

# 2014 University of Wyoming Combined Research and Extension Annual Report of Accomplishments and Results

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## I. Report Overview

### 1. Executive Summary

Agriculture is at a crossroads and faces many challenges and opportunities in the 21st century. Agriculture, as well as land-grant institutions, is challenged to compete in a global economy while still responding to the needs of a diverse U.S. population. New demands are placed on the industry to ensure that agriculture remains profitable and sustainable, while addressing environmental concerns. Issues involving production agriculture, natural resource management, and quality of life generate diverse research and extension directives. Stakeholders play a vital role in identification and prioritization of needs at the University of Wyoming.

The College of Agriculture and Natural Resources has a mission to serve the educational and information needs of students, Wyoming citizens and communities, and the global community by providing and distributing unbiased, scientifically sound information. Research and Extension programs at the University of Wyoming focus on five initiatives: 4-H and Youth Development, Community Development Education, Nutrition and Food Safety, Agriculture and Horticulture, and Sustainable Management of Rangeland Resources. The five NIFA priority programs added spring 2010 Global Food Security and Hunger; Climate Change; Sustainable Energy; Childhood Obesity; and Food Safety, have been integrated with existing initiatives or have been added as standalone plans. The University of Wyoming Research and Extension efforts have been addressing issues outlined in the new plans for several years. Fiscal year 2014, the University of Wyoming research and extension programs reported success in all initiative areas. The College of Agriculture and Natural Resources is second at the University of Wyoming in total grant dollars brought in for research and extension. In-depth educational programs such as the Ranch Management Institute, Body Works, Food Safety, 4-H After School programs, and Wyoming Municipal institutes report strong impacts for citizens of the state. Each of the above UW Extension programs is multi-session educational classes with 8 to 70 hours of class contact time with participants. These are just a few examples of high impact educational efforts by the University of Wyoming. Research and Extension Centers at UW and across the state are producing research which is relevant and vital to agriculture, families, and communities. Being an energy rich state, UW researchers are looking at possible alternative fuels. Reclamation of mined lands is an important issue being addressed through the Department of Ecosystem Science and Management and UW Extension. The two newer planned programs on Climate Change and Sustainable Energy are not only timely, but very important to the state of Wyoming due to the energy resources which we have in abundance. Since 2009, UW Extension partnered with the UW School of Energy Resources to fund an Energy Extension Coordinator; the incumbent for this position has completed e years. This position has allowed for expanded partnerships within the University and with agencies and organizations both state and federal levels.

**Total Actual Amount of professional FTEs/SYs for this State**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	100.0	0.0	43.8	0.0
Actual	102.0	0.0	42.6	0.0

**II. Merit Review Process**

**1. The Merit Review Process that was Employed for this year**

- Internal University Panel
- External University Panel
- External Non-University Panel
- Combined External and Internal University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

**2. Brief Explanation**

The merit review process for extension programs covers all programs conducted by UW Extension. A team leadership model is utilized to review program plans and chart direction for UW Extension educational programs. Program initiative teams develop and review programs on an annual basis. Teams make decisions to maintain, modify, or create new programs to meet the needs identified through external and internal stakeholder input. Five area external advisory boards comprised of stakeholders review extension programs annually. Spring, 2007 UW Extension held a CSREES program review of the total extension program. The review report was used as a guide to move forward with the academic plan for 2009 to 2013. FY 2013 UW Extension completed a comprehensive internal and external stakeholder survey and focus groups to review current programs and develop the 2014 - 2018 academic plan. All projects supported with formula funds (Hatch, Multi-State, McIntire-Stennis, Animal Health) must be approved projects. The project proposal is transmitted to a minimum of two scientific reviewers who are knowledgeable in the field to review the proposal. After a proposal is revised to satisfy reviewer comments and concerns, it, along with appropriate supportive documents, is transmitted to the University of Wyoming Office of Research and Economic Development for signature of the Assurance Statement. The proposal is then approved by the Experiment Station Director before being transmitted to NIFA for final approval. The Wyoming Agricultural Experiment Station also administers an internal competitive grants program using a portion of federal dollars. Proposals are reviewed by a ten member university wide grant panel. Each proposal is also sent to a minimum of two external reviewers. Proposals recommended for funding are transmitted to NIFA for approval following signature of the Assurance Statement and subsequent approval by the Experiment Station Director. Both AES and UW Extension require an outreach plan in proposals which demonstrates integration of research and extension.

### **III. Stakeholder Input**

#### **1. Actions taken to seek stakeholder input that encouraged their participation**

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals
- Survey of selected individuals from the general public

#### **Brief explanation.**

During the past year stakeholder input came to the College of Agriculture and Natural Resources, UW Extension, and Agricultural Experiment Station through a variety of methods. As part of the UW Extension academic plan, a working group has explored methodology to gather statewide stakeholder input. This group recommended moving from traditional area advisory committees to a focus group model which will be rotated between counties in each of the five areas over a five year period. This systematic collection of data will be shared with county, area, and state initiative teams for program planning. FY 2014 five area stakeholder meetings were held which included five concurrent focus groups representing the five initiatives that identified issues of importance. The data was compiled to identify themes common across the state in each extension discipline. In addition, UW Extension gathers on-going input through a variety of methods which is utilized in program planning. This input is summarized and shared statewide with both UW Extension and AES. All counties have had targeted advisory meetings to gather stakeholder input through 4-H Expansion and Review committees to specifically address outreach efforts toward underserved youth audiences. County personnel also utilize collaborative partners to learn the needs within communities of the state. Both Research and Extension went through an academic planning process which was integrated into the College of Agriculture and Natural Resources plan. Each of the four Research & Extension Centers held an advisory committee meeting to gather input on existing research and outreach programs and to identify new priorities in relation to research. UW Extension and AES gathered stakeholder input through targeted meetings and surveys to move forward with the 2014 UW Academic Plan. The College of Agriculture and Natural Resources maintains a separate statewide advisory committee which meets twice annually.

#### **2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

##### **1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups

- Open Listening Sessions
- Needs Assessments
- Use Surveys

**Brief explanation.**

There are five geographic Extension areas. Modified focus groups meet in each area annually to gather stakeholder input. Selection to participate in focus groups is based on gender, geographic representation, race, national origin, and underserved audiences. In 2014, a variety of both formal and informal methods were used to gather stakeholder input. These methods ranged from written and on-line surveys to discussion groups and targeted meetings to identify program needs. The Wyoming County Commissioners Association has formed an advisory committee of county commissioners who meet with the UW Extension Director during quarterly meetings of their association. Research and Extension Center Advisory Committees and Focus Groups are represented by UW Extension educators, industry leaders, and landowners (government and private) in all counties that they service. Focus Group members are nominated by UW Extension, AES personnel, and or current members of the Advisory committee or Focus Group. Meetings are held one or two times per year. In addition to these systematic methods of gathering stakeholder input, both AES and UW Extension utilize both individuals and groups throughout the state to identify relevant issues of critical importance. Just a few examples include: commodity groups - such as Wyoming Wool Growers, Stock Growers, Wyoming Wheat Growers, the Wyoming Crop Improvement Association, local and state nutrition councils, and youth organizations such as Big Brothers, Big Sisters, and school districts. These groups and individuals provide input through both formal and informal discussions with both research and extension personnel. Faculty, UW Extension specialists, and educators also gather relevant input from professional colleagues in Wyoming and across the nation.

**2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals

- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

**Brief explanation.**

Stakeholder input is collected through a variety of methods to reach the broadest scope of individuals and groups in Wyoming. UW Extension has utilized annual area advisory meetings which involve both traditional and non-traditional stakeholders. Pilot efforts using on-line surveys, focus groups, Extension cafe' have been explored by UW Extension. 2014 focus groups were conducted in each extension area to identify needs by initiative area. The AES also utilizes annual advisory meetings to gain input on research activities. Surveys both mail and on-line are used to assess needs. UW Extension educators and researchers target key stakeholders such as agriculture commodity groups, youth organizations, and schools through meetings where discussion is held on needs and issues. University of Wyoming educators and faculty assess needs throughout the year based on individual contact with citizens at meetings and in local communities. Faculty and Extension specialists and educators gather relevant input from professional colleagues through personal contact and interaction at professional meetings.

**3. A statement of how the input will be considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

**Brief explanation.**

• Stakeholder Input is used by both AES and Extension in developing research priority needs, program direction, program improvement, and identification of emerging issues. Stakeholder input gathered through modified focus groups is summarized and shared with county, area, and state initiative teams as they develop and evaluate programs. In addition UW Extension utilizes input from stakeholders in identifying staffing priorities.

A comprehensive list of applied research priorities identified by our stakeholders, identified through stakeholder surveys and meetings, is available at [http://www.uwyo.edu/uwexpstn/\\_files/docs/production-ag-research-priorities.pdf](http://www.uwyo.edu/uwexpstn/_files/docs/production-ag-research-priorities.pdf).

**Brief Explanation of what you learned from your Stakeholders**

**4-H and Youth Development**

- Increase parent or adult involvement to provide positive adult modeling of behavior and interaction with youth. Mentoring by both adults and peers can be beneficial.
- Youth and adults face competing priorities for their time. Lack of facilities and more coordination of community youth activities is needed among youth serving agencies. Many youths across the state are not aware of opportunities in 4-H. Increased communication and marketing of the program is needed.
- Leadership training is needed for volunteers; many lack the skills and confidence to become

fully engaged in the program.

**Community Development Education**

- Economic development including training for employees to enhance skills. Infrastructure needs such as affordable housing and transportation. Extension's role may be to facilitate networking and dialogue among government and local agencies to discuss needs and solutions. Personal finance as it relates to entrepreneurs.

- Facilitate opportunities for municipal and county agencies, organizations, and chamber of commerce to meet and form systematic relationships to allow for more collaborative planning in communities.

- Market the personal and community benefits of rural towns to attract growth.

- Communities need help with developing volunteerism, and service learning for youth and adults.

**Nutrition and Food Safety**

- Accessibility of food and where food comes from. Many rural communities have limited access to fresh foods. How to prepare and preserve local foods was an issue identified.

- Target youths in education on nutrition and basic food preparation skills.

- Education on improving healthy food choices; preparation, storage and food safety.

- Time management in relation to cooking at home versus convenience foods and restaurant meals, and food budgeting were identified as important issues facing families.

**Agriculture and Horticulture**

- Invasive species: new varieties of weeds and biological controls. Soils, how to mitigate damage from fires and other erosion. Endangered species is also a concern.

- Education on how to speak about the agriculture industry; including understanding of how food is grown or raised. More effort is needed to encourage young people to choose production agriculture as a career.

- Profitability; focus on income and expenses. Development of specialty crops and markets.

- Environmental information for agriculture and horticulture which is research based.

**Sustainable Management of Rangeland Resources**

- There is a need for facilitation and communication and information dissemination between agencies, (local, federal, and state) and landowners. Energy companies were also identified.

- Invasive species, noxious weeds, and endangered species, for agriculture lands are key issues.

- Small acreages need basic education on all natural resource management.

- Grazing management, including economics of grazing system implementation, water development and drought mitigation.

- Keeping the agriculture industry alive for future generations. Encouraging K-12 curriculum to cover agriculture career possibilities.

**IV. Expenditure Summary**

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1628174	0	2026807	0

<b>2. Totaled Actual dollars from Planned Programs Inputs</b>				
	<b>Extension</b>		<b>Research</b>	
	<b>Smith-Lever 3b &amp; 3c</b>	<b>1890 Extension</b>	<b>Hatch</b>	<b>Evans-Allen</b>
<b>Actual Formula</b>	1628174	0	2026807	0
<b>Actual Matching</b>	1628174	0	2026807	0
<b>Actual All Other</b>	0	0	0	0
<b>Total Actual Expended</b>	3256348	0	4053614	0

<b>3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous</b>				
<b>Carryover</b>	0	0	0	0

## V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	4-H and Youth Development
2	Community Development Education
3	Sustainable Management of Rangeland Resources (SMRR)
4	Global Food Security and Hunger, Crop, Livestock and Horticulture Systems
5	Climate Change
6	Sustainable Energy
7	Childhood Obesity, Nutrition, and Health
8	Food Safety



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

**Program # 1**

**1. Name of the Planned Program**

4-H and Youth Development

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
801	Individual and Family Resource Management	10%		0%	
802	Human Development and Family Well-Being	25%		0%	
806	Youth Development	65%		0%	
	<b>Total</b>	100%		0%	

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

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

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	34.0	0.0	0.0	0.0
<b>Actual Paid</b>	33.0	0.0	0.0	0.0
<b>Actual Volunteer</b>	17.0	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
526763	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
526763	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**

Activities include volunteer training on the following topics: Ages and stages of youth; Risk Management; Youth Development Concepts; Non-profit Management/Coordination; Financial Management/IRS Issues; Project Training; Learning Styles; Club Maintenance; Recruitment and Retention.

Traditional 4-H will focus on project or leadership activities; teach and/or facilitate educational programs; recruitment of new members, training, camps, clinics, contests, media, and assessment.

Non-traditional 4-H activities will include: Cloverbuds (pre 4-H); After school programs; School enrichment; Youth Leadership; Marketing; and Camps.

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

The University of Wyoming College of Agriculture and Natural Resources 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 Extension programs regardless of their race, national origin, gender, age, religion, or disability. 4-H Volunteers will be recruited from the following groups: Adults in the Community, Other Agencies, Civic Groups, Youth Groups, and the General Public.

Traditional 4-H youth audiences will target:

- Youth
- Volunteers
- Families
- Community.

The target audience for non-traditional 4-H will include: Underserved and high risk youth who do not participate in the traditional 4-H Youth program in Wyoming.

**3. How was eXtension used?**

eXtension is utilized as a resource for educators and clientele. The link to eXtension is prominently displayed on the UW Extension Web site home page. Additionally all Extension employees are made aware of professional development opportunities available through eXtension. UW Extension participates in "Ask an Expert" and when appropriate those in the 4-H Initiative respond to clientele request.

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	4100	500000	26664	100000

**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	0	0	0

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

**Output Target**

**Output #1**

**Output Measure**

- Number of youth enrolled in the traditional 4-H program. Target is number of youth enrolled in traditional 4-H club programs.

Year	Actual
2014	7184

**Output #2**

**Output Measure**

- Number of educational events, camps, training workshops, clinics implemented. Target is number of programs and events.

Year	Actual
2014	822

**Output #3**

**Output Measure**

- Number of volunteers enrolled as leaders in the 4-H program. Target is number of volunteers enrolled in the 4-H program.

Year	Actual
2014	2350

**Output #4**

**Output Measure**

- Number of volunteers participating in formal training programs. Target is number of volunteers participating in training programs.

Year	Actual
2014	2142

**Output #5**

**Output Measure**

- Number of non-traditional programs established. Target is number of non-traditional programs.

<b>Year</b>	<b>Actual</b>
2014	62

**Output #6**

**Output Measure**

- Number of youth enrolled in non-traditional youth development programs. Target is number of youth enrolled in non-traditional programs.

<b>Year</b>	<b>Actual</b>
2014	6148

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

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

O. No.	OUTCOME NAME
1	Wyoming youth will acquire knowledge which builds life skills including critical thinking, public speaking, teamwork, self-discipline, responsibility, decision making, self-esteem, communication, and leadership. Target is number of youth reporting outcome.
2	Wyoming youth build assets and essential life skills to lead productive, responsible, and healthy lifestyles. Target is number of participants reporting outcome.
3	Non-traditional youth participating in programs serve in leadership roles, serve on governing bodies, act as mentors, and teach other youth. Target is number of participants reporting outcome.
4	Volunteers demonstrate knowledge of youth development principles. Target is number of participants reporting outcome.
5	Trained adult volunteers will demonstrate skills and abilities in which they are able to foster youth to become responsible adults. Target is number of participants reporting outcome.

## **Outcome #1**

### **1. Outcome Measures**

Wyoming youth will acquire knowledge which builds life skills including critical thinking, public speaking, teamwork, self-discipline, responsibility, decision making, self-esteem, communication, and leadership. Target is number of youth reporting outcome.

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	0

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

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

In Wyoming there are an estimated 75,000 youth between the ages of 8 and 18 according to the U.S. Census Bureau. According to the Search Institute, 'youth who have ten or fewer of the 40 external and internal assets are at high risk of developing at-risk behaviors'. All of the 40 external and internal assets are likely to be developed by youth involved in the 4-H program. Youth in the traditional 4-H program have the opportunity to expand their knowledge base, increase their life skills and develop leadership abilities in order to become responsible, contributing citizens.

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

4-H youth educators conducted 822 educational activities including 4-H camps, Junior Leader programs, leadership retreats and special interest sessions, judging programs, training on public speaking and presentations and implemented Character Counts training statewide. Additionally UW Extension, with an over \$192,600 State Department grant participated in an cultural youth exchange with Samoa which involved 22 youth and five adults from 12 Western States under leadership of UW Extension 4-H.

#### **Results**

100 percent of youth participating in 4-H judging programs reported increased confidence and skills in decision making and communication. Junior leaders (youth age 13 - 18) reported through formal and informal evaluations increased awareness and skills in teamwork, decision making, self-discipline, leadership, communication, and responsibility. Youth participating in educational programs, camps, and other activities demonstrate increased knowledge and skills.

A leadership retreat for the state youth leadership team utilized a pre - post test which showed increased skills in working with people with different personality styles; communicating effectively, setting realistic and obtainable goals, and facilitating efficient meetings. Youth participating in the Samoa 4-H implementation gained leadership skills and understanding of diverse cultures.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

#### Outcome #2

##### 1. Outcome Measures

Wyoming youth build assets and essential life skills to lead productive, responsible, and healthy lifestyles. Target is number of participants reporting outcome.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	10189

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

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

In Wyoming there are an estimated 75,000 youth between the ages of 8 and 18 according to the U.S. Census Bureau. According to the Search Institute 'youth who have ten or fewer of the 40 external and internal assets are at high risk of developing at-risk behaviors'. All of the 40 external and internal assets are likely to be developed by youth involved in the 4-H program. Youth in the traditional 4-H program have the opportunity to expand their knowledge base, increase their life skills and develop leadership abilities in order to become responsible, contributing citizens.

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

4-H educators work with youth ages 13 - 18 in junior leader programs which target development of assets. Additionally, after school programs and other in school sessions reaches non-traditional youth with the same objectives of developing assets. A variety of methods are used including training, camps, workshops, leadership retreats, and on-going monthly junior leader meetings. WYLE(Wyoming Youth Leadership Education program)curriculum, funded through the Daniels Fund, was held in all areas in the state with 2 to 3 day retreats for junior leader age youth. Focusing on developing assets in youth is an objective of all educational activities. Bullying has been addressed through programs in schools including peer mentoring. Military partnership programs have also been implemented providing leadership opportunities for youth. Mentoring programs have been implemented.

**Results**

Junior leader age youth (13 - 18) report through formal and informal evaluation increased skills, knowledge, and assets such as self-esteem, communication, responsibility, and decision making. Wyoming Youth Leadership Education retreats had the following impact: daily evaluations as well as a final overall evaluation were used to evaluate the overall impact of the program. The evaluations showed that 84 percent of youth said that their knowledge was improved or greatly improved by the True Colors assessment, 73 percent for learning styles, 88 percent for body language, and 94 percent for extreme leadership, 45 percent for youth in governance, 58 percent for business etiquette, 90 percent for senior sensitivity, 65 percent for Character Counts, and 90 percent for communication. Mentor programs reported on average mentors and mentees spend between 4 - 12 hours per month together. 100 percent of parents express the positiveness of the mentor/mentee matches. All youth have shown an increase in self-confidence since enrolled in the program.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #3**

**1. Outcome Measures**

Non-traditional youth participating in programs serve in leadership roles, serve on governing bodies, act as mentors, and teach other youth. Target is number of participants reporting outcome.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	1600

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

**Issue (Who cares and Why)**

In Wyoming there are an estimated 75,000 youth between the ages of 8 and 18 according to the U.S. Census Bureau. According to the Search Institute 'youth who have ten or fewer of the 40 external and internal assets are at high risk of developing at-risk behaviors'. All of the 40 external and internal assets are likely to be developed by youth involved in the 4-H program. Youth in the traditional 4-H program have the opportunity to expand their knowledge base, increase their life skills and develop leadership abilities in order to become responsible,



contributing citizens.

**What has been done**

4-H educators work with youth ages 13 - 18 in traditional and non-traditional junior leader programs which target development of assets. A variety of methods are used including training, camps, workshops, leadership retreats, and on-going monthly junior leader meetings. Non-traditional efforts include: mentoring programs through a partnership between National 4-H Council and the Office of Juvenile Justice Delinquency Prevention were implemented in addition to mentoring programs as part of anti-bullying initiatives which are structured to develop trusting relationships which offer guidance, support, and encouragement aimed at developing the competence and character of youth. Programs focusing on developing assets in youth is an objective of all educational activities. American Youth Leadership Exchange programs develop cultural understanding in addition to other assets in youth.

**Results**

On Average mentors and mentees spend between 4 - 12 hours per month together.  
- 100 percent of parents express the positiveness and success of the mentor/mentee matches.  
- 100 percent of the parents report their children love doing activities with their mentor.  
Using a Likert scale both parent and mentor evaluations show:/  
- all youth have shown an increase in self-confidence since enrolled in the program.  
- all youth's outlook on life has improved since enrolled in the program.  
- all youth have shown more positive changes and or positive choices since enrolled in the program.

Sublette County After School programs conducted an assessment of increases in reading and science scores. From 2011 - 2014 program participants are scoring on average 56%, 64%, and 62% higher than their peers in reading. Science scores also increased each year. Participants behavior, engagement in learning, and problem solving skills also increased.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
802	Human Development and Family Well-Being
806	Youth Development

**Outcome #4**

**1. Outcome Measures**

Volunteers demonstrate knowledge of youth development principles. 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	Actual
2014	2350

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

**Issue (Who cares and Why)**

Adult volunteers are the mainstay of the 4-H program. The success of the program depends on the knowledge and skills volunteer leaders have and can then pass on to the youth and parents in their clubs. Leaders can directly accomplish goals of the program for positive youth development of all participants. In the 2013-2014 program years in Wyoming there were 2350 leaders at all stages of experience and expertise. Area advisory meetings, 4-H councils, program assessments compiled over three years revealed the need for leadership training beyond the basics of 4-H.

**What has been done**

4-H educators and the State 4-H volunteer development specialist teamed to design and implement the Master 4-H Volunteer Training in 2012, which is now offered every other year at the state 4-H Leaders Conference. Resources included curriculum and activities developed to provide hands-on, experiential learning opportunities for volunteers. The program consisted of 11 hours of intensive training. In addition, county youth educators conducted over 91 training sessions for volunteers, reaching over 4100 (includes duplicates) including parents of youth.

**Results**

100 percent of participants increased knowledge to increase capacity when working with youth as a result of training sessions.

Using a 5-point post retro pre-evaluation - volunteer leads showed increased knowledge in the following areas:

- 29 percent increase in understanding of the 8-essential elements.
- 20 percent increase in the understanding of how contributions impact 4-H
- 15 percent increase in understanding how to help others succeed.
- 20 percent of the 4-H mentoring program understand the impact on youth.
- 16 percent increase in understanding how Extension can support volunteers.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
806	Youth Development

**Outcome #5**

**1. Outcome Measures**

Trained adult volunteers will demonstrate skills and abilities in which they are able to foster youth to become responsible adults. Target is number of participants reporting outcome.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	2350

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

**Issue (Who cares and Why)**

Adult volunteers are the mainstay of the 4-H program. The success of the program depends on the knowledge and skills volunteer leaders have and can then pass on to the youth and parents in their clubs. Leaders can directly accomplish goals of the program for positive youth development of all participants. In the 2013-2014 program year in Wyoming there were 2350 leaders at all stages of experience and expertise. Area advisory meetings, 4-H councils, program assessments compiled over three years revealed the need for leadership training beyond the basics of 4-H.

**What has been done**

4-H youth educators conducted 91 training activities including State 4-H Leaders Conference, project and general leader training. Objectives and goals of 4-H youth development principles are incorporated into all training sessions.

**Results**

Volunteers stated increased understanding of youth development principles which foster youth to become productive adults. Testimonials from 4-H leaders and youth indicate the positive influence adult volunteers have on the life of 4-H members.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
806	Youth Development

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

### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (background of participants)

### **Brief Explanation**

High staff turnover in the 4-H program also impacts continuity of youth development programs. Additionally funding support from county partners impacts the 4-H program.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

A sample of impacts reported: A leadership retreat was held for high school age youth serving on the State 4-H Leadership team to enhance skills. Evaluations were completed to determine perceived short-term and medium-term benefits to participants. A Likert scale (1 = no knowledge; 5 = full knowledge) was used.

- Working with people with different personality styles - 3.3 before; 4.5 after
- Communicating effectively - 3.5 before; 4.2 after
- Setting realistic and obtainable goals - 3.12 before; 3.97 after
- Facilitating efficient meetings - 3.3 before; 4.7 after
- Working with Youth/Adult partnership - 3.8 before; 4.4 after.

After a full year serving on the State 4-H Leadership Team, members were surveyed to determine what they had learned, what behavior changes (if any) had occurred, and their perception of how this experience may affect their future. One respondent said, "This experience helped me improve my public speaking skills and taught me to not be afraid to speak up when I have an idea. Overall, this experience has given me the confidence to try new things and be bolder in my leadership roles." Another wrote, "I have learned how important goal setting really is before you start, not after. I am working harder to set my own personal goals, especially as I get ready to leave for college."

A second program on service learning reported the following impact:

Campbell County 4-H partnered with Boys and Girls Clubs to offer weekly service learning activities in an attempt to develop additional activities with lifelong skills. Boys and Girls Club members collected trash around club grounds then returned to discuss how they had made a difference. Members evaluated the year-long afterschool program using a Likert scale to measure their increased knowledge, understanding, and appreciation for all groups affected. Members rated greatly, minimal, no, and not applicable. Of the 98 youths, 74.4 percent had a greater knowledge, understanding, and appreciation for their local community and 82.2 percent of their non-local community with activities relating to the soup kitchen, Ronald McDonald House, and the Christmas ABATE Toy Store. After writing

thank you cards, 84.2 percent of youths rated a greater knowledge, understanding, and appreciation of their own families. Many youths at the Boys and Girls Club have had negative relationships with local law enforcement, stemming from family disturbances or even substance abuse. About 80 percent of youth developed a greater knowledge, understanding, and appreciation for law enforcement after the Helping Hands Healing Hearts afterschool program. A consensus was formed that, when youth were involved with service learning activities, not only were they making a positive impact in their communities, they were also making a difference in their own lives.

### **Key Items of Evaluation**

Volunteers contribute significant volunteer time adding nearly \$1 million dollars to youth outreach efforts.

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

**Program # 2**

**1. Name of the Planned Program**

Community Development Education

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
601	Economics of Agricultural Production and Farm Management	5%		20%	
602	Business Management, Finance, and Taxation	5%		5%	
604	Marketing and Distribution Practices	5%		20%	
608	Community Resource Planning and Development	50%		25%	
801	Individual and Family Resource Management	25%		10%	
802	Human Development and Family Well-Being	5%		10%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		10%	
	<b>Total</b>	100%		100%	

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

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

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	11.0	0.0	2.5	0.0
<b>Actual Paid</b>	11.0	0.0	4.4	0.0
<b>Actual Volunteer</b>	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
175587	0	208761	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
175587	0	208761	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**

Educational and research activities and efforts of the CDE program include:

Development of models to explain the potential impact policy changes have on the ability of communities to capture and retain dollars.

Family resource management programs will reach out to a broad spectrum of constituents throughout Wyoming using a variety of anticipated programs. Outputs include methods such as train-the-trainer workshops, home-study courses, and such approaches as the Internet ([www.uwyo.edu/CES/FRM/](http://www.uwyo.edu/CES/FRM/)), and satellite. Also included are publications, meetings, news releases, and feature articles.

Community-based leadership training institutes; (EVOLVE) Extension Volunteer Organization for Leadership Vitality and Education. Skill training workshops; i.e., board training. General public information and educational efforts; i.e., public media materials; information/educational meetings and workshops; books, booklets, bulletins, training materials; providing data. Facilitation of community processes.

Analyses of community data and economic impact. Assessments to identify individual strengths and areas to be strengthened to guide personal development and grow talent. Media resources to promote community capital development Extension education and increase awareness of Extension resources.

Outputs for entrepreneurship programs include publications and one-on-one consultations, and web sites.

Training institute for municipal clerks and treasurers to develop workforce and soft skills in developing capacity in their city/county roles.

Research efforts will include economic analysis of potential public land management decisions and rural community planning.

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

The University of Wyoming College of Agriculture and Natural Resources 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 ultimate consumer of the educational

products for financial management programs will be all individuals (including youth and senior citizens), families (including low-income families), and in general people at risk of experiencing financial stress. The group of educators, specialists, and faculty responsible for leading and delivering the outputs in the program is the smallest of the University of Wyoming's Extension initiative teams. A priority for program development is to use methods of information and instruction that make it possible for the most constituents to be assisted while minimizing face-to-face work. Thus the team will emphasize train-the-trainer courses, newsletters, and electronic delivery of information and programming.

Targeted audiences for leadership development include: Elected officials. Members and leaders of formal and informal community organizations. Faith-based leaders and members. Business owners/managers/employees. Trade/produce groups. Educational entities. Federal/state/local agency leaders/members.

Entrepreneurship programs target audiences who will manage or may develop ventures relating to food and agricultural systems, a non-farm extension of a farm business, forestry, home trades, crafts, services, etc. Other audiences through which UW Extension programs may be delivered include: teachers, public and private agencies, business owners/managers/employers, trade/produce groups, educational entities, identified publics, youth groups/students, and small acreage owners.

**3. How was eXtension used?**

eXtension is utilized as a resource for educators and clientele. The link to eXtension is prominently displayed on the UW Extension Web site home page. Additionally all Extension employees are made aware of professional development opportunities available through eXtension. UW Extension participates in "Ask an Expert" questions; CDE educators and specialists respond to clientele request when appropriate.

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	25290	100000	485	5000

**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
<b>Actual</b>	3	6	9



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

**Output Target**

**Output #1**

**Output Measure**

- Family Resource Management programs will ultimately benefit all families in Wyoming. Short term effects may be increased grant funding and increased involvement in regional and multi-state projects. Target is number of programs.

<b>Year</b>	<b>Actual</b>
2014	21

**Output #2**

**Output Measure**

- Number of individuals participating in programs. Target is number of individuals.

<b>Year</b>	<b>Actual</b>
2014	3014

**Output #3**

**Output Measure**

- Number of programs in group process, leadership, facilitation, and other CD topics delivered. Target is number of programs.

<b>Year</b>	<b>Actual</b>
2014	132

**Output #4**

**Output Measure**

- Entrepreneurship output targets include: number of individuals assisted.

<b>Year</b>	<b>Actual</b>
2014	90

**Output #5**

**Output Measure**

- Research efforts will include community economic analysis on efficiency of existing firms, ability to capture and retain dollars, potential to attract new businesses, ability to make informed decisions on resource management and community development, and socio-technological change and resource management affecting individuals, families, and communities. Target is the number research publications, bulletins, reports, and presentations.

<b>Year</b>	<b>Actual</b>
-------------	---------------

2014

5

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

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

O. No.	OUTCOME NAME
1	Permanent changes in practices as determined by follow-up surveys with those attending meetings, events, and workshops. Target is number of participants reporting positive practice changes.
2	One or more management principles from educational programs on personal finance management are adopted by workshop participants. Target is number of participants reporting outcome.
3	Participants of leadership classes will develop skills and confidence necessary for community participation, find resources to enhance community capital, recognize the needs for community vision, capacity building, and direction, and strengthen inner-community relationships. Target is number of participants reporting positive outcomes through program evaluations.
4	Research leading to the development of decision support tools on resource management and individual, family, and-or community development. Target is the number of projects reporting this outcome.

**Outcome #1**

**1. Outcome Measures**

Permanent changes in practices as determined by follow-up surveys with those attending meetings, events, and workshops. Target is number of participants reporting positive practice changes.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	2268

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

**Issue (Who cares and Why)**

Many county-appointed and non-profit board members and elected officials want to complete their assigned duties yet lack the skills and training needed to perform to the best of their ability. County Commissioners and the Wyoming Association of Municipalities have identified the need to provide training to current and new board members so they might properly fulfill their duties and responsibilities. The UW Extension Community Development Education (CDE) initiative team developed materials to support training programs for county boards and Municipal treasurers.

**What has been done**

The CDE team developed curriculum and educational materials to support the program. Area educators used the materials to develop a four-hour educational program for county-appointed and non-profit boards in the state. The team has partnered the Wyoming Association of Municipal Clerks and Treasurers (WAMCAT). The team received approval from the International Institute of Municipal Clerks and the Association of Public Treasurers for meeting certification and continuing education requirements. In 2014 2268 individuals participated in training including 101 in two comprehensive Wyoming Municipal Institutes.

**Results**

Over the past seven years board training has taken place. A 5-item Likert scale (1=Very Poor 5=Excellent) querying whether workshop series helped improve in the areas of communication, leadership, conflict-management, decision-making, and problem solving. 87 percent believe they are more effective board members, and 55 percent believe their confidence increased. Sixty three percent increased meeting facilitation skills, and 53 percent increased skills in parliamentary law. Fifty eight percent believe they are better at fulfilling their board responsibilities while 50 percent improved in planning and organizing. Thirty-nine percent improved in handling conflict and 77 percent improved in their leadership skills.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

#### Outcome #2

##### 1. Outcome Measures

One or more management principles from educational programs on personal finance management are adopted by workshop participants. 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	Actual
2014	261

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

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

In the last decade Wyoming has experienced significant economic growth stemming from its natural resources of gas, oil, and coal. Jobs in the energy sector pay well, most residents hold service sector positions that are typically low paying and are often seasonal. The first critical need is the management of credit and debt. Seven out of ten low and middle income households report using their credit cards as a safety net. In Wyoming about 2,500 people file for bankruptcy protection each year. The second critical issue is the spending habits of adolescents. Many adolescents earn income, of which they spend 98 percent, and do not have to pay for many living expenses such as housing. Information collected from UW Extension Area Advisory committees identified retirement planning, consumer decision making skills, estate planning and family resource management as the top issues in the state. Financial blogs have been on-going since 2011.

###### What has been done

Family resource management courses were taught using a variety of methods from multi-session classes meeting to blogs and webinars. One time workshops on basic finance, planning for succession with agriculture families, and starting over making the most of your money targeted to those filing for bankruptcy were held. Youth were reached through camps and specific courses on money management. A stronger on-line approach is being developed to reach this audience. Youth were reached through a community camp focusing on financial literacy. In 2014 Web trainings were utilized as the method to reach the targeted audience.

**Results**

End of session evaluations indicated over 80 percent of participants increased knowledge and skills in implementing financial principles. Over 50 percent reported adopting at least one financial principal as a result of the classes. These included improved credit management; financial recovery after bankruptcy; and initiating a savings plan. In addition, participants reported developing a plan for transfer of property and discussions with family on estate planning.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
801	Individual and Family Resource Management

**Outcome #3**

**1. Outcome Measures**

Participants of leadership classes will develop skills and confidence necessary for community participation, find resources to enhance community capital, recognize the needs for community vision, capacity building, and direction, and strengthen inner-community relationships. Target is number of participants reporting positive outcomes through program evaluations.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	134

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

**Issue (Who cares and Why)**

Leadership development was identified as a need by the Wyoming Rural Development Council's Community Assessments. The Wyoming Business Council has shared their vision of community economic development using a building block model. At the base are three blocks; leadership development, workforce development, and community capacity building. The second level has two blocks, existing business development and entrepreneur development, and one

block on the top for recruiting.

**What has been done**

In FY 2014, six EVOLVE leadership institutes were held, including implementation of a new class on the Wind River Indian Reservation. Each institute meets monthly for 8 sessions ranging from 6 - 8 hours in length. Topics covered include team-building, communication, and conflict management, a fishbowl simulation of leadership assessment, community involvement, and overall leadership. Educators also conducted assessments for Wyoming LEAD, and marketing sessions for the institutes. Additionally educators have worked with three existing community leadership programs sharing the EVOLVE model.

**Results**

In 2014, 134 individuals graduated from EVOLVE community leadership institutes in Wyoming. Past graduates served on steering committees to plan the institutes. Weekly session evaluations and an end of course written evaluation indicated 100 percent of participants reported their leadership behavior (communication, conflict management, problem solving, and meeting organization) improved. Over 89 percent reported their ability to lead groups, committees or teams increased as a result of participation in the program. This program which began in 1995 has become a model for the country. A sample of participant comments: "The classes have given me tools to organize a team and share responsibilities in reaching a common goal." "The most significant thing I learned is that anyone can develop the skill set, talent and abilities to become a great leader."

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

**Outcome #4**

**1. Outcome Measures**

Research leading to the development of decision support tools on resource management and individual, family, and-or community development. Target is the number of projects reporting this outcome.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
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**3c. Qualitative Outcome or Impact Statement**

**Issue (Who cares and Why)**

Management of Federal lands has become more contentious as interest groups with divergent concerns are increasingly involved in the planning process. One important area of debate for Wyoming communities is the economic implications of alternative Federal land management decisions.

**What has been done**

The working team for community economic development assesses economic impacts of Federal land planning in Wyoming.

**Results**

By providing solid economic information regarding management of Federal lands, emotionalism is reduced during discussions and decision making processes are improved.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
608	Community Resource Planning and Development
801	Individual and Family Resource Management
802	Human Development and Family Well-Being
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

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

**External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (changes in technology)

**Brief Explanation**

Factors external to the College of Agriculture and Natural Resources that will influence programs and results include: formation of collaborations; a shift in demographics; a shift in state and regional economic situations; shifts in local, state, university, and national policy, and changes in technology. External factors which can affect leadership activities



include competing public priorities which affect participation; competing programmatic challenges and limited resources. Many communities are under pressure to deal with multiple changes/issues. A significant portion of community members often resist such change or choose to ignore it. Resources will continue to be scarce and may diminish. The CDE team is only one of five UW Extension SIT teams. Consequently, UW Extension resources brought to bear on this objective will be limited. Leadership training has become a popular subject of concern across the nation, which increases the opportunity and need for UW Extension programming, but also increases the competition from other sources offering leadership training and community facilitation.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

The CDE team utilizes a variety of evaluation methods to collect outcome data from programs. The Wyoming Association of Municipal Clerks and Treasurers (WAMCAT) seeks to promote professional improvement and efficiency of clerks, treasurers, or finance officers in cities and towns of Wyoming. Certification for clerks is offered through the International Institute of Municipal Clerks (IIMC). IIMC requires clerks to participate in 120 hours of education, which is primarily achieved by attending an approved institute hosted by a university. UW Extension CDE team members developed and implemented institutes to meet the needs of WAMCAT. Evaluation results show the majority of participants believe the three institutes were valuable learning opportunities.

- 94 percent agreed institute curriculum was very good or excellent.
- 92 percent agreed session variety was very good or excellent.
- 91 percent believe opportunities to network with colleagues and experts were very good or excellent.
- 96 percent believed that, overall, the WMI was very good or excellent.

Non-profit board training is another major thrust for the CDE Team. A follow up survey was conducted, using a Website developed by the University of Wyoming Survey Tool. Participants of board training were invited to participate in the survey at least 6 months after attendance.

Participants indicated that they have used the training on effective meeting facilitation, parliamentary procedure, roles and responsibilities, open meetings law, and legal responsibilities the most.

In the area of skill enhancement, 87% of respondents felt they were more effective as board members while 77% felt their confidence had increased. In addition, 68% increased their skills in meeting facilitation, and 53% in parliamentary law. Fifty eight percent feel they are better at fulfilling their board responsibilities, while 45% improved in planning and organizing, 39% in handling conflict, and 77% increased their leadership roles. In summary, the involvement of 70% of respondents was strengthened.

### **Key Items of Evaluation**

Capacity for serving on governmental or non-profit boards increased as a result of educational programming by UW Extension. Over 87 percent report more confidence and skills working on boards.

Extension Volunteer Organization for Leadership, Vitality, & Enterprise (EVOLVE) the curriculum utilized for community leadership programs has become a model for the Western States. In place for over 15 years, the program has success in developing capacity of community members to serve in leadership roles.

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

**Program # 3**

**1. Name of the Planned Program**

Sustainable Management of Rangeland Resources (SMRR)

Reporting on this Program

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

**1. Program Knowledge Areas and Percentage**

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
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 FTE/SYs expended this Program**

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	13.0	0.0	6.0	0.0
<b>Actual Paid</b>	15.0	0.0	5.3	0.0
<b>Actual Volunteer</b>	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
239437	0	252134	0
<b>1862 Matching</b>	<b>1890 Matching</b>	<b>1862 Matching</b>	<b>1890 Matching</b>
239437	0	252134	0
<b>1862 All Other</b>	<b>1890 All Other</b>	<b>1862 All Other</b>	<b>1890 All Other</b>
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 will be offered within each extension area within the state. Provide professional development opportunities for rangeland professionals. Develop 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. Develop 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 and Natural Resources 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, publications, newsletters, Web sites and other methods. The general public and exurban landowners, agricultural producers and federal and state land management agency personnel are the target audience.

General youth and traditional 4-H are among the target audiences for natural resource youth programs.

**3. How was eXtension used?**

eXtension is used as a resource in Wyoming. The link to eXtension is prominently displayed on the UW Extension Web site home page. In addition, professional development opportunities through eXtension are publicized to Extension employees. UW Extension participates in "Ask an Expert" and responds to clientele questions posed through eXtension.

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	24000	200000	6073	10000

**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
<b>Actual</b>	7	24	31

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

**Output Target**

**Output #1**

**Output Measure**

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

Year	Actual
2014	187

**Output #2**

**Output Measure**

- Documented media efforts implemented. Target is number of media efforts such as magazines, TV, radio, newspaper inserts.

<b>Year</b>	<b>Actual</b>
2014	84

**Output #3**

**Output Measure**

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

<b>Year</b>	<b>Actual</b>
2014	4996

**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>Actual</b>
2014	2112

**Output #5**

**Output Measure**

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

<b>Year</b>	<b>Actual</b>
2014	36

**Output #6**

**Output Measure**

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

<b>Year</b>	<b>Actual</b>
2014	2884

**Output #7**

**Output Measure**

- Conduct research on sustainable rangeland production and watershed management. Target is number of research publications, bulletins, reports, and presentations.

<b>Year</b>	<b>Actual</b>
2014	106

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

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

O. No.	OUTCOME NAME
1	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	Increased enrollment in 4-H natural resource programs (projects, camps, activities). Target is number of increased youth participation in natural resource programs.
3	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 necessary to meet objectives. Target is number of participants reporting outcome.
4	Conduct research to increase sustainability of rangelands. Target is the number of projects reporting this outcome.
5	Conduct research that will increase appreciation of watershed management. Target is number of projects reporting this outcome.

**Outcome #1**

**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**

<b>Year</b>	<b>Actual</b>
2014	200000

**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 364 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 and posted videos have received 702,824 views. Articles on natural resource issues appear in Barnyards & Backyards, rural living in Wyoming Magazine quarterly and statewide newspaper inserts.

**Results**

In the ninth year of airing these ENOW spots, the team receives regular feedback from Wyoming citizens and now national viewers on the positive aspects of the spots. The TV station reports over 9000 homes are reached each week. The videos have been transferred to DVD's for public distribution and also distributed to schools though the state. The spots posted on You-Tube with viewership growth from 2,400 in 2007 to over 67,000 views in 2014. Total views exceed 702,824 since inception. It is difficult to measure impact, though the audience response has generated enough impact that the energy industry now provides partial funding for the segments aired twice



weekly. Barnyards and Backyards magazine has over 3000 paid subscribers. Raising awareness of natural resource issues expands UW Extension's audience base and enhances knowledge for citizens.

#### 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 #2

##### 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

Year	Actual
2014	2884

##### 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 36 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. Over half the counties in Wyoming conduct summer camping programs which include natural resource education. Extension educators and specialists actively participate in implementing Wyoming Resource Education Days (WyRED) a joint effort with the Society of Range Management and local conservation districts. In 2014 4-H Adventure camp was developed as a statewide effort and will be an on-going educational effort targeting youth in natural resources.

### 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. The increased awareness and knowledge will enhance natural resource and range career choices for youth.

## 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 #3

### 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 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	Actual
2014	2112

### 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 140 educational programs, tours, or workshops on range monitoring, ecological site descriptions, and High Plains Ranch Practicum. Most classes were targeted toward permittees reaching over 2000 individuals. Annie's project and Women in Range which were new program in 2013 continue targeting female producers.

### **Results**

100 percent of participants in educational programs reported increased awareness, knowledge, and skills of range monitoring. Over one third of individuals reported implementing or adjusting management plans as a result of the workshops. Participants reported a 20% increase in knowledge and 90% reported their expectations in the course were met. In Rangeland Management Schools over 80% of participants reported gaining some new knowledge, with 10% reporting significant knowledge gained.

## **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 #4**

### **1. Outcome Measures**

Conduct research to increase sustainability of rangelands. Target is the number of projects reporting this outcome.

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

- 1862 Research

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

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	8

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

**Issue (Who cares and Why)**

The current bark beetle epidemic in Wyoming is part of a large-scale historical event that may affect biodiversity well into the foreseeable future. Parasitoid wasps and other beneficial natural enemies associated with the mountain pine beetle are economically and ecologically important insects, but comparatively little is known about bark beetle/natural enemy associations in Wyoming forests.

**What has been done**

Understanding the role of natural enemies in bark beetle population dynamics begins with knowing which natural enemies are present. Insects were collected in lodgepole forests with two Townes-style Malaise flight-intercept traps at ground level in the same locations. In addition, we placed canopy Malaise traps in four lodgepole pine locations.

**Results**

We identified at least 49 braconid wasp species in 18 subfamilies with eleven of those species being new distribution records for the Greater Yellowstone Ecosystem, and including the discovery of at least two new species. Better information about beneficial parasitoid insect species will help to predict the future risk and to make appropriate management decisions.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
131	Alternative Uses of Land
132	Weather and Climate
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
605	Natural Resource and Environmental Economics

**Outcome #5**

**1. Outcome Measures**

Conduct research that will increase appreciation of watershed management. Target is number of projects reporting this outcome.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	3

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

**Issue (Who cares and Why)**

The length of time water is available in wetlands is sensitive to changes in precipitation, temperature and timing.

**What has been done**

Our project classified wetland location and length of time water is available in the Plains and Prairie Pothole Region using a combination of field-based and remotely sensed data.

**Results**

With the ability to monitor wetland habitat change and climate variability over time, this research will better inform conservation management decisions and improve the accuracy of climate change predictions in the Plains and Prairie Pothole Region.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
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
132	Weather and Climate
135	Aquatic and Terrestrial Wildlife

136	Conservation of Biological Diversity
205	Plant Management Systems
605	Natural Resource and Environmental Economics

#### **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
- Other (Technology changes)

##### **Brief Explanation**

Many conditions and situations that exist in Wyoming are similar to those in other parts of the country, for example, the following:

- Food choices made available and advertised to consumers by producers
- Access to timely and accurate information
- Coordination and cooperation of federal agencies and state partners
- Existence of local collaboration
- Level of funding at federal, state and local level
- Willingness of private sector-funders, such as corporations, foundations, and community organizations, to collaborate with the University of Wyoming Extension.

Weather extremes and drought may affect producers in agriculture and natural resources issues. Funding is vital to this program; changes in appropriations could impact funding.

Additionally, global market changes impact both research and extension programs in sustainable management of rangeland resources.

#### **V(I). Planned Program (Evaluation Studies)**

##### **Evaluation Results**

Educational classes, workshops, schools utilized end of session evaluations with informal follow-up to document actual practices implemented. 100 percent of participants indicated increasing knowledge and skills as a result of educational efforts. Over one-third indicated they had used the information to make a positive change on their land.

Just a sample of program evaluation data collected include:

A survey was developed and administered to assess pre - and post--workshop knowledge about ESDs and STMS, and participants' ability to access and use the management tools.

The participants' knowledge increased for all of the key points in the pre - and post-- self-assessment, of those who completed and submitted the workshop evaluation.

The four key points that participants reported their knowledge increased the most on a scale of 1 to 5 (1 is low and 5 is high) were:

**Ability to define an ecological site:** Pre--workshop average knowledge 2.82; Post--

workshop average knowledge 4.14

**Know how to access ESDs and soil survey information:** Pre--workshop average knowledge 3.00; Post--workshop average knowledge 4.27

**Understand the relationship between soil survey and ecological sites:** Pre--workshop average knowledge 3.05; Post--workshop average knowledge 4.18

**Know what STMs are, and how to use them to make informed land management decisions:** Pre--workshop average knowledge 2.86; Post-Respondents reported the field portion of the workshop helped them to better understand ESDs (average 3.25 on a scale of 1 to 5, with 1 being strongly disagree to 5 being strongly agree). Additionally, they reported being satisfied to very satisfied with the workshop structure (average 3.55) and materials (3.55) (scale of 1 to 4, with 1 being very dissatisfied and 4 being very satisfied).st-- workshop average knowledge 4.0.

An eight session series High Plains Ranch Practicum school reported in end evaluations:

- Producers who attended the class resulted in \$109,000 in improvement in net income to their operations in total.
- Participants were asked to quantify their knowledge before and after over six areas of ranch management. Average was 59% increase of knowledge gained.
- 90 % would use decision making skills gained to help them make management decisions.
- 96% reported they would improve range management or natural resource management.

## Key Items of Evaluation

Permittees have implemented range monitoring plans which improve sustainability of their land. Natural resource media efforts have enhanced knowledge of Wyoming citizens on rangeland, natural resources, water conservation and preservation of the land.

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

**Program # 4**

**1. Name of the Planned Program**

Global Food Security and Hunger, Crop, Livestock and Horticulture Systems

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%	
202	Plant Genetic Resources	5%		5%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
205	Plant Management Systems	10%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		5%	
212	Diseases and Nematodes Affecting Plants	5%		5%	
213	Weeds Affecting Plants	5%		5%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	5%		5%	
216	Integrated Pest Management Systems	5%		5%	
301	Reproductive Performance of Animals	5%		5%	
302	Nutrient Utilization in Animals	5%		5%	
305	Animal Physiological Processes	5%		5%	
307	Animal Management Systems	10%		10%	
311	Animal Diseases	5%		5%	
502	New and Improved Food Products	5%		5%	
601	Economics of Agricultural Production and Farm Management	5%		5%	
704	Nutrition and Hunger in the Population	5%		5%	
	<b>Total</b>	100%		100%	

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

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	24.0	0.0	21.2	0.0



<b>Actual Paid</b>	24.0	0.0	18.9	0.0
<b>Actual Volunteer</b>	5.0	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
383100	0	899294	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
383100	0	899294	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**

Any or all channels of the media will be used to familiarize the public with UW College of Agriculture and Natural Resources areas of research and extension programming and personnel. Newsletter articles distributed both electronically and through the mail by county offices, area teams, and the University of Wyoming will reach producers locally, regionally, and statewide. Public educational programs by extension specialists and educators presenting research-based information will be held in response to local, state, and national crop and livestock production, horticultural and nutrition issues. Demonstrations of technology and skills training will be included in education curriculum to enhance educational effectiveness. Field tours will be organized to provide producers with the opportunity to observe improved sustainable agricultural practices.

Areas of focus in livestock systems emphasis will be placed on the four main areas: herd management, herd development, cropping systems and livestock development, risk and operation management techniques and alternatives to enhance the stability of Wyoming livestock and crop producers. Fostering development of local food systems, which includes promoting use of local foods, can improve energy efficiency of the food system while yielding many other benefits. UW Extension plans to enhance efficiency within local food systems by improving relationships among local food producers and consumers in Wyoming.

- development and implementation of Wyoming Local Food Expos in at least two communities; development and distribution of the Wyoming Local Foods Guide (print and electronic versions) which will include a directory of specialty crops and other local food products, nutrition and food safety resources, recipes for using local foods, factsheets related to local foods in Wyoming, and tips on sustainable living. The Foods Guide will be uniquely Wyoming but will draw from several existing examples.

- development and implementation of a training module to provide UW Extension educators statewide with the knowledge and skills to successfully promote local foods.

**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. 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 specific target audience groups.

**3. How was eXtension used?**

eXtension is utilized as a resource for educators and clientele. The University of Wyoming Extension Web site prominently displays the eXtension link on the home page. Additionally, professional development opportunities through eXtension are publicized for Extension employees. UW Extension participates in "Ask an Expert". Educators and specialists respond to clientele questions submitted through eXtension.

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	40145	300000	864	100000

**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
<b>Actual</b>	15	32	47

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

**Output Target**

**Output #1**

**Output Measure**

- Number of educational programs focusing on global food security and hunger, crop, livestock, or horticulture systems. Target is the number of programs.

**Year                      Actual**

2014 245

**Output #2**

**Output Measure**

- Number of participants attending programs focusing on global food security and hunger, livestock, crop, and horticulture systems. Target is the number of individual participants

<b>Year</b>	<b>Actual</b>
2014	40145

**Output #3**

**Output Measure**

- Number of partnerships formed with other agencies, or organizations and volunteers integrated into programs. Target is the number of partnerships and/or volunteers.

<b>Year</b>	<b>Actual</b>
2014	50

**Output #4**

**Output Measure**

- Increased adoption of sustainable agriculture methods and practices which result in increased production of the food supply. Target is 10 to 20% of total Wyoming Ag Operations participants reporting outcome.

<b>Year</b>	<b>Actual</b>
2014	2500

**Output #5**

**Output Measure**

- Research publications, bulletins, reports, and presentations on crop, livestock, and horticulture systems.

<b>Year</b>	<b>Actual</b>
2014	87

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

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

O. No.	OUTCOME NAME
1	Increased knowledge of agriculture producers on sustainable cropping and livestock systems. Target is number of producers reporting outcome.
2	Improved sustainable agriculture production practices resulting in an increased food supply. Outcome is number of producers reporting outcome.
3	Awareness created through extension and research efforts. Target is number of participants in extension and research programs reporting that they have gained awareness on topic.
4	Wyoming producers will benefit through an increased value of livestock and crops related to improved cropping practices, herd selection, and management. Target is number of producers reporting positive outcome as a result of educational efforts.
5	Increase appreciation of research on plant production systems. Target is the number of projects reporting on this outcome.
6	Increase appreciation of research on animal production systems. Target is the number of projects reporting on this outcome.

## **Outcome #1**

### **1. Outcome Measures**

Increased knowledge of agriculture producers on sustainable cropping and livestock systems.  
Target is number of producers reporting outcome.

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	40145

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

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

The value of agriculture to Wyoming's economy approaches \$1 billion each year, and agriculture's contribution to open spaces, wildlife, and recreation is even greater. Livestock and crop producers throughout the state of Wyoming face an ever changing industry with issues such as; increasing cost of production, increasing pressure focused on land conversion, changing requirements for marketing knowledge. All of the issues are coupled with the need for producers to be able to raise agricultural products in a sustainable operation with limited resources.

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

Extension Educators in Profitable and Sustainable Agriculture Systems conducted 245 educational programs including field days, workshops, classes, multi-session courses, and volunteer training. In addition media is utilized to reach citizens through television, newspaper inserts, magazines, news columns and special articles, and radio. Educators also write educational newsletters distributed by mail and on line. Three local food expos were implemented in 2014.

#### **Results**

Formal and informal evaluations were used to determine outcome. 100 percent of agriculture producers participating in educational activities reported increased awareness on Global Food Security, Hunger, Crop, Livestock, and Horticulture Systems.

Written evaluations of the Ranch Practicum School Profitability and Sustainability following the comprehensive eight day course reported:

Forty-nine participants indicated knowledge gained would influence, management for 17,000 beef cattle and 636,000 acres of land. Producers who attended the class reported the class resulted in \$440,000 improvement in net income to their operations in total.

40% showed greater increase in time using cow body condition as a management tool.

25% increased their use decision making skills gained to help them make management decisions.  
80% indicated they gained moderate to significant knowledge in 25 specific area related to ranch production and management.

70% increased long term profitability and productivity of their cattle enterprises.

Master Gardeners assisted in extending skills and disseminating information to 34,050 contacts and recorded over 10,562.5 volunteer hours contributing \$213,073.93 to Wyoming Horticulture outreach efforts.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
307	Animal Management Systems
502	New and Improved Food Products

#### Outcome #2

##### 1. Outcome Measures

Improved sustainable agriculture production practices resulting in an increased food supply.  
Outcome is number of producers reporting outcome.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	4000

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

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

The value of agriculture to Wyoming's economy approaches \$1 billion each year, and agriculture's contribution to open spaces, wildlife, and recreation is even greater. The largest component of Wyoming agriculture is the beef cattle industry, accounting for approximately 70 percent of all cash receipts and 86.5 percent of all livestock production. Sheep, lamb, and wool receipts in 1998 were \$29 million. Forage sustains the Wyoming livestock industry. Hay is the leading crop in Wyoming with 1998 production valued at \$185 million, mostly marketed through livestock. Crop producers across Wyoming are challenged with increasing production costs, global market competition, environmental pressure, and decreased labor availability. Alternative markets,

improved management practices, and cost efficiency is critical to ensure profitability and sustainability for Wyoming producers. Irrigation is a key factor identified by UW Extension area advisory committees and AES advisory groups.

**What has been done**

UW Extension educators conducted 245 classes, workshops, tours on crop, livestock, and horticulture systems targeting Wyoming producers and landowners. In addition, educators published articles in local newspapers, newsletters, special newspaper inserts and discussed the topic on radio programs. Topics included pasture management, and introduction to irrigation, Wyoming Master Stockman ? Ranch Management Institute, which met for 3 days in 4 locations, provided 24 hours of classroom instruction. Master Sheep Producer course was implemented in 2014 in three locations. Horticulture programs are conducted throughout the state with Master Gardener programs implemented in 17 of the 23 counties.

**Results**

Participants indicated through formal and informal evaluations that they increased confidence in decision making skills necessary to make needed management decisions. Producers reported increased knowledge and awareness of pasture conditions. 4000 participants in educational activities reported gaining knowledge and awareness of resources and methods of production and sustainability. End of 2014 program evaluations reported:

85 percent gained knowledge of production strategies

90 percent gained knowledge of enterprise analysis and risk management

100 percent plan to implement one or more ideas. Sixteen of the ranchers indicated that they now utilize partial budgeting to help in the decision making process.

Wyoming Master Stockman ? Ranch Management Institute which was held for 3 days in four locations across the state.

Participants at the completed programs in the four Wyoming locations evaluated the program.

?Participants were asked if the information was useful for their ranching operation. 65 percent strongly agreed and 35 percent agreed.

?Participants were also asked if they would use tools or concepts taught in the program to make decisions on their ranch. 100 percent indicated that they would use the tools.

?Participants were asked to estimate the value created from attending this program. All participants indicated value was created and 88 percent of the participants indicated that more than \$3500 in value was gained from attending this program.

?100 percent indicated they would recommend the program to other producers.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
204	Plant Product Quality and Utility (Preharvest)
307	Animal Management Systems
502	New and Improved Food Products

### **Outcome #3**

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

Awareness created through extension and research efforts. Target is number of participants in extension and research programs reporting that they have gained awareness on topic.

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

- 1862 Extension
- 1862 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	247

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

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

Current cattle prices are stimulating national expansion. Many producers are considering retaining additional heifers to sell next summer as bred heifers.

Additionally, UW Extension strives to increase awareness not only with agriculture produces, but also citizens statewide. Advisory input consistently identifies the need to reach non-agriculture audiences and youth to increase knowledge on where the food supply comes from and to encourage careers in agriculture.

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

An analysis was conducted to determine the costs of over-wintering and breeding heifers to meet the summer bred heifer market.

In addition to the 245 educational programs presented by UW Extension, newspaper inserts, TV spots on urban horticulture, and other media efforts are used to increase awareness.

##### **Results**

Results showed that given the high value of calves this fall, a far less risky and almost as profitable option was to sell all calves not needed by the ranch for replacements this fall.

Extension evaluations, both formal and informal indicate participants have gained awareness of topics covered; media efforts continue to bring new audiences to extension for information.

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

<b>KA Code</b>	<b>Knowledge Area</b>
301	Reproductive Performance of Animals



302	Nutrient Utilization in Animals
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management
704	Nutrition and Hunger in the Population

**Outcome #4**

**1. Outcome Measures**

Wyoming producers will benefit through an increased value of livestock and crops related to improved cropping practices, herd selection, and management. Target is number of producers reporting positive outcome as a result of educational efforts.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	400

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

**Issue (Who cares and Why)**

The value of agriculture to Wyoming's economy approaches \$1 billion each year, and agriculture's contribution to open spaces, wildlife, and recreation is even greater. Livestock and crop producers throughout the state of Wyoming face an ever changing industry with issues such as; increasing cost of production, increasing pressure focused on land conversion, changing requirements for marketing knowledge. All of the issues are coupled with the need for producers to be able to raise agricultural products in a sustainable operation with limited resources.

**What has been done**

Extension Educators in Profitable and Sustainable Agriculture Systems conducted 245 educational programs including field days, workshops, classes, multi-session courses, and volunteer training. In addition media is utilized to reach citizens through television, newspaper inserts, magazines, news columns and special articles, and radio. Educators also write educational newsletters distributed by mail and on line. Master Wool Grower was implemented. The project was accomplished through five, 4-hour workshop sessions at two Wyoming locations. Wyoming Master Stockman ? Ranch Management Institute was implemented in four locations, each holding three day institutes. The objective of this project was to enhance the sustainability of Wyoming ranchers. Producers received training on ranch assessment, financial enterprise analysis, stochastic planning tools, and action plans. Participants were provided with these tools on a sub-notebook computer so that they were able to continually utilize the concepts and tools taught.

**Results**

**Master Wool Grower:**

Participants who completed programs in the three Wyoming locations evaluated the program. Participants were asked if they had used tools or concepts taught in the program to make decisions on their ranches. Ninety-three percent indicated they had used the tools. Participants were asked to estimate the value created from attending this program. All participants indicated value was created, and 60 percent of the participants indicated more than \$5,000 in value gained.

**Wyoming Master Stockman - Ranch Management Institute:**

Participants at the completed programs in the four Wyoming locations evaluated the program. Participants were asked if the information was useful for their ranching operation. 65 percent strongly agreed and 35 percent agreed. Participants were also asked if they would use tools or concepts taught in the program to make decisions on their ranch. 100 percent indicated that they would use the tools. Participants were asked to estimate the value created from attending this program. All participants indicated value was created and 88 percent of the participants indicated that more than \$3500 in value was gained from attending this program. 100 percent indicated they would recommend the program to other producers.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
301	Reproductive Performance of Animals
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

**Outcome #5**

**1. Outcome Measures**

Increase appreciation of research on plant production systems. Target is the number of projects reporting on this outcome.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
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2014

12

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Grape production in Wyoming evinces strong interest from producers seeking viable alternatives to traditional crops, and from homeowners with backyard plantings.

#### What has been done

Grapevine evaluation trials were established at Sheridan and Powell to find cultivars that will perform well under diverse conditions of soil and climate. Improvement of existing cultivars and rootstocks via precision breeding will enhance genetics without potentially altering existing desirable characteristics.

#### Results

The final result will be the development of improved genetic resources and a package of production practices for grapevine cultivation in Wyoming.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
202	Plant Genetic Resources
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
216	Integrated Pest Management Systems
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
704	Nutrition and Hunger in the Population

### Outcome #6

#### 1. Outcome Measures

Increase appreciation of research on animal production systems. Target is the number of projects reporting on this outcome.

#### 2. Associated Institution Types

- 1862 Research

#### 3a. Outcome Type:

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	9

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

**Issue (Who cares and Why)**

Feed efficiency is a trait of economic importance to livestock producers because improvements can translate to lower feed inputs and/or enhanced stocking rates. Identification of feed efficient animals is time- and cost-intensive hampering trait improvement.

**What has been done**

Our research suggests that rumen microbial populations can be used to identify the most feed efficient ewe lambs.

**Results**

Development of a 'microbial index' to predict or infer feed efficiency would enable producers to better select feed efficient breeding stock and ultimately potentially improve profits.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management
704	Nutrition and Hunger in the Population

**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**

Many conditions and situations that exist in Wyoming are similar to those in other parts of the country, for example, the following:

- Food choices made available and advertised to consumers by producers
- Access to timely and accurate information
- Coordination and cooperation of federal agencies and state partners
- Existence of local collaboration
- Level of funding at federal, state and

local level • Willingness of private sector-funders, such as corporations, foundations, and community organizations, to collaborate with the University of Wyoming Extension.

Weather extremes and drought may affect producers in agriculture or horticulture issues. Funding is vital to this program; changes in appropriations could impact funding. Additionally, global market changes impact both research and extension.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

Systematic evaluation utilizing a variety of methods was used to document outcomes and impact to clientele. This program includes four focuses: global food security and hunger, livestock systems; crop systems; and urban horticulture. Each focus has developed a logic model which includes specific evaluation plans and methods. Educational activities use written evaluations following the program, as follow-up; pre-and post -test to measure knowledge and aspirations. Follow-up evaluations either by mail, phone, or personal visit document medium and long term outcomes.

Multiple methods were used. Sampling was utilized to gather evaluative data from media education efforts. Surveys, by mail, telephone, or on-site were used with program participants. Observation and unstructured interviews were used to determine medium to long term outcomes. Tests including pre- and post- were utilized to measure knowledge gained.

100% of participants indicated increasing knowledge, awareness and skills. Over half of respondents of evaluation surveys indicated aspirations to implement practices that would be an improvement.

Over 90% of individuals enrolling in the master gardener program complete the course and pass the certification test. 212 Master Gardeners in 17 counties reported 10,562.5 volunteer hours, 2,552 continuing education hours, and 34,050 contacts. The value of volunteer time as documented by the independent sector shows that MG volunteers contribute \$244,627.50 to the Extension program in Wyoming.

### **Key Items of Evaluation**

100% of participants indicated increasing knowledge, awareness and skills. Over half of respondents of evaluation surveys indicated aspirations to implement practices that would be an improvement.

Over 90% of individuals enrolling in the master gardener program complete the course and pass the certification test. The value of volunteer time as documented by the independent sector shows that MG volunteers contribute \$244,627.50 to the Extension program in Wyoming.

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

**Program # 5**

**1. Name of the Planned Program**

Climate Change

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
104	Protect Soil from Harmful Effects of Natural Elements	10%		10%	
112	Watershed Protection and Management	10%		10%	
132	Weather and Climate	20%		20%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	10%		10%	
205	Plant Management Systems	10%		10%	
306	Environmental Stress in Animals	10%		10%	
307	Animal Management Systems	10%		10%	
605	Natural Resource and Environmental Economics	10%		10%	
608	Community Resource Planning and Development	10%		10%	
	<b>Total</b>	100%		100%	

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

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

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	2.0	0.0	2.6	0.0
<b>Actual Paid</b>	2.0	0.0	2.8	0.0
<b>Actual Volunteer</b>	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
31925	0	153429	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
31925	0	153429	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**

UW Research and Extension activities will focus on best species and variety selection as well as effectiveness of production practices as aspects of climate changes. Invasive species, and drought will be addressed through educational programs which enhance strategies to control global warming and will likely create opportunities for Wyoming agriculture to both profit and contribute to mitigation of forces driving change in climate.

Basic work in carbon storage in ecosystems, the implications of agricultural and land management practices on storage, and education related to these questions will be addressed. Plant species and variety adaption to the changing ecosystem will be critical to maintaining the agricultural productivity for the state. Educational programs will help producers and land managers understand the implications of drought for grasslands and cropping ecosystem management. The implications of climate change for invasive species and ecosystem management implications are important opportunities for UW AES and Extension.

**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 all programs regardless of their race, national origin, gender, age, religion, or disability. Specific target audience groups for the climate change program include agriculture producers, commodity groups, and agriculture agencies. Horticulture and small acreage audiences will also benefit from water conservation and risk management components of the program.

**3. How was eXtension used?**

eXtension is utilized as a resource for educators and clientele. The link to eXtension is prominently displayed on the UW Extension Web site home page. Additionally all extension employees are made aware of professional development opportunities available through eXtension. UW Extension participates in "Ask an Expert", educators respond to clientele questions on this topic when appropriate.

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	8207	100000	150	1000

**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	1	6	7

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

**Output Target**

**Output #1**

**Output Measure**

- Number of agriculture producers participating in educational programs. Target is number of program participants.

Year	Actual
2014	2000

**Output #2**

**Output Measure**

- Number of educational programs conducted targeting climate change. Target is the number of programs.

Year	Actual
2014	28

**Output #3**

**Output Measure**

- Research on production practices in the face of climate changes. Target is the number of research publications, bulletins, reports, and presentations.



<b>Year</b>	<b>Actual</b>
2014	13

**Output #4**

**Output Measure**

- Research to determine the relationship between climate change and competition among native and invasive plant species. Target is the number of research publications, bulletins, reports, and presentations.

<b>Year</b>	<b>Actual</b>
2014	15

**Output #5**

**Output Measure**

- Research on strategies to mitigate release of greenhouse gases into the atmosphere. Target is the number of research publications, bulletins, reports, and presentations.

<b>Year</b>	<b>Actual</b>
2014	7

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

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

O. No.	OUTCOME NAME
1	Awareness created through extension and research efforts. Target is the number of participants in extension and research programs reporting that they have gained awareness on topic.
2	Agriculture, horticulture and small acreage participants will increase awareness of climate change and the impact on horticulture production. Target is number of participants reporting outcome.
3	Producers will implement practices in animal and plant production which will mitigate climate change. Target is the number of producers reporting outcome.
4	Research that will create awareness of production practices, invasive plant species, and potential to mitigate greenhouse gas emissions in the face of climate change. Target is the number of projects reporting this outcome.

## **Outcome #1**

### **1. Outcome Measures**

Awareness created through extension and research efforts. Target is the number of participants in extension and research programs reporting that they have gained awareness on topic.

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

- 1862 Extension
- 1862 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	346

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

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

Wyoming is a rangelands state where small changes in temperature and growing season and amount and timing of precipitation can have a dramatic effect on the success of plant communities in the ecosystem. Best species and variety selection as well as effectiveness of production practices will change as aspects of climate changes. Invasive species are a particular problem in the dry cold desert ecosystem as small changes in climate can shift the competitive relationship among plant species. This can have a significant effect on plant community diversity and rangelands productivity. Periodic and sustained drought is another critical factor in the success of agriculture in Wyoming. Some evidence suggests that drought and other climate variability may be more of a factor as the climate warms. In addition, strategies to control global warming will likely create opportunities for Wyoming agriculture to both profit and contribute to mitigation of forces driving change in climate.

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

UW research and extension activities focus on best species and variety selection as well as effectiveness of production practices as aspects of climate changes. Invasive species, and drought were addressed through educational programs which enhance strategies to control global warming and will likely create opportunities for Wyoming agriculture to both profit and contribute to mitigation of forces driving change in climate. Basic work in carbon storage in ecosystems, the implications of agricultural and land management practices on storage, and education related to these questions are addressed. Educational programs presented help producers and land managers understand the implications of drought for grasslands and cropping ecosystem management.

#### **Results**

Participants in the 28 educational programs conducted by UW Extension reaching 346 youth and adults reported gaining awareness and knowledge on the subject.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
132	Weather and Climate
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
306	Environmental Stress in Animals
307	Animal Management Systems
605	Natural Resource and Environmental Economics

#### Outcome #2

##### 1. Outcome Measures

Agriculture, horticulture and small acreage participants will increase awareness of climate change and the impact on horticulture production. Target is number of participants reporting outcome.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	1400

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

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

Wyoming is a semi-arid climate state where small changes in temperature and growing season and amount and timing of precipitation can have a dramatic effect on the success of plant communities in the ecosystem. In urban areas, small acreages, and towns, horticulture has become an important component of UW Extensions agriculture efforts. Best species and variety selection as well as effectiveness of production practices will change as aspects of climate changes. Invasive species are a particular problem in the dry cold desert ecosystem as small changes in climate can shift the competitive relationship among plant species. This can have a significant effect on plant community diversity and rangelands productivity. Periodic and sustained

drought is another critical factor in the success of agriculture including horticulture in Wyoming. Some evidence suggests that drought and other climate variability may be more of a factor as the climate warms. In addition, strategies to control global warming will likely create opportunities for Wyoming agriculture to both profit and contribute to mitigation of forces driving change in climate.

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

UW Extension educators in crop and livestock systems and horticulture address climate change in numerous production programs presented throughout the state. The energy extension coordinator provides programming specific to climate change mitigation. Newspaper inserts, magazines, and newsletters also assist in information dissemination. Landowners with 50 acres or less are targeted in small acreage management programs which is a foci in the state. A new program last year involved a train the trainer model for real estate professionals who are first contact with new residents to the state focusing on soils and climate. Trained Master Gardeners participated in 2552 continuing education hours which include climate and impact on horticulture production.

#### **Results**

100 percent of participants indicated they had gained awareness and knowledge as a result of educational programs. Over 50 percent of participants in UW Extension programs on xeriscape, landscape design, water conservation, and plant selection and livestock production have made changes in practices as a result of educational efforts.

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

<b>KA Code</b>	<b>Knowledge Area</b>
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
132	Weather and Climate
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
306	Environmental Stress in Animals
307	Animal Management Systems
605	Natural Resource and Environmental Economics

#### **Outcome #3**

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

Producers will implement practices in animal and plant production which will mitigate climate change. Target is the number of producers reporting outcome.

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

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	1500

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

**Issue (Who cares and Why)**

Wyoming is a rangelands state where small changes in temperature and growing season and amount and timing of precipitation can have a dramatic effect on the success of plant communities in the ecosystem. In urban areas, small acreages, and towns, horticulture has become an important component of UW Extension agriculture efforts. Best species and variety selection as well as effectiveness of production practices will change as aspects of climate changes. Invasive species are a particular problem in the dry cold desert ecosystem as small changes in climate can shift the competitive relationship among plant species. This can have a significant effect on plant community diversity and rangelands productivity. Periodic and sustained drought is another critical factor in the success of agriculture including horticulture in Wyoming. Some evidence suggests that drought and other climate variability may be more of a factor as the climate warms. In addition, strategies to control global warming will likely create opportunities for Wyoming agriculture to both profit and contribute to mitigation of forces driving change in climate.

**What has been done**

UW Extension educators in crop and livestock systems and horticulture address climate change in numerous production programs presented throughout the state. The energy extension coordinator provides programming specific to climate change mitigation. Newspaper inserts, magazines, and newsletters also assist in information dissemination.

**Results**

100 percent of participants indicated they had gained awareness and knowledge as a result of educational programs. Drought and climate variability continues to be an on-going issue in Wyoming.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements
112	Watershed Protection and Management
132	Weather and Climate
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
306	Environmental Stress in Animals
307	Animal Management Systems
605	Natural Resource and Environmental Economics

**Outcome #4**

**1. Outcome Measures**

Research that will create awareness of production practices, invasive plant species, and potential to mitigate greenhouse gas emissions in the face of climate change. Target is the number of projects reporting this outcome.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	6

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

**Issue (Who cares and Why)**

Amphibians are declining globally, many species for unexplained reasons. Long-term monitoring efforts are needed to understand these trends. In particular, the conservation status of pond-breeding amphibian species is poorly established in Wyoming, simply due to lack of information.

**What has been done**

Water samples have been collected from a variety of habitats across SE Wyoming and the Plains and Prairie Potholes region. We are developing an environmental DNA test for monitoring amphibian presence. Environmental DNA, in this case, uses DNA from the target species extracted from the water in (potentially) occupied habitats.

**Results**

All species present could be established from a few water samples collected at one sampling point, reducing both field effort and error. Many of these species are threatened to be listed under provisions of the Endangered Species Act and/or are species of concern in Wyoming.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
132	Weather and Climate
306	Environmental Stress in Animals

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

### **External factors which affected outcomes**

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

### **Brief Explanation**

Weather extremes and drought often affect program participation. Funding is vital to this new program, changes in appropriations could impact funding. Additionally, global market changes impact both research and extension programs in agriculture.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

End of session evaluations were used to determine outcomes of educational efforts. In addition, small acreage (land conversion) has implemented three land demonstration projects in central and SE Wyoming mitigating soil erosion, and climate change issues. Drought has been an issue for agriculture producers for almost a decade; follow up on risk management is conducted informally.

100% of program participants report gaining awareness and knowledge of the topics covered in educational programs.

Over 50% report that they plan to make positive changes as a result of classes.

Energy audits are being implemented resulting in changes which contribute to money saved and increased efficiency of energy use.

### **Key Items of Evaluation**

100 percent of program participants report gaining awareness and knowledge of the topics covered in educational programs.

Over 50% report that they plan to make positive changes as a result of classes.

Energy audits are being implemented resulting in changes which contribute to money saved and increased efficiency of energy use.



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

**Program # 6**

**1. Name of the Planned Program**

Sustainable Energy

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	20%		20%	
121	Management of Range Resources	20%		20%	
131	Alternative Uses of Land	0%		10%	
133	Pollution Prevention and Mitigation	0%		10%	
401	Structures, Facilities, and General Purpose Farm Supplies	10%		10%	
402	Engineering Systems and Equipment	20%		20%	
608	Community Resource Planning and Development	30%		10%	
	<b>Total</b>	100%		100%	

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

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	3.0	0.0	3.2	0.0
<b>Actual Paid</b>	3.0	0.0	3.1	0.0
<b>Actual Volunteer</b>	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
47887	0	147146	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
47887	0	147146	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**

Media will be used to familiarize the public with UW College of Agriculture and Natural Resources areas of programming and personnel in regard to sustainable energy. Media releases in local newspapers, radio spots and television advertisements will inform the public of upcoming extension programs. Newsletter articles distributed both electronically and through the mail by county offices, area teams, and the University of Wyoming will reach general public and agriculture producers locally, regionally, and statewide. Public educational programs with invited speakers and extension specialists and educators presenting research-based information will continue to be held in response to local, state, and national energy sustainability. Demonstrations of technology and skills training will be included in education curriculum to enhance educational effectiveness. Field tours will be organized to provide producers with the opportunity to observe industry procedure (i.e., tour of an ethanol plant).

The Sustainable Agriculture Research and Extension Center (SAREC) located at Lingle, Wyoming will provide a resource base for integrating agriculture production and renewable energy based programs.

Educational programs will emphasize sustainable energy practices such as bio-fuels and wind energy, reclamation and restoration of disturbed lands, and energy conservation practices. Other methods will include individual interaction with landowners educating them on resources available to assist them with sustainable energy practices. UW Extension will provide coordination with other colleges on the UW campus such as Engineering and the School of Energy Resources, state and federal agencies to provide education on this topic, and funding for this effort. UW Extension will also provide educational opportunities for professionals involved with reclamation and restoration of disturbed lands.

The University of Wyoming's College of Agriculture and Natural Resources will conduct research and direct extension programming efforts to help ensure prudent use of the state's precious resources.

**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 all programs regardless of their race, national origin, gender, age, religion, or disability. Participants will include policy makers for county, state, and federal government agencies, crop producers, livestock producers, energy companies, general public, and the scientific community. An existing secondary audience will be the media, general public, and interest groups not directly involved in

production agriculture (i.e., environmental groups). Energy conservation methods will be targeted at both agriculture and general public audiences.

**3. How was eXtension used?**

eXtension is utilized as a resource for educators and clientele. The link to eXtension is prominently displayed on the UW Extension Web site home page. Additionally all extension employees are made aware of professional development opportunities available through eXtension. UW Extension participates in "Ask an Expert" questions submitted by clientele receive responses from educators or specialists within this subject expertise when appropriate.

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	15169	100000	418	5000

**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
<b>Actual</b>	1	5	6

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

**Output Target**

**Output #1**

**Output Measure**

- Number of individuals participating in sustainable energy programs. Target is the number of contacts.

<b>Year</b>	<b>Actual</b>
2014	1500

**Output #2**

**Output Measure**

- Determine ecosystem services affected by energy development and reclamation efforts. Target is the number research publications, bulletins, reports, and presentations.

<b>Year</b>	<b>Actual</b>
2014	10

**Output #3**

**Output Measure**

- Evaluate the potential for production of bioenergy. Target is the number of research publications, bulletins, reports, and presentations.

<b>Year</b>	<b>Actual</b>
2014	6

**Output #4**

**Output Measure**

- Number of educational programs or activities focusing on sustainable energy by UW Extension. Target is the number of educational programs implemented.

<b>Year</b>	<b>Actual</b>
2014	32

**Output #5**

**Output Measure**

- Number of collaborative partnerships formed to address sustainable energy in Wyoming. Target is the number of partnerships.

<b>Year</b>	<b>Actual</b>
2014	25

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

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

O. No.	OUTCOME NAME
1	Awareness created focusing on sustainable energy topics. Target is the number of individuals reporting this outcome.
2	Partnerships will be developed with agencies and organizations to expand sustainable energy efforts. Target is the number of partnerships formed.
3	New technologies or devices used in ag production systems and/or farmsteads. Target is the number of new technologies developed.
4	Create awareness of research on ecosystem services affected by energy development and reclamation efforts. Target is the number of projects reporting this outcome.
5	Create awareness of research on the potential to produce bioenergy. Target is the number of projects reporting this outcome.

## **Outcome #1**

### **1. Outcome Measures**

Awareness created focusing on sustainable energy topics. Target is the number of individuals reporting this outcome.

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

- 1862 Extension
- 1862 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	1500

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

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

The State of Wyoming is well known for being a critical source of the nation's supply of natural resources. Because fossil fuels are essentially an irreplaceable base for Wyoming's vibrant energy industry, the College of Agriculture and Natural Resources conducts research and direct extension programming efforts to help ensure prudent use of the state's precious resources. In addition to fossil fuel resources, Wyoming also possesses abundant renewable energy resources including wind, solar, hydroelectric, geothermal, and biomass. Both small-scale, such solar photovoltaics or geothermal heat pumps, and utility-scale, primarily wind energy, are important issues. Development of renewable technologies such as specific systems that can be used in agriculture production and/or farmsteads and small-scale power generation where power can be sold such as wind energy are also important issues. Conservation and preservation of our natural resources, both land and water is an ongoing effort for both extension and research.

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

The University of Wyoming College of Agriculture and Natural Resources research and extension efforts in sustainable energy focus on efficiency and conservation specifically in relation to farm and agriculture production. In addition, residential and public conservation education is targeted toward the general public and businesses. In fall 2009, UW Extension partnered with the School of Energy Resources at UW to fund an energy extension coordinator who provides leadership and coordination for extension energy programs in the college. Initial training for field extension educators was conducted. In addition to educational programs to raise awareness and knowledge, UW Extension has developed a Web site for information, publications, and a set of educational videos. To maximize outreach efforts, partnerships have been developed with the College of Engineering and Applied Science, School of Energy Resources, the Wyoming State Energy Office, Wind Energy Research Center, USDA Rural Development, Natural Resource Conservation Service, and the Wyoming Business Council. UW Range specialists and area

educators have partnered with the UW Reclamation and Restoration Center to develop and implement Reclamation 101 schools for agriculture land owners and agency personnel.

**Results**

In 2014, UW Extension initiated an issue team focusing on sustainable energy issues. 100 percent of participants in the 32 programs held reported gaining awareness of the topic and gaining knowledge. Early partnership efforts have resulted in increasing effectiveness of programs through multiple collaborators.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
121	Management of Range Resources
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
608	Community Resource Planning and Development

**Outcome #2**

**1. Outcome Measures**

Partnerships will be developed with agencies and organizations to expand sustainable energy efforts. Target is the number of partnerships formed.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	25

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

**Issue (Who cares and Why)**

The State of Wyoming is well known for being a critical source of the nation's supply of natural resources. Because fossil fuels are essentially an irreplaceable base for Wyoming's vibrant energy industry, the College of Agriculture and Natural Resources strives to conduct research and direct extension programming efforts to help ensure prudent use of the state's precious resources. In addition to fossil fuel resources, Wyoming also possesses abundant renewable

energy resources including wind, solar, hydroelectric, geothermal, and biomass. Both small-scale, such as solar photovoltaics or geothermal heat pumps, and utility-scale, primarily wind energy, are important issues. Development of renewable technologies such as specific systems that can be used in agriculture production and/or farmsteads and small scale power generation where power can be sold such as wind energy are also important issues. As an energy rich state, conservation and preservation of our natural resources, both land and water is an ongoing effort for both extension and research.

**What has been done**

To maximize outreach efforts, partnerships have been developed with the College of Engineering and Applied Science, School of Energy Resources, the Wyoming State Energy Office, Wind Energy Resource Center, USDA Rural Development, Natural Resource Conservation Service, and the Wyoming Business Council. The UW Reclamation and Restoration Center, Energy Industry, local partners focusing on local food production are additional partners.

**Results**

Partnerships have increased resources, both financial and human capital to maximize outreach efforts. Integrated program efforts are in progress.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
121	Management of Range Resources
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment
608	Community Resource Planning and Development

**Outcome #3**

**1. Outcome Measures**

New technologies or devices used in ag production systems and/or farmsteads. Target is the number of new technologies developed.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	3



### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Arsenic is considered as one of the most potent carcinogenic contaminants of drinking water. Over 137 million people in more than 70 countries are affected by arsenic poisoning through drinking water supplies. Arsenic enters water supplies from natural deposits of the earth's crust and/or anthropogenic activities (e.g., agriculture production, mineral mining including uranium, coal burning power plants, solid waste disposal).

#### What has been done

A flow-through filtration system for field applications was designed, developed, and tested to remove arsenic from groundwater. Several groundwater samples were pumped through the flow-through reactor consisting of CuO nanoparticles.

#### Results

Results, using CuO particles with a flow-through reactor suggest that the technique is efficient and effective at arsenic removal under natural conditions and high arsenic concentrations. These results could help develop a simple on-step arsenic removal process for field applications.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
401	Structures, Facilities, and General Purpose Farm Supplies
402	Engineering Systems and Equipment

### Outcome #4

#### 1. Outcome Measures

Create awareness of research on ecosystem services affected by energy development and reclamation efforts. Target is the number of projects reporting this outcome.

#### 2. Associated Institution Types

- 1862 Research

#### 3a. Outcome Type:

Change in Knowledge Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2014	5

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

#### Issue (Who cares and Why)

The state of Wyoming has implemented a plan by Executive Order from the Governor's Office to carry out a Sage-Grouse Core Area Management Plan to protect the Greater Sage-Grouse which are currently being considered for placement on the Endangered Species List. A requirement of the Core Area Management Plan is to limit land disturbance to 15% of total land area.

**What has been done**

The Douglas Core Area Restoration Team has been assembled to plan and conduct appropriate restoration projects in the Douglas Core Area. The team consists of members with expertise in land and ecosystem restoration, oil and gas resource development, wildlife biology and management, range management as well as stakeholders.

**Results**

Major impacts of this project include: 1) developing expertise in Wyoming in regard to planning and implementation of large sage-grouse habitat restoration projects, and 2) generation of an appropriate method to plant greenhouse grown sagebrush seedlings into established vegetation communities with a high success rate.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
102	Soil, Plant, Water, Nutrient Relationships
121	Management of Range Resources
131	Alternative Uses of Land
402	Engineering Systems and Equipment
608	Community Resource Planning and Development

**Outcome #5**

**1. Outcome Measures**

Create awareness of research on the potential to produce bioenergy. Target is the number of projects reporting this outcome.

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**

Funding for this new program is essential in development and implementation of both

research and extension efforts. Weather extremes are a factor in agriculture production outcomes regarding crops for alternative fuels.

#### **V(I). Planned Program (Evaluation Studies)**

##### **Evaluation Results**

End of session written evaluations were utilized to collect outcome data. In addition personal follow-up with the local educator or UW Energy Extension Coordinator was conducted. 100% of program participants indicated they increased awareness and knowledge as a result of educational efforts. Educators and professional agency personnel who participated in training on renewable energy and reclamation issues reported increased knowledge, skills and increased confidence in disseminating information on these topics.

Program participants reported that in some instances, alternative energy options are not cost effective therefore contributed to decision making which is a positive outcome.

##### **Key Items of Evaluation**

Increased awareness and knowledge on sustainable energy issues

Program participants reported that in some instances, alternative energy options are not cost effective therefore contributed to decision making which is a positive outcome.

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

**Program # 7**

**1. Name of the Planned Program**

Childhood Obesity, Nutrition, and Health

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
305	Animal Physiological Processes	0%		40%	
703	Nutrition Education and Behavior	10%		20%	
704	Nutrition and Hunger in the Population	80%		20%	
724	Healthy Lifestyle	10%		20%	
	<b>Total</b>	100%		100%	

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

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	10.0	0.0	6.3	0.0
<b>Actual Paid</b>	11.0	0.0	6.3	0.0
<b>Actual Volunteer</b>	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
175588	0	299359	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
175588	0	299359	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**

Nutrition efforts will focus on educational programs which increase knowledge and skills in nutrition needs of children and incorporate physical activity into lifestyle; media outreach; health fairs; training; assessment/data collection. Programs which teach body size acceptance will also be targeted to youth.

EFNEP adult curriculum taught in a series of lessons; adult one-time lessons; youth curricula taught in a series of lessons and day camps; displays and demonstrations; state and community partnerships with agencies serving the low-income; training for educators; evaluation of program; Ongoing- Updating of curricula and materials.

Research will focus on factors contributing to, and mechanisms associated with, incidences of metabolic disorders and disease. Nutritional strategies will be explored as methods to create healthy lifestyles. Discoveries resulting from explorations of fundamental processes are expected to lead to the development of new therapeutic inventions.

**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 all programs regardless of their race, national origin, gender, age, religion, or disability. Specific target audience groups for the CNP (EFNEP) program: Low-income adults, Youth in Title I schools.

All other nutrition efforts targeted audience includes: general public, both adults and youth and policy makers.

**3. How was eXtension used?**

eXtension is utilized as a resource for educators and clientele. The link to eXtension is prominently displayed on the UW Extension Web site home page. Additionally all extension employees are made aware of professional development opportunities available through eXtension. UW Extension participates in "Ask an Expert". Questions from clientele receive responses on nutrition topics from Nutrition and Food Safety Educators as appropriate.

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3559	100000	4635	5000

**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	0	15	15

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

**Output Target**

**Output #1**

**Output Measure**

- Number of educational programs delivered to youth. Target is number of programs.

Year	Actual
2014	91

**Output #2**

**Output Measure**

- Number of youth participating in educational program targeting childhood obesity. Target is number of youth participating.

Year	Actual
2014	4635

**Output #3**

**Output Measure**

- Number of partnerships formed in local counties of professionals to collaborate on childhood obesity, nutrition, and health issues. Target is number of partnerships formalized.

Year	Actual
2014	35

**Output #4**

**Output Measure**

- Conduct research on obesity, nutrition, and health. Target is the number of research publications, bulletins, reports, and presentations.

Year	Actual
2014	18

**Output #5**

**Output Measure**

- Number of participants in educational programs offered in Nutrition initiative. Target is number of participants.

<b>Year</b>	<b>Actual</b>
2014	8194

**Output #6**

**Output Measure**

- Increased adoption of healthy food practices and participation in regular physical activities. Target is number of participants reporting outcome.

<b>Year</b>	<b>Actual</b>
2014	7000

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

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

O. No.	OUTCOME NAME
1	Improved knowledge of food guide pyramid, serving sizes, and physical activity. Targets are the number of participants reporting outcome.
2	Improved eating behavior practices, food choices, and lifestyle habits. Targets are the number of participants reporting outcome.
3	Individuals gain awareness, knowledge and skills related to: improved attitude about healthy eating; increased knowledge of healthy food choices; improved skills in selection of healthy foods; improved body image. Target is number of participants reporting outcome.
4	Youth incorporate skills and change behaviors related to: increased physical activity; increased knowledge of healthy food choices; improved selection of healthy foods; understanding of serving sizes; improved body image.
5	Youth and families experience: improved nutritional health; reduced medical costs; health improved through community opportunities; healthier weight; decreased risk factors for nutrition-health related problems. Target is number of participants reporting outcome.
6	Create awareness of research on obesity, nutrition, and health. Target is the number of projects reporting this outcome.



## **Outcome #1**

### **1. Outcome Measures**

Improved knowledge of food guide pyramid, serving sizes, and physical activity. Targets are the number of participants reporting outcome.

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	7000

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

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

Wyoming youth and adults are at risk as reflected by various health-related data: For example, over 25 percent of Wyoming adults report no leisure time physical activity, 47 percent of Wyoming high school students report not being enrolled in a physical education class, and 83 percent of both Wyoming adults and high school students do not eat recommended amounts of fruits and vegetables. Additionally, research in Wyoming, Montana, and Idaho documented body dissatisfaction as a significant predictor of self-consciousness keeping respondents from participating in physical activity.

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

A variety of classes (many multi-session) on Real Food, Body Works, Healthy Eating, Weight Management and basic nutrition were conducted by nutrition educators. Articles were published in newsletters, newspaper columns and educational displays were developed. Youth were reached through series of classes conducted in schools by 4-H, Nutrition and Food Safety and Cent\$ibile Nutrition educators.

#### **Results**

91 percent of adults and 55 percent of youth reported improvement in one or more nutrition practices such as familiarity with MyPlate.

39 percent reported being physically active for at least 30 minutes per day, on four or more days per week, more often.

63 percent reported using the "Nutrition Facts" labels to make food choices.

50 percent reported thinking about healthy food choices more often when deciding what to feed their family.

25 percent reported weight loss as a result of changes in eating, meal planning, and increasing physical activity.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

#### Outcome #2

##### 1. Outcome Measures

Improved eating behavior practices, food choices, and lifestyle habits. Targets are the number of participants reporting outcome.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	4800

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

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

Being overweight and obese increases the risk among children to develop type 2 diabetes, elevated blood pressure, non-alcoholic fatty liver disease, elevated cholesterol, and they are at risk for entering into adulthood as overweight and or obese. According to the Robert Wood Johnson Foundation, health expenses related to childhood obesity are approximately \$14 billion per year.

In Wyoming the rate of high school students who are overweight and obese has increased from 17.4% in 2001 to 23.5% in 2013. The rates for adults in Wyoming are also important, as adults influence the younger generation in many ways, including but not limited to genetic influence and environmental influences. In 2013, 64.4% adults in Wyoming were overweight and/or obese as reflected in the Behavior Risk Factor Surveillance System (BRFSS).

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

A variety of classes (many multi-session) on Real Food, Healthy Eating, Body Works, Weight Management and basic nutrition were conducted by nutrition educators. Youth participated in day camps, and in-school curriculum including Grazing with Marty Moose, Munching through Wyoming History, Passports to Food Adventures, and WIN Kids. Most youth classes are 5 or more sessions in length. Articles were published in newsletters, newspaper columns and educational displays were developed.

#### **Results**

End of session and follow up evaluations indicated:  
39 percent reported being physically active for at least 30 minutes per day, on four or more days per week, more often.  
91 percent showed improvement in one or more nutrition practices.  
47 percent serve more than one kind of fruit and 42 percent serve more than one kind of vegetable each day.  
40 percent of youth could correctly identify the physical activity recommendation for children.  
39.2 percent of all youth improved physical activity practices.  
86.3 percent of all youth improved knowledge or skills necessary to choose foods consistent with Federal Dietary Guidelines.  
25 percent reported weight loss as a result of changes in eating, meal planning, and increasing physical activity.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle

#### Outcome #3

##### 1. Outcome Measures

Individuals gain awareness, knowledge and skills related to: improved attitude about healthy eating; increased knowledge of healthy food choices; improved skills in selection of healthy foods; improved body image. 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	Actual
2014	9000

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

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

Wyoming residents are at risk as reflected by various health-related data: For example, over 25 percent of Wyoming adults report no leisure time physical activity, 47 percent of Wyoming high school students report not being enrolled in a physical education class, and 83 percent of both Wyoming adults and high school students do not eat recommended amounts of fruits and vegetables.

**What has been done**

UW Extension educators conducted over 300 classes which emphasized a holistic approach including proper nutrition, increasing physical activity and healthy food choices. Strong Bones - Strong People, basic nutrition, and Real Food were all programs focused on objectives. Youth curriculum developed by the UW Cent\$ible Nutrition program was also implemented in schools across the state. Nutrition educators partnered with 4-H to implement Body Works. The Nutrition initiative team also does regular radio programs, news columns, and blogs to disseminate information to the public.

**Results**

9000 individuals participated in 300 classes of which 12 were multi-session with four to eight sessions in length. Over 50 percent, or 4500 participants reported improved eating behavior practices, food choices, and lifestyle habits through end of session evaluations.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
703	Nutrition Education and Behavior

**Outcome #4**

**1. Outcome Measures**

Youth incorporate skills and change behaviors related to: increased physical activity; increased knowledge of healthy food choices; improved selection of healthy foods; understanding of serving sizes; improved body image.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	5000

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

**Issue (Who cares and Why)**

Being overweight and obese increases the risk among children to develop type 2 diabetes, elevated blood pressure, non-alcoholic fatty liver disease, elevated cholesterol, and they are at risk for entering into adulthood as overweight and or obese. According to the Robert Wood Johnson Foundation, health expenses related to childhood obesity are approximately \$14 billion per year.

In Wyoming the rate of high school students who are overweight and obese has increased from

17.4% in 2001 to 23.5% in 2013. The rates for adults in Wyoming are also important, as adults influence the younger generation in many ways, including but not limited to genetic influence and environmental influences. In 2013, 64.4% adults in Wyoming were overweight and/or obese as reflected in the Behavior Risk Factor Surveillance System (BRFSS).

**What has been done**

UW Extension utilized EFNEP youth curricula taught in a series of lessons and day camps; displays and demonstrations; Other nutrition efforts focused on educational programs which increase knowledge and skills in nutrition needs of children and adults and also incorporate physical activity into lifestyle; educators use media outreach (newspapers, newsletters, radio); health fairs; Programs which teach body size acceptance also are targeted to youth. A variety of classes (many multi-session) on Real Food, Body Works, Healthy Eating, Weight Management and basic nutrition were conducted by nutrition educators. In addition 4-H educators partner with Cent\$ible Nutrition to implement special interest classes in the school system.

**Results**

Results of the educational programs (several were series of 5 - 8 weeks) reaching 5000 youth included:

- 100 percent of all youth improved in one or more core areas.
- 91 percent showed improvement in one or more nutrition practices.
- 86.3 percent of all youth improved knowledge or skills necessary to choose foods consistent with the Federal Dietary Guidelines.
- Over 50 percent increased their knowledge of MyPlate food groups;
- 39.2 percent improved physically activity practices for at least 30 minutes per day during four or more days per week.
- 30 percent increased their knowledge of body size diversity.

As a result of attending the BodyWorks in Wyoming program:

Adults:

- 88 percent reported intention to increase physical activity
- 63 percent reported intention to exercise more with their child
- 75 percent reported intention to eat more healthy foods

Youth:

- 71 percent reported intention to eat more healthy foods
- 57 percent reported intention to exercise more with their parent

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
703	Nutrition Education and Behavior

## **Outcome #5**

### **1. Outcome Measures**

Youth and families experience: improved nutritional health; reduced medical costs; health improved through community opportunities; healthier weight; decreased risk factors for nutrition-health related problems. Target is number of participants reporting outcome.

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

- 1862 Extension

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

Change in Condition Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	5000

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

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

Being overweight and obese increases the risk among children to develop type 2 diabetes, elevated blood pressure, non-alcoholic fatty liver disease, elevated cholesterol, and they are at risk for entering into adulthood as overweight and or obese. According to the Robert Wood Johnson Foundation, health expenses related to childhood obesity are approximately \$14 billion per year.

In Wyoming the rate of high school students who are overweight and obese has increased from 17.4% in 2001 to 23.5% in 2013. In 2013, 64.4% adults in Wyoming were overweight and/or obese as reflected in the Behavior Risk Factor Surveillance System (BRFSS). Like the majority of states in the US, Wyoming also showed a statistically significant increase in the number of physically inactive adults.

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

UW Extension utilized EFNEP youth curricula taught in a series of lessons and day camps; displays and demonstrations; Other nutrition efforts focused on educational programs which increase knowledge and skills in nutrition needs of children and adults and also incorporate physical activity into lifestyle; educators use media outreach (newspapers, newsletters, radio, blogs); health fairs; Programs which teach body size acceptance also are targeted to youth. A variety of classes (many multi-session) on Body Works, Real Food, Healthy Eating, Weight Management, Dining with Diabetes, and basic nutrition were conducted by nutrition educators.

#### **Results**

Results of the 300 educational programs (several were series of 5 - 8 weeks) reaching over 5000 youth and adults included:

91 % showed improvement in one or more nutrition practices.

95.5% had a positive change in any food group.  
63% reported using the Nutrition Facts label to make food choices more often.  
Over 55% increased their knowledge of MyPlate food groups;  
39% are physically active 30 minutes per day, four or more days a week.

#### 4. Associated Knowledge Areas

<b>KA Code</b>	<b>Knowledge Area</b>
703	Nutrition Education and Behavior

#### Outcome #6

##### 1. Outcome Measures

Create awareness of research on obesity, nutrition, and health. Target is the number of projects reporting this outcome.

##### 2. Associated Institution Types

- 1862 Research

##### 3a. Outcome Type:

Change in Action Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	4

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

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

Vitamin D insufficiency and deficiency increases risk for both chronic diseases and acute illness in humans and may be more prevalent in overweight and obese individuals presumably due to fat sequestration by adipose tissue. Recently, however, the "fat sequestration" hypothesis has been challenged.

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

Pigs were used as a model to evaluate the relationship between obesity and vitamin D status. Growing pigs (29 ± 1 kg) on standard grower diet were exposed to 1 hr of sunlight during solar noon for 2 wk at the spring equinox and again during the summer solstice.

###### **Results**

During the spring equinox, sun exposure increased serum concentrations of total 25(OH)D by 175% while control pigs had an increase of 25% from standard vitamin D supplemented feed alone. Serum concentrations of total 25(OH)D returned to control values following 3 mo of indoor confinement. The second exposure to sunlight during the summer solstice increased serum concentrations of total 25(OH)D by approximately 45% when pigs were near slaughter weight (94

± 3 kg). An increase in serum concentrations of total 25(OH)D was not observed in pigs held indoors. It is anticipated that completion of the proposed studies will contribute to a better understanding of how Vitamin D synthesis influences tissue deposition of vitamin D and overall health and wellbeing in humans.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes
704	Nutrition and Hunger in the Population
724	Healthy Lifestyle

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

##### External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

##### Brief Explanation

Many conditions and situations that exist in Wyoming are similar to those in other parts of the country, for example, the following:

Food choices made available and advertised to consumers by producers; Access to timely and accurate information; Coordination and cooperation of federal agencies and state partners, schools and other youth agencies; Existence of local collaboration; Level of funding at federal, state and local level; and willingness of community organizations, to collaborate with The University of Wyoming Extension.

If EFNEP funding is decreased, appropriations will impact program delivery. Population changes impact limited resource audiences eligible for program.

Availability of funding for research in childhood obesity.

#### V(I). Planned Program (Evaluation Studies)

##### Evaluation Results

UW Extension Nutrition and Food Safety educators teach curricula which uses a holistic approach to nutrition and health. All participants completed a pre- and post-questionnaire, enabling to measure new attitudes gained such as, living a life focused on health, honoring hunger, and enjoy physical activity every day. The following are significant impacts reported by them.

50% Participants increased physical activity purposely. 39 percent reported being physically active for at least 30 minutes per day, on 4 or more days per week more often.

90% of participants now stop eating when they start to feel full.



Adults who participate in programs complete end of session evaluations. Those in series of lessons complete a pre- and post-survey and/or follow up evaluations. Over 4000 adults completing lessons reported the following.

#### **Nutrition Practices and Food Intake**

- 91 percent improved in one or more nutrition practices.
- 90 percent had a positive change in any food group.
- 55.6 percent use the MyPlate to make food choices more often.
- 43.1 percent serve more than one kind of fruit, and 42 percent serve more than one kind of vegetable to their families each day more often.

#### **Physical Activity Practices**

- 39 percent are physically active for at least 30 minutes per day during four or more days per week

2936 youth participating in Grazing with Marty Moose, Munching Through Wyoming History, Passports to Food Adventures, and WIN Kids curricula reported the following through pre- and post-assessments to capture behavior changes.

Specific questions for each curriculum showed the following after the lessons.

- 50 percent improved their knowledge of MyPlate food groups.
- 31.5 percent more correctly identify the number of food groups in a meal
- 47 percent tried new fruits and 42 percent tried new vegetables more often.
- 29 percent could correctly identify the physical activity recommendation for children.
- 86.3 percent of all youth improved knowledge or skill(s) necessary to choose foods consistent with the Federal Dietary Guidelines.

#### **Key Items of Evaluation**

Research data have provided conclusive evidence that changes in individual lifestyles and behaviors can lead to improved health status (Centers for Disease Control and Prevention, 1997; Canadian Nurses Association, 1992).

100 percent of participants gained knowledge and raised awareness of the role nutrition and physical activity play in health.

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

**Program # 8**

**1. Name of the Planned Program**

Food Safety

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
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%		10%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	90%		90%	
<b>Total</b>		100%		100%	

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

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	3.0	0.0	2.0	0.0
<b>Actual Paid</b>	3.0	0.0	1.4	0.0
<b>Actual Volunteer</b>	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
47887	0	66684	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
47887	0	66684	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**

University of Wyoming Extension collaborates with the Wyoming Department of Agriculture, Consumer Health Division and Wyoming Environmental Health Association, and local health agencies in partnership as the Wyoming Food Safety Coalition. Educational efforts include a series of workshops or classes targeting food industry personal. In addition, utilizing ServSafe, the certification course of the National Restaurant Association in depth classes which include end of session certification testing are conducted. Classes, workshops, displays, and demonstrations are used to reach a general consumer audience. Youth are reached through school programs on handwashing and avoidance of cross contamination. ServSafe and ServSafe Starter classes in Spanish are conducted in Western Wyoming, and in 2014 were conducted via distance education in other locations in the state.

Educational programs on food preservation including pressure and water-bath canning, freezing, and drying foods will be delivered using multiple methods to ensure safety of the end product.

Research will focus on more rapid methods of detection of food-borne pathogens such as E.coli and Listeria. Ultimately delineate genes that promote survival in the environment and result in disease contamination of food.

**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 all programs regardless of their race, national origin, gender, age, religion, or disability. Specific target audience groups for the CNP (EFNEP) program: Low-income adults, Youth in Title I schools. All other food safety efforts targeted audiences include: general public, both adults and youth and policy makers.

**3. How was eXtension used?**

eXtension is utilized as a resource for educators and clientele. The link to eXtension is prominently displayed on the UW Extension Web site home page. Additionally all extension employees are made aware of professional development opportunities available through eXtension. UW Extension participates in "Ask an Expert"; food safety questions submitted by clientele receive responses from Nutrition and Food Safety Educators or State Specialists.

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3476	100000	2239	3000

**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	0	10	10

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

**Output Target**

**Output #1**

**Output Measure**

- Research on the ability to detect, analyze, and prevent the presence of food-borne pathogens and harmful chemicals in food products. Target is the number of research publications, bulletins, reports, and presentations.

Year	Actual
2014	18

**Output #2**

**Output Measure**

- Number of food safety programs which promote safe handling practices in the public and food service industry.

Year	Actual
2014	107

**Output #3**

**Output Measure**

- Number of participants in educational programs offered by the Wyoming Food Safety Coalition.

Year	Actual
2014	2725

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

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

O. No.	OUTCOME NAME
1	Improve personal hygiene such as hand washing. Avoidance of cross-contamination resulting in keeping foods safe. Target is the number of participants reporting outcome.
2	Increased awareness and knowledge of food safety practices. Target is the number of participants reporting outcome.
3	Transfer of knowledge on research evaluating the ability to detect, analyze, and prevent the presence of food-borne pathogens and harmful chemicals in food products. Target is the number of projects reporting this outcome.
4	Food service industry personnel pass ServSafe certification test. Target is the number of participants who complete course and pass test of the National Restaurant Association.

## **Outcome #1**

### **1. Outcome Measures**

Improve personal hygiene such as hand washing. Avoidance of cross-contamination resulting in keeping foods safe. Target is the number of participants reporting outcome.

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

- 1862 Extension

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

Change in Action Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	3400

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

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

Microbial contamination of food is a serious public health problem: Each year in the U.S., food-borne diseases cause approximately 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths. It is estimated that the average cost per foodborne illness is \$1,850. With approximately 60 percent of food-borne illness outbreaks nationwide attributable to food-service establishments, food-service personnel are key to reducing the risk of food-borne illness. Additionally, home food preparers and consumers are important groups to reach with food safety education because their behaviors greatly affect the safety of food that they serve to others and/or eat themselves.

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

UW Extension collaborates with the Wyoming Department of Agriculture, Consumer Health Division and Wyoming Environmental Health Association, and local health agencies in partnership as the Wyoming Food Safety Coalition (WFSC). Educational efforts include a series of workshops or classes targeting food industry personal. In addition, utilizing ServSafe, the certification course of the National Restaurant Association in depth classes which include end of session certification testing are conducted. Classes, workshops, displays, and demonstrations are used to reach a general consumer audience. Youth are reached through school programs on hand washing and avoidance of cross contamination.

#### **Results**

Based on data from an evaluation project conducted by UW Extension for the WFSC, this year 97 percent of participants made at least one change related to cleanliness, for example, washed their hands more often. Eighty percent made at least one change related to cooling foods. Another 78 percent made at least one change related to food preparation, for example, prevented cross-contamination by keeping raw meats, cooked foods, and fresh produce separated.

Seventy-five percent made at least one change such as monitored critical control points more closely. Improved food handling behaviors increase the likelihood that food served in Wyoming is safe and, therefore, that lives have been saved, illnesses avoided, healthcare cost controlled, fewer work days missed, and local businesses and institutions made stronger.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

#### Outcome #2

##### 1. Outcome Measures

Increased awareness and knowledge of food safety practices. Target is the number of participants reporting outcome.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	15250

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

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

Food-borne diseases cause approximately 48 million illnesses, 128,000 hospitalizations, and 3,000 deaths. It is estimated that the average cost per foodborne illness is \$1,850. With approximately 60% of food-borne illness outbreaks nationwide attributable to food-service establishments, food-service personnel are key to reducing the risk of food-borne illness. Additionally, home food preparers and consumers are important groups to reach with food safety education because their behaviors greatly affect the safety of food that they serve to others and/or eat themselves.

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

107 classes ranging from ServSafe certification courses, ServeSafe Starters, food safety classes for food service handlers, consumer food safety classes and school workshops on proper hand washing methods were conducted. Additionally classes on safe food preservation were taught statewide. In 2014 numerous courses were also taught in Spanish in Western Wyoming, and via Web conferencing in other areas of the state. Consumer displays at Health Fairs and other community gatherings were used to increase awareness of food safety.

**Results**

100 percent of participants reported through both formal and informal evaluations increased awareness and knowledge of food safety practices.  
 97% made at least one change in regard to cleanliness.  
 80% made at least one change in regard to cooling food.  
 78% made at least one change related to food preparation.  
 75% made at least one change such as monitored critical control points more closely.  
 70% made at least one change related to cooking food.  
 Improved food handling behaviors such as those listed above increase the likelihood that food served in Wyoming is safe, and therefore, that lives have been saved, illnesses avoided, health care costs controlled, fewer work days missed, and local businesses and institutions made stronger.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**Outcome #3**

**1. Outcome Measures**

Transfer of knowledge on research evaluating the ability to detect, analyze, and prevent the presence of food-borne pathogens and harmful chemicals in food products. Target is the number of projects reporting this outcome.

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	3

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

**Issue (Who cares and Why)**

In the United States, more than two million people experience antibiotic-resistant infections every year, with at least 23,000 of those cases leading to death. Food animals can play an important role in transmission of antibiotic resistance bacteria. The dissemination of antimicrobial resistant (AMR) bacteria by wildlife to animal feeding operations (AFOs), can jeopardize food safety, and consequently, adversely impact production.



**What has been done**

Bacterial strains isolated via culture methods from cattle feces, water and feed from AFOs, and AFO-associated wildlife included cephalosporin and fluoroquinolone resistant E. coli, macrolide resistant Enterococcus spp., and methicillin resistant Staphylococcus spp. isolates collected from 40 cattle facilities. Approximately 1177 AMR isolates have already been analyzed via MALDI-TOF MS, with spectra being obtained for all but 27 isolates, and with successful identification being achieved in 849 of those isolates (72%).

**Results**

The completed work has already proved the utility of the method for identification of AMR bacteria from agricultural environments. Ongoing efforts will generate improved and robust methods for rapid identification and subtyping of AMR E. coli, Enterococcus spp., and Staphylococcus spp. from cattle feeding operations and associated wildlife reservoirs, by applying novel sample preparation strategies to enrich for discriminatory analytes for typing applications. We anticipate that the optimized methods will allow for high throughput analysis of these isolates, permitting the generation of large and diverse spectral databases.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**Outcome #4**

**1. Outcome Measures**

Food service industry personnel pass ServSafe certification test. Target is the number of participants who complete course and pass test of the National Restaurant Association.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	432

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

**Issue (Who cares and Why)**

Microbial contamination of food is a serious public health problem: Each year in the U.S., food-borne diseases cause approximately 48 million illnesses, 128,000 hospitalizations, and 3,000

deaths. With approximately 60 percent of food-borne illness outbreaks nationwide attributable to food-service establishments, food-service personnel are key to reducing the risk of food-borne illness.

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

UW Extension collaborates with the Wyoming Department of Agriculture, Consumer Health Division and Wyoming Environmental Health Association, and local health agencies in partnership as the Wyoming Food Safety Coalition (WFSC). Educational efforts include a series of workshops or classes targeting food industry personal. In addition, utilizing ServSafe, the certification course of the National Restaurant Association in depth classes which include end of session certification testing are conducted. Classes are also being taught in Spanish in Western Wyoming, and via Web conferencing in other locations in the state.

#### **Results**

Of the 432 participant's in WFSC's ServeSafe and ServSafe Starters workshops : 94% passed the certification exam.

97% (419) made at least one change in regard to cleanliness.

80% (345) made at least one change in regard to cooling food.

78% (337) made at least one change related to food preparation.

75% (324) made at least one change such as monitored critical control points more closely.

70% (302) made at least one change related to cooking food.

Improved food handling behaviors such as those listed above increase the likelihood that food served in Wyoming is safe, and therefore, that lives have been saved, illnesses avoided, health care costs controlled, fewer work days missed, and local businesses and institutions made stronger.

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

<b>KA Code</b>	<b>Knowledge Area</b>
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

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

##### **External factors which affected outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

##### **Brief Explanation**

Turnover of personnel offers challenges in Wyoming; Food Preservation as part of food safety also requires specialized training to provide competency in that subject area.

Populations changes (immigration, new cultural groupings, etc.)  
Economy

Appropriation changes  
Government Regulations

Competing Programmatic Challenges  
Public Policy changes

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

End of session questionnaires, follow up surveys were used to document outcomes.

100 percent of participants reported through both formal and informal evaluations increased awareness and knowledge of food safety practices.

97% made at least one change in regard to cleanliness.

80% made at least one change in regard to cooling food.

78% made at least one change related to food preparation.

75% made at least one change such as monitored critical control points more closely.

70% made at least one change related to cooking food.

Improved food handling behaviors such as those listed above increase the likelihood that food served in Wyoming is safe, and therefore, that lives have been saved, illnesses avoided, health care costs controlled, fewer work days missed, and local businesses and institutions made stronger.

### **Key Items of Evaluation**

UW Extension is a key leader with the Wyoming Food Safety Coalition (WFSC) started in 1995. WFSC is a multi-agency, multi-disciplinary partnership that has become the primary source of food-safety education throughout the state. The heart of WFSC is a core of local trained teams, most of which include area UW Extension Nutrition and Food Safety.

## VI. National Outcomes and Indicators

### 1. NIFA Selected Outcomes and Indicators

<b>Childhood Obesity (Outcome 1, Indicator 1.c)</b>	
4635	Number of children and youth who reported eating more of healthy foods.
<b>Climate Change (Outcome 1, Indicator 4)</b>	
2	Number of new crop varieties, animal breeds, and genotypes with climate adaptive traits.
<b>Global Food Security and Hunger (Outcome 1, Indicator 4.a)</b>	
2	Number of participants adopting best practices and technologies resulting in increased yield, reduced inputs, increased efficiency, increased economic return, and/or conservation of resources.
<b>Global Food Security and Hunger (Outcome 2, Indicator 1)</b>	
1	Number of new or improved innovations developed for food enterprises.
<b>Food Safety (Outcome 1, Indicator 1)</b>	
1	Number of viable technologies developed or modified for the detection and
<b>Sustainable Energy (Outcome 3, Indicator 2)</b>	
1	Number of farmers who adopted a dedicated bioenergy crop
<b>Sustainable Energy (Outcome 3, Indicator 4)</b>	
0	Tons of feedstocks delivered.