V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Sustainable Energy: Land and Livestock

☑ 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	5%		5%	
111	Conservation and Efficient Use of Water	5%		5%	
121	Management of Range Resources	10%		0%	
122	Management and Control of Forest and Range Fires	5%		0%	
133	Pollution Prevention and Mitigation	0%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	5%		0%	
205	Plant Management Systems	12%		0%	
213	Weeds Affecting Plants	5%		20%	
216	Integrated Pest Management Systems	5%		0%	
301	Reproductive Performance of Animals	5%		15%	
302	Nutrient Utilization in Animals	10%		5%	
305	Animal Physiological Processes	5%		15%	
306	Environmental Stress in Animals	5%		0%	
307	Animal Management Systems	12%		0%	
308	Improved Animal Products (Before Harvest)	5%		10%	
405	Drainage and Irrigation Systems and Facilities	0%		5%	
605	Natural Resource and Environmental Economics	5%		5%	
901	Program and Project Design, and Statistics	1%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Extension	Research

Year: 2013	1862	1890	1862	1890
Plan	8.8	0.0	3.2	0.0
Actual Paid Professional	14.9	0.0	4.3	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**
348534	0	234949	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
348534	0	234949	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
433392	0	1692669	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The 2013 activities conducted by the Land and Livestock Team focus on three resource issues: rangeland management, forages, and beef production. Due to the integrated nature of clientele needs, most of the activities are delivered by a team of county educators and specialists (joint appointments with research and extension) who bring expertise from various disciplines to share with learners. Among the most common activities are beef schools, forage schools, range school, grazing academy, BQA workshops, weed workshops, monitoring workshops, demonstration/applied research trials, Extension publications, popular press articles, tours, field days, faculty training sessions, and farm/ranch visits. The focus of these efforts will depend on stakeholder input, questions, and needs. When appropriate, information generated by the team will be presented in scientific journals and at professional meetings.

Activities focusing on range and grazing lands included the Lost Rivers Grazing Academy, hands-on Management Intensive Grazing (MiG) workshops, a long-term grazing demonstration, and an annual grass grazing research project. Faculty members also work with Federal land managers and permittees to improve management and cooperation among stakeholders for those lands.

In the arena of forages, faculty members delivered forage schools, conducted field trials and hosted field days for promising forage crops (alfalfa, sorghum X sudangrass, dual purpose cover crops, and irrigated crop residues), contributed to weed-free hay exchange programs, conducted training for pesticide applicators certification and re-certification, and published articles in popular and trade magazines and newspapers/newsletters and Extension publications. Multi-state activities included development of the Pasture Management Professionals workshop in Colorado, the Pacific Northwest Forage Workers

Conference in Wyoming (WERA 1014), and a regional Pasture Symposium in partnership with the ARS and Utah State University personnel.

Livestock production activities included a dozen winter beef schools, training and certification for Beef Quality Assurance for producers and BQA tours, Cowboy School, numerous workshops and conferences for producers and professionals, continuation of a vaccine storage and handling educational program, and published articles in popular and trade magazines and newspapers/newsletters and Extension publications.

Integrated among forages, rangeland and livestock production are numerous activities related to invasive species management including weed spray days, the Idaho Weed Conference, contributions to the PNW Weed Management Handbook, collaborations with numerous cooperative weed management associations and weed supervisors, several weed schools, organization of the Idaho Biocontrol Task Force and technology transfer workshops for tribal land managers in Nevada, Washington and Nevada.

2. Brief description of the target audience

The target audience most likely to participate in and benefit from these programs are:

Beef cattle producers, beef industry participants and allied industry representatives, land owners, range/pasture livestock producers, local government and resource management agency personnel.

Livestock and forage producers are likely to be positively impacted by new and improved production practices that will improve their profitability and ecological sustainability.

Alfalfa and grass seed producers are likely to be positively impacted as many improved practices may involve the planting of new varieties with high productivity and pest resistance.

Supplies of a variety of production input are likely to be positively impacts since improved practices may include the use of new materials, machinery or other production inputs.

Small acreage land owners will have a great understanding of the biology of their land and livestock resources, and will be less likely to be impacted by weed invasion or be taken advantage of by unscrupulous input suppliers.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	17931	153462	3046	6942

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

Patent Applications Submitted

Year:	2013
Actual:	0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	14	17	31

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Producer schools. (number of schools: multiple sessions of instruction on multiple subjects)

Year	Actual
2013	17

Output #2

Output Measure

- Workshops (including BQA).

Year	Actual
2013	67

Output #3

Output Measure

- Demonstrations and applied research projects.

Year	Actual
2013	52

Output #4

Output Measure

- Popular press articles.

Year	Actual
2013	62

Output #5

Output Measure

- Newsletters; number of issues.

Year	Actual
2013	64

Output #6

Output Measure

- Field days

Year	Actual
2013	21

Output #7

Output Measure

- Presentations at producer meetings

Year	Actual
2013	203

Output #8

Output Measure

- Budgets developed to improve clientele decision making

Year	Actual
2013	10

Output #9

Output Measure

- Curricula developed

Year	Actual
2013	2

Output #10

Output Measure

- Surveys conducted

Year	Actual
2013	7

Output #11

Output Measure

- Tours conducted

Year	Actual
2013	30

Output #12

Output Measure

- Websites developed or significantly modified

Year	Actual
2013	0

Output #13

Output Measure

- number of blogs

Year	Actual
2013	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	O: Learners will adopt new, accepted, or recommended production practices. I: Number of participants indicating in post-program surveys that they have or intend to adopt recommended practices.
2	O: Learners aquire knowledge and understanding of new, approved, or recommended practices. I: Number of participants citing change in knowledge on evaluation instruments(pre- post-test results) [number of evaluations administered and examined.
3	O: Learners are aware of new, accepted, or recommended production practices and emerging technologies and issues (BQA, NAIS, etc.) I: Number of participants at educational events.
4	O: An increase in the number of trained graduate students prepared to enter the workforce. I: Number of M.S. and Ph.D. candidates relevant to this topic team.
5	O: Producers possess skills and knowledge about beef quality assurance (BQA). I: Number of Idaho Beef Quality Assurance (BQA) Program certificates awarded.
6	O: The better we can understand how external (environment, photoperiod) and internal (hormonal) cues alter the neuropeptides from the brain which control the hormones responsible for reproduction, this will allow researchers to develop potential assisted reproduction methods to improve reproductive efficiency in animals. I: We expect to impact the dairy and sheep industry with improved pregnancy rates and reduce economic loss.

Outcome #1

1. Outcome Measures

O: Learners will adopt new, accepted, or recommended production practices. I: Number of participants indicating in post-program surveys that they have or intend to adopt recommended practices.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	193

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Vaccines represent approximately 1-2% of per head annual cost, but the cost of not vaccinating greatly increases production costs due to sickness and lost marketing opportunities. Improperly stored vaccine loses efficacy. Storage while at the ranch prior to processing has been addressed, but little field work exists to ensure that vaccine is being stored properly while in the field.

What has been done
Extension faculty members took temperature measurements at five different times in a working setting in the field and determined some recommendations that are practical to use in the field. The recommendations were published in a newsletter and have been communicated in person.

Results
Faculty members have received dozens of confirmed reports from producers that they will or have implemented the recommendations made for vaccine storage and handling. Producers also felt that the program was extremely valuable.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
121	Management of Range Resources
122	Management and Control of Forest and Range Fires
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants

205	Plant Management Systems
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
605	Natural Resource and Environmental Economics

Outcome #2

1. Outcome Measures

O: Learners aquire knowledge and understanding of new, approved, or recommended practices. I: Number of participants citing change in knowledge on evaluation instruments(pre- post-test results) [number of evaluations administered and examined.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	297

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Extension educators and NRCS personnel indicated they wanted more training in pasture and grazing management. This will help them when consulting with producers to adapt changes in management.

What has been done
A 3-day workshop was given to 28 educators and advisors. We provided training materials and a 3-day program for grass physiology in relation to grazing, plant materials available including legumes in mixes, fertilization, irrigation, and grazing management, economics, pest management, nutrient management, and monitoring for sustainable production.

Results

There were 14.5 CEU credits available for the Certified Crop Adviser Program and 16 credits for the Certified Range Management Professional program. A detailed class syllabus and program will be revised based on evaluations and experience with the last workshop. Respondents indicated "strongly agree" (65%) or Agree (35%) to the question: "Did the workshop meet your expectations?" Respondents indicated "strongly agree" (55%) or "agree" (45%) to the question: "Did you gain understanding of critical concepts and principles?"

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
121	Management of Range Resources
122	Management and Control of Forest and Range Fires
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

O: Learners are aware of new, accepted, or recommended production practices and emerging technologies and issues (BQA, NAIS, etc.) I: Number of participants at educational events.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2571

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumer confidence in the safety and wholesomeness of their food supply is paramount to continued strength of US Agriculture and Idaho and US economies. Adoption Beef Quality Assurance practices by beef producers helps ensure the safety, wholesomeness, and quality of the US beef supply and enhances consumer confidence.

What has been done
A collaboration among the University of Idaho Extension beef specialist, several University of Idaho Extension educators, and BQA coordinators Kara Kraich and Audra Cochran, planned and delivered fifteen BQA trainings, tours and related events directed toward beef quality assurance (BQA) across Idaho. Events included both BQA program certification and re-certification opportunities.

Results
Approximately 350 individuals attended events at which beef quality assurance (BQA) information was presented. The attendees at these events left with knowledge of approved and recommended beef quality assurance (BQA) program practices and the factors that affect beef quality.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
121	Management of Range Resources
122	Management and Control of Forest and Range Fires
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
605	Natural Resource and Environmental Economics

Outcome #4

1. Outcome Measures

O: An increase in the number of trained graduate students prepared to enter the workforce. I: Number of M.S. and Ph.D. candidates relevant to this topic team.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done
There were 10 advanced degrees awarded during the last reporting cycle for this planned program.

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation
213	Weeds Affecting Plants
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
308	Improved Animal Products (Before Harvest)
405	Drainage and Irrigation Systems and Facilities
605	Natural Resource and Environmental Economics
901	Program and Project Design, and Statistics

Outcome #5

1. Outcome Measures

O: Producers possess skills and knowledge about beef quality assurance (BQA). I: Number of Idaho Beef Quality Assurance (BQA) Program certificates awarded.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	201

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Previous Beef Quality Audits have identified quality challenges in the Beef Industry. Consumers are concerned about their food supply in terms of safety, origin, and wholesomeness.

What has been done
Ten BQA certification events were held across Idaho.

Results
709 beef producers, students, and youth trained on various aspects of BQA. 300 individuals attended certification meetings and 201 were certified.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)

Outcome #6

1. Outcome Measures

O: The better we can understand how external (environment, photoperiod) and internal (hormonal) cues alter the neuropeptides from the brain which control the hormones responsible for reproduction, this will allow researchers to develop potential assisted reproduction methods to improve reproductive efficiency in animals. I: We expect to impact the dairy and sheep industry with improved pregnancy rates and reduce economic loss.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Improved pregnancy success in cattle and sheep based upon the physiology of reproduction is needed to improve profitability on farms and ranches. Hormones in the brain, ovary and uterus control reproduction. In the brain, luteinizing hormone (LH) is released to stimulate the release of egg from the ovary. Regulation of LH includes many neuropeptides in the brain including gonadotropin releasing hormone (GnRH), which is possibly controlled by kisspeptin. The corpus luteum on the ovary must produce sufficient progesterone for maintenance of pregnancy. A better understanding of the regulation of these reproductive hormones is needed to develop methods for greater rates of pregnancy.

What has been done
The effect of kisspeptin infusions into the third ventricle of the brain of sheep was examined with evaluation of LH secretion, assessed by plasma concentrations, as the end point. Infusions occurred in the presence and absence of estrogen based upon stage of the estrous cycle to examine possible interactions occurring in the brain. To examine the role of progesterone, dairy cows were given chronic administration of a GnRH agonist to enhance the number of accessory corpora lutea on the ovary for greater progesterone production. Cows were bred and pregnancy determined.

Results
Kisspeptin infusion as a bolus or chronic infusion into the third ventricle of sheep failed to alter concentrations of LH in circulation. This effect may have been modulated by estrogen status but

further work is needed to confirm the possible interaction. Administration of a GnRH agonist beginning on day 3 of the estrous cycle in dairy cows altered corpora lutea on the ovary resulting in greater circulating progesterone concentrations. No effect on length of the estrous cycle was detected. Treatment of dairy cows with this GnRH agonist for 7 days increased pregnancy rate. Thus, enhanced progesterone through alterations in neuropeptides regulating reproduction may be a viable means for improvements in pregnancy in cattle.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
305	Animal Physiological Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

A post-program evaluation was conducted following the 2013 Intermountain Rangeland Livestock Symposium (IRLS). Ninety-one percent (91%) of the respondents indicated they were either satisfied or very satisfied with the subject matter presented at the symposium. When asked if the general themes of the symposium were relevant and timely, eighty-six percent (86%) of the respondents indicated the themes were either very relevant or essential. Ninety-eight percent (98%) of the respondents either agreed or strongly agreed that they gained new knowledge related to the livestock industry and rangeland resources by attending the symposium. Ninety percent (90%) of respondents agreed or strongly agreed that as a result of attending the symposium they were better equipped to handle the issues and challenges facing the livestock and range industries.

Key Items of Evaluation

An example of succes with partnering ranchers and landowners in the Reynolds Creek valley who were concerned over riparian area issues (bank stabilization mainly) on a stretch of Reynolds Creek. They partnered with Idaho Fish and Game and the U.S. Fish and Wildlife service to fence off the creek and create a livestock exclusion. After several years of livestock exclusion from the stream bank, willows and other desirable plants moved in to improve the area. The problem was that several noxious weeds also moved in to the area and sprouted in areas opened up by decadent plant material. I helped them formulate a riparian grazing plan that they implemented. It involved high intensity, short duration livestock grazing at the right time year. Following this grazing plan has helped the rancher

and land owner to reduce the noxious weed problems while continuing to protect the stream banks.