

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Environmental Horticulture

2. Brief summary about Planned Program

The outreach efforts of the Environmental Horticulture Planning & Reporting Unit (PRU) will provide education and services to encourage the adoption of research-based best management practices (design, plant selection, establishment, and management practices) and diagnostic techniques/services by green industry professionals and the home gardener. Our goal is that professional and lay practitioners will use reasonable inputs of labor, water, fertilizers and pesticides to produce attractive, functional, cost-effective and sustainable ornamental landscapes.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	30%		0%	
111	Conservation and Efficient Use of Water	35%		0%	
216	Integrated Pest Management Systems	35%		0%	
	Total	100%		0%	

V(C). Planned Program (Situation and Scope)

1. Situation and priorities

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. The authors also found that, in 2007, the green industry provided Coloradoans with over 35,000 jobs, an increase of 12,000 jobs since 1994 (tripling in size in less than 15 years), with \$1.2 billion in payroll (up \$750 million from 1994). The average green industry wage earned in 2007 increased to an average of \$35,318 annually, up from \$26,159 in 2001. It appears that the green industry has made an almost complete recovery from the

drought restrictions and economic downturn in the early 2000s, but it is not yet clear how the industry will weather the current housing downturn. Colorado ranks 22nd of 50 states in its contribution to Gross Domestic Product (Hodges et al., 2011).

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/>). The primary issues addressed by Environmental Horticulture Extension include: ornamental landscapes, diagnostic services, and volunteer engagement. Emerging issues for consideration include:

- Sustainable landscaping
- "Green" gardening
- Organic/natural landscape management
- Composting/recycling
- Water-wise/water smart gardens
- Youth Gardening
- Wildlife gardening (birds, butterflies)
- Home greenhouses
- Spanish speaking audiences

Ornamental Landscapes

In recent decades, the Rocky Mountain region has become known for horticultural innovation. Plant Select® is a non-profit Colorado corporation administered by Colorado State University and the Denver Botanic Gardens in concert with horticulturists and nurseries throughout the Rocky Mountain region and beyond (<http://www.plantselect.org/>). The purpose of Plant Select® is to seek out, identify and distribute the very best plants for landscapes and gardens from the intermountain region to the high plains. Several plants are chosen each year that thrive in the sunny, variable conditions of Rocky Mountain gardens. These can be plants that have grown here for years and have not yet attained the popularity they deserve, known as recommended plants. Introductions represent taxa that are discovered by our cooperators. Superior forms or hybrids carefully tested over time are known as originals. Plant Select® is at the vanguard of a bold, new plant palette that is revolutionizing the way the public gardens. These plants have the capacity to thrive in both our variable winters and our hot summers. They are helping forge a truly American style of horticulture. Agents, Specialists, volunteers, and industry members collaborate to discover, propagate, and evaluate new introductions and past selections for the Plant Select® Program. Over 2 million plants were sold in 2011.

The Environmental Horticulture Work Team puts statewide efforts into the Colorado Garden and Home Show. This event brings in Colorado residents from across the state and residents and vendors from 20+ states and Canada. The show's estimated annual economic impact on Denver is \$40 million in incremental spending by those attending (<http://www.gardeningcolorado.com>). In 2013, attendance reached approximately 55,000 people, the highest-attended consumer show held at the Colorado Convention Center. Agents, specialists, and volunteers cooperate to design, install, and staff a CSU Extension educational garden and booth at the Colorado Garden and Home Show. Specialists also teach classes at this annual event.

PlantTalk Colorado™ provides reliable timely information on more than 500 horticultural topics (including over 400 translated into Spanish); it is sponsored by Colorado State University Extension, the Denver Botanical Gardens, and the Green Industries of Colorado. Information is provided in both English and Spanish in print and web-based formats. Agents, specialists, and volunteers collaborate to write, edit, and review these documents.

Demonstration gardens are a part of most county volunteer efforts as well as Agents and Specialists efforts. Twenty seven out of 59 offices of CSU Extension Offices are associated with some type of demonstration garden. Nearly 90 public gardens throughout the Rocky Mountains and High Plains area, including CSU Extension, libraries, fire stations, Xeriscape®, demonstration gardens, public parks, etc. have acquired Plant Select® plants over the past years to create a Plant Select® Demonstration Garden.

These gardens are open to the public and allow visitors to view Plant Select® introduced and recommended plants in real-life situations.

Diagnostic Services and Integrated Pest Management (IPM)

New pest outbreaks affecting horticultural plants have been occurring in Colorado with increasing frequency in recent years. Oak agrilus borer and Japanese beetle were detected 2003. Japanese beetle was eradicated in the Tri-River area in 2004, but reappeared in the Front Range in 2005 where it continues to be a growing problem. In 2013, emerald ash borer was detected in Boulder County; the presence of this insect presents the potential to cause millions of dollars of damage to the Front Range urban forest. Mountain pine beetle epidemics have occurred off and on since the 1950s and by 2011 had affected 752,000 acres of Colorado. (Results of the 2011 Aerial Detection Survey in Region 2, U.S. Forest Service, Rocky Mountain Region). Spotted wing drosophila was been reported in Fort Collins and the Denver metro area in 2013; this insect will be a significant problem for both commercial and home gardener small fruit production. Another important introduced insect, the brown marmorated stink bug, is likely to become a problematic Colorado pest in the near future. The impact of these invasive species has received increased attention from state and Federal governments and IPM programs are under development to mitigate their negative impacts. These programs need major enhancements to adequately protect human health, our food supplies, and the environment from the impact of pests and pest management tactics. Extension personnel have collaborated with other agencies in delimitation studies, public education, pest identification and research and developing management strategies. As pests are introduced or break out, extension personnel continue to devote time and effort towards them.

Lawn problems are the number one concern brought to Colorado State University Extension offices in many urban and suburban counties. In response to t

2. Scope of the Program

- In-State Extension
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Colorado State University Extension will collaborate with the entities making up the Green Industries of Colorado and professionals within the green industries, various state and federal government agencies and non-governmental organizations, and the gardening public in order to provide up-to-date, research based information for delivery horticultural programming for both rural and urban audiences.

2. Ultimate goal(s) of this Program

The outreach efforts of the Environmental Horticulture Planning & Reporting Unit (PRU) will provide education and services to encourage the adoption of research-based best management practices (design, plant selection, establishment, and management practices) and diagnostic techniques/services by green industry professionals and the home gardener. Our goal is that professional and lay practitioners will use reasonable inputs of labor, water, fertilizers and pesticides to produce attractive, functional, cost-effective and sustainable ornamental landscapes.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2015	23.0	0.0	0.0	0.0
2016	23.0	0.0	0.0	0.0
2017	23.0	0.0	0.0	0.0
2018	23.0	0.0	0.0	0.0
2019	23.0	0.0	0.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Provide up-to-date, research based information for delivery horticultural programming for both rural and urban audiences.

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Group Discussion ● One-on-One Intervention ● Demonstrations ● Other 1 (training for volunteers) 	<ul style="list-style-type: none"> ● Public Service Announcement ● Newsletters ● eXtension web sites ● Web sites other than eXtension

3. Description of targeted audience

Home gardeners and professional green industry professionals (ages 19+) and youth gardeners (ages 5-18).

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
- Number of patents submitted
- Number of peer reviewed publications

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- 1. Number of group educational events: classes, trainings, workshops, demonstrations, field days, providing content expertise, fairs, shows, booths, other group events.
- 2. Individual Education: one-on-one direct client contacts by site visit, office drop-in, e-mail, telephone, Ask an eXpert, etc.
- 3. Number of meetings convened and/or facilitated; includes strategic participation that contributes to program development.
- 4. Number of kits or similar resources loaned or provided.
- 5. Number of Extension-related research and assessment projects. External funding proposals, including local, state, federal.
- 6. Number of peer-reviewed publications including fact sheets, decision tools, curricula, multimedia, etc.
- 7. Number of media releases: indirect contacts through media releases, appearances, newsletters, blog posts, other non-peer reviewed publications, kit development, non-peer reviewed curriculum, PowerPoints or videos.
- 8. Number of online posts: Web posts, hits.

Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	ENVHORT: Participants report using or intention to use new technologies and/or intention to adopt or adoption of best management practices and/or policies promoting best management practices in their landscapes, businesses and/or communities.
2	ENVHORT: Participants report intention to change or they have changed pest management strategies, intent to utilize or utilizing new technologies to assist with pest diagnosis and management, intent to adopt or adopting integrated pest management strategies and/or intention to adopt or adopting of policy promoting or utilizing integrated pest management strategies.
3	ENVHORT: As a result of Colorado Master Gardener (CMG) training and on-going support, CMGs report increased competence (confidence and proficiency/accuracy) in educating the public.

Outcome # 1

1. Outcome Target

ENVHORT: Participants report using or intention to use new technologies and/or intention to adopt or adoption of best management practices and/or policies promoting best management practices in their landscapes, businesses and/or communities.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 2

1. Outcome Target

ENVHORT: Participants report intention to change or they have changed pest management strategies, intent to utilize or utilizing new technologies to assist with pest diagnosis and management, intent to adopt or adopting integrated pest management strategies and/or intention to adopt or adopting of policy promoting or utilizing integrated pest management strategies.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 3

1. Outcome Target

ENVHORT: As a result of Colorado Master Gardener (CMG) training and on-going support, CMGs report increased competence (confidence and proficiency/accuracy) in educating the public.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Description

Natural Disasters including invasive pest introduction, drought, flooding, hail, moisture/temperature trends can influence pest life cycles which will require redirection of effort to accommodate current needs.

Economic problems may lead more individuals to acquire/redirect their IPM strategies according to resource limitations or opportunity; more individuals may grow their own food crops, requiring redirection of programming efforts; individuals may spend less on landscape and turf, requiring redirection of programming efforts. Colorado Master Gardener volunteer numbers may be less due to increased costs associated with the program and personal economic situation.

Government regulations may alter pesticide, water and plant availability and use, redirecting efforts to alternative materials and methods.

Population changes may increase the demand on volunteer and staff time or may increase demands in specific areas such as food production. Increases in under-served populations may alter programming delivery methods.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

- Surveys will be done pre and post program
- The surveys will ask questions focused primarily on knowledge gained by attending workshops/educational programs, and if they will adopt practices discussed in these programs
 - The surveys will help us measure the percentage of program participants who increased their knowledge on proper plant/cultivar selection (for landscape and food production), establishment practices, and plant, soil, water, and pest management practices.
 - The results of the surveys will be distributed to or will be used for the purposes of program evaluation and development of future programming.