

Arizona Department of Water Resources 2023 Final Report – Tucson AMA

I. Introduction

Arizona Project WET (APW) supports water stewardship and STEM literacy by 1.) providing teacher professional development that evolves instructional practice and deepens content knowledge, 2.) delivering place-based student outreach that extends classroom learning, and 3.) coordinating community engagement that is relevant and water-centered. APW's interdisciplinary, standards-based educator Professional Development (academies and workshops) provides frameworks for curriculum integration and real-world connection. APW collaborates with districts' teachers, administrators, and specialists to provide science-instruction training necessary to evolve best practices for today's learners. Our enduring partnerships allow us to increase the breadth of offerings in the Tucson AMA and extend APW's exemplary programming to a broader audience. Arizona Project WET entered into a 1-year Intergovernmental Agreement (IGA) with Arizona Department of Water Resources (2/28/23 to 2/28/24 – inclusive of a portion previous contract 2021-3143: 8/26/21 to 11/30/22).

The purpose of this program is to educate K-12 students about their water, a complex, interconnected, finite natural resource, and its importance to Arizona's future in support of Tucson AMA's statutory goal of safe yield.

Project goals are to 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 snowpack 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



Arizona Project WET's instructional practices have students doing, exploring, discovering, and explaining, which is in perfect alignment with the Arizona Science Standards approach. We help students figure out how their world works so they can make sense of natural phenomena in the environment. Arizona Project WET lessons provide real world relevancy that makes learning interesting, fun, and action-oriented for students at all grade levels. Funds granted by this contract were used to develop and deliver curriculum components, STEM lessons, water saving content, and teacher professional development. This funding also expanded existing programs within the Tucson AMA.

II. Scope of Work

Direct Student Outreach Programs

Arizona Project WET has developed an extensive direct student outreach program through Tucson Water funding and easy access to UA students to train and deliver facilitated lessons. These lessons are scripted, yet, through the use of models and teaching tools, water educators facilitate learning through inquiry and exploration. In the 22-23 Academic Year, APW:

- Conducted **32** Sweetwater Wetland Water Festivals for 4th Grade Classes within the Tucson Active Management Area. (APPENDIX A)
- Conducted **34** in-classroom Groundwater Flow Model presentations for 3rd & 4th grade students. (APPENDIX B)
- Conducted **19** in-classroom Groundwater Flow Model presentations for middle and high school students. (APPENDIX C)



- Conducted **12** Water Scene Investigations (WSI) Programs that challenged students to become wise water users by installing water efficient devices like faucet aerators, finding/mitigating leaks, and learning more about water efficient appliances. (APPENDIX D)
- Provided relevant STEM learning in the region with middle and high school teachers by facilitating # investigation days at Sweetwater Wetlands. (APPENDIX E)

Arizona Water Festivals – Marana

The Marana Water Festival was held at Crossroads – Silverbell District Park on Thursday, September 29, 2022. This epic field day brought together 38 teachers, 44 community volunteers, and 158 parents; together they engaged 956 4th grade students with fun, meaningful, water-focused models, games, and relays. This experiential community event, with activities on groundwater, watersheds, the water cycle, and water conservation technology, instills a deeper understanding of Arizona's water resources. (APPENDIX F)



Equipment Loan Program – Canyon Del Oro High School

We have seen a **sharp** decline in interest for water testing kits. There has been, however, a marked increase in requests for materials, manipulatives, and models. This will inform our resource allocation in coming years.

III. Summary



Since its inception, Arizona Project WET's comprehensive, statewide water education program has instructed over **12,843 teachers** on water topics and best instructional practices. Those teachers have engaged over **873,286 students** in water education. Strategic support for APW provides effective educational opportunities to an extensive network of educators, young adults, and children. We appreciate your partnership in helping to ensure that Arizonans understand their interconnected water resources, are conservation savvy, and are prepared to help ensure a safe, reliable water supply.

APW partners with an extensive network of water providers and school districts to market programs. In addition, we maintain a list-serve of all past participants in the program. The APW website invites sponsors, partners, teachers, and future collaborators to explore APW programs, including teacher workshops and academies, Arizona Water Festivals, Water Scene Investigations Programs, and Groundwater Programs.

APW is active on Facebook, Instagram, and Twitter.

APPENDIX A

Sweetwater Wetlands Water Festival – 32 Classes from 12 Schools

Experience an oasis in the desert to discover the vital role that wetlands play in our environment. During this field day, 4th grade students discovered and identified the parts of the groundwater system and explored relationships between surface water and groundwater using hands-on models, games, and relays.

School	District	Teacher	Date	Classes
Sierra	SUSD	K. Davis	10/4/22	3
Sam Hughs	TUSD	A. Batchelder	10/17/22	3
Miles ELC	TUSD	J. Revell	10/24/22	3
Carillo	TUSD	M. Peralta	10/25/22	2
Craycroft	SUSD	I. Martinez	11/2/22	3
Bloom	TUSD	S. Greene-Hunley	12/2/22	3
Los Amigos	SUSD	V. Rodriguez	12/16/22	4
John E. White	TUSD	M. Oneil	1/30/23	4
Calvary Chapel	Private	R. Beitel	4/11/23	1
Gale	TUSD	J. Reinstra	4/26/23	2
Hendricks	FWUSD	J. Wendt	4/28/23	3
Dunham	TUSD	J. Hunt	5/11/23	1

APPENDIX B
Groundwater Flow Model Presentations – 34 Classes at 9 Schools

Classroom groundwater presentation uses systems thinking and the hands-on groundwater flow models, materials, and activities. 4th Grade students are challenged to discover for themselves how the system works and why it matters to them as Tucson AMA water users. The program is designed to construct new knowledge, deconstruct misconceptions, and teach about the local groundwater system.

School	District	Teacher	Date	Classes
Santa Clara	SUSD	H. Cota	8/26/22	3
Sierra K9	SUSD	K Davis	9/30/22	3
Versey	TUSD	S. Shenk	10/21/22	4
Craycroft	SUSD	I. Martinez	11/1/22	3
Butterfield	MUSD	S. Forrester	11/5/22	3
Carillo	TUSD	M. Peralta	11/15/22	2
Myers-Ganoung	TUSD	S. Fraijo	11/22/22	2
Los Amigos	SUSD	V. Rodriguez	11/28/22	4
Calvary Chapel	Private	R. Beitel	3/28/23	1
Gale	TUSD	J. Reinstra	4/18/23	2
Hendricks	FWUSD	J. Wendt	5/1/23	3
Bonillas	TUSD	D. Sainz	5/5/23	3
Dunham	TUSD	J. Hunt	5/11/23	1

APPENDIX C

Groundwater Flow Model Presentations – 19 Classes at 5 Schools

Classroom groundwater presentation uses systems thinking and the interactive Parflow groundwater flow models. 6th – 12th Grade students are challenged to discover for themselves how the system works and why it matters to them. The 50-minute presentation is designed to construct new knowledge, deconstruct misconceptions, and teach about the local groundwater system.

School	District	Teacher	Date	Classes	Grade
Wakefield Middle	TUSD	S. Sumner	12/9/22	3	7
CDO	Amphitheater	C. Gabriel	1/27/23	3	9-11
Butterfield	Marana	J. McCormick	5/15/23	3	6
Ironwood	AUSD	B. Perez	2/7/23	5	9-12
Wakefield Middle	TUSD	P. Kelly	11/29/23	3	8
Paulo Freire	Charter	T. Pfister	3/27/23	2	7

APPENDIX D

Water Scene Investigations Program – 14 classes at 4 schools

WSI empowers 6th – 12th grade students to become wise water users. By installing water efficient devices (like faucet aerators), mitigating leaks, and considering more efficient water technology, young Arizonans can make choices in favor of sustainable, responsible, and economically shrewd water use. Our student sleuths, at home or at school, investigate water waste and take action to stop it!


School	District	Teacher	Date	Classes	Grade(s)
Tucson High	TUSD	K. Scotti	11/4/22	3	10-12
McCorkle	TUSD	M. Guillen	10/17/22	6	6
CDO	Amphitheater	C. Gabriel	1/27/23	3	9-12
Tucson Intl. E	Private	B. Chambers	3/1/22 & 3/8/23	2	7-12

APPENDIX E


Sweetwater Wetlands STEM Learning Investigation Days - 13 Classes from 3 Schools

The Sweetwater Wetlands Discovery Journey cultivates observational, measurement, language, and documentation skills as 6th – 12th grade students explore the interconnectedness of the urban water cycle. As a result, they have a deeper understanding of the Tucson urban water cycle, some of the ways humans impact their surrounding environment, and the bearing of water's seasonal scarcity or abundance on life in the region.

School	District	Teacher	Date	Classes	Grade(s)
Changemaker	Charter	N. Canto	12/14/22 & 12/15/22	3	9-11
Tucson Intl. E	Private	B. Hibaya	5/10/23	2	6-12
Alice Vail	TUSD	N. Rothenberg	3/6/23	4	8
Alice Vail	TUSD	N. Rothenberg	3/14/23 & 3/15/23	4	8




COOPERATIVE EXTENSION
Arizona Project WET
Arizona Water Festival






Marana Water Festival:



- 956 Students
- 38 Teachers
- 153 Parents
- 44 Volunteers



Water Festivals are made possible by our dedicated sponsors and partners across the state of Arizona.



Thank You Team!

2022-2023 Impact Report Marana Water Festival

The Arizona Water Festival Program instills a deeper understanding of water in the earth system and Arizona's water resources.

Schools within the Marana Unified School District.

"The Water Festival has brought a lot of information and has impacted the children and myself very positively. They were excited about the activities they participated in and have a new perspective on water conservation."
- 4th Grade Teacher

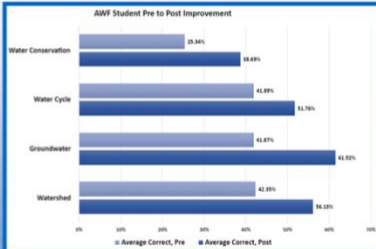
Teacher Survey Statements	Agree/Strongly Agree
My students can draw a picture of what groundwater looks like and how it moves.	86%
My students can describe what a watershed is and name some of the components of a watershed.	86%
The program increased my students' understanding of water science and conservation.	71%
My students can identify the places that water can go within the earth system.	86%
My students can demonstrate their awareness that water is constantly changing form and moving through the earth system.	86%
My students can identify multiple ways to save water in their homes.	86%

Volunteer Survey Statements	Agree/Strongly Agree
After participation in this program, children will better understand Arizona's interconnected water resources.	80%
After participation in this program, children are more aware of how their water use decisions affect our water supply.	80%
After participation in the program, volunteers and other adults are more aware of water science and how their decisions affect our water supply.	80%
I believe the Water Festival program is important for student learning, both academically and as citizens.	80%
I believe Arizona Water Festivals have a positive impact on the community.	80%

"I've worked at the Festival for several years now and I believe the lessons make the students think about water in a more wholistic way. They see water sources, sources of pollution, and conservation methods."
- Community Volunteer

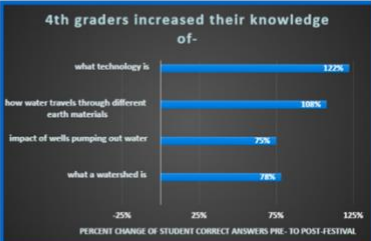
"I felt the program was well thought out and the students enjoyed the hands-on experience."
- Community Volunteer

Arizona's Water Festival Participation Since 2000				
Students	Teachers	Parents	Volunteers	
172,692	6,539	9,363	10,171	




Topic	Average Correct, Pre	Average Correct, Post
Water Conservation	28.36%	59.84%
Water Cycle	41.89%	61.76%
Groundwater	41.87%	61.52%
Watershed	42.85%	66.25%

4th graders increased their knowledge of-



Topic	Percent Change
what technology is	122%
how water travels through different earth materials	108%
impact of wells pumping out water	75%
what a watershed is	70%



Thank You !