

Key Theme - Risk Analysis and Government Policy for Genetically Modified (GM) Crops

a. Activity – The United States has led the world in the development and adoption of agricultural biotechnology and has the largest number of acres planted in genetically modified (GM) food and fiber crops. Since the 1980's, American politicians, government regulators, farmers, biotechnology companies, university scientists and citizens have had complex intersecting roles in the development and commercialization of GM crops. A Risk Policy Fellowship from the American Association for the Advancement of Science (AAAS) provided a unique opportunity to work in the US Department of Agriculture. Outputs during the 2003-2004 academic year followed from the AAAS fellowship experience and included participation in workshops, peer-reviewed publications and independent research projects.

b. Impact – Two peer-reviewed publications - Auer, C.A. 2003. Tracking genes from seed to supermarket: techniques and trends. *Trends in Plant Science* 8:591-597; and Biotechnology-derived perennial turf and forage grasses: Criteria for Evaluation. Council for Agricultural Science and Technology, Ames, Iowa, USA, May 2004. 94 pages. ISBN 1-887383-25-5, ISSN 0194-407x. Workshop participant and co-author of report -Extending the net fitness model to considerations of crop gene flow.” January, 2004. Special Issue of the *Information Systems for Biotechnology (ISB) News Report*.

c. Source of Federal Funds –Smith-Lever, 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. 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 objective is 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.

b. Impact – 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. A refereed journal article by Lehrer and Brand (Lehrer, J. M. and M. H. Brand. 2003. An interactive online database for the selection of woody ornamental plants. HortTechnology 13:562-568) received the American Society for Horticultural Science Extension Publication Award for 2004, meaning it was the best Extension-oriented paper in all three refereed journals published by the Society in 2004. The UConn Plant Database receives over 87,000 web page views per day from over 1,800 persons that visit the site each day. The United States government has even used some images for their publication. The website generates about 100 email plant material questions per month.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - 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. Transgenic rhododendrons carrying an antifungal gene that should make plants resistant to the root rot disease, as well as other common rhododendron diseases are being created. A superior disease resistant transgenic rhododendron is being tested for its ability to resist infection in outdoor production conditions.

b. Impact – Preliminary laboratory tests have show that antifungal transgenic rhododendrons can still develop beneficial mycorrhizal relationships. The implications are that the plants may be disease resistant and have a limited or no impact on the environment. Although it is still too early

to bring either root rot resistant rhododendrons or a phytophthora diagnostic assay to the nursery industry, progress to date has been encouraging and suggests that success is possible. 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. Resistant plants could nearly eliminate the need for chemical controls for root rot in rhododendron. Commercial growers as well as homeowners would realize significant dollar savings.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Effective Use of Microbial Inoculants

a. Activity – Soilborne pathogens can cause major losses for the greenhouse industry, which is high value component of agriculture in Connecticut. Growers routinely apply preventative chemical fungicides to avoid losses. Microbial inoculants (MI) that supply beneficial microbes are marketed to suppress soilborne pathogens and reduce the incidence of plant disease. Growers are reluctant to rely on MI because they must be applied prior to any incidence of disease and it is impossible to determine if the microbes persist in the potting mix or colonize roots. Growers will even go so far as to incorporate MI in their potting mix and apply preventative fungicide as well. The focus of this research is to evaluate the persistence and proliferation of MI in potting mixes and on plant roots. A trial was conducted in which the potting mix for a crop of Easter lilies was inoculated with the product RootShield (RS), an inoculant containing *Trichoderma harzianum* T-22. Populations of *Trichoderma* in potting mix and on plant roots were enumerated at intervals from planting to market.

b. Impact –Results showed that *Trichoderma* persisted in the potting mix and colonized roots throughout the production cycle. Similar studies are now being conducted on Cyclamen with three MI representing different classes of microorganisms. Results indicate the need for more definitive methods for identifying MI microbes when members of the same genus are present in the potting mix. The horticultural science community, including the greenhouse industry as well as producers of microbial inoculants has been provided with information regarding options for biological control of soilborne diseases in soilless potting mixes.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - 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. To elucidate the impact of these two parameters on the availability of phosphatase in the environment for subsequent reactivity with organic P is being sought.

b. Impact – Adsorption envelopes were obtained, and determine that the enzyme adsorbs onto goethite at low pH values. Inorganic C (carbonates) does not interfere with this adsorption behavior.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Vegetable Crops

a. Activity –The objective of this program is to provide Connecticut and New England vegetable farmers with cutting-edge solutions to their pest management and crop production problems and to help keep them competitive on the local, regional and national level. Almost 1,400 people attended the three-day New England Vegetable and Berry Conference & Trade Show in Manchester, NH. Over 115 growers, researchers and service representatives attended the Annual CT Vegetable and Small Fruit Growers' Conference in Vernon, CT. The New England Vegetable Management Guide was updated with new techniques and pesticide listings and almost 2,000 copies were sold throughout the region. The UConn vegetable telephone/internet pest message provided weekly reports on trap captures, disease occurrence, and management practices throughout the growing season and received over 600 calls/hits per year. The UConn IPM web site alone is accessed by over 450,000 people per year. An applied research program was conducted to help drive effective programming. Dozens of farm trouble-shooting visits and direct mailings were made. Finally, 14 commercial growers participated in UConn's full-season IPM training program which takes place in the growers' fields on a weekly basis.

b. Impact – 231 people returned evaluations of the New England Vegetable and Berry Conference and Trade Show. Over 97% rated the educational sessions as excellent or good, 92% of the respondents said their pest management would improve, 88% said their soil and nutrient management would improve, and 82% said their farm profitability would improve as a result of the conference. Over 90% of the respondents said they found a new source of information at the conference and 79% said they planned to implement new practices after attending. A total of 38 growers returned evaluations of the Annual CT Vegetable and Small Fruit Conference. All (100%) of the respondents rated the educational program as excellent or good, 98% said that it would result in improvements in their crop production and marketing practices, 95% said it would improve their pest management and/or crop quality, 90% said it would improve their farms' environmental quality, 78% said it would improve their farm profitability, and 80% said they would adopt new practices as a result of attending the conference. The 14 growers that participated in the full-season field training reduced the number of pesticide applications they made to 125 acres of sweet corn, peppers and cucurbits (summer squash and cucumbers) by 16% and the amount of active ingredient they used by 3.2 pounds of A.I./acre or 56%. They increased their crop yields by 5%, 12%, and 21% on sweet corn, peppers, and cucurbits respectively, and saved \$70,687 (\$566/acre) by reducing pest damage.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Perimeter Trap Crop System for Cucurbit Pests

a. Activity – A recently released U. S. General Accounting Office Report on integrated pest management (IPM), criticized IPM programs for relying too much on chemical solutions and noted the low adoption rate of biologically-based pest control tactics, which have great potential to reduce the use of pesticides and their associated environmental and human health risks. Perimeter trap cropping (PTC) involves planting a highly attractive plant so that it completely encircles and protects the cash crop like fortress walls. Efficacy can often be improved by supplementing the trap crop with other biological, mechanical, cultural or chemical control tactics or with pest attractants or repellants. The PTC system functions by concentrating and/or controlling the pest population in the border area of a field, while natural enemies in the center are spared to help provide season-long pest control on the cash crop. The PTC concept has been successfully employed against papaya fruit flies in Mexico, pepper maggots in Connecticut and the diamondback moth in Florida. The goal was to develop a PTC system for cucurbit crop pests to reduce, replace or eliminate broad-spectrum chemical pesticide applications for this crop on vegetable farms in the Northeast. Research efforts focused on controlling the striped cucumber beetle on summer squash and cucumbers, because this pest can reduce or destroy plant stands or vector bacterial wilt disease to these popular crops, which are produced on most Northeast vegetable farms.

b. Impact – The combination sprayed/trap crop treatment reduced cucumber beetle numbers, defoliation and/or bacterial wilt occurrence in both small plot work and in commercial fields. In all the commercial summer squash and cucumber fields PTC provided superior pest control compared to multiple full-field sprays and insecticide use was reduced by an average of 93% (1.5 lbs/acre). All the CT growers stated that their pest control improved using PTC and rated their crop damage at 23% prior to using the technique and at 2% in 2003. The 21% increase in crop yields produced an increase in gross revenue of over \$30,000(\$1,293/acre). Most (80%) CT growers involved in the trial stated that the system was simpler and more profitable to use than spraying entire fields repeatedly with pesticides. Recommendations for PTC were incorporated into the New England Vegetable Management Guide.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – Region (CT, MA)

Key Theme - Perimeter Trap Cropping Against Pepper Maggots

a. Activity – Despite almost a half-century of integrated pest management (IPM) research and Extension efforts, pesticide usage continues to rise. Scientists and policy-makers are beginning to express frustration with the lack of progress, and are beginning to point the finger at IPM as part of the problem. Yet, many Extension IPM programs remain heavily dependent on multiple, full-field pesticide applications as the primary or solitary pest control tactic. Perimeter trap cropping (PTC) represents one possible redesign of the crop production and pest management system that incorporates natural population regulators, plant attributes and a conservative spatial orientation of the trap crop to simultaneously improve pest control and reduce pesticide use. Connecticut growers participated in the PTC program.

b. Impact – All 5 (100%) of the growers stated that their pest control was much better using PTC than in previous years without the trap crop system. Mean damage estimates due to pepper maggots were 12% using multiple full-field sprays and < 1% using the pepper PTC system. All (100%) respondents reported pesticide savings using the trap crop system. The use of insecticide active ingredient for pepper maggot control was reduced by 0.7 pounds per acre (90%) using PTC. All (100%) said that they saved money using the trap crop system and estimated their overall savings at between \$1 and \$1,000 per acre. They attributed most of the savings to improved pest control, crop quality and yields. Most of the growers using the PTC system stated that the system was simpler to use than spraying entire fields repeatedly with pesticides and saved them time (60%). All the growers gave PTC high marks for the following benefits which are hard to put a dollar value on: easier harvesting schedules due to the elimination of insecticide day-to-harvest intervals, reduced personal and/or personnel exposure to hazards, reduced potential for chemical crop residues at harvest, reduced risk from secondary pest outbreaks, easier/faster monitoring, and reduced impact on the environment/land/water. All PTC users said they were either very satisfied or thrilled with the overall performance of the trap crop system.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme - Master Gardener Program

a. Activity – There is a strong public support for actions to protect and enhance the natural, historical and developed environments. The Master Gardener program is designed to encourage actions at the individual level which have positive environmental and community consequences. 183 students enrolled in the Master Gardener Program. 154(84%) became certified Master Gardener's after completion of 85 hours of in class instruction and at least 60 hours as interns. The Advanced Master Gardener Program conducted 36 classes.

b. Impact – Master Gardeners made 5,791 in office contacts with members of the public via telephone, mail and walk ins, resulting in diagnosis of over 2,046 different plant problems (insects, plant ID, etc). New and Advanced Master Gardeners volunteered over 13,500 hours in a variety of community settings that involved 170 outreach projects.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact – State

Key Theme –Urban Gardening

a. Activity – The urban gardening program focuses 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. Bridgeport is one of the poorest cities in the nation. Considerable efforts are directed toward establishing and maintaining strong working relationships with the local government, local agencies, community leaders and other organizations and institutions. Educational methods include demonstration gardens, hands on experience, group lecturing and individual or one-on-one consultations.

b. Impact – Community gardens provided fresh vegetables to 515 poor families and individuals. Gardeners used less chemical products because they have learned different methods and ways to combat with pest problems. Efforts lead to the establishment of good working relationships with Yale New Haven Lead Program and Regional Treatment Center, New Haven Land Trust, and New Haven Christian Community Action, leading to the establishment of a community garden in New Haven.

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.

A distance education course in food safety, developed for food service personnel, http://www.team.uconn.edu/foodsafety_course/index.htm, was tested with 50 subjects finding that distance education was as effective as traditional education.

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

In summary, the 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	86,722	1.35
Hatch	-	-
Multi-state research	-	-
State funds	609,027	9.65
Competitive grants	-	-
Animal health	-	-
Total	695,749	11.00

Key Theme – Food borne Diseases

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 a Qualified Food Operator (QFO) must be employed by food service establishments. 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 increased risk for contracting foodborne illnesses. Five food safety courses were given throughout the state to 175 school food service personnel. All individuals have taken a nationally recognized food safety test.

b. Impacts – A distance education course in food safety, developed for food service personnel, http://www.team.uconn.edu/foodsafety_course/index.htm, was tested with 50 subjects finding that distance education was as effective as traditional education with this course and is available through NCES and Nasco. Continuing education credits for the curriculum have been approved

by the American Dietetic Association and the American School Food Service Association. Continued offering of sanitation courses for school food service and child care staff in Connecticut reached 175 school food service personnel CACFP personnel completed the qualified food operator course in food safety and sanitation.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact – State

Key Theme - Food Safety for Farmstead Cheese Makers in New England

a. Activity – 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. There are concerns that subpasteurization temperatures might create pathogenic bacteria that are resistant to the acids developed during the aging of raw milk cheese. This means that they would survive the aging process and increase the risk for illness. Research was conducted to determine if acid tolerance is likely to occur.

b. Impact - The results of this research indicate that there is reason to believe that subpasteurization temperatures may be a way for artisanal makers of unpasteurized milk cheeses to reduce the risk that pathogens are present in their cheeses while not affecting the indigenous, though not pathogenic, bacteria that contribute to the unique characteristics of aged, unpasteurized farmstead cheeses, especially flavor. These two studies could lead to the development of safer raw milk cheeses using a method that can destroy pathogenic bacteria while allowing the desired flavor-making bacteria to survive.

c. Source of Federal Funds – Smith Lever, Hatch

d. Scope of Impact - State

Key Theme - Food Safety for Farmstead Cheese Makers in New England

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. 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 education project focused on helping cheesemakers to increase their adoption of recommended food handling practices as it pertains to cheese; 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 includes farmstead and artisanal cheesemakers in New England, including state regulators responsible for the cheese industry, and those considering a food processing business.

b. Impact – Six of eleven farmstead cheesemakers completed the development of five of the seven HACCP steps. After completion of the last two steps a HACCP plan will be in place.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - HACCP Education for New England Food Industry

a. Activity – In the United States, an estimated 76 million persons contract foodborne, illnesses each year. The National Center for Health Statistics estimates the number of deaths per year from foodborne illness to be 9,100. To address the presence of food safety hazards in the food system, Hazard Analysis Critical Control Point (HACCP) systems have become the food safety system of choice for the food processing industry and the system by regulation for the Meat and Poultry, Seafood, and Juice industries.

Opportunities for HACCP training in New England are very limited. The small food processing operations which characterizes most NE processors, cannot afford (due to time and/or fiscal restraints) to travel to the Midwest or South to take advantage of other courses.

UConn Cooperative Extension System has coordinated and/or participated in HACCP training efforts for seafood and meat and poultry since 1997. UConn is the only Extension program in New England offering courses for meat and poultry processors and for the juice/cider industry. Participants in the training programs gain the skills needed to develop a HACCP plan so that they are in compliance with the regulations.

b. Impact – According to the FoodNet program of the CDC, during 1996--2003, the estimated incidence of several infections declined significantly. *E. coli* down 42%, *Salmonella* down 17%; no significant change occurred in the incidence of outbreaks caused by *Listeria monocytogenes*.

Meat and Poultry: Four of six participants returned evaluation forms. All four indicated that they learned something or realized something new as a result of the workshop. In addition, all four planned to use the material learned to develop their HACCP plans as required by the USDA.

Juice: All participants indicated that they learned/realized something new and that they were prepared to write a HACCP plan. Their course was required by the FDA and there was only one other course offered in the New England area (by an industry group for a much higher fee). The 57 participants are now prepared to meet the requirements of the Juice HACCP regulation.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact – New England

Key Theme - Food Safety for Temporary Food Events

a. Activity – In the past ten years there has been an increase in foodborne illness outbreaks attributed to "community food events". A major outbreak occurred at the Norwalk, Connecticut, Oyster Festival in 1991. Over 600 attendees contracted salmonella infections from undercooked and mishandled chicken fajitas served by volunteers from a community organization. In November of 1997, Maryland reported its largest Salmonella outbreak in history at the 50th annual church dinner in rural Maryland, a stuffed ham and turkey stuffing tested positive for *Salmonella Heidelberg*. The most recent incident in the northeast states occurred in late August of 1999 at a fair outside of Albany, New York. More than one hundred and fifty individuals were infected with *E coli 015:H7*. Health officials indicated the contamination was a result of cow feces at a barn, washing into an underground aquifer, and contaminating the fair's water supply.

Food safety program personnel in four New England states developed a curriculum targeting temporary and volunteer foodservice workers (Looking for a Safe Harbor). Materials have been distributed to all Connecticut local and district health departments for their use in training this audience. The target audience for this program includes organizations whose volunteers serve food at temporary events such as fairs, suppers, and festivals that are open to the public.

b. Impact – An evaluation was conducted for the North Central Health District program. Seven of eight participants indicated that they had learned at least one new thing at the workshop (importance of air drying of utensils, importance of training for volunteers, ice must be bought from an approved source, not brought from home, identifying the riskiest menu items, and temperatures for safe food storage). The Connecticut Fair Association continues to see the value of these training sessions and has planned three additional training opportunities for this year.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact: State

Key Theme - Seafood Safety

a. Activity – In 1996, pending FDA regulations governing the safe processing and handling of fish and fishery products, including a requirement that all seafood processors process their seafood following HACCP (Hazard Analysis and Critical Control Point) principles, prompted the establishment of a seafood safety extension program. The regulation calls for all processors to meet a HACCP training requirement, which involves taking a course developed by the Seafood HACCP Alliance, a group of academics, regulators, and industry members. The training requirement in the FDA regulation requires on-going access to the training courses, because of the amount of employee turnover in the seafood industry.

b. Impact – The seafood safety extension program has enabled numerous seafood businesses in Connecticut and other parts of southern New England to remain in business by providing the training required by FDA locally, at a low cost, and on a regular basis. Individual course evaluations are conducted, using the prescribed AFDO evaluation form. It largely focuses on ranking the various chapters in the training manual and the hazards and control guide for seafood, the two major resources used for the course. The rank for the various chapters in the training manual run average between fair (3) and excellent (1). The hazards guide consistently ranks high, between 2 and 1 overall. The hands-on, model HACCP plan development part of the course also ranks consistently very high, receiving mostly scores of “Excellent”.

c. Source of Federal Funds – Smith-Lever

d. Scope of Impact: New England

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 956 EFNEP homemakers representing 2,622 family members. 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 works 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, the 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	350,080	7.03
Hatch	-	-
Multi-state research	-	-
State funds	1,059,933	12.90
Competitive grants	334,854	7.44
Animal health	-	-
Total	1,744,867	27.38

Key Theme - DHA in the Diets of Pregnant Women

a. Activity - Docosahexaenoic acid, DHA, is a long chain polyunsaturated fatty acid that is found in cold-water marine fish. Infants cannot make this fat and must get it from either the transfer across the placenta during pregnancy or in the feed in the postnatal period, i.e., either breast milk or formula. This fat, which is critical to eye and brain development, is not efficiently delivered to the infant of women who experience gestation diabetes mellitus, a form of diabetes which occurs for the first time around the beginning of the third trimester of pregnancy. Research that is aimed at increasing levels of DHA in women during pregnancy is important because optimal development of the central nervous system (CNS) can likely impact how the infant learns and develops, probably influencing such things as school readiness and ability to pay attention in the school room setting. The public health and societal importance of the research relates to the efforts and resources that are expended responding to children with special needs related to neurological development and behavior. The long term objectives of the research are to i) establish how dietary DHA can improve the levels of the pregnant woman and her child; ii) determine how DHA levels of infants relate to maturity of the CNS and cognition and ability to learn; and iii) build a foundation of knowledge which can serve the purpose of supporting public health policy decisions regarding recommendations for pregnant women and women of childbearing age.

b. Impact - Infants born to women with gestational diabetes mellitus have less mature CNS than infants born to women with normal healthy pregnancies. A USDA-funded project in underway to examine the impact of a DHA-functional food on the DHA levels of pregnant women and their infants. Discussions and negotiations with Nestle, Inc, Vevey, Switzerland are currently underway to establish an industry-funded project that would focus on the impact of a dietary supplement in women with gestational diabetes mellitus.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme – Macular Degeneration

a. Activity - Macular degeneration is associated with the loss of lutein and zeaxanthin from the macular region of the eye and is the most common cause of irreversible blindness in people over 65 years of age. Cataracts resulting from photooxidation may also be ameliorated by the presence of carotenoids in the eye. Factors that influence the absorption and use of lutein and zeaxanthin, carotenoids that may be particularly beneficial in the prevention of two diseases of the eye: age-related macular degeneration and senile cataract are being investigated.

b. Impact - Work has resulted in publication of a book chapter and an abstract at a scientific meeting. Studies will ultimately provide information that can be used in establishing guidelines for safe and optimal use of these carotenoids in slowing the progression of these diseases.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Prevent, Treat and Minimize the Consequences of Iron-deficiency Anemia

a. Activity - This project is a comprehensive nutrition education program serving exclusively low resource families with pre-school children in the Greater Hartford area. The program is divided into four integrated components: Husky Nutrition Core which provides a nutrition education and literacy program in primary care and WIC waiting areas, Husky Reads, a service learning program for student volunteers, Child Health/Family Life, a community based intensive group and individual nutrition education program, and "Get Healthy Hartford" a school based program with classroom and parent nutrition education programs. An integrated curriculum with coordinated messages either serves a distinct population group of food stamp recipients or complements the work of one of the other components

b. Impact - Increased recognition and receptiveness of Husky Reads program among children, providers and caretakers, enhanced knowledge among caretakers regarding the problem, development of a state-wide, Hartford-focused coalition and enhancement of services by Women, Infants and Children (WIC) nutritionists by Hartford Health Department.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact – State

Key Theme - Zinc Homeostasis and its Interactions with Thyroid Hormone

a. Activity - Zinc can be in short supply in the diet and is required for normal growth and proper functioning of many body systems. An unknown but likely substantial proportion of the population in parts of Africa and Asia are growth stunted due to inadequate zinc intakes. Previous work has demonstrated significant interactions between thyroid hormone and zinc, both in young growing rats and in cultured cells. The research program is on the mineral zinc and its interaction with thyroid hormone.

b. Impact - This work has raised important and fundamental questions about how cells handle zinc and the nature of the effects of both deficiency and excess of this mineral. Major external funding for this project, with a total of three new or revised and resubmitted grant applications under review at NIH or USDA is being sought.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Food Security and Nutrition Education

a. Activity - Recent data collected by USDA indicates that about 7.6% of Connecticut households are food insecure and almost 3% of Connecticut households experience hunger. Households with children are twice as likely to experience food insecurity. Poverty increased by 0.4% from 2001-2003, up to 8% of all residents. The gap between the highest and lowest income families increased faster than most other states, and the number of working poor families with children has doubled. Child poverty has also increased. 26% of all young children in Connecticut live in low-income families and between 30% and 47% of the children in the major cities live in poverty. Adult obesity increased in Connecticut from 10.9% in 1991 to 17.3% in 2001 and 18.2% in 2003. Over 55% of all Connecticut adults are considered overweight.

For 35 years, EFNEP has been providing food and nutrition education in Connecticut to low-income families with children, and low-income youth, in order to improve eating patterns, shopping and food preparation skills, and dietary adequacy. Families are reached through collaboration with other agencies such as social service agencies, housing authorities, emergency food programs, schools and after school programs, day care centers, health clinics, etc. Poor nutrition can lead to higher rates of infant mortality, low birth weight infants, learning disabilities, school absenteeism, compromised immunity, chronic diseases and hunger.

b. Impact - EFNEP staff worked with 956 program families, reaching 2,622 people in those families. Over 2,300 youth were reached. Over 52% of families who reported income were living at or below 100% of the federal poverty guideline. Over 93% of graduated families made one or more positive behavioral change. CT educational materials continue to focus on key concerns such as fat, sugar, salt and making changes in food choices for better health. The 35th EFNEP Anniversary provided the opportunity to showcase the work of EFNEP. Connecticut had 2 national winners recognized at the event in Washington. This helped to increase the visibility of EFNEP among the congressional delegation. For example, Representative Rosa DeLauro, from New Haven, delivered a special order speech to Congress about EFNEP and the importance of enhancing it to help combat the obesity epidemic. (Congressional Record, March 16, 2004). As a result of CT Food Policy and End Hunger CT efforts, several pieces of legislation related to agricultural viability and child nutrition were passed in 2003-04 session.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact – State

Key Theme - 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/m² 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. The importance of healthy diets and increased activity in maintaining body weight are emphasized with this research project.

b. Impact - 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 - Cardioprotective Effects of Grape Polyphenols in Pre- and Post-menopausal Women

a. Activity- Antioxidants present in grapes may have an important role in reducing coronary heart disease risk. The oxidation of LDL probably takes place in the arterial wall where LDL particles result in lipid deposition and lesion involvement. Oxidized LDL has been associated with increased atherosclerotic lesions. 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. 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.

b. Impact - In a guinea pig model for menopause, 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

Key Theme – Vitamin A/PEPCK

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. The goal is to further define the numerous effects of vitamin A on gene expression by examining a specific model gene, that

encoding phosphoenolpyruvate carboxykinase (PEPCK). The PEPCK gene was one of the first metabolic genes to be isolated; therefore, it serves as a model in the study of genes involved in carbohydrate metabolism. 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. The cellular vitamin A signaling pathway is being examined, to determine how vitamin A message is sent to the nucleus of the cell and is transmitted to the DNA. Additionally, vitamin A requirements are examined for the correct differentiation of liver tissue in the developing mouse fetus. Most recently, investigation by screening thousands of genes to determine responsiveness to vitamin A by using microarray analysis is being expanded.

b. Impact - Overall, research shows the need for vitamin A to assure the correct differentiation and function of the liver in terms of carbohydrate and lipid metabolism. Potentially, this will increase the understanding of the role of vitamin A in the metabolic dysfunction that occurs in type2 diabetes and obesity. If the research shows a clear link between vitamin A deficiency and an increased risk for the metabolic syndrome characteristic of the early stages of type 2 diabetes and obesity, another important risk factor will be identified. This is the first indication that a vitamin, in this case vitamin A, is critical for the control of the metabolic complications of diabetes and obesity. Given an established association between diabetes and vitamin A status, individuals at risk for this disorder (based on family history and life-style factors) could be advised to maintain proper levels of dietary vitamin A intake.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme - Exercise Training and Diet Design for Healthy Men and Women

a. Activity - National health objectives continue to focus on the need to increase routine physical activity in the lives of adults. The availability of new scientific techniques combined with improved efforts to conduct diet interventions provides the opportunity to better define the affect of routine aerobic exercise on nutrient needs. In particular, the ability to correctly balance calorie intake with energy expenditure for optimal use of dietary protein is important to long term health and weight maintenance.

b. Impact - The current recommendations for protein intake are sufficient to maintain rates of protein utilization in exercising men and women as long as attention is given to consuming sufficient calories. This work further substantiates the importance of good dietary control when studies are specifically directed at protein utilization given a number of different exercise interventions. The results from this work will directly apply to recommendations for protein intake in healthy, physically active men and women. Furthermore, this work further documents the critical relationship between energy intake and optimal protein utilization in physically active men and women.

c. Source of Federal Funds – Hatch

d. Scope of Impact – State

Key Theme – Child Nutrition Education

a. Activity - Child nutrition and feeding practices in the United States vary widely among caregivers, parents and among different socio-economic groups. Low income families and teenage mothers in particular, may be able to begin feeding for infants with guidance, but when the older infant transitions to table foods, difficulties arise. Families of children with special dietary needs such as Phenylketonuria (PKU) also have difficulty in determining the appropriate foods for their child and handling feeding transitions. Education of parents regarding appropriate child nutrition and feeding practices directly benefits the diets of children.

b. Impact - 95% of families attending a PKU Family weekend incorporated a low protein diet recipe into their child's diet that was observed/tasted during Food Demonstrations at the Weekend. This resulted in expanded diet variety for each child. 80% of parents attending the child nutrition workshops increased their child's exposure to fruits or vegetables at home after attending a workshop. 100% of Directors attending nutrition trainings provided information on feeding and nutrition to women residing on the residential treatment centers.

c. Source of Federal Funds – Smith-Lever

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 nutrient usage in significant ways through nutrient management planning.

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 Quinnebaug-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 subdivisions.

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 35 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 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, the 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	579,930	8.86
Hatch&Mc-Stennis	119,389	1.75
Multi-state research	-	-
State funds	2,945,748	41.47
Competitive grants	505,978	10.65
Animal health	-	-
Total	4,151,045	62.83

Key Theme – Invasive Plants

a. Activity - Japanese barberry (*Berberis thunbergii*) is a popular landscape shrub that accounts for \$10 million in sales in Connecticut annually. It is ornamentally appealing and tolerant of a wide range of difficult landscape situations. Unfortunately, it also possesses invasive potential due to its fruit production. Fruit production studies were conducted as well as seed germination studies and shade tolerance studies.

b. Impact - Preliminary information was generated indicating that some barberry cultivars produce reduced amounts of fruit. These cultivars may represent plants that could be grown without presenting a significant invasive risk. The nursery industry and regulatory agencies are awaiting the findings of this research to determine how to deal with Japanese barberry and winged euonymus, two potentially invasive species that are worth around \$10 million each year for CT growers and landscapers.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 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. Biological control is recommended as a low-input, sustainable management strategy for purple loosestrife. Four species of biological control agents have been introduced in Connecticut for control of purple loosestrife. Since 1996 the University of Connecticut has taken the lead in coordinating efforts to reduce purple loosestrife infestations throughout the state and restore biological diversity in natural areas. More than 300,000 purple loosestrife biological control agents have now been introduced into 40 locations in the state. Long-term monitoring studies continued at a majority of these sites.

b. Impact - Monitoring results for an increasing number of purple loosestrife biological control study sites have shown that the biological control agents are making significant impacts on reducing populations of this invasive non-native plant. A number of long-term monitoring sites where Galerucella beetles were introduced began to show significant reductions in purple loosestrife density, increasing populations of the natural enemies, and gradual recovery of native plants.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - The Connecticut Curriculum for Integrated Pest Management

a. Activity - Through partnerships with Connecticut teachers and other educators, there is an opportunity to increase the knowledge of Connecticut citizens on the principals of Integrated Pest Management (IPM), impacts on IPM on environmental problems and IPM methods that are available to them to restore and preserve the environment. During the third year of a five-year project, IPM curriculum for 7th and 8th grade students was finalized and printed. 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 is being promoted to middle school science teachers, science supervisors and curriculum specialists, 4-H leaders, and home school families. Partners included Connecticut public school teachers: science coordinators and curriculum specialists. Development of an IPM curriculum for grades K-1 and 2-3 is also underway.

b. Impact - As teachers and other educators learn about the new IPM curriculum, the demand for this information is growing. The curriculum ties in with state and national science standards and presents information on IPM in a format that is straightforward and engaging for both teachers and students to learn. The Connecticut Mastery Tests and Connecticut Science Standards are being revised and teachers will be able to use the curriculum to meet the needs of these requirements. The IPM Curriculum has received a very enthusiastic response from teachers and curriculum specialists who attend the workshops.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Recreational Sector for the Gulf of Mexico Red Snapper Fishery

a. Activity - This project explores 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. The intent is 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. Activities included one week of workshops with participants, stakeholders, and regulators in the Gulf of Mexico Red Snapper Fishery (30+ participants), one peer-reviewed publication in *Marine Policy*, one published pamphlet for distribution to stakeholders and one invited presentation at the NOAA/NMFS St. Petersburg, FL office.

b. Impact - 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 is the first fishery for which this new management paradigm will be formally proposed.

c. Source of Federal Funds – Hatch

d. Scope of Impact - National

Key Theme - Estimating Non-Use Values for Fish

a. Activity - This research assisted the Environmental Protection Agency (EPA) 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. The research included an application of meta-analysis to estimate non-use values. Outputs included two technical reports to the Environmental Protection Agency and associated responses to peer-review one publication in *Water Resources Research* and one presentation accepted for the annual meeting of the *Northeastern Agricultural and Resource Economics Association*.

b. Impact - This research provided the economic analysis necessary for approval and implementation of the EPA 316b Rule. Results provided by this effort had a direct and critical impact on policy development; namely the recent posting by EPA of 316b regulations for Phase II facilities.

c. Source of Federal Funds – Hatch

d. Scope of Impact - National

Key Theme - Land Conservation Techniques and Service Implementation

a. Activity - This research will inform efficient, cost-effective use of land preservation dollars by comprehensively evaluating public preference for the non-market services of land preservation and the ways in which these services can be provided. The supporting objectives concern the investigation of public preference for the non-market services of preserved land.

b. Impact - Increasing recognition among academics and policymakers that the rural public may not only be concerned with the consequences of land management; residents may also have systematic preferences for the policy instruments applied to management goals. Preferences for outcomes do not necessarily imply matching support for the underlying policy process.

c. Source of Federal Funds – Hatch

d. Scope of Impact - State

Key Theme - Interactions between Environmental Policy and Trade

a. Activity - Traditional environmental policies, 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 research has been to develop new models that researchers and policy analysts can use to investigate empirically the impacts of such environmental policies on trade. Outputs included two journal articles.

- b. Impact - As evidence that this research is having an impact, the models developed as part of this project were most recently used in a major research paper commissioned by the Organization of Economic Cooperation and Development on the trade effects of agri-environmental payments.
- c. Source of Federal Funds – Hatch
- d. Scope of Impact – National

Key Theme - Evaluation of Nutrient Management Plans in Connecticut

a. Activity - Little to no information is available about how effective nutrient plans are at improving the management of nutrients. Field-by field information was generated about nitrogen (N) and phosphorus (P) applications on nine farms. The nine farms collected information on 505 fields and 5114 acres of corn and hayland. The farms had three to six years of field-by-field records. The field-by-field information was collected in the EQIP AFO/CAFO Nutrient Management Program.

b. Impact - The results show improvement in N and P applications by the farmers. A summary of the results shows that over five years of education and recordkeeping - the percentage of fields where excess manure N was applied decreased from 44% to 23%, the percentage of fields with greater than 100 pounds/acre excess N fertilizer applied decreased from 25% to 10%, the percentage of fields where excess P was applied decreased from 52% to 27%, and the average excess P application decreased from 43 pounds/acre to 10 pounds/acre.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme – Turfgrass Best Management Practices

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 (BMPs) for turf need to be developed and implemented to minimize the threat of water pollution from turfgrass fertilizers. This research program is evaluating new technologies that will improve nitrogen (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.

b. Impact - The results from the research suggest that fertilization practices (rates, timing, and formulations) for turfgrass can be refined to maintain turf quality while decreasing the threats to water quality by nutrient pollution. Presentation of the research to industry professionals has prompted some to change or consider changing their current fertilization practices. Research also indicates that hand held light meters and anion-exchange membranes can improve upon the current recommendations for nitrogen fertilization of turf. These new technologies have the potential to better guide fertilization rates and times, which will result in a decreased threat of nutrient enrichment of water resources.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact – State

Key Theme - Urban Watershed Monitoring

a. Activity - Nonpoint source pollution is the primary cause of water quality problems in Connecticut and the U.S. Research was conducted to study the effectiveness of urban best management practices (BMPs) by monitoring three residential watersheds in Waterford, CT.

A component part of urban BMPs are rain gardens, also termed bioretention areas, which are increasingly being suggested to reduce runoff from urban areas and treat stormwater pollutants. The primary objectives are to demonstrate the use of rain gardens and disseminate information on their design in Connecticut. Two research rain gardens have been constructed at Haddam, CT. Twelve have been constructed in Waterford, CT. A rain garden brochure has been produced.

b. Impact - Monitoring has confirmed the expected positive reductions in pollutants, peak runoff rates and volume of runoff as compared to both the adjacent study area and an existing subdivision. There is continued national and statewide interest in the project. The volume of stormwater runoff from the BMP Watershed decreased during the construction period and continued to decrease by >100% during the post-construction period. During construction, the concentrations of TSS, TP, NO₃, NH₃, and TKN increased. Following construction, only TSS, TP, and TKN concentrations increased. Concentration peaks were associated with turfgrass development. Exports generally declined in both construction and post-construction periods, except for TP which did not change. During construction stormwater runoff from the traditional watershed increased. There was no increase in the concentrations of TSS, TP, NO₃, Cu, Pb, Zn and NH₃. TKN concentrations decreased. However, exports increased for all variables except the metals.

The word on rain gardens is spreading. Requests from the private and public sectors to review or design rain gardens were received. The demonstration rain gardens in Haddam, CT have retained over 99% of rainfall.

c. Source of Federal Funds – Hatch, Smith Lever

d. Scope of Impact - State

Key Theme - The Green Valley Institute

a. Activity - The Quinnebaug-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 night-time 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. Sixty-three Green Valley Institute (GVI) short courses, workshops and training

sessions were taught to 1,307 Corridor community leaders, landowners and interested citizens in 2003-04. Thirty-eight private forest owners, owning collectively 2,883 acres, attended a six-part short course on forest stewardship. A comprehensive sustainable landscape demonstration area was developed at the University of Connecticut Extension Center in Brooklyn.

b. Impacts - One hundred forty volunteers trained and supported by GVI programs donated at least 1877 hours of time in 2003, valued at some \$31,045, 2,852 acres of land that have been permanently protected or are in the process of such protection as a direct result of GVI programs. The GIS Center partnered to develop new aquifer and breeding bird digital data layers for Corridor communities; assisted seven Corridor communities in developing natural resource inventories (NRI's), creating a total of 14 communities worked with on NRI's; partnered with the UConn CLEAR Center to teach two 5-day GIS short courses and a one-day GPS course to 27 Corridor community leaders; successfully piloted in two communities the use of a computer program that allows weighting and overlaying of multiple NRI data layers to produce a "co-occurring" resource map for conservation planning. In addition, the GVI web site (www.thelastgreenvalley.org/gvi) was completely revised and expanded, and now receives over 1,000 visits per month.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact – Regional (CT and MA)

Key Theme - Volunteerism in the Quinnebaug-Shetucket Heritage Corridor

a. Activity - The conservation and management of natural resources in Connecticut are heavily dependent on citizen volunteers. Municipal Commissions, non-profit land trusts and Cooperative Extension are among the key groups that depend on volunteers with a variety of talents. Historically, a chronic shortage of volunteers has hampered the productivity of these groups. In cooperation with numerous partners, the Green Valley Institute is institutionalizing a system within the Quinnebaug-Shetucket Heritage Corridor (QSHC) for recruiting prospective natural resource volunteers and providing basic and issue-based education to those recruit on an annual basis.

b. Impact - On a scale of 1(none) to 7(a tremendous amount) 29 new volunteer participants in 2003 rated the retreat at 6.4 in terms of knowledge gained and the usefulness of that knowledge. Of the 142 total program graduates, at least 103 (70%) have been successfully placed to date in community volunteer positions. In total, volunteers trained and supported through this program donated at least 1877 hours of time in 2003-2004, valued at some \$31,045.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact – Regional (CT and MA)

Key Theme - Development Alternatives

a. Activity - The Quinnebaug-Shetucket National Heritage Corridor (QSHC) includes 35 towns in northeastern CT and south central MA. Today's development patterns often conflict with these characteristics that make the region so special. This Extension program is designed to teach land use decision makers about alternatives to traditional land use patterns – alternatives that can

allow for sensible economic growth and at the same time protection of rural character and sensitive natural resources.

b. Impact - Evaluations showed that all participants would support development alternatives as a result of this program. As a direct result of this program at least two communities, Scotland and Sprague, adopted Conservation Subdivision Regulations to protect open space through residential development. The Town of Brooklyn has a new Route 6 Design Review Committee to ensure that new commercial development fits in with the character of the town. Several other innovative techniques are also being considered, including creating a pedestrian friendly village and a conservation commercial development.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Nonpoint Education for Municipal Officials (NEMO)

a. Activity - The impacts of poorly planned land use on the natural resources, economic vitality, and local character of the 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. The NEMO Program was developed in 1991-92 as an educational vehicle focused on local land use decision makers, and is still operating and accruing impacts today. For the past four years, much of NEMO's work is through an educational program called the Municipal Initiative, which creates 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. In addition, NEMO created two new educational modules, Focus on the Coast, which focuses on coastal habitat areas, and Managing Stormwater in Urban Areas.

b. Impact - Local impacts run the gamut from planning to regulations to site design. Some examples include: natural resource inventories in Woodstock, Salem, Old Saybrook, Canterbury, Colchester; parking utilization studies by Northwest CT and Litchfield Hill COGs; use of landscape visioning software in Marlborough, East Haddam; adoption of GIS technology for town planning in East Hampton and Essex; development of a regional impervious surface build-out analysis by the Central Naugatuck Valley COG; stormwater management and water resource protection language inserted into Comprehensive Plans in Beacon Falls, Old Saybrook, Colchester, East Haddam; open space plans created or improved in over 10 towns, including Woodstock, Old Saybrook, Salem; a road policy statement protective of water quality by the Board of Selectmen in Old Saybrook; creation of a Shoreland Overlay Zone (to require buffers and impose impervious surface limits): by the Candlewood Lake Authority, a five-town organization; a new zoning requirement for submission of stormwater management plans in Old Saybrook, CT; alternative stormwater drainage regulations that allow creative and protective subdivision design in Watertown, Cheshire, Bethany, Old Saybrook, and East Haddam; low impact development subdivisions in Waterford, Watertown, Old Saybrook, Bethany, Wallingford; construction of wetland/pond stormwater systems in Waterford, CT; and a nutrient allocation-based permitting system in a special Lake Overlay zone in Columbia, CT.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - National NEMO Network

a. Activity - Many national agencies and organization have recognized that better land use practices are needed to protect the 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.

Nine out-of-state training workshops were conducted, to initiate or assist NEMO Network projects. Presentations were given at several national conferences, including the U.S. Conference of Mayors Urban Water Council, USDA National Water Quality Conference, NOAA/EPA National Smart Growth Symposium, and the National Nonpoint Source Program Coordinators meeting. Two issues of a Network Newsletter were written and issued (both electronically and in hard copy). A meeting was organized of the National NEMO Network Interagency Work Group, which includes representatives of all the federal agencies and national organizations that partner with NEMO. A major new web service, the "Member Resources" section of the network web site, was created to better disseminate educational products throughout the network. In collaboration with the Minnesota NEMO program, a new training module entitled, Managing Stormwater in Urban Areas, was developed.

b. Impact - 35 NEMO projects now exist, in 33 states and territories. New program include: Nevada, Vermont, Kentucky, and Pennsylvania. Other funded programs include: Ohio, Indiana, Idaho, Oregon, Maryland, Washington, Texas, Delaware, Kansas, New York, Georgia, Alabama, South Carolina, North Carolina, Rhode Island, Massachusetts, Missouri, Michigan, Minnesota, Mississippi, Utah, New Hampshire, Maine, Tennessee, Louisiana, Arizona, Colorado, California and the Virgin Islands. 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:

- Development of new educational programs in Minnesota, Massachusetts, Maine.
- Changes to land use plans and regulations in nearly all of the NEMO program states.
- Development of regional workshops and cooperation in the Southeast (Alabama, South Carolina, North Carolina) and the Midwest (Ohio, Indiana, Minnesota).

- Initiation of new planning activities such as community resource inventories, open space planning, and master planning in Minnesota, South Carolina, Connecticut, New Hampshire, Maine, Indiana.
- Use of geospatial information in community land use decision making in Ohio, South Carolina, Minnesota, Maine, Connecticut, California.
- Tailoring of NEMO educational programs to new ecosystems in Nevada and Arizona.

The Phase II stormwater permitting program, in particular, was noted as a critical new program that is providing a "teachable moment" for educating municipal and other local officials about the many advantages that smart development and low impact development techniques. As the EPA Nonpoint Pollution Control Chief Dov Weitman commented, "this teachable moment provides an entree for NEMO programs to help communities, whether they are Phase II communities or smaller communities undergoing development, to think outside the box to protect water quality in a way that is affordable and compatible with long-term community needs."

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - National

Key Theme - Geospatial Technology Program

a. Activity - Geospatial technologies include geographic information systems (GIS), global positioning systems (GPS) and remote sensing and image classification (RS). Collectively, these technologies provide power tools for data creation, analysis and management, especially in the area of natural resources and land use. However, effective use of the technologies is limited due to a lack of trained professionals and a lack of understanding on the part of many potential users about how GIS, GPS and RS can be used to improve decision making and resource/land management. The focus of the Geospatial Technology Program (GTP) is to develop and offer learning opportunities for municipal land use decision makers, state agency resource managers and other individuals and organizations involved in natural resource management and land use planning. The program's goals are to increase awareness of geospatial technologies and their applications to contemporary natural resource and environmental problems; to provide educational opportunities through workshops, seminars and other venues; and to develop and offer hands-on classroom training opportunities to teach people how to use GIS, GPS and RS software and to apply them to their particular area of interest.

b. Impact - The remote sensing workshop attended by 100+ people has served to raise the awareness of satellite and airborne multispectral imagery and their potential applications in Connecticut. As a direct result of the workshop and research projects that the GTP is involved in, the Connecticut DEP, The Nature Conservancy and Wesleyan University are actively investigating the acquisition and use of such imagery for ongoing wetlands restoration and management.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Connecticut's Changing Landscape

a. Activity - For more than a decade, the University of Connecticut has initiated a series of projects that focus on land use and land cover as a research topic, and land use decision makers as an outreach audience. This work is driven by the fact that land use is the central issue underlying many of the most pressing concerns for most communities. Air and water quality, economic development, transportation, open space protection, community character, and farmland preservation are all closely connected to land use patterns and trends. As the landscape continues to urbanize, the role that land use plays in determining the quality of the water and air becomes increasingly more important to health and well-being. CLEAR has taken on the task of deriving a series of statewide geo-spatial informational data products for four spanning a 17 year period. Based on models developed under NASA's Northeast Regional Earth Science Applications Center (RESAC) that focused on improving information and increasing understanding of urban and suburban growth, analysts at CLEAR are now applying them at the state level. Land cover maps for the years 1985, 1990, 1995 and 2002 have been developed. As the name implies, land cover shows the "*covering*" of the landscape, as opposed to land use, a term that refers to what is practiced, permitted or intended for a given area (such as zoning designations). Land cover information was derived through analyses of satellite-based remote sensing images. Statewide data, organized by various political and physical geographies, are publicly-available for download in two convenient GIS formats (<http://www.clear.uconn.edu/projects/landscape/index.htm>).

b. Impact - *Connecticut's Changing Landscape* has received a lot of media attention, for example, *Satellite Pinpoints State's Sprawl* (Hartford Courant, January 4, 2004), UConn maps state's development since '85 (Associated Press, January 4, 2004); *Sprawl: A Bird's-Eye View* (Hartford Courant, March 21, 2004), and *Maps Tell Sprawl Story Building into Oblivion: Current Development Patterns Could Results in a State of Insignificance* (Connecticut Life, April 2004). This dataset is the most consistent, longest-record of satellite-derived land cover information for any state in the country.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Connecticut River Airshed-Watershed Consortium

a. Activity - The Connecticut River Airshed-Watershed Consortium (CRAWC) is a consortium of environmental research faculty from the four land-grant universities in the four states, which share the Connecticut River basin. The purpose of the consortium is to join the resources and expertise from the four Universities to study and quantify the long-term fate of pollutants in the Connecticut River Basin. The primary pathways of contaminant movement and transformation inside the basin are through the air, soil, surface water and groundwater. The consortium is conducting a two-phase interdisciplinary research program to first resolve these most difficult interfacial problems, and then develop management tools for solving long term degradation problems.

b. Impact - The consortium is spawning a number of offshoot research proposals which use the consortium resources and findings in new lines of research. For example a USDA-NRI grant (\$466,000) was received to study air pollution emissions from agriculture operations which will

add critical data for the CT River Basin airshed modeling by using techniques being studied and developed in the consortium. Detailed reports and lists of accomplishments are available on the Consortium web site (www.ctraws.org).

c. Source of Federal Funds – Hatch

d. Scope of Impact – Region (CT, MA, NH, VT)

Key Theme - Dynamics of Biological Systems

a. Activity - Studies on transport and conversion processes of energy and biological materials in the environment are critically important to homeland security as well as to the scientific advancement in the fields of environmental pollution, water resources sustainability, applied meteorology, and environmental modeling. Research focuses on (1) integration of the dynamics of air borne biologically active chemicals across soil, water, plant canopy, and the atmosphere, and (2) integration of hydro-meteorological, ecological, and economical processes at regional scale. The main objective is to develop a cascade of holistic models that can be used in examining the causation of multi-media environmental problems.

b. Impact - The multimedia modeling has drawn a lot of attention in the scientific community. It may replace the old models for government agencies for studying and regulating purposes. The study on integrative hydrological-ecological-economical model for semi-arid areas bring human dimension into physical models, and therefore has a potential application on policy making processes regarding agricultural structure, ecosystem evaluation, and resources management. The study on gene flow from transgenic corn crop has two important findings. One, the commonly used male-sterile bait plants in previous studies does not accurately reflect the gene flow in real conditions. The other, pollen dispersion in the air cannot be adequately described by a plume. While the first finding may have an impact on future experiment design, the second put some new light on the modeling theory.

c. Source of Federal Funds – Hatch

d. Scope of Impact - State

Key Theme - Pesticide Safety Education Program (PSEP)

a. Activity - 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. The State of Connecticut requires that individuals using restricted-use pesticides on their own property or property which they rent for agricultural purposes become certified as private pesticide applicators. The PSEP offers a formal short course to educate prospective applicants for certification in these categories. Other formal and informal programs about pesticide safety are presented to specific commodity/grower, green industry groups, Master Gardeners, and other groups.

b. Impact - Three hundred fifty-six certificates of attendance for re-certification credit were issued. Five hundred thirteen individuals attended the training sessions for private pesticide

applicator re-certification credit. Thirty three post workshop evaluations for the backpack sprayer calibrating, use and maintenance workshop indicated that:

- all individuals attending learned something about backpack sprayer calibration
- 25 individuals indicated that they learned how important it is to calibrate
- 19 indicated they will pay more attention to nozzle selection and maintenance
- 9 recognized how important it is to take time to do the math and measure correctly
- 7 noted the importance of a constant walking speed
- 7 noted the importance of maintaining constant nozzle height above the target

Eighteen individuals indicated that they will change their use, maintenance or calibration practices. Eight individuals indicated that they don't use backpack sprayers and 4 would not change their practices. Those who would not change their practices indicated that they rarely use a backpack sprayer and then only for Round-up. The changes 18 reported that they will make included:

- Checking and changing nozzle tips -16
- Increase calibration accuracy to save money -6
- Will consider buying a sealed pump type backpack -4
- Improve their use of personal Protective equipment -4
- Inspect equipment carefully -1
- Will build a boom extension -1

107 individuals participated in the Ornamental and Turf Short Course at the three locations. Thirty-nine individuals or 52% passed the state written exam. These individuals will take oral exams and upon passing their orals will be certified as supervisory pesticide applicators which will allow them to open their own businesses or provide them with the certification they need to advance their careers.

The CT DEP administered 301 certification exams for Ornamentals and Turf and Golf Course Superintendents this year, of these 88 passed (29%). The number of individuals who passed the certification exam without participating in the short course was 49 for a 21% pass rate. This compared to the 52% pass rate for individuals who participated in the short course demonstrates the significant impact provided by this educational effort.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Sustainable Greenhouse Program

a. Activity - In Connecticut, the greenhouse industry is a significant part of the agricultural industry. Over 280 commercial greenhouse growers produce greenhouse crops in the state with a wholesale value of over \$124 million dollars (NASS, May 2004). Greenhouse crops produced include bedding and garden plants such as specialty annuals, and herbs, propagative material, herbaceous perennial plants, garden mums, and pot crops such as poinsettias. The majority of the plants produced fall into the category of bedding and garden plants. 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. 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 with the most judicious use of pesticides.

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, updates on cultural and pest issues are placed on the Greenhouse IPM Web site at <http://wwwhort.uconn.edu/ipm/ipmghse.htm>, presentations given at several industry events and hands-on training with growers conducted.

b. Impact - Evidence of impact or significant findings: Full season hands on training sessions were held at the individual grower greenhouses. Six growers participated in the program. Field training focused on monitoring for key insects and diseases. All growers said they would recommend the program to other growers. One grower said that they would not be in business for the next season without the help from the Greenhouse and Vegetable IPM Programs. Insecticide use was calculated by comparing their current use with their use before participating in the program. All participants increased their adoption of IPM practices. For the 6 participating growers, insecticide use decreased, as 2.6 pounds of insecticide active ingredient was saved from application. Whenever possible, growers selected more environmentally friendly products with shorter reentry levels, lessening worker exposure to pesticides.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme – Forest Stewardship

a. Activity - The forested land area of the state of Connecticut provides numerous values and benefits to the quality of life and economy of the state. Protecting public and private water supplies, supporting a 700+ million dollar annual forest products industry, providing the backdrop for a growing recreational and tourist industry, and wildlife habitat are just some of the benefits and values identified. The bulk of this forested land (83%) is owned by private individuals and groups. The continued health and productivity of the forest is threatened by parcelization, conversion to other uses, and fragmentation resulting from population pressures. Insects, diseases and fire are also significant threats to the health and productivity of CT's forestland. The Connecticut Forest Stewardship Program provides technical assistance and education to private forest landowners and forestry professionals, educating them in the advantages of actively managing forest holdings, and providing guidance in implementing management activities.

b. Impact - The primary indicator of the success of the Forest Stewardship Program has been shown to be the number of forestland owners (and acreage) utilizing the benefits of the program to obtain a Forest Stewardship Plan for their property and actively engage in the management of their forestland. Numbers of landowners enrolling in the program are up from the most recent previous years and acreage figures are also up as shown by 9,388 acres of new or updated stewardship plans, habitat improvement, timber stand improvements implemented on 1,168 acres and knowledge & information gained by 2,451 individuals, including at least 605 forest landowners.

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 possess. 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. Tree Wardens were educated in tree biology, tree care, hazard tree assessment, public participation, tree law, and meeting management 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. Impact - On scales of 0 (poor) to 4 (excellent), Tree Warden School participants rated the school program 3.7 in terms of knowledge gained, with 3.9 in the applicability of the information to their Tree Warden duties. All participants found the final exam to be difficult, yet fair. In six years, 165 Tree Wardens, Deputy Tree Wardens and others 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. This program is 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. Impact - 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 227 urban and community forestry volunteers have been trained. Participants have come from 69 Connecticut communities and three states. Since 1992, volunteers have been the initiator or participant in the following example outcomes: 39 communities have written and passed shade tree ordinances; 28 shade tree commissions have been established; about 4,180 new public trees have been planted; twenty-one cities and towns have conducted volunteer organized shade tree inventories; three 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 was launched in the spring of 2001.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme – Aquaculture Species for Culture and New Gear Technology

a. Activity - Industry - Extension Partnered Research Projects (IEPRPs) are pilot-scale feasibility studies that may lead to comprehensive proposals involving commercial-scale research. IEPRPs were initiated in an effort to diversify the aquaculture products cultivated in Connecticut. In addition to the potential economic benefit provided by these new industries, an added benefit would be to alleviate fishing pressure on traditional species. In essence, the Extension educator brings the “science” into the field, while the industry member uses his field experience to predict how experiments will work in field conditions. Following the completion of the projects, results are disseminated to a variety of stakeholders.

b. Impact - As a direct result of dissemination of the project results, several industry members have become interested in farming mussels, and also using long line technology in Long Island Sound. The long line study also allowed “pre-test” of the new permitting process for aquaculture structures in LIS. Multiple stakeholders including industry members, regulators, and public interest groups invited the Extension Educator to discuss the implementation of this gear in LIS and possible impacts.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Aquaculture Law and Policy

a. Activity - During the past decade the aquaculture industry has begun to evolve from traditional on-bottom culture to surface and submerged culture of shellfish. The development of commercial hatchery and nursery technology and the use of grow-out gear have shown the potential for increased profitability of some sectors of the industry. The gear itself and associated markers has become more visible, causing concern to other users of the marine environment. As such, the regulatory process has become more stringent. Due to the complexity of the new permitting system, the application process became a daunting task for marine aquaculturists, and an overwhelming undertaking for the large number of agencies involved in reviewing applications.

Following mounting concerns from various stakeholders, the Extension Educator formed a working group to address the issues surrounding aquaculture permitting in the State. The permitting workgroup has presented its efforts at several industry and scientific meetings which attracted the attention of regional and national groups. Frequent changes in legislation and a high turnover rate of local and state regulatory officials require that Extension continue to collaborate with industry and regulators, also necessitates the continuing collaboration and education among these stakeholders. Extension, industry, and the regulatory community continue to attend aquaculture law and policy workshops, even though they do not see eye-to-eye on policies.

b. Impact - The “new” permitting process for aquaculture structures has been clarified, and several constraints to marine industry development have been identified for future discussion and resolution.

c. Source of Federal Funds – Smith Lever

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.

Parenting education programs were designed to enhance healthy family functioning through positive parent-child interactions, communications and discipline techniques. Of the 120 parents who participated, all felt better about their parenting practices, with 94% 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, the 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	850,867	14.95
Hatch	-	-
Multi-state research	-	-
State funds	945,846	13.27
Competitive grants	84,216	2.10
Animal health	-	-
Total	1,880,929	30.30

Key Theme - Family Functioning/Identity Theft Prevention

a. Activity – The Federal Trade Commission (FTC) reported that close to 10 million American’s were victims of identity theft last year. Connecticut is ranked 24th in the nation for victims of identity theft. On average victims spent \$500 and 30 hours resolving their problems related to their identity theft experience. Victims of “new accounts” fraud estimated that they spent \$1,200 on average and 60 hours resolving their problems. The impact on identity victims may continue

for more than 10 years after the crime was first discovered as they try to repair the damage done to their credit history and reputation. A train-the-trainer program, *Preventing Identity Theft: Protecting Your Privacy and Your Good Name* addresses this issue. The objectives of this program are to provide 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 is also offered to adults.

b. Impact – Train-the-trainer workshops have been conducted for 80 program participants, including social service agency staff and volunteers who work with senior citizens; housing authority personnel; assisted living facility staff; and municipal employees. A training program was developed for middle and high school teachers. 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; and their students. Thirty-three percent plan to conduct identity theft prevention programs for their clientele. Eighty percent plan to share the information gained with co-workers and 65% will reprint fact sheets in their agency newsletters. Fifty-five percent indicated that they intend to share the information with professionals at other agencies.

Workshops have also been conducted for 325 adult participants of the following: 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.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Family Functioning/Financial Literacy Education

a. Activity – Making financial decisions has grown increasingly more complex with an ever-increasing array of options. Investment and retirement savings vehicles increase in complexity as do health care plans and a variety of consumer goods and services. There is a trend toward shifting more financial responsibility for health care insurance and retirement planning to consumers. With an increasing lifespan and medical technology, more savings are required to pay for later life. At the other end of the lifespan, many teens are earning a paycheck and are making financial decisions.

b. Impact –Participants in the Clifford Beers Training indicated that they would use information from the training with their clients and found the debt management information especially beneficial. By observation, 82% (50) of participants have completed this activity. These goals frequently relate to their job search or finding a place to live. Their individual goals then are used to encourage them to identify actions they will take to improve their financial situation. About

90% can identify at least one change they would be willing to make. Two thirds of the participants are concerned about their credit history and how it might negatively affect them.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Family Functioning/Mental Health and Addiction Services Parenting People Project

a. Activity – A growing number of state-funded substance abuse treatment programs for women are admitting mothers and their preschool age children into their year long residential treatment facilities. While the staff at these treatment programs has had extensive training and education in alcohol and substance abuse treatment, individual and group counseling, trauma response, and recovery issues, few, if any, of them have had any formal training in parenting or child development. The Director of Women’s Services at DMHAS acted upon these findings by entering into a service agreement with the Extension’s and School of Family Studies’ Center for Applied Research (CAR) for the development of a train-the-trainer program of staff development which would prepare staff to address parenting and family life issues as a routine part of each woman’s plan for treatment and recovery. A 3 phase, year-long program of training was designed to address the staff training needs around issues pertaining to parenting, child development, and family life skills.

b. Impact – Analysis of the data collected from the Parenting People participants clearly suggest that the approach taken to train the staff at the participating residential treatment programs worked. The participants (residential directors and line staff at 4 DMHAS funded treatment programs) reported statistically significant changes in their level of knowledge for several parenting techniques. Similarly, statistically significant changes were reported in terms of the participants’ ability to utilize parenting skills and processes. DMHAS has agreed to fund the expansion of the Parenting People training program to include all residential treatment programs funded by the state (n = 16) based upon Phase 2 data results which have been supported by DMHAS staff observations and training participants’ self-reports.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Family Functioning/Center for Applied Research

a. Activity –Activities included providing consultation to others engaged in evaluation projects; conducting community needs assessments, evaluation studies, or other types of research projects for state or community programs; offering training seminars, public presentations, or disseminating educational materials on topics related to children, youth, adults, or families.

b. Impact –Based upon the success of the state evaluations and presentations offered through the Center for Applied Research, and the wide appeal of a handbook produced by the Center, the Governor’s Prevention Council commissioned the Center for Applied Research to develop a second edition of *Assessing Outcomes in Youth Programs: A Practical Handbook*.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Family Functioning/Healthy Environments for Children

a. Activity – It is now widely accepted that children have special vulnerabilities to environmental exposures. As evidence of this concern, the National Children’s Study is currently under way. While much remains to be learned, research has already demonstrated clear issues that can and must be addressed immediately. The Healthy Environments for Children (HEC) Initiative is helping to tackle some of the well-understood issues—such as lead poisoning—and is addressing emerging issues—such as the environmental aspects of asthma. HEC’s focus is on designing, developing, conducting, and evaluating primary prevention programs that promote the physical and psychological health of children. Working in partnership with federal, state, local, and private agencies and organizations, HEC supports interventions that can be implemented at home, at school, and in other community settings. Distribution of the video entitled *The Five Keys to Lead Safety* was begun. This video was designed to raise lead awareness and to teach lead-safe work practices to volunteers who are working in painting and housing rehabilitation projects (such as Rebuilding Together and Habitat for Humanity). This video has been distributed to volunteer groups nationwide by the U.S. Department of Housing and Urban Development. It has also been used to train paint store employees and homeowners.

b. Impact – *How Mother Bear Taught the Children about Lead*, a lead-poisoning prevention curriculum for Native American children in grades 3-5 completed in June 2003 has been presented at national conferences and distributed to Native Americans nationwide by the Penobscot Indian Nation, which sponsored its publication. The National Institute of Environmental Health Sciences (part of the National Institutes of Health) is currently adapting this curriculum for its children’s web site. This is the second HEC team publication to be adapted for this site. HEC has been asked by the EPA and the Penobscot Indian Nation to submit a proposal to develop an animated version of this curriculum. As a result of the national promotion of this curriculum, HEC has been asked by EPA region 2 and the Seneca and Mohawk Indian nations to submit a proposal to produce a similar children’s publication on water conservation.

Based upon the role HEC plays in various regional, state and local capacities two staff members are serving on the Statewide Task Force to End Childhood Lead Poisoning and one staff member has been asked to serve as a member of the oversight and evaluation committee of the CT Lead Action for Medicaid Primary Prevention (LAMPP) grant.

As a result of the publication of the *First Steps in Preventing Childhood Lead Poisoning: The Role of Childcare Practitioners* article published in *Young Children*, 15 individuals serving on in-state or regional coalitions for early childhood education and health along with five national leaders involved in early childhood education have contacted the authors to praise the excellence of this article.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact – State

Key Theme – Family Functioning/Parenting Apart Workshops

a. Activity – With one out of two marriages ending in divorce, Family Courts have implemented court-connected educational programs for divorcing parents. 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. When children receive support and validation from caring adults they can recover more successfully from the trauma of divorce.

b. Impact – 131 parents participated in the court ordered program in this time period and 80% of parents improved their parenting skills through participation in six hours of court ordered parenting classes.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Family Functioning/Parent Education

a. Activity – Parenting People is a parent education curriculum developed by the University of Connecticut Cooperative Extension System for use by community agencies. It is being adopted or adapted by 17 states. In the Danbury area, a coalition of family and child service agencies, ParentNet, is coordinating parenting education. This coalition determined that parent education was a priority and those parents, especially those mandated by the courts to attend parent education classes should have timely, year round access to parent education. Prior to this initiative, parents typically waited months to attend a class. This delay often had a negative impact on parent child reunification.

b. Impact – ParentNet studied available curricula and selected Parenting People because it was comprehensive, research based, flexible and easy to use. During this time period 12 ten week sessions were conducted reaching about 120 parents. Approximately 80 % of participating parents are Connecticut Department of Children and Family (DCF) referred. Classes are conducted in English, Spanish and Portuguese reflecting the diversity of the population. According to program evaluations and informal feedback from agency staff working with these parents:

- 85% of parents demonstrated improved parenting skills as reported by family caseworker
- 94% of the respondents reported that their parenting skills improved substantially as a result of attending the programs
- 100% of the respondents reported that they were using or planned to use new skills as a result of attending the program. Skills include: less yelling and hitting, more talking, being more moderate, being more consistent, developing and using rules and routines, having age appropriate expectations for children etc.
- 80% of parents indicate interest in ongoing parent support groups. Support groups have been implemented in the community as a result of parental interest.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme – Family Functioning/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 of this project is provide transferable techniques to youth that will teach children, parents or grandparents how to use and access technology. Youth will receive training that will help them develop and strengthen life skills for academic and workforce preparedness through this After School Computer Program. Youth and adults will access resources to learn technology for necessary skills to become contributory individuals in the quickly emerging technological society (job skills, resume writing, research, etc). Twelve youth were trained as technology facilitators. Fifty-three youth and adults have been trained as secondary audience for technology.

b. Impact –In collaboration with the Dixwell Newhallville Mental Health Clinic an Internet café was completed. Teen facilitators have been teaching adults in the café. The Executive Director is so pleased with program, he is applying for additional funding to continue the NCP facilitators at his agency. There was a proposal by a collaborating agency to expand the program during the summer after camp hours (everyday) and afternoons during the school year. There is increasing adult interest in the computer program as evidenced by more phone inquiries. The agency director also expressed interest in training adults who are completing incarceration as a life skill for re-entering the job market. Another agency wants to offer a weeklong summer computer camp and will be exploring funding opportunities to support it.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - Family Functioning/Financial Management

a. Activity – Connecticut ranks number one nationally in per capita income, with the gap between its highest and lowest income families increasing faster than most other states. The average income of Connecticut's families that earn the most is 9.4 times higher than the average income of the lowest income families. Connecticut's cost of living is 20% higher than the national average and has the highest tax rate in the nation. Social service agency staffs 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; The Family Counseling Center, Employment Success Program; Municipal Social Workers; 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.

b. Impact - Managing Your Money program series at the Danbury Regional Commission on Child Care, Rights and Abuse reported that 80% of the 111 clients who participated in this program achieved their goals, including improved money management skills. 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. Social service agency staff in post-program evaluations reported that they felt more confident advising clients about money management. Evaluations also indicated that: 100% plan to use the skills learned in their work; 99% will distribute one or more worksheets to their clientele; 99% will share workshop information with their co-workers; and 58% plan to present a money management program at their agency. Agency staff indicated that they have changed their own personal practices, improving their money management skills after participating in the training.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - University of Connecticut Income Tax School

a. Activity - To provide Connecticut tax practitioners with high quality, up-to-date tax law information. Tax accountants, preparers, attorneys and enrolled agents are the target audience. This program is conducted in cooperation with the Internal Revenue Service, Connecticut Department of Revenue Services, and private attorneys and accountants. An annual Income Tax School is held in Meriden, Connecticut. The school is a two-day event. Participants receive up to 16 hours of CPE credits from the University of Connecticut.

b. Impact - For twelve 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. The school is a primary source of tax information for many Connecticut practitioners that serve individuals and small business clients in the state. Sample quotes from recent participants: *The seminars and speakers were really tops and the material as before, relevant, up to date and interesting. The conference was well organized and efficient flow of people and food for such a large group. 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 - 4-H Youth Development/Leadership Education

a. Activity – The Cooperative Extension 4-H Youth Development Program provides experiential learning opportunities for youth by caring adults in all life skills areas including leadership, citizenship and personal development. Waterbury “Opening Doors” is a collaborative effort between the University of Connecticut Cooperative Extension System Youth Development Program, Waterbury Youth Services, Inc. and Waterbury Regional Workforce. 16 teens of limited resources are trained and supervised in leadership education, workforce preparation and animal

science. In addition to participating in workshops on public presentation, conflict management, employability, team building and teaching skills, teens participate in community service activities and teach youth in other community agencies about animal science. During the past year, they conducted workshops with about 200 younger children.

b. Impact – Waterbury “Opening Doors” teens have demonstrated their increased knowledge and have shown marked improvement in their ability to work with younger children, their peers and adults and coping with daily crisis in their personal lives. They have also shown improved employability skills and school attendance and grades. Two graduates from the program last summer have successfully completed a year at local community colleges and three more youth will be graduating in June. All three are heading off to a post-secondary experience. Two of the participants attended the annual 2004 CYFAR conference as presenters. They prepared a power point presentation and taught conference attendees about the animal science curriculum used by the program. Participants have 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. Youth take an active role in performing community service above the requirements for the program. Most have reported improved confidence in their speaking ability as they continue to teach animal science to other community agencies.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Afterschool/Out-of School/Child Care

a. Activity – An estimated 610,000 youth age 5-17 years old reside in Connecticut. Of these, 1/3 or 185,000 youths are involved in supervised, safe, enriching after school programs. 91% of parents and school personnel surveyed believe it is “very important” that before and after school activities be available at their schools. However, 41 % of elementary schools do not offer programs. Extension is an excellent resource for child care professionals who seek research, information on best practices, and curricula appropriate for out-of-school youth. Nationally and statewide, there is an increased focus on developing and maintaining high quality out-of-school programs that will serve greater numbers of youth. Training was offered to professionals both nationally and in-state which highlighted Extension resources.

b. Impact – Data collected indicates Extension professionals found the Extension CYFERnet School Age web site to be beneficial to their work as educators. ECI and CSACA surveys from the CSACA Conference revealed that 88% of the participants rated the workshop between good and excellent, 92% considered the content to be relevant and useful to their child care programs, 88% would recommend the program to other child care professionals and 14 participants are interested in having staff and parents receiving training in the 4-H Afterschool Curriculum. As a result of poster session at Statewide School Age Summit, twelve professionals are interested in receiving training on the 4-H Afterschool Curriculum. This includes the one legislator who has been successful in securing funding this session for after school in three Connecticut towns.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Youth Development/State 4-H Marine Science Day

a. Activity – Although Connecticut’s southern counties border Long Island Sound, many 4-H’ers have little experience with that environment. Since the marine environment is part of the state’s heritage and a state treasure and since many decisions and practices of residents and homeowners affect it, it is important that youth gain an understanding and appreciation for the marine environment. The State 4-H Marine Science Day is held in late June each year, on the University of Connecticut Avery Point campus in Groton and out in Long Island Sound. One hundred 4-H youth and 4-H leaders participate. The 2 ½ hour experience onboard Project Oceanology’s research and education vessel Envirolab”, based in Groton, is the focal point for the program. Onboard Envirolab, the 4-H’ers use the vessel’s educational instruments to measure the temperature, salinity, oxygen level, clarity and density of the ocean water at different depths and chart this with the instructor; examine a core sample of the sea bottom; learn about navigation and about the history of Long Island Sound.

b. Impact –Evaluations show that participants increase their knowledge of and appreciation for the marine environment. They are more aware of pollution problems and are more focused on improving water quality. As future voting citizens, homeowners and decision makers, this background is essential to the health of Long Island Sound and other bodies of water. Many 4-H’ers report seeing and handling several marine species for the first time while on the Project Oceanology vessel. They are intrigued with using the scientific equipment. Evaluation comments from the 4-H participants included: *I learned how special Long Island Sound is – where the fresh water and salt water mix; I learned how to come up with a deduction and answer and how much effort and time it takes to collect data; I learned that Long Island Sound is an estuary; I learned that phytoplankton produces most of the oxygen on Earth; I learned that most things start out as plankton; and I learned that plants make oxygen for the animals, which live in the water.*

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Youth Development/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. 120 registered 4-H Club volunteer leaders provided the local officer leadership opportunities to teens through their club programs

b. Impact – 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), and two teens serve as members of the state teen ambassador group. Another teen is a full board member of the Litchfield County 4-H Foundation, the first to serve in this capacity. Two teens received training in youth and adult partnerships and are now part of

the CT teams that will help other groups work in youth/adult partnerships. 20 teens provide leadership for the 4-H program, as junior leaders. Leadership skills learned and practiced by 15 teens have helped them to plan, organize and run the Litchfield County 4-H Fair, and increased their abilities to work in leadership roles in their local 4-H clubs. 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. The effectiveness of the 4-H program to reach groups of children is enhanced through the 4-H junior leadership concept.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Youth Development/4-H LIFT

a. Activity – 4-H LIFT is an afterschool and summer program for students in the Windham Middle School, Willimantic, CT. Many of the students enrolled in Windham Middle School are from single parent, low-income families, living in neighborhoods characterized by drugs and related criminal activity. Many go home after school to empty houses with no supervision. LIFT provides a free, safe place that includes transportation home for the students. Enrichment activities that allow students to interact with each other and practice social skills with a goal to increase each student's success in school, through better grades, attendance, and improved attitudes towards school. 74% of LIFT students are at or below poverty level, and 55% of the students have identified special needs. LIFT is an inclusive program that welcomes students and staff who have special needs, be it physical, emotional, or developmental.

b. Impact LIFT students have better attitudes towards school, greater self-control, and increased ability in conflict resolution. LIFT students have better grades, and lower incidences of discipline (85% fewer). LIFT students average a 98.7% attendance rate for school, 5.2% higher than the school average.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Youth Development/Food Safety

a. Activity – The State 4-H Dairy Advisory Committee, comprised of volunteer leaders and teens, identified a need for additional opportunities for statewide team building activities and project skill development for 4-H youth in the dairy project. These opportunities would provide youth with a solid foundation for working together at other events including the Eastern States Exposition, and Regional and National Quiz Bowl and Judging Events. A 4-H Dairy Clinic was held where 135 4-H'ers ages 7-18 from Connecticut, Rhode Island and Massachusetts participated in five workshops presented by the University of Connecticut's Animal Science professors.

b. Impact –One Hundred Eighteen of the participants (87%) were able to answer questions about BSE (Mad Cow Disease) that they were unable to answer prior to the workshop. Seventy three

percent (73%) reported that they would now be better able to answer questions concerning the safety of the beef in the food chain. 4-H youth also showed an increase in ability in figuring feed costs of their animals on their 4-H Record Sheets by using actual examples following the clinic. Fifty eight percent (58%) were able to name all of the nutrients that their animals needed. A 60% increase in participation in judging activities was noted over the previous two years.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Youth Development/Math Common Core Curriculum

a. Activity – The 4-H Center at Auer Farm provides quality educational experiences to youth, predominately in the Greater Hartford area. Connecticut has a new framework for science curriculum for pre-k through high school. In 2008 Connecticut will expect that all school children pass a State Mastery Test in science. The 4-H Center provides 30 different educational curricula that correspondingly meet the objectives taught by grade level as prescribed in the CT Science Framework and when appropriate, combine lessons that have their base in the Common Core for math. Programs selected by the Hartford and Bloomfield school systems correspond 100% to the CT Framework and Common Core. The initial classes were Ecosystems and Biotechnology provided to 6th and 7th grade classes at Bloomfield Schools.

b. Impact – The grade level based curricula address the learning objectives in math and the CT Science Framework and the 4-H Center at Auer Farm is now recognized as a credible education resource to the students of Connecticut. The Center has been asked to be included by other groups on proposals as the education component for both students and teachers such as the SARE Grant proposal 2004, CREC Proposal to State Department of Education for a Teacher Summer Institute, and funding discussions with the State Science Center.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Youth Development/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.

b. Impact – A group of 20 representatives from all four 4-H camp foundations has demonstrated that they have learned skills to work together and network by attending meetings to plan a comprehensive staff training conference. They have increased their 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. Other foundation members have also learned these skills. They were also mailed educational material at least monthly. 4009 youth attended a CT 4-H resident camp for at least a week last summer. An extensive survey was conducted with parents and campers. It was reported by 97.3% of camper parents that their child's camp experience was excellent or good. Several stated that camp made a positive impact on their child's life.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Youth Development/Leadership Education

a. Activity – Involvement in an informal program of citizenship education provides youth with challenges, experiences, support and help which foster a positive attitude toward current and future citizen and community responsibilities. CES developed a process, standards and opportunities in which youth and leaders recognize the value and importance of community service.

b. Impact – 50 youth and four 4-H groups received recognition for their 8 community service projects. Over 800 hours were contributed by local 4-Hers to better their communities. 3 local 4-H youth entrepreneur groups made cash donations (over \$350) to local charities as the youth learned the ethics of a responsible business. Over 500 booklets on fire safety and barn management for horse owners have been distributed nationally. The development of this booklet was a community service project of 3 teens.

Fairfield County conducted a community service project during Fallback into 4-H Festival where they collected gently used books and new mittens and gloves for a local women's shelter.

c. Source of Federal Funds – Smith Lever

d. Scope of Impact - State

Key Theme - 4-H Youth Development/Workforce Preparation

a. Activity – Involvement in workforce preparation projects provide youth with challenges, experiences, support and help which 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. CES/4-H offers youth entrepreneurship programs and works to integrate workforce preparation skills into existing programs and activities. The marketing and distribution of the "R.I.S.E. (Respect and Integrity Through Skills and Education): A Workforce Readiness Program for Youth" is a focus. CT 4-H is contributing to the national efforts to develop curriculum in work force preparation.

b. Impact – 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 (90%), encouraged them to attend school (97%), and gave them self

confidence (93%). By participating in this program, individual youths earned from \$2-\$287. 86 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. Impacts reported by staff included improved skills in teamwork, problem solving, money management, decision making, personal responsibility and public speaking and self confidence.

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. The annual key event has been the Leaders' Forum. For a variety of reasons, this event was postponed from November 2004 until March 2005. The past four events have focused on leaders of non-private organizations with whom Extension works. The intent for the 2005 Leaders' Forum is to focus more on the role of the College in assisting towns. The target audience will be volunteers who serve on town boards and commissions as well as town council members. Extension works in all 169 towns in the state and have a relationship with this audience but have never specifically focused on assessing their needs. Other efforts conducted within, as well as outside of the College, include the State of Connecticut Voices of Children report, needs and trends as identified within the Extension Bulletin newsletter, the Connecticut Food Policy Council's report on food insecurity in the state, and a recent assessment of the needs of non-English speaking farm employees.

Focus on Evaluation

As a result of the 2003 Department of Extension program review conducted by CSREES, action has occurred related to the identifying of needs to increase impact data. Dr. Trish Manfredi, retired University of Massachusetts Extension administrator, was hired to conduct training for Extension faculty both in centers as well as in academic departments. As a result, an increase in formal program planning for expected outcomes that also includes the planning for stakeholder input has occurred.

One example is the work of the Green Valley Institute, a program designed to educate land owners as well as town officials on the sustainable use of the natural resource base in the Quinebaugh-Shetucket National Heritage Corridor. The needs assessment is conducted every five years of municipal officials in the Corridor. A three-wave mailing to a list of 1400 is planned. The partnership to conduct the needs assessment includes work by a faculty member at Central Connecticut State University.

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. for the first time as well as planned and conducted their the first Legislative Reception at the Capital. During 2004, the Extension Partners group initiated conversation on conducting a needs assessment for statewide programming. The last time this occurred was in 1999. Councils have expressed enthusiasm to work in support of the University. Dr. Trish Manfredi has developed a timeline and process to be conducted during the 2005 calendar year.

Connecticut Voices for Children Survey

Published in September 2004, this survey serves as a needs assessment for the family and community development team. Findings include a shift to greater involvement of women in the workforce dictating the need for the workplace to adopt more “family-friendly” policies and to assist with child care issues. The state now ranks 5th highest in the proportion of the labor force having at least a Bachelor’s degree or higher. There has been a striking decline in the labor force participation in the state of less well-educated workers. The proportion of workers in the state over the age of 55 is the second highest in the nation. The proportion of workers who are 16-24 years is the second lowest in the nation. The need exists for a reduced out-migration of youthful workers, an increased in-migration of younger workers and/or an increase in the birthrate to reverse these trends.

Extension Bulletin

Each month the associate director publishes a newsletter to update the extension faculty on programs, grants and conferences. An important component of that newsletter is the inclusion of recent trend data and needs identified by clientele during the course of conversations over the past month. Topics related to needs assessment have included New England immigrants and their needs, sudden oak death and the related forestry program needs, identifying program needs from current literature such as *Begging for Change* and *High Noon*. Results of the Department of Extension program review and the related implications were also discussed.

Food Insecurity in Connecticut

The Connecticut Food Policy Council commissioned a study conducted by a faculty member in the Department of Agricultural and Resource Economics on food insecurity. Variables of what creates food insecurity were measured for each of the 169 towns in the state using existing data sources. This needs assessment for a very fragile group in a state of such wealth is critical for the development of policy in the state. This work is just being complete and findings will be shared with the state legislators as well as town officials.

Survey of Needs for Non-English Speaking Farm Employees

A team of faculty both in the Department of Plant Science and the Department of Extension spent a year and a half designing and conducting a two-prong study. The first prong identified the needs of production agriculture owners and managers related to their non-English speaking employees. This is a more sizable population in the state than expected with very diverse backgrounds and needs. One surprise finding was related to the number of languages spoken by employees. The assumption had been that the majority spoke Spanish and that proved not to be the case. Needs identified by owners included materials in languages appropriate for their employees related to pesticide use and health and safety issues.

A second survey focused on the employees themselves. This is a much more difficult group to reach as many may not be in the country legally and therefore did not wish to speak to the researchers. This survey is not yet complete but having interviewed 250 so far the number one need proved to be the need for education in their own language conducted on the farm. There exists a need to interview workers in the industries of golf course management, arborists, and tobacco workers to obtain a more complete picture of the needs.

Education efforts that have been identified include the need for a bilingual illustrated manual including technical terms, to teach English at the work sites, for bilingual health and safety posters, to train the crew leaders who usually are bilingual and to consider educational spots on Spanish radio. This has been an integrated research and extension integrated effort just in the beginning stages. An advisory committee will be considered to focus on the next steps.

These are just a few examples of the diversity of stakeholder input sought for the Connecticut research and extension programs.

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). While the department of extension consisting of the eight extension centers was reviewed in 2003, unfortunately the final report from the team leader did not arrive until mid-2004. 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, a process to be completed in 2005.

The five year plan of work components included: planning by all faculty and staff on three levels, a university wide review of the plan, a review by the peer institutions, and a review by the 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 achieved in a number of areas. Particular note is made of:

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.

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 bronchitis infection control. 3.5 million birds were protected from IBVD spread.

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. Particular note is made of:

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 956 EFNEP homemakers representing 2,622 family members. 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 works 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.

A number of projects were implemented in the area of *Greater Harmony Between Agriculture and the Environment* (Goal 4). Considerable success was achieved in a number of areas. Particular note is made of:

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 Quinnebaug-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 subdivisions.

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 35 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 paired watershed residential water quality project saw numerous changed landscape management practices and significant reductions in bacteria and nitrate-nitrogen leaving the targeted watershed.

Efforts in the area of *Enhanced Economic Opportunity and Quality of Life for Americans* (Goal 5) were many and varied. Considerable success was achieved in a number of areas. Particular note is made of:

Parenting education programs were designed to enhance healthy family functioning through positive parent-child interactions, communications and discipline techniques. Of the 120 parents who participated, all felt better about their parenting practices, with 94% 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.

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 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 program adoptions.

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.

(W-171) Germ Cell and Embryo Development and Manipulation for the Improvement of Livestock, Yang X., Riesen, J.

The efficiency of fusion for bovine nuclear transfer was improved by 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 >19,500 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 causes 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 modern 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. The overall goal of this project is to develop an effective, safe broad spectrum vaccine for the prevention 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.

New Projects include:

(W-1133) Benefits and Costs of Natural Resources Policies Affecting Public and Private Lands,
R. Johnston

The overall goal of the project is to improve the policy process which influences agricultural and natural land preservation. To accomplish this goal, the project seeks to better model public preferences for farm and forest preservation, including preferences for the growth control and public access services provided by preservation activities. Through this increased knowledge of public preferences, this project will assist policymakers in the design of farm and forest preservation policies that better serve the public interest, and provide valued amenities in the most cost-effective manner. Primary impacts are expected in two areas. First, the project is expected to improve understanding of the relationship between preferences and values for conservation in local communities as compared to the preferences and values of a larger regional or statewide population. This portion of the project may also uncover significant points at which the approaches to environmental valuation by economists could be better informed by attention to insights from landscape aesthetics. Second, the project is expected to improve understanding of the relationship between attributes of the policy process through which farm and forest is preserved, and the ultimate improvement in social welfare that is derived from farm and forest preservation activities.

(W-188) Characterization of Flow and Transport Processes in Soils at Different Scales

Direct observations were made in support of modeling arrangement and evolution of clay fabric mixed with other textural constituents representing swelling soils. The role of soil physical properties and water distribution characteristics on soil microbial behavior (activity, distribution and community composition) was evaluated. New methods to measure specific surface area, matric potential, and water retention will improve abilities to manage spatially variable soil and water resources efficiently and profitably. Known variation in soil water retention measurements will help identify inherent limitations and establish realistic measurement goals. Characterizing soil physical impacts on soil microbial activities will enhance productivity, bioremediation, and other soil uses.

(W-1001) Population Change in Rural Communities

The multi-state research group on Population Change and Rural Communities continues to analyze the varying nature of demography and demography related issues in rural areas of the US. This past year the group put the finishing touches on a new edited volume on rural population in the 21st century (book edited by David Brown and William Kandell). The project remains an ongoing venture, but the completion of the book on rural population will provide a very comprehensive narrative on the nature of demographic processes into the 21st century. This information will be useful to any scholar of policymaker interested in the socioeconomic dynamics of rural America.

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: 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	6,207
<i>Food & Food Safety</i>	2,675	2,992	2,843	2,843	3,323
<i>Natural Resources</i>	14,176	15,464	16,194	16,194	16,924
<i>Family, Youth & Community</i>	24,131	47,826	49,660	49,660	52,811
<i>Dairy & Livestock</i>	395	0	0	0	3,874
<i>Sustainable Agriculture</i>	2,732	1,461	1,695	1,271	1,320
<u>Horticulture</u>	<u>301</u>	<u>336</u>	<u>357</u>	<u>357</u>	<u>381</u>
Total	55,640	82,794	83,166	76,567*	84,840

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



 Director

 4/1/05
 Date

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.

- 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 bronchitis 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 35 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. Expansion of activities in this area was accomplished through a regionally-funded Water Quality 406 project for New England.
- 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.


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Check one: **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
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
<i>Total</i>	<u>258,111</u>	<u>354,081</u>	<u>354,081</u>	<u>350,000</u>	<u>354,081</u>



Director

4/1/05
Date



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).

*An Equal Opportunity Employer
and Program Provider*

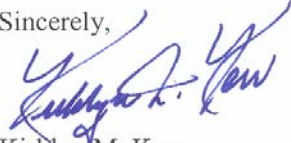
1376 Storrs Road Unit 4066
Storrs, Connecticut 06269-4066

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

"The University of Connecticut and the U.S. Department of Agriculture cooperating"

Please notify us should you need additional information.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kirklyn M. Kerr". The signature is fluid and cursive, with a large initial "K" and "M".

Kirklyn M. Kerr
Dean and Director

Cc: Sam Burnett
Nancy H. Bull
Ian Hart

Integrated Activities (Hatch) – 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 bronchitis 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.
- Nutrient management plan studies aimed at improving the management of nutrients demonstrated improvement in N and P applications by the farmers, with the percentage of fields where excess manure N was applied decreased from 44% to 23%. Similar results were found for other parameters.
- Geospatial technology research and education programs – designed to increase awareness of geospatial technologies and their applications to contemporary natural resource and environmental problems resulted in the Connecticut DEP, The Nature Conservancy and Wesleyan University actively investigating the acquisition and use of such imagery for ongoing wetlands restoration and management.
- The College's Center for Land Use Education and Research (CLEAR), which is focused on land use and land cover as a research topic, and land use decision makers as an outreach audience, derived a series of statewide geo-spatial informational data products spanning a 17 year period. (<http://www.clear.uconn.edu/projects/landscape/index.htm>). This dataset is the most consistent, longest-record of satellite-derived land cover

information for any state in the country. The project's report - *Connecticut's Changing Landscape* -received a lot of media attention, for example, *Satellite Pinpoints State's Sprawl* (Hartford Courant, January 4, 2004), UConn maps state's development since '85 (Associated Press, January 4, 2004); *Sprawl: A Bird's-Eye View* (Hartford Courant, March 21, 2004), and *Maps Tell Sprawl Story Building into Oblivion: Current Development Patterns Could Results in a State of Insignificance* (Connecticut Life, April 2004).

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

Actual Expenditures

<i>Title of Planned Program/Activity</i>	<i>FY 2000</i>	<i>FY 2001</i>	<i>FY 2002</i>	<i>FY 2003</i>	<i>FY 2004</i>
<i>Food & Food Safety</i>	23,897	27,461	27,462	18,299	78,165
<i>Natural Resources</i>		87,919	95,320	99,346	100,468
<i>Dairy & Livestock</i>	51,274	53,942		14,149	15,859
<i>Sustainable Agriculture</i>	191,425	162,488	186,829	195,270	140,121
<i>Horticulture</i>	31,666	35,281	35,281	37,450	38,112
<i>Publications</i>	79,738	89,478	99,980	104,356	63,108
<i>Economic Viability</i>	23,622	24,244	23,985	23,985	24,985
<i>Total</i>	489,541	488,314	487,032	495,687	494,017

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



 Director

 4/1/05
 Date

Integrated Activities (Smith-Lever) – Brief Descriptions

Integrated research and Extension activities as related to Smith-Lever funds evolved from an integrated program approach that 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.

- 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 evolve 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.
- 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 bronchitis infection control. 3.5 million birds were protected from IBVD spread.
- The viability and financial health of Connecticut agricultural producers through crop insurance and risk management education resulted in significantly increased participation in crop insurance programs by Connecticut producers.
- 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.
- The Expanded Food and Nutrition Education Program (EFNEP) provided community outreach and education to 956 EFNEP homemakers representing 2,622 family members. 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 works 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.
- 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 Quinnebaug-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 subdivisions.
- The nationally acclaimed NEMO program (Nonpoint Education for Municipal Officials) 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 paired watershed residential water quality project saw numerous changed landscape management practices and significant reductions in bacteria and nitrate-nitrogen leaving the targeted watershed.