

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Sustain, Protect, and Manage Hawaii's 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	7%		6%	
111	Conservation and Efficient Use of Water	0%		9%	
112	Watershed Protection and Management	7%		3%	
121	Management of Range Resources	8%		4%	
123	Management and Sustainability of Forest Resources	29%		4%	
124	Urban Forestry	0%		2%	
125	Agroforestry	0%		5%	
131	Alternative Uses of Land	0%		7%	
133	Pollution Prevention and Mitigation	0%		7%	
135	Aquatic and Terrestrial Wildlife	0%		1%	
136	Conservation of Biological Diversity	0%		4%	
205	Plant Management Systems	21%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	4%		8%	
212	Diseases and Nematodes Affecting Plants	3%		9%	
213	Weeds Affecting Plants	7%		4%	
402	Engineering Systems and Equipment	0%		2%	
403	Waste Disposal, Recycling, and Reuse	0%		2%	
404	Instrumentation and Control Systems	0%		1%	
605	Natural Resource and Environmental Economics	0%		9%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	14%		3%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	3.5	0.0	7.0	0.0
Actual Paid	4.3	0.0	5.3	0.0
Actual Volunteer	474.0	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
156048	0	284479	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
585048	0	1563616	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
33632	0	887503	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research and extension efforts to promote harmony between agriculture and environment continue to be a priority for CTAHR. Areas addressed by research and extension projects include agricultural waste management, forest resource management, agroforestry, range management, fire science, nutrient management, soil erosion, soil quality and bioremediation, biological diversity, rehabilitation of degraded and idle lands, handling of hazardous materials, and water quality. Research and extension efforts at preserving, protecting, and renewing Hawaii's natural resources continue to be an area of focus.

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In addition to presenting the third annual Forest Stewards master forest landowners training program in FY2014, and additional workshops to train forestry consultants, workshops for forestry and conservation nurseries were conducted for resource professional on Yap Island and Pohnpei Island in the Federated States of Micronesia. Research on forest resource management included surveying consumer preferences for koa wood color and figure as part of an assessment of young koa wood quality; developing an overall protocol for the Carbon Assessment of Hawaii (CAH) and produced wall to wall datasets of carbon stocks (soil carbon, coarse woody debris carbon, forest floor carbon, live biomass carbon); and characterization of stress-related genes in *Leucaena leucocephala* (*leucaena*) that may confer drought resistance in this stress tolerant tree legume.

The goal of the Wildfire Extension program for Hawaii is a reduced threat to ecosystems and communities in the Pacific from wildfire. To further this goal, the Pacific Fire Exchange (PFX) is a partnership between CTAHR, the US Forest Service (USFS) and the Hawaii Wildfire Management Organization (HWMO). Regular interactions through the PFX advisory panel include the US Fish and Wildlife Service (USFWS) in Honolulu, the USDA National Resource Conservation Service in Guam, Kamehameha Schools (a native Hawaiian educational institute), the Hawaii state Department of Forestry and Wildlife (DOFAW), the US Army Environmental Division, the Pacific Island Climate Change Cooperative, the Center for the Environmental Management of Military Lands, the Army Fire Department, the Nature Conservancy, and the Pacific Disaster Center. Facilitation of wildfire preparedness planning has been applied in one-on-one settings and provides clientele with increase awareness of the problem, knowledge about how to improve conditions, and a better understanding of their ability to mitigate fire risk.

In FY2014, significant progress was made in development and application of economic evaluation tools for Hawaii's environment and resources that are inclusive of environmental and social costs, and human well-being. A proof of concept ecosystem service value trade-off model was tested to determine cost effectiveness of road rehabilitation on a watershed area. As an alternative to use of Gross Domestic Product (GDP) to assess the value of natural capital in Hawaii, a set of policy-relevant green accounting measures was developed, and applied to create a comprehensive wealth account for the state, to be updated annually. This is reported annually as the Green Progress Indicator (GPI). In FY2014, a pilot valuation study (focused on the value of forests, land and water) was performed using the GPI measures.

Waste management and cleanup of environmental contaminants are serious issues in island ecosystems. In FY2014, biochar-supported nano-scale photocatalysts were found to be effective in completely degrading both endocrine disruptors and pharmaceutical compounds (medical wastes). Biochar applications to soil were also found to increase magnesium tolerance in plants, and may well have implications for remediation of other heavy metals as well.

CTAHR faculty continued efforts to conserve Hawaii's resources and endangered biota, including research on the impacts of animals and human interactions on natural environments, and evaluation of the first full year of impacts of release of an herbacious moth for fireweed biological control. The University of Hawaii Insect Museum (UHIM) supported by CTAHR increased their collection by 30,000 specimens in FY2014, and updated the museum online database with thousands of images and data files.

2. Brief description of the target audience

As intended by the Land Grant perspective, CTAHR's "targeted" clients for this program in teaching are the undergraduate and graduate students in agriculture, natural resource management, and allied fields. Targeted clients for research are peers and extension specialists. Clients for extension specialists are CTAHR's county extension agents and the counterpart professional personnel of sister state and federal agencies (such as the Hawai'i State Departments of Agriculture, Health, and Land and Natural Resources, and the USDA Natural Resources Conservation Service, NRCS). Clients for extension agents are land users and commodity producers and their organizations (such as the Hawai'i Association of Soil and Water Conservation Districts, Hawai'i Forestry Industry Association, and the Hawai'i Farm Bureau), extension staff in other CTAHR units and at sister institutions, and other members of the professional community who deal with managing land, soil and water resources especially in tropical agro-ecosystems. Interfacing with other professional and community groups who can provide new and useful knowledge to facilitate making decisions is an important expectation for effectively meeting its commitments.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6657	53048	975	292

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	7	69	76

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Grant proposals submitted.

Year	Actual
2014	71

Output #2

Output Measure

- Presentations at international and national meetings.

Year	Actual
2014	33

Output #3

Output Measure

- Number of workshops and other educational activities held

Year	Actual
2014	108

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people who actually adopt one or more recommended practices
2	Total dollar value of grants and contracts obtained.

Outcome #1

1. Outcome Measures

Number of people who actually adopt one or more recommended practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	398

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

All residents and visitors in the State of Hawaii enjoy the State's natural environment and will suffer should it not be sustained. Many residents also rely on the environment to support the tourism industry and provide employment for residents.

What has been done

Various stakeholders were educated about how to better manage Hawaii's open ranges, forest and urban landscapes using workshops, demonstrations, field days, websites, publications, and other outreach activities.

Results

Hawaii's watersheds and all the resource contained in these watersheds are more sustainable.

4. Associated Knowledge Areas

KA Code	Knowledge Area
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
124	Urban Forestry

125	Agroforestry
133	Pollution Prevention and Mitigation
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
402	Engineering Systems and Equipment
403	Waste Disposal, Recycling, and Reuse

Outcome #2

1. Outcome Measures

Total dollar value of grants and contracts obtained.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	3952689

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Protecting Hawaii's natural resources preserves the islands unique environments and native species, enhances the well-being of Hawaii residents, and promotes the main economic engine of the state, which is tourism.

What has been done

Forest conservation and restoration activities have taken place throughout the state, but particularly on the Big Island of Hawaii, where preservation and restoration of endangered native bird habitat has been enhanced by koa forest restoration. Invasive species control is being promoted by CTAHR faculty, particularly through collaboration with other agencies and private organizations. Soil and water conservation remain important activities statewide, along with animal waste management.

Results

Through a variety of research and extension programs, Hawaii residents and visitors are more aware of the environmental impacts of their activities. Many are increasingly adopting more sustainable and environmentally responsible practices.

4. Associated Knowledge Areas

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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 (Quarantine procedures)

Brief Explanation

- Natural disasters such as hurricanes, typhoons, floods and fires are often destructive to natural resources such as reefs, water sheds, forests, indigenous species habitats, research plots or equipment.
- When the economy is poor, public and private funding decreases and is more difficult to obtain.
- Current and new quarantine and inspection procedures for imported materials affect the rate of new introductions of invasive species into the State

V(I). Planned Program (Evaluation Studies)

Evaluation Results

All projects conducted under this program were peer-reviewed before installation. Annual progress reports were collected and evaluated by the associate deans for research and extension. Funds are not released for those projects which did not show tangible progress.

Key Items of Evaluation

None.