

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Water Quality

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	10%			
104	Protect Soil from Harmful Effects of Natural Elements	10%			
111	Conservation and Efficient Use of Water	40%			
112	Watershed Protection and Management	20%			
133	Pollution Prevention and Mitigation	20%			
	Total	100%			

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	1.9	0.0	0.0	0.0
Actual	1.9	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
90000	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
90000	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
43700	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Interest in the popular V.I. Home & Farm Water Quality Assessment (VI*A*Syst) program was evidenced by the increase in requests for VI*A*SYST presentations. Throughout the year, VI*A*Syst presentations and workshops were regularly requested by schools, community groups, youth groups, churches, scouts, businesses, maintenance professionals, and government agencies, and residents of the British Virgin Islands. These presentations focused on transmitting information about water quality protection and least-toxic household products to the respective audiences so convincingly that many attendees indicated that they would stop using hazardous products. Locally oriented outreach materials were also requested and disseminated related to water conservation, drinking water protection, waste water disposal and best management practices for pollution prevention through the VI*A*Syst program. Linkages between lifestyle practices, watershed health and water quality were key outreach focuses of the VI*A*Syst program. CES contributed to the *VI Wetlands and Watersheds Characterization Phase II: Inventory, Monitoring, Assessment, Management and Education in the USVI* project by conducting site visits, inventories, and attending stakeholder meetings. Watershed awareness also was promoted through the adoption of the methodology used by the CDC-CES "Pilot Study to Integrate the Effects of Watershed Activity Patterns and Coastal Processes on Near-Shore Coral Reefs" in targeted watersheds by the UVI Master of Marine and Environmental Science program and the UVI Center for Marine and Environmental Studies, VI public school librarians and local schools. This study funded by VI EPSCoR utilized GIS technology to investigate the patterns of sediment delivery and septic system nutrient loading and the impacts on coastal water quality. Study findings are also being utilized in a CDC-CES grant-funded project to develop a field guide of VI wetlands and watersheds for resource managers funded by the VI Division of Environmental Protection and the VI Department of Agriculture. CES promoted the implementation of BMPs to protect water quality at coastal public parks, hotels and large subdivisions with extensive coastal and off-shore resources. Media outreach methods utilized by the WQ Program were PSAs, television video spots, and local talk shows (radio & TV). During office, phone consultations, and site-visits, clients were provided with technical assistance about erosion and sediment control, storm water control, preserving land cover, xeriscaping, wetlands preservation and restoration, preservation of riparian systems (guts) and alternative waste-water treatment systems. Ties with the Region 2 Water Quality team strengthened with the joint coordination and implementation of a training and certification program for waste water treatment system operators in conjunction with the VI Division of Environmental Protection, the University of Rhode Island Onsite Wastewater Treatment Demonstration Center, and the VI Waste Management Authority.

2. Brief description of the target audience

Policy-makers and regulatory personnel, community groups, teachers and students, business community, resource managers, owners/developers of large properties (>300 acres), non-governmental organizations, and the general public.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	250	1000	200	300
Actual	813	2900	1122	1630

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	0	0	
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Education/Classes/Training in water quality protection and VI * A * Syst Program

Year	Target	Actual
2010	3	12

Output #2

Output Measure

- Workshops / Presentations about water quality protection, less toxic household products and NPS BMP's through the VI * A * Syst Program, on-site waste water treatment, cistern care, and watershed protection.

Year	Target	Actual
2010	5	19

Output #3

Output Measure

- One on one consultations with residents, government employees, students

Year	Target	Actual
2010	200	500

Output #4

Output Measure

- Tours of VI natural areas with students, community groups and others to raise awareness about watersheds and water quality protection.

Year	Target	Actual
2010	3	13

Output #5

Output Measure

- Educational/research publications, articles, posters, newsletters, GIS maps related to non-point source pollution, on-site wastewater treatment, watersheds, VI * A * Syst, and protection of VI native plant communities.

Year	Target	Actual
2010	6	14

Output #6

Output Measure

- PSAs

Year	Target	Actual
2010	1	2

Output #7

Output Measure

- Fairs

Year	Target	Actual
2010	2	6

Output #8

Output Measure

- TV/Media

Year	Target	Actual
2010	2	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Awareness of the health risks associated with water quality impairment and water and wastewater treatment systems will increase, and 75 homeowners will consider installing or retrofitting their existing septic systems with improved packaged sewage treatment systems or alternative wastewater treatment systems.
2	Fifty (50) homeowners will request technical assistance with the evaluation of old septic systems; 20 homeowners will proactively pump their septic systems, and three (3) businesses will construct alternative wastewater treatment systems based on successful prototypes recommended by CES.
3	Educational materials, workshops, tours and other direct and indirect outreach methods will increase public knowledge of the characteristics and functions of aquatic ecosystems (guts, salt ponds, mangrove lagoons, bays and oceans) including their role within a watershed. Five (5) homeowners and/or natural resource managers will protect riparian and wetlands vegetation. Fifty (50) clients will become aware of the VI laws protecting riparian and wetlands vegetation.
4	Requests for site visits and VI*A*Syst assessments and presentations will increase. 75 clients or more will each adopt at least one VI*A*Syst recommended practice such as the use of non-toxic household products, etc. Fifty (50) homeowners will improve cistern water quality by following CES recommendations.
5	At least twenty (20) clients will implement effective stormwater, erosion and sediment control practices and xeriscaping. The VI Dept. of Public Works roadside maintenance crews (10) will improve their roadside clearing methods to prevent soil erosion and sediment runoff.
6	Over 1000 VI youth will become aware of the vital connections between human activities and water quality, how land-based activities affect coastal water quality, why watershed protection is important to them and their well-being. Youth and volunteer involvement in water quality protection and resource conservation will increase.
7	Information from watershed studies utilizing oceanographic and GIS technology will lead to specific recommendations for watershed residents and government agencies about how to reduce sediments and nutrients in stormwater runoff.

Outcome #1

1. Outcome Measures

Awareness of the health risks associated with water quality impairment and water and wastewater treatment systems will increase, and 75 homeowners will consider installing or retrofitting their existing septic systems with improved packaged sewage treatment systems or alternative wastewater treatment systems.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	15	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nutrication and contamination of surface, groundwater and coastal waters from leaking septic systems is considered to be a major problem in the VI. Nonpoint Source Pollution from defective septic systems impacts human health and marine resources.

What has been done

CES partnered with the VI Department of Planning and Natural Resources and the VI Waste Management Authority on St. Croix to provide Onsite Wastewater Treatment System (OWTS) information to homeowners.

Results

Based on this information, seven homeowners were permitted to install improved OWTS home systems.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Fifty (50) homeowners will request technical assistance with the evaluation of old septic systems; 20 homeowners will proactively pump their septic systems, and three (3) businesses will construct alternative wastewater treatment systems based on successful prototypes recommended by CES.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	15	41

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The Virgin Islands Department of Planning and Natural Resources (DPNR) has been promoting the installation and maintenance of traditional and alternative wastewater treatment systems (OSDS) in the Virgin Islands. DPNR has referred architects, businesses, developers to CES for specific technical assistance with OSDS installations.

What has been done

CES helped coordinate a Training Program for Septic Inspectors conducted by instructors from the University of Rhode Island Onsite Wastewater Treatment Demonstration Center in partnership with the VI Division of Environmental Protection and the VI Waste Management Authority. This team is planning a Septic System Designer Training Program for March 2011 and exploring the possibility of scheduling a training workshop for sewage plant operators in 2012.

Results

Forty-one septic system installers/service providers and VI government personnel participated in the 3-day Training Program for Septic Inspectors on St. Croix. Training program evaluations were favorable and participants indicated that the training was useful to them. 85% of the participants scored passing grades on the exam to certify them as septic inspectors.

4. Associated Knowledge Areas

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

Outcome #3

1. Outcome Measures

Educational materials, workshops, tours and other direct and indirect outreach methods will increase public knowledge of the characteristics and functions of aquatic ecosystems (guts, salt ponds, mangrove lagoons, bays and oceans) including their role within a watershed. Five (5) homeowners and/or natural resource managers will protect riparian and wetlands vegetation. Fifty (50) clients will become aware of the VI laws protecting riparian and wetlands vegetation.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	10	55

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Through direct and indirect methods, resource managers, property owners, educators, students, researchers, etc. require basic and technical information about riparian and aquatic ecosystems, including their roles within watersheds and are impacted by human activities.

What has been done

CES contributed to the project: VI Wetlands and Watersheds Characterization Phase II: Inventory, Monitoring, Assessment, Management and Education in the USVI project by conducting site visits, inventories, and attending stakeholder meetings. A VI watershed/wetlands field guide was produced and will be posted on a UVI website. CES co-researched the DFW funded project, Landowner Incentive Program, that produced GIS map data layers with detailed modeling of island drainages, basins, and wetlands.

Results

The VI Wetlands and Watersheds project provided DPNR-DEP (funding agency) and other key stakeholders with valuable new data about all VI wetlands and priority watersheds. Important information from several informants about wetlands was incorporated into GIS maps; these maps are being used by DPNR and will be available to the general public. The recently completed VI wetlands/watersheds field guide is currently available by request and will be installed on UVI and DPNR websites. Maps and findings of the Landowner Incentive Program project are being made available to wildlife researchers and managers.

4. Associated Knowledge Areas

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

Outcome #4

1. Outcome Measures

Requests for site visits and VI*A*Syst assessments and presentations will increase. 75 clients or more will each adopt at least one VI*A*Syst recommended practice such as the use of non-toxic household products, etc. Fifty (50) homeowners will improve cistern water quality by following CES recommendations.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	25	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Custodial professionals, business owners, school students, the general public and the natural environment can be exposed to negative effects caused by the use of toxic household products. Many residents rely on maintaining healthy cistern catchments for their water supplies.

What has been done

Through its VI*A*SYST program, CES continues to make numerous presentations to the VI population promoting the use of non-toxic household products for protecting human health and the environment. Presentations were made to school groups, church congregations, scouts, businesses, maintenance professionals, government agencies and environmental groups. Cistern care also is promoted in these presentations and during individual consultations. Saff was able to expose the National Program Leader and his wife to our types of housing and show him our intended revision of the National Healthy Home booklet to one for the Caribbean.

Results

The VI*A*SYST presentations continue to be very popular with all segments of the VI community. After attending VI*A*SYST presentations, many individuals indicated that they would stop using toxic household products. Several attendees have referred others to CES for information on non-household products or requested VI*A*SYST presentations for various groups. At least ten (10) homeowners chlorinated their cistern water based on instructions provided by CES. Retailers have indicated an increase in the sale of Borax and other natural cleaning products.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

Outcome #5

1. Outcome Measures

At least twenty (20) clients will implement effective stormwater, erosion and sediment control practices and xeriscaping. The VI Dept. of Public Works roadside maintenance crews (10) will improve their roadside clearing methods to prevent soil erosion and sediment runoff.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	6	42

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

To protect the V.I. environment, prevent economic loss and comply with governmental regulations, CES clients (resource managers, Public Works personnel, businesses, developers, environmental groups, property owners, etc.) need technical assistance with xeriscaping, stormwater, erosion and sediment control.

What has been done

During site visits and phone consultations, CES provided several property owners, Public Works Department, government regulators, and landscape specialists with information related erosion and sediment control practices, xeriscaping and environmental landscaping.

Results

Clients implemented CES recommendations or indicated that they would adopt recommended practices. Several clients requested additional consultations from CES. Drainage systems were installed along a St. Croix highway with technical assistance from CES.

4. Associated Knowledge Areas

KA Code	Knowledge Area
104	Protect Soil from Harmful Effects of Natural Elements

Outcome #6

1. Outcome Measures

Over 1000 VI youth will become aware of the vital connections between human activities and water quality, how land-based activities affect coastal water quality, why watershed protection is important to them and their well-being. Youth and volunteer involvement in water quality protection and resource conservation will increase.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	200	180

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

VI youth and their instructors need basic scientific information about the unique connections between land and sea and how human activities affect water quality. With the rapid urbanization in the VI, the youthful population will be the most affected by land-use impacts degrading water quality.

What has been done

For the fourth year, CES conducted watershed tours for graduate students. Publications co-authored or co-researched continued to be used for instruction by educators and librarians. CES gave water quality presentations at ecofairs. CES promoted "land-sea connection" awareness through its participation with the VINE (VI Natural Resources Educators) association in VI schools (K-12).

Results

Coastal and Watershed Management Program graduate students continue to conduct watershed research on St. Thomas, focusing on water quality monitoring in impacted St. Thomas guts. Young volunteers on St. Croix participated in activities to restore a major watercourse with the goal of reducing the polluting effects of sediment-laden stormwater runoff on coastal waters. Students demonstrated greater awareness of the critical interactions between land and sea through their contributions to the annual 2010 NonPoint Source Pollution Conference on St. Thomas.

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

Information from watershed studies utilizing oceanographic and GIS technology will lead to specific recommendations for watershed residents and government agencies about how to reduce sediments and nutrients in stormwater runoff.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Residents, government agencies, resource managers, and other partnering academic institutions require scientific information utilizing oceanographic and GIS technology in order to better understand the patterns of stormwater runoff and the impacts of sediment and nutrient-laden runoff.

What has been done

CES contributed to the development of GIS technology featuring drainages, basins, watersheds and wetlands produced by the VI Wetlands and Watersheds Characterization Phase II: Inventory, Monitoring, Assessment, Management and Education in the USVI project and the Virgin Islands Landowner Incentive Program..

Results

Both of these projects conducted gap assessments and produced significant geodatabases and hydrology maps that provided much more detailed terrestrial and marine geodata than has previously been available locally.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Government Regulations

Brief Explanation

CES maintained good relationships with VI governmental/federal regulatory agencies and NGOs that affect VI natural resources management including the VI Dept. of Planning and Natural Resources, Waste Management Authority, the VI Dept. of Agriculture, the Environmental Protection Agency, and the Nature Conservancy. Turnover is high in some VI Government agencies, mainly due to political elections. It is difficult to establish very effective long-term relationships that can result in policy changes because of the high turnover. Employees in these agencies acknowledge the need for more comprehensive enforcement of environmental laws, but they are overextended and need additional staff support to effectively enforce existing regulations. Political pressures can impede with enforcement. DPNR-DFW, DEP and CZM have developed long-term partnerships with CES resulting in workshops, grants, client referrals and resource management initiatives. CES strengthened its cooperation with the EPA.

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

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- During (during program)

Evaluation Results

CES communicated closely with VI governmental partners, NGOs, environmental groups and the business community. These clients responded favorably to the informal, mostly verbal, evaluation methods used by CES during all stages of program implementation. Post workshop evaluations were distributed, and evaluations were favorable. Research project reports and publications are peer-reviewed.

Key Items of Evaluation