

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

**Program # 4**

**1. Name of the Planned Program**

Water Management

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
111	Conservation and Efficient Use of Water	50%	0%	50%	50%
112	Watershed Protection and Management	50%	0%	50%	50%
	<b>Total</b>	100%	0%	100%	100%

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

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

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	20.0	0.0	10.0	2.0
<b>Actual Paid</b>	30.1	0.0	27.6	3.0
<b>Actual Volunteer</b>	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
394717	0	798142	498320
1862 Matching	1890 Matching	1862 Matching	1890 Matching
394717	0	1671328	266267
1862 All Other	1890 All Other	1862 All Other	1890 All Other
3268084	0	3599130	0

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

**1. Brief description of the Activity**

**AgriLife Extension, AgriLife Research and Cooperative Agricultural Research Center**

Published research findings generated through evaluation of best management practices to efficiently manage available water resources, to limit off-site contaminant transport from production, processing, and landscaping systems, to utilize alternative water sources and to remove contaminants from impaired/alternative water sources.

Developed and conducted research and educational programs utilizing direct and indirect educational methods to support efficient utilization and conservation of water resources, to develop alternative water supplies, to implement best management practices on agricultural production and landscapes to protect water resources from contaminants, to promote proper management of surface and ground water resources, to enhance rainwater harvesting and to remove contaminants from impaired water supplies.

The work of AgriLife Research and AgriLife Extension is conducted jointly where research-based information is generated and then transferred to clientele.

Continued development of educational resources such as articles, fact sheets, bulletins, curriculum materials, short course manuals and other teaching materials.

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

**AgriLife Extension, AgriLife Research and Cooperative Agricultural Research Center**

Programs focusing on the issue of water address target audiences including but not limited to producers, homeowners, landscape managers, industry practitioners, water resource managers, and others who identify themselves with this issue.

Research findings on water resources management were published to effectively manage the water resources and allocate water for irrigation. Research focused on urban, forested and agricultural watersheds to help water managers, forester, farmers and ranchers to manage water resource effectively with little or no impact on environment.

Research and educational programs were developed by utilizing direct and indirect educational methods such as trainings and seminars and/or instructional classes for effective water conservation and management to develop an awareness among stakeholders.

Development of educational resources such as articles, fact sheets, bulletins, curriculum materials, short course manuals and other teaching materials and in progress.

**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
<b>Actual</b>	101657	657271	92500	0

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

**Patent Applications Submitted**

Year: 2014  
 Actual: 2

**Patents listed**

System and Method for Super-Intensive Shrimp Production  
 System and Method for Super-Intensive Shrimp Production Density Shrimp Production

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

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	0	245	245

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

**Output Target**

**Output #1**

**Output Measure**

- # of group educational sessions conducted.

Year	Actual
2014	1452

**Output #2**

**Output Measure**

- # research-related projects.

Year	Actual
2014	64

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

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

O. No.	OUTCOME NAME
1	% of participants who report an increased knowledge of best management practices related to water management.
2	% of participants who report the plan to or have adopted best management practices related to water management.

**Outcome #1**

**1. Outcome Measures**

% of participants who report an increased knowledge of best management practices related to water management.

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research
- 1890 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	94

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

**Issue (Who cares and Why)**

AgriLife Extension and Research:

Urban streams in Texas have been deteriorating due to the increased imperviousness from development and channel modifications (straightening and lining) that have been done through the years for flood control and water supply. Instability in river banks has resulted in erosion and land loss, flooding (upstream and downstream of modifications) and water quality problems in receiving water bodies. The most prevailing restoration practices include gabions, concrete lining and riprap. There is a need for restoring streams using natural methods that accommodate urban development while keeping the stream stable and performing its natural function. One of the most negative environmental impacts resulting from urbanization is the pollution to our waters and the erosion of our streams as a result of increased urban stormwater. Urbanization causes increased volumes of stormwater, flow rates and contaminant loadings. Traditional stormwater management relies on moving the water as fast as possible to the nearest water body. Recent development in stormwater management involves low impact development (LID)/Green infrastructure(GI) approaches to stormwater management such as rain gardens, green roofs, rainwater harvesting, and porous pavements in urban areas that address water quality as well as water quantity.

Cooperative Ag. Research Center:

Agricultural water allocation/management and urban water management are major issues which impact both water quality and quantity in the State of Texas because fast growing populations in urban area is increasing contaminated runoff including stream erosion, use of pesticides and fertilizers in agriculture also increasing contamination both in surface and groundwater resources.

### **What has been done**

#### **AgriLife Extension and Research:**

Two events were held during 2014 that reached 34 contacts resulting in 52 contact hours. In addition, an online course was developed and recorded and is currently in the final stages before it being released. Twenty-two events addressing stormwater management were presented in 2014 for audiences ranging from engineers, city officials, Master Naturalists, Master Gardeners, and the general public. These events reached 849 individuals through face-to-face contact resulting in 1277 contact hours.

#### **Cooperative Ag. Research Center:**

Two educational events were conducted among 60 participants of k-12 students from various schools and youths from various counties in the State of Texas.

### **Results**

#### **AgriLife Extension and Research:**

A survey was conducted for a stream restoration and natural channel design events. 100% of the attendees of the 2-hour workshop responded to the survey. 95% reported that they will take action as a result of the workshop. 94% of participants identified themselves as having good or excellent knowledge for all topics after completion of the workshop. Survey results for a workshop on smart growth indicated 100% of participants were completely or mostly satisfied with the overall workshop, the quality of the course materials, the ease of understanding of the material presented, and the helpfulness of the information as it relates to the attendee situation. 51.2% reported anticipating benefiting economically.

#### **Cooperative Ag. Research Center:**

The goals of these educational events were to develop awareness among students and youths. No evaluation survey was conducted.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management

## **Outcome #2**

### **1. Outcome Measures**

% of participants who report the plan to or have adopted best management practices related to water management.

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

- 1862 Extension
- 1862 Research
- 1890 Research

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	93

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

**Issue (Who cares and Why)**

AgriLife Extension and Research:

Water quantity also is a concern with landscape irrigation being a primary consumer of municipal water supply, especially during summer months. By considering water conservation during the design, installation and operation of landscape irrigation systems, the amount of water needed to maintain landscapes can be significantly reduced. Target audiences include licensed irrigators, landscape contractors, and conservation directors of cities and public utilities. In rural areas, onsite wastewater treatment systems provide the wastewater infrastructure for about 25% of Texas's population; operation and maintenance of these systems is critical for protecting our water quality and environmental health.

Cooperative Ag. Research:

Research instrument setup at demonstration farm and lecture series to develop awareness among youths.

**What has been done**

AgriLife Extension and Research:

Fifteen irrigation short courses were conducted statewide in seven cities to 425 irrigators, irrigation technicians, irrigation inspectors and municipal water conservation staff addressing weather stations, irrigation scheduling, troubleshooting, computer aided design and smart irrigation, and related topics. Sixteen on-site system management trainings were conducted including 10 Introduction to Septic Systems programs at 7 locations and 6, six-hour Homeowner Maintenance of Aerobic Treatment Units programs delivered at five locations.

Cooperative Ag. Research:

Since water management research program started from FY 2013/2014, we did not reach yet on evaluation stage.

**Results**

AgriLife Extension and Research:

A retrospective pre-post evaluation survey was distributed at the conclusion of nine landscape irrigation programs to gain feedback on the course. 79% of the participants indicated a willingness to adopt the practice of pumping out their septic tank as necessary and 93% of the participants indicated a willingness to adopt the practice of performing operation and maintenance activities on their septic system. The Homeowner Maintenance of Aerobic Treatment Units programs were attended by 107 people generating 642 contact hours. Documentation of programming impact

indicates a gain in knowledge by clients of 77-93%. Additionally, 64% of the participants indicated a willingness to limit the organic loading to the OSSF, maintain the disinfection component, and adopt the practice of performing operation and maintenance activities on their aerobic treatment unit.

#### 4. Associated Knowledge Areas

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

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

##### External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Other (Other Program Areas)

##### Brief Explanation

Overall, these programs were highly successful with greater than anticipated participation and high levels of knowledge gain. Interest in stream restoration, stormwater management, irrigation management, and on-site septic system management is high in most communities. Economic factors in smaller communities may limit implementation of recommended stream restoration practices, which can be costly if damage already is severe. Likewise, repair/replacement of failed or failing septic systems may be limited by homeowner economics. Emphasis on economics and low cost alternatives will continue to be a focus in the future.

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

##### Evaluation Results

Evaluation results for the different programs all clearly demonstrate a high level of client satisfaction, significant increases in knowledge gained, and most importantly, a high level of intention to adopt recommended practices. For example, 95% of participants at stream restoration and natural channel design educational events reported they will take action as a result of the information they were provided. Seventy-nine percent of septic system workshop participants indicated a willingness to adopt the practice of pumping out their septic tank as necessary and 80% of the participants indicated a willingness to adopt the practice of performing operation and maintenance activities on their septic system.

##### Key Items of Evaluation