2007 University of Maine Research Annual Report

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2007 University of Maine Research Annual Report

I. Report Overview

1. Executive Summary

Executive Summary for the 2007 Annual Report of the Maine Agricultural & Forest Experiment Station

Merit Review Process

The external scientific peer review process fully described in our 2000-2004 Plan of Work continues to be used to evaluate all MAFES projects, regardless of funding source. A total of 32 Hatch and McIntire-Stennis projects went through the process in FY2007.

Stakeholder Input

MAFES took several actions to seek stakeholder input including formal meetings with advisory groups, attending monthly meetings of the Agricultural Council of Maine, using the MaineAgriculturalCenter to facilitate communication between MAFES and University of Maine Cooperative Extension, faculty interaction with stakeholder groups and individuals in both formal and informal settings, and field days at our research facilities.

Stakeholder groups were identified through coordinating and advisory committees. Input was collected through formal organization processes, feedback on research programs of faculty via stakeholder grant review programs, and through informal conversations with groups and individuals by MAFES leaders. Input was used internally to evaluate research, outreach, and hiring priorities for MAFES and the Maine Agricultural Center (MAC).

MAFES stakeholders emphasized the the value of research on specialty crops.

Expenditure Summary

In FY2007 the MAFES Hatch allocation was $3,292,088. Actual expenditures for this year are $1,723,179 (Actual Hatch), $6,066,151 (Actual Matching), $1,490,869 (Actual All Other) for a total of $9,280,199. The amount of expended formula dollars that comes from carryover funds is zero.

Planned Programs

Animal Production and Protection

In our original plan of work, we estimated that there would be 4.7 SYs in this program area; the actual amount of SYs expended for 2007 was 5.4. During FY2007, in this program area MAFES expended$241,312 (Hatch), $1,067,506 (1862 Matching), and $311,309 (1862 All Other) for a total of $1,620,127.

In FY2007 there were 13 research projects in this program area, falling under 11 knowledge areas. Research in this program area has resulted in a number of outputs for FY2007, including completed projects, publications, and presentations at professional meetings, workshops, and at other venues. An interesting new output involved dog biscuits made from lobster byproducts, which are being marketed by Blue Seal Feeds.

There were several outcomes in this program area during FY2007, which are elucidated in the outcome section. To highlight a few: MAFES scientists developed an in vivo method to measure protein digestibility of microdiets in larval marine fish. This has not been possible before using conventional techniques. Using this technique, MAFES researchers will be able to develop improved microdiets for larval marine fish. Also MAFES researchers continued their investigation on the effect of environmental estrogens on fish. Knowledge from this study has set a new precedent for the effects of environmental estrogens.

Economics, Marketing, Policy and Community Development

In our original plan of work, we estimated that there would be 4.4 SYs in this program area; the actual amount of SYs expended for 2007 was 4.9. During FY2007, in this program area MAFES expended $299,363 (Hatch), and $780,486 (1862 Matching) for a total of $1,079,849.

In FY2007 there were 13 research projects in this program area, falling under eight knowledge areas. MAFES research in this program area has resulted in a number of outputs for FY2007, including completed projects, publications, and presentations at professional meetings, workshops, and at other venues.

There were several outcomes in this program area during FY2007, which are elucidated in the outcome section. To highlight a few: MAFES economists provided assistance to Farm Fresh Connection (FFC) by working directly with its management in an advisory capacity. This resulted in a change in the infrastructure of local agriculture marketing by providing about 40 farmers an access to local markets that was not generally available previously. Other MAFES economists investigated the issue of agritourism and conservatively estimate that agritourism activities currently generate more than $28 million in sales and support more than 1,700 full and part time jobs on Maine farms. Also a MAFES economist found that children exposed to secondhand

tobacco smoke typically suffer from more respiratory illnesses, in addition to ear infections, tooth decay, and impaired neurological development than their non□exposed counterparts. The researcher calculated that children in Maine who are exposed to secondhand tobacco smoke in homes, cars and other environments can suffer serious health problems, resulting in $8 million to $11.5 million a year in medical□related expenses.

Foods and Nutrition

In our original plan of work, we estimated that there would be 4.4 SYs in this program area; the actual amount of SYs expended for 2007 was 4.8. During FY2007, in this program area MAFES expended $364,093 (Hatch), and $702,468 (1862 Matching), $136,634 (1862 All Other) for a total of $1,203,213.

In FY2007 there were 11 research projects in this program area, falling under eight knowledge areas. MAFES research in this program area has resulted in a number of outputs for FY2007, including completed projects, publications, and presentations at professional meetings, workshops, and other venues.

There were several outcomes in this program area during FY2007, which are elucidated in the outcome section. To highlight a few: responding to the melamine contamination of pet food in the spring of 2007, MAFES food scientists started a joint venture with a technology□driven Maine company to develop a rapid and inexpensive EIA kit to test for melamine in pet foods. The EIA kit for rapid melamine detection in pet food is now a commercial product marketed by Beacon Analytical Systems, Inc. (Portland, ME). As part of multistate project NE-1018, MAFES researchers investigated ways to prevent soft scald of Honeycrisp apples. Maine apple growers were informed about the new technique through a newsletter, at grower meetings, and during on□site visits to farms. Most growers have adopted this technique, saving growers$175,000 in a year when soft scald was severe.

Natural Resources

In our original plan of work, we estimated that there would be 7.2 SYs in this program area; the actual amount of SYs expended for 2007 was 6.3. During FY2007, in this program area MAFES expended $197, 820(Hatch), and $736,143 (1862 Matching), $27,932 (1862 All Other) for a total of $961,895.

In FY2007 there were 17 research projects in this program area, falling under 14 knowledge areas. MAFES research in this program area has resulted in a number of outputs for FY2007, including completed projects, publications, and presentations at professional meetings, workshops, and other venues. An additional output was a database of harbor seal and gray seal distribution and numbers over time, which is available as a database and as a Google-map add-on.

There were several outcomes in this program area during FY2007, which are elucidated in the outcome section. To highlight a few: a MAFES biologist has substantial data showing that Maine's populations of Arctic charr have diverged substantially in features related to their trophic ecology. Recognition of the important nature of this divergence has led to increased emphasis on the preservation of population diversity in this species, including a decision by the state to attempt to recover a threatened population, rather than replace it with another source. MAFES wildlife ecologists have developed a molecular identification key to the 10 species of freshwater mussels in Maine in an effort to determine which fish in the wild serve as hosts for the larvae. This is particularly important to two state□designated threatened species—the yellow lampmussel and tidewater mucket.

Plant Production

In our original plan of work, we estimated that there would be 5.0 SYs in this program area; the actual amount of SYs expended for 2007 was 6.6. During FY2007, in this program area MAFES expended $292,954 (Hatch), and $1,118,797 (1862 Matching), $587,027 (1862 All Other) for a total of $1,998,778.

In FY2007 there were 13 research projects in this program area, falling under 11 knowledge areas. MAFES research in this program area has resulted in a number of outputs for FY2007, including completed projects, publications, and presentations at professional meetings, workshops, and other venues.

There were several outcomes in this program area during FY2007, which are elucidated in the outcome section. To highlight a few: MAFES researchers developed new propagation methods for Rhododendron carolinianum, a beautiful evergreen shrub native to Eastern U.S. coast that tolerates temperatures to □33C. In collaboration with researchers from the NE□1017 multi□state project, MAFES researchers developed an irrigation automation system for commercial greenhouse growers. Using this system, herbaceous perennials and annuals were irrigated with as little as 1 to 2 L of water throughout the entire production cycle. No non□point source pollution from fertilizer leachate is released when plants are irrigated with this irrigation system.

Plant Protection

In our original plan of work, we estimated that there would be 5.6 SYs in this program area; the actual amount of SYs expended for 2007 was 5.2. During FY2007, in this program area MAFES expended $327,637 (Hatch), and $1,660,751 (1862 Matching), $427,967 (1862 All Other) for a total of $2,416,355.

In FY2007 there were 15 research projects in this program area, falling under 17 knowledge areas. MAFES research in this program area has resulted in a number of outputs for FY2007, including completed projects, publications, and presentations at professional meetings, workshops, and other venues.

There were several outcomes in this program area during FY2007, which are elucidated in the outcome section. To highlight a few: MAFES research on blueberries has had several positive outcomes. The percentage of Maine blueberry growers adopting and maintaining integrated pest management strategies has risen to 91%, and 50% of Maine blueberry acreage was treated with

perimeter tactics for control of blueberry maggot fly. MAFES researchers have developed a new forecasting tool for blueberry fungal disease. The mummy berry forecasting method was used by a number of growers to determine when they should spray for control of Monilinia infection and when it was safe to stop spraying because there was no more fungal inoculum. Additionally MAFES entomologists have demonstrated that the bumble bee, Bombus impatiens, can be used for pollination of lowbush blueberry and achieve similar levels of fruit set and harvestable berries as are observed in paired honey bee fields. For potato growers, MAFES researchers have shown a reduction in potato insect pests from improved soil quality. The decrease in pest populations on plants grown in amended soil suggests that soil amendments are not only improving plant nutrition, but also contribute to better plant protection from insect herbivory.

Total Actual Amount of professional FTEs/SYs for this State

Year:2007	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	31.3	0.0
Actual	0.0	0.0	33.3	0.0

II. Merit Review Process

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

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

2. Brief Explanation

The external scientific peer review process fully described in our 2000-2004 Plan of Work continues to be used to evaluate all MAFES projects, regardless of funding source. The following is a summary of that process. The MAFES Research Council takes leadership for the review process, which begins each September. New and current faculty whose MAFES projects terminate a year hence begin the process of developing new research projects. The faculty are encouraged to consult with their unit administrators, faculty colleagues, client groups, and members of the Research Council to identify priority research areas. Scientists developing a new or revised research project prepare a preproposal, which contains all of the elements required for a Hatch or McIntire-Stennis project, plus a discussion of the expected benefits from participation in multi-state research and a review of information available in the USDA Current Research Information System. Then, a meeting is scheduled between the Research Council, the scientist, and the scientist's unit administrator to discuss the proposed research. For those who have a project that is terminating, accomplishments of the previous project as well as plans for future research are discussed. All preproposals also are distributed to the University of Maine Board of Agriculture and the Forest Resources Advisory Committee, whose members are invited to comment on the relevance of the proposed research. Following the meeting with the Research Council, the scientist and unit administrator are informed of the Research Council's decision regarding the preproposal including requests for revisions. Once approved, the scientist prepares a full research proposal, and a member of the Research Council is appointed to serve as "oversight." The full proposal is sent to four external peer reviewers for evaluation and input.Upon receiving input, the scientist submits a revised proposal along with a letter outlining all of the substantive peer reviewers' comments. The oversight person then makes a general recommendation to the Research Council as to whether the final proposal should be accepted. The Research Council makes a final evaluation of the revised proposal and recommends approval of the proposal to the director or returns the proposal to the scientist with suggestions for further revisions. When the project is approved by the Research Council, the director submits the proposal and required forms to the USDA CSREES for final approval. This process of peer review of all Experiment Station projects has been used for more than 15 years and has improved the quality of the proposals and, more importantly, the quality of the research conducted by MAFES faculty.

III. Stakeholder Input

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

- 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
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public

Brief Explanation

MAFES encouraged stakeholder input by hosting (along with the College leadership) formal meetings with advisory groups including the Board of Agriculture (twice annually), the Forest Resources Advisory Committee (twice annually), the Coordinating Committee of the Maine Cooperative Fish and Wildlife Research Unit (annually). This year, as a way to encourage more participation by state legislatures, one Board of Agriculture meeting was held in the state capitol building.

Other key stakeholders groups also provided input in direct or indirect ways. Three boards or committees (Wild Blueberry Commission of Maine Advisory Committee, Maine Potato Board, Cooperative Forestry Research Unit) held funding competitions where MAFES scientists submitted all or the majority of project proposals. Feedback from these committees provide information on research priorities and needs for these commodity groups.

The Associate Director of MAFES attended monthly meetings of the Agricultural Council of Maine as a way to maintain effective communication with the wide array of agricultural organizations in the state. As this group revises its long-range plan, these meetings provide MAFES administration with good information on issues important to Maine's agricultural community.

The Maine Agricultural Center continued to facilitate improved communication between MAFES and University of Maine Cooperative Extension and therefore between researchers and extension faculty. Extension educators are both stakeholders in research and good sources of information about the research needs of the groups they serve.

MAFES faculty, through their interaction with stakeholder groups and individuals in both formal and informal settings, also continued to encourage stakeholder participation.

At our research facilities, MAFES hosted field days held for apples, small fruits, and vegetables, potatoes, and wild blueberries and other interests of growers which allows researchers and administrators to learn more about the needs of the stakeholders in attendance.

Overall, the Station will make every effort to allow all groups and individuals to express their suggestions and concerns about station-sponsored research through the mechanisms discussed above.

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

Brief Explanation

In the agricultural and forestry sectors, the major stakeholder groups are identified through coordinating and advisory committees such as the Board of Agriculture and the Forestry Research Advisory Committee. MAFES provides input on potential committee members as do the current member stakeholder groups. For agriculture and forestry, MAFES maintains a list of all known stakeholders, and these groups are contacted on a regular basis. Individual stakeholders are identified in a variety of ad hoc ways including through faculty and department/school contacts as well as UMaine Cooperative Extension.

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
- 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

Brief Explanation

Input is collected through formal organization processes (Board of Agriculture, Forest Resources Advisory Committee, Maine Cooperative Fish and Wildlife Research Unit Coordinating Committee) and feedback on research programs of faculty via stakeholder grant review programs (Wild Blueberry Commission of Maine Advisory Committee, Maine Potato Board, Cooperative Forestry Research Unit). The Board of Agriculture and Forest Resources Advisory Committee reviews all MAFES project preproposals. In 1999, the Board of Agriculture contacted all known agricultural stakeholders to collect information on their research and extension and that information was used by the Board to advise MAFES and UMCE. A similar effort is currently being considered by the Board.

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

Input was used internally to evaluate research, outreach and hiring priorities for MAFES and the Maine Agricultural Center (MAC). As noted above, some stakeholder groups provide direct input during project approval processes. Based on the input received and the priorities set by the Board of Agriculture and Forest Research Advisory Committee, critical areas were identified for emphasis and support. Since agriculture is a dynamic industry, MAC/MAFES needs to update long-range plans and the strategic plan of the Agricultural Council of Maine, once completed, will be a key input to that process.

Brief Explanation of what you learned from your Stakeholders

Stakeholders felt provisions in the Farm Bill to increase funding for research on specialty crops were important to Maine.

The following research position searches/hires were initiated in FY07 based on stakeholder input on critical research needs for Maine: dairy economic specialist, sustainable agriculture specialist, veterinarian pathologist.

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	3292088	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	0	0	1723179	0
Actual Matching	0	0	6066151	0
Actual All Other	0	0	1490869	0
Total Actual Expended	0	0	9280199	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	Animal Production and Protection
2	Plant Production
3	Plant Protection
4	Natural Resources
5	Economics, Marketing, Policy and Community Development
6	Foods and Nutrition

Program #1

V(A). Planned Program (Summary)

1. Name of the Planned Program

Animal Production and Protection

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			14%	
302	Nutrient Utilization in Animals			10%	
303	Genetic Improvement of Animals			10%	
304	Animal Genome			8%	
305	Animal Physiological Processes			10%	
307	Animal Management Systems			1%	
308	Improved Animal Products (Before Harvest)			9%	
311	Animal Diseases			15%	
312	External Parasites and Pests of Animals			8%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals			7%	
402	Engineering Systems and Equipment			8%	
	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	4.7	0.0
Actual	0.0	0.0	5.4	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	241312	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1067506	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	311309	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research new ways to increase the reproductive success of dairy cows. Develop new stocks of mussels and oysters. Develop and test new fish diets. Develop new rearing techniques for cod and halibut. Research the efficacy of vaccines for infectious pancreatic necrosis virus. Discover the effects of toxicants on fish and shellfish. Determine the relationship between green crab and softshell clam populations. Design a GIS to track distribution of lobster shell disease. Publish peer-reviewed journal articles and other publications concerning research. Present findings at professional meetings and at other venues.

2. Brief description of the target audience

Scientists, extension specialists, state fisheries managers, dairy farmers, Maine's aquaculture and shellfish industries

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	0	0	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	8	8

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of peer-reviewed publications, annually

Year	Target	Actual
2007	10	8

Output #2

Output Measure

- # of research projects completed, annually

Year	Target	Actual
2007	3	3

Output #3

Output Measure

- # of papers presented at professional meetings, annually

Year	Target	Actual
2007	26	22

Output #4

Output Measure

- # of other types of publications, annually

Year	Target	Actual
2007	8	13

Output #5

Output Measure

- New dog biscuits made from lobster byproducts marketed by Blue Seal Feeds

Year	Target	Actual
2007	{No Data Entered}	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of zebrafish models validated for use in toxicology studies and for testing new pesticides
2	# of new lab-scale protocols that accurately reflects farm-scale ensilage
3	# of new cost-benefit models for establishing mussel hatcheries for new mussel lines
4	# of DNA vaccines against infectious pancreatice necrosis virus developed and tested
5	# of thematic maps regarding incidence of lobster shell disease and other environmental factors
6	# of state agencies using findings on effects of contaminants in rivers on maturation of Maine salmon to develop BMPs for pesticide use
7	% of Maine dairy farmers sending samples to be measured for bovine placental lactogen (bPL) and using the results of samples to make management decisions involving their animals
8	# of crab-monitoring programs undertaken by coastal communities
9	# of Maine mussel growers using new submersible raft
10	# of new oyster lines with superior cold-water growth and disease resistance
11	% increase in Maine's clam catch levels
12	% increase in oyster seed from new lines being used by industry
13	% increase in mussel seed used for grow-out on commercial mussel farms
14	% increase in the fertility of marine broodfish (Atlantic cod and halibut)
15	% increase in the hatching rate of marine larval fish (Atlantic cod and halibut)
16	% increase in the viability of juvenile marine fish raised in captivity (Atlantic cod and halibut)
17	% reduction in the use of live food inputs in diets for larval marine fish
18	New method to measure protein digestibility of microdiets in larval marine fish.
19	Effect of environmental estrogens on fish

Outcome #1

1. Outcome Measures

# of zebrafish models validated for use in toxicology studies and for testing new pesticides

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
304	Animal Genome

Outcome #2

1. Outcome Measures

# of new lab-scale protocols that accurately reflects farm-scale ensilage

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #3

1. Outcome Measures

# of new cost-benefit models for establishing mussel hatcheries for new mussel lines

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals

Outcome #4

1. Outcome Measures

# of DNA vaccines against infectious pancreatice necrosis virus developed and tested

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

The finding that a subunit recombinant vaccine resulted in increased rates of clearing for IPNV demonstrated that the zebrafish system is suitable for the study of IPNV and that recombinant DNA-based vaccines may halp prevent the carrier state of IPNV.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #5

1. Outcome Measures

# of thematic maps regarding incidence of lobster shell disease and other environmental factors

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
312	External Parasites and Pests of Animals

Outcome #6

1. Outcome Measures

# of state agencies using findings on effects of contaminants in rivers on maturation of Maine salmon to develop BMPs for pesticide use

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
304	Animal Genome

Outcome #7

1. Outcome Measures
% of Maine dairy farmers sending samples to be measured for bovine placental lactogen (bPL) and using the results of samples to make management decisions involving their animals

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes

Outcome #8

1. Outcome Measures

# of crab-monitoring programs undertaken by coastal communities

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
312	External Parasites and Pests of Animals

Outcome #9

1. Outcome Measures

# of Maine mussel growers using new submersible raft

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

The submersible mussel raft has not been so successful due to the illness of the commercial partner.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment

Outcome #10

1. Outcome Measures

# of new oyster lines with superior cold-water growth and disease resistance

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals

Outcome #11

1. Outcome Measures

% increase in Maine's clam catch levels

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
312	External Parasites and Pests of Animals

Outcome #12

1. Outcome Measures

% increase in oyster seed from new lines being used by industry

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals

Outcome #13

1. Outcome Measures

% increase in mussel seed used for grow-out on commercial mussel farms

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
303	Genetic Improvement of Animals

Outcome #14

1. Outcome Measures

% increase in the fertility of marine broodfish (Atlantic cod and halibut)

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
308	Improved Animal Products (Before Harvest)
307	Animal Management Systems
302	Nutrient Utilization in Animals
301	Reproductive Performance of Animals

Outcome #15

1. Outcome Measures

% increase in the hatching rate of marine larval fish (Atlantic cod and halibut)

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
308	Improved Animal Products (Before Harvest)
307	Animal Management Systems

Outcome #16

1. Outcome Measures

% increase in the viability of juvenile marine fish raised in captivity (Atlantic cod and halibut)

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
301	Reproductive Performance of Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

Outcome #17

1. Outcome Measures

% reduction in the use of live food inputs in diets for larval marine fish

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
308	Improved Animal Products (Before Harvest)
302	Nutrient Utilization in Animals
307	Animal Management Systems

Outcome #18

1. Outcome Measures
New method to measure protein digestibility of microdiets in larval marine fish.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Improper feeding and inadequate diets during all life stages (broodfish, larvae and juvenile) can result in poor production performance. This project examines the nutrition and feeding of marine fish to improve production performance (survival, growth, and reproductive performance)during different life stages.

What has been done

An in vivo method to evaluate dietary protein quality in larval fish was developed.

Results

We were able to develop an in vivo method to measure protein digestibility of microdiets in larval marine fish. This has not been possible before using conventional techniques. This change in knowledge will allow, for the first time ever, to measure digestibility of microdiets in marine larval fish. Using this technique we will be able to develop improved microdiets for larval marine fish.

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
302	Nutrient Utilization in Animals
301	Reproductive Performance of Animals

Outcome #19

1. Outcome Measures

Effect of environmental estrogens on fish

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Elevated heavy metal concentrations in ground water present a health hazard to aquatic organisms.

What has been done

This project has investigated an organism's ability to cope with heavy metal insult through mechanisms that are mediated by the transcription factor MTF-1.

Results

Knowledge from our studies has set a new precedent for the effects of environmental estrogens. We have discovered that waterborne estrogens decrease the ability of fish to repair ubiquitous DNA lesions. This has far reaching implications for environmental carcinogenesis and population dynamics as a result of anthropogenic pollution. We have also discovered that quantum confined nanocrystals do not exert their effects on the cell in the same manner as their bulk constituents. Thus, particulate metals can act at different locations in the cell and through different mechanisms.

4. Associated Knowledge Areas

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

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (new invasive species)

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- During (during program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #2

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Production

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources			8%	
102	Soil, Plant, Water, Nutrient Relationships			23%	
201	Plant Genome, Genetics, and Genetic Mechanisms			7%	
202	Plant Genetic Resources			17%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			7%	
204	Plant Product Quality and Utility (Preharvest)			7%	
205	Plant Management Systems			17%	
206	Basic Plant Biology			10%	
211	Insects, Mites, and Other Arthropods Affecting Plants			1%	
212	Pathogens and Nematodes Affecting Plants			2%	
511	New and Improved Non-Food Products and Processes			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	5.0	0.0
Actual	0.0	0.0	6.6	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	292954	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1118797	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	587027	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research new ways to increase the productivity of potato, blueberry, apple, small fruit and vegetable crops. Develop and test new potato, other vegetable, and horticultural plant varieties.Conduct research on basic plant biology and molecular biology issues. Research new soil management and cover crop techniques to increase yields and improve soil quality. Research basic soil chemistry issues. Publish peer-reviewed journal articles and other publications concerning research. Present findings at professional meetings, at field days for growers, and at other venues.

2. Brief description of the target audience

Plant geneticists, biologists, and molecular biologists, soil scientists, extension specialists, plant breeders, Maine' s horticultural industry, Maine fruit and vegetable producers, greens 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	0	0	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	19	19

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of field days/research tours

Year	Target	Actual
2007	5	7

Output #2

Output Measure

- # of research projects completed

Year	Target	Actual
2007	5	6

Output #3

Output Measure

- # of papers presented at professional meetings

Year	Target	Actual
2007	26	38

Output #4

Output Measure

- # of peer-reviewed publications

Year	Target	Actual
2007	10	19

Output #5

Output Measure

- # of other types of publications

Year	Target	Actual
2007	8	33

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of improved analytical methods developed to study dissolved organic matter in soils
2	# of candidate stress-related genes or alleles that are functionally characterized
3	% of Maine apple growers who increase their knowledge about most suitable rootstocks for Maine conditions
4	# of gene-based marker systems used for targeted introgression in potato-variety-improvement program
5	# of new potato varieties released from Eastern potato-breeding program
6	# of potato clones with the best characteristics that will be selected annually for commercial-scale testing on experiment station and commercial farms
7	% of Maine potato growers adopting new recommendations (i.e., fertility programs, tissue-testing tools, crop rotation recommendations)
8	# of new, resistant Poa annua clones
9	% of Maine apple growers planting winter-hardy, early-bearing rootstocks
10	# of small Maine farms that will diversify
11	# of Maine farmers implementing sustainable agricultural practices
12	# of Maine farms developing new agricultural products
13	# of new potato varieties adopted by Maine potato farmers
14	% decrease in blueberry leaf samples showing nutrient deficiencies
15	% increase in productivity of blueberry fields (lbs/acre) through better fertility management
16	Increase in profitability for Maine apple industry from a quicker return on investment and reduction in catastrophic tree losses ($)
17	New propagation methods for Rhododendron carolinianum.
18	New, water-saving irrigation system for commercial greenhouse growers

Outcome #1

1. Outcome Measures

# of improved analytical methods developed to study dissolved organic matter in soils

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources

Outcome #2

1. Outcome Measures

# of candidate stress-related genes or alleles that are functionally characterized

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #3

1. Outcome Measures

% of Maine apple growers who increase their knowledge about most suitable rootstocks for Maine conditions

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
204	Plant Product Quality and Utility (Preharvest)

Outcome #4

1. Outcome Measures

# of gene-based marker systems used for targeted introgression in potato-variety-improvement program

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #5

1. Outcome Measures

# of new potato varieties released from Eastern potato-breeding program

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
212	Pathogens and Nematodes Affecting Plants
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)

Outcome #6

1. Outcome Measures

# of potato clones with the best characteristics that will be selected annually for commercial-scale testing on experiment station and commercial farms

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants
202	Plant Genetic Resources
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

Outcome #7

1. Outcome Measures
% of Maine potato growers adopting new recommendations (i.e., fertility programs, tissue-testing tools, crop rotation recommendations)

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

Outcome #8

1. Outcome Measures

# of new, resistant Poa annua clones

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #9

1. Outcome Measures

% of Maine apple growers planting winter-hardy, early-bearing rootstocks

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

Outcome #10

1. Outcome Measures

# of small Maine farms that will diversify

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	29

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #11

1. Outcome Measures

# of Maine farmers implementing sustainable agricultural practices

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	5	31

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #12

1. Outcome Measures

# of Maine farms developing new agricultural products

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #13

1. Outcome Measures

# of new potato varieties adopted by Maine potato farmers

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
202	Plant Genetic Resources
205	Plant Management Systems
204	Plant Product Quality and Utility (Preharvest)
212	Pathogens and Nematodes Affecting Plants

Outcome #14

1. Outcome Measures

% decrease in blueberry leaf samples showing nutrient deficiencies

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
206	Basic Plant Biology

Outcome #15

1. Outcome Measures

% increase in productivity of blueberry fields (lbs/acre) through better fertility management

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology
102	Soil, Plant, Water, Nutrient Relationships

Outcome #16

1. Outcome Measures
Increase in profitability for Maine apple industry from a quicker return on investment and reduction in catastrophic tree losses ($)

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
204	Plant Product Quality and Utility (Preharvest)

Outcome #17

1. Outcome Measures

New propagation methods for Rhododendron carolinianum.

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Rhododendron carolinianum is a beautiful evergreen shrub native to Eastern U.S. coast and tolerates for -33C. It is not common in the landscapes, however, because of the difficulty in vegetatively propagating it.

What has been done

MAFES researchers conducted cutting experiments to determine the best method for propagating this shrub.

Results

From our cutting experimental results, propagators had gained knowledge of collecting hardwood cuttings of Rhododendron carolinianum in November, treating them with double dips of 16000 mg/L IBA, then placing them under mist system for 3 to 4 months to reach commercial feasible quality and rooting rate of 84.4%. Growers also learned that rooted cuttings should be placed into a cooler for 6 weeks and vernalized for the next spring flash growth.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources

Outcome #18

1. Outcome Measures

New, water-saving irrigation system for commercial greenhouse growers

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Currently, many greenhouse growers over-water and fertilize container-grown ornamental plants to ensure that they don't die due to drought stress.

What has been done

In collaboration with researchers from the NE-1017 Multi-State project, an irrigation automation system was developed for commercial greenhouse growers. This irrigation system uses capacitance sensors to measure substrate volumetric water content (volume of water in a given volume of substrate). These measurements are collected via a datalogger and irrigation is initiated only when the substrate volumetric water drops below a pre-determined set point.

Results

Using this system, herbaceous perennials (Gaura lindhiemeri, Coreopsis verticillata, and Sunny Border Blue Veronica) and annuals (petunia, Catharanthus roseus, and Salvia splendens) were irrigated with as little as 1-2 L of water throughout the entire production cycle. No non-point source pollution from fertilizer leachate is released when plants are irrigated with this irrigation system. Irrigation recommendations were developed for all six plants listed above. Further, it was determined that the area of the uppermost fully expanded leaf of petunia correlates to substrate volumetric water content. Thus, leaf area may be used to detect early symptoms of drought stress in commercial greenhouse production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (new pest/disease species)

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- During (during program)
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #3

V(A). Planned Program (Summary)

1. Name of the Planned Program

Plant Protection

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			1%	
123	Management and Sustainability of Forest Resources			1%	
136	Conservation of Biological Diversity			4%	
201	Plant Genome, Genetics, and Genetic Mechanisms			1%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants			1%	
204	Plant Product Quality and Utility (Preharvest)			1%	
205	Plant Management Systems			3%	
206	Basic Plant Biology			2%	
211	Insects, Mites, and Other Arthropods Affecting Plants			8%	
212	Pathogens and Nematodes Affecting Plants			13%	
213	Weeds Affecting Plants			22%	
215	Biological Control of Pests Affecting Plants			10%	
216	Integrated Pest Management Systems			23%	
601	Economics of Agricultural Production and Farm Management			1%	
605	Natural Resource and Environmental Economics			1%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.			1%	
721	Insects and Other Pests Affecting Humans			7%	
	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	5.6	0.0
Actual	0.0	0.0	5.2	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	327637	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	1660751	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	427967	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research new ways to control diseases of potato and blueberry. Research new soil management techniques to control weeds. Research biological control of pests of potato, blueberry, other crops, and invasive ant species. Publish peer-reviewed journal articles and other publications concerning research. Present findings at professional meetings and at field days for growers and other venues.

2. Brief description of the target audience

Scientists, extension specialists, pest management professionals, potato, blueberry, and other crop producers in Maine

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	0	0	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	24	24

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of peer-reviewed publications

Year	Target	Actual
2007	12	24

Output #2

Output Measure

- # of other types of publications

Year	Target	Actual
2007	10	26

Output #3

Output Measure

- # of papers presented at professional meetings

Year	Target	Actual
2007	30	53

Output #4

Output Measure

- # of research projects completed on ways to protect valuable plant/crop species

Year	Target	Actual
2007	4	2

Output #5

Output Measure

- # of field days/research tours

Year	Target	Actual
2007	5	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	% of potato growers familiar with effects of soil management on populations of insect
2	# of Rhizoctania solani genes identified that express differentially under conditions of quinate-induced hypovirulence
3	# of Rhizoctonia solani genes identified that express differentially under conditions of genetically stable hypovirulence
4	# of Rhizoctonia solani genes identified that express differentially under conditions of virulence
5	# of Maine blueberry growers using University of Maine's diagnostic services, annually
6	# of Maine potato growers developing a better understanding of how the use of manure soil amendments and longer crop rotations affect potato insect and weed pests, and diseases and well as potato yield, quality, and profitability
7	# of Maine potato growers learning how to integrate animal-based production systems with their potato operations
8	# of Maine bluberry growers adopting and maintaining integrated pest management strategies
9	% of Maine blueberry acreage treated with perimeter tactics for control of blueberry maggot fly
10	# of alternative pest and soil management systems for potato that are ready for commercial-scale evaluation
11	% of organic and diversified vegetable farmers surveyed who have adopted weed seedbank management practices
12	% reduction in the amount of damage from blueberry maggot fly in treated fields vs nontreated fields
13	% reduction in the amount of organophosphate insecticides used to treat blueberry maggot fly in Maine
14	# of commercial-scale demonstrations with significant reductions in pesticide and fertilizer use and improvements in soil quality
15	Average density of germinable weed seedbank found by Maine growers adopting ecologically based weed management practices (# of germinable seeds per square meter, 10 cm deep). Weed populations surviving cultivation will not reduce crop yield or quality and
16	Reduction in potato insect pests from improved soil quality
17	Alternative pollinators for wild blueberry producers
18	New forecasting tool for blueberry fungal disease

Outcome #1

1. Outcome Measures

% of potato growers familiar with effects of soil management on populations of insect

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

# of Rhizoctania solani genes identified that express differentially under conditions of quinate-induced hypovirulence

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)

What has been done

Results

Current work on an exemplary organic farm showed that the hypovirulent isolate Rhs 1A1 significantly reduced the total incidence and severity of all tuber diseases whereas compost significantly increased tuber yields, especially the production of large tubers (32% increase), and also increased plant emergence.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

Outcome #3

1. Outcome Measures

# of Rhizoctonia solani genes identified that express differentially under conditions of genetically stable hypovirulence

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

Outcome #4

1. Outcome Measures

# of Rhizoctonia solani genes identified that express differentially under conditions of virulence

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants

Outcome #5

1. Outcome Measures

# of Maine blueberry growers using University of Maine's diagnostic services, annually

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	152

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
601	Economics of Agricultural Production and Farm Management

Outcome #6

1. Outcome Measures

# of Maine potato growers developing a better understanding of how the use of manure soil amendments and longer crop rotations affect potato insect and weed pests, and diseases and well as potato yield, quality, and profitability

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
102	Soil, Plant, Water, Nutrient Relationships
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
212	Pathogens and Nematodes Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
601	Economics of Agricultural Production and Farm Management

Outcome #7

1. Outcome Measures
# of Maine potato growers learning how to integrate animal-based production systems with their potato operations

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems
102	Soil, Plant, Water, Nutrient Relationships

211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
601	Economics of Agricultural Production and Farm Management

Outcome #8

1. Outcome Measures

# of Maine bluberry growers adopting and maintaining integrated pest management strategies

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	91

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

This outcome measure should be revised to 'Percentage of Maine blueberry growers' and the actual number is 91% based on a survey of growers

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants
216	Integrated Pest Management Systems

Outcome #9

1. Outcome Measures

% of Maine blueberry acreage treated with perimeter tactics for control of blueberry maggot fly

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

based upon questions asked at last field day

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants

Outcome #10

1. Outcome Measures

# of alternative pest and soil management systems for potato that are ready for commercial-scale evaluation

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
601	Economics of Agricultural Production and Farm Management
204	Plant Product Quality and Utility (Preharvest)
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems
102	Soil, Plant, Water, Nutrient Relationships
213	Weeds Affecting Plants

Outcome #11

1. Outcome Measures

% of organic and diversified vegetable farmers surveyed who have adopted weed seedbank management practices

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

Outcome #12

1. Outcome Measures
% reduction in the amount of damage from blueberry maggot fly in treated fields vs nontreated fields

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants

Outcome #13

1. Outcome Measures

% reduction in the amount of organophosphate insecticides used to treat blueberry maggot fly in Maine

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #14

1. Outcome Measures

# of commercial-scale demonstrations with significant reductions in pesticide and fertilizer use and improvements in soil quality

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
213	Weeds Affecting Plants
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
601	Economics of Agricultural Production and Farm Management
204	Plant Product Quality and Utility (Preharvest)
216	Integrated Pest Management Systems

Outcome #15

1. Outcome Measures

Average density of germinable weed seedbank found by Maine growers adopting ecologically based weed management practices (# of germinable seeds per square meter, 10 cm deep). Weed populations surviving cultivation will not reduce crop yield or quality and

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
213	Weeds Affecting Plants

Outcome #16

1. Outcome Measures

Reduction in potato insect pests from improved soil quality

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Potato plants are host to a number of insect pests, including the Colorado potato beetle, infamous for its ability to develop resistance to virtually every chemical that has been used against it. To reduce the amount of pesticides used on the crop is a valuable goal that should improve environmental quality along with profitability.

What has been done

Populations of Colorado potato beetles, flea beetles, European corn borers, and potato-colonizing aphids were scouted weekly on field plots.

Results

Potato plants grown in soils amended with compost supported 14-21% fewer Colorado potato beetle larvae, up to 90% fewer green peach aphids, 40% fewer buckthorn aphids, and 58% fewer flea beetles when compared to plants grown without compost. In contrast, compost-grown plants had 15% more Colorado potato beetle adults and 20% fewer egg masses than control plants, probably because early emergence and more vigorous plant stand early in the season encouraged their colonization by overwintered adults. The decrease in pest populations on plants grown in amended soil suggests that soil amendments are not only improving plant nutrition, but also contribute to better plant protection from insect herbivory. This makes them an important tool in integrated crop management that focuses on maintaining holistic crop health as opposed to indiscriminate use of chemical inputs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #17

1. Outcome Measures
Alternative pollinators for wild blueberry producers

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Honey bees provide essential pollination services for Maines wild blueberry growers, but the supply of healthy colonies is volatile as parasitic mites and the rigors of migratory beekeeping cause catastrophic die-offs. In addition to finding ways of improving honey bee health, MAFES researchers are looking at alternative pollinators for Maine crops.

What has been done

MAFES entomologists completed a three-year study to evaluate the performance of the alternative pollinator Bombus impatiens (bumble bees) for pollination of lowbush blueberry. This was a large scale experiment where 7 to 8 isolated fields each year for three years were stocked with either honey bees or bumble bees at the recommended stocking densities of 4 hives/acre (honey bees) or 3/4 quad/acre (bumble bees).

Results

The scientists demonstrated that after three years the bumble bee, Bombus impatiens, can be used for pollination of lowbush blueberry and achieve similar levels of fruit set and harvestable berries as are observed in paired honey bee fields.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #18

1. Outcome Measures

New forecasting tool for blueberry fungal disease

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Leaf spot and stem diseases may affect yields of wild blueberries. Blueberries vary in their resistance to the mummy berry fungus. Better information on the prevalence of mummy berry fungus will enable wild blueberry growers to reduce the amount of fungicides they apply.

What has been done

In the spring of 2007, forecasts for the probability of infection by Monilinia vaccinii-corymbosi, causing mummy berry blight, on wild blueberries were disseminated by telephone hotline and on the University of Maine Cooperative Extension website. Growers and the crew at the Blueberry hill farm were taught to evaluate the percent of susceptible tissue on blueberry stems, and measure rainfall duration and temperature and to relate them to the probability of Monilinia infection. Consultations were also made with growers on how to use the forecasting system to better time their applications of fungicides to control this disease.

Results

The mummy berry forecasting method was used by a number of growers to determine when they should spray for control of Monilinia infection and when it was safe to stop spraying because there was no more fungal inoculum. Many growers have set out mummy berry plots in their fields this fall so they can track the fungus's progress and production of inoculum in the spring. This was a result of the information provided by the Monilinia forecasting system and the grower's improved knowledge on the environmental conditions for infection by Monilinia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants
215	Biological Control of Pests Affecting Plants

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (new insect pests or diseases)

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- During (during program)
- Comparison between locales where the program operates and sites without program intervention

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

Natural Resources

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources			3%	
102	Soil, Plant, Water, Nutrient Relationships			9%	
111	Conservation and Efficient Use of Water			4%	
112	Watershed Protection and Management			7%	
123	Management and Sustainability of Forest Resources			9%	
132	Weather and Climate			4%	
133	Pollution Prevention and Mitigation			7%	
135	Aquatic and Terrestrial Wildlife			36%	
136	Conservation of Biological Diversity			1%	
201	Plant Genome, Genetics, and Genetic Mechanisms			9%	
206	Basic Plant Biology			3%	
304	Animal Genome			2%	
315	Animal Welfare/Well-Being and Protection			4%	
511	New and Improved Non-Food Products and Processes			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	7.2	0.0
Actual	0.0	0.0	6.3	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	197820	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	736143	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	27932	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research on Maine's ground water and surface water resources. Conduct research on Maine native animal and plant species and their habitats. Investigate soil-landscape relationship in coastal ecosystems. Participate in the National Atmospheric Deposition Program. Publish peer-reviewed journal articles and other publications concerning research. Present findings at professional meetings and at other venues.

2. Brief description of the target audience

Other scientists in plant biology, marine biology, animal biology, evolutionary biology, aquaculture, phycology, molecular biology; teachers at all levels; directors of aquariums and museums, exhibit halls, etc.; cancer biologists and pharmaceutical companies; endangered species biologists/managers; policy makers; state regulatory agencies; environmental consultants

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	0	0	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	18	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of peer-reviewed publications

Year	Target	Actual
2007	16	18

Output #2

Output Measure

- # of other types of publications

Year	Target	Actual
2007	14	9

Output #3

Output Measure

- # of papers presented at professional meetings

Year	Target	Actual
2007	38	42

Output #4

Output Measure

- # of research projects completed

Year	Target	Actual
2007	3	7

Output #5

Output Measure

- Database of harbor seal and gray seal distribution and numbers over time is available as a database and as a google-map add on.

Year	Target	Actual
2007	{No Data Entered}	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of complete chloroplast gene sequences submitted to GenBank for public use for Vaucheria litorea
2	# of people increasing their knowledge about the interactions between seals and Atlantic salmon, annually
3	# of people increasing their knowledge about the contribution of watershed nutrient exports to non-point pollution and nutrient cycling in Maine rivers and coastal waters
4	# of lakes from which data are used in a database to quantify statistical relationship and to develop empirical models
5	# of new software programs created to evaluate borehole flow profile data collected using borehole geophysics
6	# of new ground-water-modeling programs created to simulate ground-water flow
7	# of people improving their understanding of habitat requirements for marsh bird species of management concern in Maine, annually
8	# of people developing a better understanding of patterns of adaptive divergence in wild fish populations and the relevance of evolution in fish conservation management, annually
9	# of state and/or federal agencies using information on marsh bird species occurrence and habitat requirements in making assessments and recommendations on development proposals near wetlands
10	# of state agencies using information on marsh bird species occurrence and habitat requirements to develop recovery strategies for rare marsh bird species
11	# of new recommendations for maintaining water quality in Maine rivers and minimizing adverse impacts of non-point pollution
12	# of state agencies using information on watershed nutrient exports for developing new recommendations for maintaining water quality in Maine rivers and minimizing the impacts of non-point pollution
13	# of state agencies using information about the biology of rare wildlife species in Maine to help to create policies to protect species and habitats
14	Number of public school children and other visitors to the area using a checklist for birds for the Dwight B. Demeritt Forest in Orono/Old Town, Maine, and a checklist for birds for the Penobscot Experimental Forest in Bradley/Eddington, Maine
15	Number of Internet-accessible databases containing what may be the largest and most complete set of ecological and physiological data on a wide variety of songbirds from North America.
16	# of lake associations, such as Congress of Lake Associations, promoting maintenance of healthy lake foodwebs
17	# of management agencies using measurement of lake foodweb structure in their lake assessment and education programs
18	# of management agecies using information on seal behavior to create management plans
19	# of rare marsh bird species affected by changes in harvest regulations
20	% decrease in nutrient enrichment of Maine rivers and coastal waters
21	New evolutionary insights useful to management of Maine fishes and building new research programs supported by local and national interests
22	New findings on beaver-modified wetland landscapes
23	New molecular identification key to the 10 species of freshwater mussels in Maine

Outcome #1

1. Outcome Measures

# of complete chloroplast gene sequences submitted to GenBank for public use for Vaucheria litorea

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #2

1. Outcome Measures

# of people increasing their knowledge about the interactions between seals and Atlantic salmon, annually

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Database of harbor seal and gray seal distribution and numbers over time is available as a database and as a google-map add on.

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #3

1. Outcome Measures

# of people increasing their knowledge about the contribution of watershed nutrient exports to non-point pollution and nutrient cycling in Maine rivers and coastal waters

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

In August 2007, a severe algal bloom was stimulated by a papermill discharge of phosphoric acid into the Penobscot River. This acute nutrient enrichment event was documented by the Bangor Daily News and provided an unusual opportunity for public education concerning the effects of nutrient loading on river ecosystems. Hundreds of citizens increased their knowledge about nutrient pollution in their local river system.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #4

1. Outcome Measures

# of lakes from which data are used in a database to quantify statistical relationship and to develop empirical models

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	100	143

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Events included a one-day session on How Lakes Work for a High School Teacher's Academy organized by the Maine Lakes Conservancy Institute; the session included a discussion on links between lake water quality and food web structure and field activities useful for transfer to the classroom. In addition, I organized a day-long symposium on the East Pond Biomanipulation project designed to bring together researchers from the University of Maine, Colby College, Maine DEP and IFW, and lake association members to assess the status and make future recommendations on the project.

Results

Due to increased awareness of the role of lake foodwebs in mitigating lake stressors such as eutrophication, more lake associations have become interested in assessing the status of their lake's zooplankton communities. This interest has been translated to more requests for assistance from lake associations and offers from the VLMP to collect zooplankton samples as part of their monitoring activities. The decision of the Maine DEP, with support of the East Pond Lake Association, to proceed with the biomanipulation through removal of a substantial portion of white perch biomass from the lake, is further evidence that this message is getting into the mainstream of lake management.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife

Outcome #5

1. Outcome Measures

# of new software programs created to evaluate borehole flow profile data collected using borehole geophysics

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
111	Conservation and Efficient Use of Water

Outcome #6

1. Outcome Measures

# of new ground-water-modeling programs created to simulate ground-water flow

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation

Outcome #7

1. Outcome Measures

# of people improving their understanding of habitat requirements for marsh bird species of management concern in Maine, annually

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	200	160

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

Outcome #8

1. Outcome Measures

# of people developing a better understanding of patterns of adaptive divergence in wild fish populations and the relevance of evolution in fish conservation management, annually

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	200	370

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

Outcome #9

1. Outcome Measures

# of state and/or federal agencies using information on marsh bird species occurrence and habitat requirements in making assessments and recommendations on development proposals near wetlands

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

The Maine Department of Inland Fisheries and Wildlife has the draft thesis and data.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #10

1. Outcome Measures

# of state agencies using information on marsh bird species occurrence and habitat requirements to develop recovery strategies for rare marsh bird species

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #11

1. Outcome Measures

# of new recommendations for maintaining water quality in Maine rivers and minimizing adverse impacts of non-point pollution

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #12

1. Outcome Measures
# of state agencies using information on watershed nutrient exports for developing new recommendations for maintaining water quality in Maine rivers and minimizing the impacts of non-point pollution

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	0

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

Outcome #13

1. Outcome Measures

# of state agencies using information about the biology of rare wildlife species in Maine to help to create policies to protect species and habitats

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	1

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

Outcome #14

1. Outcome Measures

Number of public school children and other visitors to the area using a checklist for birds for the Dwight B. Demeritt Forest in Orono/Old Town, Maine, and a checklist for birds for the Penobscot Experimental Forest in Bradley/Eddington, Maine

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	150000	600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

600 checklists were distributed at the Association of Field Ornithologists' meeting I held on campus last July

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife

Outcome #15

1. Outcome Measures

Number of Internet-accessible databases containing what may be the largest and most complete set of ecological and physiological data on a wide variety of songbirds from North America.

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
123	Management and Sustainability of Forest Resources

Outcome #16

1. Outcome Measures

# of lake associations, such as Congress of Lake Associations, promoting maintenance of healthy lake foodwebs

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	3	1

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
135	Aquatic and Terrestrial Wildlife

Outcome #17

1. Outcome Measures

# of management agencies using measurement of lake foodweb structure in their lake assessment and education programs

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	0

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
135	Aquatic and Terrestrial Wildlife

Outcome #18

1. Outcome Measures

# of management agecies using information on seal behavior to create management plans

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	0

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

Outcome #19

1. Outcome Measures
# of rare marsh bird species affected by changes in harvest regulations

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #20

1. Outcome Measures
% decrease in nutrient enrichment of Maine rivers and coastal waters

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #21

1. Outcome Measures

New evolutionary insights useful to management of Maine fishes and building new research programs supported by local and national interests

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Preservation of adaptive variation within and among populations is an important element of many conservation and management programs. However, little is generally known about adaptive diversity in many species of practical concern or the best approaches to maintain such diversity. Indeed, the implications of most conservation and management schemes for adaptive variation are largely untested.

What has been done

Arctic charr: We now have substantial data showing that Maine's populations of Arctic charr have diverged substantially in features related to their trophic ecology.

Results

Recognition of the important nature of this divergence has led to increased emphasis on the preservation of population diversity in this species, including a decision by the state to attempt to recover a threatened population, rather than replace it with another source. Similarly, recognition of the importance of local Arctic charr diversity has led the Bangor Water District to work with my lab to establish a fund to be used to support long term research on this population, including resources to aid in the training of undergraduate and graduate students. Insights that we have obtained for shortnose sturgeon regarding their seasonal movements and aggregations in the Penobscot River formed the core knowledge needed by NOAA and the Army Corps of Engineers to evaluate the potential impacts of a very large scale construction and dredging project in this river system.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #22

1. Outcome Measures

New findings on beaver-modified wetland landscapes

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

For frogs in Acadia National Park, beavers are their best friends, according to a new University of Maine study.

What has been done

In a survey of 71 freshwater wetlands in Acadia, the researchers found that active, beaver-modified wetland landscapes created such habitat diversity as to benefit all pond-breeding amphibian species, even those with very different living requirements. Sites richest in pond-breeding amphibians were those connected to stream corridors and those modified by beaver activity.

Results

As beavers have recolonized areas of their former range in North America, they have increased the number and diversity of available breeding sites in the landscape for pond-breeding amphibians, according to UMaine wetland ecologists. The study highlights the importance of beavers in creating and connecting suitable breeding sites for pond-breeding amphibians in northern forested landscapes.
Their findings were published in the Journal of Wildlife Management.

4. Associated Knowledge Areas

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

Outcome #23

1. Outcome Measures

New molecular identification key to the 10 species of freshwater mussels in Maine

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

When it's time for the larvae of freshwater mussels to disperse, they hitch a ride on the gills, fins or scales of certain fish species. Finding out which fish the parasitic larvae or glochidia prefer as hosts is essential to regional conservation efforts leading to recovery of natural populations. In Maine, that's particularly important to two state-designated threatened species — the yellow lampmussel and tidewater mucket.

What has been done

University of Maine wildlife ecologists have developed and used a molecular identification key to the 10 species of freshwater mussels in Maine in an effort to determine which fish in the wild serve as hosts for the larvae.

Results

In their research, published by the international Journal of Molluscan Studies and, most recently, the Journal of the North American Benthological Society, DNA samples were taken from mussels in the Penobscot, Kennebec and St. George River drainages in Maine. The key was used to successfully identify more than 680 larvae on the gills of 230 fish, representing 18 species from 13 locations in the study area. As a conservation tool, molecular identification keys provide efficient and accurate information on host use by the entire mussel community. In this case, potential new host fish were identified for five of six mussel species, including three considered by the state to be of 'special concern.'

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

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 Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration,new cultural groupings,etc.)
- Other (new invasive species)

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- During (during program)
- Comparison between locales where the program operates and sites without program intervention

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, Marketing, Policy and Community Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management			11%	
603	Market Economics			24%	
604	Marketing and Distribution Practices			17%	
605	Natural Resource and Environmental Economics			15%	
606	International Trade and Development			6%	
607	Consumer Economics			8%	
608	Community Resource Planning and Development			17%	
610	Domestic Policy Analysis			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	4.4	0.0
Actual	0.0	0.0	4.9	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	299363	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	780486	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

Research new ways to increase profitability of the agricultural sector. Develop tools for modeling consequences of land-use change. Analyze rural labor markets. Create systems for managing Maine's commercial fisheries. Publish peer-reviewed journal articles and other publications concerning research. Present findings at professional meetings, at field days for growers or producers, and at other venues.

2. Brief description of the target audience

Scientists, economists, state and local policymakers, extension specialists, Maine farmers and food producers, seafood processors, and commercial fishermen

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	0	0	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	12	12

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of peer-reviewed publications

Year	Target	Actual
2007	9	12

Output #2

Output Measure

- # of other types of publications

Year	Target	Actual
2007	8	19

Output #3

Output Measure

- # of papers presented at professional meetings

Year	Target	Actual
2007	24	50

Output #4

Output Measure

- # of research projects completed

Year	Target	Actual
2007	5	6

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of people increasing their understanding of ongoing changes in the food system, annually
2	# of people increasing their understanding of factors affecting the profitability of Maine farming, annually
3	# of Maine specialty and value-added food producers increasing their knowledge of marketing alternatives, annually
4	# of Maine fruit and vegetable growers or seafood producers learning about sources of competitiveness and market challenges, annually
5	# of policies or programs adopted by state that promote local agricultural production
6	# of state-level committees, task forces, or commissions that integrate economic information into agricultural regulatory activities
7	% of land manager surveyed who will recognize or use land-use change data
8	% of land managers surveyed who will recognize or use forecasting tool to predict future land-use change
9	% of Maine cruis ship passengers who will visit www.freestaymaine.com Web site, annually
10	# of "freestayMaine" vouchers that are redeemed per year by cruise ship passengers who are returning to Maine for a land-based vacation
11	# of Maine growers involved in cooperative horse hay-marketing system
12	% of Maine food producers who regularly place products with Maine food retailers
13	% of Maine food producers who have developed new markets
14	# of Maine farms joining networks of local food producers and food-buying institutions
15	Maine farms and agritourism
16	Costs of secondhand smoke exposure on children

Outcome #1

1. Outcome Measures

# of people increasing their understanding of ongoing changes in the food system, annually

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
606	International Trade and Development

Outcome #2

1. Outcome Measures

# of people increasing their understanding of factors affecting the profitability of Maine farming, annually

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	250	250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

# of Maine specialty and value-added food producers increasing their knowledge of marketing alternatives, annually

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

Outcome #4

1. Outcome Measures

# of Maine fruit and vegetable growers or seafood producers learning about sources of competitiveness and market challenges, annually

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
603	Market Economics

Outcome #5

1. Outcome Measures

# of policies or programs adopted by state that promote local agricultural production

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
604	Marketing and Distribution Practices

Outcome #6

1. Outcome Measures

# of state-level committees, task forces, or commissions that integrate economic information into agricultural regulatory activities

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
607	Consumer Economics

Outcome #7

1. Outcome Measures
% of land manager surveyed who will recognize or use land-use change data

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

It is not clear whether or not the 2007 target for achieving these advances in understanding was met because land managers were not surveyed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
610	Domestic Policy Analysis
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #8

1. Outcome Measures

% of land managers surveyed who will recognize or use forecasting tool to predict future land-use change

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #9

1. Outcome Measures

% of Maine cruis ship passengers who will visit www.freestaymaine.com Web site, annually

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #10

1. Outcome Measures

of "freestayMaine" vouchers that are redeemed per year by cruise ship passengers who are returning to Maine for a land-based vacation

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #11

1. Outcome Measures

# of Maine growers involved in cooperative horse hay-marketing system

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

4. Associated Knowledge Areas

KA Code	Knowledge Area
603	Market Economics
601	Economics of Agricultural Production and Farm Management

Outcome #12

1. Outcome Measures

% of Maine food producers who regularly place products with Maine food retailers

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	15	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

As part of project objective 1, collaborate with food system stakeholders to identify high priority information needs and the forms in which information should be shared, assistance was provided to Farm Fresh Connection (FFC) by working directly with its management in an advisory capacity. FFC is a program that connects local farmers to institutional food markets, primarily colleges and restaurants, and to local independent food stores, The work this year focused on transitioning FFC from a project of the non-profit Maine Sustainable Agriculture Society to a for-profit private firm. The transition completes the original objectives of the FFC project.

Results

The transition resulted in a change in the infrastructure of local agriculture marketing by providing about 40 farmers an access to local markets that was not generally available previously.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
606	International Trade and Development

Outcome #13

1. Outcome Measures

% of Maine food producers who have developed new markets

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

Outcome #14

1. Outcome Measures
# of Maine farms joining networks of local food producers and food-buying institutions

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	20	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

As part of project objective 1, collaborate with food system stakeholders to identify high priority information needs and the forms in which information should be shared, assistance was provided to Farm Fresh Connection (FFC) by working directly with its management in an advisory capacity. FFC is a program that connects local farmers to institutional food markets, primarily colleges and restaurants, and to local independent food stores. The work this year focused on transitioning FFC from a project of the non-profit Maine Sustainable Agriculture Society to a for-profit private firm. The transition completes the original objectives of the FFC project.

Results

The transition resulted in a change in the infrastructure of local agriculture marketing by providing about 40 farmers an access to local markets that was not generally available previously.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development

604	Marketing and Distribution Practices

Outcome #15

1. Outcome Measures

Maine farms and agritourism

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farming in Maine can be a tough row to hoe. Pressured by huge national and international agribusinesses supplying giant grocery chains, family farms in Maine have been marginalized even within their own state, struggling to compete with hormone-enhanced beef and gas-ripened tomatoes trucked in from corporate-owned megafarms. Without a strong local connection, food quickly becomes just another packaged and processed commodity. As economic forces widen the gap between consumers and producers, the connection between farmers and their communities deteriorates as well, completing a socioeconomic one-two punch for the farming lifestyle. But Maine farmers are a tough breed, and their successes are evidence of the power of determination and adaptability.

What has been done

According to a recent study by University of Maine School of Economics researchers, direct-to-consumer enterprise is a critical part of the success of many Maine farms. The researchers applied their combined expertise in economics to determine how consumer-oriented activities — from roadside stands to farm-based festivals — contribute to the success of Maine farms. The study was conducted in cooperation with the Maine Department of Agriculture, Food and Rural Resources, and funded by the Maine Agricultural Center at UMaine. Using surveys and statistics from a variety of sources, the group identified a broad range of direct-to-consumer activities as examples of agritourism, and set out to determine how they influence the Maine economy and survival of the family farm. The researchers surveyed nearly 500 Maine farms that self-identified as agritourism businesses in records filed with the Maine Department of Agriculture, Food and Rural Resources. Of those surveyed, the majority depended on agritourism for more than half of their farm revenues.

Results

The research found that agritourism is a proven economic development strategy for small farms. Trends in wholesale agriculture have made it more challenging for small farms to produce the kind of volume that allows them to continue to be price competitive. Agritourism allows small farms to diversify in ways that capture more consumer dollars, helping them to survive. The researchers conservatively estimate that agritourism activities currently generate more than $28 million in sales and support more than 1,700 full- and part-time jobs on Maine farms. In addition to the farm sales, the researchers used a statewide economic model to examine how agritourism activity relates to other businesses and industries across the state. Findings show that agritourism activity on Maine farms generates an additional $13 million of economic activity in non-farm businesses, pushing the total contribution to the Maine economy to approximately $41 million. According to UMaine's survey, a fourth of Maine's agritourism farmers established their businesses in the last five years, and nearly half are interested in adding more agritourism activities. The study also found that agritourism farms in Maine may benefit from establishing strong connections and linkages with tourism-related businesses and organizations in their communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #16

1. Outcome Measures

Costs of secondhand smoke exposure on children

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Based on a recent Maine Department of Health and Human Services survey, 21 percent of adults smoke and 43 percent of smokers have children. Further, an estimated 43 percent of Medicaid recipients in Maine are smokers, and more than 25 percent of children in Maine are routinely exposed to secondhand smoke.

What has been done

A MAFES economist found through a review of medical and scientific research and statistics, provided by various state and national offices and organizations, that children exposed to secondhand tobacco smoke typically suffer from more respiratory illnesses, such as cough, wheezing, asthma, pneumonia, bronchitis and reduced lung function, in addition to ear infections, tooth decay and impaired neurological development than their non-exposed counterparts.

Results

Children in Maine who are exposed to secondhand tobacco smoke in homes, cars and other environments can suffer serious health problems, resulting in $8 million-$11.5 million a year in medical-related expenses, a University of Maine economist says. The study includes only the cost of illnesses that have been causally linked with secondhand smoke exposure. Other associated illnesses would push the economic consequences even higher. The Maine legislature is considering whether to discuss a statewide ban on smoking with young people in a vehicle. Advocacy groups from across the country have requested copies of this report.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

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

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

Program #6

V(A). Planned Program (Summary)

1. Name of the Planned Program

Foods and Nutrition

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies			17%	
502	New and Improved Food Products			14%	
503	Quality Maintenance in Storing and Marketing Food Products			15%	
701	Nutrient Composition of Food			5%	
702	Requirements and Function of Nutrients and Other Food Components			23%	
703	Nutrition Education and Behavior			14%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc			4%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins			8%	
	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	4.4	0.0
Actual	0.0	0.0	4.8	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	364093	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	702468	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	136634	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct research experiments; publish peer-reviewed articles and other types of publications; create and test new food products; develop and test nutrition interventions; develop new methods to test for food-borne pathogens and pesticide residues; develop databases

2. Brief description of the target audience

Scientists; extension educators; policy makers; specialty food producers; seafood processors; fruit and vegetable farmers; students; nutritionists; consumers

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	0	0	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	18	18

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- # of peer-reviewed publications

Year	Target	Actual
2007	9	18

Output #2

Output Measure

- # of other publications

Year	Target	Actual
2007	7	22

Output #3

Output Measure

- # of professional presentations

Year	Target	Actual
2007	20	42

Output #4

Output Measure

- # of websites on phytonutrients

Year	Target	Actual
2007	0	0

Output #5

Output Measure

- # of completed research projects

Year	Target	Actual
2007	3	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O No.	OUTCOME NAME
1	# of new crab-protein-based products developed
2	# of new natural antimicrobials developed from fruits and/or vegetables
3	% of Maine food processors learning about principles of food safety programs
4	# of new analytical methods for detecting phytocompounds in foods
5	# of Maine food processors learning about new methods to detect pesticide residues
6	% of Maine food processors establishing their own HACCP plans
7	% of Maine food processors adopting new technologies to reduce microbial contamination of food products
8	% of acreage planted of acreage planted to new apples varieties that have greater consumer appeal
9	Increase in fruit and vegetable consumption by Maine seniors
10	Increase in consumption of fruits and vegetables by targeted young adults
11	Decrease in obesity among young adults taking part in nutrition education program
12	Reduction in incidence of type 2 diabetes in Maine
13	New methods to improve the post-harvest quality of fresh-cut and processed Maine potatoes
14	New methods for detecting melamine in petfood
15	Increased profitability for Maine apple growers

Outcome #1

1. Outcome Measures

# of new crab-protein-based products developed

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	1	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

Three varieties of crab appetizers were developed: Curry, Jalapeno cheese, and Italian. Sixty-six consumers evaluated each using a 9-point hedonic scale to evaluate appearance, flavor, crab flavor, texture, and overall acceptability. The results show that minced meat by-products from Jonah crab can be used to create a consumer acceptable crab appetizer product. This research is likely the first to show that cooked crustacean proteins can form gels upon further treatment, and that the crab mince can be used as a primary ingredient in new value-added food products.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products

Outcome #2

1. Outcome Measures

# of new natural antimicrobials developed from fruits and/or vegetables

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

% of Maine food processors learning about principles of food safety programs

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	30	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
502	New and Improved Food Products

Outcome #4

1. Outcome Measures

# of new analytical methods for detecting phytocompounds in foods

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
701	Nutrient Composition of Food
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc

Outcome #5

1. Outcome Measures
# of Maine food processors learning about new methods to detect pesticide residues

2. Associated Institution Types

•1862 Research

3a. Outcome Type:
Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	2	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
701	Nutrient Composition of Food

Outcome #6

1. Outcome Measures

% of Maine food processors establishing their own HACCP plans

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	40	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #7

1. Outcome Measures

% of Maine food processors adopting new technologies to reduce microbial contamination of food products

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	10	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
502	New and Improved Food Products

Outcome #8

1. Outcome Measures

% of acreage planted of acreage planted to new apples varieties that have greater consumer appeal

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products

Outcome #9

1. Outcome Measures

Increase in fruit and vegetable consumption by Maine seniors

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior

Outcome #10

1. Outcome Measures

Increase in consumption of fruits and vegetables by targeted young adults

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #11

1. Outcome Measures

Decrease in obesity among young adults taking part in nutrition education program

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #12

1. Outcome Measures
Reduction in incidence of type 2 diabetes in Maine

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)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products

Outcome #13

1. Outcome Measures
New methods to improve the post-harvest quality of fresh-cut and processed Maine potatoes

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Two studies were conducted in 2007 to investigate the use of sodium acid sulfate as a dip application to prevent enzymatic browning of fresh cut potatoes. Potatoes were cut into French fry slices, dips were applied in various concentrations for one minute.

Results

The three percent sodium acid sulfate concentration appeared to have the least browning, maintained textural properties, and had comparable microbial counts over a refrigerated storage time of two weeks, compared to the control and citric acid treated samples. Since the three percent concentration seemed to be effective, this concentration was used in our current after-cooking darkening studies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
503	Quality Maintenance in Storing and Marketing Food Products
501	New and Improved Food Processing Technologies

Outcome #14

1. Outcome Measures

New methods for detecting melamine in petfood

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In the spring of 2007, thousands of pet owners became concerned as their pets sickened and some died due to melamine in pet food.

What has been done

Responding to this national melamine pet food scare, UMaine food scientists started a joint venture with a technology-driven Maine company to develop a rapid and inexpensive EIA kit to test for melamine contamination of pet foods.

Results

The EIA kit for rapid melamine detection in pet food is now a commercial product marketed by Beacon Analytical Systems, Inc. (Portland, ME).

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sourc
701	Nutrient Composition of Food

Outcome #15

1. Outcome Measures

Increased profitability for Maine apple growers

2. Associated Institution Types

•1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2007	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Honeycrisp is a new variety that is highly profitable for Maine apple growers selling at a wholesale price of $35 per bushel, $10 to $15 more than for most other varieties. It also has great consumer appeal being highly prized by people who eat apples. However, it is prone to a storage disorder, soft scald, that makes it unmarketable and can cause economic losses for apple growers.

What has been done

At the Maine Agricultural and Forest Experiment Station in Monmouth and at other experiment stations in the US, the technique of delayed cooling was tested over several years to prevent soft scald development in Honeycrisp apples. Delayed cooling or holding fruit at temperatures in the range of 50F to 70F for a period of up to ten days prevents soft scald but can be detrimental to fruit quality. A minimum of seven days is needed to effectively prevent soft scald, but in some cases only two days was sufficient.

Results

In 2007, an estimated 5000 bushels were stored for wholesale marketing in fall and winter. Maine apple growers were informed about the technique through a newsletter, at grower meetings and during on-site visits to farms. Most growers have adopted this technique and prevented the loss of apples or $175,000 in a year when soft scald was severe. Production of this variety will continue to increase in the next several years.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products

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

Brief Explanation

{No Data Entered}

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- During (during program)
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}