2016 University of Maine Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

The University of Maine Cooperative Extension has served the people of Maine for over 100 years, and is a partnership of county, state and federal funding. By conducting Extension programs in every Maine County, we support UMaine's public education and service role as a land-grant and sea-grant institution. Volunteer advisory boards, comprised of county residents, oversee budgets for the local offices and advise Extension staff on programming to meet local needs.
UMaine 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**.
We are very proud of the success stories included in this report and we are pleased to take this opportunity to share information about these and other accomplishments and impacts.
Maine Food and Agriculture Center
The Maine Food and Agriculture Center is a partnership of the Experiment Station and Cooperative Extension, and is located on the University of Maine campus in Orono. The center utilizes the 16-county reach of Extension, and many of Extension's recommendations to the state's agricultural community come directly from research conducted at Experiment Station farms. This research-Extension partnership has been working for nearly 100 years and is as vital today as it was early in the 20th century.
With $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 is growing to 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.

Agriculture
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. Even though Maine is 90 percent forested, the state has over 8,200 farms, the largest number of any New England state. UMaine Extension played pivotal roles in supporting a majority of these farms over the past year.

The Maine potato industry encompasses over 500 businesses employing over 2,600 people and providing over $142 million in income to Maine citizens. The economic impact from our pest monitoring and educational programs for the 2016 season is estimated to be more than $12.8 million.

Maine's wild blueberry industry, with 500 growers on 44,000 acres, produces 100 million pounds of blueberries and has a direct and indirect economic impact of over $250 million to the state's economy. UMaine Extension outreach 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.

Maine has the third-largest maple production in the United States, behind Vermont and New York. Our maple industry has an annual statewide economic contribution of an estimated $48.7 million in output, 805 full and part-time jobs, and $25.1 million in labor income. UMaine Extension leadership in an annual International Maple Syrup Institute Maple (IMSI) Grading School supports this important internationally recognized industry.
The expanding interest in locally grown grains among consumers and food businesses represents a new economic opportunity for grain growers looking for higher value and diversified markets. However, these new grain markets are dispersed and often seeking specific types and varieties of grain unfamiliar to Maine growers. UMaine Extension connects growers with buyers in high-value markets and provides the production information needed to help growers succeed, creating increased revenue for Maine growers.

Dairy farmers are an important agricultural resource for Maine, and small farmers are especially at risk of economic losses due to prototheca mastitis. UMaine researchers are exploring effective means to quickly determine the presence and type of prototheca in a herd of dairy cattle. Detection of this organism will allow Extension specialists and veterinarians to counsel producers about methods to keep the disease under control. If a "cow-side" test can be developed, an industry partnership will be created to bring the diagnostic test to producers. This knowledge and screening for the disease could save dairy producers over $2.5 million per year.

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, nearly 20,000 adults and youth participated in educational opportunities last year. In Maine, over 13 percent of the population lives in poverty, and the USDA estimates Maine's food insecurity rate at 15.5 percent of the population, with one in four children experiencing food insecurity. Two-thirds of adults and a quarter of school-aged youth are overweight or obese.
UMaine Extension's Eat Well program and Maine FoodCorps work directly with Maine's limited income populations. Over 300 adults and 3400 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 on grocery expenses through meal planning and smart shopping strategies; Eat Well youth reported improvements in choosing foods from MyPlate, food safety practices, and increased physical activity.
In the past 5 years, Food Corps service members have served in 55 schools teaching over 25,000 students about food and nutrition and helping make schools healthier places for Maine youth. 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.
UMaine Extension adapts its nutrition programming to meet the unique needs of the state's Native American population. In Washington County, where 28 percent of the Native American population has been diagnosed with diabetes, UMaine Extension in 2016 created the Diabetes Education in Tribal Schools: Health Is Life In Balance program to be culturally specific to the Passamaquoddy Tribe in Washington County. The program includes community statistics, Passamaquoddy language, and cultural images.

Food Insecurity Activities and Education
The third Maine Hunger Dialogue was held at the University of Maine this year, with 339 students and staff from 21 Maine universities and colleges, and one high school. The goal of the Maine Hunger Dialogue is to inspire students to take action to address hunger on their campuses and in their communities. Twenty-seven teams successfully applied for MHD grants to support new and existing initiatives. Teams used the

funds to develop food recovery networks, initiate food pantries and resource hubs, develop a new college course, write and distribute a cookbook for easy nutritious meals on a limited budget, initiate an "edible park", start community gardens, and conduct food drives and hunger awareness initiatives. "Meal food pack-outs" (packaging healthy nonperishable meals) held at twelve college campuses packed 163,000 meals that were distributed to food insecure students and community members across the state.
The Maine Hunger Dialogue grew out of our Maine Harvest for Hunger (MHH) program. Since MHH's inception, participants have distributed more than 2.44 million pounds of food to people in Maine experiencing food insecurity. In 2016, over 257,000 pounds of food went to 142 distribution sites. Over 600 program volunteers in 14 counties collectively logged more than 5,000 hours. The value of the produce was over $434,000, based on an average $1.69 per pound.

Master Gardener Volunteers

UMaine Extension's Master Gardener Volunteer (MGV) program provides participants with research-based horticulture training and connects them with meaningful service projects in their community. Maine has 952 active MGV, 127 of whom were trained in 2016. In total, they donated over 35,000 hours to a variety of educational and food security projects throughout the state including supporting 80 community gardens, 86 school gardens, 103 demonstration gardens, and 56 programs involving 1,579 youth in horticulture. Those involved with food security projects distributed 257,426 pounds of food to 142 food distribution agencies and countless neighbors in need as part of the Maine Harvest for Hunger program. Many volunteers enter the MGV program with the goal of improving their gardening skills for personal benefit and then become deeply involved and passionate about community projects.

Support for Entrepreneurs and Microbusinesses

UMaine Extension provides small-business education for Maine people. Workshops help home-based and micro-enterprise business entrepreneurs improve their decision-making and business management skills, so their businesses can grow and prosper. Workshops and business management publications cover a variety of business-related topics, including marketing, pricing, financial management, Internet marketing, record keeping, and customer service. Our highly successful "Small-Business Clinic" program is available through Extension offices across the state. Small-business clinics are confidential individual consultations with UMaine Extension faculty that provide information and learning opportunities that are based on research and practical experience.

UMaine Extension supports improved access to financing for Maine businesses through its collaboration with a regional economic development agency that provides Small Business Administration loan guarantees for prospective borrowers. Through this loan program $14.5 million was invested in local communities, 129 jobs were created or retained, and thirteen of Maine's sixteen counties benefited.

4-H Youth Development

Last year more than 28,500 youth participated in the Maine 4-H program by attending 4-H camps and learning centers, 4-H community clubs, school, afterschool, and special interest programs. We reached more underserved and underrepresented youth than ever before. With many youth participating in multiple ways, UMaine Extension faculty and staff, and more than 2,000 volunteers, provided positive learning experiences for:

- 9,000 youth through our 4-H Camp and Learning Centers
- 2,600 youth through our 4-H clubs
- 9,000 youth through our FoodCorps program
- 3,500 youth through our Eat Well program
- 10,500 youth through our Special Interest/Short Term programs
- 9,600 youth through our School Enrichment Programs

4-H STEM Ambassadors are students at University of Maine System campuses who are trained in experiential learning, risk management, and science content, and then are paired with host sites to

facilitate STEM activities with youth. The program often engages in underserved communities. Currently, six of seven UMS campuses are partners in this program to bring hands-on STEM education to young people in their community. In 2016, 121 ambassadors reached over 1200 youth with at least six hours of hands-on STEM activities.

Another way UMaine Extension provides STEM programming to youth is through Follow a Researcher™. Extension and UMaine collaborators created Follow a Researcher (FAR™) to increase youth understanding of the research process by engaging them directly with UMaine researchers in the field. In 2016, the program grew to 1676 Maine youth (over 50 percent female), and 76 adults, and an additional 149 youth and 12 adults from other seven other states. Participating middle school teachers created curriculum related to the expedition, exposing youth to science in their classrooms in new and engaging ways. FAR™ is expected to grow significantly as it develops relationships with Polartrec (Teachers and Researchers Exploring and Collaborating) and the National Public Radio podcast Science Friday.

Our three 4-H Camp and Learning Centers are vibrant hubs of experiential, place-based education that in 2016 served over 9000 youth from 16 Maine counties, 31 states, and 7 countries. Since 2011 UMaine Extension 4-H Camp and Learning Centers have offered Military Teen Adventure Camps to provide outdoor adventure, STEM, and leadership camp programs for over 540 of teens with parents who are deployed or about to be deployed. Our Open Air Classroom and Lakeside Classroom programs provide schools a residential program using the Centers' forest, lakes and ocean resources as a classroom in which to integrate active learning in art, ELA, and science. In 2016, over 5000 students from 106 school groups participated in OAC and Lakeside programming.

Cooperative Extension and the Marine Extension Team

As a designated Sea Grant College, the University of Maine hosts the Maine Sea Grant College Program, a federal-state partnership funded by the National Oceanic and Atmospheric Administration and the state of Maine. The Marine Extension Team is a collaboration between Sea Grant and Extension and includes 10 professionals located in coastal communities statewide. The MET provides coastal communities and other stakeholders with scientific information and assistance and ensures that researchers are aware of the most pressing issues facing the state. Information is transferred to and from citizens by Extension Associates who design and deliver local outreach programs. Through this process, communities gain the capacity to make informed decisions on the management of coastal and marine resources that promote ecological and economic sustainability.

Marine research areas and outreach efforts include: Healthy coastal ecosystems for everyone; safe and sustainable seafood for fishermen, aquaculturists, fisheries managers, fishing communities and consumers; resilient coastal communities for municipal officials, regional planners, local bay and watershed organizations, conservation groups and economic development agencies; climate change impacts and response for coastal property owners, municipal officials, fishermen, aquaculturists and K-12 students.

Support for Maine's Marine and Coastal 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 $547 million in 2016, 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 improve 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.

Tourism and coastal beaches are integral to Maine's economy. In 2015, visitors to Maine beaches contributed $1.61 billion to the southern coast and tourism contributed $735 million to the midcoast

economy. Tourism, and the coastal environment on which it depends, is vulnerable to pollution and climate change. UMaine Extension coordinates Maine Healthy Beaches to monitor water quality and protect public health on coastal beaches. MHB builds local capacity by engaging stakeholders in multi-year enhanced monitoring and pollution source-tracking studies, data analysis, GIS watershed risk analysis, and stakeholder workshops.

University of Maine Animal Health Lab

With Maine's continued growth in popularity of small farms and their expansion into areas where wildlife are common, getting animal health information into the hands of farmers is vitally important, as is having a state conduit for veterinarians to learn about livestock disease. The University of Maine Animal Health Lab (UMAHL) provides services to the veterinarians, livestock producers, and animal owners of the state. The lab performs a variety of diagnostic services, including necropsy, microbiology, virology, pathology, and special research support. It offers diagnostic support to clinicians, and assists in finding solutions for agricultural and aquacultural producers using UMaine Extension resources. Through Extension it links with industry to help in the control of animal health related problems in Maine.

In 2016, UMAHL tested almost 10,000 samples, the great majority of which were from farm animals. It tested over 5000 poultry samples and over 2000 milk samples, thus allowing farms of all sizes to operate with more assurance of healthy animals and healthy products. Medium to large-sized poultry farms were able to meet their FDA-requirements for salmonella testing locally, with quick turn-around time. Sheep and goat owners were able to find out whether their animals have enteric parasites, and what to do about it. Nearly 1000 samples from sheep and goats were tested for contagious diseases, such as caseous lymphadenitis (CL), and information provided about preventing it on farms. The Extension Plant, Animal, and Insect Diagnostic Lab being constructed in 2017 will expand UMAHL's services, reach, and positive impact on Maine's over 8,000 farms.

Plant, Animal, and Insect Diagnostic Lab

The new Cooperative Extension Plant, Animal, and Insect Diagnostic Lab is under construction and we anticipate it opening in the fall of 2017. 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 protect the natural resource based economy, protect food safety and human health, and provide unique diagnostic and testing services for Maine. The facility will house our new Maine Tick Lab that will identify tick species and diagnose them as carriers of infectious diseases such as Lyme. It will also house the UMaine Animal Health Lab.

UMaine Extension Website

In 2016, UMaine Extension's website at extension.umaine.edu--a composite of 60+ interconnected websites--received more than 2.3 million pageviews from users in 228 countries. Nearly 83% of visitors came from the United States and 37% of those were from Maine. Nearly 40% used mobile devices to view our pages. More than 20,500 visits were referred from Facebook. More than 175 educational videos were available to visitors on our YouTube channel and embedded in our web pages. Fifty trackable QR Codes on posters, postcards, signage, and more, pointed visitors to additional information on our website. More than 300 interactive forms allowed users to request assistance, presentations, workshops, newsletters, updates, and more; report volunteer hours; register for classes and events; and make donations.

Visitors searched for and found information on a wide variety of topics including vegetable gardening in Maine, tick identification, plant propagation, soil and plant nutrition, growing blueberries, and summer camps for kids. We offered educational slideshows, image galleries, and nearly 550 publications for free download. The most popular fact sheets received tens of thousands of pageviews each: Best Ways to Wash Fruits and Vegetables, Growing Raspberries and Blackberries, Facts on Fiddleheads, and Safe Homemade Flavored and Infused Oils.

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. In 2016, over 4000 Maine people volunteered more than 87,000 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.

Continuing to Bring Research-based Knowledge to Maine People

We are proud to report that UMaine Extension's faculty and staff continue to perform excellent work as we bring research-based knowledge and practical solutions to the people of Maine. We are committed to working successfully with a broad range of partners to meet the needs of Maine people, and we understand that community-based collaboration is key to achieving measurable results. We believe that the need for University outreach through a committed, enthusiastic, and energized Cooperative Extension program has never been greater.

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 22 Hatch, Animal Health, and McIntire-Stennis projects went through the process in FY2016.

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 Food and Agriculture 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 Food and Agricultural Center (MFAC).

From discussions with stakeholders, station administrators have learned that Maine's forest stakeholders are looking for information on developing new markets, forest health issues, maintaining prosperity of this economic sector in the wake of several mill closings, and enhancing rural community prosperity. 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 2016 Plan of Work, the Maine Agricultural & Forest Experiment Station (MAFES) estimated 36.1 SYs for 2016; the actual number of SYs was 48.1 for FY2016. For FY2016, MAFES expended $2,351,847 (Actual Formula Funds), $5,046,124 (Actual Matching Funds), $818,648 (Actual All Other Funds), for a total of $8,216,619. 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.

Planned Programs--Maine Agricultural & Forest Experiment Station

Maine Food System

In our 2016 Plan of Work, we estimated that there would be 17.0 SYs in this program area; the actual SYs allocated for 2016 were 28.4. During FY2016, MAFES expended $1,294,498 (Hatch), and $2,716,169 (1862 Matching), and $0 (1862 All Other), for a total of $4,010,667 in this program area. MAFES research in this program area has resulted in a number of outputs for FY2016, including completed projects, peer-reviewed and other publications, presentations at professional meetings,

workshops, and other venues.
There were several outcomes in this program area during FY2016. To highlight a few: MAFES marine scientists have developed best management practices for raising razor clams, a potential source of diversification for the Maine shellfish industry; joint MAFES/Extension research on bees has created a pesticide exposure database to protect honey bees from chemical exposure thus enhancing wild blueberry pollination and output; Maine food scientists assessed the effects of minimal processing treatments on four varieties of farm raised sea vegetables in Maine to provide new information on important properties of the seafood.

Climate Change

In our 2016 Plan of Work, we estimated 2.8 SYs in this program area; the actual number of SYs allocated for 2016 was 2.1. During FY2016, MAFES expended $107,875 (Hatch), $208,557 (1862 Matching), $980 (1862 All Other) for a total of $317,413 in this program area. MAFES research in this program area has resulted in a number of outputs for FY2016, including completed projects, publications, and presentations at professional meetings, workshops, and other venues.
There were several outcomes in this program area during FY2016. To highlight one: University of Maine scientists used environmental DNA (eDNA) to confirm and to document the presence of invasive fish species threatening the populations of highly-valued and in some cases exceedingly rare native species.

Sustainable Community and Economic Development

In our 2016 Plan of Work, we estimated that there would be 5.6 SYs in this program area; the actual number of SYs allocated for 2016 was 6.7. During FY2016, MAFES expended $345,604 (Hatch), $772,261 (1862 Matching), $259,773 (1862 All Other) for a total of $1,377,638 in this program area. MAFES research in this program area has resulted in a number of outputs for FY2016, including completed projects, publications, and presentations at professional meetings, workshops, and other venues.
There were several outcomes in this program area during FY2016. To highlight two: testing performed at the UMaine Composites Center resulted in the successful approval of Norway spruce for use as dimensional lumber, a once-in-a-lifetime achievement potentially yielding millions of dollars of new income for the entire forest products supply chain; new analytical tools to foster improved understanding of existing land use developed by UMaine researchers have been packaged in an easy-to-use website and highlighted on statewide public television allowing individuals, government and businesses to anticipate and avoid conflicts, and maximize social, ecological and economic benefits while reducing unnecessary costs.

Sustainable Natural Resources

In our 2016 Plan of Work, we estimated 8.4 SYs in this program area; the actual SYs allocated for 2016 were 10.8. During FY2016, MAFES expended $603.870 (Hatch), $1,349,136 (1862 Matching), and $557,895 (1862 All Other) for a total of $1,953,007 in this program area. MAFES research in this program area has resulted in a number of outputs for FY2016, including completed projects, peer-reviewed and other publications, and presentations at professional meetings, workshops, and other venues.
There were several outcomes in this program area during FY2016. To highlight two: a MAFES scientist collaborated with stakeholders, regulating agencies and other scientists to create the Vernal Pool Special Area Management Plan for Maine, a voluntary mitigation tool that helps conserve vernal pools and benefits developers with a streamlined environmental compliance process; University of Maine scientists completed a seven-year research project evaluating effects of dam removals in Sedgeunkedunk Stream, providing convincing evidence that dam removal in small streams is an effective tool in mitigating historic disruption of river-system connectivity.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	95.4	{No Data Entered}	36.1	{No Data Entered}
Actual	91.3	0.0	48.1	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

In an ongoing effort to maintain valuable and relevant programming, Cooperative Extension 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.

We partner with all regional Extension programs in the Northeast Region whose active vision is to coordinate translational research, education, outreach, and diversity programming to address problems, opportunities, and workforce development.

UMaine Extension is a member of the New England Planning and Reporting Consortium. Working in collaboration with these other states, we maintain an online planning and reporting system that results in ongoing discussions about state and regional priorities and programs, opportunities for multistate work, sharing staff resources, and a better understanding of how our programs are unique within New England.

The station uses its standard external scientific review process for continuing faculty proposing new five-year 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. A total of 22 projects went through the process in FY2016; of this total, four were fast-track projects.

For the standard process, Experiment Station faculty prepare a pre-proposal reviewed by the MAFES Research Council, which is comprised of senior faculty. Following Research Council review to ensure that the proposed work falls within the purview of MAFES, addresses an important need identified by stakeholders, and that the project director possesses the expertise to conduct the research, full proposals are developed. The full research proposals are sent out for external, expert peer review. 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 goal is to complete project development and obtain USDA approval in four months. The shorter timeline 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.

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 statute, advises UMaine on agricultural research and Extension priorities.
• 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 agricultural commodity.
• 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 Maine Sea Grant Policy Advisory Committee, Tanglewood 4-H Camp and Learning Center Board, Bryant Pond 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: Maine Organic Farmers and Gardeners Association, 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 formal meetings with advisory groups including the Board of Agriculture, the Forest Resources Advisory

Committee, the Potato Licensing Advisory Committee, and the Coordinating Committee of the Maine Cooperative Fish and Wildlife Research Unit. The director and associate director also take part in 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. Feedback from these committees provides information on research priorities and needs for these commodity groups. 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. 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 Food and Agricultural Center (MFAC). Based on the input received, critical areas were identified for emphasis and support. Since agriculture is a dynamic industry, MFAC/MAFES needs to update longrange 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 Clapp Greenhouses advisory committee, made up of the associate director, superintendent, and faculty users of the greenhouses, conducted a series of listening sessions across campus to develop a concept plan for facility modernization that increases research capacity, improves safety and pest control, and reduces energy costs. At the Witter Center (animal science research facility), a new operations plan was implemented by a new farm superintendent. The dairy herd was reduced to create additional staff time for infrastructure improvements and modernization planning. This operations plan was the result of discussions with leaders from the Maine Dairy Industry Association, a taskforce of animal and veterinary sciences faculty, the farm superintendent, and station/college
administrators.

Brief Explanation of what you learned from your Stakeholders

Funding is key - the unique resource of research and Extension regularly produces significant social, environmental, and economic benefit for the people of our state. The ability to provide the full spectrum of help in understanding and identifying issues, researching and addressing issues, and disseminating quality information takes a critical infrastructure drive by high-level expertise. An ongoing commitment to funding will repay this investment many times over.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2425014	0	2390407	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	3410413	0	2351847	0
Actual Matching	3330413	0	5046123	0
Actual All Other	7975873	0	818648	0
Total Actual Expended	14716699	0	8216618	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	1851174	0	0	0

V. Planned Program Table of Content

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	50%		0%	
802	Human Development and Family Well-Being	30%		0%	
806	Youth Development	20%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	24.9	0.0	0.0	0.0
Actual Paid	51.5	0.0	0.0	0.0
Actual Volunteer	39.5	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**
743487	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
743487	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
2233158	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

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2848	995	29137	387

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

Year:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	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
2016	2420

Output #2

Output Measure

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

Year	Actual
2016	75

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

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
2016	8791

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Students from St. George School worked with their town?s Conservation Commission and the Department of Marine Resources to reintroduce alewives into their local marsh after a thirty-year absence. The work included community planning, data collection, and evaluation, performed collaboratively among students, community members, and government agencies. The school requested help from UMaine Extension to expand the program through ecological study and field explorations of the habitat.

What has been done
Extension offered the Tech Wizards 4-H Program to the School. Tech Wizards is a youth mentoring program that uses STEM education and service learning to help youth learn life and workforce skills; improve academic performance; and aspire to post-secondary education, productive careers, and community engagement. Extension Tech Wizards staff provided students with a weeklong intensive study of alewives, a species of herring that migrates biennially from the ocean to freshwater.
Results ?The students:

Results
The students:
?Connected with community elders to discuss the economic and historic importance of alewives.
?Learned hard science skills such as fish dissection, water quality testing, and sampling techniques.
?Learned canoe skills and paddled the migration path of the alewives.
?Interviewed local scientists to discuss career opportunities.
?Documented their experiences via blog posts.
?Were physically active and ate nutritious lunches with local ingredients from 4-H camp gardens.
Research confirmed the alewives were successful in their migration from the ocean to the marsh for the first time in thirty years. Students learned invaluable STEM skills, became engaged in community service, and built relationships in their community. In 2016, Maine?s Tech Wizards Program worked statewide with 373 students in 10 Maine schools, training teen mentors to help younger students understand that they are problem-solvers, capable of recognizing and solving real problems in their communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
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
2016	7675

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Oxford County?s SAD 44 school district students, parents, and community members recognized a need for a place-based learning program to support ninth grade students in their transition to high school. A new educational model was needed to support incoming freshmen experiencing low

self-confidence, challenges with public speaking, writing and problem solving, and low impulse control.

What has been done
In 2014 the UMaine 4-H Center at Bryant Pond and SAD 44 created Telstar Freshmen Academy (TFA), a yearlong, experiential program to engage students, build communities of learning, resilience and high aspiration for the high school years. The program is based on a rigorous small-group learning model that includes integrated academics, service learning, 21st Century Skills, and community mentoring.

Results
For the entire school year, the ninth grade class attended daily outdoor programming at Bryant Pond. In the program?s first year, TFA students test scores improved at double the national average and revealed growth in aspiration toward college and careers. Parents of students reported dramatic, positive changes in their children?s behavior, including improvements in self-confidence, impulse control, speaking, writing, and problem solving abilities. The community benefited from TFA service learning projects such as installing solar panels at the 4-H Center, designing and installing interpretive signs on a local hiking trail, volunteering at an assisted living home, and designing a school snack program and planting and harvesting crops for those snacks. A positive, supportive culture was created in the freshmen class, high school culture was improved, and the bond among the students, TFA staff, and community was strengthened.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
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
2016	7562

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Research shows that physical, social and emotional environments can significantly impact children?s learning outcomes. Children in public housing often have increased vulnerability due to their environment and can benefit from programs that mitigate risk factors, build social capital, and connect them to positive assets.

What has been done
In 2014, UMaine Extension initiated 4-H Community Central at public housing sites in the state?s two largest cities, Portland and Lewiston, to build stronger families, reduce school-age youth learning loss, increase their science literacy and improve their critical life skills. The program places Extension staff in public housing sites, where they engage youth with their parents, elders, school, and community through hands-on 4-H projects in science, leadership and citizenship.

Results
In three years, Maine 4-H Community Central has reached over 660 youth. In their local communities, youth in grades 3-8 received over 460 hours of 4-H STEM programming taught by teen mentors and community leaders. Twenty-five teens in grades 9-12 dedicated over 330 hours of mentoring and leadership to young people in their communities. These teens also completed a total of 60 hours of supervision and over 100 hours of training and planning to prepare and implement lessons with younger students. Participating youth have demonstrated knowledge, skills, attitudes, and behaviors necessary for fulfilling, contributing lives.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results

{No Data Entered}

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Reducing Summer Learning Loss and Sparking an Interest in Science**
Relevance ? In Maine over 33 percent of 5th and 45 percent of 11th graders are not proficient in science. Low-income students have less than average access to science education, and the achievement gap is worsened during the summer for low-income students, who lose more grade equivalency due to lack of out-of- school and summer learning opportunities. Improved STEM education can lead to better employment opportunities and increase the likelihood of youth furthering their education.

What has been done
In an effort to increase science proficiency in underserved communities, and prevent summer learning loss, UMaine Extension in 2016 created and delivered science curricula to youth in grades 3-8 at 21 free or reduced-lunch sites, 2 libraries, and 6 summer camps across the state. Three thousand, five hundred fifty youth participated in the program, one-third were of a minority race/ethnicity and almost half were girls.

Results

Engaging in SOS activities prepared these youth to return to their academic school year with reduced summer learning loss and an increased interest in science. Research shows that youth involved in 4-H are more likely to pursue future courses or a career in science, engineering or computer technology, which can lead to improved employment opportunities. SOS Teen Teachers develop new skills and positive attitudes toward their community. An example in 2016 was Mariam, who is 14 and first learned about 4-H SOS when her mother was chatting with the 4-H Community Education Assistant at the local Islamic Community Center. Mariam was an avid trainee and demonstrated a natural ability to share information with others. By the end of the training, she was eagerly requesting opportunities to teach the Aquaculture lesson. Throughout the summer Mariam was on time and on task, effectively engaging youth in hands-on learning and enthusiastic in helping others.

4. Associated Knowledge Areas

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

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results

{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	5287

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Family life in the military can be challenging, especially for teens. At least one parent may be gone for long periods of time, there may be constant, underlying worry about the parent that is deployed, and there may be additional stress related to relocations. Research shows that while many military children and families manage well, for some these challenges can have a detrimental effect on their health and wellbeing.

What has been done
Since 2011 UMaine Extension 4-H Camps have offered Military Teen Adventure Camps to provide teens outdoor adventure, STEM, and leadership experiences. For example in 2016, Tanglewood 4-H Camp delivered a ten-day overnight camp where U.S. Navy teens learn practical technology and engineering skills, made friends and enjoyed outdoor recreation. The program provided the teens with summer camp experiences that promoted positive life skills, new friendships and physical activity.

Results
Through the 2016 Navy Teen Camp program, twenty-four teens from Navy bases in Singapore and California gained knowledge and skills in STEAM, 4-H, and community as they built submersible robots to explore the Ducktrap Watershed and discover the elements essential for healthy ecosystems. Participants reported a 65 percent increase in knowledge about Atlantic Salmon, a 65 percent increase in understanding of electrical circuits, and a 75 percent increase in understanding of land-grant colleges and 4-H. By bringing together teens with families from military backgrounds, Military Teen Adventure Camps provide meaningful experiences where they are able to connect with a new peer group. By living and adventuring with others they have unique connections to, teens report feeling greater sense of support and camaraderie than in their

home communities. Since 2011, the three Camp and Learning Centers have provided camp experiences to over 540 military teens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
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
2016	7519

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Despite a 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 percent higher than those of other occupations.? It is critical that Maine youth have the knowledge and aspiration to access higher education, particularly in STEM, and 4-H can be a conduit to that end.

What has been done
In 2016, with the support of the UMaine System Chancellor and Board of Trustees, the 4-H STEM Ambassadors program expanded to six of the seven UMaine campuses. Ambassadors are trained college students who act as caring mentors to youth, facilitate STEM activities with them, and help them learn about college and career options. In 2015-2016, 121 ambassadors reached over 1200 youth with at least six hours of hands-on STEM activities. The program often engages in underserved communities.

Results
Ambassadors reported increased knowledge of STEM and comfort facilitating STEM activities. One said, "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 right for them. Youth were extremely excited that UMaine students came to share STEM activities.
Teachers are encouraged by the program?s success. One 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.? Another said: ?The program has really added value to what we are trying to accomplish with these kids. They are able to see someone closer to their own age, doing science and math and making it fun. It is also helped us feel closer to our local university.?

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle
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
102	Soil, Plant, Water, Nutrient Relationships	4%		12%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		6%	
202	Plant Genetic Resources	0%		7%	
204	Plant Product Quality and Utility (Preharvest)	3%		0%	
205	Plant Management Systems	5%		9%	
206	Basic Plant Biology	3%		0%	
211	Insects, Mites, and Other Arthropods Affecting Plants	8%		7%	
213	Weeds Affecting Plants	4%		9%	
215	Biological Control of Pests Affecting Plants	10%		10%	
216	Integrated Pest Management Systems	15%		0%	
302	Nutrient Utilization in Animals	1%		0%	
307	Animal Management Systems	1%		0%	
311	Animal Diseases	1%		11%	
315	Animal Welfare/Well-Being and Protection	1%		0%	
501	New and Improved Food Processing Technologies	5%		14%	
601	Economics of Agricultural Production and Farm Management	8%		0%	
605	Natural Resource and Environmental Economics	0%		9%	
703	Nutrition Education and Behavior	15%		6%	
704	Nutrition and Hunger in the Population	8%		0%	
724	Healthy Lifestyle	8%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	40.9	0.0	17.0	0.0
Actual Paid	41.5	0.0	28.4	0.0
Actual Volunteer	20.5	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**
2199112	0	1294498	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2119112	0	2716169	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
4922995	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 Hotriculture Activities - Direct (Club, Conference, Program, Consultation, Scholarship, or

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

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	41732	4386092	11883	1308136

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

Patent Applications Submitted

Year:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	0	70	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2016	13371

Output #2

Output Measure

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

Year	Actual

2016	7902

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 access to agricultural workers
22	Farmers of All Abilities Remain Active on the Farm

Outcome #1

1. Outcome Measures

Pounds of food donated

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	257426

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Maine has the highest rate of food insecurity in New England, and is 12th in the U.S. Over 15 percent of Maine households (209,000 people), and 24 percent of its children are food insecure. Twenty-three percent of seniors have marginal to very low food security, and 43 percent of food-insecure people are food stamp ineligible. Food insecure people have difficulty affording quality fresh, nutritious food, and donations of fresh produce to Maine?s emergency food system has declined.

What has been done
Since 2000, UMaine Extension?s Maine Harvest for Hunger (MHH) program has mobilized gardeners, farmers, businesses, schools, and civic groups to grow, glean, and donate quality produce to distribution sites (pantries, shelters, community meals) and directly to neighbors in need, with the goal of mitigating hunger, improving nutrition and health, and helping recipients develop lifelong positive nutritional habits.

Results

Since 2000, MHH participants have distributed over 2,444,000 lbs. of food to citizens grappling with hunger. In 2016, donations of 257,000 lbs. of fresh produce went to 142 hunger alleviation distribution sites. Over 620 volunteers in 14 counties logged over 5,000 hours and the value of the produce was over $434,000. Working with recipients, donors, and staff, the MHH team has expanded the number of offerings accepted and consumed by recipients, minimized waste, and extended the donation season. To extend the season, donors are offering more storage crops that can be distributed over a longer time period.

?Through Maine Harvest for Hunger gleaning at Zach's Farm?I volunteer on Monday afternoons and whenever else they need help. I wear my Master Gardener nametag to give credit to our group that does such good work with food insecurity. This is what I was hoping for in retirement, to find a way to give back and be part of the hunger solution.? Master Gardener Volunteer

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

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
2016	434000

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
724	Healthy Lifestyle

Outcome #3

1. Outcome Measures

Number of agencies served

Not Reporting on this Outcome Measure

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1465

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Wild blueberries have a direct and indirect economic impact of over $250 million to Maine?s economy. Because they are indigenous to Maine, wild blueberries are naturally resistant to many native pests. Valdensia leaf spot disease can be a devastating to wild blueberry crops. First identified in Maine in 2009, this was a new disease to growers who were unaware of its symptoms, life cycle and consequences or how to control it.

What has been done
Since 2009, UMaine Extension has presented growers with information on this disease and how to mitigate its spread. Through field visits and related research Extension assessed the severity and distribution of the disease and effectiveness of methods of control. Extension works closely with growers to confirm the presence of the disease, give advice on how to eradicate the disease and revisits fields to evaluate its control.

Results
Most wild blueberry growers are now aware of Valdensia leaf spot and scout their fields for this disease. They know not to walk or drive through fields when they are wet since this may spread Valdensia leaf spot and potentially other diseases. Hard burning of fields has proved effective in eradicating this disease in many fields. By eradicating this disease, growers save hundreds of dollars per acre in fungicide treatments required once this disease is well established in a field. Grower awareness of this disease has greatly limited its spread and impact on this $250 million industry.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
215	Biological Control of Pests Affecting Plants

Outcome #5

1. Outcome Measures

Adopt and maintain integrated pest management strategies

Not Reporting on this Outcome Measure

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

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Establish new farm enterprises

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	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
601	Economics of Agricultural Production and Farm Management

Outcome #9

1. Outcome Measures

New crops and markets developed

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	104

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The expanding interest in locally grown grains among consumers and food businesses represents a new economic opportunity for grain growers looking for higher value and diversified markets. However, these new grain markets are dispersed and often seeking specific types and varieties of grain unfamiliar to Maine growers. UMaine Extension plays a unique role in our emerging local grain sector by connecting growers with these buyers, as well as providing the production information needed to help growers succeed in growing for these high value markets.

What has been done
In 2015, Extension was contacted by a Danish food company seeking help in developing a Maine supply of two heritage Nordic grain varieties for their new Nordic eatery in New York City?s Grand Central Station. To evaluate whether the varieties, Øland spring wheat and Svedje winter rye, would grow well in Maine, the UMaine Local Grain project planted large plot trials at UMaine Rogers Research Farm. Both varieties yielded well and had good grain quality. Extension identified growers who could successfully grow the grain and networked them with the buyer.

Results
In 2016, Maine growers produced over 80 tons of Øland spring wheat (65 acres) and 5 tons of Svedje rye (5 acres) for this buyer. The pay price growers are receiving for the specialty wheat is three to five times the typical price for spring wheat. In this initial year, this new market for Maine grown grain represented over $65,000 in increased revenue for Maine growers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	801

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Because high quality perennial forages in pastures and hay land are critical to sustaining our livestock agriculture in New England, farmers need to adopt proper techniques for identifying and managing both weed and forage species.

What has been done
Northeast Ag service providers, including Extension, NRCS and private industry were invited to participate in a SARE funded Professional Development Program to learn and gain skills in weed and forage identification and management. The goal was to train 20 providers who would provide services to 200 producers who manage an average 120 acres. One hundred of these farmers would adopt new and integrated management techniques to improve forage production.

Results
A survey revealed 100 percent of participants learned new information about managing forages, 100 percent gained new insight into identifying forage species, 88 percent gained identification skills of pasture weeds, and 81 percent learned methods to better manage weeds. All participants indicated they have applied their newly gained knowledge when working with farmer. Observed outcomes of their efforts have included improvements in management practices (improved grazing management, reduction in overgrazing, grazing plans, testing of forages, field renovation, improved forage storage, raised cutting height, pasture and weed ID, soil testing, change in fertilizer use, better species selection) and increased protection of resources (improved soil quality, reduced runoff).

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
204	Plant Product Quality and Utility (Preharvest)
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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1623

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
More than 13 percent of Mainers (180,892 people) live in poverty. Food insecurity in the state has burgeoned in the past 10 years to 15.5 percent (206,090 people) of the population. With food insecurity comes greater health risks, such as obesity and 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
UMaine Extension's EFNEP paraprofessionals educate limited-income families and youth to help them make better lifestyle choices and improve their nutritional wellbeing. EFNEP participants learn how to eat well on a budget and apply what they learn in their daily lives. These positive changes help reduce the incidence of obesity and chronic disease of limited income families in Maine.

Results
In 2016, of 317 adult EFNEP/Eat Well participants surveyed:
?84 percent showed improvement in one or more food resource management practice (plan meals, compare prices, uses grocery lists, not run out of food).
?84 percent showed improvement in one or more nutrition practice (plans meals, makes healthy food choices, prepares food without adding salt, reads nutrition labels or has children eat breakfast).
?72 percent showed improvement in one or more food safety practice.
?20 percent reported increasing physical activity to at least 30 minutes per day.
?Graduates reported increasing fruit and vegetable intake by one-half cup per day, and increasing whole grains and potassium intake.
In 2016, 3466 youth participated in the Eat Well Program, through an average of six classes.
?70 percent of improved their abilities to choose foods according to Dietary Guidelines.
?44 percent used safe food handling practices more often.
?23 percent improved their physical activity practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
704	Nutrition and Hunger in the Population

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1970

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One in 3 American children are on track to develop diabetes in their lifetime. According to a 2012 UMaine study, the medical costs of obesity associated with Maine children will be an estimated $1.2 billion over the next 20 years. Studies also indicate that children and adults who suffer from diet-related diseases score lower on tests, miss more days of school, advance less in their careers, and raise children who are likely to repeat the same cycle.

What has been done
UMaine Extension has partnered with Maine FoodCorps since its inaugural year in 2011. FoodCorps connects kids to healthy food in school, so they can lead healthier lives and reach their full potential. In the past 5 years, FC service members have supported 55 schools teaching 25,415 students about food and nutrition and helping make schools healthier places for youth. They have built or revitalized 30 school gardens, engaged with 222 farmers, producers or distributors, and engaged 704 volunteers who contributed 8,733 hours of service.

Results
Survey results from 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. Assessments showed improvement in school food environments in 89 percent of schools with FoodCorps service. Evaluation data mirrors overall national trends documented by USDA indicating farm to school success.
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 UMaine Extension and other service providers can offer,
●Educators trained in garden-based nutrition programming, and
●Food service staff requesting bids from local farms.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

Outcome #14

1. Outcome Measures

Adopt techniques to improve soil quality

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	27511

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Strawberries are an important retail crop in Maine. However, an aggressive pest complex, including tarnished plant bug, strawberry bud weevil, spotted spider mites, and gray mold, combined with very low consumer tolerance for pest damage, can make this crop challenging to grow profitably. Frequent applications of pesticides used in the past to achieve high crop quality are no longer considered economically, environmentally or socially tolerable.

What has been done
UMaine Extension works with local farmers to develop and support Integrated Pest Management practices for strawberry production to improve the long-term sustainability of this crop. The program now reaches over 100 farms statewide. Volunteer farmers work with Extension each season to provide monitoring sites and pest information, which is shared with over 100 growers via weekly. Farmers have participated in applied research projects to enhance alternative pest control measures.

Results
Eighty-five percent of farmers responding to a program evaluation indicate they have modified their pest management practices usually reducing the amount of pesticide used significantly (as much as 50 percent). Most have seen an improvement in crop quality, and found that IPM has reduced pesticide costs (up to $100/acre) and improved crop profitability.

4. Associated Knowledge Areas

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

Outcome #17

1. Outcome Measures

Increase consumption of home-grown food

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	1000

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 #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 Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The potato industry is Maine's largest agricultural sector, with over 500 businesses generating over $300 million in annual sales, employing over 2,600 people, and providing $142 million in income to Maine citizens. Current market demand for perfect, pest and damage-free produce and crops, and public demand to decrease pesticide use, coincides with increasing production costs and pest pressure. Effective integrated pest management is crucial to maintaining industry viability.

What has been done
In 2016, UMaine Extension engaged in a robust potato IPM program insect component, including operating 85 traps for European corn borer, 55 traps for aphid collection, regularly scouting 62 fields, and employing 10 college age students for summer fieldwork. The program engaged in 1500 individual grower contacts and distributed weekly pest updates to over 425 industry staff in Maine, New Brunswick and Eastern United States.

Results

The economic impact from Extension's pest monitoring and educational programs for the 2016 season is estimated at over $12.8 million, with a 135:1 return on investment by the industry for each dollar invested into the UMaine Extension Potato IPM program.

4. Associated Knowledge Areas

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

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pollination is critical to one of Maine's most important crops, wild blueberry. Almost 80,000 honey bee colonies are brought into Maine each year for pollination. In addition to honey bees, native bees are extremely important to pollination of wild blueberry. Almost 30% of wild blueberry flowers are pollinated by native bees. Because of the importance of this crop which is totally dependent upon bee pollination, any factors affecting bee health need to be minimized where possible. Pesticide exposure is one factor that has been shown in specific cases to reduce native and honey bee health in Maine wild blueberry.

What has been done
University of Maine scientists constructed a pesticide exposure data base.

Results
Researchers finished pollen sampling with honey bees across the state of Maine in order to provide the data for a pesticide exposure data base. The study was conducted with volunteer beekeepers and the sampling design covered all geographic regions of the state, the three climate zones, and both agricultural and non-agricultural landscapes. This data base will be

utilized by the Maine Department of Agriculture, Forestry, and Conservation for decision making regarding input on new legislation designed to protect honey bees from pesticide exposure.

4. Associated Knowledge Areas

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

Outcome #20

1. Outcome Measures

Improve food safety

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Most of the research reported to date on bioactive compounds in sea vegetables has been on dried, wild harvested product. University of Maine scientists adopted a novel approach by focusing on fresh, farm-raised sea vegetables. The effects of minimal processing such as blanching and freezing on bioactive compounds in sea vegetables have not been reported. Moreover, the amount of bioactive compounds present in sea vegetables can vary within different parts such as blade versus stipe.

What has been done
The University of Maine research assessed the effects of minimal processing treatments (blanching/freezing) and source of edible plant tissue (blade/stipe) on sugar kelp, dulse, alaria and gracilaria.

Results
Fresh, fresh frozen, blanched and blanched frozen samples of aforementioned species underwent two types of antioxidant analyses and total phenolic content analyses. The antioxidant capacity of blanched, frozen and blanched frozen dulse, gracilaria, sugar kelp and winged kelp were compared to fresh samples. Blanching significantly dropped total phenolic content and the antioxidant capacity of the sea vegetables, however, freezing for one month did not affect their total phenolic content and antioxidant capacity in most cases. Overall, the brown sea vegetables

had higher antioxidant capacity compared to the red sea vegetables. For sugar kelp and alaria, stipes had a higher phenolic content and antioxidant capacity compared to blades. The research will be presented to members of Maine's seaweed industry in an upcoming aquaculture R&D summit. The general results of the seaweed and other seafood research was featured in a professional organization trade magazine (Food Technology) which also produced a video highlighting the SEANET seaweed research at the University of Maine.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

Outcome #21

1. Outcome Measures

Improve access to agricultural workers

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	35

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Spanish-speaking workers in agriculture are increasingly more numerous in New England, but have limited access to production information because of language barriers.

What has been done
UMaine Extension partnered with New England partners to develop and present a full-day track of greenhouse-related programming at the 2016 Northeast Greenhouse Conference, in Boxboro, Massachusetts. The programming was designed to be accessible to Spanish-speaking participants, and was approved for pesticide recertification credits in all six New England states plus New York.

Results
Thirty-five Spanish-speaking agricultural workers are now more deeply connected to the greenhouse industry of New England. All 35 attendees learned (1) why greenhouse practices are conducted, (2) how to diagnose abiotic and biotic disease problems, (3) how to identify beneficial

and pest insects, and (4) how to work safely in greenhouses. Twelve of the attendees gained one or more pesticide recertification credits, enabling them to more safely and successfully manage greenhouse crop insect pests and diseases.

4. Associated Knowledge Areas

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

Outcome #22

1. Outcome Measures

Farmers of All Abilities Remain Active on the Farm

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	306

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farming is the sixth most dangerous job in the U.S. In Maine the average farmer is 57 years old. An estimated 5,700 farmers, farm family members, or farm workers in the state 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 face similar challenges for remaining successful in production agriculture.

What has been done
Maine AgrAbility helps Maine farmers, fishermen and loggers facing physical or cognitive challenges enhance their ability to farm and live independently, improving 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 Extension, Goodwill Industries, and Alpha One.

Results
? Since 2010, AgrAbility has provided technical information to 306 farmers and conducted on-site assessments for 86 agricultural workers in other diverse areas such as dairy and livestock operations, Christmas tree farms, fruit orchards, agritourism, vegetable and maple syrup

production, hay sales, woodlot management, and lobstering. 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 said of the recommendations made by Maine AgrAbility: ?These recommendations and our executing them allowed me to work years longer than me and my family had imagined I could. As you may imagine, that was an enormous gift for the dignity and independence and the ability to contribute to the success of my family farm.?

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
601	Economics of Agricultural Production and Farm Management

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

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 70 peer-reviewed articles.

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 70 peer-reviewed articles.

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	2%		6%	
123	Management and Sustainability of Forest Resources	0%		3%	
131	Alternative Uses of Land	5%		0%	
134	Outdoor Recreation	0%		6%	
202	Plant Genetic Resources	0%		6%	
311	Animal Diseases	0%		6%	
315	Animal Welfare/Well-Being and Protection	0%		6%	
511	New and Improved Non-Food Products and Processes	23%		11%	
601	Economics of Agricultural Production and Farm Management	20%		6%	
602	Business Management, Finance, and Taxation	10%		0%	
603	Market Economics	5%		5%	
604	Marketing and Distribution Practices	20%		0%	
605	Natural Resource and Environmental Economics	0%		21%	
607	Consumer Economics	0%		5%	
608	Community Resource Planning and Development	0%		13%	
609	Economic Theory and Methods	0%		3%	
610	Domestic Policy Analysis	0%		3%	
801	Individual and Family Resource Management	15%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	6.5	0.0	5.6	0.0
Actual Paid	8.2	0.0	6.7	0.0
Actual Volunteer	1.2	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**
467814	0	345604	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
467814	0	772261	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
819720	0	259773	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

2016	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	4406	2473	273	0

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

Patent Applications Submitted

Year:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	0	34	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

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

Year	Actual
2016	539

Output #2

Output Measure

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

Year	Actual
2016	22

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

Outcome #1

1. **Outcome Measures**

   Adopt sound business management practices

2. **Associated Institution Types**

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2016 18

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Micro-businesses are crucial to Maine?s rural economic vitality. One in five rural Maine jobs are created by micro-businesses, yet many entrepreneurs lack the business management skills they need to survive and grow in today?s challenging economy. One essential business management skill is pricing. What entrepreneurs charge for their products or services can make the difference between success and failure. Many small business owners lack knowledge and skills in strategic pricing.

What has been done
UMaine Extension organized and conducted pricing workshops for micro-entrepreneurs across the state. During the past year, Extension presented in-depth workshops to help existing and aspiring entrepreneurs improve their pricing knowledge and skills so they could develop profitable pricing strategies for their products and services. Workshop topics included key elements of pricing, pricing models, price elasticity of demand, mark-up vs. margin, and cost analysis.

Results
Over forty micro-entrepreneurs from across Maine participated in this highly successful training. They included specialty food producers, farmers, craft artists, technology-based businesses, educational consultants, and other small businesses. Seventy-five percent of participants indicated that they plan to set a new price for their product or service and 97 percent plan to adopt new pricing techniques they had learned. Changes they planned to make within six months of the training included: conduct a through analysis of costs, evaluate customer base, keep track of time producing food products, and conduct more market research before setting prices. Some entrepreneurs indicated they subsequently revised their pricing strategies and increased their profitability as a result of the pricing training.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices

Outcome #3

1. Outcome Measures

Jobs created

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

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

Outcome #8

1. Outcome Measures

Reduce business management risks

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

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

Outcome #9

1. Outcome Measures

Start a business

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

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

Outcome #11

1. Outcome Measures

Expand a business

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	71

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Aspiring and existing entrepreneurs need capital to start, improve, and expand their businesses to create high quality jobs for Mainers. Many business owners are challenged to secure adequate

funding from traditional lenders to start or expand a business. However, by partnering with a regional economic development organization, traditional lenders such as banks are able to increase access to capital for Maine businesses that otherwise would not be eligible for financing.

What has been done
UMaine Extension supports improved access to financing for Maine businesses through its collaboration with a regional economic development agency that provides Small Business Administration loan guarantees for prospective borrowers. As an active member of the Loan Review Committee, Extension provides guidance and oversight on credit and lending strategies, reviews loan applications, and along with other business and community leaders, makes loan recommendations.

Results
In fiscal year 2016 the Loan Review Committee approved 51 loans totaling $6.8 million, and leveraging an additional $7.7 million in private funds. Through this loan program $14.5 million was invested in local communities, 129 jobs were created or retained, and thirteen of Maine?s sixteen counties benefited.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
608	Community Resource Planning and Development

Outcome #12

1. Outcome Measures

Reconsider business plan

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

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

Outcome #13

1. Outcome Measures

Join a business association

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #14

1. Outcome Measures

Join a local chamber of commerce

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #15

1. Outcome Measures

Increase partnerships

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #19

1. Outcome Measures

Adopt effective community strategies

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	70

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Tourism and coastal beaches are integral to Maine?s economy. In 2015, visitors to Maine beaches contributed $1.61 billion to the southern coast and tourism contributed $735 million to the midcoast economy. Tourism, and the coastal environment on which it depends, is vulnerable to pollution and climate change. Maine coastal residents and visitors value work that protects public health, reduces pollution, and keeps Maine?s tourism industry strong.

What has been done
UMaine Extension coordinates Maine Healthy Beaches to monitor water quality and protect public health on coastal beaches. MHB builds local capacity by engaging stakeholders in multi-year enhanced monitoring and pollution source-tracking studies, data analysis, GIS watershed risk analysis, and stakeholder workshops. Without MHB only 16 percent of beach managers believe their communities would continue monitoring, putting the tourism industry at risk.

Results

Regarding problems related to impaired water quality, 63 percent identified public health issues as ?extremely important? and 46 percent noted increased beach advisories as ?extremely important.? Local beach managers believe MHB delivers diverse benefits to Maine communities: 84 percent noted greater protection of public health, 80 percent noted improved beach information for residents and visitors, 76 percent noted improved beach information for local officials, and 67 percent 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 thinking of visiting coastal areas. In 2016, MHB saved coastal communities over $300,000 associated with sample collection and analysis.

4. Associated Knowledge Areas

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

Outcome #20

1. Outcome Measures

Mobilize community capacities, assets, or resources

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #21

1. Outcome Measures

Demonstrate leadership skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	30

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The first 3 years of a child?s life are critical for growth and development. Research shows a child?s experiences during this period affect the developing brain and lay the foundation for future wellbeing. Adverse experiences during this crucial time can have lasting negative outcomes in adulthood and impact 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
Parenting Education Professionals (PEPs)?part of the Maine Families Program?supported families in 4 counties as their young child?s most important teacher. Nine certified PEPs made 2,601 home visits to 289 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, and to provide links to community resources.

Results
A 2016 parent survey of participant families in 3 counties showed 98 percent of families had learned about their child?s development, 92 percent said their parent educator helped them find useful community services and 93 percent reported feeling better about their parenting. These are important in increasing positive parenting behavior and creating supportive early experiences for children. Other results:
?Breastfeeding rates for children referred prenatally were higher than statewide: Over 79 percent were breastfeeding at early postpartum (statewide 76%) and 36 percent at one year (statewide 24%).
?94 percent of children are up to date with immunizations. This is significant given that this region has been identified as under-immunized.
?Over 96 percent of enrolled children were up to date with well child visits.
?All children were offered regular developmental screenings.
?All enrolled families were assessed for basic needs and referred to services as appropriate.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #24

1. Outcome Measures

Assess alternate choices for managing household resources

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
610	Domestic Policy Analysis

Outcome #25

1. Outcome Measures

Adopt sustainable living practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
610	Domestic Policy Analysis

Outcome #26

1. Outcome Measures

Engage positively in their community

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #28

1. Outcome Measures

Demonstrate application of leadership skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #29

1. Outcome Measures

Demonstrate civic engagement

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

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

2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Alternative futures modeling (AFM) has proven to be an effective way to foster improved understanding of existing land use, and the intricate and dynamic connections between human and natural systems. In Maine, AFM is particularly relevant given the close economic and social ties between the State's forests and its people - both culturally and economically. Indeed, ensuring the health of these systems is not only important to quality-of-life, but also the sustained viability of the tourism and forest products sectors. The proactive nature of the AFM approach is of great value to a wide range of stakeholders, allowing individuals, government and businesses to anticipate and avoid conflicts, and in doing so help to achieve future landscape conditions that maximize social, ecological and economic benefits while reducing unnecessary costs. The applications to protecting working forests will help ensure a sustainable supply of wood to area processors.

What has been done
Land suitability indices for two large watersheds in Maine (i.e., the Lower Penobscot and the Lower Androscoggin/Casco Bay regions) were created. The indices cover four major land uses -- e.g., forestry, agriculture, conservation and development. Moreover, a set of 5 future development scenarios have been constructed.

Results
All of this work has been packaged in an easy-to-use website (see www.MaineLandUseFutures.org), and documented through a 30-minute MPBN TV special entitled "Preserving Paradise" (see http://www.mpbn.net/Television/LocalTelevisionPrograms/SustainableMaine/PreservingParadise.aspx). Additional efforts include two video training modules to assist stakeholders in

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
608	Community Resource Planning and Development

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rural communities within the state of Maine have experienced a number of recent economic setbacks as the forest products industry, the economic backbone of Maine's rural communities since statehood, has declined. University of Maine scientists have lead research activities in a variety of areas to increase the diversity of forest products manufactured in the state of Maine as well as to evaluate new applications for existing products. Both of these potential outcomes would help to improve the economic viability of forest products in Maine in particular as well as the region and ultimately the entire nation.

What has been done
Norway spruce, a wood species extensively tested at the Advanced Structures and Composites Center at the University of Maine, was approved for use as construction-grade dimensional lumber. The American Lumber Standards Committee approved the inclusion of Norway spruce in the Spruce-Pine-Fir South grouping of wood species for home construction and industrial applications based on the testing by University of Maine researchers.

Results
A team of scientists and students at the UMaine Composites Center tested 1,320 pieces of lumber milled from Norway spruce grown in Maine, Vermont, four regions of New York and Wisconsin from Oct. 15, 2015 to Feb. 2, 2016. The University of Maine researchers completed the technically demanding certification process and wrote the final report that the Northeastern Lumber Manufacturers Association submitted to the American Lumber Standards Committee. Every contributor within the supply chain and end users will reap substantial benefits from the approval of Norway spruce for home construction and industrial applications. Landowners can now earn more money from their Norway spruce holdings as sawlogs command a higher price compared to pulp wood. Lumber mills benefit as the higher volume of available sawlogs helps to moderate prices for raw material. Buyers of dimensional lumber have another market choice.

Industry leaders described the approval of Norway spruce for home use and industrial applications as an once-in-a-lifetime event projected to boost the rural economy by millions of dollars.

4. Associated Knowledge Areas

KA Code	Knowledge Area
511	New and Improved Non-Food Products and Processes

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

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 34 peer-reviewed articles.

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%		13%	
132	Weather and Climate	0%		7%	
135	Aquatic and Terrestrial Wildlife	0%		26%	
136	Conservation of Biological Diversity	0%		10%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		13%	
205	Plant Management Systems	0%		8%	
215	Biological Control of Pests Affecting Plants	0%		4%	
216	Integrated Pest Management Systems	0%		3%	
305	Animal Physiological Processes	0%		2%	
306	Environmental Stress in Animals	0%		4%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	2.8	0.0
Actual Paid	0.0	0.0	2.1	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	107875	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	208557	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	980	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

2016	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: 2016

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	0	20	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Researcher serves as a member of the Stream Temperature Working Group, which is a collaboration of freshwater and fisheries scientists and resource managers from Maine DEP, Maine IFW, NOAA, USFWS, Penobscot Indian Nation and the Atlantic Salmon Federation. The Working Group is developing a coordinated and consistent stream temperature monitoring network statewide, and building platforms for the wider dissemination of Maine stream temperature data.

Year	Actual
2016	0

Output #2

Output Measure

- University of Maine scientist serves as a member of the Maine Atlantic Salmon Recovery Program's Genetic Diversity Action Team (GDAT). The Action Team has adopted a strategy to maintain the genetic diversity of Atlantic salmon populations in Maine over time. Foci of the Action Team include monitoring genetic diversity, evaluating hatchery practices and products, and monitoring to detect aquaculture Atlantic salmon.

Year	Actual
2016	0

Output #3

Output Measure

- University of Maine researchers applied the suite of microsatellite markers they assembled for brook trout to assay the population structure and potential historic hatchery effects on Maine's wild brook trout populations in the Dead River and Fish River drainages (as well as a subset of populations from other drainages). In total, the research team surveyed over two dozen populations and found surprising evidence of fine-scale genetic structure suggesting significant genetic heritage within each drainage. They also found evidence that some populations were likely impacted by historic stocking of hatchery trout.

Year	Actual
2016	0

Output #4

Output Measure

- University scientists continued to conduct a mark-recapture and ultrasonic tagtracking study of shortnose and Atlantic sturgeon to better understand their potential recolonization of river reaches made accessible by dam removals in the Penobscot River System. As part of this work, they obtained new insights that shortnose sturgeon have now expanded their range to the full up-river extent possible (the falls and dam at Milford, ME).

Year	Actual
2016	0

Output #5

Output Measure

- University of Maine research team developed a new website for its lab (the Evolutionary Application Lab - https://umaine.edu/evoappslab), that provides publicly accessible information on basic and applied research at the broad interface of evolution, ecology and human interactions with wild populations. The Lab address these themes through studies of fishes and other species in aquatic ecosystems.

Year	Actual
2016	0

Output #6

Output Measure

- # of non-peer reviewed publications

Year	Actual
2016	3

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

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Differences in ability to adapt to climate change will likely dramatically reshape fish communities in coming decades, and proposed approaches to meet these limits (e.g., managed relocation) present their own adaptive challenges. Invasive fish species adapt rapidly to new habitats hastening their spread and intensifying their potential costs. Efforts by fisheries managers and scientists to support threatened species and fisheries through stocking may lead to hidden losses of diversity and reduced performance in the wild. Fisheries managers rarely have the requisite resources of time, staff, and funding to investigate and to document all suspected invasive species introductions. The development of environmental DNA (eDNA) as a detection tool for non-indigenous (e.g., pike, bass) and indigenous species (e.g., brook trout, bridle shiner) offers an exciting analytical tool to anyone interested in fish presence and populations.

What has been done
University of Maine scientists moved from the development stage of eDNA (environmental DNA) assays to field implementation.

Results
The research team demonstrated the utility of this tool by applying it to survey the extent of pike invasion in the Penobscot River system, the largest watershed in the state of Maine. The introduction of pike to the Penobscot watershed is a major concern as the Penobscot River contains the top remaining run of endangered Atlantic salmon in the continental United States and features many highly valued landlocked salmon and brook trout waters. The research team confirmed pike presence in the known positive sites and detected some sites with new presence. They also developed new eDNA assays for the bass/sunfish family (smallmouth bass, largemouth bass, crappie, bluegill, rockbass) and applied those to confirm illegal fish introductions. The same research team is now developing eDNA tools for highly prized native species including Atlantic salmon, Arctic charr and other species of concern. In the fall of 2016, the lead University of Maine

scientist held a focus meeting with multiple representatives from Maine Chapters of Trout Unlimited to discuss the conservation status of Arctic Charr and ways in which eDNA could be applied to monitor charr populations.

4. Associated Knowledge Areas

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

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management

135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
203	Plant Biological Efficiency and Abiotic Stresses 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

Brief Explanation

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 20 peer-reviewed articles.

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 20 peer-reviewed articles.

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%		3%	
111	Conservation and Efficient Use of Water	0%		3%	
112	Watershed Protection and Management	0%		8%	
123	Management and Sustainability of Forest Resources	0%		7%	
131	Alternative Uses of Land	0%		1%	
132	Weather and Climate	0%		2%	
134	Outdoor Recreation	0%		3%	
135	Aquatic and Terrestrial Wildlife	0%		27%	
136	Conservation of Biological Diversity	0%		8%	
202	Plant Genetic Resources	0%		3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		1%	
215	Biological Control of Pests Affecting Plants	0%		3%	
306	Environmental Stress in Animals	0%		1%	
311	Animal Diseases	0%		3%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%		3%	
601	Economics of Agricultural Production and Farm Management	0%		3%	
605	Natural Resource and Environmental Economics	0%		11%	
607	Consumer Economics	0%		2%	
608	Community Resource Planning and Development	0%		7%	
609	Economic Theory and Methods	0%		1%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2016	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	8.4	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	603870	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	1349136	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	557895	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

2016	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:	2016
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2016	Extension	Research	Total
Actual	0	57	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- University scientists collaborated on the publication of a website (http://www.tidalmarshbirds.org) as part of the Saltmarsh Habitat & Avian Research Program (SHARP). The Saltmarsh Habitat & Avian Research Program (SHARP) is a group of academic, governmental, and non-profit collaborators gathering the information necessary to conserve tidal-marsh birds. The group?s goal is to advise management actions across the Northeast United States for the long-term conservation of tidal marsh birds and the ecosystem that

Year	Actual
2016	0

Output #2

Output Measure

- University researchers participated in a stakeholder meeting involving academic, state, federal, and non-governmental agencies for parties interested in the restoration of tidal marshes following Hurricane Sandy. The meeting took place at the Region 5 Headquarters of the US Fish and Wildlife Service in Hadley, Massachusetts.

Year	Actual
2016	0

Output #3

Output Measure

- University research helped inform a stakeholder meeting involving academic, state, federal, and non-governmental agencies for those interested in developing a conservation business plan for the preservation of tidal marsh birds of the Atlantic and Gulf Coasts of the US.

Year	Actual
2016	0

Output #4

Output Measure

- The physical characteristics of six small watersheds in central and coastal Maine were parameterized. They included the following locations: Bear Brook Experimental Watershed - Beddington, ME; U Maine Campus ? Orono, ME; Darling Marine Center Tributary ? Walpole, ME; Sebago Lake Watershed ? Sebago? ME; Wells Harbor Estuary - Wells, ME; Cromwell Brook - Bar Harbor, ME. Characteristics of the watersheds were parameterized using readily available spatial data information including topography, drainage network, hydrologic soil group, roadways, and land cover conditions.

Year	Actual
2016	0

Output #5

Output Measure

- University researchers developed a database that cataloged the 65,435 bird detections acquired during 6,129 surveys during field work to evaluate the effects of different forest management treatments on community diversity, occupancy, and relative abundance of conifer-associated forest birds, particularly migrant species of federal conservation priority.

Year	Actual
2016	0

Output #6

Output Measure

- Non-peer-reviewed publications:

Year	Actual
2016	17

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

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
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Native fishes of commercial, recreational, or ecological importance in Maine, such as Atlantic salmon, brook trout, alewife, and sea lamprey, have experienced range-wide decline because human activities have degraded freshwater habitats. Recently humans have sought to mitigate these negative impacts and restore native fisheries, especially for migratory species, by removing dams and restoring access to historic habitat. Both types of human impact can result in rapid changes to in-stream habitat, and it is vital to understand how native species respond and how their functional roles change so we can evaluate and adjust management objectives and actions accordingly. Much of Maine's economy and cultural identity is based upon restoring native fish species and their habitats while also providing angling opportunities for citizens and tourists. Those citizens, groups, and communities in rural parts of the state whose livelihoods depend directly on aquatic resources stand to benefit from a better understanding and management of Maine's native fisheries in the face of a rapidly-changing environment.

What has been done
University of Maine scientists completed a seven-year research project evaluating effects of dam removals and connectivity restoration in Sedgeunkedunk Stream, a small tributary in the lower Penobscot River watershed.

Results
Initial monitoring in 2007-2008 showed distinct zonation in fish assemblages, with greatest diversity, abundance, and biomass immediately downstream of the lowermost dam and decreasing sharply immediately upstream. Sea-run Atlantic salmon, alewife, and sea lamprey were restricted to reaches downstream of the lowermost dam and could not ascend into historic habitat upstream. The removal of 2 dams and installation of a rock-ramp fishway occurred in 2008-2009. University investigators documented re-colonization and successful spawning of sea-run Atlantic salmon, alewife, and sea lamprey in newly-accessible habitat upstream of former dam

sites. Mark-recapture studies of sea lamprey showed a quadrupling in abundance of spawning adults in the 3 years following dam removal, and spawning occurred throughout all accessible reaches. The distribution and abundance of stream-resident fishes changed such that assemblages became more uniform throughout the stream and zonation due to former dams disappeared. The research team concluded that both sea-run and resident fishes responded quickly to dam removal, and they provided convincing evidence that dam removal in small streams is an effective tool in mitigating or reversing historic disruption of connectivity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

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

Not Reporting on this Outcome Measure

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 Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2016	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Maine and Massachusetts have regulatory policies limiting development of vernal pools. Maine?s vernal pool laws regulate the most ecologically important vernal pools based on the presence of key amphibian egg mass abundance. However, the protection of vernal pools suffers from a lack of statewide inventory and from an inefficient means of assessing specific pool characteristics.

Development may cause direct loss or degradation of vernal pools, reduce adjacent wetland and terrestrial habitats, result in increased road mortality of amphibians, and create barriers to movement of amphibians. While Maine is in the forefront of vernal pool conservation, several uncertainties emerged when regulations were developed to implement the Maine law. Many individual property owners may be unaware of the existence of vernal pools on their property, local governments may be unable to assess the need for additional reconnaissance, the economic impact of these regulations on town property owners is unknown, and municipalities vary in their knowledge and ability to encourage enforcement of the state law or to plan proactively for local level vernal pool. With no consideration of the terrestrial habitat necessary for juvenile dispersal and adult habitat, policies may be less than effective at protecting amphibian populations. Thus, vernal pool regulations provide an example of a natural resources policy that could be adjusted and more effective using local knowledge to better protect rural resources while easing approval of development in appropriate growth zones.

What has been done
The Vernal Pool Special Area Management Plan for Maine was signed by the US Army Corps of Engineers and Maine Department of Environmental Protection on September 6, 2016.

Results
A University of Maine scientist collaborated with stakeholders, regulating agencies and other scientists to ensure the Vernal Pool Special Area Management Plan for Maine would align with the biophysical and social needs of Maine?s future. It was the outcome of a 6-year stakeholder initiative to develop a creative, local vernal pool mitigation tool that benefits town economies and wetland conservation on private lands at the municipal and regional level. The US Army Corps of Engineers defines the Special Area Management Plan process as a ?comprehensive plan providing for natural resource protection and reasonable economic growth containing a detailed and comprehensive statement of policies, standards and criteria to guide public and private uses of lands and waters and mechanisms for timely implementation in specific geographic areas.? It fine-tunes existing state regulation to a local level. The Plan will serve as a voluntary mitigation tool that helps towns control their vernal pool resources, provide incentives for rural landowners to conserve their vernal pools and help developers with a streamlined environmental compliance process. The towns of Orono and Topsham are in the process of implementing the plan, and the Environmental Protection Agency granted funding for a part-time person to help communities adopt the new guide.

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

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

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 57 peer reviewed articles.

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 57 peer-reviewed articles.

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 whit 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.