

**V(A). Planned Program (Summary)**

**Program # 5**

**1. Name of the Planned Program**

Sustainable Management of Rangeland Resources (SMRR)

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	5%		5%	
102	Soil, Plant, Water, Nutrient Relationships	5%		5%	
103	Management of Saline and Sodic Soils and Salinity	5%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	5%		5%	
112	Watershed Protection and Management	5%		5%	
121	Management of Range Resources	5%		5%	
123	Management and Sustainability of Forest Resources	5%		5%	
131	Alternative Uses of Land	5%		5%	
132	Weather and Climate	5%		5%	
135	Aquatic and Terrestrial Wildlife	5%		5%	
136	Conservation of Biological Diversity	5%		5%	
205	Plant Management Systems	5%		5%	
206	Basic Plant Biology	5%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		5%	
213	Weeds Affecting Plants	5%		5%	
306	Environmental Stress in Animals	5%		5%	
311	Animal Diseases	5%		5%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	5%		5%	
605	Natural Resource and Environmental Economics	5%		5%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	12.0	0.0
Actual	14.0	0.0	10.0	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
206936	0	133151	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1180952	0	133151	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**

Natural resource programs will reach out to a broad spectrum of constituents throughout Wyoming using a variety of sources. Workshops on sustainable rangeland and animal management principles were offered within each extension area within the state. Provide professional development opportunities for rangeland professionals. Developed written educational materials on rangeland and animal management practices and principles (fact sheets, bulletins, media, presentations, Web). Conduct technical consultation on rangeland and animal management, and monitoring of rangelands. Developed media on rangeland management principles (radio, TV, press). Conduct research and demonstrations on sustainable natural resource management principles. Work with individual rangeland managers on developing, implementing, and evaluating sustainable management practices.

Develop and/or present programs on natural resources at youth activities. Produce, or update currently produced educational materials targeted to youth on natural resource education. Produce information/education modules emphasizing natural resource topics for 4-H leader use in 4-H project with large enrollment.

**2. Brief description of the target audience**

The University of Wyoming is committed to reaching underrepresented groups and individuals and to implementing the objectives of equal opportunity regulations relative to the consideration and treatment of clientele for participation in programs regardless of their race, national origin, gender, age, religion, or disability. The College of Agriculture is committed to transmitting unbiased scientific-based information to solve local and regional natural resource conflicts involving state, Federal, and private resources. All efforts will be made to provide information through direct contact and through publications, newsletters, Web sites and other methods. The general public and exurban landowners, agricultural producers and federal and state land management agency personnel as well as general youth and traditional 4-H, are among the target audiences for natural resource youth programs.

**V(E). Planned Program (Outputs)**

**1. Standard output measures**

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Plan</b>	200	2000	50	500
<b>Actual</b>	2308	30000	391	500

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

**Patent Applications Submitted**

Year: 2010  
 Plan: 1  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2010	Extension	Research	Total
<b>Plan</b>	1	8	
<b>Actual</b>	1	29	30

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of programs implemented. Target is number of programs.

Year	Target	Actual
2010	10	16

**Output #2**

**Output Measure**

- Documented media efforts implemented. Target is number of media efforts such as magazines, TV, radio, newspaper inserts.  
 Not reporting on this Output for this Annual Report

**Output #3**

**Output Measure**

- Number of individuals participating in educational programs or activities. Target is number of

participants.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	200	2308

**Output #4**

**Output Measure**

- Number of agency personnel, range professionals, and general public participating in training. Target is number of participants.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	150	2308

**Output #5**

**Output Measure**

- Number of youth related natural resource programs implemented. Target is number of programs.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	1	10

**Output #6**

**Output Measure**

- Number of youth participating in natural resource educational programs or activities. Target is number of participants.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	100	397

**Output #7**

**Output Measure**

- Research: The ability of producers to adopt economically and environmentally sustainable production practices in the face of persistent drought will improve the economic viability while reducing potential resource damage. The long term goal will be to model scenarios of long term drought on economic viability of rural communities. Target is number of producers implementing practices.  
Not reporting on this Output for this Annual Report

**Output #8**

**Output Measure**

- Research - Impacts of natural resource development on long term rural water quality. Long term goals will be to integrate knowledge gained into environmental regulations and improved water quality. Target is number of projects.  
Not reporting on this Output for this Annual Report

**Output #9**

**Output Measure**

- Research - One of the major environmental controversies is rising CO2 levels. There is a large potential to increase C storage in disturbed and reclaimed land. Long term goals will be to develop improved soil properties on these sites. Target is number of projects.  
Not reporting on this Output for this Annual Report

**Output #10**

**Output Measure**

- Research - Matching animal productivity to actual resources available rather than modifying resources to match animal nutrient needs. The long term goal is to develop more sustainable grazing systems. Target is number of projects.  
Not reporting on this Output for this Annual Report

**Output #11**

**Output Measure**

- Research: Number of research publications, bulletins, reports, and presentations on sustainable rangeland production practices. Target is number of outputs reported.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	{No Data Entered}	25

**Output #12**

**Output Measure**

- Research: Number of research publications, bulletins, reports, and presentations on watershed management. Target is number of outputs reported.

<b>Year</b>	<b>Target</b>	<b>Actual</b>
2010	{No Data Entered}	25

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Increase public knowledge and appreciation of natural resources and public awareness of sustainable resources. Target is number of participants reporting outcome.
2	General public understands the impact of resource use and management on the quality and quantity of the resources. (i.e. water, rangeland, wildlife, viewsheds). Target is number of participants reporting outcome.
3	Raise the understanding of the general public on the interaction of natural resource use in Wyoming's economy. Citizens will make better informed decisions on natural resource issues and topics. Target is number of participants reporting outcome.
4	Greater public consensus of management of private and public lands resulting in less litigation and burden on the system, through unbiased information that will reduce conflict and contribute to the economic and biological sustainability of Wyoming communities. Target is number of participants reporting outcome.
5	Youth participating in natural resource programs will have increased interest in careers in natural resources. Target is youth participants choosing natural resource careers.
6	Increased enrollment in 4-H natural resource programs (projects, camps, activities). Target is number of increased youth participation in natural resource programs.
7	Increase knowledge, awareness and skills among youth on natural resources, their management and associated issues. Target is number of participants reporting outcome.
8	Raise awareness, knowledge, and skills for development, implementation and evaluation of land management plans that include management of grazing and browsing animals, and adjusting management as to necessary to meet objectives. Target is number of participants reporting outcome.
9	Land managers, public and private, will develop, implement, and evaluate plans for improved management of rangeland resources and associated herbivores. Target is number of participants reporting outcome.
10	Increased profit for range-based agriculture enterprises. Target is number of participants reporting outcome.
11	Improved rangeland health, productivity, and profitability including value of rangeland for multiple use. Target is number of participants reporting outcome.
12	Research - Increased knowledge and appreciation of sustainable production practices. Change in knowledge through publications and integration into extension programs. Target is number of projects which have resulted in publication of results and/or integration into extension programs.
13	Research - Increase knowledge and appreciation of resource development on water quality. Outcomes will be change in knowledge through publications, bulletins, reports and long term to integrate research into extension programs. Target is number of projects which have outcomes that have been documented in publications, bulletins and/or integrated into extension programs.
14	Research - Increase public awareness on long term CO2 levels and integrate findings into extension programs. Target is number of projects in which outcomes have been integrated into extension programs.

15	Research - Increase producers ability to match resources to animal productivity. Target is number of projects which report research outcome. These projects have been integrated into extension programming.
16	Research: Transfer knowledge and increase appreciation of sustainable rangeland production. Target is number of projects reporting outcome.
17	Research: Transfer knowledge and increase appreciation of watershed management. Target is number of projects reporting outcome.

**Outcome #1**

**1. Outcome Measures**

Increase public knowledge and appreciation of natural resources and public awareness of sustainable resources. Target is number of participants reporting outcome.

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

General public understands the impact of resource use and management on the quality and quantity of the resources. (i.e. water, rangeland, wildlife, viewsheds). Target is number of participants reporting outcome.

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

Raise the understanding of the general public on the interaction of natural resource use in Wyoming's economy. Citizens will make better informed decisions on natural resource issues and topics. Target is number of participants reporting outcome.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Quantitative Target	Actual
2010	100	30000

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Many Wyomingites are not directly tied to natural resources and agriculture. This results in lack of knowledge and experience regarding natural resource systems, their management and the industries they support. Unfortunately, a segment of the general public appears to believe that any use of even renewable resources is damaging. There is often conflict and occasional litigation among interest groups that differ on how resources should be used and managed. Natural resources are important to all segments of the Wyoming population.

#### What has been done

The Sustainable Management of Rangeland Resources initiative team has produced over 175 seventy second TV spots which air twice weekly on commercial TV station in Casper. The segment titled 'Exploring the Natural Wonders of Wyoming' (ENOW) covers natural resource topics to provide education to the general public. The ENOW spots have also been placed on You-Tube to reach a national audience.

#### Results

In the fifth year of airing these spots, the team receives regular feedback from Wyoming citizens and now national viewers on the positive aspects of the spots. It is difficult to measure impact, though the audience response has generated enough impact that the the energy industry now provides partial funding for the segments aired twice weekly.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics

### Outcome #4

#### 1. Outcome Measures

Greater public consensus of management of private and public lands resulting in less litigation and burden on the system, through unbiased information that will reduce conflict and contribute to the economic and biological sustainability of Wyoming communities. Target is number of participants reporting outcome.

Not Reporting on this Outcome Measure

## **Outcome #5**

### **1. Outcome Measures**

Youth participating in natural resource programs will have increased interest in careers in natural resources. Target is youth participants choosing natural resource careers.

Not Reporting on this Outcome Measure

## **Outcome #6**

### **1. Outcome Measures**

Increased enrollment in 4-H natural resource programs (projects, camps, activities). Target is number of increased youth participation in natural resource programs.

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	50	397

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Extension is uniquely positioned in that we have existing volunteer youth development programming infrastructure already built in the 4-H program featuring offices in all of Wyoming's 23 counties, several thousand volunteer staff and thousands of youth already acquainted with the 4-H program. These youth present an immediate natural resource education audience and an opportunity to reach the broader youth audience with the educational resources we have. Building stronger natural resource programs, enhancing natural resource teaching opportunities within existing high-interest projects (like market livestock and shooting sports projects) and increasing youth development opportunities are key. This will continue to foster interest in natural resource careers. Science, engineering, and technology emphasis of 4-H align with SMRR educational efforts.

#### **What has been done**

Educators conducted 12 educational programs including an ag expo, GPS training, plant anatomy, native plants and noxious weeds, and nature awareness. Alternative energy, windmill science and wind workshops were also conducted.

### Results

Enrollment in 4-H livestock projects continues to increase. Shooting sports which is also closely tied to natural resources is also experiencing increased enrollment. All youth participating in targeted natural resource education programs report increased knowledge and skills.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
132	Weather and Climate
135	Aquatic and Terrestrial Wildlife

#### Outcome #7

##### 1. Outcome Measures

Increase knowledge, awareness and skills among youth on natural resources, their management and associated issues. Target is number of participants reporting outcome.

Not Reporting on this Outcome Measure

#### Outcome #8

##### 1. Outcome Measures

Raise awareness, knowledge, and skills for development, implementation and evaluation of land management plans that include management of grazing and browsing animals, and adjusting management as to necessary to meet objectives. Target is number of participants reporting outcome.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	50	828

##### 3c. Qualitative Outcome or Impact Statement

**Issue (Who cares and Why)**

Rangelands comprise over 80 percent of Wyoming's land base. Range livestock production, recreation, and wildlife habitat are some of the dominant uses of rangelands. Rangelands also provide water for homes and municipalities, irrigation, industries, fisheries, wildlife and livestock. In semi-arid Wyoming, rangeland uses need to be compatible with maintaining the quality and quantity of water resources. Livestock grazing and wildlife habitat management must also be compatible as both are important for the sustainability of the State's rangeland resources and its economy.

#### **What has been done**

Extension educators in the SMRR initiative conducted 32 educational programs, tours, or workshops on range monitoring. Most classes were targeted toward permittees reaching 828 individuals. Reclamation 101 School has been implemented to assist producers and industry in mitigating energy impacts.

#### **Results**

100 percent of participants in educational programs reported increased awareness, knowledge, and skills of range monitoring. 65 individuals reported implementing or adjusting management plans as a result of the workshops.

#### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land

#### **Outcome #9**

##### **1. Outcome Measures**

Land managers, public and private, will develop, implement, and evaluate plans for improved management of rangeland resources and associated herbivores. Target is number of participants reporting outcome.

Not Reporting on this Outcome Measure

#### **Outcome #10**

##### **1. Outcome Measures**

Increased profit for range-based agriculture enterprises. Target is number of participants reporting outcome.

Not Reporting on this Outcome Measure

### **Outcome #11**

#### **1. Outcome Measures**

Improved rangeland health, productivity, and profitability including value of rangeland for multiple use. Target is number of participants reporting outcome.

Not Reporting on this Outcome Measure

### **Outcome #12**

#### **1. Outcome Measures**

Research - Increased knowledge and appreciation of sustainable production practices. Change in knowledge through publications and integration into extension programs. Target is number of projects which have resulted in publication of results and/or integration into extension programs.

Not Reporting on this Outcome Measure

### **Outcome #13**

#### **1. Outcome Measures**

Research - Increase knowledge and appreciation of resource development on water quality. Outcomes will be change in knowledge through publications, bulletins, reports and long term to integrate research into extension programs. Target is number of projects which have outcomes that have been documented in publications, bulletins and/or integrated into extension programs.

Not Reporting on this Outcome Measure

### **Outcome #14**

#### **1. Outcome Measures**

Research - Increase public awareness on long term CO2 levels and integrate findings into extension programs. Target is number of projects in which outcomes have been integrated into extension programs.

Not Reporting on this Outcome Measure

### **Outcome #15**

#### **1. Outcome Measures**

Research - Increase producers ability to match resources to animal productivity. Target is number of projects which report research outcome. These projects have been integrated into extension programming.

Not Reporting on this Outcome Measure

## **Outcome #16**

### **1. Outcome Measures**

Research: Transfer knowledge and increase appreciation of sustainable rangeland production.  
Target is number of projects reporting outcome.

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	3

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Monitoring and assessing rangeland sustainability and the communities that depend upon them are necessary for policy makers, land managers, and the people that use rangelands. Knowing how social, economic, and ecological systems are changing through time and across space helps those decision-makers to understand how changes in management and policy affect the ecosystem.

#### **What has been done**

The Sustainable Rangelands Roundtable is a national effort to bring interested parties together to develop mutually agreed upon criteria and indicators of social, economic, and ecological sustainability. To date, the roundtable has agreed upon 64 indicators, developed a conceptual framework to assess those indicators, developed a guide for ecosystem goods and services from rangelands, and is currently developing a ranch assessment guide.

#### **Results**

The Sustainable Rangelands Roundtable efforts are helping stakeholders from federal, state, local, and tribal governments, industry, environmental groups, academics, and other interested citizens evaluate the same data to assess the U.S. sustainability of rangelands.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
123	Management and Sustainability of Forest Resources

131	Alternative Uses of Land
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants

### **Outcome #17**

#### **1. Outcome Measures**

Research: Transfer knowledge and increase appreciation of watershed management. Target is number of projects reporting outcome.

#### **2. Associated Institution Types**

- 1862 Research

#### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Quantitative Target</b>	<b>Actual</b>
2010	{No Data Entered}	2

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

A significant challenge the West faces is to satisfy local, state, and national energy needs, while ensuring adequate quantity and quality water supplies and minimizing negative environmental impacts associated with management of co-produced water, often of substantially impaired quality.

##### **What has been done**

Integrated research was conducted by regional team members and collaborators across the Northern region to address questions regarding the potential short and long-term impacts of the discharge water to soil, vegetation, and water resources and management alternatives. Individual and state strengths and expertise were integrated to develop effective education and extension program tools to address the identified needs across the region and in individual states.

##### **Results**

The development of the comprehensive integrated research, education and extension project has resulted in providing numerous landowners within the Northern Plains and Mountain Regions the tools to institute science-based natural resource monitoring programs to better manage produced and impaired waters from energy development. The impacts of this integrated project continue to reach local, regional, and national levels - with the state of Montana, Northern Cheyenne Tribe, and US EPA adopting promulgated surface water quality standards specific to salinity and sodicity.

At the local level, the "landowner guide" has provided a scientific approach for landowners to use to measure and monitor changes in their plant, soil, and water resources due to the impacts of CMB development.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
103	Management of Saline and Sodic Soils and Salinity
135	Aquatic and Terrestrial Wildlife
605	Natural Resource and Environmental Economics

#### V(H). Planned Program (External Factors)

##### External factors which affected outcomes

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

##### Brief Explanation

CES has experienced several educators resigning during this period. Searches are in progress to bring this team of educators back to full capacity. Weather extremes and funding are factors which impact both research and extension efforts.

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

##### 1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Time series (multiple points before and after program)
- Case Study
- Comparison between locales where the program operates and sites without program intervention

##### Evaluation Results

{No Data Entered}

##### Key Items of Evaluation

{No Data Entered}