

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Sustainable Natural Ecosystems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	4%		7%	
102	Soil, Plant, Water, Nutrient Relationships	9%		15%	
103	Management of Saline and Sodic Soils and Salinity	4%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	1%		2%	
111	Conservation and Efficient Use of Water	12%		5%	
112	Watershed Protection and Management	9%		2%	
121	Management of Range Resources	6%		3%	
122	Management and Control of Forest and Range Fires	1%		2%	
123	Management and Sustainability of Forest Resources	6%		2%	
131	Alternative Uses of Land	2%		2%	
132	Weather and Climate	3%		3%	
133	Pollution Prevention and Mitigation	11%		8%	
135	Aquatic and Terrestrial Wildlife	9%		9%	
136	Conservation of Biological Diversity	6%		8%	
141	Air Resource Protection and Management	4%		3%	
206	Basic Plant Biology	4%		8%	
305	Animal Physiological Processes	1%		2%	
605	Natural Resource and Environmental Economics	5%		8%	
610	Domestic Policy Analysis	2%		4%	
702	Requirements and Function of Nutrients and Other Food Components	1%		2%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

	Extension		Research

Year: 2010	1862	1890	1862	1890
	63.6	0.0	84.6	0.0
Plan				
Actual	56.4	0.0	86.0	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
1673767	0	733986	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1673767	0	733986	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
16361283	0	50423743	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

UC ANR's integrated research and extension programs conducted research projects, workshops, education classes and demonstrations, as well as one-on-one interventions. In addition, the programs used PSAs, newsletters, mass media, web sites and collaborations with other agencies and organizations to create and deliver programs.

2. Brief description of the target audience

- Farmers
- Ranchers
- Governmental agencies
- Agricultural and fishing organizations
- Owners/managers of private and public rangeland, forest and wildlands
- Community organizations
- Resource managers

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	30700	0	0	0
Actual	70821	0	192	0

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	40	340	
Actual	44	338	382

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Classes/Short Courses Conducted

Year	Target	Actual
2010	100	52

Output #2

Output Measure

- Workshops Conducted

Year	Target	Actual
2010	140	40

Output #3

Output Measure

- Demonstrations and Field Days Conducted

Year	Target	Actual
2010	120	19

Output #4

Output Measure

- Newsletters Produced

Year	Target	Actual
2010	70	5

Output #5

Output Measure

- Web Sites Created or Updated

Year	Target	Actual
2010	40	9

Output #6

Output Measure

- Research Projects Conducted

Year	Target	Actual
2010	240	170

Output #7

Output Measure

- Videos, Slide Sets and Other AV or Digital Media Educational Products Created

Year	Target	Actual
2010	20	0

Output #8

Output Measure

- Manuals and Other Printed Instructional Materials Produced

Year	Target	Actual
2010	90	14

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Percentage of farm, ranch, rangeland and marine industry owner/operators and managers and allied industry professionals participating in water quality education programs gaining knowledge of best management practices for preserving water quality
2	Number of governmental agencies, agricultural and fishing organizations, resource managers and other stakeholders in marine and inland fishery management issues gaining knowledge of strategies and techniques for sustainable use of marine and inland fishery resources
3	Percentage of owners/managers of private and public rangeland, forest and wildlands participating in range, forest and wildland education programs gaining knowledge of strategies and techniques for sustainable use of range, forest and wildland resources
4	Number of governmental agencies, community organizations and other stakeholders in land use policy issues gaining increased understanding of land use planning strategies, methodologies and data
5	Percentage of farm, ranch, rangeland and marine industry owner/operators and managers and allied industry professionals participating in water quality education programs adopting best management practices for preserving water quality
6	Percentage of owners/managers of private and public rangeland, forest and wildlands participating in range, forest and wildland education programs adopting recommended strategies and techniques for sustainable use of range, forest and wildland resources
7	Percentage of fire protection and land management agencies, land and home owners, community organizations, and landscape professionals participating in wildland fire education programs gaining knowledge on how to increase fire resistance of homes and landscaping
8	Percentage of farm, ranch, and landscape owners/operators and managers and allied industry professionals and governmental agency representatives participating in air quality education programs gaining knowledge of the atmospheric system and/or how policies, products, plants, and practices can help improve air quality
9	Percentage of farm owner/operators, allied industry professionals, and members of the public participating in water conservation education programs gaining knowledge of water use and conservation practices
10	Farm, ranch, and rangeland owner/operators and managers, allied industry professionals, public agency representatives, and members of the public, participating in water quality education programs, gained knowledge of best management practices for preserving water quality.
11	Resource managers and other stakeholders in watershed management issues, participating in sustainable use of fisheries education programs, gained knowledge of strategies and techniques for sustainable use of inland fishery resources.
12	Owners/managers of private and public rangeland, forest and wildlands, participating in sustainable use of natural resources education programs, gained knowledge of strategies and techniques for sustainable use of range, forest and wildland resources.
13	Farm owner/operators, allied industry and natural resource professionals, and members of the public, participating in water conservation education programs, gained knowledge of water use and conservation practices.
14	Fire protection and land management agencies, land and home owners, community organizations, and landscape professionals, participating in wildland fire education programs, gained knowledge on how to increase the fire resistance of homes and landscaping.

15	Farm, nursery, ranch and rangeland owner/operators and managers, allied industry professionals, public agency representatives, and members of the public, participating in water quality education programs, intended to use best management practices for preserving water quality.
16	UC helped to complete 15 Agricultural Conservation Easements and to protect 2,745 acres of working farm and ranch land in the northern San Joaquin Valley through the development of the Central Valley Farmland Trust.
17	Cattle ranchers adopted new grazing practices that improve water use efficiency.
18	UC research improved aviculture.
19	Members of the public in Los Angeles and Ventura counties adopted fire-safe landscape practices.
20	UC research on urban runoff develops improved landscape management practices related to water.
21	UC research on the negative impacts of nitrogen deposition on native plants is now available to regulators to consider ecosystem as well as human health.

Outcome #1

1. Outcome Measures

Percentage of farm, ranch, rangeland and marine industry owner/operators and managers and allied industry professionals participating in water quality education programs gaining knowledge of best management practices for preserving water quality

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of governmental agencies, agricultural and fishing organizations, resource managers and other stakeholders in marine and inland fishery management issues gaining knowledge of strategies and techniques for sustainable use of marine and inland fishery resources

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Percentage of owners/managers of private and public rangeland, forest and wildlands participating in range, forest and wildland education programs gaining knowledge of strategies and techniques for sustainable use of range, forest and wildland resources

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of governmental agencies, community organizations and other stakeholders in land use policy issues gaining increased understanding of land use planning strategies, methodologies and data

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Percentage of farm, ranch, rangeland and marine industry owner/operators and managers and allied industry professionals participating in water quality education programs adopting best management practices for preserving water quality

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Percentage of owners/managers of private and public rangeland, forest and wildlands participating in range, forest and wildland education programs adopting recommended strategies and techniques for sustainable use of range, forest and wildland resources

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Percentage of fire protection and land management agencies, land and home owners, community organizations, and landscape professionals participating in wildland fire education programs gaining knowledge on how to increase fire resistance of homes and landscaping

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Percentage of farm, ranch, and landscape owners/operators and managers and allied industry professionals and governmental agency representatives participating in air quality education programs gaining knowledge of the atmospheric system and/or how policies, products, plants, and practices can help improve air quality

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Percentage of farm owner/operators, allied industry professionals, and members of the public participating in water conservation education programs gaining knowledge of water use and conservation practices

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Farm, ranch, and rangeland owner/operators and managers, allied industry professionals, public agency representatives, and members of the public, participating in water quality education programs, gained knowledge of best management practices for preserving water quality.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1280

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #11

1. Outcome Measures

Resource managers and other stakeholders in watershed management issues, participating in sustainable use of fisheries education programs, gained knowledge of strategies and techniques for sustainable use of inland fishery resources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	60

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

Outcome #12

1. Outcome Measures

Owners/managers of private and public rangeland, forest and wildlands, participating in sustainable use of natural resources education programs, gained knowledge of strategies and techniques for sustainable use of range, forest and wildland resources.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	245

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity

Outcome #13

1. Outcome Measures

Farm owner/operators, allied industry and natural resource professionals, and members of the public, participating in water conservation education programs, gained knowledge of water use and conservation practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	76

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

Outcome #14

1. Outcome Measures

Fire protection and land management agencies, land and home owners, community organizations, and landscape professionals, participating in wildland fire education programs, gained knowledge on how to increase the fire resistance of homes and landscaping.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	151

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
122	Management and Control of Forest and Range Fires

Outcome #15

1. Outcome Measures

Farm, nursery, ranch and rangeland owner/operators and managers, allied industry professionals, public agency representatives, and members of the public, participating in water quality education programs, intended to use best management practices for preserving water quality.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	52

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #16

1. Outcome Measures

UC helped to complete 15 Agricultural Conservation Easements and to protect 2,745 acres of working farm and ranch land in the northern San Joaquin Valley through the development of the Central Valley Farmland Trust.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Prime farmland is disappearing at an alarming rate all across the nation and the problem is especially acute in the San Joaquin Valley.

Farmers and local governments need more effective tools for preserving prime farmland. Agricultural Conservation Easements (ACE) allow land owners to preserve working farms and also accomplish long-term estate-planning objectives. A farmland trust is needed to facilitate these projects and to hold the resulting easements.

What has been done

UC Cooperative Extension in Merced County has worked with interested agriculturalists to establish and grow the Central Valley Farmland Trust (CVFT). A UC farm advisor provided technical assistance in policy development, capacity building and building organizational strength. He also lectures to groups in other agricultural areas of the state who are interested in developing farmland trusts to serve their regions. He provides technical assistance to groups and agencies on and use issues and impacts on production agriculture.

Results

As of June 2010 the CVFT has completed 15 ACE and has protected 2,745 acres of working farm and ranch land in the northern San Joaquin Valley. Projects are pending that will protect additional high-value lands. All of the existing farms are in production today and monitored regularly by volunteers and staff members to assure the objectives of the ACE are being met. The large number of inquiries and applications is indicative of the big demand by property owners for the opportunity to complete ACE. Funding for them has been difficult to obtain, so the waiting list

is long. The CVFT is working with other jurisdictions to help them develop similar programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

Outcome #17

1. Outcome Measures

Cattle ranchers adopted new grazing practices that improve water use efficiency.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Most ranchers in the intermountain area of Northern California rely on irrigated pastures or public land grazing allotments for grazing during the growing season. Because of harsh winter conditions, there is insufficient good-quality forage on the range or in irrigated pastures from October to mid April or later. That makes winter feeding one of the most costly inputs in cow/calf cattle operations as ranchers feed hay, low-quality crop aftermath, or supplements. There are other incentives for cattle producers to find alternative grazing systems. Growers are facing continued and more aggressive reductions in public lands grazing. This will intensify the need for improved efficiency and increased forage supplies, especially in the fall. Water use for forage production is also falling under increased scrutiny. A forage system that decreases winter hay feeding, reduces the dependency on public lands grazing, and improves water use efficiency would be highly desirable.

What has been done

UC Cooperative Extension advisors conducted a series of field trials in Siskiyou County to develop a grazing system using winter annual grasses. Trials were conducted with growers and at the UC Intermountain Research and Extension Center. Yield and forage quality were evaluated

for several different grass species under actual grazing conditions. Grazing management practices were also studied by cutting to simulate grazing. The results indicated that annual grasses such as triticale could lengthen the forage production season by allowing late fall grazing, early spring grazing and still allow for a hay crop to be produced from the regrowth after grazing. Much of the growing season for winter annual grasses occurs at times of the year when temperatures are cool and rain frequent. Since the amount of water needed per unit of forage is less with this annual grass system than it is with perennial grasses, this system has improved water use efficiency.

Results

The new forage management system, primarily with a new crop called triticale, is a terrific improvement. Triticale doesn't replace an old crop; it complements the traditional cattle grazing systems. Triticale provides grazable forage of high quality when previously that wasn't available. Growth occurs during the year when natural rainfall is more plentiful making better use of water. It's advantages are so great many cattle ranchers are readily adopting the new practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources

Outcome #18

1. Outcome Measures

UC research improved aviculture.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In the 1970s and 1980s, the popularity of parrots as pets increased markedly in the U.S. During that time, production of parrots in captivity was limited due to a lack of information about their nutrition and reproduction. Birds, mostly parrots, became the third most popular pet after cats and dogs. Most of the parrots sold as pets, except for budgerigars and cockatiels, were caught from the wild. Capture from the wild was so extreme that it led to the endangerment of many parrot species. As a result, the Wild Bird Conservation Act was enacted in 1992 to reduce capture from the wild by stopping importation of birds into the U.S., a major market for such birds. The act has been highly effective. Since 1992, the demand for pet parrots has been met by increased domestic production. To meet domestic demand, the conduct of aviculture has improved dramatically.

What has been done

In the early 1980s, captive parrots were often mismanaged, particularly in the areas of nutrition, reproduction, and rearing methods. Until recently, pet bird diets were based on folklore and tradition. Recent studies on parrot nutrition have led to the development and widespread adoption of formulated diets. UC ANR faculty in the UC Davis College of Agricultural and Environmental Sciences developed molecular genetic approaches for sexing birds, a dramatic advance over surgical methods of sexing birds. Photographic guides showing embryonic development have educated aviculturists on artificial incubation. Recent studies have shown how human handling of chicks better adapts them to captive environments and how cage enrichments, i.e., cage toys, help the psychological well-being of parrots, reducing the number of birds handed over to shelters and sanctuaries.

Results

Collectively, these studies have had a major positive impact on the conduct of aviculture. Importation of wild-captured birds to the U.S. has largely been halted. Domestically produced parrots are now meeting the demand for pet birds. Pet bird nutrition has been greatly improved by nutritionally balanced pelleted diets. Genetic sexing and environmental control of reproduction have improved the reproductive efficiency of parrots. Methods of rearing and cage enrichments are addressing the psychological well-being of birds. These new practices, along with advances in pet bird medicine, have radically transformed aviculture from what it was 30 years ago.

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes

Outcome #19

1. Outcome Measures

Members of the public in Los Angeles and Ventura counties adopted fire-safe landscape practices.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Risk of wildfire is one of the critical issues facing California communities that border wildlands. As we were reminded during 2009s catastrophic Station Fire, wildfires devastate families and communities and damage precious natural areas. Educating homeowners about fire-safe landscaping is one of the most effective ways to increase fire safety, reduce costs associated with property destruction, and reduce the risk of erosion and debris flows after a fire. In addition, wildlands close to communities can suffer if exotic plant species escape from backyards and invade habitat areas. Invasive plants harm habitat and increase the risk of wildfire.

What has been done

The UC Cooperative Extension Sustainable and Fire-Safe (SAFE) Landscapes program teaches Los Angeles and Ventura county wildland/urban interface homeowners how to create and maintain fire-safe landscaping around their homes, and take steps to protect the health of neighboring habitat. In particular, the program educates homeowners about the ecological and fire risks posed by invasive plants. UCCE also works with fire agencies, nurseries, and other organizations that provide lists of recommended plants to make sure they do not suggest the use of invasive species.

Results

SAFE Landscapes calendars were distributed to 49,000 residents in the wildland/urban interface areas of Los Angeles and Ventura counties through direct mail and at events and workshops. Mail-in surveys were included. Of 241 survey respondents, 76 percent reported being more concerned about invasive plants after reading the calendar, 81 percent said they have avoided buying invasive plants, 55 percent said they would change their landscape because of the calendar, and 51 percent specifically said they were removing these species from their landscapes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
122	Management and Control of Forest and Range Fires

Outcome #20

1. Outcome Measures

UC research on urban runoff develops improved landscape management practices related to water.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Recent droughts and expanding urban populations place increasing pressure on California's water supplies. In residential areas, outdoor water use, primarily for landscapes, comprises 50 percent or more of total water use. It is commonplace to see excess water gushing down storm drains from poorly aimed sprinklers, broken sprinkler heads, and a larger volume of water applied than the soil can absorb. The runoff water can carry pesticides, fertilizers and other waste into waterways, causing a detrimental effect on the health of the aquatic life in rivers, lakes and bays.

What has been done

UC researchers, in cooperation with CALFED and the State Water Resources Control Board, examined the runoff from eight neighborhoods in Sacramento and Orange counties. Water runoff samples were collected regularly during the irrigation season and during the first rains of each storm season. The samples were analyzed for 11 pesticides, fertilizers, other pollutants and pathogens. In both counties, UC master gardeners developed activities for homeowners to improve landscape management practices related to water, fertilizer, and pesticide use. The aim was to reduce or eliminate pollution runoff.

Results

The research found runoff flow in both counties showed consistent water waste from normal landscape irrigation. In Northern California, irrigation runoff was nearly five times higher than storm runoff, indicating poor outdoor water management in the dry season. In general, pesticides and pathogen indicators were found in all samples. This data helped water agencies develop customer programs on managing landscapes. Master Gardener outreach improved the landscape practices of homeowners. The flow data also is being used by a team of UC researchers to develop a model for urban planners and developers to reduce water runoff and runoff pollutants in

new and existing urban landscapes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation

Outcome #21

1. Outcome Measures

UC research on the negative impacts of nitrogen deposition on native plants is now available to regulators to consider ecosystem as well as human health.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Research documented the harmful effects of air pollution, specifically nitrogen deposition, on coastal sage scrub and desert native vegetation. Nitrogen deposited on the soil promotes the growth of non-native invasive grasses that can quickly replace and out-compete native plants. The loss of native plant communities can displace native wildlife that relies on the native species for nutrition, shelter, or nesting. The spread of invasive grasses has also been linked to increases in the frequency and severity of wildfires.

What has been done

A UC Specialist has been working with a multi-agency (EPA, National Park Service, Forest Service) working group to determine critical loads of nitrogen deposition that will cause harmful ecosystem impacts to southern California shrublands. Relatively low amounts of nitrogen deposition will cause increases in invasive grass biomass that fuel fires, and will cause losses in diversity of native wildflower species.

Results

The results of this research will be presented to regulators to inform air quality standards to avoid major ecosystem impacts. Air quality standards are set based on human health standards. However, in some cases, even lower amounts of atmospheric NO_x pollution than affect human health will have negative impacts on native California ecosystems. These negative impacts of nitrogen deposition on native ecosystems have previously been unknown, and now for the first time critical load values are available to regulators to consider ecosystem as well as human health.

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
141	Air Resource Protection and Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The continuing effects of global environmental change are being felt, with more extreme weather events, warming climate, and displacement of natural organisms. Superimposed on the above are a rapidly growing and urbanizing population with an increased gap between rich and poor. California's economy, which used to be ranked 8th in the world, has slipped to 12th, limiting available appropriations for issues related to sustainable natural ecosystems.

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

Evaluation Results

Key Items of Evaluation