## 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% | | | |
| | **Total** | 100% | | | |

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

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

| Year: 2014 | Extension | | Research | |
|---|---|---|---|---|
| | 1862 | 1890 | 1862 | 1890 |
| **Plan** | 2.8 | 0.0 | 0.0 | 0.0 |
| **Actual Paid** | 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** |
| 105000 | 0 | 0 | 0 |
| **1862 Matching** | **1890 Matching** | **1862 Matching** | **1890 Matching** |
| 45000 | 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, habit protection and restoration plans for territorial parks and recreation areas.

• 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 were also 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 websites, educational materials, workshops, presentations and demonstrations (informal 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.

**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** | 300 | 500 | 120 | 600 |

**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** | 0 | 0 | 0 |

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

**Output Target**

**Output #1**

**Output Measure**

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

**Year** **Actual**

| | |
|---|---|
| 2014 | 15 |

**Output #2**

**Output Measure**

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

| Year | Actual |
|---|---|
| 2014 | 4 |

**Output #3**

**Output Measure**

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

| Year | Actual |
|---|---|
| 2014 | 160 |

**Output #4**

**Output Measure**

- Tours of VI natural areas for students and community groups

| Year | Actual |
|---|---|
| 2014 | 4 |

**Output #5**

**Output Measure**

- E-education - NREM websites updated

| Year | Actual |
|---|---|
| 2014 | 1 |

**Output #6**

**Output Measure**

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

| Year | Actual |
|---|---|
| 2014 | 6 |

**Output #7**

**Output Measure**

- Demonstration site relating to native plants, environmental management

| Year | Actual |
|---|---|
| 2014 | 4 |

**Output #8**

**Output Measure**

- Fairs

| Year | Actual |
|---|---|
| 2014 | 2 |

**Output #9**

**Output Measure**

- TV/Media

| Year | Actual |
|---|---|
| 2014 | 50 |

**Output #10**

**Output Measure**

- PSA's

| Year | Actual |
|---|---|
| 2014 | 0 |

### 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, 150 persons will adopt recommended landscaping practices, incorporate native plants into their landscapes, protect and/or enhance soil resources for agriculture, construction, and landscaping. |
| 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

| Year | Actual |
|---|---|
| 2014 | 1 |

### 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 Association and the Nature Conservatory (NGOs), and private landowners with conservation areas 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 clients (UVI, Magens Bay Authority, Rotary Clubs, tract solar installation companies) develop natural resource management plans related to landscaping with native plants, preserving native plant communities, and/or removing invasive plants. CES provided requested information to CZM permit applicants about 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**
CZM and UVI major permit applicants included and implemented recommendations by CES in landscape plans. As a VI Department of Agriculture Forest Stewardship Program member, CES approved native forest conservation plans 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. Magens Bay Authority implemented plans recommended by CES.

### 4. Associated Knowledge Areas

| KA Code | Knowledge Area |
|---|---|
| 112 | Watershed Protection and Management |
| 123 | Management and Sustainability of Forest Resources |
| 134 | Outdoor Recreation |
| 136 | Conservation of Biological Diversity |

## Outcome #2

### 1. Outcome Measures

After attending non-formal education programs, 150 persons will adopt recommended landscaping practices, incorporate native plants into their landscapes, protect and/or enhance soil resources for agriculture, construction, and landscaping.

### 2. Associated Institution Types

- 1862 Extension

### 3a. Outcome Type:

Change in Condition Outcome Measure

### 3b. Quantitative Outcome

| Year | Actual |
|---|---|
| 2014 | 75 |

### 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, workshops, web outreach, and e-extension, CES provided clients with information about native plants in various ways including: conservation, environmental landscaping, plant identification, plant uses, 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**

Property owners preserved forested areas on construction or earth change sites after receiving CES technical information. Native trees recommended by CES were included in urban area and roadside renovation plans developed by landscape architects and VI regulatory agencies. The VI Economic Development Agency incorporated information about landscaping with native trees into EDA public meetings addressing urban beautification projects. CES contributed to the development of draft VI Tree Law promoting the protection and planting of native trees in private and public urban areas. The drafted law sponsored by the VI Senate and VI Dept. of Agriculture awaits final approval by the VI Legislature. Developers of a St. Thomas 25-acre solar installation incorporated information from CES about native trees into site landscaping plans. Property owners indicated that they learned about preserving and landscaping native plants from workshops conducted by CES.

**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 #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 |
|---|---|
| 2014 | 300 |

**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 about native plants and how humans impact native plant habitats to students, VI regulatory agencies, UVI administration, developers, engineers, landowners and advisory committees through site visits, permit evaluations and other direct and indirect contacts. Tours with educators and students were conducted to evaluate human impacts on native plant ecosystems.

**Results**
Students and the general public continued to indicate that they learned about the importance of protecting and documenting VI native plants during CES herbarium tours. CES publications and a televised CES herbarium tour broadcast numerous times has prompted requests for additional information about native plants. VI 6-12 grade teachers continue to use 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, and it was recommended on eco-tour company and the VI National Park websites. As a result of CES site visits, phone and office consultations, clients indicated that their awareness of the issues affecting terrestrial resources increased, and developers NREM information about VI native plants useful for landscaping. Developers, UVI administration, and engineers incorporated CES recommendations about how to reduce impacts to native plant communities into project plans.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 123 | Management and Sustainability of Forest Resources |
| 136 | Conservation of Biological Diversity |

**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 |
|---|---|
| 2014 | 250 |

### 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 delivered information about watershed protection through partnerships with: VI Forest Stewardship Program, school & community groups, beach managers, UVI science faculty and UVI Environmental Management Studies (MMES) program graduate students, Yale U. Watershed Management Program, My Brothers Workshop (vocational training), and developers. Contacts were made during site visits, informal meetings, field trips, advisory committee meetings, phone consultations and publication distribution.

**Results**
As an official advisor, CES staff helped a UVI MMES graduate candidate successfully detect phytochemical changes in mangrove plant species as a possible method of determining pollution levels in coastal areas. CES regularly interacted with stakeholders in coastal recreational areas to learn about management issues and possible land-based sources of pollution affecting coastal and off-shore resources. CES management recommendations were followed by St. Thomas Territorial Park managers (Magens Bay Authority) resulting in the planting of native tree buffers along coastal access roads near wetlands. 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. CES exhibits informed the public about the usefulness of key coastal and mangrove plants within a watershed context.

### 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 #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**

| Year | Actual |
|---|---|
| 2014 | 5 |

**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 graduate program, and UVI environmental management graduate students who are investigating VI watershed management issues and conducting long-term monitoring of VI guts and mangroves. 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**
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. Serving as an advisor to a UVI Master of Marine and Environmental Management graduate student, NREM staff assisted with the development of a research project investigating the effects of human impacts on St. Thomas mangrove plants including possible implications for future mangrove resource management. Native trees continued to be successfully planted in coastal VI territorial parks and on construction sites near coastal areas to help filter 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 |
|---|---|
| 2014 | 45 |

### 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.

**What has been done**
During several site visits CES provided an architect developing a commercial botanical garden on St. Thomas with technical information to be used in educational tours and also assisted the developer in her attempts to gain support from the VI Economic Development Agency. VI tour company websites advertised and recommended CES natural resource publications. CES provided developers of ecotourism destinations with information and assisted with conserving VI properties suitable for ecotourism.

**Results**
With CES assistance, a St. Thomas architect received funding to complete a 2.5 acre botanical garden that preserves native forest, non-invasive exotic plants, pervious walkways, and wildlife refuges making it a novel ecotourism attraction and a good location for St. Thomas students/residents to learn about native plants and environmental landscaping. Tour directors incorporated CES information into tours and indicated that it improved the educational value of their tours. 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 helped preserve forests and cultural features on St. Croix properties with ecotourism potential. CES assisted the VI Economic Development Agency, State Historic

Preservation Society, local businesses and landscape architects with the development of a plan to restore natural landscapes in Charlotte Amalie to increase its ecotourism value.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area |
|---|---|
| 134 | Outdoor Recreation |

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

**External factors which affected outcomes**

- Government Regulations

**Brief Explanation**

CES maintained good relationships with staff in various VI governmental regulatory agencies charged with natural resource management (i.e., 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 political turnover in the VI government agencies and governmental fiscal cutbacks may restrict hiring staff and affect environmental policy-making and enforcement. Consequently, it can be difficult to establish very effective long-term relationships that can result in policy changes and/or training. 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.

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

**Evaluation Results**

Clients responded favorably to the informal evaluation methods used by CES, especially in-person, one-on-one conversations. 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. UVI students and faculty involved with CES in environmental research projects have indicated that they value CES's guidance and technical assistance; they also indicate that they wish to continue partnering with CES on new projects.

**Key Items of Evaluation**

All key items of evaluation were used.