

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

**Program # 2**

**1. Name of the Planned Program**

Climate Change

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	25%		30%	
123	Management and Sustainability of Forest Resources	15%		20%	
124	Urban Forestry	25%		15%	
125	Agroforestry	25%		15%	
132	Weather and Climate	10%		20%	
	<b>Total</b>	100%		100%	

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

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	0.5	0.0	0.2	0.0
Actual Paid Professional	2.7	0.0	0.8	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
70799	0	27237	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
70799	0	27237	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**

Coliform and E. coli monitoring will be done monthly on selected streams not currently monitored by the EPA. The Enzyme Substrate Coliform Test from Idexx Laboratories, Inc., will be used for determining the Most Probable Number (MPN) of bacteria per 100 ml of sample.

The Polymerase Chain Reaction (PCR), together with a unique membrane filtration technique developed by a colleague at the University of Nevada, Reno, will be used to detect presence or absence of leptospirochetes.

We will collaborate with partners at the local Department of Marine and Wildlife and the EPA for monitoring and reducing sedimentation on our fringing coral reef.

- Conduct conservation and climate change workshops.
- Propagate trees for agroforestry, watershed, and coastal stabilization projects.
- Survey areas infested with invasive tree species.
- Conduct control program for invasive tree species.
- Develop GPS/GIS maps.
- Develop FSP management plans.

**2. Brief description of the target audience**

Scientists involved in environmental resources protection.

Policymakers in the Executive and Legislative branches of local government.

- The Public.
- Students
- Farmers
- Forestry clients

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	400	4000	2035	5000

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

**Patent Applications Submitted**

Year: 2013  
 Actual: 0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

2013	Extension	Research	Total
Actual	1	1	0

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

**Output Target**

**Output #1**

**Output Measure**

- Technical Reports/Peer-reviewed papers/Media reports

Year	Actual
2013	2

**Output #2**

**Output Measure**

- Number of conservation and climate change workshops completed.

Year	Actual
2013	11

**Output #3**

**Output Measure**

- Number of plants propagated at nursery for climate change projects.

Year	Actual
2013	1250

**Output #4**

**Output Measure**

- Number of workshops' participants.

Year	Actual
2013	350

**Output #5**

**Output Measure**

- Number of trees planted for climate change projects.

<b>Year</b>	<b>Actual</b>
2013	469

**Output #6**

**Output Measure**

- Number of acres (infested by invasive species) surveyed using GPS/GIS.

<b>Year</b>	<b>Actual</b>
2013	35

**Output #7**

**Output Measure**

- Review of major publication on climate change and food security

<b>Year</b>	<b>Actual</b>
2013	0

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

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

O. No.	OUTCOME NAME
1	Bacterial and sediment loads in stream runoff.
2	Number of agroforestry projects established.
3	Number of watershed projects established and protected.
4	Number of coastal stabilization projects completed.
5	Number of acres infested by invasive tree species controlled.
6	Number of GPS/GIS maps developed.
7	Number of Forest Stewardship Management plans completed.

## **Outcome #1**

### **1. Outcome Measures**

Bacterial and sediment loads in stream runoff.

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

- 1862 Extension
- 1862 Research

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2013	0

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

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

Agricultural and construction activities in stream riparian zones may lead to soil erosion and pollution of streams with anthropogenic nutrients and coliform bacteria loads. These activities have a greater impact on the reef, where a blanket of soil may impede coral photosynthesis while excess nutrients promote algae growth. As a nursery for many marine fauna and shoreline safeguard against wave erosion, loss of coral at the expense of algae has serious repercussions on fish and crustaceans stocks as well as shoreline erosion.

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

Monitoring bacterial counts at the mouths of streams, where access is relatively easy, alerts regulators, i.e., EPA, of a potential violation upstream. Likewise, visiting stream mouth soon after storm events allows for a qualitative assessment of soil erosion problems.

#### **Results**

Since an EPA initiative in 2009 to remove illegal piggeries from riparian areas and to identify possible households with ineffective sewage procedures, stream and off-shore bacterial counts have been substantially reduced and soil runoff seen only after the most severe storms will accompanying intensive rainfall.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management

## **Outcome #2**

### **1. Outcome Measures**

Number of agroforestry projects established.

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

- 1862 Extension
- 1862 Research

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

Change in Condition Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2013	3

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

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

Population pressure and land clearance for agriculture and economic development in the mountainous areas of the limited land area (76 square miles) of American Samoa are major threats and challenges to the forests and natural resources. 42% of American Samoa's 76 square miles has a slope of more than 45%. Soil erosion is highly visible in many of these sites.

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

Forestry program conducted 11 conservation and climate change workshops for 350 participants. Moreover, forestry staff propagated 469 plants for climate change projects.

#### **Results**

Established three (3) agroforestry project. The mixed cropping system at the site not only provided food for the family but also controls the soil erosion. Moreover, the landowner and staff controlled all the invasive tree species and replanted with recommended native trees species at the site. The landowners appreciated the support from the forestry program.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
132	Weather and Climate

**Outcome #3**

**1. Outcome Measures**

Number of watershed projects established and protected.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	2

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

**Issue (Who cares and Why)**

Pollution (trash & Pig Wastes), sedimentation, nutrient enrichment, soil erosion, invasive species, and human activities are major threats and challenges to the fresh water supply and quality in American Samoa. The threats also impacted mangroves, fresh water fish, and marine life and coral reefs.

**What has been done**

Conducted 11 workshops on conservation and climate change education on agroforestry, technical assistance, land management, planning, and building partnerships with villages and landowners.

**Results**

Families agreed to relocate their piggeries 50 feet away from the streams to maintain fresh water quality. The Forestry established a partnership with the village and were able to plant native trees to control soil erosion, replace invasive species, and maintain wildlife habitat.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
132	Weather and Climate

**Outcome #4**

**1. Outcome Measures**

Number of coastal stabilization projects completed.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	3

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

**Issue (Who cares and Why)**

Throughout the years, natural disasters had caused destruction to the shorelines and coastal areas of American Samoa. For instance, trees that were used for windbreaks, coastal stabilization, and soil erosion were wiped out by the Tsunami of 2009.

**What has been done**

Forestry propagated 350 plants for climate change projects and conducted 11 conservation and climate change workshops.

**Results**

Planted 469 trees at the coastal stabilization projects.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
132	Weather and Climate

## **Outcome #5**

### **1. Outcome Measures**

Number of acres infested by invasive tree species controlled.

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

- 1862 Extension
- 1862 Research

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

Change in Condition Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2013	7

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

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

The spread of exotic invasive plants has become the greatest danger to American Samoa's native rainforest. Such serious invasive plants included the African tulip, Panama rubber tree, albizia, red-bead tree, strawberry guava, cinnamon and false kava.

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

Forestry staff surveyed 64 acres of land and about 32 acres are infested in invasive species.

#### **Results**

Forestry team controlled 7 acres of infested areas.

### **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
132	Weather and Climate

**Outcome #6**

**1. Outcome Measures**

Number of GPS/GIS maps developed.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	0

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

**Issue (Who cares and Why)**

**What has been done**

**Results**

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
132	Weather and Climate

**Outcome #7**

**1. Outcome Measures**

Number of Forest Stewardship Management plans completed.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Condition Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	13

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

**Issue (Who cares and Why)**

Out of 34,082 acres of land on Tutuila land, only 18,626 acres have less than 45% slope. Land for development and agriculture are limited. Many landowners do not have any existing management plans to care for and manage their own lands. The spread of exotic invasive species throughout the island and climate change has negatively impact the forests and natural resources in American Samoa.

**What has been done**

Forestry staff conducted 11 conservation education workshops and presentations to the community at large. Assisted 13 clients in developing management plans for their lands.

**Results**

Forestry staff completed 13 forest stewardship management plans for 13 landowners. Landowners are now able to manage their land and are frequent visitors at the Forestry greenhouse for technical assistance or for needed plants.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
132	Weather and Climate

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

### **External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

### **Brief Explanation**

Out of 34,082 acres of land on Tutuila island, only 18,000 acres have less than 45% slope. Land for development and agriculture are limited. Many landowners do not have any existing management plans to care for and manage their own lands. The spread of exotic invasive species throughout the island, population increase, and climate change will negatively impact the future of forests and natural resources in American Samoa.

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

### **Evaluation Results**

Program evaluation indicated the following: 1) Forestry program staff should be more visible in the community to assist and encourage landowners to plant more native trees to address climate change. 2) The program must work with the village councils in managing watersheds and coastal areas; 3) The program must focus on native tree species and medicinal plants; 4) Must extend the program to Aunu'u and Manu'a. 5) Need to hire more professional and support forestry staff.

### **Key Items of Evaluation**