

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Resource Protection and Management

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	10%			
111	Conservation and Efficient Use of Water	15%			
112	Watershed Protection and Management	15%			
123	Management and Sustainability of Forest Resources	15%			
125	Agroforestry	5%			
133	Pollution Prevention and Mitigation	15%			
135	Aquatic and Terrestrial Wildlife	15%			
136	Conservation of Biological Diversity	10%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	13.0	0.0	0.0	0.0
Actual Paid	12.0	0.0	0.0	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
481812	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
441239	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Campus-based and region-based faculty members, in partnership with commodity groups, conservation partners, general public, and private industry will:

- Conduct workshops and seminars, host field days, assist with planning sessions, establish watershed committees, use mass media (printed, radio, television coverage), to increase awareness and knowledge of Missourians to implement practice and programs that will preserve, protect and sustain the state's natural resource base.
- Conduct water quality education for pesticide use in sensitive watersheds. Watershed education in select eight digit hydrologic units that have been identified with environmental concerns.
- Develop curriculum-based natural resource management programs, including assessment and evaluation tools, marketing strategies and promotional materials.
- Conduct training workshops for local natural resource teams (University of Missouri Extension, Missouri Department of Conservation, and USDA NRCS) and potential local partners (e.g., Missouri Tree Farm, Conservation Federation of Missouri, Quail Unlimited, Wild Turkey Federation, Ducks Unlimited, Isaac Walton League, and Walnut Council).
- Produce up-to-date, science-based information and deliver through guide sheets, newsletters, and websites.

2. Brief description of the target audience

Citizens of Missouri, agency and NGO partners, farmers in sensitive watershed communities, etc.

3. How was eXtension used?

University of Missouri personnel are listed as part of the Community of Service through eXtension. The Bio-energy curriculum, which has an environmental component, is housed with eXtension.

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6840	13680	8500	17000

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

Patent Applications Submitted

Year: 2014
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	11	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Provide training sessions for Extension specialists and/or state/federal natural resource professionals.

Year	Actual
2014	9

Output #2

Output Measure

- Coordinate delivery of natural resource/watershed management education via 'live' short courses, field days, and workshops.

Year	Actual
2014	47

Output #3

Output Measure

- Assist groups and individuals to develop and implement forest, wildlife, and watershed plans.

Year	Actual
2014	155

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	70% of water resource seminar participants will indicate increased knowledge and 70% of those attending water resource protection and management courses for professional education credits will change behavior based on knowledge gained. Five watershed groups will receive assistance and change their behaviors towards water resource protection and management.
2	75% of farmers and family forest landowners completing a natural resource management plan will have engaged in at least one natural resource management practice within six months of the plan's completion and 50% of them who implement a management practice will see a positive response within 12 months of completion.
3	50% of farmers and family forest landowners participating in either 'live' or distance-learning education events exhibit a knowledge gain in natural resource ecology and management and 30% will have a natural resource management plan in-place after six months.
4	As part of watershed management planning program, special classes were conducted on pesticide and water quality concerns in vulnerable watersheds. There were 66 meetings held with more than 1,320 participants from 49 counties. Surveys showed that 95% increased knowledge of water quality concerns in their watershed areas. 75% indicated that they will implement management practices to reduced pesticide and nutrient runoff on their property and 88% will implement practices to reduce soil erosion. Those completing the forms controlled between 900,000 and 1 million acres of cropland in Missouri.

Outcome #1

1. Outcome Measures

70% of water resource seminar participants will indicate increased knowledge and 70% of those attending water resource protection and management courses for professional education credits will change behavior based on knowledge gained. Five watershed groups will receive assistance and change their behaviors towards water resource protection and management.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Water quality concerns have increased as pesticide and nutrient loading in vulnerable areas has led to a need for more educational activities. Many of the areas identified as vulnerable have public drinking water reservoirs and have agriculture as their main source of local revenue generation. Pesticide use education and watershed planning have become major tools in helping reduce the risk of pesticide runoff and watershed pollution. Environmental and public health can be affected by excessive nutrient and pesticide loading in waterways.

What has been done

Educational meetings on watershed management are offered for private citizens and producers on topics such as pesticide management, nutrient load reduction, and soil erosion control. Group meetings with local producers and one-on-one consultations were used to increase awareness and identify available practices that work effectively in reducing pollutant loading. More than 300 watershed residents have attended conferences on watershed planning this past year.

Results

Increased cover crop and precision agriculture practices have helped control runoff and nutrient loading. A series of pesticide management programs are being offered to increase the awareness of pesticides impact on vulnerable watershed areas. Follow-up survey with those attending these trainings shows a 95% increased knowledge of water quality concerns in their watershed areas. 75% indicate that they will implement management practices to reduced pesticide and nutrient runoff on their property and 88% will implement practices to reduce soil erosion. By understanding proper management to reduce pesticide loss, farmers in critical watersheds have

retained the use of atrazine, which keeps pesticide cost to a minimum. Water quality educational program for youth occurred through a series of programs and displays at MU field days where the program, "What do you do to affect water quality," was offered. More than 9,000 youth attended the series of youth education field days.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #2

1. Outcome Measures

75% of farmers and family forest landowners completing a natural resource management plan will have engaged in at least one natural resource management practice within six months of the plan's completion and 50% of them who implement a management practice will see a positive response within 12 months of completion.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

To be truly effective, the landowner needs to put into practice the knowledge gained.

What has been done

Six-month follow-up surveys were sent to the 230 farmers and forest landowners who completed a management plan in FY14.

Results

Of the 200 responses received (87% response rate), 148 (64% affect rate) said they implemented at least one new practice on more than 44,850 acres. The top three practices were forest stand improvement (15,000 acres), tree planting (6,100 acres), and invasive species eradication (3,250

acres). Simple cash flow analysis of net present value (NPV) based upon inventory data from the timbered acreage shows that the implementations of research based management practices have a major economic impact. Data shows that liquidated forest today yields a NPV of \$1,000/acre. Owners that do not manage and liquidate their forest 40 years from now have an NPV of \$100/acre. Owners that manage the forest through forest stand improvement and sustainable harvests yields have a resulting NPV of \$1,150/acre. Therefore, the estimated economic impact resulting from owners implementing the MU Extension forest management program is \$15.75 million (\$1,050/acre) NPV. In contrast, it is estimated that by not implementing the MU Extension forest management program, that increased value would only be \$2.25 million over liquidating the forest asset today!

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

50% of farmers and family forest landowners participating in either 'live' or distance-learning education events exhibit a knowledge gain in natural resource ecology and management and 30% will have a natural resource management plan in-place after six months.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers and family forest landowners need to know the latest science-based information to assist them in meeting their land management goals and objectives. Missouri citizens at large also need to gain knowledge in natural resource ecology to support the efforts of these farmers and forest landowners.

What has been done

IN FY14, 880 farmers, forest landowners and members of the general public attended either a Missouri Master Wildlifer, Missouri Master Naturalist workshop, quail management field day, or quality deer management workshop.

Results

Of the 880 individuals attending the above educational events, we collected 650 valid pre- and post-event self-evaluations. KA 135 (Aquatic and Terrestrial Wildlife) impact was assessed by observing a 2.1-point knowledge gain in the 650 individuals participating in either a Missouri Master Wildlifer or Missouri Master Naturalist short course. This is a 74% gain in knowledge; 24 percentage points above our target of a 50% knowledge gain.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

As part of watershed management planning program, special classes were conducted on pesticide and water quality concerns in vulnerable watersheds. There were 66 meetings held with more than 1,320 participants from 49 counties. Surveys showed that 95% increased knowledge of water quality concerns in their watershed areas. 75% indicated that they will implement management practices to reduced pesticide and nutrient runoff on their property and 88% will implement practices to reduce soil erosion. Those completing the forms controlled between 900,000 and 1 million acres of cropland in Missouri.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

This past year produced an excellent growing season with record yields for corn in the state. Where the state corn yield is generally 121 bushels per acre, this year the average was 180 bushels per acre. Conditions in the early spring with heavy rainfalls followed by two or three days of dry weather increased the potential for pesticide, nutrient and soil runoff. Watershed planning in rural areas is built around the agricultural communities and the timeliness of agricultural activities. These extreme weather conditions create a need for higher management and watershed planning. Many "next" generation farmers are utilizing precision agriculture, cover crops and other programs that help reduce nutrient loading, soil erosion and pesticide use. Many of these younger farmers have financial burdens and focus more on production instead of conservation/environmental concerns.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluations show an increase in awareness and knowledge of many of the issues associated with natural resource planning. Surveys show that 75-80% of all participants have increased awareness and knowledge of environmental issues and 64-75% indicated a change in behavior. The increased use of best management practices for pesticide and nutrient management, timber stand improvement, and wildlife habitat improvement indicates the willingness of producers to make changes once they recognize the economic and environmental benefit of the practices.

Key Items of Evaluation

Protection of environmental and human health through increased implementation of management practices to reduce, control or eliminate pesticide and nutrient runoff, soil erosion, on-site sewage system maintenance and on-farm fuel storage containment. New research indicates the benefits of certain practices, such as cover crop use, that haven't been recognized before.