

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

**Program # 4**

**1. Name of the Planned Program**

Climate Change: Natural Resources and Environmental Management Program

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
112	Watershed Protection and Management	35%			
123	Management and Sustainability of Forest Resources	35%			
134	Outdoor Recreation	20%			
136	Conservation of Biological Diversity	10%			
	<b>Total</b>	100%			

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

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

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	2.8	0.0	0.0	0.0
Actual Paid Professional	2.8	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
80000	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
75500	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

**V(D). Planned Program (Activity)**

## 1. Brief description of the Activity

- Continued participation with the development and implementation of environmental management master plans for Magens Bay, Estate Adventure Trail, and Great Pond Park recreation areas and a Magens Bay watershed advisory committee. Habitat protection and restoration plans/procedures will also be used to restore and/or protect other critical habitats, areas of particular concern in the territory, and areas designated as part of the VI Territorial Park initiative established by the Legislature of the VI in 2004.

- Developed resource conservation education outreach materials to engage the islands' growing immigrant populations and disseminate materials and information utilizing an innovative approach that incorporates and builds upon indigenous knowledge and practices.

- Developed web sites, materials, workshops, presentations and demonstrations (in-formal learning sites) that relay information regarding native plants, ecosystems and habitats; naturalized, exotic, endangered and threatened plant species; urban forestry and other resource conservation issues.

- Utilized the media to promote Natural Resources programs through various methods, including, but not limited to, radio and television PSAs, television video spots, E-education, local talk shows (radio & TV), and presentations.

- Identified and developed technical materials related to resource conservation; pollution control practices; and native, medicinal, naturalized, exotic, endangered and threatened plant species for use by researchers, policy-makers and regulatory personnel.

- Provided technical assistance on a variety of topics, including but not limited to, plant identification, selection and maintenance; native, naturalized, exotic, endangered and threatened plant species; natural products development, environmental assessment; ecotourism development and other resource conservation issues to government agencies, community groups, various areas of the private sector, students and the general public.

- Played a lead role in facilitating the interaction of community groups and leaders to address natural resource conservation and management issues, as well as pollution control and prevention.

- Conducted ecotours for local schools and groups (mostly on St. Croix) to stimulate interest in careers in science, ecotourism or environmental management and to provide students and others with a general introduction to VI natural and cultural resources.

## 2. Brief description of the target audience

- Policy-makers and regulatory personnel, community groups, teachers and students, business community, non-governmental organizations, and the general public.

- Those charged with managing public recreation areas including the Magens Bay Authority, VI Territorial Park Advisory Committee, St. Croix East End Marine Park Committee, and Great Pond Park.

- Local environmental associations and Rotary Clubs that engage in activities to conserve and manage the VI environment.

- Immigrant populations whose practices (land clearing techniques, littering, etc.) negatively impact

VI natural resources. Efforts will be made to identify contacts.

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	302	500	174	250

**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
<b>Actual</b>	0	0	0

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

**Output Target**

**Output #1**

**Output Measure**

- Education/Classes in natural resources management, VI forest ecosystems

<b>Year</b>	<b>Actual</b>
2012	10

**Output #2**

**Output Measure**

- Workshops -VI forests, medical plants, environmental landscaping, watershed awareness, VI cultural and natural history, ecotourism, in-door air quality

<b>Year</b>	<b>Actual</b>
2012	9

**Output #3**

**Output Measure**

- One on One consultation with residents, government employees, students

<b>Year</b>	<b>Actual</b>
2012	165

**Output #4**

**Output Measure**

- Tours of VI natural areas for students and community groups

<b>Year</b>	<b>Actual</b>
2012	7

**Output #5**

**Output Measure**

- E-education - NREM websites updated

<b>Year</b>	<b>Actual</b>
2012	1

**Output #6**

**Output Measure**

- Publications, articles, posters related to natural resources and environmental management

<b>Year</b>	<b>Actual</b>
2012	8

**Output #7**

**Output Measure**

- Demonstration site relating to native plants, environmental management

<b>Year</b>	<b>Actual</b>
2012	5

**Output #8**

**Output Measure**

- PSA's

Not reporting on this Output for this Annual Report

**Output #9**

**Output Measure**

- Fairs

<b>Year</b>	<b>Actual</b>
2012	3

**Output #10**

**Output Measure**

- TV/Media

<b>Year</b>	<b>Actual</b>
2012	1

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

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

O. No.	OUTCOME NAME
1	The recommended BMP's in environmental management master plans will be adopted by one natural resource manager annually. Successful plans will be used as prototypes for other critical habitats, parks and areas designated as part of the VI Territorial Park.
2	After attending non-formal education programs, the number of people who adopt recommended landscaping practices, incorporate native plants into their landscapes, protect and/or enhance soil resources for agriculture, construction, and landscaping will increase by 30%
3	As a result of direct and indirect contacts the number of adults and students who adopt practices that protect native plants and their habitats because of their increased understanding of the human effects on native ecosystems will increase by 200
4	Increase the number of stakeholders (government personnel, developers, community groups and students) who became more aware of the connections between terrestrial and marine communities, how watersheds function, and the importance of watershed protection by 500.
5	Based upon watershed research, the number of projects within targeted watersheds which protect water quality will increase by one, annually.
6	The number of Virgin Islands youth who increase their awareness of VI natural and cultural resources, and careers in environmental management and ecotourism will increase annually by 300

## **Outcome #1**

### **1. Outcome Measures**

The recommended BMP's in environmental management master plans will be adopted by one natural resource manager annually. Successful plans will be used as prototypes for other critical habitats, parks and areas designated as part of the VI Territorial Park.

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

- 1862 Extension

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

Change in Condition Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2012	3

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

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

The Magens Bay Authority and other local government agencies, Forest Stewardship Advisory Committee (U.S. Dept. of Forestry), St. Croix Environmental Assoc. and the Nature Conservancy (NGOs), or private landowners with conservation areas are manage natural areas but are limited in their management resources. Hotel managers and developers are also responsible for implementing sound environmental management practices to protect their properties and critical natural resource habitats.

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

CES helped partners (MBA, VI Dept. of Agriculture and St. Thomas Humane Society) develop natural resource management plans related to landscaping with native plants and preserving native plant communities. CES provided requested Information to CZM permit applicants about BMPs to incorporate into landscape management plans, and contributed to several Forest Stewardship Program management plans that landowners (3+ acres) are required to follow to receive program benefits.

#### **Results**

With CES's assistance, MBA planned an extensive planting project at Smith Bay Territorial Park (St. Thomas) using native trees along newly constructed roadways. Based on CES's technical advice, MBA used these roadside trees to slow stormwater runoff from the roads. CZM major permit applicants included recommendations by CES in landscape plans. As a VI Dept. of Agriculture Forest Stewardship Program member, CES approved a master plan (i.e. native forest conservation) included in the purchase agreement of a large St. Croix conservation property through the Forest Legacy Program. Landowners enrolled in the Forest Stewardship Program followed master plans approved by CES. CES provided technical assistance with the planning of 100 + acre native plant landscaping project on the new St. Humane Society property on St.

Thomas.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
136	Conservation of Biological Diversity

#### Outcome #2

##### 1. Outcome Measures

After attending non-formal education programs, the number of people who adopt recommended landscaping practices, incorporate native plants into their landscapes, protect and/or enhance soil resources for agriculture, construction, and landscaping will increase by 30%

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	55

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

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

Developers, engineers, architects, environmental groups, resource managers, businesses and property owners requested technical information to protect landscapes and the environment, comply with the VI government permitting requirements for earth-change operations and construction or to develop urban landscape plans.

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

Through phone/office consultations, publications, site visits, volunteer training and the CES Environmental Repository, CES provided clients with information about native plants in various ways including: conservation, environmental landscaping, plant identification, forest conservation, plant selection for urban forests and erosion control. CES increased collaboration with professionals involved with developing plans and outreach programs to introduce native plants into urban and park landscapes.

###### **Results**

DPNR personnel (CZM, DFW, and Permits) referred permit applicants to CES for assistance with identifying and preserving native plant communities on construction sites, as a result, applicants selected native trees for projects. CES convinced several individual landowners to preserve or cultivate native plants. The VI Environmental Associations utilized CES strategies for protecting and planting native plants on public properties. Landscape architects were assisted with developing lists of suitable native plants for landscaping to be distributed to regulatory agencies and the general public. Native plants were used to restore VI historic sites based on CES recommendations, and plans were developed to expand the introduction of native plants into urban settings.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

#### Outcome #3

##### 1. Outcome Measures

As a result of direct and indirect contacts the number of adults and students who adopt practices that protect native plants and their habitats because of their increased understanding of the human effects on native ecosystems will increase by 200

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2012	200

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

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

Many educators, resource managers, students, environmental groups, developers, environmental professionals, architects, engineers and the general public want to increase their understanding of V.I. native plants/natural ecosystems and the effects of human alterations to natural ecosystems.

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

CES delivered information to students, landowners and advisory committees about how humans impact native plant habitats. CES is participating in a 2-year project to restore the St. Thomas UVI-CES Diagnostic Herbarium with the goal of making more information about VI flora available. Tours were conducted to evaluate human impacts on native plant ecosystems, and CES

participated in developing a grant proposal to draft ?VI tree law? legislation that was recently approved.

### Results

CES is training UVI students to manage plant specimens in the CES Herbarium, develop plant data-bases and create educational webpages focusing on VI native flora. Staff has been taking photos of these plants. During the herbarium inventory, databases for 14 separate VI plant collections from 1969-2001 were created, improving the usefulness and value of these collections for reference and as support for natural products research and environmental education. Ethnobotanical information derived from the herbarium collections is now available on a CCAM-CES website. VI 6-12 grade teachers continue to utilize materials about VI native flora originally developed by CES. The UVI Master of Environmental Science Program and Yale University used the CDC-CES book, Island Peak to Coral Reef. It also was recommended on websites operated by tour companies and the VI National Park. As a result of CES site visits and office consultations, clients indicated that their awareness of the issues affecting terrestrial resources increased.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

### Outcome #4

#### 1. Outcome Measures

Increase the number of stakeholders (government personnel, developers, community groups and students) who became more aware of the connections between terrestrial and marine communities, how watersheds function, and the importance of watershed protection by 500.

#### 2. Associated Institution Types

- 1862 Extension

#### 3a. Outcome Type:

Change in Condition Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2012	200

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

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

Stakeholders (government personnel, developers, community groups, resource managers, educators, students) requested information about the connections between terrestrial and marine communities and watershed protection. Reasons for requests included: concern about environmental degradation, environment management in Territorial Parks, protection of coastal

resources on hotel and private properties, DPNR requirements that permit applicants consult CES for technical information, class assignments.

**What has been done**

CES continued partnerships with VI Forest Stewardship Program, Magens Bay Authority, UVI science faculty, UVI Master of Marine and Environmental Science Program, Yale U. Watershed Management Program, and the Island Green Builders Assoc. to investigate land-sea interconnectivity. CES delivered information about watershed protection during interactions with developers, site visits, informal meetings, field trips, advisory committee participation, phone consultations and publication distribution.

**Results**

During routine interactions with stakeholders in coastal areas, CES learned about local resource management issues and possible land-based sources of impacts to coastal water observed by stakeholders. As a result, CES made recommendations or reported stakeholder complaints to resource managers/ regulatory personnel who made efforts to address the problems. Watershed information shared with working groups, students, resource managers (Magens Bay Authority, Coral Bay Community Council) was incorporated into management strategies or research activities. As member of the VI Forest Stewardship and Forest Legacy Program committees, CES participated in the development of long-range strategies to purchase and conserve VI priority watersheds and watershed management plans adopted by private property owners enrolled in programs. Exhibits developed by CES's herbarium restoration project informed the public about the usefulness of key coastal and mangrove plants within a watershed context.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
136	Conservation of Biological Diversity

**Outcome #5**

**1. Outcome Measures**

Based upon watershed research, the number of projects within targeted watersheds which protect water quality will increase by one, annually.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2012	3

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Those directly and indirectly responsible for watershed management (Magens Bay Authority, National Park Service, UVI, Governmental agencies, property owners, NGOs) require research-based information to be able to make the best decisions regarding watershed protection.

#### What has been done

CES continued to provide technical assistance to the Yale U. School of Coastal and Watershed Management program director and graduate students who are investigating VI watershed management issues and conducting long-term monitoring of VI guts. CES research related to VI native plants in specific habitats enabled environmental associations and resource managers to select the best trees to plant in coastal parks.

#### Results

These recent research-based products developed with CES input have provided resource specialists and managers with useful data on which to base management decisions and planning. Native trees were successfully planted in along VI territorial park access roads and on a business construction site near a public beach to help control stormwater runoff.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

### Outcome #6

#### 1. Outcome Measures

The number of Virgin Islands youth who increase their awareness of VI natural and cultural resources, and careers in environmental management and ecotourism will increase annually by 300

#### 2. Associated Institution Types

- 1862 Extension

#### 3a. Outcome Type:

Change in Condition Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2012	800

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

The VI has an economy based on tourism attracted by the natural and cultural resources and scenic beauty of the islands. Both residents and tourists rely on the high-quality presentation and maintenance of these valuable resources to preserve the economy, standard of living and the environment. VI residents, especially VI youth, need guidance into interesting careers in the local economy that support environmental management and protection. CES partnered with environmental associations and agritourism NGO's to provide information about natural and cultural resources.

**What has been done**

CES continued to provide VI Taxi drivers/tour operators with information about Virgin Islands natural resources to be used in educational tours conducted for tourists and local school students. VI tour company websites advertised and recommended CES natural resource publications. CES continued to provide developers of ecotourism destinations with information about the value of preserving and featuring natural habitats. CES assisted with conserving VI properties suitable for ecotourism

**Results**

Taxi tour directors incorporated CES information into their tours and certification curriculum used for training tour directors. Tour directors indicated that the information provided by CES improved the quality and educational value of their tours. The developers of a St. Thomas cultural and natural history park and wildlife petting zoo continued to use CES's recommendations regarding the use of native plants in the landscape. CES publications about native plants and ecosystems were used and promoted by VI tour companies. Through its involvement with the Forest Stewardship and Forest Legacy Programs, CES help preserve Forests and cultural features on St. Croix properties with ecotourism potential. Resource managers and property owners considered developing ecotourism attractions based on information about natural and cultural history provided by CES.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
123	Management and Sustainability of Forest Resources
134	Outdoor Recreation

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

**External factors which affected outcomes**

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

**Brief Explanation**

CES maintained good relationships with staff in various VI governmental regulatory agencies that affect VI natural resources management including the VI Dept. of Planning and Natural Resources, Waste Management Authority, the VI Dept. of Agriculture and the

Environmental Protection Agency. There is a high amount of turnover in the VI government agencies. It is difficult to establish very effective long-term relationships that can result in policy changes and training. Also, many of the employees in these agencies acknowledge the need for more comprehensive enforcement of environmental laws, but they are already overextended and need additional staff support to effectively enforce existing regulations, or they may be experiencing resistance to change at the legislative level. Recent governmental fiscal cutbacks restrict hiring staff. Some employees are hesitant about enforcing environmental regulations because of various political pressures.

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

##### **Evaluation Results**

CES worked closely with Territorial Park managers to plan, implement and evaluate BMPs various VI Territorial Parks. CES communicated closely with managers during the implementation of BMPs, and managers responded favorably to the informal evaluation methods used by CES. Clients and viewers verbally indicated interest and approval after NREM presentations or media appearances. Standard evaluation forms are used during workshops and training programs, and Research project reports and publications were peer-reviewed. A positive evaluation of CES's recently formed partnerships with UVI science and nursing faculty and students participating in the UVI-CCAM research project earned favorable responses of the project P.I., co-researchers and students. CCAM recipients requested that CES take more of a leadership role in the project.

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

All key items of evaluation were used.