

2016 Montana State University Combined Research and Extension OGFM Multi-State and Integrated Activity Supplemental Forms

I. Brief Summaries

- Use the 2016 Plan of Work in place of submitting a separate brief summaries document.

{NO DATA ENTERED}

- Separate Brief Summaries document (brief description of the multi-state and integrated program activities).**

COA/MAES Multistate Hatch projects reflect Montana and the Northern Great Plains most pressing agricultural challenges and needs, which reflect each of our Planned Program areas, though most notably within Animal Health Sciences, Integrated Pest Management, Energy and Natural Resources and Plant Sciences. Collectively, these Integrated and Multistate activities speak to current and emerging pests, climate changes affecting production agriculture, animal health systems, crop production, soil nutrient viability and exploratory research in animal and land resources. The primary Planned Programs where the majority of the research and impact are found within:

Animal Sciences:

MSU Research and Extension partnered with producers to address issues and needs of Montana's agricultural industry in a variety of animal health topics, largely the reproductive performance in animals, nutrition, genetic improvements for herds, and developing better animal management systems. The majority of the Animal Health program focused on pre-harvest research and investigation; namely neonatal health of livestock, disease resistance and best breeding practices. Food safety and security continued as important concerns for the beef industry at all production levels. COA/MAES and Extension helped to ensure that Montana producers raise safe beef while improving the quality of the beef and ensured consumers are aware of the quality and health of their products through advancements in educational programs on beef quality assurance (BQA) practices, voluntary beef cattle marketing options, and ranch management issues throughout the state via meetings, one-on-one discussions and interactive technologies. Food safety within Animal Health also involved mycotoxins in grains and feeds.

Plant Sciences

2016 research accomplishments in Plant Sciences spoke to the plant science, genomics and pathology that have a direct impact on increasing yield potential, improving winter hardiness, enhancing disease resistance, and improving dual-purpose end-use quality grains. MSU's intensive genomic research helped Montana producers stay competitive and provided improved cultivars adapted to Montana's climatic conditions and cropping systems. Continued productivity of breeding programs improved the understanding of the genetics from key traits and produced the development of new selection tools. The broader impacts of the work were a larger and higher quality food supply for the world, an improved ability of Montana farmers to compete in a global marketplace, and a strengthening of export markets for U.S. wheat. MSU faculty and researchers continued to garner national notoriety in their horticulture research in biology, chemistry, plant materials and physiology, plant pathology, plant reproduction and arboriculture. COA, MAES and Extension faculty conducted and led programs in cereal quality, genetics, cropping systems, molecular and conventional approaches to plant improvement, plant breeding, molecular genetics, biochemistry and agronomy. Much of the current research conducted in campus labs and in fields across the state was centered on disease resistance through genetics, bacterial diseases and the biochemistry and molecular genetics of plant diseases.

Farm Management

COA/MAES and Extension faculty again supported Montanans in managing their farms, ranches and similar enterprises as businesses in 2016. Collectively, the faculty capacity ensured best practices,

contracts and estate planning, marketing from an ag perspective, taxation, accounting, operational planning, budgeting, agricultural policy and commodity support programs, risk management and decision support software for Montana. MSU Extension faculty and specialists ensured Montana producers understood implications and changes within the 2014 Farm Bill and MSU agricultural economics faculty continued evaluating, engaging and researching federal agricultural policy that directly affects regional producers.

Energy and Natural Resources

COA/MAES and Extension faculty continued to recruit competitive grant dollars and personnel to bolster current and forecasted research faculty lines, undergraduate and graduate students, programs and labs, as they relate indirectly and directly to the field of energy and natural resources. This program saw an increase of nine new Hatch projects, many of them interdisciplinary in nature - as they speak to research areas that rapid environmental change and natural resource and energy development has affected. The agricultural community in Montana wants to add value to Montana's high quality crop and livestock systems in ongoing adaptations in regard to the state's energy and natural resource base. Faculty in 2016 prioritized research exploring water, and researchers also explored climate in the wake of threatened natural resources. COA/MAES and Extension professionals continued to make advancements in this critical research agenda and continued excelling in the discovery and communication of how natural and managed environments and their elements function in an era of global climate change. With more than 60,000 miles of perennial streams providing irrigation, drinking water and recreation, Extension and MAES partnered with communities and citizens to involve local people with data collection to better understand surface and groundwater issues. In addition, forests cover large areas and contribute to the economic base of the state while also serving as a critical natural resource for wildlife, recreation, tourism and cultural purposes. Extension and MAES provide unbiased, science-based research, education and outreach related to preserving and supporting the best use and management of these resources.

Food Safety

Nutrition, biological control of pests and diseases and environmental threats in livestock and crop production that threaten the safety and production of food products.

These Multistate Hatch projects include, but are not limited to:

- Locoweed and its Fungal Endophyte: Impact, Ecology and Management
- Environmental and Genetic Determinants of Seed Quality and Performance
- Exploratory Research in Land Resources and Environmental Sciences
- Enhancing Management, Production, and Sustainability of Grazing Ruminants in Extensive

Landscapes

- Cropping Systems for Profitability and Conservation
- Management and Utilization of Plant Genetic Resources
- Biological Control in Pest Management Systems of Plants
- The Working Group on Improving Microbial Control of Arthropod Pests
- Exploratory Research in Animal and Range Sciences
- Agrochemical Impacts on Human and Environmental Health: Mechanisms and Mitigation
- Curation of the MSU Entomology Collection
- Nutrient Bioavailability - Phytonutrients and Beyond
- Marketing and Delivery of Quality Grains and BioProcess Coproducts
- Sustainable Solutions to Problems Affecting Bee Health

Healthy Living, Nutrition and Food Safety

One program in which MSU Extension had particular impact, was the multi-state, integrated Strong Hearths, Healthy Communities (SHHC): a rural community-based cardiovascular disease prevention program. Cardiovascular disease is the leading cause of death in the United States and places substantial burden on the healthcare system. Rural populations have considerably higher rates of the disease. SHHC aimed to reduce disease morbidity and mortality, improve quality of life and reduce the cardiovascular disease-related health burden in underserved rural communities. Twelve county faculty participated in this research by recruiting participants, hosting focus groups, providing regular update of metrics, education

with clients, recommending changes for next steps, compiling data and more. Two additional projects currently underway are one that focuses on diabetes education and another on mental health.

Family and Youth Development

Primarily efforts were related to youth exchanges with other states, some multi-state work in family economics and occasional research projects with campus or other investigators.

U.S. Department of Agriculture
National Institute of Food and Agriculture
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(OMB 0524-0036)
Fiscal Year: 2016

Institution: Montana State University

State: Montana

NIFA-REPT Final	Integrated Activities (Hatch)	Multistate Extension Activities (Smith-Lever)	Integrated Activities (Smith-Lever)
Established target %	5.80	1.16	2.00
This FY Allocation (from 1088) \$	2,764,397.00	2,742,508.00	2,742,508.00
This FY Target Amount \$	160,827.27	31,813.09	54,850.16

Title of Planned Program Activity	Integrated Activities (Hatch)	Multistate Extension Activities (Smith-Lever)	Integrated Activities (Smith-Lever)
Animal Sciences \$	29,213.38	1,491.00	7,453.00
Community Development \$	0.00	0.00	3,591.00
Energy and Natural Resources \$	4,863.21	3,337.00	2,124.00
Family and Youth Development \$	0.00	11,413.00	35,716.00
Farm and Ranch Management \$	10,256.87	6,020.00	12,238.00
Healthy Living, Nutrition, and Food Safety \$	1,656.77	50,878.00	74,757.00
Integrated Pest Management \$	81,973.67	17,778.00	28,463.00
Plant and Soil Sciences \$	37,449.42	2,264.00	12,766.00
Total \$	165,413.32	93,181.00	177,108.00
Carryover \$	1,647.80	0.00	0.00

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Director(s):

Charles Boyer

Jeff Bader

Date Submitted: 03/31/2017

**U.S. Department of Agriculture
National Institute of Food and Agriculture
Supplement to the 5-Year Plan of Work
Multistate Extension Activities and Integrated Activities
(OMB 0524-0036)**

Institution: Montana State University

State: Montana

1. Integrated Activities (Hatch Act Funds)

Estimated Costs

Title of Planned Program Activity	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Animal Sciences \$	29,213.38	29,213.38	29,213.38	29,213.38	29,213.38
Energy and Natural Resources \$	4,863.21	4,863.21	4,863.21	4,863.21	4,863.21
Farm Management \$	10,256.87	10,256.87	10,256.87	10,256.87	10,256.87
Food Safety \$	1,656.77	1,656.77	1,656.77	1,656.77	1,656.77
Integrated Pest Management \$	81,973.67	81,973.67	81,973.67	81,973.67	81,973.67
Plant Sciences \$	37,449.42	37,449.42	37,449.42	37,449.42	37,449.42
Total \$	165,413.32	165,413.32	165,413.32	165,413.32	165,413.32

2. Multistate Extension Activities (Smith-Lever Act Funds)

Estimated Costs

Title of Planned Program Activity	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Animal Sciences \$	1,491.00	1,491.00	1,491.00	1,491.00	1,491.00
Community Development \$	0.00	0.00	0.00	0.00	0.00
Energy and Natural Resources \$	3,337.00	3,337.00	3,337.00	3,337.00	3,337.00
Family and Youth Development \$	11,413.00	11,413.00	11,413.00	11,413.00	11,413.00
Farm and Ranch Management \$	6,020.00	6,020.00	6,020.00	6,020.00	6,020.00
Healthy Living, Nutrition, and Food Safety \$	50,878.00	50,878.00	50,878.00	50,878.00	50,878.00
Integrated Pest Management \$	17,778.00	17,778.00	17,778.00	17,778.00	17,778.00
Plant and Soil Sciences \$	2,264.00	2,264.00	2,264.00	2,264.00	2,264.00

Estimated Costs

Title of Planned Program Activity	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Total \$	93,181.00	93,181.00	93,181.00	93,181.00	93,181.00

3. Integrated Activities (Smith-Lever Act Funds)

Estimated Costs

Title of Planned Program Activity	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022
Animal Sciences \$	7,453.00	7,453.00	7,453.00	7,453.00	7,453.00
Community Development \$	3,591.00	3,591.00	3,591.00	3,591.00	3,591.00
Energy and Natural Resources \$	2,124.00	2,124.00	2,124.00	2,124.00	2,124.00
Family and Youth Development \$	35,716.00	35,716.00	35,716.00	35,716.00	35,716.00
Farm and Ranch Management \$	12,238.00	12,238.00	12,238.00	12,238.00	12,238.00
Healthy Living, Nutrition and Food Safety \$	74,757.00	74,757.00	74,757.00	74,757.00	74,757.00
Integrated Pest Management \$	28,463.00	28,463.00	28,463.00	28,463.00	28,463.00
Plant and Soil Sciences \$	12,766.00	12,766.00	12,766.00	12,766.00	12,766.00
Total \$	177,108.00	177,108.00	177,108.00	177,108.00	177,108.00

Director(s):
 Charles Boyer
 Jeff Bader

Date Submitted: 03/31/2017