2007 University of New Hampshire Research Annual Report

Status: Accepted
Date Accepted: 05/30/08

2007 University of New Hampshire Research Annual Report

I. Report Overview

1. Executive Summary

The New Hampshire Agricultural Experiment Station (NH-AES) resides within the University of New Hampshire College of Life Sciences and Agriculture. It has the responsibility for Hatch, McIntire Stennis, Animal Health, and Multi State Research Programs. This Plan of Work does not include New Hampshire Cooperative Extension, which is a separate administrative unit in New Hampshire. However, there is effective coordination of appropriate programs between the two units. Through the COLSA Agriculture Strategic Planning Committee and the NH-AES Advisory Committee, we are working to facilitate constituent input, to focus our research on priority issues and to improve our delivery of research findings to end users. The goal of our planned programs is to provide both basic and applied research to support increased knowledge to address state and regional agricultural issues, and to improve production, marketing and processing of regional agricultural products. The New Hampshire AES has established as an outcome indicator increasing the effectiveness of basic and applied projects related to New Hampshire (NH) agricultural needs. Additionally, we use the increase in agricultural production in New Hampshire and income growth to New Hampshire farm operations as indicators. Based on the most recent data available from the USDA's New England Agricultural Statistics Service, the number of NH farms remained stable at 3400 between 2003 and 2006 compared to 2800 farms in 1995. In 2006, total land in acres was 450,000 with the average size farm of 132 acres compared to the average size farm in 1996 of 145 acres. Between 2003 and 2007, the agricultural sector contribution to the State's Economy increased from $195 to $ 554 million in direct sales of agricultural and other horticulture products and services. The largest segment is ornamental horticulture, which accounts for $381 million. We continue our philosophy that the mission of the Agricultural Experiment Station is greater than solely enhancing production agriculture and thus support basic and applied sciences that help position NH to 1) develop new agricultural products and jobs, 2) augment farm based and farm related industry, 3) provide opportunities for non-traditional and sustainable farming endeavors such as the Organic Dairy, and 4) create opportunities for farm and rural community development. Each of these areas contributes to the development of a highly competitive and sustainable agricultural system for local, regional and global markets. The NH Agricultural Experiment Station supports the following basic and applied projects to create technology and research for the benefit of the state, region and nation. We believe these projects provided valuable results, excellent return on the investment of AES funds, and a strategic position for the NH AES to successfully achieve our goals. The research findings, developments and technologies are and will be transferred through various mechanisms including classroom, laboratory and field instruction, stakeholder workshops, publications, presentations at regional, national and international scientific meetings, websites, web portals and genomic data banks, technology transfer, and policy recommendations.

During FY2007, 241 scientists, professionals, graduate students (42) and undergraduate students (89) directly participated in 66 research project supported by the New Hampshire Agricultural Experiment Stations. The projects carried out basic and applied research in 9 Planned Program Areas that included Agriculture and Food Biosecurity (1 project); Agricultural Systems (1 project); Animals and Animal Products (10 projects); Biotechnology & Genomics (9 projects); Economics & Commerce (4 projects); Food, Nutrition & Health (12 projects); Natural Resources & Environment (19 Projects); Pest Management (2 projects); and Plant & Plant Products (8 projects). Overall, the research projects advance the knowledge in a wide variety of fields. This knowledge was disseminated through 55 publications in peer-reviewed scientific journals, 5 books, 13 book chapters 19 MS Theses, 7 PhD Dissertations and 75 other articles and publications. The scientists and graduate students presented results of their research at 164 regional, national and international scientific meeting and workshops.

Total Actual Amount of professional FTEs/SYs for this State

Year:2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	12.6	0.0
Actual	0.0	0.0	21.2	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

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

2. Brief Explanation

The New Hampshire Agricultural Experiment Station has had a peer review process for projects for over sixteen years. The proposal process applies to all Planned Programs and is as follows. Each fall a letter is sent to all faculty in the College of Life Sciences and Agriculture and to Deans of other Colleges announcing a competition for Hatch and McIntire-Stennis funds. Faculty must submit a one page description of their proposed project and subsequently meet with the AES Associate Director to discuss the work. If the proposed project is determined to fit within the guidelines for support from either of these two funds, the faculty member develops a full proposal using the CSREES/USDA format. Faculty must also suggest five potential external (non□UNH) peer reviewers from whom the Associate Director obtains at least two anonymous reviews. After the reviews are returned, the faculty member then has the opportunity to revise the proposal or rebut the reviewer's comments, if they wish. The next step in the process is the project funding priority evaluation performed by an internal panel of five faculty members and the Associate Director. All proposals are reviewed, taking into account the external reviewer's evaluations and the faculty member's response. From this, the committee recommends a priority for submission to USDA for approval. The AES Administrators use this recommendation and their own evaluation to make the final decision as to which projects the Experiment Station will fund. Usually about 80% of the proposals submitted are forwarded to CSREES/USDA for their approval for funding. We will continue this process in New Hampshire. However, we have modified it to utilize the results of stakeholders input. When the call for proposals is sent out each year, it now includes guidelines of the criteria used for internal proposal evaluation. These criteria include, 1) research quality and potential, 2) how the proposal addresses state, regional and stakeholder issues, 3) the quality of the prior year progress report, and 4) output (including publications and grant submissions) and outcomes from the work performed.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public
- Other (Reviews from submitted proposals and manuscripts)

Brief Explanation

The N. H. Agricultural Experiment Station developed an External Advisory Committee, representing a diverse group of stakeholders in 2002.The advisory committee membership was developed with broad input from various people and groups including the NH Commissioner of Agriculture. The group meets once or twice per year to exchange ideas for increasing this station’s effectiveness in serving stakeholders and the citizens of our state and region. The station welcomes stakeholder input through this committee as well as individually. In addition to the interaction with our Advisory Committee, the NH AES sends information about our programs online to citizens of the state and region and requests input on research areas, concerns and needs. The NH AES and the College of Agriculture representatives accompany a prepared display to state and regional fairs and expositions to meet stakeholders, distribute information and obtain input. The NH AES Administrators also meet stakeholders and acquire input by presenting talks at meetings of various grower groups, and the Farm Bureau. The AES Administrators and others working with the NH AES visit state and regional farms, orchards, greenhouses, and extension meetings to assess needs and collect input. The AES Administrators frequently travel to different counties with Extension Specialists to obtain input on integrated needs.The AES and UNH regularly host meetings of other agricultural groups and advisory panels. The AES helps support scientific meetings at UNH in disciplines related to its mission.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Use Surveys
- Other (Cooperative Extension)

Brief Explanation

Although the NH AES and UNH Cooperative Extension have separate administrations, there is a close working relationship between the two.UNHCE has an extremely effective network for communicating with stakeholders in the state and region. A number of UNHCE specialists have faculty appointments in the UNH College of Life Science and Agriculture and are directly involved with the NH AES and AES research.This relationship has been most helpful for identifying stakeholders including farmers, growers, producers, industry groups, etc.NH AES administration and staff regularly attend UNHCE organized stakeholder workshop and conferences.We use these venues plus our NH AES advisory committee to help identify additional stakeholders. Meetings with the NH Department of Agriculture, plus DoA publications like "Who's who in NH Agriculture" have been most helpful.Stakeholders with the University are identified through responses to email announcements and organization of college and university-wide meetings on topics related to the AES mission. NH AES research project investigators identify stakeholders through responses to manuscripts, proposals, publications and presentations at scientific conferences. Graduate and undergraduate stakeholders are identified through course enrollment and participation in student organizations such asOrganic Gardening Club, Dairy Club, AgSci Council and others.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public
- Other (From reviewers of manuscripts and proposals.)

Brief Explanation

Stakeholder input is collected primarily through meetings with stakeholder groups. Each year, the NH AES staff and administration holds meetings for stakeholders or attends meetings organized by Extension or by the stakeholders groups. These group meetings include the NH AES External Advisory Committee, the UNH Organic Dairy Executive Advisory Committee, UNH academic departmental and program meetings, college-wide faculty/staff meetings, university-wide meetings on sustainability, biofuels, agriculture and food production, the NH AES Internal Advisory Committee, various plant growers group meetings, the NH Horticulture Industry Council, the Farm and Forest exhibition, the UNH Greenhouse Open House, the NH Department of Agriculture and the Farm Bureau, and others. Input is collected via listening and taking notes at the meetings and frequently through follow-up emails or conversations with individuals. The NH AES administration and staff regularly attend regional AES meetings (NERA, NEMO, NASULGC) to collect input and develop collaborations with other AESs. Our AES project directors collect stakeholder feedback in response to proposal and manuscript submission and through presentations of their AES project results at regional, national and international meetings.

3. A statement of how the input was considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief Explanation

Stakeholder input is used to identify emerging and continuing issues in the region and to establish priorities for NH AES research programs.These priorities in turn shape our efforts to facilitate collaborations between the NH AES, other state AESs, regional farmers, industry, UNH faculty and staff and Extension. NH AES stakeholder input has influenced the reorganization efforts in the UNH College of Life Sciences and Agriculture and has identified priority areas for new faculty hires in the college.Stakeholder input has influenced decisions on NH AES infrastructure improvements.Internal stakeholder input has helped reshape our budget process and research development procedures. Stakeholder input received by our research project investigators has influenced their research program development and strengthened their ability to attract additional research funding from other sources.

Brief Explanation of what you learned from your Stakeholders

Horticulture is the fasted growing segment of agriculture in NH and the second fastest growing industry in the state. The NH AES and the University of New Hampshire should prioritize research and academic program support for Horticulture.The general public (consumers) in the region are concerned with sustainability and are increasingly interested in locally grown and organic foods. Farmers and growers in the region are very concerned with the increasing cost of energy, animal feed, seed, and other materials and would like the NH AES and the University to address these issues in research and academic programs.Farm business management is an important issue.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	2555970	0

2. Totaled Actual dollars from Planned Programs Inputs

	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	2083081	0
Actual Matching	0	0	2083081	0
Actual All Other	0	0	1343949	0
Total Actual Expended	0	0	5510111	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous years

Carryover	0	0	0	0

V. Planned Program Table of Content

S. NO.	PROGRAM NAME
1	Agricultural & Food Biosecurity
2	Agricultural Systems
3	Animals & Animal Products
4	Biotechnology & Genomics
5	Economics & Commerce
6	Food, Nutrition & Health
7	Natural Resources & Environment
8	Pest Management
9	Plants & Plant Products

Program #1

V(A). Planned Program (Summary)

1. Name of the Planned Program

Agricultural & Food Biosecurity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
136	Conservation of Biological Diversity			50%	
213	Weeds Affecting Plants			50%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	0.1	0.0
Actual	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		**Research**	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

This project, originally scheduled to begin in 2007, was delayed until 2008 because the PI's leave from UNH to work at NSF was extended by one year. Molecular markers will be developed to resolve population structure of Neosiphonia harveyi. These markers will be used to survey new and extant populations of the alga from Long Island through the Gulf of Maine. The genotypes of these populations will be compared to extant populations in Europe and Ireland and to populations in the Sea of Japan to determine whether there have been one or multiple introductions of the invasive alga in the Gulf of Maine, relative to the recent explosive expansion of this alga.

2. Brief description of the target audience

Scientists in the discipline and ecosystem managers.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	50	20	0	50
2007	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer Review Publications

Year	Target	Actual
2007	0	0

Output #2

Output Measure

- Non peer reviewed publications including abstracts

Year	Target	Actual
2007	1	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Members of the general public identifying the algal in new locations along the Gulf of Maine
2	Number of citations from publications

Outcome #1

1. Outcome Measures

Members of the general public identifying the algal in new locations along the Gulf of Maine

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Scientist in the discipline, coastal zone mananger and regulatory agencies, ecologists and conservation groups

What has been done

The project start was delayed until 2008

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
136	Conservation of Biological Diversity

Outcome #2

1. Outcome Measures

Number of citations from publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Scientist in the discipline, coastal zone mananger and regulatory agencies, ecologists and conservation groups

What has been done

The project start was delayed until 2008

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
213	Weeds Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (Project start was delayed until 2008)

Brief Explanation

The PI was on leave from UNH to serve at NSF for a year and the project was scheduled to start in 2007, but the PI's NSF assignment was extended for a year and she was given a one year delay in the project start date.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

Key Items of Evaluation

Program #2

V(A). Planned Program (Summary)

1. Name of the Planned Program

Agricultural Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
131	Alternative Uses of Land			20%	
205	Plant Management Systems			40%	
307	Animal Management Systems			40%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.3	0.0
Actual	0.0	0.0	0.3	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	23471	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	23471	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	54162	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The potential for agricultural sustainability and food self-sufficiency and security in northern and central New England was examined and researched with particular emphasis on pasture and grazing potential and the integration of plant and animal agriculture to acheive agricultural/farm sustainability. Activities included authoring a nine chapter book "Pastures of Plenty: The Future of Food, Agriculture and Environmental Conservation in New England" with a foreward by the NH Commissioner of Agriculture, 30 presentations to diverse groups, incorporation of project information into a number of undergraduate and graduate level courses at UNH and communication and testimony to local and state govenment and representative to the US House and Senate.

2. Brief description of the target audience

Project 1: All farmers and future farmers in New England, especially NH, ME, MA and VT, and indirectly, all consumers of food in the region.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	800	7200	200	0
2007	900	500	100	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer Reviewed Publications

Year	Target	Actual
2007	2	1

Output #2

Output Measure

- Chapters in Books

Year	Target	Actual
2007	2	9

Output #3

Output Measure

- Author of Book or Editor

Year	Target	Actual
2007	1	1

Output #4

Output Measure

- Non-peer reviewed publications including abstracts

Year	Target	Actual
2007	18	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Change in farming practice
2	Change in food consumption patterns
3	Change in public policy
4	Regulators increase knowledge
5	Change in percent of agricultural land
6	Change in on-farm biodiversity
7	Producers use soil testing.
8	Change in support for small-scale farms
9	Change in farmer income

Outcome #1

1. Outcome Measures

Change in farming practice

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Optimum use of pasture and farm lands is of interest to dairy and other farmers who raise livestock, as well as consumers and anyone else interested in food security and agriculture.

What has been done

The book and numerous presentations have educated farmers, town, state and national government agencies in the US and Canada, on the central importance of grazing and pasturing.

Results

The long-term goal is a change in farming practices. Through education, regulation and market pressure this should be accomplished

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
131	Alternative Uses of Land
205	Plant Management Systems

Outcome #2

1. Outcome Measures

Change in food consumption patterns

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Consumers are increasingly interested in high quality, heathful, locally grown food that is produced using sustainable practices.

What has been done

The book, public presentation, and other educational activities has reinforced this desire and pointed out the role of pasture/grazing.

Results

There is documented evidence of increased demand for organically and sustainably produced dairy and other food products.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
131	Alternative Uses of Land
307	Animal Management Systems

Outcome #3

1. Outcome Measures

Change in public policy

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers interested in increased grazing for economics, sustainability, herd health, and product quality because it effects profitability and stewardship. Consumers who are interested in food quality and sustainability.

What has been done

Education of farmers, consumers and government agencies.

Results

This is a long-term outcome, but an awareness the importance of grazing and optimum farm land use is increasingly apparent in state and federal legislation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
205	Plant Management Systems
131	Alternative Uses of Land

Outcome #4

1. Outcome Measures

Regulators increase knowledge

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers and consumers stand to benefit when regulators learn more about optimum farm land and pasture use.

What has been done

Activities include numerous presentations to government agencies, plus the book.

Results

Perhaps the most apparent indication that regulators have become increasing aware of the importance of grazing is that fact that the NH Commissioner of Agriculture wrote the forward to the book.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
205	Plant Management Systems
131	Alternative Uses of Land

Outcome #5

1. Outcome Measures
Change in percent of agricultural land

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers care because it effects their business and the availability and cost of land. Consumers care because it effects the availability of locally produced food.

What has been done

Educate farmers, the public and regulators about the importance of optimum land use and the value of locally produced food.

Results

Unfortunately, once farm land is lost to development it is never regained. With the population of the state increasin, there is pressure for building and development. It will be impossible to maintain the amount of farm land without public pressure and state regulation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

131	Alternative Uses of Land
307	Animal Management Systems

Outcome #6

1. Outcome Measures

Change in on-farm biodiversity

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers,consumers, conservation groups, regulators all have an interest in maintaining on-farm diversity.

What has been done

Education through publication and presentation.

Results

Educational efforts have contributed to an increased awareness of the importance of diversification both in terms of pasture management and in overall farm management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
205	Plant Management Systems
131	Alternative Uses of Land

Outcome #7

1. Outcome Measures

Producers use soil testing.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	500	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This was an outcome measure for a project that completed prior to 2007. It is not relevant this year.

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #8

1. Outcome Measures

Change in support for small-scale farms

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Small scale farmers, state government, consumers

What has been done

Education of stakeholders through presentation and the book.

Results

There is increased interest amoung consumers to buy foods that have been produced locally in a sustainble manner. This has increased the support of local small-scale farms.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
131	Alternative Uses of Land
307	Animal Management Systems

Outcome #9

1. Outcome Measures

Change in farmer income

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers have been facing unprecedented increases in energy and feed costs.

What has been done

Education on the benefits of grazing.

Results

UNH and local dairy farmers have increased and improved grazing programs to offset increasing costs of energy and feed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
131	Alternative Uses of Land
307	Animal Management Systems

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

The short-term goals of the project have been met. The long-term goals will take time. Energy and feed prices have increased faster than anticipated. This has increased farmer interest in grazing and on-farm feed production.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

-

Evaluation Results

Key Items of Evaluation

Program #3

V(A). Planned Program (Summary)

1. Name of the Planned Program

Animals & Animal Products

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals			34%	
302	Nutrient Utilization in Animals			19%	
303	Genetic Improvement of Animals			5%	
304	Animal Genome			2%	
305	Animal Physiological Processes			10%	
306	Environmental Stress in Animals			1%	
307	Animal Management Systems			13%	
308	Improved Animal Products (Before Harvest)			1%	
311	Animal Diseases			13%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals			2%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.5	0.0
Actual	0.0	0.0	3.5	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	364920	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	364920	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	362137	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

During 2007 there were 10 projects in the Animals and Animal Products Planned Program. Three were related to aquaculture and commercially important marine animals. In the first project (1), experiments were completed and procedures were developedto synchronize reproduction in male and female Atlantic cod. The second project (2) examined the molecular basis of leukemia in soft-shelled clams, a commercially important shellfish in the New England region. The third project (3) conducted experiments to optimize feeding methods and out planting success for sea urchin aquaculture. Several projects focused on animal reproduction: Project 4 developed protocols for freezing equine semen that enhance reproductive efficiency. Projects 5 and 6 examined ovarian and environmental influences on embryonic and fetal mortality in ruminants and discovered controllable factors that can improve fertility. Project 7 looked at metabolic relationships in the supply of nutrients in lactating dairy cows. Projects 8 & 9 are part of a multi-state effortto develop management systems that will improve the economic and environmental sustainability of dairy enterprises. Project 8 specifically looked at the effects of feeding supplemental lactoferrin in milk replacer for pre-weaned calves. Project 9 examined combinations of protein sources to produce optimal amino acid balances in feed for lactating dairy cows. Project 10 is part of a multi-state effort to determine the genetic basis for resistance and immunity to avian diseases. The study examined resistance to Rous sarcoma in several genetic lines of chickens.

2. Brief description of the target audience

The target audience for all projects in the program include scientist in the respective disciplines, graduate and undergraduate students though classroom learning and project participation.The target audience for Projects 1, 2 & 3 include businesses, individuals, and agencies involve or interested in marine aquaculture and/or seafood production. Project 4 is of most interest to horse breeders and veterinarians. Projects 5, 6, 7, 8, and 9 will provide direct and indirect benefits to dairy farmers in the state and region and agencies involved in the development and sustainability of dairy farming. Project 10 is of primary interest to the poultry industry and agriculture agencies.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	500	3000	50	25
2007	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	10	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer Reviewed Publications

Year	Target	Actual
2007	7	10

Output #2

Output Measure

- Chapters in books

Year	Target	Actual
2007	0	0

Output #3

Output Measure

- Non peer reviewed publications including abstracts

Year	Target	Actual
2007	5	20

Output #4

Output Measure

- MS Theses and PhD Dissertations

Year	Target	Actual
2007	{No Data Entered}	7

Output #5

Output Measure

- Presentations at local, regional, national and/or international meetings.

Year	Target	Actual
2007	{No Data Entered}	25

Output #6

Output Measure

- Number of University courses in which the project results have been incorporated.

Year	Target	Actual
2007	{No Data Entered}	17

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Number of published Publications
2	Citations
3	Number of submissions of grant proposals
4	Average Impact factor of publications
5	Number of Aquaculturists learning ovulation induction methods
6	Number of youths and adults attending educational classes/workshops
7	Number of specific antibodies generated
8	Number of oral/poster presentations at meetings
9	Number of graduate students trained
10	Number of educational workshops held
11	Number of fishermen who have been trained in the treatment of leukemia

Outcome #1

1. Outcome Measures

Number of published Publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

College and University administration, the scientific community, other funding agencies and proposal reviewers.

What has been done

Results of the projects have been published in eight peer reviewed publications, 6 MS theses, and 1 PhD Dissertation, and numerous symposium abstracts.

Results

In addition to disseminating knowledge to the scientific community and other stakeholders, publications are one indication of research productivity. They enhance the reputation of the NH AES and increase the competitiveness of research proposals for further studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
307	Animal Management Systems
303	Genetic Improvement of Animals
305	Animal Physiological Processes
304	Animal Genome
311	Animal Diseases
306	Environmental Stress in Animals
301	Reproductive Performance of Animals
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
302	Nutrient Utilization in Animals

Outcome #2

1. Outcome Measures

Citations

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	25	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Project PI, AES Administration. It is an indication of the impact of the publications produced by the research program.

What has been done

This information was not requested from PIs in their annual reports, but will be in the future.

Results

None

4. Associated Knowledge Areas

KA Code	Knowledge Area
304	Animal Genome
307	Animal Management Systems
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
303	Genetic Improvement of Animals
308	Improved Animal Products (Before Harvest)
301	Reproductive Performance of Animals
311	Animal Diseases
306	Environmental Stress in Animals
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals

Outcome #3

1. Outcome Measures

Number of submissions of grant proposals

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The project PI, AES, college and university administration, other funding agencies.

What has been done

PI have been engouraged by NH AES and college administration to use AES funding to address immediate issues in agriculture and to conduct research that will increase their ability to attract additional funding for synergistic studies from other sources.

Results

Submission of proposals to competitive programs in the USDA and other funding agencies is a way of leveraging AES formula funds. It has allowed us to find additional resources to solve issues that are central to the mission of the AES.

4. Associated Knowledge Areas

KA Code	Knowledge Area
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
301	Reproductive Performance of Animals
306	Environmental Stress in Animals
304	Animal Genome
302	Nutrient Utilization in Animals

305	Animal Physiological Processes
311	Animal Diseases
303	Genetic Improvement of Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

Outcome #4

1. Outcome Measures

Average Impact factor of publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

PIs, administrators, and proposal reviewers use journal impact factors as in indication of how successfully project results have been disseminated.

What has been done

Project PI's were not asked to provide this information in their annual reports. It is possible it will be requested in future years.

Results

n/a

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
305	Animal Physiological Processes
304	Animal Genome
306	Environmental Stress in Animals
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
311	Animal Diseases
303	Genetic Improvement of Animals

Outcome #5

1. Outcome Measures

Number of Aquaculturists learning ovulation induction methods

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Marine aquaculture industry, especially fish hatcheries.

What has been done

Workshops and training.

Results

The primary supplier of juvenile cod for the northeast marine aquaculture industry as adopted the techniques developed by the project and has increased production and quality of fish supplied to growers

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
308	Improved Animal Products (Before Harvest)
303	Genetic Improvement of Animals
307	Animal Management Systems

Outcome #6

1. Outcome Measures
Number of youths and adults attending educational classes/workshops

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	300

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Students and Professionals who are interested in the animal production, aquaculture, dairy farming, poultry production etc.

What has been done

Research results have been incorporated into existing and new courses at UNH and presented in workshops to professionals

Results

Seventeen courses taught to undergraduates and graduates at UNH include knowledge developed from NH AES projects in this program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals

305	Animal Physiological Processes
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
301	Reproductive Performance of Animals
306	Environmental Stress in Animals
304	Animal Genome
307	Animal Management Systems
311	Animal Diseases
308	Improved Animal Products (Before Harvest)

Outcome #7

1. Outcome Measures

Number of specific antibodies generated

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Not reported for any 2007 Project

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #8

1. Outcome Measures

Number of oral/poster presentations at meetings

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	17

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Scientific communitee

What has been done

Presentations were made at regional, national and international scientific meetings.

Results

An increase in knowledge of scientists in the respective disciplines. Understanding has been advanced. AES researchers have benefitted from feedback from conference attendees.

4. Associated Knowledge Areas

KA Code	Knowledge Area
304	Animal Genome
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
307	Animal Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
303	Genetic Improvement of Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
308	Improved Animal Products (Before Harvest)
311	Animal Diseases

Outcome #9

1. Outcome Measures

Number of graduate students trained

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Graduate students, university department, college and graduate school.

What has been done

Graduate students worked on the AES projects as part of their graduate program requirements.

Results

Seven graduate students working on the AES projects completed their degrees (6 MS and 1 PhD)and became experts in their respective fields and contributed to our knowledge.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
303	Genetic Improvement of Animals
306	Environmental Stress in Animals
311	Animal Diseases
307	Animal Management Systems
304	Animal Genome
308	Improved Animal Products (Before Harvest)
305	Animal Physiological Processes
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
302	Nutrient Utilization in Animals

Outcome #10

1. Outcome Measures

Number of educational workshops held

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Marine aquaculture industry, graduate and other graduate students studying aquaculture.

What has been done

Workshops were held to train professionalsand students in Atlantic cod breeding methods developed during the project

Results

Atlantic cod hatcheries have adopted the techniques presented during the workshops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
301	Reproductive Performance of Animals

Outcome #11

1. Outcome Measures

Number of fishermen who have been trained in the treatment of leukemia

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Fisherman

What has been done

A presentation was made at the Maine Fishermen's forum.

Results

Fishermen have a better understanding of the nature, extent and financial implications of leukemia in soft-shelled clams.

4. Associated Knowledge Areas

KA Code	Knowledge Area
306	Environmental Stress in Animals
305	Animal Physiological Processes
304	Animal Genome
311	Animal Diseases

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought,weather extremes,etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges
- Other (Power failures)

Brief Explanation

Greater than expected increases in the cost of energy and livestock feed have created an incentive to optimize animal production methods. This situation is appreciated by producers, researchers, agencies and consumers.The results of research that can improve productivity are more critical than ever.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #4

V(A). Planned Program (Summary)

1. Name of the Planned Program

Biotechnology & Genomics

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
135	Aquatic and Terrestrial Wildlife			14%	
201	Plant Genome, Genetics, and Genetic Mechanisms			18%	
202	Plant Genetic Resources			2%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			4%	
205	Plant Management Systems			4%	
206	Basic Plant Biology			10%	
215	Biological Control of Pests Affecting Plants			7%	
303	Genetic Improvement of Animals			11%	
304	Animal Genome			16%	
305	Animal Physiological Processes			3%	
502	New and Improved Food Products			2%	
511	New and Improved Non-Food Products and Processes			9%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.0	0.0
Actual	0.0	0.0	4.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	295303	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	295303	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	49894	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

In 2007 the NH AES had nine Biotechnology & Genomics research projects. Project 1 used a genomic approach and to examine bacterial-nematode interaction and identify genetic mechanism that predispose for mutualism or pathogenesis. Project 2developed and applied genomic tools to identify genes responsible for desirable traits in strawberries and mint. Project 3 Used molecular biological techniques to study mRNA degradation in yeast. Project 4 used Arabidopsis as a model system to determine the role of protein phosphatase genes. In Project 5, genetic mapping was used to identify genes underling sex differentiation and skin color of tilapia and to genetically improve tilapia for aquaculture. Project 6 measure charge on beta-lac A & beta-lac B under varying solvent conditions to determine the role of charge in protein functional properties. Project 7 performed experiments to comprehensively investigate the impact of genetic manipulation of a single step in the polyamine pathway in Poplar to determine its effect on other metabolic pathways. Project 8 performed molecular, biochemical and physiological research in sea lamprey; analyze data and screen genomes. Project 9 carried out experiments to determine the mechanism by which Vibrio fisheri regulates it key symbiosis operon. For all projects, presentations were be given at regional, national and/or international meetings and/or manuscripts were submitted to peer reviewed journals. Grant proposals have submitted. Undergraduate students, graduate students and/or postdoctoral fellows were trained through participation in the research projects and/or through incorporation of research findings in classroom instruction. In many cases, presentations were made to various traditional and non-traditional stakeholders.

2. Brief description of the target audience

Target audiences include students in university and K-12 classrooms; graduate and undergraduate students who have been trained through participation in the projects; attendees at regional, national and international symposia; readers of scientific journals, theses and dissertations in which project results have been published; visitors to websites developed by the project PIs and the NH AES;growers, producers and other stakeholders whose businesses will benefit from the investigations.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	3600	4760	255	150
2007	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	5
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	17	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed manuscripts

Year	Target	Actual
2007	23	17

Output #2

Output Measure

- Chapters in Books

Year	Target	Actual
2007	6	0

Output #3

Output Measure

- Author of book or editor

Year	Target	Actual
2007	2	0

Output #4

Output Measure

- Non peer reviewed publications including abstracts

Year	Target	Actual
2007	28	8

Output #5

Output Measure

- Identity and submission of cDNA, ESTs,proteins, genes, RNA to GenBank

Year	Target	Actual
2007	50	71

Output #6

Output Measure

- Websites developed and/or maintained

Year	Target	Actual
2007	{No Data Entered}	4

Output #7

Output Measure

- Total molecular sequence length (Mb)

Year	Target	Actual
2007	{No Data Entered}	0

Output #8

Output Measure

- Total number of direct participants in the project (this does not include audiences)

Year	Target	Actual
2007	{No Data Entered}	36

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Peer Reviewed Publications
2	Public understanding of Microbial opportunists
3	Number of farmers considering biological control
4	Number of Readers of Peer Reviewed Publications
5	Number in audience of class or scientific meeting
6	Number of Graduate students trained in laboratories
7	Number of undergraduate students trained in laboratory; involved in investigations
8	Number of postdoctoral fellows trained
9	Number of users of released DNA sequences, germplasm; ESTs, proteins
10	Change in policy
11	Number of grant submissions
12	Number of meetings/workshops attended

Outcome #1

1. Outcome Measures

Peer Reviewed Publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	25	17

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

College and University administration, the scientific community, other funding agencies and proposal reviewers.

What has been done

Results of the projects have been published in 17 peer reviewed publications, 3 MS theses, and 6 PhD Dissertations, and numerous symposium abstracts.

Results

In addition to disseminating knowledge, publications are an indication of productivity. They enhance the reputation of the NH AES and increase the competitiveness of research proposals for further studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
304	Animal Genome
511	New and Improved Non-Food Products and Processes
202	Plant Genetic Resources
201	Plant Genome, Genetics, and Genetic Mechanisms
305	Animal Physiological Processes
135	Aquatic and Terrestrial Wildlife
205	Plant Management Systems
502	New and Improved Food Products
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
303	Genetic Improvement of Animals
206	Basic Plant Biology

Outcome #2

1. Outcome Measures

Public understanding of Microbial opportunists

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This is primarily of interest to students and other scientists in the discipline, although the ultimate application of the knowledge has a much wider impact.

What has been done

Presentations were given at one local and two international scientific meetings.

Results

The audience developed and increased understanding of associations between hosts, symbionts and pathogens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology
135	Aquatic and Terrestrial Wildlife
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #3

1. Outcome Measures

Number of farmers considering biological control

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers

What has been done

Basic research

Results

Although the results of Project 1 may lead to practical applications, the scope of the project is basic in nature.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

Outcome #4

1. Outcome Measures

Number of Readers of Peer Reviewed Publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	500	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

We have no way of assessing this. It should not have been included as an output or outcome measure.

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
303	Genetic Improvement of Animals
502	New and Improved Food Products
305	Animal Physiological Processes
135	Aquatic and Terrestrial Wildlife
304	Animal Genome
205	Plant Management Systems
511	New and Improved Non-Food Products and Processes
206	Basic Plant Biology
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
215	Biological Control of Pests Affecting Plants

Outcome #5

1. Outcome Measures
Number in audience of class or scientific meeting

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	6000	4200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Students and scientists in the disciplne who are interested in leading edge information.

What has been done

Project results have been presented in the classroom and at 39 regional, national and international symposia with audience up to several hundred.

Results

Presentation of research result in the classroom and at scientific meetings are an important way of distributing new knowledge in a timely fashion.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
305	Animal Physiological Processes
135	Aquatic and Terrestrial Wildlife
215	Biological Control of Pests Affecting Plants
202	Plant Genetic Resources
511	New and Improved Non-Food Products and Processes
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
206	Basic Plant Biology
304	Animal Genome
303	Genetic Improvement of Animals
502	New and Improved Food Products

Outcome #6

1. Outcome Measures

Number of Graduate students trained in laboratories

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	25	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
305	Animal Physiological Processes
135	Aquatic and Terrestrial Wildlife
511	New and Improved Non-Food Products and Processes
205	Plant Management Systems
303	Genetic Improvement of Animals
202	Plant Genetic Resources
206	Basic Plant Biology
502	New and Improved Food Products
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
304	Animal Genome

Outcome #7

1. Outcome Measures

Number of undergraduate students trained in laboratory; involved in investigations

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	40	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Undergraduate students, the college and university, graduate schools and future employers are interested in a strong undergraduate research program that produces graduates that are well prepared for graduate school and/or who can fill positions in government, industry and the private sector.

What has been done

Seven undergraduate students were involved in 4 of the 11 projects

Results

In most cases, the student developed a research report and prepared a presentation for the UNH Undergraduate Research Conference. In some cases, the work was used to prepare an undergraduate honors thesis.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
304	Animal Genome
305	Animal Physiological Processes
502	New and Improved Food Products
201	Plant Genome, Genetics, and Genetic Mechanisms
511	New and Improved Non-Food Products and Processes
206	Basic Plant Biology
135	Aquatic and Terrestrial Wildlife

Outcome #8

1. Outcome Measures

Number of postdoctoral fellows trained

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
202	Plant Genetic Resources
305	Animal Physiological Processes
304	Animal Genome
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #9

1. Outcome Measures

Number of users of released DNA sequences, germplasm; ESTs, proteins

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

We have no way of assessing this and it should not have been included as an outcome measure

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals
304	Animal Genome
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #10

1. Outcome Measures

Change in policy

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

No policy changes were reported by PIs

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
215	Biological Control of Pests Affecting Plants
305	Animal Physiological Processes
205	Plant Management Systems
206	Basic Plant Biology
303	Genetic Improvement of Animals
304	Animal Genome
502	New and Improved Food Products
511	New and Improved Non-Food Products and Processes
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
135	Aquatic and Terrestrial Wildlife
202	Plant Genetic Resources

Outcome #11

1. Outcome Measures
Number of grant submissions

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	30	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The project PI, AES, college and university administration, other funding agencies.

What has been done

PI have been encouraged by NH AES and college administration to use AES funding to address immediate issues in agriculture and to conduct research that will increase their ability to attract additional funding for synergistic studies from other sources.

Results

Submission of proposals to competitive programs in the USDA and other funding agencies is a way of leveraging AES formula funds. It has allowed us to find additional resources to solve issues that are central to the mission of the AES.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
305	Animal Physiological Processes
205	Plant Management Systems
206	Basic Plant Biology
511	New and Improved Non-Food Products and Processes
304	Animal Genome
502	New and Improved Food Products
202	Plant Genetic Resources
135	Aquatic and Terrestrial Wildlife
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
215	Biological Control of Pests Affecting Plants
303	Genetic Improvement of Animals

Outcome #12

1. Outcome Measures

Number of meetings/workshops attended

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	55	43

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Students and scientists in the discipline who are interested in leading edge information.

What has been done

Project results have been presented in the classroom and at 39 regional, national and international symposia with audience up to several hundred.

Results

Presentation of research result in the classroom and at scientific meetings are an important way of distributing new knowledge in a timely fashion.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
305	Animal Physiological Processes
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
135	Aquatic and Terrestrial Wildlife
206	Basic Plant Biology
511	New and Improved Non-Food Products and Processes
303	Genetic Improvement of Animals
502	New and Improved Food Products
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

215	Biological Control of Pests Affecting Plants
304	Animal Genome

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (Technical challenges.)

Brief Explanation

In Project 9, completion of hypothesis driven mechanistic studies took longer than planned. This delayed the beginning of explorative microarray work.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #5

V(A). Planned Program (Summary)

1. Name of the Planned Program

Economics & Commerce

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation			22%	
603	Market Economics			4%	
608	Community Resource Planning and Development			22%	
609	Economic Theory and Methods			3%	
610	Domestic Policy Analysis			7%	
611	Foreign Policy and Programs			7%	
704	Nutrition and Hunger in the Population			8%	
801	Individual and Family Resource Management			8%	
802	Human Development and Family Well-Being			8%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities			7%	
805	Community Institutions, Health, and Social Services			4%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	0.0
Actual	0.0	0.0	0.9	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	76032	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	76032	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	37395	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The NH AES had four projects in 2007 in the Economics and Commerce Planned Program Area. Project 1 conducted online and mail surveys to link market-valued community skill profiles with corporate outsourced functions to identify financially attractive rural sourcing targets. Corporations were contacted to determine their interest in offering a portion of currently offshore jobs to retired individuals in both rural and urban areas of New England. Project 2 developed surveys for the non-profit NH Made, Inc. and ultimately for the benefit of small, locally owned businesses in New Hampshire. The questionnaires determined consumer loyalty for and knowledge of locally made goods and services. One questionnaire was sent before a statewide campaign to increase awareness of local goods, the other was sent after. Project 3 investigated aspects of rural economic activity in New Hampshire ranging from economic impacts to infrastructure impacts from property tax and land preservation policies. Two of the economic sectors analyzed were the dairy and fishing industries, both historically important in NH and now in decline. Project 4 examined the reality of economic self-sufficiency among rural, low-income mothers in New Hampshire.

2. Brief description of the target audience

Target audiences included retired citizens in New England; NH industry that is outsourcing service and support; consumers in New England; local producers and service providers; research economists; local and state government agencies and welfare organizations; AARP

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	250	10000	0	0
2007	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	2	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer Review Publications

Year	Target	Actual
2007	1	2

Output #2

Output Measure

- Non peer reviewed publications including abstracts

Year	Target	Actual
2007	1	7

Output #3

Output Measure

- Number of direct participants in the projects (this does not include audiences)

Year	Target	Actual
2007	{No Data Entered}	13

Output #4

Output Measure

- Number of presentations at local, national and/or international meetings.

Year	Target	Actual
2007	{No Data Entered}	13

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Peer Reviewed publications
2	Obtaining additional funding to conduct detailed cost benefit analysis to select NH communities

Outcome #1

1. Outcome Measures

Peer Reviewed publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

College and University administration, the scientific community, other funding agencies and proposal reviewers

What has been done

Results of the projects have been published in 2 peer reviewed publications and 2 MS theses, and several symposium abstracts.

Results

In addition to disseminating knowledge, publications are an indication of productivity. They enhance the reputation of the NH AES and increase the competitiveness of research proposals for further studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
805	Community Institutions, Health, and Social Services
603	Market Economics
609	Economic Theory and Methods
803	Sociological and Technological Change Affecting Individuals, Families and Communities
608	Community Resource Planning and Development
610	Domestic Policy Analysis
801	Individual and Family Resource Management
602	Business Management, Finance, and Taxation
704	Nutrition and Hunger in the Population
611	Foreign Policy and Programs

Outcome #2

1. Outcome Measures

Obtaining additional funding to conduct detailed cost benefit analysis to select NH communities

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The project PI, AES, college and university administration, other funding agencies.

What has been done

PI have been encouraged by NH AES and college administration to use AES funding to address immediate issues in agriculture and to conduct research that will increase their ability to attract additional funding for synergistic studies from other sources.

Results

Proposals have been developed and submitted to external funding agency to expand Projects 1 and 4 to include snergistic work beyond the current scope of the projects.

4. Associated Knowledge Areas

KA Code	Knowledge Area
805	Community Institutions, Health, and Social Services
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families and Communities
602	Business Management, Finance, and Taxation
603	Market Economics
608	Community Resource Planning and Development
611	Foreign Policy and Programs
704	Nutrition and Hunger in the Population
801	Individual and Family Resource Management
610	Domestic Policy Analysis

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Government Regulations
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

Economic challenges faced by the region have underscored the importance of these investigations.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

Before and after surveys demonstrated the effectiveness in the NH Made campaign to increase awareness of local producers and loyalty.

Key Items of Evaluation

Program #6

V(A). Planned Program (Summary)

1. Name of the Planned Program

Food, Nutrition & Health

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
133	Pollution Prevention and Mitigation			4%	
302	Nutrient Utilization in Animals			2%	
305	Animal Physiological Processes			13%	
311	Animal Diseases			2%	
403	Waste Disposal, Recycling, and Reuse			1%	
502	New and Improved Food Products			1%	
604	Marketing and Distribution Practices			4%	
607	Consumer Economics			1%	
610	Domestic Policy Analysis			1%	
701	Nutrient Composition of Food			8%	
702	Requirements and Function of Nutrients and Other Food Components			10%	
703	Nutrition Education and Behavior			13%	
704	Nutrition and Hunger in the Population			1%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.			10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			15%	
722	Zoonotic Diseases and Parasites Affecting Humans			3%	
723	Hazards to Human Health and Safety			3%	
724	Healthy Lifestyle			6%	
903	Communication, Education, and Information Delivery			2%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	1.2	0.0
Actual	0.0	0.0	3.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	282963	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	282963	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	258992	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Twelve project in 2007 addressed issues related to Food, Nutrition and Health. Project 1 focused on sustaining local food systems in a globalizing environment and examined forces, responses and impacts. It was part of the UNH Office of Sustainability's Food and Society Initiative. The project participants worked with schools systems and local food producers in NH to develop a direct farm-to-cafeteria relationship. Projects 2 & 3 were part of a multi-state effort to improve fruit, vegetable and whole grain availability and intake in older adults. Project 2 participants conducted face-to-face interviews with older adults to collect information on whole grain consumption. Project 3 conducted lab experiments to examine the link between lutein and zeaxanthin and age-related macular degeneration. The project also examined the effects of whole grains and other forms of carbohydrates on blood sugar levels following consumptions. Project 4 carried out a study of forty nursing mothers to determine the levels of the environmental pollutant PCDE in breast milk. Project 5 carried out experiments to examine the relationship between obesity, insulin resistance and allergic airway disease including asthma. The PI and students of Project 6 conducted laboratory studies to determine the role of notch1 mediated signaling in the regulation of adipogenesis and adipocyte function and survival. Project 7 researchers developed new analytical methods that they applied to study defenses against Salmonella in human host cells. Project 8 carried out laboratory experiments to optimize an integrated cell-culture and real-time PCR assay for detection of reovirus in two different type of biosolids. Project 9 was a laboratory study to examine regulation of Shiga-like toxins in enterohemorrhagic E. coli, which is the cause of hemorrhagic colitis or "hamburger disease". Project 10 conducted laboratory experiments using and in-vitro model of the blood-brain barrier (BBB) to study the potential application of hyperthermia as a means of opening the BBB to enhance delivery of pharmaceuticals into the brain. In Project 11, laboratory research was conducted to evaluate the molecular basis for differences between rod and cone photoreceptors in the vertebrate retina. Project 12 conducted laboratory experiments to examine the relationship between dietary lipids (fat and cholesterol), hyperglycemia and the development of aortic atherosclerotic lesions. In additions to the activities described above, the project participants prepared manuscripts for submission to peer reviewed journals and presented research results at regional, national and/or international meetings. Undergraduate students, graduate students and post-doctoral students participated in the projects as part of their training.

2. Brief description of the target audience

The target audience for Project 1 included local food producers, consumers, school and institutional dieticians, state agencies, educators, and practitioners. The audiences for Project 2 & 3 include older adults, nutrition scientists, dieticians and other practitioners, public health agencies and personnel. The target audience for Project 4 includes nursing mothers, public health agencies and personnel, the medical community, nutrition researchers and scientists in related disciplines. Project 5 results are relevant to medical and nutritional researchers and educators. The findings also have implications for feed products used in the beef, poultry and pork industry. Project 6 results are of interest to the scientists and other audiences and associations connected to obesity, diabetes and tumor biology. In addition to scientists in the discipline, the results of Projects 7, 8 and 9 are of interest to public health agencies and the medical community. The target audience for Project 10 includes research scientists and physicians in the fields of neurological disorders and dementia. The findings of Projects 11 and 12 are of interest to other research scientists in the disciplines and segments of the medical community.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	900	5550	10	0
2007	0	0	0	15000

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	3	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer reviewed publications

Year	Target	Actual
2007	7	3

Output #2

Output Measure

- Chapters in Books

Year	Target	Actual
2007	0	0

Output #3

Output Measure

- Author of book or editor of book

Year	Target	Actual
2007	0	0

Output #4

Output Measure

- Non peer reviewed publications including abstracts

Year	Target	Actual
2007	13	12

Output #5

Output Measure

- Number of graduate theses and dissertations completed

Year	Target	Actual
2007	{No Data Entered}	4

Output #6

Output Measure

- Total number of project participants (not including audiences)

Year	Target	Actual
2007	{No Data Entered}	44

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Peer Reviewed Publications
2	Number of graduate students trained
3	Number of Undergraduate students trained and/or performing investigations
4	Number of presentations/posters at regional, national or international conferences or workshops
5	Number of Grant submissions
6	Number of public presentations
7	Model Development
8	Town meetings
9	Results to NH DES

Outcome #1

1. Outcome Measures

Peer Reviewed Publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	7	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
311	Animal Diseases
722	Zoonotic Diseases and Parasites Affecting Humans
607	Consumer Economics

Outcome #2

1. Outcome Measures

Number of graduate students trained

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	6	9

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
703	Nutrition Education and Behavior
607	Consumer Economics
723	Hazards to Human Health and Safety
610	Domestic Policy Analysis
702	Requirements and Function of Nutrients and Other Food Components
302	Nutrient Utilization in Animals
311	Animal Diseases
403	Waste Disposal, Recycling, and Reuse
604	Marketing and Distribution Practices
502	New and Improved Food Products
701	Nutrient Composition of Food
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
724	Healthy Lifestyle
903	Communication, Education, and Information Delivery
305	Animal Physiological Processes
704	Nutrition and Hunger in the Population
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
722	Zoonotic Diseases and Parasites Affecting Humans

Outcome #3

1. Outcome Measures

Number of Undergraduate students trained and/or performing investigations

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	18

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes
311	Animal Diseases
723	Hazards to Human Health and Safety
722	Zoonotic Diseases and Parasites Affecting Humans
702	Requirements and Function of Nutrients and Other Food Components
607	Consumer Economics
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #4

1. Outcome Measures

Number of presentations/posters at regional, national or international conferences or workshops

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	7	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

It is primarily other scientists in the discipline and some industry researchers that attend scientific conferences to learn about new and ongoing research and recent discoveries. Workshops are generally attended by end-users interested in application of research results.

What has been done

Sixteen conference and workshop presentations were made.

Results

The audiences gained up-to-the-minute knowledge in their respective disciplines.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
703	Nutrition Education and Behavior
903	Communication, Education, and Information Delivery
701	Nutrient Composition of Food
724	Healthy Lifestyle
722	Zoonotic Diseases and Parasites Affecting Humans
311	Animal Diseases
502	New and Improved Food Products
610	Domestic Policy Analysis
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
702	Requirements and Function of Nutrients and Other Food Components
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
133	Pollution Prevention and Mitigation
305	Animal Physiological Processes
704	Nutrition and Hunger in the Population
302	Nutrient Utilization in Animals
403	Waste Disposal, Recycling, and Reuse
604	Marketing and Distribution Practices
723	Hazards to Human Health and Safety

Outcome #5

1. Outcome Measures

Number of Grant submissions

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The project PI, AES, college and university administration, other funding agencies.

What has been done

PI have been encouraged by NH AES and college administration to use AES funding to address immediate issues in agriculture and to conduct research that will increase their ability to attract additional funding for synergistic studies from other sources.

Results

Submission of proposals to competitive programs in the USDA and other funding agencies is a way of leveraging AES formula funds. It has allowed us to find additional resources to solve issues that are central to the mission of the AES.

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes
702	Requirements and Function of Nutrients and Other Food Components
723	Hazards to Human Health and Safety
311	Animal Diseases
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
722	Zoonotic Diseases and Parasites Affecting Humans
607	Consumer Economics

Outcome #6

1. Outcome Measures
Number of public presentations

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	7	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Consumers and other persons involved in food, nutrition and health education and practitioners.

What has been done

'Get Smart Eat Local' workshops were run in connection with the NH Farm to School program.

Results

27 schools in 10 districts with over 15,000 students have benefitted from locallay grown produce in school menus

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population
701	Nutrient Composition of Food
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.
903	Communication, Education, and Information Delivery
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
724	Healthy Lifestyle

Outcome #7

1. Outcome Measures

Model Development

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	4	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

None reported

4. Associated Knowledge Areas

KA Code	Knowledge Area
903	Communication, Education, and Information Delivery

Outcome #8

1. Outcome Measures

Town meetings

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

No town meetings were reported.

4. Associated Knowledge Areas

KA Code	Knowledge Area
903	Communication, Education, and Information Delivery

Outcome #9

1. Outcome Measures

Results to NH DES

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Several of the projects are of interest to NH Department of Environmental Service. Project 8 looked at reovirus detection in biosolids and specifically listed NH DES as its target audience.

What has been done

The project use integrated cell culture and real time PCR to compare Reovirus detection in alkaline stabilized and anaerobically digested biosolids.

Results

When the study is complete, a final report will be sent to NH DES.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse
723	Hazards to Human Health and Safety
133	Pollution Prevention and Mitigation

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Government Regulations
- Populations changes (immigration,new cultural groupings,etc.)

Brief Explanation

No external factors adversely affected project outcomes.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study

Evaluation Results

Key Items of Evaluation

Program #7

V(A). Planned Program (Summary)

1. Name of the Planned Program

Natural Resources & Environment

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships			4%	
112	Watershed Protection and Management			6%	
123	Management and Sustainability of Forest Resources			18%	
132	Weather and Climate			1%	
133	Pollution Prevention and Mitigation			1%	
135	Aquatic and Terrestrial Wildlife			20%	
136	Conservation of Biological Diversity			26%	
201	Plant Genome, Genetics, and Genetic Mechanisms			1%	
213	Weeds Affecting Plants			1%	
304	Animal Genome			1%	
313	Internal Parasites in Animals			1%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals			4%	
315	Animal Welfare/Well-Being and Protection			1%	
403	Waste Disposal, Recycling, and Reuse			2%	
602	Business Management, Finance, and Taxation			1%	
605	Natural Resource and Environmental Economics			5%	
608	Community Resource Planning and Development			3%	
609	Economic Theory and Methods			2%	
610	Domestic Policy Analysis			1%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities			1%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	6.0	0.0
Actual	0.0	0.0	7.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	841378	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	841378	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	455287	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

In 2007, the NH-AES had nineteen projects investigating diverse issues in Natural Resources and the Environment. They ranged from biodiversity assessments, to the development of species identification keys, to remote sensing methodology for forest composition, to the detection of environmental hazards to human health, to assessments of the impact of invasive species. Project 1 assessed the increased accuracy of using higher resolution images to create vegetation maps of New England forests. The primary activities associated with Project 2 included field data collection, data analysis, model building to measure, manage and project forest structure in New Hampshire. In Project 3, a field survey of floristic diversity was completed in forests of islands in Lake Winnipesaukee, NH. Project 4 completed field studies to assess the impact of glossy buckthorn, an invasive shrub that is has spread through New Englandforests. Land management strategies and recommendations were developed. As part of a systematic evaluation of land use on water quality in southern New Hampshire, Project 5 used field studies in early success ional habitats to determine site characteristics that affect vulnerability to invasion by alien shrubs. Project 6 completed field and laboratory studies to assess the environmental impacts of agriculture in a fragmented landscape. Project 7 completed field and herbarium studies to assess biodiversity of aquatic plants in the northeastern US. Project 8 sampled the insect fauna of 46 streams and rivers in New Hampshire and developed printed and web based manuals for species identification. Project 9 conducted field sampling and lab analyses to study microcystins in NH lakes and examine localized impacts of blooms and implications for human health. Project 10 conducted field and laboratory studies to examine the effects of chronic warming and nitrogen deposition on the microbial community in forest soils. Project 11 used mesocosm and field studies of vernal pool amphibians to develop integrated wetland and upland management recommendations. Project 12 used field sampling and laboratory genetic analyses to examine the effect of forest fragmentation on dispersal of vernal pool-breeding amphibians. Project 13 engaged and communicated with the public and stakeholders regarding natural and agricultural resource management policies. Project 14 assessed, though surveys, the costs and benefits of natural resource policies affecting public and private lands. Through surveys, Project 15 examined economic considerations in municipal solid waste disposal. Project 16 using new field collections and historic herbarium specimens and records, looked a the alterations of biodiversity patterns as a result of invasive seaweed species in the Gulf of Maine. Project 17 using filed collections and DNA barcoding has cataloged 116 marine invertebrates from 8 phyla. Project 18 through field studies and genetic analyses has assessed the influence of trematode parasites on the ecology of nearshore marine communities. Project 19, using electronic tracking and data analysis has studied the home range and habitat preference of the American lobster.

2. Brief description of the target audience

For all of the research projects, the target audiences include other scientists in the respective disciplines and students in university classrooms. For many of the projects related to natural resource management and policy, the target audience also includes state and federal agencies, policy makers, elected officials, conservation groups, town planners and the general public. The target audience for Projects 1, 2, 4 and 5 also includes forest ecologists, Extension personnel, professional foresters and landowners. Project 3 results are of interest to the town of Guilford NH and conservations groups. Project 6 is of particular interest to municipal and state water resource managers as well as the NH Department of Agriculture. Project 13 target audiences also include a number of regional watershed associations and commissions, plus survey practitioners and methodologists. Specific target audience for Project 14 include Cape Wind, Inc., the Alliance to Protect Nantucket Sound, residents of Cape Cod, Martha's Vineyard, Nantucket and other regions where windfarms have been proposed. Project 15 is of interest to construction and demolition waste producers and processors. Projects 16 and 17 are of interest to invasion biologist, fisheries, aquaculture and coastal zone managers. The target audience for Project 18 also includes lobsterman.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	6096	4400	220	4980
2007	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	17	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-Reviewed Publications

Year	Target	Actual
2007	34	17

Output #2

Output Measure

- Chapters in Books

Year	Target	Actual
2007	9	4

Output #3

Output Measure

- Author of book or editor

Year	Target	Actual
2007	3	4

Output #4

Output Measure

- Non-peer reviewed publications including published abstracts

Year	Target	Actual
2007	39	28

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Peer Reviewed Publications
2	Number of Graduate Students trained
3	Number of Undergraduate students trained and/or performing investigations
4	Number of presentations/posters at regional, national or international conferences or workshops
5	Number of Grant submissions
6	Number of agencies better informed about amphibian habitat needs
7	Use of more precise biological data in making water quality statements
8	Use of biological data by aquatic entomologists
9	Number in audience of meeting presentations
10	Number of resources managers addressed
11	Number of workshops held
12	Number of websites developed
13	Public service announcement
14	Number of trade publications
15	Lake Management plans that consider biotoxin problems
16	Development of NH state drinking water program with biotoxin control
17	Foresters learning about methods to reduce spread of invasive species
18	Identification of invasive species
19	CZM manager, environmental resource groups/individuals
20	Dissemination of results to land ure planners
21	websurveys
22	Questionnaire
23	Enhance knowledge of lobsters, improve management; educate community

Outcome #1

1. Outcome Measures

Peer Reviewed Publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	15	17

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

College and University administration, the scientific community, other funding agencies and proposal reviewers.

What has been done

Results of the projects have been published in seventeen peer reviewed publications, 4 books, 3 MS theses, and numerous symposium abstracts.

Results

Peer reviewed publications represent new knowledge. In addition to disseminating new knowledge to the scientific community and other stakeholders, publications are one indication of research productivity. They enhance the reputation of the NH AES and increase the competitiveness of research proposals for further studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
133	Pollution Prevention and Mitigation
602	Business Management, Finance, and Taxation
213	Weeds Affecting Plants
403	Waste Disposal, Recycling, and Reuse
102	Soil, Plant, Water, Nutrient Relationships
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics
112	Watershed Protection and Management
313	Internal Parasites in Animals
132	Weather and Climate
201	Plant Genome, Genetics, and Genetic Mechanisms
304	Animal Genome
608	Community Resource Planning and Development
315	Animal Welfare/Well-Being and Protection
136	Conservation of Biological Diversity
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families and Communities
123	Management and Sustainability of Forest Resources
609	Economic Theory and Methods

Outcome #2

1. Outcome Measures

Number of Graduate Students trained

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	26	28

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Graduate students, the college and university, and future employers are interested in a strong graduate program that produces well trained graduates that can fill positions in government, industry and academia.

What has been done

Graduate students were involved in 12 out of the 19 projects and in most cases, the project research was the focus of the students MS thesis.

Results

The graduate students whose MS thesis research was based on the project have become experts in the issues addressed. They are likely to have a continued interest in the issue and may pursue additional related studies in the PhD work and future professional studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse
608	Community Resource Planning and Development
102	Soil, Plant, Water, Nutrient Relationships
605	Natural Resource and Environmental Economics
315	Animal Welfare/Well-Being and Protection
136	Conservation of Biological Diversity
132	Weather and Climate
610	Domestic Policy Analysis
609	Economic Theory and Methods
133	Pollution Prevention and Mitigation
803	Sociological and Technological Change Affecting Individuals, Families and Communities
123	Management and Sustainability of Forest Resources
112	Watershed Protection and Management
304	Animal Genome

Outcome #3

1. Outcome Measures

Number of Undergraduate students trained and/or performing investigations

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	27	29

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Undergraduate students, the college and university, graduate schools and future employers are interested in a strong undergraduate research program that produces graduates that are well prepared for graduate school and/or who can fill positions in government, industry and the private sector.

What has been done

Twenty-nine undergraduate students were involved in 8 of the 19 projects.

Results

In most cases, the student developed a research report and prepared a presentation for the UNH Undergraduate Research Conference. In some cases, the work was used to prepare an undergraduate honors thesis.

4. Associated Knowledge Areas

KA Code	Knowledge Area
313	Internal Parasites in Animals
102	Soil, Plant, Water, Nutrient Relationships
315	Animal Welfare/Well-Being and Protection
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity
135	Aquatic and Terrestrial Wildlife
132	Weather and Climate
304	Animal Genome

Outcome #4

1. Outcome Measures

Number of presentations/posters at regional, national or international conferences or workshops

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	52	49

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

It is primarily other scientists in the discipline and some industry researchers that attend scientific conferences to learn about new and ongoing research and recent discoveries. Workshops are generally attended by end-users interested in application of research results.

What has been done

Forty-nine conference and workshop presentations were made.

Results

The audiences gained up-to-the-minute knowledge in their respective disciplines.

4. Associated Knowledge Areas

KA Code	Knowledge Area
609	Economic Theory and Methods
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics
315	Animal Welfare/Well-Being and Protection
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families and Communities
136	Conservation of Biological Diversity
313	Internal Parasites in Animals

132	Weather and Climate
112	Watershed Protection and Management
102	Soil, Plant, Water, Nutrient Relationships
123	Management and Sustainability of Forest Resources
610	Domestic Policy Analysis

Outcome #5

1. Outcome Measures

Number of Grant submissions

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	9	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The project PI, AES, college and university administration, other funding agencies.

What has been done

PI have been encouraged by NH AES and college administration to use AES funding to address immediate issues in agriculture and to conduct research that will increase their ability to attract additional funding for synergistic studies from other sources.

Results

Submission of proposals to competitive programs in the USDA and other funding agencies is a way of leveraging AES formula funds. It has allowed us to find additional resources to solve issues that are central to the mission of the AES.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
102	Soil, Plant, Water, Nutrient Relationships
213	Weeds Affecting Plants
135	Aquatic and Terrestrial Wildlife
608	Community Resource Planning and Development
136	Conservation of Biological Diversity
123	Management and Sustainability of Forest Resources
201	Plant Genome, Genetics, and Genetic Mechanisms
112	Watershed Protection and Management
132	Weather and Climate
304	Animal Genome

Outcome #6

1. Outcome Measures

Number of agencies better informed about amphibian habitat needs

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Wildlife and conservation biologists, agencies resposible for wildlife, wetlands and land managment as well as citzens of the state.

What has been done

The results have been presented at several symposia and at a NH State Government workshop on vernal pools.

Results

NH State agencies are better informed about the importance of vernal pools.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife

Outcome #7

1. Outcome Measures
Use of more precise biological data in making water quality statements

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This outcome does not apply to any of the 2007 projects

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

Outcome #8

1. Outcome Measures

Use of biological data by aquatic entomologists

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Aquatic entomologists, forest resource managers, land use managers and policy makers are interested in the effects of stream and river management on the biodiversity of aquatic organisms.

What has been done

46 rivers and streams were surveyed. Biodiversity information has been presented at 2 meetings and disseminated via publication and the 2 websites.

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
135	Aquatic and Terrestrial Wildlife

Outcome #9

1. Outcome Measures

Number in audience of meeting presentations

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This data is not available

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
313	Internal Parasites in Animals
605	Natural Resource and Environmental Economics
133	Pollution Prevention and Mitigation
608	Community Resource Planning and Development
102	Soil, Plant, Water, Nutrient Relationships
610	Domestic Policy Analysis
403	Waste Disposal, Recycling, and Reuse
136	Conservation of Biological Diversity
213	Weeds Affecting Plants
123	Management and Sustainability of Forest Resources
609	Economic Theory and Methods
135	Aquatic and Terrestrial Wildlife
803	Sociological and Technological Change Affecting Individuals, Families and Communities
132	Weather and Climate
201	Plant Genome, Genetics, and Genetic Mechanisms
112	Watershed Protection and Management
602	Business Management, Finance, and Taxation
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
315	Animal Welfare/Well-Being and Protection
304	Animal Genome

Outcome #10

1. Outcome Measures

Number of resources managers addressed

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This number is not available

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
112	Watershed Protection and Management
608	Community Resource Planning and Development
133	Pollution Prevention and Mitigation

Outcome #11

1. Outcome Measures

Number of workshops held

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
123	Management and Sustainability of Forest Resources

Outcome #12

1. Outcome Measures

Number of websites developed

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	6	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
315	Animal Welfare/Well-Being and Protection

Outcome #13

1. Outcome Measures

Public service announcement

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

None reported

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #14

1. Outcome Measures

Number of trade publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

Number not tracked. Total number of non-peer reviewed publications was 28.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
602	Business Management, Finance, and Taxation
610	Domestic Policy Analysis
136	Conservation of Biological Diversity
213	Weeds Affecting Plants
605	Natural Resource and Environmental Economics
803	Sociological and Technological Change Affecting Individuals, Families and Communities
315	Animal Welfare/Well-Being and Protection
608	Community Resource Planning and Development
135	Aquatic and Terrestrial Wildlife
132	Weather and Climate
102	Soil, Plant, Water, Nutrient Relationships
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #15

1. Outcome Measures

Lake Management plans that consider biotoxin problems

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Department of Environmental Services, Department of Health, municipal water supply and recreation departments and the public are all conserned with and potentially affected by biotoxins in natural waters.

What has been done

Field sampling and lab analyses to study microcystins in NH lakes and examine localized impacts of blooms and implications for human health.

Results

Knowledge of levels of biotoxins and conditions leading to blooms of microcystin producing organisms has increased.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
133	Pollution Prevention and Mitigation
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
112	Watershed Protection and Management

Outcome #16

1. Outcome Measures

Development of NH state drinking water program with biotoxin control

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Department of Environmental Services, Department of Health, municipal water supply and recreation departments and the public are all conserned with and potentially affected by biotoxins in natural waters.

What has been done

Field sampling and lab analyses to study microcystins in NH lakes and examine localized impacts of blooms and implications for human health.

Results

This result has not been reported by the project investigators.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
112	Watershed Protection and Management
135	Aquatic and Terrestrial Wildlife
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals

Outcome #17

1. Outcome Measures

Foresters learning about methods to reduce spread of invasive species

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	6000	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Professional foresters, landowners, NH Dept of Env. Services, USDA Forest Service.

What has been done

Field studies to assess the impact of glossy buckthorn, an invasive shrub that is has spread through New England forests. Land management strategies and recommendations were developed. Field studies were conducted in early successional habitats to determine site characteristics that affect vulnerability to invasion by alien shrubs. Results were presented at regional and national meetings and a workshop was run for professional foresters and landowners.

Results

Many more people are aware of the presence, spread and impact of invasive shrubs. Local foresters and landowners have adopted recommended practice to control spread.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #18

1. Outcome Measures

Identification of invasive species

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Invasive species can alter community structure and have adverse effects on natural ecosystems.

What has been done

Three studies have addressed the identification and/or control of invasive species in New England. Two have looked at the effects and control of invasive shrubs. One has looked at the presence, distribution and impact of invasive seaweeds in the Gulf of Maine.

Results

Foresters and landowners have a better understanding of how to control invasive shrubs. Seven invasive seaweed species have been identified: 4 from Asia, 2 from Europe and 1 from the northeastern Pacific.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
213	Weeds Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #19

1. Outcome Measures

CZM manager, environmental resource groups/individuals

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	25	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Coastal zone managers, land use managers, conservation groups, and individuals as well as the members of the other target audienced identified on the 'Activities' page for this planned prrogram are interested in the Natural Resource management issues that have been addressed by many of the projects.

What has been done

The Activities page of the Natural Resources and Environment Planned Program summarizes what has been done.

Results

Results have been detailed in Outputs, State Defined Outputs and in the responses to the other State Defined Outcomes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
313	Internal Parasites in Animals
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
136	Conservation of Biological Diversity
132	Weather and Climate
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
133	Pollution Prevention and Mitigation
602	Business Management, Finance, and Taxation
213	Weeds Affecting Plants
608	Community Resource Planning and Development
609	Economic Theory and Methods
315	Animal Welfare/Well-Being and Protection
605	Natural Resource and Environmental Economics
102	Soil, Plant, Water, Nutrient Relationships
403	Waste Disposal, Recycling, and Reuse
112	Watershed Protection and Management
201	Plant Genome, Genetics, and Genetic Mechanisms
304	Animal Genome
610	Domestic Policy Analysis
803	Sociological and Technological Change Affecting Individuals, Families and Communities

Outcome #20

1. Outcome Measures

Dissemination of results to land ure planners

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Land use planners are one sector of the target audiences for many of the projects in this Planned Program. They are interested in the impacts of various management practices, invasive species, accuracy of forest vegetation maps and may of the other project results.

What has been done

Virtually all of the projects are or should be relavant to land use planning. Project results have been widely disseminated and have either directly or indirectly reached land use planners.

Results

As a result of the NH-AES projects land use managers have greater awareness and knowledge of the effect that managment practices might have on species diversity, environmental quality, ecosystem function, invasive species impacts, resource conservation, public perception, and public health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
403	Waste Disposal, Recycling, and Reuse
132	Weather and Climate
133	Pollution Prevention and Mitigation
313	Internal Parasites in Animals
609	Economic Theory and Methods
102	Soil, Plant, Water, Nutrient Relationships
304	Animal Genome
803	Sociological and Technological Change Affecting Individuals, Families and Communities
315	Animal Welfare/Well-Being and Protection
610	Domestic Policy Analysis
136	Conservation of Biological Diversity
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
123	Management and Sustainability of Forest Resources
213	Weeds Affecting Plants
608	Community Resource Planning and Development
605	Natural Resource and Environmental Economics
135	Aquatic and Terrestrial Wildlife
112	Watershed Protection and Management
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #21

1. Outcome Measures

websurveys

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10000	8000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Policy makers, consumers, conservation groups and objective information on issues related to public policy.

What has been done

Web based surveys were used as a tool in three projects. They were used extensively to engage, communicate with and obtain input from the public and stakeholders in a study natural resource managment policies effecting a range of issues. They were used to collect public opinion information related to the proposed windfarm construction in Nantucket Sound. Surveys were used in a study of municipal disposal of demolition waste.

Results

The design, implementation and evaluation of these tools has engaged stakeholders in a variety of issues facing the management of natural resources. It has provided policy makers with knowedge to make informed decisions on such issues related to ecology, enviromental conservation, windfarm construction and waste disposal

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse
602	Business Management, Finance, and Taxation
803	Sociological and Technological Change Affecting Individuals, Families and Communities
610	Domestic Policy Analysis
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
609	Economic Theory and Methods

Outcome #22

1. Outcome Measures
Questionnaire

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The outcome related to Questinnaires was covered under the response to Web Surveys.

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
609	Economic Theory and Methods
403	Waste Disposal, Recycling, and Reuse
610	Domestic Policy Analysis
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families and Communities
602	Business Management, Finance, and Taxation

Outcome #23

1. Outcome Measures

Enhance knowledge of lobsters, improve management; educate community

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	300	300

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The primary audience for this study included marine biologists, other scientists and marine resource managers. Lobsterman in particular can benefit from the increase knowledge of lobster behavior and habitat use.

What has been done

Using GIS, electronic tagging, SCUBA surveys and underwater video photography, the behavior, habitat use and home range of American lobsters were studied. Findings were presented via a variety of methods including publication, website, television appearance, scientific meetings, radio interviews, newspapers and museum exhibits.

Results

Prior to the study, the home range and behavior of lobsters were poorly understood. Scientist, resource managers and lobsterman now have a much better understanding on shore and off shore movements of lobsters and what triggers them, the behavior of lobsters in lobster traps, changes in home range. The results have altered people views of lobster behavior and provided a window into the normal behavior of lobsters in their natural habitat. The data is currently being used when marine fisheries managers debate ways to assess the health of the stocks and the lobster industry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
315	Animal Welfare/Well-Being and Protection
135	Aquatic and Terrestrial Wildlife

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Other (See Below)

Brief Explanation

Project 1 - Inadequacy of existing data for forest vegetation mapping led to the need to develop a new database with higher spacial resolution in order to complete the project goals.

Project 11 - Lower than expected survival of amphibians in field enclosures led to development of an alternative design.

Project 19 - The original plan was to track lobster movement year round, however the lobsters unexpectedly moved far off-shore and out of the range of tracking antennae and out of the reach of SCUBA surveys.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #8

V(A). Planned Program (Summary)

1. Name of the Planned Program

Pest Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants			55%	
212	Pathogens and Nematodes Affecting Plants			15%	
215	Biological Control of Pests Affecting Plants			15%	
216	Integrated Pest Management Systems			15%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.3	0.0
Actual	0.0	0.0	0.9	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	49112	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	49112	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	9088	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

There were two Pest Management projects in 2007. In the first, experiments were conducted to examine the role of hormones, juvenile hormone and several biogenic amine that circulate in hemolymph, on the reproductive behavior of several species of beetles. It is only with a good understanding of these mechanisms that good pest control methods can be developed.In addition to the experiments, two manuscripts were prepared and published and presentations were made at two regional meetings.The second project conducted experiments to test the olfactory responses of fungus gnats to different types of greenhouse growing media. In addition, and attempt was made to recover and identify a "new" parasite that has potential for biological control of fungus gnats. Finally, several trials were conducted to assess methods of inoculating greenhouse tomato plants with leaf mold (Fulvia fulvum) so that the effectiveness of treatment and prevention regimes could be studied.Results were shared with greenhouse growers through a number of growers meetings. A manuscript was prepared and published.

2. Brief description of the target audience

The target audience for the beetle project is primarily the scientific community although the ultimate application of the findings would be important producers of crops (field and forest) that are affected by beetles. The primary target audience for the fungus gnat and the leaf mold research is greenhouse producers in New England.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	50	50	0	0
2007	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	0
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	2	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer Reviewed Publications

Year	Target	Actual
2007	3	2

Output #2

Output Measure

- Chapters in Books

Year	Target	Actual
2007	1	0

Output #3

Output Measure

- Non peer reviewed publications including abstracts

Year	Target	Actual
2007	1	1

Output #4

Output Measure

- Undergraduate students trained

Year	Target	Actual
2007	{No Data Entered}	1

Output #5

Output Measure

- Graduate Students trained

Year	Target	Actual
2007	{No Data Entered}	1

Output #6

Output Measure

- Presentations at regional, national and international symposia and workshops

Year	Target	Actual
2007	{No Data Entered}	11

Output #7

Output Measure

- Number of persons participating in the projects.

Year	Target	Actual
2007	{No Data Entered}	6

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Peer Reviewed Publications
2	Increase in knowledge

Outcome #1

1. Outcome Measures

Peer Reviewed Publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

College and University administration, the scientific community, other funding agencies and proposal reviewers.

What has been done

Results of the projects have been published in two peer reviewed publications.

Results

In addition to disseminating knowledge to the scientific community and other stakeholders, publications are one indication of research productivity. They enhance the reputation of the NH AES and increase the competitiveness of research proposals for further studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Increase in knowledge

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Greenhouse producers are especially interested in methods to control fungus gnats and leaf mold.

What has been done

Research results and suggested control methods were presented at growers workshops.

Results

Greenhouse producers have modified the control methods for fungus gnats.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
215	Biological Control of Pests Affecting Plants
212	Pathogens and Nematodes Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Weather conditions prevented the researchers from effectively innoculating greenhous tomato plants with leaf mold. Consequently it was not possible study the affects of potential prevention methods.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

For both projects, data was collected through the course of the experiments and analyzed statistically after completion.

Key Items of Evaluation

Program #9

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plants & Plant Products

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
136	Conservation of Biological Diversity			6%	
201	Plant Genome, Genetics, and Genetic Mechanisms			3%	
202	Plant Genetic Resources			13%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			23%	
204	Plant Product Quality and Utility (Preharvest)			23%	
205	Plant Management Systems			9%	
206	Basic Plant Biology			14%	
212	Pathogens and Nematodes Affecting Plants			3%	
216	Integrated Pest Management Systems			3%	
903	Communication, Education, and Information Delivery			3%	
	Total			100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2007	**Extension**		**Research**	
	1862	**1890**	**1862**	**1890**
Plan	0.0	0.0	1.2	0.0
Actual	0.0	0.0	1.4	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		**Research**	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	149902	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	149902	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	116994	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

In 2007, the NH-AES had eight projects in the Plant and Plant Product program area. Three projects stress response in plants.The first (Project 1) carried out experiments to understand how plants combat the effects of abiotic stress, particularly DNA damage from UV radiation. Results of this work were presented at an international symposium. Project 2 began looking at the generalized stress response at the cellular and tissue level in sunflower leaves exposed to osmotic and mechanical stress.Responses were assessed via analysis of light and electron microscopy. Project 3 conducted experiments to determine the role of iron deficiency in oxidative stress and the inhibition of photosynthesis. Four projects were involved in genetics, breeding, field trials and cultural practices of vegetables and landscaping shrubs. Project 4 was the fourth breeding cycle of a program to breed different size classes of ornamental pumpkins with powdery mildew resistance. Addition breeding work was done to improve growth habit and nutritional value of New England varieties of acorn squash. Results were presented at growers meeting and a national horticultural conference. Project 5 was a breeding program to develop varieties of melons with superior traits for productivity, disease resistance, flavor, and nutritional quality. Project 6 conducted variety trials for cantaloupe and sweet potatoes; looked at season extension methods for peppers, sweet potatoes and blackberries; and evaluated winter sprouting broccoli as a new crop for New England. Project 7 carried out field experiments to assess methods to prevent root zone freezing damage in container grown nursery shrubs and trees.Project 8 has been revising the taxonomy, examining the phylogeography, and assessing the impact of invasive species of the commercially important red seaweed Porphyra, which is extensive for food in Asia via coastal aquaculture. Specimens have been collected throughout the coast of New England and compare via DNA sequencing to taxonomic voucher specimens from historic herbarium collections from around the world. Two new species have been described. Results were presented at two international scientific conferences.

2. Brief description of the target audience

Target audience will include students in university classrooms and K-12, and other researchers and scientists in the appropriate discipline. Target audience for Project 4, 5, and 6 also includes seed companies, commercial producers and home gardeners. The audience Project 7 includes nursery owners/managers/growers/extension educators in the state and region. Invasive species studied in Project 8 are of interest to coastal zone managers, ecologists, and conservation groups. The new species are of potential interest to aquaculture enterprises.

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	1210	10340	5	0
2007	0	0	0	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year	Target
Plan:	2
2007 :	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	6	4	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed publications

Year	Target	Actual
2007	7	4

Output #2

Output Measure

- Chapters in Books

Year	Target	Actual
2007	1	0

Output #3

Output Measure

- Non-peer reviewed publications including abstracts

Year	Target	Actual
2007	16	8

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	Peer Reviewed Publications
2	Number of Graduate Students Trained
3	Number of Undergraduate students trained and/or performing investigations
4	Number of presentations/posters at regional, national or international conferences or workshops
5	Change in Knowledge in field
6	Growers improve water & fertilizer use
7	Growers improve fungus gnat management
8	Growers improve borytis management
9	Growers adopt new genetics or new technology
10	No. of farmers learning about new vegetable varieties
11	No. of farmers learning about new fruit varieties
12	No. of farmers learning about season extension

Outcome #1

1. Outcome Measures

Peer Reviewed Publications

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	7	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

College and University administration, the scientific community, other funding agencies and proposal reviewers.

What has been done

Results of the projects have been published in four peer reviewed publications several symposium abstracts.

Results

In addition to disseminating knowledge to the scientific community and other stakeholders, publications are one indication of research productivity. They enhance the reputation of the NH AES and increase the competitiveness of research proposals for further studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
202	Plant Genetic Resources
216	Integrated Pest Management Systems
136	Conservation of Biological Diversity

Outcome #2

1. Outcome Measures

Number of Graduate Students Trained

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	4	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
202	Plant Genetic Resources
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

Number of Undergraduate students trained and/or performing investigations

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology

Outcome #4

1. Outcome Measures

Number of presentations/posters at regional, national or international conferences or workshops

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	12	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
212	Pathogens and Nematodes Affecting Plants
136	Conservation of Biological Diversity
204	Plant Product Quality and Utility (Preharvest)
206	Basic Plant Biology
202	Plant Genetic Resources
201	Plant Genome, Genetics, and Genetic Mechanisms
216	Integrated Pest Management Systems
205	Plant Management Systems

Outcome #5

1. Outcome Measures
Change in Knowledge in field

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In the projects related to plant stress, the primary audience is other scientists and researchers in plant physiology. Ultimately, this basic research may lead an understanding of plant stress response that will have applications for growers. UV radiation resonses are of relevent to ozone layer depletion and therefore of concern to regulators. The crop breeding research is of direct interest to seed companies and growers interested in disease resistant and more nutritious varieties; it is also of interest of consumers. The systematics, phylogeography and effects of invasive seaweeds are of interest to scientists, coastal managers, regulatory agencies, and aquaculture operations.

What has been done

Experiments have been completed to increase our knowledge about plant stress responses. Breeding programs and field trials have been conducted. Field collections and historic herbarium collections have been studied and assessed via DNA sequencing. Results have been disseminated through publications, websites and presentations.

Results

Plant stress research has led to the discovery of new genes involved in UV stress response. Iron deficiency was found to produce a decrease in chlorophyll levels and photosynthetic rate and decreases in anti-oxidants used to defend against oxidative stress. Addition of iron salts to the media resulted in rapid recovery.

The breeding programs resulted in several new varieties of squash and melons with improved disease resistance and enhance flavor and nutritional qualities.

Two new species of the red seaweed Porphyra have been discribed from the North Atlantic. Three Asian species of Porphyra have invaded the coast of New England; two are abundant and widespead and grow as epiphytes on native intertidal species.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
205	Plant Management Systems
206	Basic Plant Biology
903	Communication, Education, and Information Delivery
136	Conservation of Biological Diversity
212	Pathogens and Nematodes Affecting Plants
201	Plant Genome, Genetics, and Genetic Mechanisms
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)

Outcome #6

1. Outcome Measures

Growers improve water & fertilizer use

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	150	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

There were no projects addressing this issue.

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #7

1. Outcome Measures

Growers improve fungus gnat management

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	300	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Greenhouse producers who combat fungus gnats on plants and soil.

What has been done

Experiments were conducted to determine specific growing media or media component attracted fungus gnats.

Results

No specific media component was identified as an attractant.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems

Outcome #8

1. Outcome Measures

Growers improve borytis management

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	50	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Greenhouse and field growers who have had problems with fungal infections of plants.

What has been done

Although none of the projects were looking at botrytis, two of the projects have address fungal infections. The squash and melon breeding programs have developed varieties improved resistance to powdery mildew. The goal greenhouse tomato production study was to develop cultural practices that would reduce leaf fungus damage.

Results

Leaf mold resistant varieties of squash and melons developed in the breeding program are going into commercial production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

216	Integrated Pest Management Systems
136	Conservation of Biological Diversity
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)
903	Communication, Education, and Information Delivery

Outcome #9

1. Outcome Measures

Growers adopt new genetics or new technology

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1500	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Growers, seed companys, home garndeners, landscapers and plant nurseries.

What has been done

Squash and melon breeding program. Field trials of new varieties. Field trials of new methods of season extension and root zone freezing protections.

Results

Breeding programs developed a number of new varieties of melon, squash and pumpkins that have been picked up for commercial seed production. Commercial growers and home gardeners have been taught about successful methods of season extension for peppers, sweet potatoes and blckberries using mulch, row covers and high tunnels. Nurseries have adopted more cost effective and less labor intesive methods of overwintering container grown trees and shrubs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
202	Plant Genetic Resources
212	Pathogens and Nematodes Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
903	Communication, Education, and Information Delivery

Outcome #10

1. Outcome Measures

No. of farmers learning about new vegetable varieties

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Seed producers, vegetable producers and home gardeners who are interested in new varieties of vegetables with improved flavor, nutrition and disease resistance.

What has been done

Breeding program and field trials were conducted to develop and assess new varieties of squash and sweet potatoes. Results were presented at scientific meetings and workshops for growers and home gardeners.

Results

Seed companies are producing seed for a number of the new varieties.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
903	Communication, Education, and Information Delivery
136	Conservation of Biological Diversity
204	Plant Product Quality and Utility (Preharvest)
202	Plant Genetic Resources

Outcome #11

1. Outcome Measures
No. of farmers learning about new fruit varieties

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Seed producers, vegetable producers and home gardeners who are interested in new varieties of melons with improved flavor, nutrition and disease resistance.

What has been done

Breeding program and field trials were conducted to develop and assess new varieties of melons. Results were presented at scientific meetings and workshops for growers and home gardeners.

Results

Seed companies are producing seed for a number of the new varieties.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
212	Pathogens and Nematodes Affecting Plants
216	Integrated Pest Management Systems
136	Conservation of Biological Diversity
903	Communication, Education, and Information Delivery
204	Plant Product Quality and Utility (Preharvest)
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #12

1. Outcome Measures

No. of farmers learning about season extension

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	150	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

New England growers and gardeners are limited in the type and varieties of fruits and vegetable they can grow due to a short growing season. Improved short-season varieties and methods of 'season extension' are of economic importance in the region.

What has been done

The use of high-tunnels, mulches and row covers were evaluated for season extension in peppers, sweet potatoes, and winter sprouting broccoli; row covers were evaluated for winter protection of blackberries. Results and recommendations were disseminated via workshops and publications.

Results

The evaluation of winter sprouting broccoli was started in 2007 and results are expected in spring 2008. The most profitable (yeild and quality) of 20 pepper varieties were recommended to NH growers. Grower awareness of sweet potatos that are suitable for NH has increased.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Weather negatively effected the pepper trials and the greenhouse tomato leaf fungus projects.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}