

**Arizona Project WET – Phoenix AMA  
Request for Renewal of Funding**

**7/15/2016**

**PROGRAM DESCRIPTION:**

**Purpose:** To educate K-12 students about their interconnected water resources and their importance to Arizona's future in support of Phoenix AMA's statutory goal of safe yield.

**Goals:** Work towards an understanding of:

- Surface water in terms of a watershed's components, its dynamics, and its role in the hydrologic cycle.
- The groundwater system in terms of its components, composition, and its role in the hydrologic cycle.
- The effect of snow pack on water flow in a watershed
- The movement of water through diverse substrates
- Surface water and groundwater rights in the Arizona
- Surface water management through containment and distribution
- Colorado River system allocations and uses.
- The Central Arizona Project and the Shortage Sharing Agreements on the Colorado River
- Groundwater recharge and the Arizona Water Bank
- Water reuse and augmentation
- Water Conservation Technology
- The Engineering Design Process

**Audiences:** The proposed programs benefit public, charter and private school teachers and students in the Phoenix AMA.

**Methodology:** Arizona Project WET offers a three-pronged approach to promote water stewardship and STEM literacy. First, our Teacher Academies offer professional development that evolves teachers' instructional practice and water-related content mastery through STEM integration, student-directed learning, and collaborative work. For the past three years, we've focused our professional development on STEM learning, due to the need for education that integrates these subjects into real world, rigorous, and relevant learning experiences for students. We use the relevant topic of water to model this process. All professional development incorporates: 1) Making claims and arguments based on evidence and reasoning (Common Core & Next Generation Science Standards), 2) Incorporating authentic data sets and informational text regarding issues that directly affect students (Common Core & Next Generation Science Standards), 3) Using technology and math skills for relevant inquiry and 4) Identifying and motivating STEM careers.

Second, APW's direct student outreach delivers or extends classroom learning by facilitating exploration and discovery. Groundwater flow models, watershed models, water efficient devices and whole body simulations are used to drive exploration and inquiry. Learning in this way builds foundational knowledge, from which students can then construct a deeper understanding of a subject. The School Water Audit Program (SWAP) and the Water Scene Investigation (WSI) Program offer project based learning experiences that incentivize water conservation through student-driven inquiry and students acting to install technology that saves water.

**Background:** Arizona Project WET (APW), a recipient of ADWR Assistance Program funds since 2001, has developed and provided teacher workshops, Arizona-specific instructional materials, water

education festivals and other innovative and valuable educational resources that promote the awareness, appreciation, knowledge, and stewardship of Arizona water resources. In 2008, funds were rescinded as a result of the state budget shortfall. In 2014, APW re-established a 2-year IGA with the Phoenix AMA to provide pertinent education to Phoenix Valley teachers and students (\$50,000 per year). The request herein (\$50,000 per year) will maintain Arizona Project WET programming in the Phoenix region which includes curriculum components, STEM lessons, water saving projects and professional development for teachers.

**Description:** Education is a key to Phoenix AMA achieving its statutory goal of safe-yield by 2025 and sustaining it thereafter. Phoenix's water resources, specifically in-state surface water, groundwater and Colorado River water via the Central Arizona Project, need to be understood as interconnected systems. Since all APW programs are made locally relevant, drought is a pervading theme in them. Also, the existing conservation ethic in Arizona needs to be expanded beyond behavioral methods to the use of water efficient technology. Through a deepened understanding of water resources and reliability, we will develop a water literate citizenry prepared for decision-making that ensures societal wellbeing and economic growth.

All Arizona Project WET programs are developed in consultation with regional district specialists using the logic model format of inputs, outputs and short, medium and long-term outcomes. Using clear objectives, APW has developed assessment tools for all programs. APW programs in Phoenix all achieve measureable learning gains using pre and post assessments. Programs are evaluated and altered based on data and new programs are developed based on need. Our water audit programs can actually achieve measureable water savings through meaningful STEM education.

In the 2014-15 fiscal year, Arizona Project WET programs in the Phoenix area reached 487 teachers, 30,029 students and 2,671 adults with 428 hours of instruction. During this school year, 230 teachers improved their mastery of content knowledge and instructional practices by an average of 49% through participation in professional development academies and workshops. This positively affects the 18,648 students that they teach annually. In direct instruction provided by APW, 8,855 students from 257 teachers' classes gained knowledge about water resources and efficiency with knowledge gains ranging from 8 - 28% (Water Festival data) (program and grade level dependent). Student-driven water audit projects resulted in a projected 2.0-million gallons/year water savings. Public outreach events engaged 1,986 students and 1,723 adults in water education activities.

#### SCOPE OF WORK:

APW shall perform the following annually for the next 2 years:

#### **Teacher Professional Development**

##### **Task 1: Teacher Multi-day Academy**

APW shall conduct a multi-day academy, potentially reaching 30, teachers from the Phoenix AMA. Teachers will improve their skills in engaging students in real-world and relevant science, technology, engineering and math learning that focuses on systems thinking and problem solving. They will leave these workshops with practical applications of these concepts to utilize in their classrooms and as participants, will receive implementation support in the classroom from APW.

**Education Links to ADWR Programs:** Colorado River, Assured Adequate Water Supply and

Arizona Water Bank

**Deliverable:** The Annual report shall include a description of the progress of the academies, including location, syllabus, marketing efforts, attendance, results and evaluation.

### **Task 2: Teacher 2 Day Academy**

APW shall conduct one 2-day academy targeted to engage 25 teachers in learning new STEM-oriented instructional practices and systems thinking. Teachers will leave this workshop with practical STEM applications to utilize in their classrooms and, as participants, will receive implementation support in the classroom from APW.

**Education Links to ADWR Programs:** Drought and Conservation, Colorado River, Assured Adequate Water Supply and Arizona Water Bank

**Deliverable:** The Annual report shall include a description of the progress of the academy, including location, syllabus, marketing efforts, attendance, results and evaluation.

### **Task 3: 2.0 Teacher One-day Workshops**

APW shall conduct two 1-day workshops focused on the *Project WET Curriculum and Activity Guide version 2.0*, modeling interdisciplinary inquiry-based lessons, potentially reaching 50 teachers.

**Education Links to ADWR Programs:** Drought and Conservation

**Deliverable:** The Annual report shall include a description of the workshops, including location, syllabus, marketing efforts, attendance, results and evaluation.

### **Direct Student Outreach**

#### **Task 4: School Water Audit and Water Scene Investigation Programs**

These STEM units engage students in collecting data through a scientific process, and calculating water savings based on the installation of water efficient technology. Arizona Project WET Program Coordinators will support teachers who attend our professional development sessions in facilitating these STEM units in their classrooms. APW facilitators will work with at least 5 teachers to implement these real-world and relevant STEM units with their students.

**Education Links to ADWR Programs:** Drought and Conservation and Assured Adequate Water Supply

**Deliverable:** The semi-annual report will include per class-calculated projected water savings, number of students, student and parent comments, and evaluation data from each teacher.

#### **Task 5: Engineering Design Process**

The E in STEM is the most difficult subject to incorporate for most teachers. APW will support teachers who attend our professional development sessions in facilitating Engineering Design Projects that might include rainwater harvesting systems, a method of lifting water over a distance, calculating energy loss in a piping system etc. APW facilitators will work with at least 5 teachers to implement these real-world and relevant STEM units with their students.

**Education Links to ADWR Programs:** Drought and Conservation and Assured Adequate Water Supply

**Deliverable:** The semi-annual report will include number of students, student and parent comments, and evaluation data from each teacher.

**Task 6: The Groundwater System and Riparian Areas**

The groundwater system is one of Arizona’s most important water reserves. Increasingly, in many areas of the state, we are even managing water storage using the groundwater system. Arizona students need to understand this system as a crucial part of the water cycle to ensure that, as decision makers, we manage this resource for future prosperity. APW will conduct groundwater presentations in at least 5 teachers’ classrooms.

In addition, students need to understand the value of water to all life. APW will support field investigations at Rio Salado Habitat Restoration Area, in partnership with Phoenix Parks and Recreation, if teachers can get their students there. APW will support at least five field days at Rio Salado. APW facilitators will work with at least 5 teachers to supplement instruction with real-world and relevant learning outside of the classroom.

**Education Links to ADWR Programs:** Drought and Conservation, Assured Adequate Water Supply and Arizona Water Bank

**Deliverable:** The semi-annual report will include number of students, student assessment, and evaluation data from each teacher.

**Education on all ADWR Programs could be disseminated at events by APW program coordinators upon request.**

SCHEDULE OF DELIVERABLES AND PAYMENTS:

**Deliverables:** APW shall submit copies of the Semi-Annual Progress Reports to the Department’s Technical Administrator according to the schedule listed below.

DELIVERABLES	DUE DATE(S)	PAYMENTS (Not to exceed)
Annual Progress Reports July 2016 to December 31, 2016	January 31, 2017	\$25,000
January 2017 to June 2017	July 31, 2017	\$25,000
July 2017 to December 2017	January 31, 2018	\$25,000
January 2018 to June 2018	July 31, 2018	\$25,000
<b>TOTAL AMOUNT</b>		<b>\$100,000</b>