

2015 University of Maine Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Executive Summary

The University of Maine Cooperative Extension's ongoing focus areas continue to be the Maine Food System through research and outreach related to agriculture, aquaculture, food processing, distribution, business education, food safety, and human nutrition; and Youth Development through 4-H programs with a focus on the STEM disciplines. These programs are well supported in a variety of ways by a planned program focused in sustainable community and economic development.

While we are proud of the success stories included in this report we are very pleased to take this opportunity to share information about other activities and impacts that we are accomplishing.

Maine Food and Agriculture Center; an Integrated Partnership

In 2015 the Chancellor of the University of Maine System and the Board of Trustees expanded the Maine Agriculture Center (A partnership of the Experiment Station and Cooperative Extension) to become an expanded center called the Maine Food and Agriculture Center. Located on the University of Maine campus in Orono, the center will utilize the 16-county reach of Cooperative Extension and be led by the Executive Director of UMaine Extension. With 8,200 farms and \$3.9 billion in overall economic impact, agriculture is one of Maine's largest, fastest growing and most promising industries. The Maine Food and Agriculture Center will encompass all sectors of the burgeoning food economy; establish first-contact access to the programs and expertise available at all seven of Maine's public universities; and explore opportunities for cross-campus and cross-discipline coordination and program development based on emerging needs in Maine's food economy.

Food and Health

UMaine Extension offers a diverse portfolio of educational opportunities in the area of Food and Health to meet the needs of Maine people. Through the Eat Well Nutrition Education program, Maine FoodCorps, Home Food Preservation, Cooking for Crowds, and Dining with Diabetes programs, almost 20,000 adults and youth participated in educational opportunities last year.

In Maine, 14.1 percent of the population lives in poverty, and the USDA estimates Maine's food insecurity rate at 16.2 percent of the population, with one in four children experiencing food insecurity. UMaine Extension's Eat Well program and Maine FoodCorps work directly with Maine's limited income populations. Over 500 adults and 15,000 youth participated in the Eat Well Program; adult graduates reported improving their diet by increasing fruit, vegetable and whole grain intake after the program, as well as saving money on their monthly grocery expenses through planning meals and using smart shopping strategies; Eat Well youth reported improvements in choosing foods from MyPlate, food safety practices, and increased physical activity after participating in the program. FoodCorps Service Members have worked to increase the number of school gardens, and increased demand for local foods in schools, and worked directly with local food producers to connect them with local producers and growers.

The demand for food preservation education has been growing as the public's interest in the local food

system and home gardening continues to increase. UMaine Extension remains the go-to resource for up-to-date food safety information and Master Food Preserver volunteers help to meet the public's demand for these recommendations. Our staff and volunteers delivered more than 100 workshops, demonstrations, and displays to approximately 3,800 people. As a result participants reported understanding how to preserve foods better and feel more confident about their food preservation skills.

Food safety education is vital to keeping the Maine population safe and healthy. In an effort to provide the safest food possible to the almost 200,000 people in Maine who rely on food pantries and meal service programs to feed themselves and their families, UMaine Extension provides Cooking for Crowds: Food Safety Training for Volunteers to teach best practices and to improve food safety and reduce the risk of foodborne illness. A majority of the population served by the volunteers are food insecure families who rely on hot meals or food donations from local emergency food providers. Each volunteer in the Cooking for Crowds program has been educated on how to safely plan and purchase foods, transport and store foods, prepare foods, and how to handle left over foods to prevent food borne illnesses. The fifteen Cooking for Crowds workshops last year have provided education for 195 volunteer attendees from 9 different Maine counties, each responsible for safely feeding approximately 500 people each week (97,500 meals/week). These trained volunteers have increased their knowledge base to reduce food borne illness of the 5 million meals they serve annually to Maine's food insecure population.

Agriculture; Extension and Research Add Value to a Key Element of Maine's Economy

Even though Maine is 90 percent forested, the state has over 8,150 farms, the largest number of any New England state. Maine agriculture is diverse with important sectors that include wild blueberries, potatoes, dairy, livestock, poultry, grains, maple, fruits, vegetables and a vibrant ornamental horticulture industry. The University of Maine Cooperative Extension played pivotal roles in supporting a majority of these farms over the past year.

Maine's wild blueberry industry with 500 growers added value to the 100-million-pound crop grown on 44,000 acres in 2015. UMaine Extension and Research efforts improved crop productivity and efficiency by addressing pollinator population enhancement, weeds, pest insects, and diseases. The research-based knowledge provided to growers has enabled growers in Maine to remain competitive in the world marketplace and maintain a significant contribution to the State's economy.

The Maine potato industry encompasses over 500 businesses generating over \$300 million in annual sales, employing over 2,600 people and providing over \$112 million in income to Maine citizens. The economic impact from our pest monitoring and educational programs for the 2015 season is estimated to be more than \$11.4 million.

According to USDA statistics, there are 2,700 acres of apple orchard in Maine, with a crop value of up to \$15 million per year. It is estimated that 80 apple farms in Maine produce 900,000 bushels of apples annually. UMaine Extension specialists, technicians and scientists supported these commercial growers by addressing pest management, orchard establishment practices, variety and rootstock selection, crop load management, pruning practices, improved fruit quality and consistency as well as harvest and storage practices that prevent losses to chilling injury and quality loss. Our Tree Fruit Integrated Pest Management Program served apple growers across the state. Extension's Ag-Radar website provided weather-based forecasting and management timing guides for all the key apple pests. A scouting co-operative funded in part by the Maine State Pomological Society and operated by our apple IPM Program visited 25 Maine orchards weekly during the 2015 growing season. In a grower survey, savings on pesticide costs attributed to the IPM information was \$207 per acre, with estimated crop damage reduction of 37 percent. Extrapolated statewide, those values become \$560,000 in pesticide cost savings and over \$5 million in crop value.

UMaine Extension's Ornamental Horticulture Specialist consulted with more than 160 nursery and

greenhouse businesses over the past year on plant selection, crop production, problem management, and marketing issues. As a result of these consultations, these businesses selected plants that perform well in Maine, scouted and treated pests and diseases in a way that managed them with lowest-danger/least environment-impactful methods and sold profitable crops based on cost accounting and business-sustainable models.

Food Insecurity Activities and Education

The second Maine Hunger Dialogue was held at the University of Maine this year, with 150 students and staff from 19 universities and colleges statewide. The goal of the Maine Hunger Dialogue is to inspire students to take action to address hunger on their campuses and in their communities. To help in that effort, Hunger Dialogue campus teams can apply for as much as \$500 in startup funds to implement a new project, or expand/strengthen/build sustainability for an already existing hunger-related project. Projects could include activities such as establishing a new campus food pantry, hosting community "wellness" meals, establishing a resource hub, or expansion of an organic garden to provide larger quantities of fresh vegetables for local homeless shelters. As a sign of their commitment, Dialog participants packaged 10,000 nutritious, nonperishable meals for distribution to food pantries across Maine.

The Maine Hunger Dialogue grew out of our Maine Harvest for Hunger (MHH) program. Since MHH's inception, participants have distributed more than 2.19 million pounds of food to people in Maine experiencing food insecurity. In 2015, record-breaking donations of over 318,000 pounds of food went to 188 distribution sites and directly to individuals. Nearly 500 program volunteers in 14 counties collectively logged more than 5,000 hours. The value of the produce was over \$537,000, based on an average \$1.69 per pound.

4-H Youth Development in Maine

Last year more than 17,300 youth participated in the Maine 4-H program by attending 4-H camps and learning centers, 4-H community clubs, and after school and/or school enrichment programs. UMaine Extension's 4-H youth development program is the largest out-of-school educational program in Maine.

4-H STEM Ambassadors are students at one of the University of Maine System campuses who are trained in experiential learning, risk management, and science content, who are paired with host sites to facilitate STEM activities with youth. 4-H youth development staff have been working with other campuses in the University of Maine System to expand the STEM Ambassadors' program throughout the state. Currently, six UMS campuses are partners in this program to bring hands-on STEM education to young people in their community. In 2015, UMaine Extension trained and mentored 85 students who provided hands-on STEM learning for more than 1,000 youth; attended six University of Maine System campuses; and volunteered in 28 Maine communities.

Cooperative Extension and the Marine Extension Team

UMaine Extension has recommitted to our Marine Extension Team (MET) recently through a new memorandum of understanding with the Maine Sea Grant program. Our 16-year partnership has focused on economic outreach to address the truly unique issues of coastal communities in Maine. Our partnership supports the MET as shared staff members with expertise in community development, aquaculture, fisheries issues, climate change, coastal water quality, and tourism.

This year the MET worked with NOAA economists to develop an economic model and community-based resources to address fishing community dependence on the declining lobster fishery. Feedback from Maine pilot testers provided NOAA with specific information on the utility of the model in its current form and facilitated direct cooperation between Maine coastal community leaders and the NOAA economists to identify means to improve the model for use in Maine. The model is being revised and will be further tested in Maine.

Working waterfronts are cornerstones of many coastal communities across the country. In Maine in

particular, the social, economic, and environmental value of working waterfronts is critical to the sustainability of small fishing communities. To address the need to preserve working waterfronts in Maine and the nation, the National Working Waterfront Network (NWWN) was established with the support of Maine Sea Grant leadership. The NWWN has become an important resource organization for state and federal legislators seeking to develop policy approaches to address working waterfront issues. Maine Congresswoman Pingree worked with NWWN to draft legislation entitled "Keep America's Waterfronts Working Act of 2011", and evolving policy effort.

Support for Maine's Aquaculture and Marine Economy

Aquaculture continues to be one of Maine's fastest growing industries, worth over \$75 million. Much of this income is due to the net pen salmon industry. Other growing sectors of the marine economy include the shellfish industry, seaweed, baitfish and other finfish. The lobster industry in Maine, earning \$365 million in 2013, is considered second only to Alaska's in profitability, and thousands of Maine jobs are associated with lobster harvesting. Our research in the areas of sea lice of salmon, lobster health, and vaccine testing for commercial interests contributes to the health of aquaculture and aquatic animal industries in the Northeast. Contributions to knowledge about infectious salmon anemia and other salmon health issues improves aquaculture industries in other countries. Our ability to address aquaculture and fisheries issues and to engage in research will be significantly expanded with the construction of Cooperative Extension's Plant, Animal, and Insect Diagnostic Lab.

Plant, Animal, and Insect Diagnostic Lab

Design and pre-construction work is underway for the new Cooperative Extension Plant, Animal, and Insect Diagnostic Lab. This state of the art facility is a result of an \$8.0 million dollar bond voted for by the people of Maine in 2014, and will support the agriculture and food based economy in Maine, and much more. The facility will house our new Maine Tick Lab which will identify tick species and diagnose them as carriers of infectious diseases such as Lyme. We anticipate opening the lab in summer of 2017.

Extending Our Reach; In-direct Contacts

UMaine Extension extended its outreach in 2015 to over 2.1 million online visitors through its website at extension.umaine.edu. The site, a composite of 60+ interconnected websites, received more than 2.7 million page views from users in 225 countries. UMaine Extension instructional videos have been viewed more than 4,000,000 times!

Extension Volunteers

Volunteers are the heart of UMaine Extension, giving their valuable time, effort, and expertise to greatly magnify the value of our work to the people of Maine. All of our volunteers commit time to appropriate training prior to their service. As we summarize the annual reports of our faculty and staff, we are delighted to note that over 4,000 Maine people volunteered more than 85,000 hours with us this year in a myriad of ways from 4-H clubs to fundraising, from growing food to managing County budgets. This remarkable effort equates to 41 full-time staff members.

Thank you for the partnership of the USDA-NIFA in bringing Extension education, applied research and services to the people of Maine. We look forward to your feedback on this report.

Executive Summary--Maine Agricultural & Forest Experiment Station

Merit Review Process

The external scientific peer review process fully described in our 2017-2021 Plan of Work continues to be used to evaluate all MAFES projects, regardless of funding source. A total of 25 Hatch, Animal Health, and McIntire-Stennis projects went through the process in FY2015.

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 Maine Agricultural Center 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).

From discussions with stakeholders, station administrators have learned that Maine's forest stakeholders are looking for information on managing the impact of spruce budworm outbreaks on Maine's forests. Stakeholders in Maine's coastal areas see the need for more research on shellfish aquaculture--a growing sector in the aquaculture industry. Maine's agricultural groups are looking for help with detecting and managing invasive insect pests, robotic milking, and high-density apple production.

Expenditure Summary

In our 2015 Plan of Work, the Maine Agricultural & Forest Experiment Station (MAFES) estimated 36.5 SYs for 2015; the actual number of SYs was 38.0 for FY2015. For FY2015, MAFES expended \$2,488,094 (Actual Formula Funds), \$5,572,427 (Actual Matching Funds), \$1,330,521 (Actual All Other Funds), for a total of \$9,391,042. We are continuing to report on McIntire-Stennis and Animal Health projects in the appropriate program area. The All Other Funds column for our program areas includes totals spent on these funds (MS and A) and their associated match. Extramural grants awarded are entered as an output for each program area. MAFES researchers in these program areas received a total of \$14,685,509 in grants and contracts in university fiscal year 2015 (July 1, 2014, through June 30, 2015).

Planned Programs--Maine Agricultural & Forest Experiment Station

Maine Food System

In our 2015 Plan of Work, we estimated that there would be 16.7 SYs in this program area; the actual SYs allocated for 2015 were 19.0. During FY2015, MAFES expended \$1,439,146 (Hatch), and \$3,052,447 (1862 Matching), and \$0 (1862 All Other), for a total of \$4,491,593 in this program area.

MAFES research in this program area has resulted in a number of outputs for FY2015, including completed projects, peer-reviewed and other publications, presentations at professional meetings, workshops, and other venues. One patent was granted, and another was provisionally submitted. Faculty working in this area brought in \$9,174,502 in extramural funding during university fiscal year 2015.

There were several outcomes in this program area during FY2015. To highlight a few: MAFES marine scientists have developed best management practices for controlling blister worm, a pest of oysters; joint MAFES/Extension research on plum varieties is helping Maine apple growers to diversify their orchards. Maine food scientists are working with a new aquaculture venture that grows sea vegetables to provide the company with key information about the nutritional benefits and shelf-life stability of four varieties of farm-raised sea vegetables in Maine.

Climate Change

In our 2015 Plan of Work, we estimated 3.2 SYs in this program area; the actual number of SYs allocated for 2015 was 2.4. During FY2015, MAFES expended \$161,856 (Hatch), \$512,878 (1862 Matching), \$45,199 (1862 All Other) for a total of \$719,933 in this program area.

MAFES research in this program area has resulted in a number of outputs for FY2015, including completed projects, publications, and presentations at professional meetings, workshops, and other venues. Faculty working in this area brought in \$151,443 in extramural funding during university fiscal year 2015.

There were several outcomes in this program area during FY2015. To highlight one: UMaine forest research demonstrates that reducing tree densities (by silvicultural thinning) confers resistance and resilience to drought.

Sustainable Community and Economic Development

In our 2015 Plan of Work, we estimated that there would be 6.9 SYs in this program area; the actual number of SYs allocated for 2015 was 6.2. During FY2015, MAFES expended \$315,136 (Hatch), \$655,679 (1862 Matching), \$433,537 (1862 All Other) for a total of \$1,404,352 in this program area.

MAFES research in this program area has resulted in a number of outputs for FY2015, including completed projects, publications, and presentations at professional meetings, workshops, and other venues. Faculty working in this area brought in \$330,019 in extramural funding during university fiscal year 2015.

There were several outcomes in this program area during FY2015. To highlight one: UMaine economists have created a database of 6,000 community energy projects in the US, including more than 5,000 community solar projects, of which 52 are in Maine with a total installed capacity of more than 9.6 megawatts.

Sustainable Natural Resources

In our 2015 Plan of Work, we estimated 5.8 SYs in this program area; the actual SYs allocated for 2015 were 10.8 . During FY2015, MAFES expended \$571,956 (Hatch), \$1,351,423 (1862 Matching), and \$857,785 (1862 All Other) for a total of \$2,775,164 in this program area.

MAFES research in this program area has resulted in a number of outputs for FY2015, including completed projects, peer-reviewed and other publications, and presentations at professional meetings, workshops, and other venues. Faculty working in this area brought in \$3,056,861 in extramural funding during university fiscal year 2015.

There were several outcomes in this program area during FY2015. To highlight two: a MAFES scientist and undergraduate have written a how-to guide for people interested in starting community wood banks. A MAFES wildlife ecologist created a pilot citizen science-based bat-monitoring project, named BatME. The goal was to test the feasibility of using handheld detectors to monitor bat populations in Maine. More than 20 volunteers took part during summer 2015, collecting more than 4000 bat detections with their detectors.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	99.2	{No Data Entered}	36.5	{No Data Entered}
Actual	71.7	0.0	38.0	0.0

II. Merit Review Process

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

- Internal University Panel
- External University Panel
- External Non-University Panel
- Expert Peer Review
- Other (Volunteer advisory boards and County Executive Committees)

2. Brief Explanation

External University Panel and External Non-University Panel

In an ongoing effort to maintain valuable and relevant programming, faculty and staff engaged in formal and informal review by discipline-specific review panels and advisory groups that help to provide focus. While this results in defined programming intentions for the near- and long-term, the process is dynamic and ongoing throughout the year, and can result in new work to address emerging issues at any time.

Programming merit and success for faculty members is also reviewed by faculty peers and supervisors through reappointment, promotion, and post-tenure processes established by the faculty and administration and codified in employment contracts. A unique process exists for non-faculty programming professionals who undergo annual reviews by supervisors, and peer reviews every 4 years.

We partner with regional Extension programs in the Northeast Extension Consortium whose active vision is to coordinate translational research, education, outreach, and diversity programming to address problems, opportunities, and work force development in the Northeast region. Our primary mission is to enhance regional cooperation and improve coordination of regional Extension program initiatives for our region. Consortium partners are:

University of Connecticut
Cornell University
University of Delaware
Delaware State University
University of District of Columbia
University of New Hampshire
University of Maine
University of Maryland
Maryland Eastern Shore
University of Massachusetts
Penn State University
University of Rhode Island
University of Vermont
Rutgers University
West Virginia University
West Virginia State University

UMaine Extension is a member of the New England Planning and Reporting Consortium, a formalized partnership of Extension programs in Massachusetts, New Hampshire, Maine, and Vermont. Working in

collaboration with three other states in developing and managing an online planning and reporting system results in ongoing discussions around state and regional priorities and programs, opportunities for multistate work, sharing staff resources, and a much better understanding of how each of our programs are unique from others in New England.

As a result, the four states provide periodic informal merit review and feedback as a component of our partnership. Every faculty and programming professional has online access to review the programming intentions and accomplishments of staff from other states, as does the public and important stakeholders. This capacity allows for collaborative planning, evaluation, and feedback that can communicate the value of multistate accomplishments.

The station uses its standard external scientific review process for continuing faculty proposing new projects and a fast-track project approval process for new faculty. The fast-track process is intended for new faculty, where an accelerated approval process and a shorter two-year project period better meets the needs of the faculty member and station. Subsequent development of a five-year project begins during the initial two-year project. A total of 25 Hatch and McIntire-Stennis projects went through the process in FY2015; of this total, five were fast-track projects.

For the standard process, MAFES-funded projects go through the following review process. First, all preproposals are reviewed by the MAFES Research Council, which is comprised of senior faculty who have an established record of high productivity and high-quality research. The Research Council reviews the preproposals to ensure that the proposed work falls within the purview of MAFES, addresses an important need identified by stakeholders, and that the faculty member submitting the pre-proposal possesses the expertise to conduct the research. Upon receiving the input of the Research Council, faculty members develop full research proposals for the work they wish to perform. Completed full proposals are sent out for external, expert peer review by scientists who are qualified to review the proposals. All reviewers are external to the University of Maine. Potential reviewers are identified through the CRIS system, faculty, and department chairs who work in related areas, and through other experiment station directors. Each proposal is sent to three to five reviewers. Upon completion of the external expert peer reviews, proposals are returned to the researchers, who make changes based on the comments of the reviewers. Finally, the proposals are reviewed and approved by the Research Council before being submitted to USDA for final approval.

The fast-track process for MAFES-funded projects is initiated by the station director after consultation with the unit director/chair. The fast-track process can begin before a new faculty member arrives on campus. The goal is to complete project development and obtain USDA approval in four months, which is substantially shorter than the time line for standard projects. Fast-track projects also are two years in duration compared to standard five-year projects. Subsequent development of a five-year project will occur during the initial two-year project. The shorter time line for fast-track projects is achieved by using an abbreviated and internal proposal review, reducing proposal requirements, and expediting processing. Proposals are reviewed by a member of the research council and a faculty member designated by the unit director/chair to ensure that the proposed work falls within the purview of MAFES, addresses an important need identified by stakeholders, and that the faculty member submitting the proposal possesses the expertise to conduct the research.

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
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Other (Research using relevant current and first-source data)

Brief explanation.

The University of Maine Cooperative Extension has learned from our constituents that high-quality engagement takes place best when the issue is current, and have therefore chosen to engage with stakeholders on an ongoing basis as needs and issues arise. Our matrix of County-based programs involves citizen and volunteer advisory group input as an inherent part of the work, and our statewide staff works closely with community, commodity, and professional stakeholders to guide their work. Selected examples include:

- Our partnership with County-based citizen executive committees who provide direction and advice to each local Extension program in Maine and help to prioritize regional programming efforts.
- Quarterly interactions with the UMaine Board of Agriculture, a diverse stakeholder group grounded in state legislation, advises UMaine on agricultural research and Extension priorities. The Wild Blueberry Commission of Maine who represents the industry growers and processors, and who administers a state tax fund of over \$1 million.
- The Maine Potato Board composed principally of Maine-based potato farmers who offer input and advice backed up with support for research through their education and research committees. The Board also administers a state tax fund. Potatoes are Maine's most valuable commodity.
- The Maine 4-H Foundation and its volunteer governing board who work as a close partner to enrich youth experiences through our 4-H Youth Development Program.
- A variety of advisory boards and councils who are formed with targeted intent to guide the work of some of our important programs. Examples include the Senior Companion Advisory Board, the Maine Sea Grant Policy Advisory Committee, Tanglewood 4-H Camp and Learning Center Board, and the Maine Board of Pesticides Control.
- We also work in partnership with discipline specific groups whose mission is to help achieve success in a given area or for a given group. Examples include the Maine Organic Farmers and Gardeners Association, Maine Science, Technology, Engineering and Math (STEM) Collaborative, Maine Math and Science Alliance, and the Sportsman's Alliance of Maine.
- We maintain an ongoing open dialogue with Maine Legislators and County Commissioners to communicate our program focus areas and to respond to the needs that have been identified through their constituents.

The Maine Agricultural & Forest Experiment Station 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 Potato Licensing Advisory Committee (twice annually), and the Coordinating Committee of the Maine Cooperative Fish and Wildlife Research Unit (annually). This year again, as a way to encourage more

participation by state legislators, one Board of Agriculture meeting was held in the state capitol building.

The associate director attended a legislator's tour of Maine's wild blueberry industry, which included participation by local growers and presentations on the station's research programs. Associated discussions help inform the station on current research needs. The director and associate director also take part on on-campus legislative tours.

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. A committee of horticultural professionals along with the associate director approves research proposals supported by a horticulture fund. Feedback from these committees provides information on research priorities and needs for these commodity groups. The station also met with several private businesses and foundations to explore potential partnerships for future research in bioenergy, forest ecology, and sustainability.

The director and associate director discussed current research programs with legislators at two college exhibitions at the State House, one in association with the agricultural industry. The associate director of MAFES attended monthly meetings of the Agricultural Council of Maine (AGCOM) as a way to maintain effective communication with the wide array of agricultural organizations in the state. These meetings provide MAFES administration with good information on issues important to Maine's agricultural community.

The Maine Agricultural Center, which was renamed the Maine Food and Agriculture Center in fall 2015, 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. Our research facilities hosted field days for apples, small fruits, and vegetables, potatoes, grains, and wild blueberries and other interests of growers, which allow researchers and administrators to learn more about the needs of the stakeholders in attendance. Overall, the station makes 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
- Needs Assessments
- Use Surveys
- Other (Identify and analyze issues)

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, the Forestry Research

Advisory Committee, and the Coordinating Committee of the Maine Cooperative Fish and Wildlife Research Unit. 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 stakeholder groups, 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
- Other (Research using relevant current and first-source data)

Brief explanation.

Input is collected through formal organization processes (Board of Agriculture, Forest Resources Advisory Committee, and 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). Faculty researchers meet with and collect input from both traditional and nontraditional stakeholders at the group and individual level.

3. A statement of how the input will be considered

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

Brief explanation.

Input was used internally to evaluate research, outreach and hiring priorities for MAFES and the Maine Agricultural Center (MAC). Based on the input received, critical areas were identified for emphasis and support. Since agriculture is a dynamic industry, MAC/MAFES needs to update long-range plans, and will rely on the recently completed strategic plan of the Agricultural Council of Maine. Faculty, where appropriate, develop their research proposals to address the stated concerns of stakeholders.

The Highmoor Farm advisory committee, made up of the associate director, farm superintendent, and faculty users of the farm, is using the Pomological Society's input in developing a concept plan

for facility modernization. After discussions with leaders from the Maine Dairy Industry Association, a taskforce of animal and veterinary sciences faculty, the farm superintendent, and station/college administrators is conducting a review of the Witter Center (animal science research facility) programs and will be making recommendations to the dean/director.

Brief Explanation of what you learned from your Stakeholders

Key Stakeholder Input Items for NIFA Attention: What did you learn from your Stakeholders?

Through our partnership with the UMaine College of Natural Sciences, Forestry, and Agriculture and the Maine Agricultural and Forest Experiment Station, we represent the Maine Food and Agricultural Initiative, which supports stakeholder-driven agricultural research and Extension education for Maine. Examples of recent projects include:

- Soil solarization for enhanced weed control in vegetables
- The use of portable doppler radar microphone to assess honey bee colony size and health
- Evaluation of Onion and Shallot Varieties for Maine Farmers
- "Elderberry Virus Survey:
- Testing Maine's wild and cultivated elderberries for Tomato Ringspot Virus (ToRSV)"
- Improving barley quality and yields for emerging high-value markets
- Investigation and Education on the Potential Food Allergenic Residues in Composts
- Identifying Profitable Vegetable and Small Fruit Varieties for Maine (Y1-3)

Based on the needs assessment of agricultural research and extension priority areas, station administrators have learned that stakeholders would like more research on food safety, climate change, agricultural economics, and agricultural engineering. The Maine Dairy Industry Association is interested in robotic milking, and MAFES administrators and faculty are taking part in a discussion with the group to explore options. Stakeholders provided information on trends in their industries, which the station is using to modernize facilities and programs at the research farms. Maine's forest industry and landowners are looking for help with managing the impacts of the next spruce budworm outbreak, along with the impacts of moose on forest tree productivity. There is a great deal of interest in coastal Maine for continued and additional research on shellfish aquaculture. Maine farmers are looking for improved ways to detect and manage invasive insects, and Maine apple growers, in specific, are interested in high-density apple production.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2411847	0	2397947	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3956028	0	2488094	0
Actual Matching	7594127	0	5572427	0
Actual All Other	3327480	0	1330521	0
Total Actual Expended	14877635	0	9391042	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	1544181	0	292411	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Positive Youth Development
2	The Maine Food System
3	Sustainable Community & Economic Development
4	Climate Change
5	Sustainable Natural Resources

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Positive Youth Development

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
724	Healthy Lifestyle	30%		0%	
802	Human Development and Family Well-Being	20%		0%	
806	Youth Development	50%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	30.5	0.0	0.0	0.0
Actual Paid	23.7	0.0	0.0	0.0
Actual Volunteer	24.9	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
722998	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2125797	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
971032	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- General Activities in Support of Youth - Direct
- General Activities in Support of Youth - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
 - Youth Development Activities - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
 - Youth Development Activities - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)

2. Brief description of the target audience

- .. 4-H Volunteers (Adult)
- .. 4-H Youth (Youth)
- .. Agricultural Workers (Adult)
- .. Business Assist Organization Staff (Adult)
- .. Community Leaders (Adult)
- .. County Executive Committee Members (Adult)
- .. Eat Well Participants (Youth)
- .. EFNEP Participants (Youth)
- .. Extension - staff (Adult)
- .. Extension Staff (Adult)
- .. Families (Adult)
- .. General Public (Adult)
- .. General Public (Youth)
- .. Home Gardeners (Adult)
- .. Parent Educators (Adult)
- .. Parents (Adult)
- .. Senior Companion Program Volunteers (Adult)
- .. Teachers (Adult)
- .. Volunteers (Adult)

3. How was eXtension used?

{No Data Entered}

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3213	225	33581	2224

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

Patent Applications Submitted

Year: 2015
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Direct; Club, Conference, Program, Consultation, Scholarship, or Training

Year	Actual
2015	964

Output #2

Output Measure

- Indirect; Applied Research, Media, Internet, Publication, Resulting from Training

Year	Actual
2015	149

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Youth will demonstrate responsibility, critical thinking and problem solving skills through informed decision making
2	Youth will demonstrate flexibility and adaptability through decision-making
3	Youth will set goals and determine steps to reach them
4	Youth will demonstrate the ability to communicate through multiple methods and media
5	Youth will develop positive and sustained relationships
6	Youth will express interest and be engaged in science related activities
7	Youth will express positive attitudes about science
8	Youth will see science in their futures and recognize the relevance of science
9	Youth will demonstrate a capacity for science process skills (i.e. Designing a scientific procedure to answer a question, Explaining to others why things happen in an experiment, Using data to create a graph for a presentation to others)
10	Youth will participate in service learning/community service
11	Youth will demonstrate leadership
12	Youth have intentions for future civic engagement
13	Youth will demonstrate value and respect for other cultures
14	Youth will consume more healthy foods
15	Youth will consume less unhealthy foods
16	Youth will follow healthy eating patterns
17	Youth will understand the benefits of physical activity

18	Youth will engage in 60 minutes or more of physical activity per day
19	Youth will reduce sedentary activity
20	Youth will engage in safety practices
21	Youth will engage in prevention practices
22	Increase consumption and preservation of healthful, locally-grown and produced food (farm to school program, food preservation, etc.)
23	Adopt a water saving technique (rain barrels, soaker hoses, etc.)
24	Demonstrate application of life skills
25	Increase career aspirations and goal setting
26	Increase partnerships
27	Demonstrate leadership skills
28	Engage positively in their community
29	Demonstrate civic engagement
30	Strengthen human capacities, human capital, building partnerships

Outcome #1

1. Outcome Measures

Youth will demonstrate responsibility, critical thinking and problem solving skills through informed decision making

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	5038

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Summer of Science: Nurturing an Interest in Science, and Reducing Summer Learning Loss Relevance - The United States must improve the proficiency of students in STEM disciplines. Maine assessment testing (2014-15) found that more than 1/3 of Maine students are not proficient in science and that proficiency decreases in later grades.

What has been done

Response - In an effort to increase science proficiencies in underserved communities, and prevent summer learning loss, UMaine Extension created and delivered science curricula at twenty-two sites in four Maine counties reaching 452 youth during the summer 2015. The program uses the 4-H Summer of Science model that engages community teen leaders to deliver educational content. The team of 4-H staff and teens used experiential learning activities to help students meet grade proficiency. The curriculum, Every Hero Has a Story, introduced hero scientists and included a science activity connected to their work for youth in grades 3-8. Youth learned about various scientists, including some Maine scientists, while fostering scientific principles.

Results

Results - As a result, 452 youth, many of minority and/or economically disadvantaged backgrounds, participated in more than one science experiment. The activities mainly reached the same youth from week to week. Therefore, these youth were well poised to return to the school year with reduced summer learning loss and increased interest in science.

This program also fosters career development, leadership, and responsibility in the 22 Maine teens trained to deliver educational content in their neighborhoods. A survey of 14 of the teens showed:

?94% gained skills that will help them in the future.

?91% believe they can make a difference in their community as a result of the program.

?75% would consider joining a 4-H club during the school year.

One teen indicated ?my favorite part of the 4-H Summer of Science is meeting new people and sharing my knowledge with children.?

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #2

1. Outcome Measures

Youth will demonstrate flexibility and adaptability through decision-making

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3342

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #3

1. Outcome Measures

Youth will set goals and determine steps to reach them

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2988

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #4

1. Outcome Measures

Youth will demonstrate the ability to communicate through multiple methods and media

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3281

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #5

1. Outcome Measures

Youth will develop positive and sustained relationships

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3604

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being

806 Youth Development

Outcome #6

1. Outcome Measures

Youth will express interest and be engaged in science related activities

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Youth will express positive attitudes about science

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	6511

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

4-H STEM Ambassadors: Sparking Student Interest in STEM Careers

Relevance - Despite its consistently high rate of high school graduation, Maine's college attendance and success rates are low by comparison. In 2010, the Maine STEM Collaborative estimated that in the next decade one in seven new Maine jobs will be in STEM-related areas and will offer wages that are 58% higher than those of other occupations. In the best interest of Maine's future, it is critical that Maine youth have the knowledge and aspiration to access higher education, particularly in STEM fields.

What has been done

Response - 4-H can be a conduit for youth to higher education and careers, especially in STEM. Based on the success of a small pilot project, and with the support of the UMaine System Chancellor and Board of Trustees, the 4-H STEM Ambassadors program has expanded to five of the seven UMaine campuses. In 2014-2015, thirty-three ambassadors (trained college students who directly facilitate STEM activities with youth) reached over 600 youth with at least six hours of hands-on STEM activities.

Results

Results - Student leaders reported increases in their knowledge of best practices in STEM teaching and their ability and comfort facilitating STEM activities. One STEM Ambassador commented, "Being a 4-H STEM Ambassador has really helped me with public speaking. In the beginning, I was really nervous. Now I am confident and looking forward to doing more." Youth participant surveys suggested they want to learn more about science, feel they are good at science, and feel college could be for them. The 4-H STEM Ambassador program provided opportunities for UMaine to engage in local communities that have been previously underserved. Youth were extremely excited that UMaine students came to share STEM activities. Teachers are encouraged by the program's success and ask that the ambassadors return. An after-school coordinator remarked, "The program has really added value to what we are trying to accomplish. Kids are able to see someone closer to their own age doing science and math and making it fun."

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #8

1. Outcome Measures

Youth will see science in their futures and recognize the relevance of science

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	5249

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #9

1. Outcome Measures

Youth will demonstrate a capacity for science process skills (i.e. Designing a scientific procedure to answer a question, Explaining to others why things happen in an experiment, Using data to create a graph for a presentation to others)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	4941

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #10

1. Outcome Measures

Youth will participate in service learning/community service

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3724

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #11

1. Outcome Measures

Youth will demonstrate leadership

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3641

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #12

1. Outcome Measures

Youth have intentions for future civic engagement

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3455

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #13

1. Outcome Measures

Youth will demonstrate value and respect for other cultures

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2633

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being

806 Youth Development

Outcome #14

1. Outcome Measures

Youth will consume more healthy foods

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	4072

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #15

1. Outcome Measures

Youth will consume less unhealthy foods

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2430

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #16

1. Outcome Measures

Youth will follow healthy eating patterns

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1812

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #17

1. Outcome Measures

Youth will understand the benefits of physical activity

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1935

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being

806 Youth Development

Outcome #18

1. Outcome Measures

Youth will engage in 60 minutes or more of physical activity per day

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2050

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #19

1. Outcome Measures

Youth will reduce sedentary activity

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2705

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #20

1. Outcome Measures

Youth will engage in safety practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3295

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #21

1. Outcome Measures

Youth will engage in prevention practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2458

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being

806 Youth Development

Outcome #22

1. Outcome Measures

Increase consumption and preservation of healthful, locally-grown and produced food (farm to school program, food preservation, etc.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #23

1. Outcome Measures

Adopt a water saving technique (rain barrels, soaker hoses, etc.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #24

1. Outcome Measures

Demonstrate application of life skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	193

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
802	Human Development and Family Well-Being
806	Youth Development

Outcome #25

1. Outcome Measures

Increase career aspirations and goal setting

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	45

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #26

1. Outcome Measures

Increase partnerships

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	24

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #27

1. Outcome Measures

Demonstrate leadership skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	34

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #28

1. Outcome Measures

Engage positively in their community

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	243

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #29

1. Outcome Measures

Demonstrate civic engagement

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

Outcome #30

1. Outcome Measures

Strengthen human capacities, human capital, building partnerships

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	24

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Appropriations changes
- Public Policy changes
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

The Maine Food System

Reporting on this Program

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	4%		0%	
102	Soil, Plant, Water, Nutrient Relationships	7%		11%	
202	Plant Genetic Resources	0%		8%	
205	Plant Management Systems	3%		7%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		7%	
212	Pathogens and Nematodes Affecting Plants	3%		6%	
213	Weeds Affecting Plants	2%		8%	
215	Biological Control of Pests Affecting Plants	0%		8%	
216	Integrated Pest Management Systems	16%		1%	
301	Reproductive Performance of Animals	1%		7%	
302	Nutrient Utilization in Animals	2%		2%	
311	Animal Diseases	1%		8%	
403	Waste Disposal, Recycling, and Reuse	3%		1%	
501	New and Improved Food Processing Technologies	5%		8%	
502	New and Improved Food Products	5%		5%	
601	Economics of Agricultural Production and Farm Management	11%		4%	
702	Requirements and Function of Nutrients and Other Food Components	0%		5%	
703	Nutrition Education and Behavior	16%		4%	
704	Nutrition and Hunger in the Population	11%		0%	
724	Healthy Lifestyle	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	61.3	0.0	16.7	0.0
Actual Paid	39.3	0.0	19.0	0.0
Actual Volunteer	40.9	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2751743	0	1439146	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
4244731	0	3052447	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
2052950	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct scientific research. Publish peer-reviewed journal articles and other publications. Present findings at professional and public meetings and at other venues, and provide training sessions for food producers and processors. Educate undergraduate and graduate students.

- Crop Production Activities - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Crop Production Activities - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- Eat Well (Expanded Food and Nutrition Education Program) - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- Eat Well (Expanded Food and Nutrition Education Program)- Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Farm Energy Activities - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Farm Energy Activities - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- Food Safety - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Food Safety - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- General Activities in Support of the Maine Food System - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- General Activities in Support of the Maine Food System - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- Home Horticulture Activities - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- Home Horticulture Activities - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)

Training)

- Livestock Activities - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Livestock Activities - Indirect (Applied Research, Media, Internet, Publication, Resulting from

Training)

- Nutrition Education - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Nutrition Education - Indirect (Applied Research, Media, Internet, Publication, Resulting from

Training)

- Specialty Food Products - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Specialty Food Products - Indirect (Applied Research, Media, Internet, Publication, Resulting from

Training)

2. Brief description of the target audience

Maine crop and livestock farmers, aquaculture industry, food producers, processors and marketers, Cooperative Extension staff, other scientists, state policymakers, regulators, and legislators, classroom teachers

- 4-H Volunteers (Adult)
- 4-H Youth (Youth)
- Agricultural Producers (Adult)
- Agricultural Service Providers
- Agricultural Workers (Adult)
- Apple Growers (Adult)
- Beef Producers (Adult)
- Blueberry Growers (Adult)
- Business Assist Organization Staff (Adult)
- Community Leaders (Adult)
- Cranberry Growers (Adult)
- Dairy Producers (Adult)
- Elders or Seniors (Adult)
- Families (Adult)
- Families (Youth)
- Farmers (Adult)
- Food Processors (Adult)
- General Public (Adult)
- General Public (Youth)
- Home Gardeners (Adult)
- Home Gardeners (Youth)
- Low-Income Families (Adult)
- Low-Income Families (Youth)
- Master Gardener Volunteers (Adult)
- Ornamental Horticulture Industry (Adult)
- Parents (Adult)
- Pesticide Applicator Training Participants (Adult)
- Pesticide Applicators (Adult)
- Policy Makers (Adult)
- Potato Growers (Adult)
- Sweet Corn Growers (Adults)
- Teachers (Adult)
- Vegetable Growers (Adult)
- Volunteers (Adult)

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	93596	1415883	9361	222

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

Patent Applications Submitted

Year: 2015
Actual: 2

Patents listed

Patent: lobster hemolymph as a utility for treating mammalian skin lesions--Granted

Patent: Soft Tissue In-Growth of Porous, Three-Dimensionally Printed, Transcutaneous Implants of Varying Material and Pore Geometry--Provisional application USSN: 62/111,308

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	46	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Direct; Club, Conference, Program, Consultation, Scholarship, or Training

Year	Actual
2015	10657

Output #2

Output Measure

- Indirect; Applied Research, Media, Internet, Publication, Resulting from Training

Year	Actual
2015	21888

Output #3

Output Measure

- Non-peer-reviewed research publications

Year	Actual
2015	56

Output #4

Output Measure

- parasite identification workshop for producers - using a microscope (Durham, NH. Windsor, ME and Orono, ME).

Year	Actual
2015	3

Output #5

Output Measure

- New websites: www.myicook4h.com ALSI public access website:
<http://umaine.edu/wahlelab/current-projects/american-lobster-settlement-index/>

Year	Actual
2015	2

Output #6

Output Measure

- Disclosure of invention: New methods for the control of sea lice (ongoing)

Year	Actual
2015	1

Output #7

Output Measure

- Extramural funds awarded to experiment station faculty in this program area in FY15:

Year	Actual
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2015

9174502

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Pounds of food donated
2	Monetary value of food produced, gleaned, and donated
3	Number of agencies served
4	Implement practices that improve efficiency, reduce inputs and negative impacts on the environment, increase profitability, or reduce energy consumption
5	Adopt and maintain integrated pest management strategies
6	Demonstrate how to develop integrated farming systems (on farm composting? different enterprises on the same farm?)
7	Improve animal well-being
8	Establish new farm enterprises
9	New crops and markets developed
10	Implement techniques to reduce effects of variable climate
11	Adopt specific food safety plans and/or policies
12	Adopt healthy dietary practices (consume nutrient-rich foods, follow current Dietary Guidelines for Americans or DASH, etc)
13	Increase consumption and preservation of healthful, locally-grown and -produced food (farm to school program, food preservation, etc.)
14	Adopt techniques to improve soil quality
15	Adopt a water saving technique (rain barrels, soaker hoses, etc.)
16	Utilize Cooperative Extension to identify pest problems and determine research-based management strategies
17	Increase consumption of home-grown food

18	Enhance capacity of a sustainable global food system including new/improved plants, animals, technologies, and management systems
19	More sustainable, diverse, and resilient food systems in Maine
20	Improve food safety
21	Improve Animal Health
22	Expand a business
23	Improve efficiency
24	Increase profitability
25	Make more effective business decisions
26	Start a business
27	Demonstrate leadership skills
28	Adopt sustainable living practices
29	Engage positively in their community
30	Youth will consume more healthy foods
31	Youth will consume less healthy foods
32	Youth will follow health eating patterns
33	Youth will understand the benefits of physical activity
34	Youth will reduce sedentary activity
35	Number of downloads of published journal article
36	Number of meals
37	Number of participants who learn about food system through community forums

38	Adopt specific food safety plans and/or policies in response to disease
39	Improve Food Safety for Families and Commercial Food Producers
40	New disease-fighting technologies for wild blueberries
41	Industry adoption of new potato varieties
42	New processes for maintaining/increasing value of Maine lobster harvest
43	Diversifying crops for Maine orchards
44	Research to improve resilience of aquaculture
45	Improve human health and nutrition

Outcome #1

1. Outcome Measures

Pounds of food donated

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	318000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

Outcome #2

1. Outcome Measures

Monetary value of food produced, gleaned, and donated

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	537000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Number of agencies served

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	17

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

Outcome #4

1. Outcome Measures

Implement practices that improve efficiency, reduce inputs and negative impacts on the environment, increase profitability, or reduce energy consumption

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	97

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Improving Potato Yields to Sustain Market Viability

Relevance - Potato producers in Maine need to improve potato yields to sustain market viability. The industry's taskforce proposed lengthening rotations (increasing the time between potato crops on any field). But this strategy brings economic challenges because of greater time between potato crops, lack of crop diversity in current portfolios, and the lack of potential alternative crops, alternative markets for existing crops, and value-added processing potential for new and existing rotation crops.

What has been done

Response - A collaborative project was undertaken between UMaine Extension and the Maine Potato Board, which since 2014 has secured \$225,000 in grant money. We have emphasized rotation and alternative crop research and education. Efforts have been made to increase producers' awareness of the biological, financial, and ecological consequences of cropping choices and systems. We have also increased awareness about geographically atypical farm revenue streams such as value-added processing and agritourism.

Results

Results - As a result of this collaborative effort, the Maine Potato Board has hired a full-time professional to research rotation crops and cropping alternatives and to educate its growers. We have secured funding to conduct crop market assessments and feasibility studies. To date, local farming practice changes have included increased acreages of soybeans, canola, and green manure crops. Several area growers are now experimenting with small-scale, high-value crops such as hops and grapes. One farm family has diversified into value-adding several of the farm's rotation crops such as barley and oats, and they are now producing malt for Maine beer brewers and processed feed for New England livestock.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
501	New and Improved Food Processing Technologies

502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #5

1. Outcome Measures

Adopt and maintain integrated pest management strategies

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	15849

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Integrated Pest Management Strategy for Maine's Wild Blueberry Industry Saves \$12.5 Million
Relevance - A sustainable approach is needed to managing spotted wing drosophila (SWD) in wild blueberries. This invasive insect was first reported in Maine in fall 2011. In 2012 the Maine wild blueberry industry was devastated, with approximately 25% crop loss. Despite repeated warnings and emergency trainings, many growers undertook intensive and sometimes unnecessary insecticide applications, a practice that became widespread throughout the wild blueberry growing region.

What has been done

Response ? Working together Cooperative Extension and the Maine Agriculture and Forest Experiment Station have conducted extensive research and developed an integrated pest management strategy for SWD. This strategy involved training growers to identify the insect, developing a monitoring trap, developing an action threshold based on male fly captures, screening insecticides to determine the best options, integrating natural enemies of SWD with other control tactics, and demonstrating the effectiveness of enclosure netting to protect organic blueberries. This significant response to a dangerous invasive insect involved a cross-section of Research and Extension faculty including jointly-appointed faculty members.

Results

Results - The development and adoption of the Maine wild blueberry SWD strategy led to reduced insecticide spraying and almost no recorded damage, except in a few later-harvested

fields. The economic impact can be assessed as reduced crop loss, which is estimated for 2015 at close to 0%, or a savings of 25% of 80 million pounds, with a processor cost of \$0.60/pound, for a total of \$12 million. This figure does not include savings on insecticides, the costs of their application, or benefits to the environment from reduced applications. SWD continues to be a significant problem in Maine blueberries, but growers are learning to manage this devastating pest.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Demonstrate how to develop integrated farming systems (on farm composting? different enterprises on the same farm?)

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Improve animal well-being

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	227

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Protecting Maine's Dairies

Relevance - Many of Maine's more than 8,000 small farms have dairy animals. Increasingly, organic and small ruminant dairies are producing a diverse collection of artisanal cheeses and alternative milk products. For public safety and quality control, dairies must keep pathogenic bacteria out of their dairy animals and dairy products. Culturing milk samples (bulk tank or individual animal samples) is key to protecting Maine's dairies, both large and small.

What has been done

Response - In 2014-2015, the UMaine Animal Health Lab cultured approximately 2,000 milk samples for mastitis; 4.5 percent were positive for Staphylococcus aureus, one of various pathogens causing infected udders in cattle. Unlike many mastitis-causing pathogens, S. aureus can cause serious human illness. Because S. aureus cannot usually be cleared from the udder, culling chronically infected cows is advised to protect the public and avoid the spread of this disease on dairies.

Results

Results - Maine's dairy owners and dairy product consumers continue to benefit from our local, responsive mastitis diagnostic service. We screen samples from both large and small dairies for mycoplasma, S. aureus, and other pathogens. Allowing farmers to administer antibiotics appropriately, and to avoid excessive antibiotic use by culling animals with incurable infections, saves money and protects public health. Effective responses to animal illnesses are possible only when the disease is identified. Involvement with a multi-state project, Mastitis Research Workers, has resulted in grant proposals regarding milk quality assessment and improvement.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
311	Animal Diseases

Outcome #8

1. Outcome Measures

Establish new farm enterprises

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	21

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

Outcome #9

1. Outcome Measures

New crops and markets developed

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	86

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Expanding and Diversifying Maine's Local Wheat Economy

Relevance - Recent successes in building New England's local wheat economy have inspired new markets for various food grains. Our region now boasts scores of businesses (e.g., mills, bakeries, malt houses, and distilleries) with business models centered around locally grown grains. The need for local sources of organic and non-GMO feed grains continues to grow and is a documented bottleneck in the supply chain for organic value-added products. Local grains could

become an important agricultural sector for our region.

What has been done

Response ? A jointly-appointed Research and Extension faculty member initiated a comprehensive integrated program in local food and feed grains. We secured over \$1 million in grants and gifts in 2015 to fund a diverse program that generates region-specific, research-based information and provides educational and networking opportunities for participants in the grain economy. Key collaborators include MOFGA, the Maine Grain Alliance, the University of Vermont, and the US Organic Grain Collaboration.

Results

Results - Maine and New England farmers now have access to information based on applied research on local grain production, markets, quality standards, and economics. Trials started in 2013 on field peas as a rotation crop for cereal grains inspired and informed at least 5 farmers to grow about 800 acres of field peas in 2015 for local markets. Three winter grain farmers adjusted seeding and fertility methods based on on-farm research results, affecting another 800 acres. Aroostook County farmers grew approximately 1,000 acres of organic grains--at least a five-fold increase since 2009. Two farmers planted a specialty heirloom rye for a new Nordic restaurant in New York City as a result of our connections and 3 years of trialing. With our guidance, a cooperating farmer produced Maine's first crop of blue tag certified organic grain seed, and one of the region's first certified seed of an heirloom variety. Farmers are successfully supplying new and expanding grain markets with high quality grain.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #10

1. Outcome Measures

Implement techniques to reduce effects of variable climate

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #11

1. Outcome Measures

Adopt specific food safety plans and/or policies

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Adopt healthy dietary practices (consume nutrient-rich foods, follow current Dietary Guidelines for Americans or DASH, etc)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	4091

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 #13

1. Outcome Measures

Increase consumption and preservation of healthful, locally-grown and -produced food (farm to school program, food preservation, etc.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1046

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Eat Well: Responding to Food Insecurity

Relevance - More than 13 percent of Mainers (180,892 people) live in poverty. Food insecurity in the state has increased dramatically in the past 10 years to 15.5 percent (206,090 people) of the Maine population. With food insecurity comes greater health risks. Overweight, obesity, sedentary lifestyles, and poor diet quality are associated with many chronic diseases. In Maine, almost two-thirds of adults and more than a quarter of school-aged youth are overweight or obese.

What has been done

Response - Maine Cooperative Extension's EFNEP paraprofessionals educate Maine's limited-income families and youth to help them make better lifestyle choices and improve their nutritional well-being. EFNEP participants learn how to eat well on a budget and apply what they learn in their daily lives. These positive changes will eventually help reduce the incidence of obesity and chronic disease of limited income families in Maine.

Results

Results - As a result of completing the Eat Well program funded by EFNEP (320 adult participants surveyed):

74 percent (237) showed improvement in one or more food resource management practice (i.e.,

plans meals, compares prices, does not run out of food, uses grocery lists).
 ?81 percent (258) showed improvement in one or more nutrition practice (i.e., plans meals, makes healthy food choices, prepares food without adding salt, reads nutrition labels, or has children eat breakfast).
 ?68 percent (218) showed improvement in one or more food safety practice (i.e., thawing and storing foods correctly).
 Eat Well graduates reported increasing fruit and vegetable intake by one-half cup per day and self-reported increases in fiber, calcium, and vitamin D intake. Fifteen percent of Eat Well graduates also reported increasing physical activity to at least 30 minutes per day.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #14

1. Outcome Measures

Adopt techniques to improve soil quality

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	906

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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102	Soil, Plant, Water, Nutrient Relationships
215	Biological Control of Pests Affecting Plants

Outcome #15

1. Outcome Measures

Adopt a water saving technique (rain barrels, soaker hoses, etc.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

Outcome #16

1. Outcome Measures

Utilize Cooperative Extension to identify pest problems and determine research-based management strategies

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	17307

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Supporting Maine's Wild Blueberry Industry by Controlling a Pathogenic Fungus

Relevance - Mummy berry, a serious disease caused by a pathogenic fungus, can decrease yield up to 80% in wild blueberries if not properly controlled. Maine blueberry growers were applying fungicides following a calendar method and at times when the fungicides were not effective, so growers were not successfully controlling this disease.

What has been done

Response - Since 2007 we have presented information to growers about a forecasting system for mummy berry. This system uses the development of the plant and fungus and weather data to determine infection. In 2015, jointly-appointed Research and Extension faculty set up 15 Internet-connected weather stations throughout the wild blueberry growing regions. We provide growers with reports on infection risk during mummy berry season and make recommendations on effective times for fungicide applications.

Results

Results ? Since starting to educate growers about the forecasting system in 2007, there has been an increase in growers using the system to determine when to apply fungicides. In 2014, approximately 67% of the growers surveyed were using the forecast system and reported improved control of mummy berry disease. Growers report using fewer fungicide applications to control this disease, and because they are applying fungicides at the proper time, they are achieving improved control. Growers using the forecasting system are saving approximately \$50/acre in fungicide costs each time they avoid a fungicide application to control mummy berry. Statewide, a total of \$590,000 is saved if all growers using the forecast system reduce fungicide use by one application. This figure does not include benefits to the environment from reduced fungicide applications and the increased yield from effectively controlling this disease.

4. Associated Knowledge Areas

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

215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #17

1. Outcome Measures

Increase consumption of home-grown food

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1023

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
702	Requirements and Function of Nutrients and Other Food Components

Outcome #18

1. Outcome Measures

Enhance capacity of a sustainable global food system including new/improved plants, animals, technologies, and management systems

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Blister worm, a polychaete worm that burrows into the shells of oysters and other shellfish, was first recognized as a serious pest in Australia in the 1890s. As the number of oyster culture operations in Maine and the Northeast have increased, so too has the incidence of blister worm. Blister worm burrowing creates visible pockets of mud and worm feces that mar the oysters' appearance when served on the half shell. The blisters are not only unsightly, but if broken, mud and worm feces leak into the oyster meat. Because oysters cultured in Maine are almost exclusively sold on the half-shell market, blister worm infestations can result in an increase of off-flavor and catastrophic decreases in the value of Maine's cultured oysters.

What has been done

University of Maine marine scientists seek to develop best management plans to reduce the impact of pest species on the value of oysters produced by Maine shellfish farmers.

Results

The scientists have produced a fact sheet on blister worm and remedies that have been used to treat existing infestations of this pest species in oyster culture. This fact sheet has been posted on the Maine Sea Grant website. The fact sheet link was emailed to members of the East Coast Shellfish Growers Association and will be distributed at upcoming regional meetings of shellfish growers. This represents the first aspect of the scientists' intended training in best management practices for controlling blister worm. The researchers found that a combination of periodic washing and drying of oysters substantially reduces the settlement of new worms and thus can break the cycle of infestation on oyster farms.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
202	Plant Genetic Resources
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
215	Biological Control of Pests Affecting Plants

301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
311	Animal Diseases
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

Outcome #19

1. Outcome Measures

More sustainable, diverse, and resilient food systems in Maine

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Seaweed consumption in the U.S. has increased over the past decade, due in part to its nutritional benefits, including high levels of dietary fiber, minerals, and antioxidants. Only a small portion of the seaweed harvest is farmed in the U.S.; however, various species of seaweeds are currently being tested for their aquaculture potential in Maine. Although seaweeds are traditionally dried prior to consumption, recent interest in consuming more fresh and local foods has created opportunities to market fresh seaweeds, or "sea vegetables."

What has been done

University of Maine food scientists are working with a company in Bristol, Maine, to study the shelf life and nutritional values of aquacultured sea vegetable products.

Results

Maine Fresh Sea Farms, a startup based on the Damariscotta River, received \$71,673 from the Value Added Producer Grants from the U.S. Department of Agriculture's Rural Development Program to help create a business plan and study the feasibility of delivering fresh aquacultured sea vegetable products to the marketplace using agricultural produce and seafood distribution systems. To study the products, the company turned to researchers in the University of Maine's School of Food and Agriculture. The researchers are collecting baseline data on the length of time several species of sea vegetables can be considered fresh while under refrigeration. They also are conducting basic nutritional analyses to help meet nutritional labeling requirements. The

study will provide key information about the nutritional benefits and shelf-life stability of four varieties of sea vegetables farm raised in Maine. The results will promote the production of locally sourced, high-quality, and nutritious seaweed products from Maine and help in job creation along the coast.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

Outcome #20

1. Outcome Measures

Improve food safety

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Protozoan parasite *Toxoplasma gondii* is one of three pathogens (together with Salmonella and Listeria) that account for >75% of all deaths due to foodborne disease in the US. One-third of the human world population is infected with *T. gondii*. The high disease burden in combination with disappointing results of the currently available treatments has led to a plea for more effective prevention. The goal of proposal is to identify effective intervention measures to reduce *T. gondii* contamination of meat and produce as well as to improve the detection of *T. gondii*.

What has been done

UMaine food scientists have developed a rapid and specific optical sensing method for the detection of *T. gondii* by DNA sandwich hybridization with oligonucleotide-functionalized gold nanoparticles (AuNps).

Results

This colorimetric method requires less than an hour for detection of *T. gondii* after the DNA preparation. This method offers significant advantages over the traditional cat-and-mouse bioassay for screening of *T. gondii* contamination in terms of time, cost, and simplicity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

Outcome #21

1. Outcome Measures

Improve Animal Health

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	227

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Eliminating Disease in Sheep Without Using Antibiotics

Relevance - Footrot is a contagious disease of sheep and goats that can affect animal performance such as rate of gain, breeding, and general productivity. The disease affects the profitability of flocks and herds and often can put a farmer out of business. The disease is expensive to treat due to the medicine needed and the continued labor involved.

What has been done

Response - UMaine Extension received a USDA SARE grant to eliminate footrot in sheep in the Northeast. The researchers set in place a protocol to eliminate the disease without antibiotics. Each sheep's feet were trimmed and evaluated. Sheep with footrot were treated and separated from healthy sheep. All sheep spent time weekly for 4 weeks in a zinc sulfate footbath. Clean sheep were pastured where no infected sheep had been for at least 2 weeks. After 4 weeks sheep still infected were culled.

Results

Results - Over 4 years, more than 1,500 sheep at 22 farms were handled. All farms were surveyed at the end of the research project. Using the protocol above, more than 60% of the participating farms stated that they had eliminated footrot from their flocks.

The cost of footrot on farms in the Northeast with small flocks of sheep is not well documented,

but this method avoids antibiotic and vaccination costs and development of resistance. It also avoids productivity losses in infected sheep. One producer said, "The sheep foot health project has made the difference between us getting out of the sheep business and continuing and now growing the flock."

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #22

1. Outcome Measures

Expand a business

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Farmer Veteran Coalition of Maine

Relevance - Military veterans are looking to the Maine food system for employment. Veterans are often entrepreneurial and enjoy working toward goals and doing physical labor. Farming also allows veterans to use outdoor work and interaction with livestock as therapy. The unique needs of veteran farmers led to the creation of a national nonprofit, the Farmer Veteran Coalition (FVC), in California. Veteran farmers wanted a Maine chapter, but a lack of experience in organizing formal groups impeded progress.

What has been done

Response - UMaine Extension led an effort to bring together stakeholders to determine the needs for military veteran farmers in Maine and to form an FVC chapter. Farmer veterans, agricultural and veterans service providers, and elected officials met regularly to assess local resources in agriculture, particularly for beginning farmers, and veterans' benefits applicable to this group. In 2015 a board of directors was formed and the official application for a state chapter was submitted to the national FVC.

Results

Results - Through two years of meetings, stakeholders developed a comprehensive inventory of resources available to veteran farmers, and the needs of this group became more clear to all participants. Organizing this group served as a model for how to bring together and communicate within a community group in general. The use of Robert's Rules of Order, development of meeting agendas, the use of subcommittees to do work between meetings, consistent communication by email and Facebook, and regular attendance at in-person meetings all were important in working toward a common goal. Maine is now the first official FVC state chapter in the country, and farmer veterans have increased access to:

Funding:

- ?A branding effort know as ?Homegrown By Heroes,?
- ?Specific educational opportunities geared towards veterans,
- ?Shared use equipment, and
- ?A community of farmer veterans with whom they can share their struggles and successes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #23

1. Outcome Measures

Improve efficiency

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

Outcome #24

1. Outcome Measures

Increase profitability

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	63

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

IPM Strategies for Sweet Corn

Relevance - Sweet corn comprises nearly half of the commercial vegetable acreage in Maine, yet it may bring only marginal profits due partly to high pest management costs. Of the three major corn pests in Maine, only one can survive the winter; the other two must fly north each summer. These factors make sweet corn an ideal candidate for integrated pest management (IPM) strategies.

What has been done

Response - Farmers volunteered their fields for pest monitoring and demonstration of IPM techniques. UMaine Extension set up insect traps and trained student field scouts to regularly monitor sweet corn pest populations and report to participating farmers. Information gathered from 24 farms was summarized and shared with growers, agricultural consultants, and Extension educators around Maine through a weekly newsletter (154 recipients) and blog. Corn IPM techniques were also demonstrated at two grower field days.

Results

Results - Growers adopting these techniques could see significant reductions in pest management costs and reduced the risk of pesticide exposure to themselves and the environment. Of the participants responding to a post-season survey, 61% used the information provided by the program to reduce the number of pesticide sprays they applied (average saved three sprays). 69% found the program significantly reduced their pest management costs (e.g., 25%), and more than 75% found that adopting IPM techniques improved their crop yield and quality. Applying the sample results to numbers from recent state agricultural statistics suggests that Maine growers conservatively reduced insecticide applications by over 100,000 gallons this season and saved over \$100 per acre on insecticide costs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #25

1. Outcome Measures

Make more effective business decisions

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #26

1. Outcome Measures

Start a business

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Fostering the Next Generation of Organic Dairy Farmers

Relevance - The average age of dairy farmers in Maine is approaching 60. Too few young people are entering the field of organic dairy. Labor costs are one of Maine dairy farms' largest expenses. Maine ranks very low in number of cows per full-time equivalent worker. Meanwhile, the demand for organic milk is increasing at a dramatic rate, creating a shortage of organic milk and a significant price premium.

What has been done

Response - UMaine Extension helped Wolfe's Neck Farm develop and launch a residential Organic Dairy Farmer Research and Training Program that aims to increase production of organic milk in the Northeast. The program partners with new, transitioning, and existing organic dairy farmers to improve practices and ensure long-term sustainability and production in this region. This program, the first of its kind in the nation, is funded with a \$1.7 million grant from Danone Ecosystem Fund and Stonyfield Yogurt.

Results

Results - Wolfe's Neck Farm operators have started the training program with three trainees and a milking system imported from the Netherlands. Since 2014 more than a dozen farms have made or started the switch from conventional to organic production, with three processors vying for producers. If we assume that these twelve producers represent an increase of nearly 20% in

the number of commercial organic dairy farms in the state, that increase would represent a value of \$327,600 to Maine farmers.

Extension faculty member Rick Kersbergen has been an invited speaker at several regional dairy meetings to talk about robotic milking and innovative technology. His blog, Cows and Crops, received 1,540 page views from Oct 1, 2014, to February 2015. He spent part of his recent sabbatical in the Netherlands and Germany learning about their equipment and facilities innovations that he might bring back to Wolfe's Neck Farm and other Maine organic dairies.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #27

1. Outcome Measures

Demonstrate leadership skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #28

1. Outcome Measures

Adopt sustainable living practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	44

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management

Outcome #29

1. Outcome Measures

Engage positively in their community

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	14

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

AgrAbility?Supporting Farmers of all Abilities to Remain Active on the Farm

Relevance - The average U.S. farmer is 57 years old, and farming is the seventh most dangerous job in America. An estimated 5,700 farmers, farm family members, or farm workers in Maine have a chronic health condition or disability, such as post-traumatic stress disorder, traumatic brain injury, or aging-related issues, such as arthritis or hearing loss. Fishermen, forest workers, and migrant workers, a new focus of the Maine AgrAbility Project, face similar challenges for remaining productive.

What has been done

Response - Maine AgrAbility helps Maine farmers facing physical or cognitive challenges to enhance their ability to farm and live independently, which improves their quality of life and economic sustainability. AgrAbility specialists assess issues and offer adaptive recommendations. They provide education about safe work methods and connect people with other resources through this nonprofit partnership between the UMaine Cooperative Extension, Goodwill Industries of Northern New England, and Alpha One.

Results

Results - Since the project began in 2010, AgrAbility has provided technical information to 247 farmers and conducted on-site assessments for 75 others with cow and goat dairies, livestock operations, Christmas tree farms, fruit orchards, agritourism, vegetable stands, maple production, and hay sales.

Clients reported increased knowledge of their conditions and increased accessibility for their daily work. They reported ways that the assessment and suggested changes helped them decrease physical pain, stress, and strain through modifications to equipment, the work or home environment, and farm operations or chores.

One participant shared this success story: ?How much has this program increased my income? The new part of my business has added probably 30% to my bottom line. This new part can give me additional income even if crops fail. I just want to keep working. I don?t want to be on disability; I?m not ready for that. They are giving me tools to be successful.?

4. Associated Knowledge Areas

KA Code Knowledge Area

501	New and Improved Food Processing Technologies
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

Outcome #30

1. Outcome Measures

Youth will consume more healthy foods

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2630

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
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

Outcome #31

1. Outcome Measures

Youth will consume less healthy foods

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2570

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
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

Outcome #32

1. Outcome Measures

Youth will follow health eating patterns

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2535

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maine Food Corps: Connecting Kids to Real Food and Reducing Obesity

Relevance - In the last 30 years, the percentage of overweight or obese children in this country has tripled. According to a 2012 University of Maine study, the medical costs of obesity associated with the current cohort of Maine children and adolescents--both those who are obese and non-obese--will be an estimated \$1.2 billion over the next 20 years. Increasing the percent of healthy Maine youth will significantly reduce our future healthcare spending.

What has been done

Response - UMaine Extension has acted as the host site for FoodCorps in Maine since its inaugural year in 2011. FoodCorps is a nationwide team of AmeriCorps leaders who connect kids to healthy food and help them grow up healthy. In the past 4 years, our 6-12 service members have served in 47 schools teaching 16,973 students about food and nutrition. They have coordinated the building of 15 new school gardens, made contacts with 71 local food producers, and engaged 387 new volunteers who contributed 6,869 hours of service.

Results

Results - Survey results from a subset of youth served show 50 percent net improvement in vegetable preferences. In addition to positive changes in food preference, youth have greater access to healthy food options through school lunch offerings, taste tests, and home backpack and school pantry programs.

The FoodCorps Landscape Assessment showed improvement in school food environments in 89% of Maine schools with FoodCorps service.

Examples of observed outcomes that will result in long-term change in schools and the communities they serve as a result of FoodCorps support include more:

- ?Demand for local fresh food in school and home meals
- ?Volunteer resources to support school garden and nutrition initiatives
- ?Knowledge of resources that UMaine Extension and other service providers can offer
- ?Educators trained in garden-based nutrition programming
- ?Food service staff requesting bids from local farms
- ?Our data mirror overall national trends documented by USDA indicating farm to school success.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

Outcome #33

1. Outcome Measures

Youth will understand the benefits of physical activity

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2535

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #34

1. Outcome Measures

Youth will reduce sedentary activity

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	2535

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The "Whole Schools Whole Communities" Initiative

Relevance - Research shows that when students in grades 6-12 are provided meaningful opportunities to connect academic work to real world issues in a supportive context of peers and adult mentors, many achieve enhanced academic and personal success. Increasingly, Maine schools are challenged to find funding to support out-of-classroom activities that meet these goals. Meanwhile, schools are tasked with implementing proficiency-based curricula with deadlines as early as 2018.

What has been done

Response - The Environmental Living and Learning for Maine Students (ELLMS) Project secured a \$275,000 grant to implement the Whole Schools Whole Communities Initiative. The project partners?UMaine's 4-H centers, Chewonki, the Schoodic Institute, and the Ecology School?have joined with 10 Maine school districts to engage in a facilitated planning process designed to deepen schools' connections with nonprofit learning centers and connect students and curricula to natural landscapes and human communities.

Results

Results - Ten Maine public school districts representing nearly 8,000 students are deeply engaged in the process of envisioning and implementing significant change in teaching and learning. This process includes facilitated planning sessions during which school leaders, teachers, community stakeholders, and ELLMS Project representatives are collectively shaping the future of education to include meaningful connection to community through service learning opportunities, leadership development, place-based curricula, outdoor field science, and STEM. The ELLMS partners are also conducting an integrated research project using "Most Significant Change" methodology. The research is designed to ascertain the longitudinal impact of quality environmental education opportunities for students and teachers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #35

1. Outcome Measures

Number of downloads of published journal article

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	32

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 #36

1. Outcome Measures

Number of meals

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	21859

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population

Outcome #37

1. Outcome Measures

Number of participants who learn about food system through community forums

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	73

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 #38

1. Outcome Measures

Adopt specific food safety plans and/or policies in response to disease

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Protecting Maine's Poultry and Egg Industry

Relevance - Maine's poultry and egg industries are worth over \$75 million yearly. Because the University of Maine Animal Health Lab (UMAHL) provides the FDA-required salmonella testing for medium- to large-sized egg producers in Maine, New Hampshire, and Vermont, these farms can operate within FDA's Egg Rule. This work protects public health via prevention of human salmonellosis (SE) that might be acquired through eggs.

What has been done

Response - Both large and small producers may require disease diagnosis and monitoring. UMAHL handled over 6,000 avian samples during reporting year 2015. We provided national training to producers on how to manage carcass mortalities with highly pathogenic avian influenza (HPAI) through composting. Disease prevention and diagnostic consultation also extends to meat producers.

Results

Results - It is estimated that the cost to the egg industry of an SE outbreak could be higher than 10% of production. Although it is difficult to accurately estimate the impact of the lab, the impact of salmonella prevention alone is estimated to be more than \$7 million per year.

Results - It is estimated that the cost to the egg industry of an SE outbreak could be higher than 10% of production. Although it is difficult to accurately estimate the impact of the lab, the impact of salmonella prevention alone is estimated to be more than \$7 million per year.

During 2015, HPAI caused the death of more than 49 million poultry in the United States. If this

disease comes to our region, substantial losses to the commercial egg industry would result. UMAHL is working with small and large producers to increase bio-security and preparedness for emergencies such as HPAI.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases
403	Waste Disposal, Recycling, and Reuse

Outcome #39

1. Outcome Measures

Improve Food Safety for Families and Commercial Food Producers

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	10000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Food Safety Education for Families and Commercial Food Producers

Relevance - Each year 48 million people in the United States contract foodborne illnesses. Safe food is essential to avoiding illness and staying healthy. In Maine, food safety risks exist in home food preparation and preservation, from people serving crowds, and in retail and commercial manufacturing and sales. All of these groups prepare or process food for others, but many of these potential food preparers do not have proper food safety training, leading to an increased occurrence of foodborne illness.

What has been done

Response - UMaine Extension provides food safety training programs such as food preservation; home food safety; Cooking for Crowds; industrial food sanitation; Good Agricultural Practices; Hazard Analysis Critical Control Points (HACCP) certification; and soon, Food Safety Modernization Act trainings. Extension provides private food safety consulting and process authority food product reviews to companies statewide. These programs directly reached and

trained over 10,000 people in Maine in the past year.

Results

Results - We estimate that more than 50,000 consumers of home prepared and preserved food, and those attending public and community events, have a reduced potential to contract foodborne illness due to our food safety trainings. Further, more than 500,000 consumers of food produced by New England-based food businesses have a reduced potential to contract foodborne illness because of our trainings.

The food process authority lab reviewed over 500 products, leading to added income and jobs across Maine and New Hampshire. In almost all cases one-on-one food safety consulting led to increased revenue, retention of jobs, and/or increased hiring. One new startup company hired 171 employees and said, "Extension's work with our company has contributed to the safe production of 7.2 million pounds of lobster per year with a value of over \$36 million." These results are decreasing the occurrences of foodborne illness and increasing overall health in Maine and wherever Maine foods are sold and consumed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
502	New and Improved Food Products

Outcome #40

1. Outcome Measures

New disease-fighting technologies for wild blueberries

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The lowbush blueberry industry in Maine has a significant share of the blueberry market. Over the last decade the industry has come under pressure to decrease inputs, such as fungicides, that

may impact the environment and at the same time, the number of fungal diseases affecting the crop has increased.

What has been done

UMaine experiment station and extension researchers have been working to develop effective integrated pest management strategies for the most damaging fungal diseases of lowbush blueberry.

Results

In a study of the biology of *Monilinia vaccinii-corymbosi* (MVC) and control of mummy berry--the most widespread, damaging disease of lowbush blueberry and the disease that most fungicides are applied to control--the scientists have tested fungicides with different chemistries, biological control materials, and mixtures of fungicides to find alternatives to the most commonly used fungicide, propiconazole, which MVC is becoming less sensitive to. The scientists have found one fungicide with a different chemistry and one with a different azole ingredient, which had significantly less mummy berry disease compared to untreated controls. A survey of growers using fungicides in 2013 found approximately 88% of growers used propiconazole, 4% used fenbuconazole and 5% were using crop rotation to control mummy berry disease, but in 2014, 83% of growers were using propiconazole, and 15% were rotating fungicides. This research has increased the number and variety of fungicides available for controlling mummy berry, and some growers have adopted these new fungicides in their management practices.

4. Associated Knowledge Areas

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

Outcome #41

1. Outcome Measures

Industry adoption of new potato varieties

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Consumer demographics and food preferences present new challenges for farmers who seek to supply high-quality, highly nutritional products to consumers, while maintaining economically and environmentally sustainable production practices. A multidisciplinary multistate research project helps farmers address these needs. Specifically, the scientists are providing farmers with new potato varieties to solve production problems and meet consumers changing needs. These varieties will have improved yields, enhanced fresh market, processing or value-added traits, and better pest resistance resulting in reduced chemical inputs.

What has been done

In the past two years, the Maine Potato Board and University of Maine have released three new potato varieties.

Results

Caribou Russet, one of the new releases, is gaining traction in the market. The Maine Potato board of directors voted to allow the board's executive staff to discuss an international licensing arrangement for the Caribou Russet with McCain Foods, the world's largest producer of french fries. The board and University of Maine license the variety in the U.S. and Canada, but McCain Foods is interested in paying for the rights to license it in other countries.

4. Associated Knowledge Areas

KA Code	Knowledge Area
202	Plant Genetic Resources
212	Pathogens and Nematodes Affecting Plants

Outcome #42

1. Outcome Measures

New processes for maintaining/increasing value of Maine lobster harvest

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

While the lobster fishery in Maine has experienced record high catches in the past two years, the value of the catch has declined while the cost of doing business has increased. Lobsters shipped out-of-state make up a large part of the market for Maine lobsters, but lobsters need to be healthy and strong to withstand the stresses of shipment.

What has been done

University of Maine researchers and students are working to developing a noninvasive procedure to determine the viability of lobsters for shipping.

Results

The scientists built a prototype of a device that uses a load cell to measure closing strength of lobster claws and have tested it to see if it would work as a noninvasive way to evaluate viability of lobsters for shipping. Knowing a lobster's viability is relevant to Maine's primary seafood industry because it can determine if the crustacean is most suitable for shipping live or going straight to a processing plant. The prototype has been field tested at local lobster dealers and seems to work well although more testing is needed to study the effects of water temperature on lobsters' strength and their ability to close their crusher claws. The scientists believe this research will save the distributors money from losses incurred during shipment. If the most healthy and viable lobsters were picked to ship, there would be fewer casualties due to weakness.

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse
502	New and Improved Food Products

Outcome #43

1. Outcome Measures

Diversifying crops for Maine orchards

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The majority of plums found in Maine are shipped long distances and are harvested unripe, compromising quality. Growing plums in Maine could bring in extra income for farmers, as well as decreasing transportation costs by selling the plums locally.

What has been done

UMaine experiment station and extension researchers are working to bring locally grown plums to farm stands around the state in a two-year project that is identifying suitable plum varieties for Maine's climate that would help diversify the state's apple farms.

Results

Currently, the team is harvesting different plum varieties--grown at the university's Highmoor Farm in Monmouth--for sensory testing, which will allow the researchers to see how consumers will perceive the fruit based on appearance, taste and texture. Plums are a low-calorie snack and a good source of fiber and Vitamin C and potassium. By assessing the phytonutrient content of the plums, the researchers are able to better market the fruit. The project will help farmers diversify their farms with fruit that could be harvested during peak tourist season. By the time apple season rolls around, the tourists have already left. So the potential market for apples is decreased, whereas plums are ready during the peak tourist season. Based on sensory evaluation with 80 to 100 participants, harvest date was shown to have an effect on consumer preference. For most varieties, harvest at a stage of tree-ripe was preferred to mature-green, and new plum varieties were preferred over the two standard varieties.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #44

1. Outcome Measures

Research to improve resilience of aquaculture

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Aquaculture is the fastest growing agricultural sector, and continues to grow at a rate of 8-10% per year. If Maine aquacultural producers are to keep pace with global demand, they must understand the impacts and implications anthropogenic pollutants have in their aquatic systems, and understand the causes of adverse production outcomes.

What has been done

University of Maine marine scientists are investigating the linkages between endocrine function, development, and environmental contaminants in commercially important fish and shellfish species in Maine. For the study, for 48 hours, captive-bred orchid dottybacks (*Pseudochromis fridmani*) were kept in synthetic seawater in Teflon bags, glass bowls or in plastic bags from one of two manufacturers. The FDA labels both types of plastic bags as food-safe polyethylene.

Results

All of the fish in Teflon bags and glass bowls lived for the 48 hours. While 89% of the fish in one manufacturer's plastic bags survived, in the other manufacturer's bags, 60% of the fish died within the two days. Of the 40% that survived 48 hours, all died within eight days of being released in an aquarium, demonstrating that the exposure to NP caused irreversible damage to the fish. The chemical NP--also found in food packaging, cosmetics, and laundry and dish detergents--binds to estrogen receptors. Even at low concentrations, it mimics estrogen, which feminizes and alters fertility in fish, thus threatening their existence. NP also alters fish immune function and damages DNA. NPs enter aquatic systems through a number of ways, including wastewater discharge, and studies have indicated NP can last for decades in estuary mudflats. The findings demonstrate that NP may pose a greater health risk to people, the ocean, and aquatic wildlife than can be predicted from examining properties of plastic from one manufacturer, which is the method the FDA currently uses to test for toxicity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals

Outcome #45

1. Outcome Measures

Improve human health and nutrition

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
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2015

0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Researchers have identified lack of parental education in nutrition, sedentary lifestyles, availability of high-caloric foods, and scarcity of healthful foods as contributing to the obesity crisis. Decreased frequency of family meals has been associated with low socioeconomic status and overweight in youth. The 2010 White House Task Force on Childhood Obesity emphasized that solutions for the next generation will result from educating children on nutrition and healthful living.

What has been done

University of Maine nutrition researchers are taking part in the iCook 4-H program, a 5-state partnership among researchers and extension faculty who will use a community-based participatory approach to reduce childhood obesity in rural, low-income populations. The objective is to test whether a 24-month intervention, based on building foundational skills for culinary proficiency and increasing family meals and physical activity, can positively impact the body mass index of youth compared to a control condition.

Results

Youth participants in the program reported that they spent more quality time with their family, were more active in meal planning, recipe selection, grocery shopping, table setting, and helping parents prepare family meals. Adults participants reported that the program helped them with considering healthy meal planning, cooking more with their children, and with communicating more during meals and less TV time. The top five identified influencers of positive family meal experience included enjoying the food served, being together, having fun and not fighting, good conversations, and meal-time not being inhibited by time constraints. These factors were confirmed by both positive and negative journal entries.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

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)

Evaluation Results

Evaluations in the experiment station are currently conducted at the project and program levels. At the project level, all projects are reviewed by an internal research council and external peer reviewers when initiated and again at completion by the research council. During the research council final evaluation, the focus is on determining if terminating projects met their stated objectives, secured extramural funding, and produced peer-reviewed publications. As for other measures of successful research programs, research faculty in this program area published 46 peer-reviewed articles and secured more than \$9.1M in extramural funding.

Researchers use a variety of methods to evaluate their own research projects including evaluations retrospectively, before-after, and during the life of the project; case studies; and comparisons between treatment/intervention and nontreatment/nonintervention.

At the program level, external NIFA review teams are asked to review the research programs of schools/departments. These teams provide input on the impact and productivity of research programs supported through the station. The station is working to develop a standard program-level evaluation process, which will be used to evaluate each station program area. Our current plans include an approach based on use of expert panels as recommended by the federal Government Accounting Office with individual program evaluations occurring every four to five years on a staggered time table.

Key Items of Evaluation

Research faculty in this program area published 46 peer-reviewed articles and secured more than \$9.1M in extramural funding.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Sustainable Community & Economic Development

Reporting on this Program

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	0%		7%	
112	Watershed Protection and Management	0%		3%	
123	Management and Sustainability of Forest Resources	0%		3%	
131	Alternative Uses of Land	0%		2%	
134	Outdoor Recreation	0%		7%	
311	Animal Diseases	0%		7%	
315	Animal Welfare/Well-Being and Protection	0%		7%	
511	New and Improved Non-Food Products and Processes	0%		3%	
601	Economics of Agricultural Production and Farm Management	0%		4%	
602	Business Management, Finance, and Taxation	25%		0%	
603	Market Economics	0%		7%	
604	Marketing and Distribution Practices	20%		0%	
605	Natural Resource and Environmental Economics	0%		22%	
607	Consumer Economics	15%		5%	
608	Community Resource Planning and Development	15%		13%	
609	Economic Theory and Methods	0%		4%	
610	Domestic Policy Analysis	0%		4%	
801	Individual and Family Resource Management	20%		2%	
805	Community Institutions, Health, and Social Services	5%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	11.9	0.0	6.9	0.0
Actual Paid	8.1	0.0	6.2	0.0
Actual Volunteer	1.1	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
481287	0	315136	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1223599	0	655679	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
303498	0	433537	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Community Development - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Community Development - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- Economic Development - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Economic Development - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- General Community and Economic Development Activities - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- General Community and Economic Development Activities - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)
- Small and home based business education - Direct (Club, Conference, Program, Consultation, Scholarship, or Training)
- Small and home based business education - Indirect (Applied Research, Media, Internet, Publication, Resulting from Training)

Conduct scientific research. Publish peer-reviewed journal articles and other publications. Present findings at professional and public meetings and at other venues. Educate undergraduate and graduate students.

2. Brief description of the target audience

Scientists, economists, state and local policymakers, extension specialists, green/horticulture industry, tourism planners, land use commissions, and commercial fishermen

- Business Assist Organization Staff (Adult)
- Community Leaders (Adult)
- County Executive Committee Members (Adult)
- Elders or Seniors (Adult)
- Extension - staff (Adult)
- Families (Adult)
- Families (Youth)
- General Public (Adult)
- General Public (Youth)
- Small or Home-Based Business Owners - Current (Adult)
- Small or Home-Based Business Owners - Potential (Adult)
- Teachers (Adult)
- Volunteers (Adult)

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	12795	1411	720	150

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

Patent Applications Submitted

Year: 2015
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	22	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Direct; Club, Conference, Program, Consultation, Scholarship, or Training

Year	Actual
2015	498

Output #2

Output Measure

- Indirect; Applied Research, Media, Internet, Publication, Resulting from Training

Year	Actual
2015	62

Output #3

Output Measure

- Non-peer-reviewed publications by research faculty

Year	Actual
2015	14

Output #4

Output Measure

- # of wild blueberry production systems for which researchers developed preliminary budgets and farm management strategies developed:

Year	Actual
2015	4

Output #5

Output Measure

- A new system for detecting S. equi in environmental samples by ELISA developed by research faculty

Year	Actual
2015	1

Output #6

Output Measure

- Extramural funds awarded to research faculty in this program area in FY15:

Year	Actual
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2015

330019

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Adopt sound business management practices
2	Increase profitability
3	Jobs created
4	Make more effective business decisions
5	Increase sales
6	Improve efficiency
7	Hire employees
8	Reduce business management risks
9	Start a business
10	Stay in business
11	Expand a business
12	Reconsider business plan
13	Join a business association
14	Join a local chamber of commerce
15	Increase partnerships
16	Increase career aspirations and goal setting
17	Demonstrate applications of life skills

18	Assess community needs and assets
19	Adopt effective community strategies
20	Mobilize community capacities, assets, or resources
21	Demonstrate leadership skills
22	Assess current and projected impacts of climate change and adopt effective strategies to respond to and mitigate such training
23	Identify household priority needs and aspirations
24	Assess alternate choices for managing household resources
25	Adopt sustainable living practices
26	Engage positively in their community
27	Train, support and mentor others in leadership roles
28	Demonstrate application of leadership skills
29	Demonstrate civic engagement
30	Strengthen human capacities, human capital, building partnerships
31	Improve knowledge of, or strategies and tools for, sustaining Maine's rural economies and communities
32	Adoption of strategies/tools for sustaining Maine's rural economies and communities
33	Enhance sustainability, diversity, and resiliency of Maine's rural economies and communities
34	Youth will express positive attitudes about science
35	Establish new farm enterprises
36	New crops and markets developed

Outcome #1

1. Outcome Measures

Adopt sound business management practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	421

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #2

1. Outcome Measures

Increase profitability

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	38

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
607	Consumer Economics
609	Economic Theory and Methods

Outcome #3

1. Outcome Measures

Jobs created

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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
607	Consumer Economics

Outcome #4

1. Outcome Measures

Make more effective business decisions

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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
602	Business Management, Finance, and Taxation
609	Economic Theory and Methods

Outcome #5

1. Outcome Measures

Increase sales

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	21

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
607	Consumer Economics
609	Economic Theory and Methods

Outcome #6

1. Outcome Measures

Improve efficiency

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
607	Consumer Economics
609	Economic Theory and Methods

Outcome #7

1. Outcome Measures

Hire employees

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	27

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #8

1. Outcome Measures

Reduce business management risks

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Start a business

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	44

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
609	Economic Theory and Methods

Outcome #10

1. Outcome Measures

Stay in business

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Expand a business

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
607	Consumer Economics

609 Economic Theory and Methods

Outcome #12

1. Outcome Measures

Reconsider business plan

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Join a business association

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

Join a local chamber of commerce

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

Increase partnerships

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	104

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Relevance - Regional wildlife professionals have not had a local, comprehensive wildlife disease diagnostic lab system in the northeastern U.S. until recently. Maine has joined a group of laboratories that can link our regional agencies with local diagnostic assistance for wild animals, the Northeast Wildlife Disease Cooperative (NWDC).

What has been done

Response - Collaboration with the Department of Inland Fish and Wildlife has yielded information about the health of both Maine and New Hampshire moose. We have documented health status at capture of more than 200 radio-collared moose over a 3-year period, performed surveillance of hunter-killed moose lung parasites, and provided diagnostic services for radio-collared moose dying of natural causes.

During 2014-15, the University of Maine Animal Health Lab (UMAHL) hosted wildlife biologist trainings, provided diagnostic information for wildlife cases. UMAHL assisted in investigations of lead toxicosis in waterfowl.

Results

Results - Participation in the NWDC has been helpful for Maine's wildlife agencies, and is bringing more expertise both to the region and to the UMAHL. Students at the University of Maine benefit from opportunities to work with wildlife disease researchers, and biologists benefit from improved safety in the field due to the information conveyed at the workshops. Regionally acquired information provides better disease surveillance, which is useful to wildlife managers. A 2014 report to the Maine Office of Tourism and the Maine Department of Inland Fisheries and Wildlife found that moose and waterfowl hunting brought more than \$33 million to Maine annually, and supported more than 450 full- and part-time jobs. The work of the UMAHL helps ensure continued hunting opportunities in Maine.

4. Associated Knowledge Areas

KA Code	Knowledge Area
315	Animal Welfare/Well-Being and Protection
602	Business Management, Finance, and Taxation
610	Domestic Policy Analysis

Outcome #16

1. Outcome Measures

Increase career aspirations and goal setting

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	192

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
609	Economic Theory and Methods

Outcome #17

1. Outcome Measures

Demonstrate applications of life skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	115

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
610	Domestic Policy Analysis

Outcome #18

1. Outcome Measures

Assess community needs and assets

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	60

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Protecting Maine's Coastal Tourism Industry and Coastal Beaches

Relevance - Tourism and coastal beaches are integral components of Maine's economy and way of life, yet elevated bacteria levels and other forms of pollution threaten public health and ecosystem integrity. In 2014, coastal tourism and recreation added \$2.5 billion to Maine's gross domestic product (\$1.2 billion in wages; 64,943 jobs; 5,024 establishments).

What has been done

Response - UMaine Extension coordinates Maine Healthy Beaches, a quality-assured program to monitor water quality and protect public health on coastal beaches. Extension staff also build local capacity to identify, eliminate, and prevent pollution sources. This work helps protect against water-borne illnesses and protects the state's coastal tourism. Only 16% of beach managers believe their communities would continue some form of monitoring without the program and support provided by UMaine Extension.

Results

Results - Maine coastal residents and visitors value work that protects public health, reduces pollution, and keeps Maine's tourism industry resilient and strong. When asked about the most important problems related to impaired water quality, 63% identified public health issues as ?

extremely important? and 46% noted increased beach advisories as ?extremely important.? Local beach managers also believe the program delivers diverse benefits to Maine communities: 84% noted greater protection of public health, 80% noted improved beach information for residents and visitors, 76% noted improved beach information for local officials, and 67% noted improved coastal water quality. When asked to prioritize coastal management issues, beach users ranked reducing coastal pollution first among thirteen priorities. Clean waters and sandy beaches were the two most important factors to beach users when planning visits to coastal areas.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #19

1. Outcome Measures

Adopt effective community strategies

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	110

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maine Harvest for Hunger

Relevance - Maine has the highest rate of food insecurity in New England, and ranks twelfth in the United States. USDA estimates that 16 percent of Maine households are food insecure, including 24% of children and 23% of seniors. Forty-three percent of food-insecure people do not qualify for food stamps or other government program. It is challenging for food-insecure people to afford fresh, nutritious food, and donations of fresh produce to Maine’s emergency food system have declined recently.

What has been done

Response - Since 2000, UMaine Cooperative Extension’s statewide Maine Harvest for Hunger (MHH) program has mobilized gardeners, farmers, businesses, schools, and civic groups to grow, glean, and donate high quality produce to distribution sites (pantries, shelters, community meals)

and directly to neighbors in need. The objective is to mitigate hunger, improve nutrition and health, and help recipients develop lifelong positive nutritional habits.

Results

Results - In 2015, record-breaking donations of over 318,000 pounds (value of \$537,000, based on an average \$1.69 per pound) went to 188 distribution sites and to individuals. Nearly 500 volunteers in 14 counties collectively logged more than 5,000 hours.

MHH has greatly improved program efficiency. Through a dialogue between recipients, donors, and staff, the team has made significant progress in expanding the variety of offerings readily accepted and used by recipients, minimizing donation waste and extending the donation season. Shelters that years ago didn't want vegetables such as kale are now using our recipes and getting clients to taste test, making them more likely to adopt a healthier diet. Pantries are minimizing waste by networking to match excess in one site with need in another, sharing best practices for handling and distributing produce, and processing less marketable produce into nutritious food. To extend the season, donors are offering more storage crops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
801	Individual and Family Resource Management
805	Community Institutions, Health, and Social Services

Outcome #20

1. Outcome Measures

Mobilize community capacities, assets, or resources

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	177

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
805	Community Institutions, Health, and Social Services

Outcome #21

1. Outcome Measures

Demonstrate leadership skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	106

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 #22

1. Outcome Measures

Assess current and projected impacts of climate change and adopt effective strategies to respond to and mitigate such training

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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
608	Community Resource Planning and Development

Outcome #23

1. Outcome Measures

Identify household priority needs and aspirations

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Parent Education: Laying the Foundation for Future Success and Well-Being
Relevance - The first three years of a child's life are critical for growth and development. Research demonstrates that the experiences a child has during this time affect the developing brain and lay the foundation for future well-being. Adverse experiences during this period can have lasting negative outcomes in adulthood and affect physical and emotional health, school achievement, relationships, self-sufficiency, and overall functioning and success. These impacts can be costly to families and society.

What has been done

Response - With federal, state, and local funding, Parenting Education Professionals (PEPs) part of the Maine Families Program supported families in 3 counties as their young child's most important teacher. Seven certified PEPs made 1,984 home visits to 248 families. Using the internationally recognized and evidenced-based model Parents as Teachers, PEPs met with families in their homes to share activity ideas to support child development and build parenting skills, as well as links to community resources.

Results

Results - Results from an annual parent survey delivered to all families served this year showed that 99% of families said they used the child development information they received from the parent educator at home visits, 92% of families reported they had been helped by participating in the program, and 97% reported increased confidence as parents. These are important factors in increasing positive parenting behavior and creating supportive early experiences for children.

Other positive impacts include:

?Breastfeeding rates for participating children were higher than the statewide average: 86% at early postpartum (statewide 76%), 51% at six months (statewide 35%) and 36% at one year (statewide 24%). These rates exceed the Healthy People Goals 2010.

?98% of children enrolled prenatally were up to date with well child visits.

?94% of eligible children had a complete developmental screening.

All enrolled families were assessed for basic needs and referred to services as appropriate.

4. Associated Knowledge Areas

KA Code	Knowledge Area
610	Domestic Policy Analysis

Outcome #24

1. Outcome Measures

Assess alternate choices for managing household resources

Not Reporting on this Outcome Measure

Outcome #25

1. Outcome Measures

Adopt sustainable living practices

Not Reporting on this Outcome Measure

Outcome #26

1. Outcome Measures

Engage positively in their community

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	276

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 #27

1. Outcome Measures

Train, support and mentor others in leadership roles

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Protecting Maine Citizens Against Lyme Disease

Relevance - Tick-borne disease related to an expanding tick population continues to be a significant concern for the people of Maine. There were approximately 1,400 reported cases of Lyme disease in Maine last year, and this is estimated to be but a fraction of the actual number of cases. Providing outreach and services related to this increasingly common public health threat is an important issue for all Maine citizens.

What has been done

Response - In 2014 UMaine Extension created and implemented an in-state tick identification program. We have worked to expand this program by creating and consistently updating an informational website, providing public presentations on ticks and vector-borne disease, and developing informational tick cards for distribution at events and through the mail. The activities associated with this program also aided in the passage of an \$8 million bond for construction of a new biosecure laboratory that, among other things, will be able to test ticks for pathogens.

Results

Results - Clients have access to a wide range of tick information targeted specifically at issues relating to Maine. Tick specimens can be identified more quickly in-state, and upon completion of the new lab, ticks will be tested for pathogens, a service that is not currently offered in Maine. Lyme disease afflicts more than 300,000 people per year in the United States. In 2011, 96 percent of Lyme disease cases were reported from 13 states, including Maine, New Hampshire, Vermont, Massachusetts, and Connecticut.

Lyme disease costs the U.S. economy up to \$1.3 billion per year in treatment costs alone. This estimate does not include the value of lost productivity for people with Lyme disease. If we assume that UMaine Extension's educational program prevents even just 1% of new infections in the state each year, the value of treatment costs saved is more than \$60,000 annually.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #28

1. Outcome Measures

Demonstrate application of leadership skills

Not Reporting on this Outcome Measure

Outcome #29

1. Outcome Measures

Demonstrate civic engagement

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	50

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 #30

1. Outcome Measures

Strengthen human capacities, human capital, building partnerships

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	1252

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maine College Students Take Action on Food Security

Relevance - Increasing student retention and building strong connections with surrounding communities are two goals that all institutions of higher learning throughout Maine have in common. Food insecurity can have a direct impact on student retention. Students engaged in community service can greatly enhance the positive connections schools can have in their community. Until 2014, there was no organized effort among Maine's college campuses to address hunger on campus and in their communities.

What has been done

Response - UMaine Extension collaborated with the Maine Campus Compact to offer the first Maine Hunger Dialogue (MHD) in 2014. We invited all Maine colleges and universities to send students and staff to learn about hunger on local, national, and global scales and to leave with ideas and action plans for ending hunger in their regions. The event was purposely designed to allow for inter- and intra-campus networking to capitalize on the diverse group convened.

Results

Results - Representatives from 16 colleges and one high school developed new partnerships, assessed community needs and assets, and set goals and identified action steps. Six teams were awarded \$500 grants to support new or existing initiatives. Teams were required to report the impacts of the grant at the 2015 MHD. Groups used the funds to obtain a refrigerator and freezer for their food pantry, develop a website for an edible park, build leverage toward establishing a campus food pantry, expand a community garden, purchase items for a resource hub, and

sponsor a bake sale to raise food drive funds. One team used their new connections to start a chapter of the Food Recovery Program. They recovered over 1,500 pounds of food for a local food pantry in one semester.

Through MHD, UMaine Extension has strengthened partnerships with Maine Campus Compact, Good Shepherd Food Bank, Maine corporations, UMaine System campuses, and other Maine institutes of higher education to take action on hunger.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
801	Individual and Family Resource Management
805	Community Institutions, Health, and Social Services

Outcome #31

1. Outcome Measures

Improve knowledge of, or strategies and tools for, sustaining Maine's rural economies and communities

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maine spends approximately \$4 billion per year on imported energy, and approximately 55% of Maine's energy demands are met with imported fossil fuels, which make the state particularly susceptible to price fluctuations. Rural workers and residents in poverty-stricken counties are typically affected most by these price fluctuations. In addition, roughly one thousand Mainers do not even have access to the electricity grid.

What has been done

UMaine economists have created a database of 6,000 community energy projects in the US, including more than 5,000 community solar projects, of which 52 are in Maine with a total installed

capacity of more than 9.6 megawatts (MW).

Results

The researchers are working to make this database publicly available and easily accessible for people who would like to learn from past projects as they develop their own. The University of Maine became a member in the White House's National Community Solar Partnership as a result of these efforts. The researchers have also launched a pilot survey of community solar projects in Maine, Massachusetts, and Vermont, which they plan to expand to a national survey next year. The results of this project will benefit Maine residents (especially rural off-grid customers), the Maine agricultural community, renewable energy industry professionals, policymakers, and scientific researchers. It is hoped that the comparative results from this project will assist policymakers in drafting renewable energy legislation based on Maine-specific data and analysis.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
605	Natural Resource and Environmental Economics
607	Consumer Economics

Outcome #32

1. Outcome Measures

Adoption of strategies/tools for sustaining Maine's rural economies and communities

Not Reporting on this Outcome Measure

Outcome #33

1. Outcome Measures

Enhance sustainability, diversity, and resiliency of Maine's rural economies and communities

Not Reporting on this Outcome Measure

Outcome #34

1. Outcome Measures

Youth will express positive attitudes about science

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	446

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #35

1. Outcome Measures

Establish new farm enterprises

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	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
511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
603	Market Economics
604	Marketing and Distribution Practices
605	Natural Resource and Environmental Economics
607	Consumer Economics
608	Community Resource Planning and Development

Outcome #36

1. Outcome Measures

New crops and markets developed

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	56

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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511	New and Improved Non-Food Products and Processes
601	Economics of Agricultural Production and Farm Management
603	Market Economics
604	Marketing and Distribution Practices

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)

Evaluation Results

Evaluations in the experiment station are currently conducted at the project and program levels. At the project level, all projects are reviewed by an internal research council and external peer reviewers when initiated and again at completion by the research council. During the research council final evaluation, the focus is on determining if terminating projects met their stated objectives, secured extramural funding, and produced peer-reviewed publications. As for other measures of successful research programs, research faculty in this program area published 22 peer-reviewed articles and secured more than \$300,000 in extramural funding.

Researchers use a variety of methods to evaluate their own research projects including evaluations retrospectively, before-after, and during the life of the project; case studies; and comparisons between treatment/intervention and nontreatment/nonintervention.

At the program level, external NIFA review teams are asked to review the research programs of schools/departments. These teams provide input on the impact and productivity of research programs supported through the station. The station is working to develop a standard program-level evaluation process, which will be used to evaluate each station program area. Our current plans include an approach based on use of expert panels as recommended by the federal Government Accounting Office with individual program evaluations occurring every four to five years on a staggered time table.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Climate Change

Reporting on this Program

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	0%		10%	
112	Watershed Protection and Management	0%		5%	
123	Management and Sustainability of Forest Resources	0%		10%	
132	Weather and Climate	0%		2%	
135	Aquatic and Terrestrial Wildlife	0%		27%	
136	Conservation of Biological Diversity	0%		14%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		22%	
205	Plant Management Systems	0%		3%	
215	Biological Control of Pests Affecting Plants	0%		4%	
216	Integrated Pest Management Systems	0%		3%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	3.2	0.0
Actual Paid	0.0	0.0	2.4	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	161856	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	512878	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	45199	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct scientific research. Publish peer-reviewed journal articles and other publications. Present findings at professional and public meetings and at other venues. Educate undergraduate and graduate students.

2. Brief description of the target audience

Maine natural-resource-based industries, Cooperative Extension staff, other scientists, state and federal policymakers, regulators, and legislators, classroom teachers

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	27	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Researcher co-organized and co-instructed the North American Dendro-Ecological Field Week (NADEF) at Schoodic Institute, Maine (June, 2015). NADEF is a highly visible, annual workshop taught by dendrochronology experts from across the US. This year it trained 39 students (including professionals, graduates, and undergraduates).

Year	Actual
2015	0

Output #2

Output Measure

- Extramural funds awarded to research faculty in this program area in FY15:

Year	Actual
2015	151443

Output #3

Output Measure

- # of non-peer-reviewed publications

Year	Actual
2015	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Develop new knowledge and technologies to address the effects of climate variability and change
2	Enhance adaptive capacity of production and natural systems to reduce exposure and vulnerability to climate change
3	Improve mitigation strategies for the reduction of greenhouse gas emissions and increase carbon sequestration in production and natural systems and communities

Outcome #1

1. Outcome Measures

Develop new knowledge and technologies to address the effects of climate variability and change

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The wild blueberry agroecosystem is a unique fruit crop involving culture of wild genotypes of the several ericaceous plant species. This native plant community is an important part of Maine's agricultural production (U.S. \$250 million/yr). A new invasive insect, the spotted wing drosophila (SWD), has recently and dramatically expanded its global range with significant consequences for its primary host crops: blueberries, blackberries, raspberries, cherries, and strawberries. SWD populations can increase quickly, and infestation is difficult to predict and prevent. The potential for a moderate, but realistic, level of 25% crop reduction from SWD infestation, would result in millions of dollars of loss to Maine growers and the Maine economy. Calculating Maine's 84.2 million pound wild blueberry crop production and \$0.70 price to the grower (5 year averages based on USDA data), a 25% loss of the crop loss would equal an unacceptable \$15 million.

What has been done

UMaine research and extension entomologists have been working to develop tools to detect the presence of SWD in new areas and have been studying biocontrol of SWD for the past two years.

Results

In 2015, the researchers collected enough data to develop action thresholds for insecticide application decision making. The threshold is 10 cumulative male SWD for a threshold that provides a 50% chance that the following week will result in SWD infested fruit, 3 cumulative male SWD for a 10% chance that fields will be infested the following week, and 1 male SWD for a 1% chance that the field will be infested the following week. Laboratory studies identified *Beauveria bassiana* (strain GHA) as the pathogen with the best potential for causing high levels of mortality in flies. In 2015, the scientists conducted a field study with Mycotrol (a formulated product of *Beauveria bassiana* (GHA strain), but they did not see promising levels of control in this study.

4. Associated Knowledge Areas

KA Code	Knowledge Area
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Enhance adaptive capacity of production and natural systems to reduce exposure and vulnerability to climate change

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Climate change is one of the greatest challenges facing forest managers today. Managers are urgently exploring strategies that confer adaptive capacity to forest ecosystems, yet having to do so with much uncertainty about future climatic conditions. Climate models predict changes not only in temperature and precipitation, but also increases in forest disturbances such as windstorms, insect outbreaks, and wildfire, further confounding future planning. Increases in these stresses and disturbances may reduce forest productivity, lead to increased tree mortality, and result in shifts on tree species composition.

What has been done

University of Maine scientists are working to identify which forest management practices could best be used to enhance the adaptive capacity of Maine's forests to forecasted alterations to climate and disturbance regimes. The research group has collected field data and increment cores (for growth analyses) from eight US Forest Service Experimental forests from Maine through Arizona, representing a gradient in aridity and forest types.

Results

Results from the ongoing work demonstrates that reducing tree densities (by silvicultural thinning) confers resistance and resilience to drought. Results clearly show that relative tree density was negatively related to drought resistance and resilience, indicating that trees growing at lower densities were less vulnerable to drought. This result was found on the three forest types we

evaluated and was consistent across species, forest development stage, soil characteristics, and drought intensity. The researchers conclude that managing forest ecosystems at low tree density represents a promising adaptive strategy for reducing the adverse impacts of climate change on forests in coming decades.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #3

1. Outcome Measures

Improve mitigation strategies for the reduction of greenhouse gas emissions and increase carbon sequestration in production and natural systems and communities

Not Reporting on this Outcome Measure

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluations in the experiment station are currently conducted at the project and program levels. At the project level, all projects are reviewed by an internal research council and external peer reviewers when initiated and again at completion by the research council. During the research council final evaluation, the focus is on determining if terminating projects met their stated objectives, secured extramural funding, and produced peer-reviewed publications. As for other measures of successful research programs, research faculty in this program area published 27 peer-reviewed articles and secured more than \$150,000 in extramural funding.

Researchers use a variety of methods to evaluate their own research projects including evaluations retrospectively, before-after, and during the life of the project; case studies; and comparisons between treatment/intervention and nontreatment/nonintervention.

At the program level, external NIFA review teams are asked to review the research programs of schools/departments. These teams provide input on the impact and productivity of research programs supported through the station. The station is working to develop a standard program-level evaluation process, which will be used to evaluate each station program area. Our current plans include an approach based on use of expert panels as recommended by the federal Government Accounting Office with individual program evaluations occurring every four to five years on a staggered time table.

Key Items of Evaluation

Faculty in this program area published 27 peer-reviewed articles and secured more than \$150,000 in extramural funding.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Sustainable Natural Resources

Reporting on this Program

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	0%		2%	
111	Conservation and Efficient Use of Water	0%		4%	
112	Watershed Protection and Management	0%		7%	
123	Management and Sustainability of Forest Resources	0%		10%	
131	Alternative Uses of Land	0%		2%	
132	Weather and Climate	0%		2%	
134	Outdoor Recreation	0%		4%	
135	Aquatic and Terrestrial Wildlife	0%		19%	
136	Conservation of Biological Diversity	0%		10%	
202	Plant Genetic Resources	0%		4%	
206	Basic Plant Biology	0%		4%	
215	Biological Control of Pests Affecting Plants	0%		4%	
301	Reproductive Performance of Animals	0%		2%	
306	Environmental Stress in Animals	0%		2%	
311	Animal Diseases	0%		2%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%		4%	
605	Natural Resource and Environmental Economics	0%		9%	
607	Consumer Economics	0%		1%	
608	Community Resource Planning and Development	0%		6%	
609	Economic Theory and Methods	0%		2%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2015	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	5.8	0.0
Actual Paid	0.0	0.0	10.8	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	571956	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	1351423	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	851785	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Conduct scientific research. Publish peer-reviewed journal articles and other publications. Present findings at professional and public meetings and at other venues. Educate undergraduate and graduate students.

2. Brief description of the target audience

Other scientists; teachers at all levels; directors of aquariums and museums, exhibit halls, etc.; endangered species biologists/managers; state and local policymakers; state regulatory agencies; environmental consultants; landowners

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2015	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2015
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2015	Extension	Research	Total
Actual	0	65	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Extramural funds awarded to research faculty in this program area in FY15:

Year	Actual
2015	3056861

Output #2

Output Measure

- Non-peer-reviewed publications:

Year	Actual
2015	44

Output #3

Output Measure

- Website: 2015 Citation: <http://www.tidalmarshbirds.org>

Year	Actual
2015	1

Output #4

Output Measure

- Platform for real time flow sensing in lotic systems

Year	Actual
2015	1

Output #5

Output Measure

- Scripting for drainage network delineations based on high resolution elevation datasets

Year	Actual
2015	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Improve knowledge of, or strategies and tools for, sustaining Maine's natural resources
2	Enhance sustainability, diversity, and resiliency of Maine's natural resource-based industries
3	Improve health, distribution, and/or abundance of crucial plant and animal species
4	New tools for monitoring amphibians
5	Increase bat abundance
6	New fungus to combat invasive fire ants

Outcome #1

1. Outcome Measures

Improve knowledge of, or strategies and tools for, sustaining Maine's natural resources

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The number of Blackpoll warblers (*Setophaga striata*) documented on the move through migration monitoring sites in the Gulf of Maine region has declined dramatically at some locations over the last 30 years. But until recently, scientists hadn't determined which of the breeding populations that span the entire North American boreal forest was responsible for this decline.

What has been done

To learn where and when specific breeding populations moved during migration, a research team led a University of Maine biologist collected feathers from Blackpolls at multiple locations throughout North America during fall and spring migration. The team analyzed feathers for naturally occurring chemical signals that indicate where the bird was when its feathers grew. The distribution of the chemicals, a stable form of a hydrogen isotope (deuterium) that occurs naturally in rainwater and gets carried into the food chain, follows a distinct pattern across North America. By analyzing each feather's isotope signature, the team could identify the bird's breeding location. Birds annually grow new feathers before flying to their wintering grounds.

Results

This study marks the first time scientists have determined a most likely explanation for why numbers of birds on migration have declined. Blackpoll warblers captured and banded during fall migration in the Gulf of Maine region carried stable isotope signatures that indicated they came from breeding populations in Alaska and western Canada. Those breeding populations have shown the greatest and most rapid decline in North America, with many declining by 70% to 90% in the past decade. Over much of the same period, the same areas have experienced a rapid rate of deforestation due to harvesting and fires. This study has also encouraged the application of banding and stable isotope markers in monitoring plans being developed by other regions (e.g. Midwest Landbird Migration Monitoring Network Strategic Action Plan - 2015-2019; Vermont's Wildlife Action Plan, 2015, Vt Dept. Fisheries & Wildlife). Additionally, effective conservation of a

species is more likely through the implementation of management strategies that take into account how different factors affect population viability throughout the full life cycle.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
301	Reproductive Performance of Animals
306	Environmental Stress in Animals

Outcome #2

1. Outcome Measures

Enhance sustainability, diversity, and resiliency of Maine's natural resource-based industries

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Like a food pantry, wood banks are programs that aim to help community members with life essentials by supplying firewood at little to no cost to those in need that rely on firewood as a heating source. As straightforward and tangible as these centers sound, as of 2014 only about a dozen wood banks are clearly recognized across the states of Maine, New Hampshire and Vermont, with only a handful consistently active in Maine. There may be many more wood banks that exist but are not advertised or labeled as a wood bank.

What has been done

A University of Maine scientist and undergraduate have written a how-to guide for people interested in starting community wood banks.

Results

Wood banks have the potential to be a significant support system that citizens can rely on. The purpose of this document is to introduce the concept of wood banks to communities across Maine. A Community Guide to Starting & Running a Wood Bank focuses on such topics as types of wood banks, location, legalities, eligibility, firewood sources, volunteers, distribution and

equipment needed. The guide also includes profiles and contacts for New England wood banks. The publication is available at http://digitalcommons.library.umaine.edu/sfr_studentpub/1/

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

Outcome #3

1. Outcome Measures

Improve health, distribution, and/or abundance of crucial plant and animal species

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Historically, shortnose sturgeon and Atlantic sturgeon, a related species, had spawning populations in the Penobscot River as far upstream as the site of the current Milford dam, and provided an important food and trade source to native peoples and early European settlers. Overharvest and loss of suitable habitat due to dams and pollution led to declines in shortnose sturgeon populations and a listing as endangered under the U.S. Endangered Species Act (ESA) in 1967. In 2012, Gulf of Maine populations of Atlantic sturgeon were listed as threatened under the ESA.

What has been done

Since 2006, UMaine researchers and graduate students have been working to better understand the sturgeon populations of the Penobscot River and Gulf of Maine by tagging and tracking sturgeon in the Penobscot. A network of sound receivers, which sit on the river bottom along the lower river from Penobscot Bay up to the Milford Dam, detect movement and location of tagged fish.

Results

This year the researchers confirmed evidence that three female shortnose sturgeon were in the area between Veazie and Orono in mid-October. Researchers had previously implanted the

sturgeon with small sound-emitting devices known as acoustic tags to see if they would use the newly accessible parts of the river. The fish have since been tracked joining other individuals in an area identified as wintering habitat near Brewer. Wintering habitat in other rivers is known to be staging habitat for spawning the following spring. Habitat access is essential for the recovery of these species. In addition to dam removals, construction of a nature-like fish bypass at the Howland Dam in 2015 significantly improves habitat access for the remaining nine species of sea-run fish native to the Penobscot, including Atlantic salmon and river herring. Scientific research and monitoring of this restoration effort has been ongoing for the past ten years, and the body of research on this project is among the most comprehensive when compared to other river restoration projects across the country.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
301	Reproductive Performance of Animals

Outcome #4

1. Outcome Measures

New tools for monitoring amphibians

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Radio telemetry provides fine-scale temporal and spatial information about an animal's movements and habitat use; however, its use for tracking amphibians has been restricted by transmitter mass and lack of suitable attachment techniques.

What has been done

In an attempt to improve how amphibians are monitored, University of Maine researchers evaluated a waistband for attaching external radio transmitters to frogs and toads.

Results

Using radio telemetry, the researchers monitored the movements and habitat use of wood frogs in 2006 and 2011-13 in Maine; American toads in 2012 in North Carolina; as well as wood frogs, southern leopard frogs and green frogs in 2012 in South Carolina. After observing 172 frogs and toads, the researchers found their waistband resulted in an injury percentage comparable to seven alternative waistband attachment techniques, but 12.5 percent fewer animals shed the waistband. Waistband retention facilitates longer monitoring periods, providing more data per radio tagged animal, the researchers say. The findings are documented in the paper "Evaluation of a waistband for attaching external radiotransmitters to anurans," published by the journal Wildlife Society Bulletin.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
605	Natural Resource and Environmental Economics

Outcome #5

1. Outcome Measures

Increase bat abundance

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maine is home to eight species of bats, three of which are proposed for state listing as threatened or endangered. The eastern small-footed bat is listed in Maine as threatened, the little brown bat and the northern long-eared bat are listed as endangered in Maine and threatened under the U.S. Endangered Species Act. The declines in bat species have been attributed to white-nose syndrome, a disease caused by the cold-loving fungal pathogen *Geomyces destructans*, which awakens cave-dwelling bats from hibernation.

What has been done

A UMaine wildlife ecologist has been bringing the massive declines in bat populations to the public's attention and educating residents about the extensive services that the animals provide to humans. He has also worked to improve monitoring methods used by researchers to evaluate Maine's bat populations to increase efforts to conserve them and he has worked to increase citizen participation in monitoring efforts. The researcher has created a pilot citizen science-based bat-monitoring project, named BatME. The goal was to test the feasibility of using handheld detectors to monitor bat populations in Maine. He proposed the project to officials at the Maine Department of Inland Fisheries and Wildlife, who immediately showed interest.

Results

During two months in summer 2015, 20 volunteers collected more than 4,000 detections of bats with hand-held bat detecting units produced by Wildlife Acoustics. The new equipment--purchased with funding from the Maine Outdoor Heritage Fund--included an acoustic microphone that attaches to an iPad and simultaneously records bat echolocation calls and identifies the species of bat. The application quickly translates the call into sounds the human ear can interpret (bats use ultrasonic sound to navigate.) The utility of this method is that it allows researchers to collect data in places they wouldn't if they were using traditional methods for bat monitoring. In a study published in spring 2011 in Science, researchers estimated that bats annually provide more than \$3.7 billion in pest-control services to the agricultural system in the United States. Some bat species also aid in seed dispersal and the pollination of flowers. Even in Maine, that study estimates that by a county-to-county basis, bats are providing millions of dollars of services in a given year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #6

1. Outcome Measures

New fungus to combat invasive fire ants

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2015	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

European fire ants are a nuisance pest for people and a potential threat to the environment. They aggressively defend their territory and readily sting humans, pets and livestock that have the misfortune to move slowly or rest within the ants' large foraging areas. Due to the highly competitive and aggressive behavior of these fire ants, eradication has proven to be almost impossible.

What has been done

University of Maine researchers are one step closer to controlling the ever-growing invasive fire ant populations, *Myrmica rubra*, spreading through Maine for the last 15 years.

Results

UMaine researchers are turning their attention to a different kind of control to combat these tiny stinging insects. Their weapon--pathogenic fungi. The scientists are attempting to grow this newly discovered fungi in the lab to look at its utility for management of the ants. The newly discovered fungus is the first species of the *Orphiocordyceps* (previously *Hirsutella*) genus to be isolated from the North American European fire ant in New England, though there are two other pathogens within the genus that infect fire ants in the United Kingdom.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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 invasive species)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluations in the experiment station are currently conducted at the project and program levels. At the project level, all projects are reviewed by an internal research council and

external peer reviewers when initiated and again at completion by the research council. During the research council final evaluation, the focus is on determining if terminating projects met their stated objectives, secured extramural funding, and produced peer-reviewed publications. As for other measures of successful research programs, research faculty in this program area published 65 peer-reviewed articles and secured more than \$3M in extramural funding.

Researchers use a variety of methods to evaluate their own research projects including evaluations retrospectively, before-after, and during the life of the project; case studies; and comparisons between treatment/intervention and nontreatment/nonintervention.

At the program level, external NIFA review teams are asked to review the research programs of schools/departments. These teams provide input on the impact and productivity of research programs supported through the station. The station is working to develop a standard program-level evaluation process, which will be used to evaluate each station program area. Our current plans include an approach based on use of expert panels as recommended by the federal Government Accounting Office with individual program evaluations occurring every four to five years on a staggered time table.

Key Items of Evaluation

Research faculty in this program area published 65 peer-reviewed articles and secured more than \$3M in extramural funding.

VI. National Outcomes and Indicators

1. NIFA Selected Outcomes and Indicators

Childhood Obesity (Outcome 1, Indicator 1.c)	
0	Number of children and youth who reported eating more of healthy foods.
Climate Change (Outcome 1, Indicator 4)	
0	Number of new crop varieties, animal breeds, and genotypes with climate adaptive traits.
Global Food Security and Hunger (Outcome 1, Indicator 4.a)	
0	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
Global Food Security and Hunger (Outcome 2, Indicator 1)	
0	Number of new or improved innovations developed for food enterprises.
Food Safety (Outcome 1, Indicator 1)	
0	Number of viable technologies developed or modified for the detection and
Sustainable Energy (Outcome 3, Indicator 2)	
0	Number of farmers who adopted a dedicated bioenergy crop
Sustainable Energy (Outcome 3, Indicator 4)	
0	Tons of feedstocks delivered.