

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Natural Resources and Environment

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	25%		9%	
111	Conservation and Efficient Use of Water	25%		8%	
112	Watershed Protection and Management	10%		0%	
121	Management of Range Resources	0%		5%	
123	Management and Sustainability of Forest Resources	0%		9%	
132	Weather and Climate	10%		0%	
133	Pollution Prevention and Mitigation	0%		6%	
136	Conservation of Biological Diversity	20%		6%	
204	Plant Product Quality and Utility (Preharvest)	10%		0%	
205	Plant Management Systems	0%		11%	
206	Basic Plant Biology	0%		5%	
216	Integrated Pest Management Systems	0%		21%	
307	Animal Management Systems	0%		5%	
605	Natural Resource and Environmental Economics	0%		15%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	30.0	0.0	11.0	0.0
Actual Paid Professional	44.0	0.0	16.7	0.0
Actual Volunteer	225.0	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
777672	0	945791	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
777672	0	945791	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1810267	0	10040920	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

This Planned Program - Natural Resources - in Extension includes three Work Teams: Environmental Horticulture (HORT), Native Plant Education (NPE), and Water Resources (WR).

- Conduct workshops and educational classes for producers, landowners, and agency personnel.
- Establish demonstration plots and field days to share research and outreach results.
- Consult with individual producers and landowners to address local problems.
- Conduct basic and applied research on environmental and natural resources issues.
- Conduct natural resources research to develop agricultural and forestry management systems that are compatible with conservation and environmental goals and economically sustainable.
- Develop and test technical, institutional, or social solutions to water quality and quantity problems in Colorado.
- Develop technologies for managing agricultural and municipal wastes.
- Provide educational programs for urbanites on horticultural practices and the environment resulting in less pollution and more efficient water use.
- Sustain local agriculture while lessening adverse impacts on the environment.

2. Brief description of the target audience

Individual agricultural producers, landowners, commodity groups, regulatory agencies, agribusinesses, and local, state, and federal land management agencies.

3. How was eXtension used?

Ask an Expert (estimated time spent responding to questions in HOURS = 434)

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	566558	8111725	11176	1258

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

Patent Applications Submitted

Year: 2012
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	4	136	140

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of attendees at workshops/trainings/field days.

Year	Actual
2012	33516

Output #2

Output Measure

- Amount of grant dollars garnered to support natural resources research and outreach.

Year	Actual
2012	8799278

Output #3

Output Measure

- Number of Master Gardener and Wildlife Master volunteer hours

Year	Actual
2012	49571

Output #4

Output Measure

- Value of volunteer time at \$20.25/hr (nationally recognized value.)

Year	Actual
2012	1003813

Output #5

Output Measure

- Number of volunteers supporting this program.

Year	Actual
2012	4163

Output #6

Output Measure

- Number of partnering agencies supporting this program.

Year	Actual
2012	113

Output #7

Output Measure

- Number of new technologies adopted by producers.

Year	Actual
2012	10

Output #8

Output Measure

- Pounds of food donated to local food banks through Master Gardener efforts.

Year	Actual
2012	32136

Output #9

Output Measure

- Number of curriculum pieces developed and/or reviewed in support of this planned program.

Not reporting on this Output for this Annual Report

Output #10

Output Measure

- Number of Small Acreage Workshops Delivered
Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Number of Demonstration Plots established/maintained to share research and outreach results

Year	Actual
2012	247

Output #12

Output Measure

- Number of field days conducted to share research and outreach results
Not reporting on this Output for this Annual Report

Output #13

Output Measure

- Number of individual producers and/or landowners receiving consultation to address local problems.
Not reporting on this Output for this Annual Report

Output #14

Output Measure

- Number of Native Plant Master Volunteer Hours
Not reporting on this Output for this Annual Report

Output #15

Output Measure

- Value of Native Plant Masters' volunteer time (at \$20.25/hour)
Not reporting on this Output for this Annual Report

Output #16

Output Measure

- User fees in dollars, collected through Natural Resources & Environment programming

Year	Actual
2012	62384

Output #17

Output Measure

- Number of acres impacted by planting of natives in a sustainable landscape

Year	Actual
2012	153441

Output #18

Output Measure

- Number of acres impacted by alien weed control efforts.

Year	Actual
2012	291401

Output #19

Output Measure

- Dollar amount saved by residents from their planting of natives in a sustainable landscape.

Year	Actual
2012	20662

Output #20

Output Measure

- Number of land managers and residents who reported they retained their current job, got a promotion or got a new job as a result of their program participation.

Year	Actual
2012	32

Output #21

Output Measure

- Dollar amount saved by land managers and residents from control of alien weeds.

Year	Actual
2012	136736

Output #22

Output Measure

- WR: Number of water quality sampling and analysis performed in a manner meaningful to the user and regulating agencies.

Year	Actual
2012	28

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percent of participants in workshops/trainings/field days indicating an increase in knowledge gained about agriculture/horticultural practices and the environment.
2	Percent of participants indicating change in behavior/best practices adopted.
3	Economic impact in dollars reported as a result of the change in behavior.
4	Percent of participants gaining knowledge to change irrigation practices in order to provide a cleaner environment.
5	Percent of participants indicating they changed behavior in order to have less pollution and more efficient water use.
6	Colorado Master Gardener (CMG) volunteers gain knowledge in home gardening (soils, plant selection, planting and management, BMPs, identification, diagnostics and problem-solving) and gain competence in areas of leadership, organizational, and other life skills, allowing them to be more proficient in providing the public with research-based gardening knowledge.
7	Environmental Horticulture (HORT): Home gardeners and green industry professionals report enhanced plant health and more efficient use of labor, water, fertilizer and pesticides when creating and maintaining landscapes
8	LOCAL FOOD Availability and quality of locally produced food increases (more home gardens, community gardens, school gardens, prison gardens); support of CSAs and Farmers' Markets is increased (as measured by visits, vendor participation, dollars spent).
9	WATER RESOURCES (WR): Understanding the consumptive use of water for different crop types and varieties for agriculture under regional conditions throughout Colorado.
10	NATIVE PLANT EDUCATION (NPE): Number of land managers and residents who began or increased weed control efforts.
11	Systems for measuring and managing consumptive water use
12	Control of invasive species
13	Adoption of cropping systems to improve crop water productivity

Outcome #1

1. Outcome Measures

Percent of participants in workshops/trainings/field days indicating an increase in knowledge gained about agriculture/horticultural practices and the environment.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Percent of participants indicating change in behavior/best practices adopted.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Economic impact in dollars reported as a result of the change in behavior.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Percent of participants gaining knowledge to change irrigation practices in order to provide a cleaner environment.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Percent of participants indicating they changed behavior in order to have less pollution and more efficient water use.

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Colorado Master Gardener (CMG) volunteers gain knowledge in home gardening (soils, plant selection, planting and management, BMPs, identification, diagnostics and problem-solving) and gain competence in areas of leadership, organizational, and other life skills, allowing them to be more proficient in providing the public with research-based gardening knowledge.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	6274

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Professional landscape management and homeowner gardening activities contribute significantly to the economy of Colorado. According to a study conducted by Colorado State University (Thilmany et al., 2008; <http://www.greenco.org/downloadables/GreenCO-ExecSumFinal08.pdf>), entitled The Economic Contribution of Colorado's Green Industry: A 2008 Update, Colorado household and business expenditures on garden, landscape and lawn products and services (including linkage industries such as irrigation systems, botanical gardens, lawn and garden equipment and maintenance services) have averaged almost 10% annual growth since 1993, for a 2007 total of \$1.8 billion. The \$1.8 billion directly contributed to the Colorado economy increases to \$3.3 billion when its impact on broader economic activity and employment generation in the Colorado economy is considered.

What has been done

Around the state, county CMG volunteers report helping Coloradans improve the quality of their lives through gardening. From teaching young children and families how to grow their own food, to demonstrating water-saving solutions for residential landscapes, CMG volunteers extend research-based information that helps people make informed choices regarding resource issues.

Results

- CMGs help families and individuals learn to grow their own food, develop self-sufficiency skills, adopt healthy lifestyles and stretch dollars during tough economic times.
- CMGs assist communities in strengthening local food systems and addressing regional food security by helping improve local food production and donating produce to food banks.
- CMGs promote economic development and increase access to local foods through farmers' markets and food-based community events that celebrate local food and seasonal harvests and

attract thousands of citizens.

-CMGs promote and share environmentally responsible gardening solutions via water-wise, low precipitation xeric gardens and appropriate pesticide use; homeowners save money, conserve resources and improve property values.

-CMGs help youth develop ecological understanding, lifelong gardening skills, an ethic of community service and a taste for nutritious foods.

-CMGs provide opportunities for youth and adults to overcome physical or social challenges to quality of life.

-The number of Coloradans with access to gardening expertise, information and assistance has increased from new media initiatives, annual symposia, community festivals and an expanded CMG volunteer base.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #7

1. Outcome Measures

Environmental Horticulture (HORT): Home gardeners and green industry professionals report enhanced plant health and more efficient use of labor, water, fertilizer and pesticides when creating and maintaining landscapes

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	20892

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The quality of a landscape design and maintenance is a major factor in the home and property values. The average household in Colorado spends over \$1,000 annually on landscape care and gardening supplies (<http://www.greenco.org/images/downloadables/GreenCO-ExecSumFinal08.pdf>). Landscaping yields an average of a 109% return on every dollar spent, much more so than other home improvements. (<http://ellisonchair.tamu.edu/emphasis-areas/marketing-economics/economic-benefits-of-plants/>).

What has been done

Colorado Garden & Home Show
PlantTalk Colorado?
Plant Select®
Demonstration gardens
LawnCheck

Results

One Example: 45 stated they agreed/agreed strongly that the drip irrigation class increased their knowledge of how to design and build a drip irrigation system. COMMENTS: When asked, "As a result of today's class, I plan to" 16 replied they planned to try/install/switch to drip irrigation for containers and vegetable gardens; 31 stated they agreed/strongly agreed that the turf care class will save them money by using water and fertilizer more effectively for a healthier lawn.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water

Outcome #8

1. Outcome Measures

LOCAL FOOD Availability and quality of locally produced food increases (more home gardens, community gardens, school gardens, prison gardens); support of CSAs and Farmers' Markets is increased (as measured by visits, vendor participation, dollars spent).

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1603

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In recent years, Colorado citizens have become increasingly more interested in the source and quality of their food, availability of local and sustainably produced foods, and community food security through strengthening local food systems. Commonly asked questions regarding the food

they purchase include: Is it organic? Is it GMO? Is it from a family farm? Is it locally produced? What is its carbon footprint? Programs and movements including Ark of Taste, Farm-to-Table, Slow Food USA have captured the interest of a growing number of consumers. This demand is creating opportunities for new and existing food producers to engage in higher-value markets. However, challenges exist that need to be addressed to grow the local foods movement. CSU Extension can play a role in providing guidance and education in the areas of local food production, processing, distribution, and consumption as where communities are working to develop affordable, diverse, healthy, and just local food systems.

What has been done

Interest in local food production is reflected in growing popularity of farmers' markets and community gardens. A number of counties are involved in the direct organization and/or operation of local farmers' markets, while other counties participate in them as venues for providing consumer education in areas like home gardening, food preservation, and healthy eating. Some markets offer workshops and demonstrations on good nutrition, safe food preparation, home gardening, plant problem diagnostics, etc.

Results

- Farmers' Market administration - FM coordinator and other Extension staff (hours) (629)
- Farmers' Market administration - agent hours (595)
- Farmers' Market estimated attendance (63332)
- Farmers' Market gross sales (\$633546)
- Farmers' Market number of participating vendors (134)
- Farmers' Market-specific volunteer hours (2453)

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #9

1. Outcome Measures

WATER RESOURCES (WR): Understanding the consumptive use of water for different crop types and varieties for agriculture under regional conditions throughout Colorado.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	105

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Adequate supplies of clean water are essential to the health and wellbeing of Colorado citizens, agriculture, industry, wildlife and the economic vitality of the State. With shifting demographics, a growing population and a more integrated global economy, Colorado communities are increasingly faced with losing irrigated agriculture to growing municipal and industrial demands. Many residents and visitors to Colorado also value the state's recreational and environmental water uses putting additional pressure on the state's scarce water supply.

What has been done

Agriculture, industry, homeowners, water providers, and agencies in addition to other educational and research institutions look to Colorado State University Extension to provide research-based information and educational programs on water quality, water quantity, water policy, and other water resource issues. Extension is not the only institution with outreach expertise. Extension's value is in bringing the credibility and continuity of science based land grant institution.

Results

105 participants reported increased understanding of the consumptive use of water for different crop types and varieties for agriculture under regional conditions throughout Colorado.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water

Outcome #10

1. Outcome Measures

NATIVE PLANT EDUCATION (NPE): Number of land managers and residents who began or increased weed control efforts.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	172

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Colorado is a dry state. According to the Colorado Climate Center, statewide average annual precipitation is only 17 inches. Sustainable landscapes using site-appropriate native plants can reduce the need for water and maintenance. A five year study of homes that converted non-native turf to water-efficient native and non-native plants in Las Vegas, Nevada found a 39 percent reduction in average summer monthly water use and a 33% reduction in maintenance costs in addition to the water savings. (Source:

http://www.snwa.com/assets/pdf/about_reports_xeriscape.pdf Xeriscape Conversion Study. Sovocool, K. 2005.)

Native plants can also be beneficial because they are environmentally adapted, hardy, provide food and shelter for wildlife and maintain local biological diversity.

Invasive, non-native weeds are a concern in many communities and threaten native ecosystems. Management of invasive weeds is critical when maintaining a natural space or a landscaped yard and garden. About 42% of the species on the Threatened or Endangered Species lists are at risk primarily because of alien invasive species. Nonindigenous species in the United States cause major environmental damage and losses totaling approximately \$120 billion per year. (Source: <http://www.sciencedirect.com/science/article/pii/S0921800904003027> Update on the Environmental and Economic Costs Associated with Alien-Invasive Species in the United States, Pimentel et al., Feb. 2005.)

Noxious weeds are moving into valued ecosystems displacing natives at an alarming rate. Invasive plants are found on 133 million acres in the US (as big as California and New York combined), in federal, state, and private ownerships. Each year, invasive species advance by 1.7 million acres. (Source: <http://www.fs.fed.us/projects/four-threats/facts/invasive-species.shtml> Invasive Species. U.S. Forest Service, 2006.)

What has been done

Colorado State University Extension created the Native Plant Master (NPM) education and volunteer program 16 years ago, to raise awareness about native plants, sustainable landscapes and threats to native ecosystems, including invasive weeds.

Jefferson County Extension launched the state's first NPM training in 1997. Today, 14 Extension offices around the state offer hands-on courses taught by county agents and other NPM trainers. Each course is divided into three sessions which cover:

- Plant identification using a key along with a botanical field guide;
- Ecological relationships between noxious weeds, native plants and insects, birds and wildlife;
- Landscape and other human uses for Colorado native plants.

Results

Educational programs provide research-based information on native plants suitable for sustainable landscaping and noxious weed management that has enabled residents to make informed choices. Their choices can result in cost savings from reduced inputs such as water and maintenance and a positive impact on the environment through control of alien invasives that threaten native plant communities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
136	Conservation of Biological Diversity

Outcome #11

1. Outcome Measures

Systems for measuring and managing consumptive water use

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Growers need an irrigation water management tool that utilizes localized crop ET estimates, weather, and soil information for efficient use of irrigation water. In the Arkansas Valley, such information is necessary for resolving the Colorado/Kansas water dispute.

What has been done

An irrigation-scheduling spreadsheet (Excel) tool has been developed. Two versions of the tool are available: one for annual crops and another for hay crops (e.g., alfalfa hay). Daily crop consumptive water use is estimated from reference crop evapotranspiration (ET) calculated by CoAgMet and adjusted with a daily crop coefficient for the specific crop. The hay crop version incorporates alfalfa hay crop coefficients developed from the lysimeter studies at Rocky Ford, CO. Hourly and daily consumptive water use of alfalfa hay was collected using two weighing lysimeters at Rocky Ford, CO during the 2012 growing season.

Results

Information on the consumptive water use of alfalfa hay in the Arkansas River Valley of southeast Colorado was presented to approximately 120 water professionals (water managers, irrigators, water lawyers) in Colorado. Also, a newly-developed irrigation scheduling spreadsheet tool gives users that have Internet access the capability of tracking the daily soil water balance of individual irrigated fields calculated from evapotranspiration and rainfall data from the Colorado Agricultural Meteorological Network (CoAgMet) and field-specific soils information from USDA-NRCS Web Soil Survey. The irrigation scheduling tool was delivered to Colorado NRCS for use at their field offices in Colorado.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
132	Weather and Climate

Outcome #12

1. Outcome Measures

Control of invasive species

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The non-native invasive shrub, tamarisk, (*Tamarix* sp.) is one of the most significant threats to aquatic and riparian ecosystems in the arid western U.S. This non-native tree has the potential to crowd out native vegetation and modify river flow patterns and habitat quality for native species. In Colorado, resource managers are particularly concerned with potential impact of tamarisk on endangered fish species in the Colorado River basin and with the impact of this noxious weed on native plant species and wildlife.

What has been done

We have been examining the impact of a biological control agent of Tamarisk, *Diorhabda carinulata*. This research has demonstrated: A) When established, repeated defoliation of tamarisk by the biological control agent results in smaller tamarisk trees, reduced flowering and seed set, and in some cases tree death. B) Extensive defoliation of tamarisk by the biological control agent does not reduce the abundance or richness of other arthropods occupying tamarisk. C) Tamarisk collected from northern portions of the weed's US range are less resistant to *D. carinulata* feeding but are more tolerant of defoliation by either the beetle or a defoliating herbicide.

Results

The results of this research will be used by resource managers to develop better management practices for this invasive weed. Biological control is having a substantial impact on tamarisk over most populations of tamarisk in Colorado, and should have a relatively greater impact on tamarisk

performance in more northern populations than in more southern populations. Similarly, mechanical or chemical defoliation will have a greater impact on northern tamarisk populations than southern populations. Contrary to expectations, high populations of the biological control agent and associated tamarisk defoliation do not result in a reduction in the abundance of other tamarisk inhabiting arthropods.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
121	Management of Range Resources
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #13

1. Outcome Measures

Adoption of cropping systems to improve crop water productivity

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Information and models are needed by growers for water limited agroecosystems and sustainable management of both dryland and limited-irrigation cropping systems in eastern Colorado. Field research and models are used to develop cropping systems that improve crop water productivity. The limited irrigation research has been used to identify profitable cropping systems with reduced consumptive water use of 20-50%. However, adoption of these systems depends on the acceptance by state government of approaches to verify crop water use.

What has been done

We tested three approaches: crop stress coefficients (Ks), crop water stress index (CWSI), and a model for remote sensing of evapotranspiration (RESET) using corn under multiple irrigation strategies as the model crop. ET calculated using the Ks approach tracks closely with actual ET with acceptable level of error. CWSI is based on the measurement and use of crop canopy

temperature. Crop canopy temperature is higher when a crop is under water stress and CWSI indexes the canopy temperature relative theoretical weather based limits and can be used to calculate ET. CWSI based on weekly measurements clearly identified degrees of water stress and appears to be a valid approach for ET determination.

Results

Intensive dryland cropping systems build soil organic carbon, improve soil quality, and improve both air and surface water quality because they provide high amounts of year around cover. These benefits have been realized for about 1,500,000 acres in CO that have been converted from wheat-fallow to wheat-summer crop-fallow. This conversion increased net return by \$22,275,000 per year under normal precipitation conditions. Limited irrigation cropping systems based on conservation tillage practices demonstrated in this project build soil organic carbon, improve soil quality, and improve both air and surface water quality because they provide high amounts of year around cover. These benefits have the potential to affect as much as 2,000,000 acres in CO.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
132	Weather and Climate
205	Plant Management Systems

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 Programmatic Challenges

Brief Explanation

Colorado's on-line planning and reporting system does not give data in percentages; therefore, we are not reporting on outcomes that were written in percentages.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Colorado Master Gardener, Farmers' Market, and Native Plant Education programs collect substantial data on outputs.

Key Items of Evaluation

NATIVE PLANT EDUCATION: Thousands of Coloradans are annually educated by a few hundred Native Plant Master (NPM) volunteers. The team annually measures this impact

through a survey asking program participants to report on sustainable landscaping and weed mitigation projects they complete. In 2012, NPM participants from across the state reported a combined savings of \$20,662 from reduced landscape inputs such as water, pruning and pest control as a result of planting native species on more than 150,000 acres of public and private land. NPM participants also reported a combined \$136,736 in savings from improved grazing, crop output, ornamental landscapes, wildlife and tourism--resulting from weed control of invasive non-native plants--on more than 280,000 acres of public and private land. These figures indicate that CSU Extension has found a cost-effective way to increase the sustainability of Colorado's public and private landscapes while reducing invasive weeds.

WATER: Water quality samples were done in one county (Huerfano) and were of a very sophisticated nature, as the sampling was being done as a "baseline" for potential hydraulic fracturing activities in the area. Water specialists also trained participants to perform the sampling. The "Well-Educated" program at CSU has online resources devoted to this as (<http://waterquality.colostate.edu/>).