

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

**Program # 1**

**1. Name of the Planned Program**

ENVIRONMENT, WATER, LAND AND NATURAL RESOURCES

**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%             |                 | 44%            |                |
| 111     | Conservation and Efficient Use of Water    | 30%             |                 | 25%            |                |
| 112     | Watershed Protection and Management        | 15%             |                 | 10%            |                |
| 121     | Management of Range Resources              | 20%             |                 | 21%            |                |
|         | <b>Total</b>                               | 100%            |                 | 100%           |                |

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

1. Actual amount of FTE/SYs expended this Program

| Year: 2011               | Extension |      | Research |      |
|--------------------------|-----------|------|----------|------|
|                          | 1862      | 1890 | 1862     | 1890 |
| Plan                     | 11.0      | 0.0  | 21.0     | 0.0  |
| Actual Paid Professional | 10.0      | 0.0  | 22.0     | 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    |
| 543310              | 0              | 88462          | 0              |
| 1862 Matching       | 1890 Matching  | 1862 Matching  | 1890 Matching  |
| 1686499             | 0              | 587406         | 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

### Issue

Water quality and availability in the arid West are issues that affect all Arizonans, including youth. Arizona Project WET trains teachers to utilize the relevant topic of water to teach critical thinking and problem solving skills in K-16 classrooms. Administered through the University of Arizona's Water Resources Research Center, Project WET assists in building water-related decision making skills in both students and adults. APW programming also assists city water conservation staff in meeting Groundwater Management Act requirements and helps private water company staff in meeting Corporation Commission best management practices. The APW Advisory Council comprises water and education specialists from across the state.

### What has been done?

Water education curricula are developed and administered by water resource specialists working together with teachers--all curricula meet state academic standards. In addition to curriculum guides, other teaching tools include drinking water and stream water testing kits, macroinvertebrate sampling kits, watershed models, groundwater flow models and history trunks. A teaching support center is available online to supplement lessons, and APW has an active blog and Facebook page.

In 2011, this project developed 34 new workshops and reached 528 educators who report teaching 33,464 students annually. APW staff and facilitators conducted these workshops logging 407 hours of face time. In response to a needs assessment for the Phoenix area, APW teamed with Arizona State University's Global Institute of Sustainability for the 6<sup>th</sup> year to deliver a 2-day Advanced Water Educators' workshop, themed Water and Public Perception. The workshop engaged 21 educators who report reaching 1,388 students annually. Another workshop involved 40 4<sup>th</sup>-6<sup>th</sup> grade teachers as part of the Biosphere 2 STEM (Science, Technology, Engineering and Mathematics) Academy. These teachers will reach 1,917 students annually with locally relevant STEM education. RinseSmart, a pre-rinse spray valve replacement program targeting area restaurants and commercial industrial/institutional kitchens, was funded June 2010-11.

### Impact

- Survey data shows that 97 percent of the teachers participating in the statewide workshops strongly agreed or agreed that "the workshop met my expectations and will have an impact on my teaching," 96 percent "intend to become a better water steward as a result of this workshop," 98 percent agreed "the information, strategies and instructional methods presented during the workshop were helpful to me." In the Advanced Educator Workshop on Energy and Water, 90 percent of the participants strongly agreed that "I have a better understanding of the relationship between water conservation and public perception." After the Biosphere 2 STEM Academy for K-3 Teachers, 100 percent of the participants agreed or strongly agreed that "the workshop activities were relevant and improved my knowledge," "the workshop met my expectations and will have an impact on my teaching," and that "it was excellent--the best workshop I've ever attended."

- Results from the STEM focused Water Investigations Program indicate a projected water savings of over 13 million gallons per year from school and home water savings due to installation of water efficient faucet aerators.

- At a workshop in Phoenix, one teacher wrote, "The instructors successfully modeled how to have fun doing science as well as demonstrating critical thinking and questioning strategies. Loved it! After today, I am thinking of starting an after-school science club for students."

- In Tucson, a RinseSmart program taught in schools has replaced 667 pre-rinse spray valves which will save an estimated 37,055,160 gallons per year in the Tucson service area.

- Through targeted education and water efficiency programs in the first three years (community, K-12, residential and business) in Pinal County, a cumulative **3,610,182 gallons of water is projected to**

**be saved annually** due to the installation of water conserving devices through the School Water Audit Program's Spray Valve Replacement and Water Scene Investigators programs.

Volunteers provided **2,658 service hours** delivering Arizona Water Festivals, a contribution **valued at \$55,419** (using Independent Sector value of \$20.85). A teacher survey was conducted to **evaluate the Arizona Water Festivals**. Teachers rate students' overall reaction to the water festivals **excellent 88 percent of the time and good to excellent 100 percent of the time**. Since 2000, the AWF program has engaged **48,156 4th grade students in 22 Arizona communities**. Hundreds of volunteers have also been trained to deliver effective water education transcending the water festival, as members in the community increase their own water literacy as a result of participating in the program.

### **Issue**

All forested communities in the White Mountains Zone of Arizona's Navajo, Apache and Greenlee counties are listed as "at risk communities" in the Federal Register with respect to catastrophic wildfire. The National Institute of Food and Agriculture (NIFA) and the University of Arizona have adopted Firewise USA as an applicable community and property owner education and implementation tool for comprehensively addressing wildland fire community risk. Local governments throughout the area determined that effectively addressing the risk to local communities was a priority and requested Cooperative Extension to provide leadership, on-the-ground development and programming facilitation.

### **What has been done**

As part of an ongoing effort that continued in 2011, Arizona Cooperative Extension in Navajo County increased fire mitigation awareness by conducting a comprehensive program that includes education guides, training, assessments and a highly visible demonstration area in cooperation with local communities. The Navajo County Extension director was a co-author on the NRCD's national publication, NACD Community Wildfire Desk Guide, published in June 2009. The handbook addresses how to prepare for, respond to and recover from a catastrophic wildfire in and around rural communities. The 2009 Sitgreaves Community Wildfire Protection Plan Report was developed and published through the Navajo County Cooperative Extension office.

Vegetation reduction to cut wildfire risk has been carried out on 7,580 acres of private and 64,600 acres of Forest Service administered tracts to date. Included in the mapping and reporting process are 6,373 properties; of these, 2,677 property owners have completed necessary fuels reduction hazard mitigation or forest health treatments on their properties. This has created a mosaic of fuel breaks across local communities that will limit fire behavior and increase the potential for defending populated areas if a major wildfire starts.

### **Impact**

Forest contracts developed through associated with the restoration efforts on public land through this project have generated \$53 million in revenue. Of this, a UA economist determined that with multipliers and improvements to local communities the total economic impact in the regional area has been \$97 million over the past six years, with the impact in 2011 of about \$23 million.

The signal test of all that is being done regarding wildfire risk reduction came in 2011 with the half million acre Wallow fire in the Apache National Forest. It impacted five communities in Apache County. Community Wildfire Protection Planning based on lessons learned from the Rodeo-Chediski Fire in 2002 and the implementation of these plans produced spectacular results. The towns of Alpine, Greer, Nutrioso, Eagar, and Springerville were all evacuated due to the fire and all were impacted with fire on the ground, ember storms, and in some cases losses of residences and structures. However, in comparison the Rodeo-Chediski blaze, where 480 homes were lost, Wallow destroyed 35. The result is a social and cultural shift in attitudes toward forest thinning, fuel reduction, and community forest management

throughout the White Mountains Region. Communities, neighborhoods, and local governments are embracing planning and maintenance of the community wildfire protection plan to reduce risk to communities and property. It is a quintessential validation of the role that Cooperative Extension provided locally in defining issues of community wildfire preparedness and safety while assisting in implementing effective mitigation processes.

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

Natural resource managers, Governor's Office and state agencies, municipal organizations and leaders, households, consumers, youth, master gardening and master watershed programs

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

| 2011   | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|--------|------------------------|--------------------------|-----------------------|-------------------------|
| Actual | 15000                  | 22000                    | 5000                  | 550                     |

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

**Patent Applications Submitted**

Year: 2011  
Actual: 3

**Patents listed**

Withaferin A Analogs and Uses Thereof  
Antimicrobial Efficacy of Treatments Based on Plant Compounds  
Targeted Cryptosporidium Biocides

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

**Number of Peer Reviewed Publications**

| 2011   | Extension | Research | Total |
|--------|-----------|----------|-------|
| Actual | 20        | 60       | 80    |

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

**Output Target**

**Output #1**

**Output Measure**

- Effectiveness of the research program will be used to reach direct and indirect contacts

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2011        | 3             |

**Output #2**

**Output Measure**

- Number of individuals participating in educational programs

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2011        | 17500         |

**Output #3**

**Output Measure**

- Number of individuals adopting new technology

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2011        | 800           |

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

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

| O. No. | OUTCOME NAME   |
|--------|--|
| 1      | Effectiveness of research programs will be based on publications, external grant support, and integration into existing extension programs |
| 2      | Number of individuals gaining knowledge by participating in educational programs   |
| 3      | Volunteers completing Master Gardening training  |
| 4      | Create awareness and increase knowledge  |

## **Outcome #1**

### **1. Outcome Measures**

Effectiveness of research programs will be based on publications, external grant support, and integration into existing extension programs

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

- 1862 Extension
- 1862 Research

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

Change in Action Outcome Measure

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

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2011        | 0             |

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

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

All participants in the research and extension programs and the respective clientele for these programs care.

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

Arizona has a fully integrated research and extension program and all faculty strongly pursue competitive grants.

#### **Results**

More than \$1 million dollars in non USDA grants were obtained to support this program.

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

| <b>KA Code</b> | <b>Knowledge Area</b>                      |
|----------------|--|
| 102            | Soil, Plant, Water, Nutrient Relationships |
| 111            | Conservation and Efficient Use of Water    |
| 112            | Watershed Protection and Management        |
| 121            | Management of Range Resources              |

## **Outcome #2**

### **1. Outcome Measures**

Number of individuals gaining knowledge by participating in educational programs

### **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> |
|-------------|---------------|
| 2011        | 8000          |

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

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

Water is always a critical issue in the desert southwest

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

Intensive educational programs have been delivered to schools and the general public

#### **Results**

Awareness of the need to conserve and reuse water has increased significantly

### **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 #3**

#### **1. Outcome Measures**

Volunteers completing Master Gardening training

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

| <b>Year</b> | <b>Actual</b> |
|-------------|---------------|
| 2011        | 400           |

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

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

The Master Gardener program is an important component of our Cooperative Extension program.

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

Over 400 volunteers completed Master Gardener training.

##### **Results**

The Master Gardeners provided over 20,000 volunteer hours which is valued [at \$21/hour] of over \$420,000.

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

| <b>KA Code</b> | <b>Knowledge Area</b>                      |
|----------------|--|
| 102            | Soil, Plant, Water, Nutrient Relationships |
| 111            | Conservation and Efficient Use of Water    |
| 112            | Watershed Protection and Management        |

**Outcome #4**

**1. Outcome Measures**

Create awareness and increase knowledge

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

| Year | Actual |
|------|--------|
| 2011 | 0      |

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

**Issue (Who cares and Why)**

All recipients of our programs care about increasing their knowledge.

**What has been done**

Materials were distributed to more than 250,000 adults and youth in the state.

**Results**

75% of the recipients indicated a change in behavior resulting from the programs and materials.

**4. Associated Knowledge Areas**

| KA Code | Knowledge Area                             |
|---------|--|
| 102     | Soil, Plant, Water, Nutrient Relationships |
| 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
- Government Regulations
- Competing Public priorities

##### **Brief Explanation**

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

##### **Evaluation Results**

All programs are currently in the process of being evaluated internally for existing areas to preserve, protect, or enhance, as well as areas to discontinue or modify. We will seek further input from stakeholders, advisory committees, and focus groups utilizing needs assessments with the assistance and expertise of an Evaluation Specialist. See State Defined Outcomes.

##### **Key Items of Evaluation**