V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Natural Resources and Environment

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	5%		5%	
102	Soil, Plant, Water, Nutrient Relationships	15%		16%	
104	Protect Soil from Harmful Effects of Natural Elements	0%		3%	
111	Conservation and Efficient Use of Water	0%		7%	
112	Watershed Protection and Management	0%		5%	
121	Management of Range Resources	80%		13%	
122	Management and Control of Forest and Range Fires	0%		1%	
131	Alternative Uses of Land	0%		4%	
132	Weather and Climate	0%		3%	
133	Pollution Prevention and Mitigation	0%		3%	
134	Outdoor Recreation	0%		5%	
135	Aquatic and Terrestrial Wildlife	0%		22%	
136	Conservation of Biological Diversity	0%		11%	
141	Air Resource Protection and Management	0%		2%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Actual Paid Professional	2.7	0.0	52.8	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**
212933	0	373215	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
212933	0	418986	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

- Conduct Field and Lab Research
- Collaborate with SDSU Extension
- Collaborate with Other States
- Partner with South Dakota Game, Fish and Parks
- Partner with the South Dakota Grassland Coalition
- Partner with Business Organizations
- Collaborate with Non-profit Organizations
- Participate with the South Dakota State Climate Office
- Participate with the United States Army Corps of Engineers
- Conduct Training for Concentrated Animal Feeding Operations
- Partner with the South Dakota Department of Environment and Natural Resources
- Partner with the Natural Resources Conservation Service

2. Brief description of the target audience

- Wildlife and Fisheries Managers
- Scientists
- Environmentalists
- Outdoor Enthusiasts
- Farmers, Ranchers and Producers
- General Public
- Operators of Concentrated Animal Feeding Operations

3. How was eXtension used?

eXtension is not part of this Planned Program.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2285	200829	517	3749

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

Patent Applications Submitted

Year:	2012
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	2	37	39

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Percentage of all Hatch Research Projects in Natural Resources and Environment

Year	Actual
2012	20

Output #2

Output Measure

- Increase Rancher's Knowledge of Grazing Techniques and Grassland Management

Year	Actual
2012	0

Output #3

Output Measure

- Number of Articles Posted on igrow Website

Year	Actual
2012	39

Output #4

Output Measure

- Number of Podcasts Posted on igrow Website

Year	Actual
2012	47

Output #5

Output Measure

- Number of Radio Programs Posted on igrow Website

Year	Actual
2012	56

Output #6

Output Measure

- Number of CAFOs Participants

Year	Actual
2012	38

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

Outcome #1

1. Outcome Measures

Number of Natural Resources and Environment Hatch Research Projects

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	23

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
South Dakota has a wide diversity of natural resources that depend on maintenance and good stewardship of the land. Too much grazing, urban sprawl, the creation of reservoirs, plant invasion, feedlot runoff, global warming, as well as the growing world economy all contribute to the degradation of our natural resources.

What has been done
Within the College of Agricultural and Biological Sciences, there are 23 Hatch projects that are categorized in the Planned Program of Natural Resources and Environment. The research activities in this program are primarily supported by our Department of Natural Resource Management. Projects include but are not limited to research studies in carbon sequestration, ecosystems, wildlife habitat, climate change, soil productivity, water quality, bioenergy, and pollution prevention.

Results
Through research, our Department of Natural Resource Management continues to build a scientific knowledge base to improve and understand the management of natural resources in South Dakota. In addition, graduate students gain valuable knowledge and skills while collaborating on research projects. Notes of interest on results:
Rehabilitated soil plots show a 10-50 percent yield increase; US Army Corps of Engineers adopted change in managing Missouri River; Choice between greater short-term grain yields or longer-term carbon storage potential; Loss of CRP grasslands influence the ecology of White-Tailed deer fawns; Grasslands ecology enhanced with patch grazing and patch-burn grazing; Updated index values for rangeland plants in soil productivity calculations; Better understanding of weather condition changes impacting agricultural productivity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
104	Protect Soil from Harmful Effects of Natural Elements
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
121	Management of Range Resources
122	Management and Control of Forest and Range Fires
131	Alternative Uses of Land
132	Weather and Climate
133	Pollution Prevention and Mitigation
134	Outdoor Recreation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
141	Air Resource Protection and Management

Outcome #2

1. Outcome Measures

Number of Grazing School Participants

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The mismanagement of natural resources can cause many problems that affect the sustainability of grasslands. Without proper maintenance of this resource, the livelihood of ranchers is at risk.

What has been done

In cooperation with the South Dakota Grasslands Coalition and several other entities, SDSU Extension has partnered in grasslands management training to more than 265 ranchers for the last 10 years. In 2012, SDSU Extension's efforts were dedicated to participants of the beefSD program, which is aimed at beginning ranchers. Ranchers participated in classroom presentations as well as hands-on activities in the field.

Results
Even though the Grazing School is designed for all producers, the focus on beginning ranchers enabled SDSU Extension to reach new participants and increase their knowledge with many topics, including managing diversity on rangelands, pasture allocation, holistic management, soil health and infiltration, and concepts of grazing. Other topics also include planning your own place and planning for a forage shortage.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
121	Management of Range Resources

Outcome #3

1. Outcome Measures

Number of CAFOs Training Sessions

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Large-scale livestock producers, known as Concentrated Animal Feeding Operations (CAFOs), create potential water and air quality conflicts for rural communities in South Dakota. There is a need for the development of these operations, but environmental laws must be followed and good will with neighbors is imperative for the sustainability of large operations. Any CAFO that is applying for a General Permit must attend the course.

What has been done

SDSU Extension, the South Dakota Department of Environment and Natural Resources, and the Natural Resources Conservation Service provide training three times a year for federal and state water pollution and control programs. The training sessions included topics on livestock production, manure management and land application practices. In addition, SDSU Extension Specialists discuss the management of nitrogen and phosphorus content of manure and air quality and odor.

Results

Approximately half of the participants were required to be at the training sessions and about half of them attended for the learning experience. The sessions represented approximately 21,350 animals in the beef industry, 17,700 animals in the dairy industry, and 124,240 animals in the swine industry. Survey results show a 55% increase in the overall understanding of the topics and an 83% overall satisfaction rate with the program. Eighty-five percent of the participants said they plan to adopt certain practices they learned.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Competing Programmatic Challenges

Brief Explanation

The effects of restructuring SDSU Extension in October of 2011 are likely being felt with the greatest impact during this reporting period. With the huge loss of staff and the turn-around time to hire new employees, many vacancies were created. This means less programming and less data to work with in all areas of this report.

Programming was also affected as resources had to be reappropriated to address the drought of 2012.

Funding cuts continue to impact South Dakota State University.

SDSU Extension's recent hiring of a new range field specialist should increase the outreach activity of Natural Resources and Environment Planned Program.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Due to continued budget constraints, a full-time evaluator has not been hired.

However, we are diligent in our efforts to teach staff how to collect and report meaningful, useful programming data. This includes establishing baseline data, templates that correspond to NIFA reporting, and writing impacts that show strong results.

Grazing Schools

Success of the SD Grazing School led SD NRCS administrators to require attendance at the School by livestock producers qualifying for Conservation Stewardship Program contracts for grazing lands they manage.

Success of the SD Grazing School is also reflected in the inquiries received from other states by the SD Grasslands Coalition Board about how to conduct similar training events.

As a result of the SD Grazing School over the last ten years, more than 265 ranchers and managers have been trained, representing management influence on more than 900,000 acres of grazing land.

Concentrated Animal Feeding Operations

Pre and Post Surveys
35 of 38 Participant Responses
83% - Overall Participant Satisfaction with the Program

Understanding of the Topic before Program

- 63% - Water Quality
- 56% - Permit
- 61% - Land Application
- 59% - Worksheets
- 56% - Conservation
- 49% - Nutrition
- 50% - Air Quality

Understanding of the Topic after Program

- 87% - Water Quality
- 87% - Permit
- 89% - Land Application
- 88% - Worksheets
- 86% - Conservation
- 84% - Nutrition
- 87% - Air Quality

Participants that Plan to Adopt Practices

- 86% - Land Application
- 89% - Conservation
- 80% - Nutrition
- 85% - Air Quality

Key Items of Evaluation

Grazing Schools

As a result of the SD Grazing School over the last ten years, more than 265 ranchers and managers have been trained, representing management influence on more than 900,000 acres of grazingland.

Concentrated Animal Feeding Operations
Pre and Post Surveys
35 of 38 Participant Responses
83% - Overall Participant Satisfaction with the Program
55% - Increase in Overall Understanding of the Program Topics