

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Climate Change - Preserving Water Quality of North Florida Watersheds

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				35%
111	Conservation and Efficient Use of Water				35%
133	Pollution Prevention and Mitigation				30%
	Total				100%

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	0.0	4.0
Actual Paid Professional	0.0	0.0	0.0	4.2
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
0	0	0	334603
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	92494
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

The activities in the planned program include: Selection of a suitable study site representing typical soil type, cropping system and management; Quantifying historic and current land-use patterns; Collection of field data on soil erosion and nutrient loss; and, recording of aquatic biota information.

2. Brief description of the target audience

The target audience for the planned program include: crop producers in the Apalachicola River Basin, small and limited resource farmers, extension personnel, environmental personnel and local, state and federal agencies.

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
Actual	0	0	0	0

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	2	2	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Inventory of land use/land cover patterns in the Apalachicola River Basin.

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Data on soil erosion and nutrient loss under irrigated and non irrigated conditions.
Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Baseline aquatic insects data on two major water streams in the basin.
Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Information on changing land-use patterns in the Apalachicola River Watershed.
2	Comparison of soil erosion measurements by the Mesh-bag method and the simulation results of RUSLE (the Universal Soil Loss Equation).
3	Identification of best management practices for efficient management of soil, water and nutrients.
4	Improvements of stream ecosystems.

Outcome #1

1. Outcome Measures

Information on changing land-use patterns in the Apalachicola River Watershed.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Comparison of soil erosion measurements by the Mesh-bag method and the simulation results of RUSLE (the Universal Soil Loss Equation).

2. Associated Institution Types

- 1890 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Soil erosion and re-deposition are processes of soil degradation of croplands, a central conservation concern of all farmers and the general public with respect to sustainable land use and management. Soil erosion and re-deposition in a landscape scale has rarely been observed due to lack of a suitable field technology.

What has been done

We developed the mesh-pad technology to observe the soil erosion and re-deposition on a 220-m slope farm land and compared the results with those of the SWAT model.

Results

We compared the measured results of soil loss (and soil re-deposited) using the mesh-pad method from the 220-m slopes (2-3 %) of the 160-acre Mears Farm with the simulation results of SWAT (Revised Universal Soil Loss Equation, RUSLE, based simulation model). The measured soil loss from the first four weeks (150.1 mm total rainfall) of the peanut cultivation was 0.5 t/h vs. the SWAT simulation of 9.8 t/h. The measured soil loss of the following seven weeks (196.6 mm total rainfall) was 0.16 t/h vs. the SWAT simulation of 1.5 t/h. The reduced soil erosion during the last seven weeks of the cultivation, which was reflected both in the measured and simulated

results, was due to the much better vegetation cover of the ground. This is the first time soil loss is actually measured from a true non-obstructed field runoff condition of a 220-m slope. The comparison concluded that the SWAT simulation of soil loss has been exaggerated 10-20 times over the observed values. The re-deposition of the eroded soil on the slope, which cannot be estimated from SWAT, was 11.5 t/h for the first four weeks of the cultivation and 28.2 t/h for the last seven weeks of the cultivation. Vegetation cover did not reduce soil re-deposition but it did reduce soil loss substantially.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

Outcome #3

1. Outcome Measures

Identification of best management practices for efficient management of soil, water and nutrients.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Improvements of stream ecosystems.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Public Policy changes

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Our results show that the mesh-bag method can be successfully deployed to observe soil nutrient erosion under un-obstructed natural run-off field conditions of relatively large-scale field experiments. This is the first time a true field soil erosion technology has been developed to observe true soil erosion process in natural field conditions. The

development of this technology will fill a significant gap in soil and water conservation science and will provide valuable information that has been unavailable in the past for the verification, validation and calibration of soil erosion models. The biological monitoring employed in this study may be effectively used in developing watershed protection and ecosystem management strategies.

Key Items of Evaluation

The mesh-bag method to estimate soil erosion under irrigated and non-irrigated conditions provides valuable information regarding the redistribution of top soil.

The EPT (Ephemeroptera, Plecoptera, Tricoptera) Aquatic Index may be used to determine the water quality status of freshwater streams in a watershed.