Welcome

The meeting will begin shortly, in the meantime please:

- Keep your phone muted during the meeting
- If you have a question/comment during the meeting type it in the chat box and it will be read and addressed
- If you experience any technical difficulties, please contact ADWR Help Desk at 602-771-8444 or tickets@azwater.gov

Phoenix AMA GUAC
September 19th, 2024

Meeting Agenda

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2. **Meeting Logistics** – *Nicholas Mason, ADWR*
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4. **Arizona Water Banking Authority –** *Rebecca Bernat, AWBA*

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- During the Call to Public attendees will have the option to speak to the Council
- This meeting is being recording and will be posted to ADWR's website
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2025 Preliminary AWBA Plan of Operation

Rebecca Bernat, Ph.D., Manager

Groundwater Users Advisory Council | Phoenix AMA
Sept 19, 2024

2025 Preliminary Plan of Operation

Water Availability

- BOR announced Tier 1 shortage for 2025
  - 512,000 AF reduction to AZ Colorado River entitlement
- Resultant reduction to CAP
  - Portion of non-Indian agricultural (NIA) pool

2025 Preliminary Plan of Operation

Credit Development

- No Excess CAP water available to AWBA
- Goals achieved through other means
  - Intentionally Created Surplus (ICS) Firming Credits
  - Long-term Storage Credit (LTSC) purchases
    - Changes in pricing method due to tightening market

Funding for 2025 Plan of Operation

Funding Source	Estimated Funds Available		Estimated Funds Utilized		Estimated Credits (AF)	
	AWBA	CAWCD	AWBA	CAWCD	Water Storage	Developed Credits
Withdrawal Fees						
Phoenix AMA[1]	$1,676,210		$1,676,210		0	5,327
Tucson AMA[2]	$367,337		$367,337		0	918
Water Storage Tax						
Phoenix AMA		$0		$0	0	0
Pinal AMA		$0		$0	0	0
Tucson AMA		$0		$0	0	0
Total	**$2,043,547**		**$2,043,547**		**0**	**6,245**

[1] Funds used to develop ICS Firming Credits at $283.2/AF pursuant to AWBA's 2019 IGA with the Community. Developed credits include a 10% loss factor.

[2] The purchase rate of $400 per LTSC neither accounts for the source of credit nor market fluctuation.

Distribution of Credits

Firming for 2025

- Tier 1 Shortage condition
- Tribal firming obligation for the Gila River Indian Community (Community): 6,102 AF

Firming Proposal for the Community - Tier 1 Shortage in 2025:

Year	Firming Credits Developed			Firming Credits Used (AF)		Remaining Balance (AF)
	Firming Credits Developed (AF)	Cost/AF	Total Cost	Through CY 2024	CY 2025[1]	
2015	16,000	$157.00	$2,512,000	16,000	0	0
2016	12,000	$161.00	$1,932,000	11,174	826	0
2017	7,000	$164.00	$1,148,000	0	5,276	1,724
2018	9,000	$160.00	$1,440,000	0	0	9,000
Total	**44,000**		**$7,032,000**	**27,174**	**6,102**	**10,724**

[1] Based on CAWCD's August 2024 estimates of 2025 water orders.

- No firming for CAP M&I or on-River (sub)contractors

No request for Intentionally Created Unused Apportionment

Estimated Firming Volumes thru 2025

Objective and Location	Estimated Credits Available as of Dec 31, 2024[1]	Estimated Credits Used in 2025	Estimated Credits Remaining as of Dec 31, 2025
	Acre-feet		
CAP M&I Firming (4-cent tax)	**2,329,457**	**0**	**2,329,457**
Phoenix AMA	1,582,453	0	1,582,453
Pinal AMA	234,791	0	234,791
Tucson AMA	512,213	0	512,213
On-River M&I Firming (gen. fund)	**403,830**	**0**	**403,830**
Tribal Settlement Obligations: [2]	**161,262**	**6,102**	**155,160**
Community - 15,000 AFY	161,262	6,102	155,160
LTSCs	*105,390*	*0*	*105,390*
Firming Credits	*16,826*	*6,102*	*10,724*
ICS Firming Credits	*39,046*	*0*	*39,046*
WMAT - 3,750 AFY	0	0	0
Hualapai - 557.5 AFY	0	0	0
Future Settlements- 4416.5 AFY[3]	**0**	**0**	**0**
Federal Assistance (SAWRSA)	**34,102**	**0**	**34,102**
Groundwater Mgmt. (W/Fees)	**777,591**	**0**	**777,591**
Phoenix AMA	228,878	12,350	216,528
Pinal AMA	444,757	-12,350	457,107
Tucson AMA	103,956	0	103,956
Shortage Reparations	**109,489**	**0**	**109,489**
Pinal Redirect Credits	**14,125**	**0**	**14,125**
Interstate - SNWA	**613,846**	**0**	**613,846**

[1] Includes all credits accrued and utilized through 2024

[2] The White Mountain Apache Tribe Water Rights Quantification Act enforceability date is December 30, 2027. The Hualapai Tribe settlement enforceability date is April 15, 2029.

[3] The AWBA understands that it is highly unlikely that additional NIA priority water would be included in future settlements. Therefore, the AWBA is assuming there will be no additional firming obligations of NIA priority water.

Questions?

Email: rbernat@azwater.gov

Website: https://waterbank.az.gov/

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Water Management Assistance Program Fund

Current Balance: $657,33

Encumbered/committed: $446,672 (+ $75,000 for APW)

Remaining Balance: $210,661 ($135,661)

PHOENIX ACTIVE MANAGEMENT AREA
Groundwater Withdrawal Information

Year		2020	2021	2022	2023	2024	2025
WMAP	Fee	$0.25	$0.25	$0.25	$0.25	$0.30	Max. $2.00
	Collected	$192,269	$189,094	$204,201	$160,261	N/A	
Admin & Enforcement	Fee	$0.50	$0.50	$0.50	$0.50	$0.50	Min. $0.50 Max. $1.00
	Collected	$385,250	$380,914	$408,401	$320,522	N/A	
Water Bank	Fee	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50
	Collected	$1,925,479	$1,904,572	$2,042,004	$1,603,011	N/A	
Total	Fee	$3.25	$3.25	$3.25	$3.25	$3.30	TBD
	Collected*	$2,730,644	$2,731,949	$2,867,164	$2,319,182	N/A	

*In addition to WMAP, Admin & Enforcement and Water Bank, amount includes late fees, recovery wells fee, and Water Quality Fund fee

Current Projects being funded WMAP:

PROJECT NAME	CONTRACTOR	TOTAL FUNDING	REMAINING FUNDING	CONTRACT ENDS
Arizona Project WET	University of Arizona	$75,000	$32,500	12/31/2024
Residential Water Use	City of Phoenix	$139,000	$139,000	2/28/2027
Smartscape Professional Landscape Training	University of Arizona	$112,896	$56,448	8/31/2025
Water Conservation Management Program (WCMP)	Buckeye Valley Natural Resources Conservation District (NRCD)	$216,000	$141,000	12/31/2025
Gilbert Smart Irrigation Controller Rebate Program	Town of Gilbert	$45,000	$31,500	12/31/2025

Current Projects being funded Groundwater Conservation Grant Projects:

PROJECT NAME	CONTRACTOR	TOTAL FUNDING	REMAINING FUNDING	CONTRACT ENDS
Using Project-Based STEM Education to Enhance Groundwater Conservation in Maricopa County Schools	University of Arizona – Arizona Project WET	$195,855	$0	Completed
Northern Avenue Lateral Surface Water Capacity Restoration	Maricopa Water District	$251,500	$46,110	7/31/2025
El Mirage Water Conservation Program	City of El Mirage	$150,000	$45,000	1/19/2026
Pecan to New Magma Reclaim Water Line	EPCOR Water	$250,000	$110,000	Terminated
Leak Detection Equipment Replacement	Arizona Water Company	$60,000	$18,000	3/31/2026

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2020-3114:

Using Project-Based STEM Education to Enhance Groundwater Conservation in Maricopa County Schools

Lisa Townsend, Director

Kirstyn Kay, Senior Program Coordinator

September 19, 2024

WHAT WE DO

Arizona Project WET builds water-literate leaders, educators, professionals, and stewards.

We do this by hosting teacher professional development workshops that deepen water-related content knowledge and support evolving instructional practice.

We offer direct student and community outreach that inspires and engages through relevant, water-focused experiences and we use our expertise as educators to connect community water stewards and the K-12 education system.

Our programs are in the classroom, in “the field”, online, and in blended learning formats.

We have resources for educators, students, and community members.

WATER RESOURCES

WE TELL ARIZONA'S WATER STORY

Arizona Project WET learners grapple with the intricacies of interconnected surface water, groundwater, the hydrologic cycle, as well as climate change, water management, and conservation. We offer real world relevancy based on the best, most up-to-update science, and most pressing issues. All water users have a voice in the study of water-Native Nations, large-scale manufacturers, animals, farmers, plants, and even the river itself.

Arizona Project WET Education digs into Arizona's water resources exploring distinctions about them, relationships between them, and the management of them. We explore the unseen groundwater system that provides 41% of Arizona's water supply and offers water storage unaffected by evaporation. We extol the brilliance of both the SRP and the Hohokam People before them, for their use of gravity to move water where it's needed. We challenge students to match the engineering feat achieved by CAPengineers of moving water 336 miles across the Sonoran Desert uphill 2,900 feet.

We study the long history of water management and use that narrative and current innovations to teach wise water use in a complex and ever-changing mix of water resources.

ENGAGE EXPLORE EXPLAIN

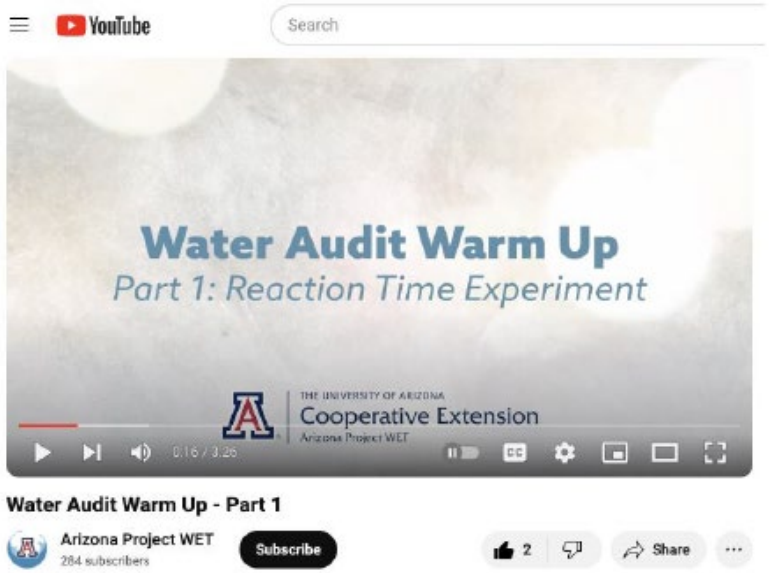
Arizona Project WET's instructional practices have students doing, exploring, discovering and explaining, which is in perfect alignment with the Arizona Science Standards approach. We help students figure out how their world works and make sense of phenomena in the natural world. Arizona Project WET lessons provide real world relevancy that makes learning engaging, interesting, and action-oriented for Arizona students at all grade levels.

Intergovernmental Agreement

The purpose of this Agreement is to deliver 3 STEM and project-based learning experiences to 10 schoolteachers in the Phoenix AMA whose water supply is primarily groundwater. The GEC curriculum will combine water conservation components from established School Water Audit Program (SWAP) with their school groundwater education program.

Task 1: Supplementary GEC Project Video Facilitation

Teachers have a wide range of responsibilities and welcome outside presentations that do not impose cumbersome expectations on their time or resources. To encourage completion of post-presentation GEC activities without requiring the commitment of days of professional development, APW will create two short videos for educators to use to prepare their students for the audit activities. One video will focus on pre- flow- rate measurement and unintended error in scientific measurement. The other video will support students and educators in generating water savings using the Water Savings Calculator.



Task 1 – Appendix A: Two education support videos

Water Audit Warm-up Part 1

Water Audit Warm-up Part 2

Task 2: Develop a specialized curriculum for the Groundwater Education and Conservation Project

APW will develop a new GEC curriculum which builds on the foundational knowledge in existing lessons but also addresses age-appropriate West Valley facts and figures, and ADWR management goals and terminology associated with the groundwater system. Learners will understand the importance of the groundwater system in the Phoenix AMA and mechanisms for groundwater conservation.

As detailed above, the new GEC curriculum will facilitate and direct student inquiry by incorporating project-based learning activities and employing systems thinking strategies a) to make distinctions, b) to explore parts of the groundwater systems and learn what the groundwater systems are a part of, c) to examine relationships and impacts between the groundwater and surface water systems, and d) to observe the groundwater system from multiple perspectives; such as a hydrologist, as a farmer, as a water consumer, and as an animal needing access to water supplies.

The new GEC curriculum will cover:

- The Uniqueness of Arizona's hydrological cycle and its implications on groundwater
- The groundwater system in terms of its components and composition
- The movement of water through diverse substrates
- Groundwater recharge and groundwater discharge
- The importance of groundwater and the impacts of human use
- Overdraft, subsidence, and safe yield
- How to conserve water using technology or behavioral change
- How to perform indoor and/or outdoor water audits to promote efficiency and conservation

Specialized Curriculum for Groundwater Education and Conservation Project Direct Student Outreach

Task 2.1 – Developed

GEC Curriculum Lesson 1:

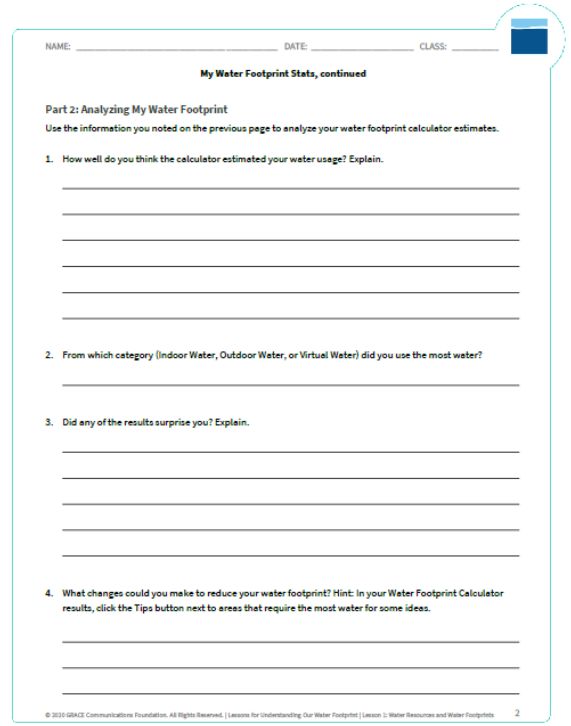
The first GEC lesson focuses on **foundational principles of the groundwater system** and introduces groundwater overdraft as a concern for Arizona West Valley communities. Students engage with a newly designed set of physical models which offer flexibility in learning multiple concepts on the groundwater system.

The overall objectives of the first lesson are:

1. **Distinguish that:** Groundwater exists within an underground system with different inputs and outputs.
2. **Explore the System:** Groundwater is found in the pores between earth materials, such as sand and gravel, and in the cracks in hard rock. It is pulled down by gravity and moves laterally from higher elevation to lower elevation, even under the ground.
3. **Make relationships:** Groundwater and surface water are connected, and both forms of water are part of the hydrologic cycle and used for water supplies.
4. **Take Perspectives:** As a water consumer, what will happen if we pump out more groundwater than what goes into the system?

Lesson 1 Homework:

Calculate Water Footprint



THE UNIVERSITY OF ARIZONA Cooperative Extension

ARIZONA project WET WATER EDUCATION TODAY

NAME: _____ DATE: _____ CLASS: _____

My Water Footprint Stats, continued

Part 2: Analyzing My Water Footprint

Use the information you noted on the previous page to analyze your water footprint calculator estimates.

1. How well do you think the calculator estimated your water usage? Explain.

2. From which category (Indoor Water, Outdoor Water, or Virtual Water) did you use the most water?

3. Did any of the results surprise you? Explain.

4. What changes could you make to reduce your water footprint? Hint: In your Water Footprint Calculator results, click the Tips button next to areas that require the most water for some ideas.

Specialized Curriculum for Groundwater Education and Conservation Project Direct Student Outreach

Task 2.2 – Developed

GEC Curriculum Lesson 2:

GEC Lesson two builds on Lesson One's foundation. It focuses on overdraft and the deleterious result from unchecked overdraft which may result in earth fissures. Students again manipulate models to dive even deeper into the delicate balance of discharge and recharge and learn the possible impacts of drought and long-term climate change on the groundwater system.

Alongside the Lesson 2 presentation, students use the water use information calculated from their "water footprint" homework and make correlations to the volume of groundwater their family uses.

The second half of Lesson 2 focuses on **water conservation technology**. The driving point of this section is to make sure students understand that technology has made it very easy for us to use excessive amounts of water, but technology can also assist our efforts in reducing water use. Devices discussed include low flow showerheads, toilet flappers, dual flush toilets, energy star appliances vs. standard appliances, drip irrigation, and hose nozzles. Faucet aerators are the last item discussed because GEC Day 3 includes installing low flow aerators on faucets throughout their campus.

Lesson 1 Homework:

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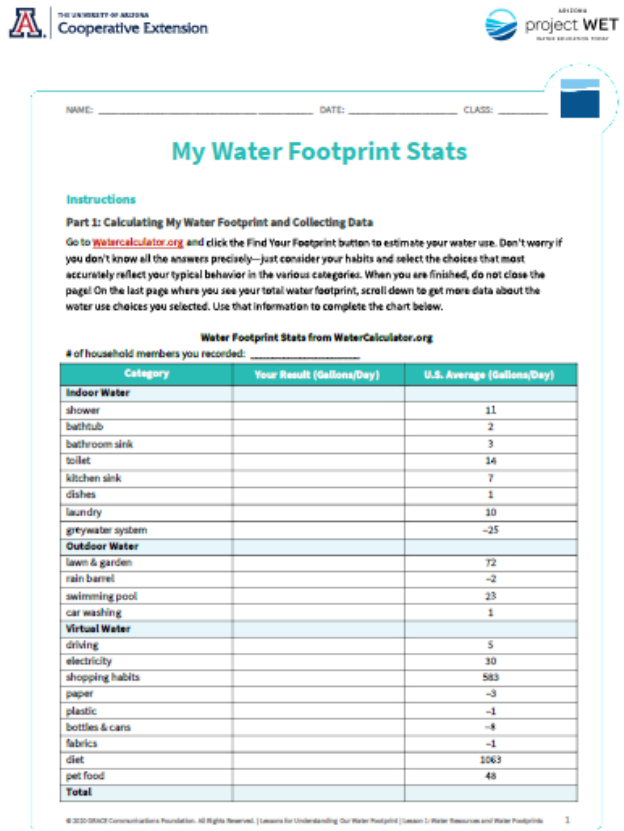


Cooperative Extension

project WET

NAME: _____ DATE: _____ CLASS: _____

My Water Footprint Stats

Instructions

Part 1: Calculating My Water Footprint and Collecting Data

Go to Watercalculator.org and click the Find Your Footprint button to estimate your water use. Don't worry if you don't know all the answers precisely—just consider your habits and select the choices that most accurately reflect your typical behavior in the various categories. When you are finished, do not close the page! On the last page where you see your total water footprint, scroll down to get more data about the water use choices you selected. Use that information to complete the chart below.

Water Footprint Stats from WaterCalculator.org

# of household members you recorded: _____

Category	Your Result (Gallons/Day)	U.S. Average (Gallons/Day)
Indoor Water		
shower		11
bathtub		2
bathroom sink		3
toilet		14
kitchen sink		7
dishes		1
laundry		10
greywater system		-25
Outdoor Water		
lawn & garden		72
rain barrel		-2
swimming pool		23
car washing		1
Virtual Water		
driving		5
electricity		30
shopping habits		583
paper		-3
plastic		-1
bottles & cans		-8
fabrics		-1
diet		1063
pet food		48
Total		

Specialized Curriculum for Groundwater Education and Conservation Project Direct Student Outreach

Task 2.3 – Developed

GEC Curriculum Lesson 3:

Lastly, GEC Lesson 3 is the **water audit**. Students, along with volunteers and teachers, replace aerators on their school campus to conserve water. The tasks for Lesson 3 are:

1. Measure the faucet flow rate with current aerator on using a flow rate bag. This is done three times to ensure the reading is accurate.
2. Take the aerator off and measure the flow rate ONCE. This gives students an appreciation of how much water would be wasted if an aerator was not installed. Often the flow rates from a faucet without an aerator are between 5 to 7 gallons per minute.
3. A new 0.5 GPM aerator is installed, and its flow rate is measured three times.
4. Water is collected from each run and poured into a five-gallon bucket and taken outside to use on plants or trees. This further reinforces the need for the community to conserve water.

Students work in small groups of 4 or 5 to accomplish the audit tasks. An adult volunteer or teacher accompanies each team. Generally, each team replaces 1-4 aerators. Once the aerators are replaced, students return to the classroom and the data is transcribed into the Water Savings Calculator excel workbook.

From *Development* to DELIVERY…

Task 3: Delivery of Groundwater Education Lessons:
Arizona Project WET Education Coordinators will support participating teachers by facilitating **1 groundwater system lesson** in their classroom. APW facilitators will work with at least 10 teachers to implement these real-world and relevant STEM lessons to an estimated student population of 800 to 1200 students. Each groundwater lesson will be tailored to the needs of the students.

Task 4: Delivery of Water Conservation Technology lessons
Arizona Project WET Education Coordinators will support participating teachers by facilitating **1 Water Conservation Technology introductory lesson** in their classroom. These APW facilitators will work with at least 10 teachers to implement these real-world and relevant STEM lessons to an estimated student population of 800 to 1200 students.

Task 5: Delivery of School Water Audit Activity
Arizona Project WET Education Coordinators will facilitate students in collecting data through a scientific process and calculating water savings based on the installation of water efficient technology. Coordinators will support participating teachers by facilitating **1 school water audit activity**. APW facilitators will work with at least 10 teachers to implement these real-world and relevant STEM lessons to an estimated student population of 800 to 1200 students; estimated water savings will be 250,000 to 750,000 gallons per year. The water savings impact will be cumulative over the course of funding and beyond; ultimately reaching 1,000,000 to 3,000,000 gallons per year of additional savings.

School Year Summary	Groundwater Lesson Date	Water Conservatiopn Lesson Date	School Water Audit Date	Teachers	# Teachers	School	City	# of Students	#classes
	11/17/2021	11/18/2021	12/1/2021	Prokow	1			12	1
	1/3/2022	1/4/2022	2/7/2022	Silva	1	Verrado	Buckeye	60	2
	1/10/2022	1/11/2022	2/14/2022	Sherman/Carmen	1	Verrado	Buckeye	90	3
	1/14/2022	1/15/2022	4/11/2022	Carroll	1	Desert Edge HS	Goodyear	150	5
	1/17/2022	1/18/2022	4/19/2022	Stringham	1	Desert Edge HS	Goodyear	150	5
	3/21/2022	3/22/2022	4/21/2022	Brooke	1	Desert Edge HS	Goodyear	150	5
	2/1/2022	2/2/2022	2/23/2022	Prokow	1	Willow Canyon HS	Surprise	120	4
2021-22 School Year					7			732	25
	9/29/2022	9/30/2022	10/25/2022	Garcia	1	Desert Thunder	Goodyear	30	1
	11/29/2022	11/30/2022	12/1/2022	Prokow	1	Willow Canyon HS	Surprise	14	1
	1/17/2023	1/25/2023	2/1/2023	Cory de la Cruz	1	Belen Soto	Goodyear	137	4
2022-23 School Year					3			181	6
Program Delivery Totals					10			913	31

Delivered… 1,438,301 GPY saved!

10 Teachers

31 Classes

913 Students

Indoor School Water Audits

Date	Teachers	# Teachers	School	City	# of Students	#classes	# of aerators replaced	# of emitters changed	Locations Audited	Estimated GPY Saved
12/1/2021	Prokow	1	Willow Cnyon HS		12	1	6			2,400
2/7/2022	Silva	1	Verrado HS	Buckeye	60	2	27		School Science Labs	17,187
2/14/2022	Sherman/Carmen	1	Verrado HS	Buckeye	90	3	12		School staff bathrooms, science lab sinks	27,292
4/11/2022	Carroll	1	Desert Edge HS	Goodyear	150	5	23		Staff bathrooms, all scieince labs, art room, Ceramics room, AG room, Cafeteria, nurse's office, Special Student population rooms, athletic bathroom sinks, PE bathroom sinks	
4/19/2022	Stringham	1	Desert Edge HS	Goodyear	150	5	17		All scieince labs, art room, Ceramics room, AG room, Cafeteria, nurse's office, Special Student population rooms, athletic bathroom sinks, PE bathroom sinks	878,102
4/21/2022	Brooke	1	Desert Edge HS	Goodyear	150	5	13		Staff bathrooms	33,158
2/23/2022	Prokow	1	Willow Canyon HS	Surprise	120	4	24		All science lab sinks, nurses office, staff bathrooms	22,130
2021-2022 TOTALS		7	3	3	732	25	122			980,269
10/25/2022	Garcia	1	Desert Thunder HS	Goodyear	30	1	7		Library, teachers lounge, nurses office	80,123
12/1/2022	Prokow	1	Willow Canyon HS	Surprise	14	1		10	Outdoor Irrigation Audit	8,439
2/1/2023	Cory de la Cruz	1	Belen Soto MS	Goodyear	137	4	22		Office, Nurse, RR Buildings B,C, D, Classrooms	369,470
2022-2023 TOTALS		3	3	2	181	6	29	10		458,032
Program Savings		10	5	3	913	31	151	10		1,438,301

Student Knowledge Gain Data

Concepts	Pre	Post	Knowledge Gain
Knows that GW is part of water cycle.	16%	27%	69%
Knows GW flows between spaces in earth materials.	24%	30%	25%
Knows that GW is connected to surface water.	14%	30%	114%
Understands water moves through earth materials at different rates.	28%	35%	25%
Understands how we use groundwater and it's importance.	14%	27%	93%
Understands the importance of safe yield.	13%	29%	123%
Understands that GW moves by gravity.	14%	33%	136%
Average Knowledge Gain			72%

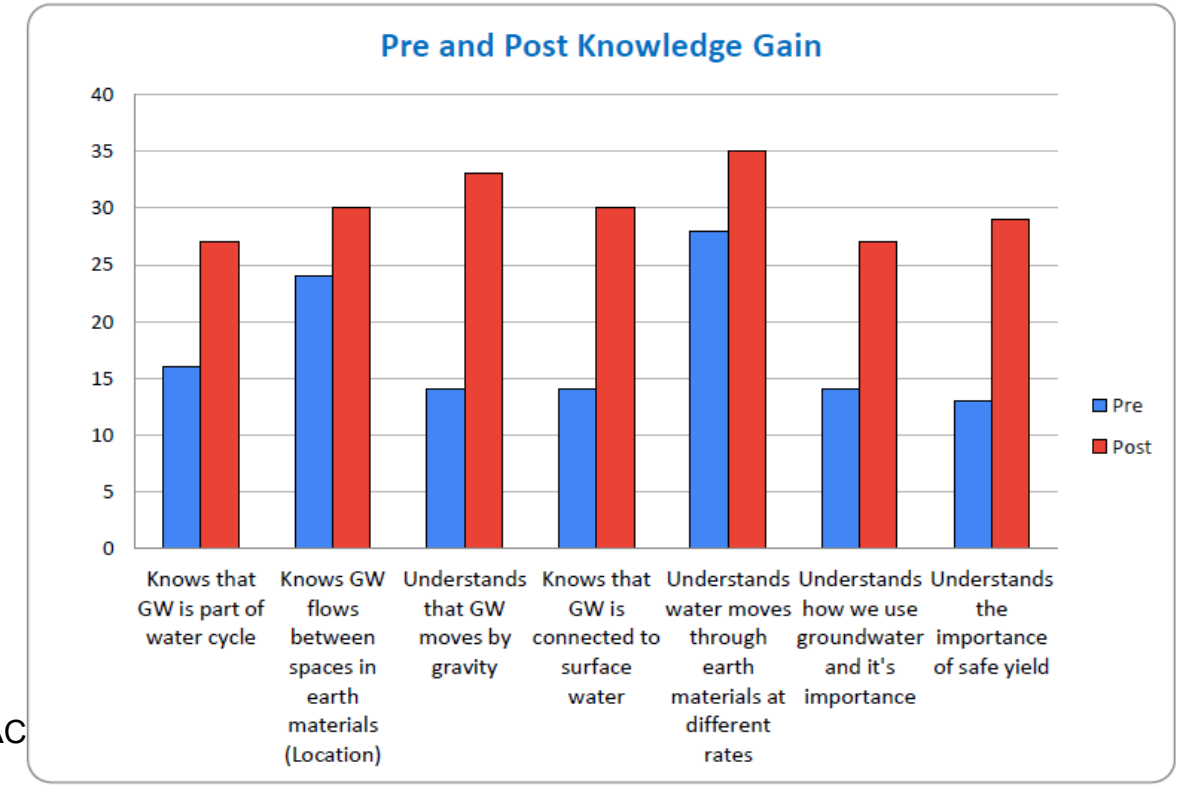
Teacher Testimonials:

"Great real-world learning!"

"I have never seen a groundwater presentation in such detail before, very impressive."

"I learned a lot! Groundwater isn't an 'underground river' like I had imagined it."

"The groundwater model that students used, and the activity was a great student engagement and high interest learning activity to teach about groundwater."



ARIZONA project WET
WATER EDUCATION TODAY

Results Summary

APW was able to perform full (three-part) GEC programs at **5 different schools** in 3 cities for **10 teachers** and a total of **913 students**. Two-year water savings for the five campuses is estimated to be **1,438,301 gallons per year**.

- Verrado High School
- Willow Canyon High School
- Desert Edge High School
- Desert Thunder Elementary School
- Belen Soto Elementary School

Thank you!

Lisa Townsend
Director
Arizona Project WET
lisatownsend@arizona.edu

Kirstyn Kay
Senior Coordinator - Phoenix
Arizona Project WET
kkay@arizona.edu

Meeting Agenda

1. **Call to Order – Welcome & Introductions** – *Chair*
2. **Meeting Logistics** – *Nicholas Mason, ADWR*
3. **Elect GUAC Chair & Vice Chair** – *Council Members, Phoenix GUAC*
4. **Arizona Water Banking Authority –** *Rebecca Bernat, AWBA*

   Rebecca will present the AWBA 2025 Preliminary Plan of Operation
5. **Water Management Assistance Program Updates.** – Francesca Pfingstler, *ADWR*

   Melissa will review withdrawal fee rates and money collected in past five years, current projects, and remaining balance.
6. **WMAP Completed Project Presentations**

   a. Using Project-Based STEM Education to Enhance Groundwater Conservation in Maricopa County Schools – *Lisa Townsend & Kirstyn Kay, University of Arizona*
7. **WMAP Contract Renewal**

   a. Arizona Project Wet – *Lisa Townsend & Kirstyn Kay, University of Arizona*
8. **Groundwater Withdrawal Fee Recommendation**

   The Council will discuss and recommend to ADWR Director groundwater withdrawal fee rates for the reporting year 2025.
9. **AMA Deputy Director Report –** *Ryan Melson, ADWR*

   Ryan will provide an update on ADWR activities & staffing.
10. **Call to the Council –** *Council*
11. **Call to the Public** – *Chair*
12. **Adjournment** – *Chair*

2023-3172 Groundwater Users Advisory Council Meeting

Lisa Townsend, Director

Kirstyn Kay, Senior Program Coordinator

September 19, 2024

WHAT WE DO

Arizona Project WET builds water-literate leaders, educators, professionals, and stewards.

We do this by hosting teacher professional development workshops that deepen water-related content knowledge and support evolving instructional practice.

We offer direct student and community outreach that inspires and engages through relevant, water-focused experiences and we use our expertise as educators to connect community water stewards and the K-12 education system.

Our programs are in the classroom, in “the field”, online, and in blended learning formats.

We have resources for educators, students, and community members.

ENGAGE EXPLORE EXPLAIN

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 and make sense of phenomena in the natural world.

Arizona Project WET lessons provide real world relevancy that makes learning engaging, interesting, and action-oriented for Arizona students at all grade levels.

The purpose of this program is 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. 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

Funds granted by this contract will be used to develop and conduct curriculum components, STEM lessons, water saving and professional development for teachers. This funding will also expand existing programs within the Phoenix AMA region.

WATER RESOURCES

WE TELL ARIZONA'S WATER STORY

Arizona Project WET learners grapple with the intricacies of interconnected surface water, groundwater, the hydrologic cycle, as well as climate change, water management, and conservation. We offer real world relevancy based on the best, most up-to-update science, and most pressing issues. All water users have a voice in the study of water-Native Nations, large-scale manufacturers, animals, farmers, plants, and even the river itself.

Arizona Project WET Education digs into Arizona's water resources exploring distinctions about them, relationships between them, and the management of them. We explore the unseen groundwater system that provides 41% of Arizona's water supply and offers water storage unaffected by evaporation. We extol the brilliance of both the SRP and the Hohokam People before them, for their use of gravity to move water where it's needed. We challenge students to match the engineering feat achieved by CAPengineers of moving water 336 miles across the Sonoran Desert uphill 2,900 feet.

We study the long history of water management and use that narrative and current innovations to teach wise water use in a complex and ever-changing mix of water resources.

Teacher Professional Development

Task 1: Teacher Multi-Day Workshops

APW shall conduct up to 4 multi-day academy, potentially reaching 120 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.

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

Master Gardeners' 2-Day Workshop: January 31st & February 3rd

CAP Academy 2-Day Workshop: June 3rd & 4th, 2024

SRP Academy at PERA: June 24th – June 28th

Buckeye Teachers' Workshop 2-Day Training: September 6th & October 4th

Central Arizona Project

CAP Academy

Salt River Project

SRP Academy

Direct Student Outreach

Task 2a: The Groundwater System

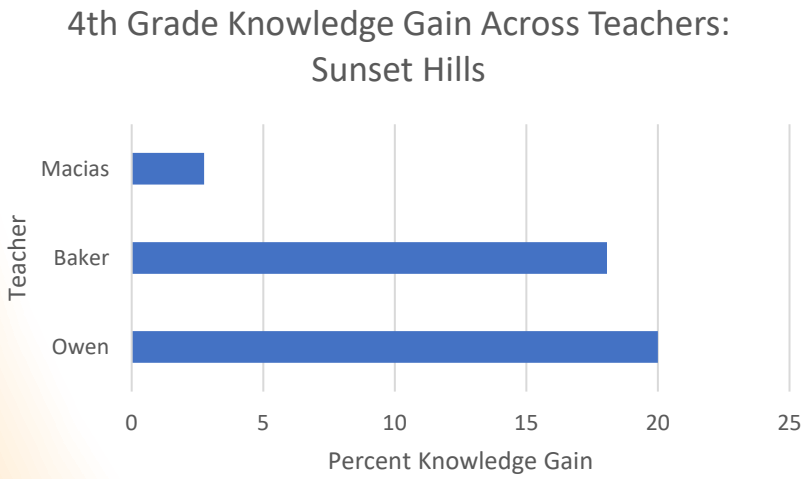
The groundwater system is one of Arizona's most important water reserves. Increasingly, in many areas of the state, we are even managing water storage using the groundwater system. Arizona students need to understand this system as a crucial part of the water cycle to ensure that, as decision makers,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

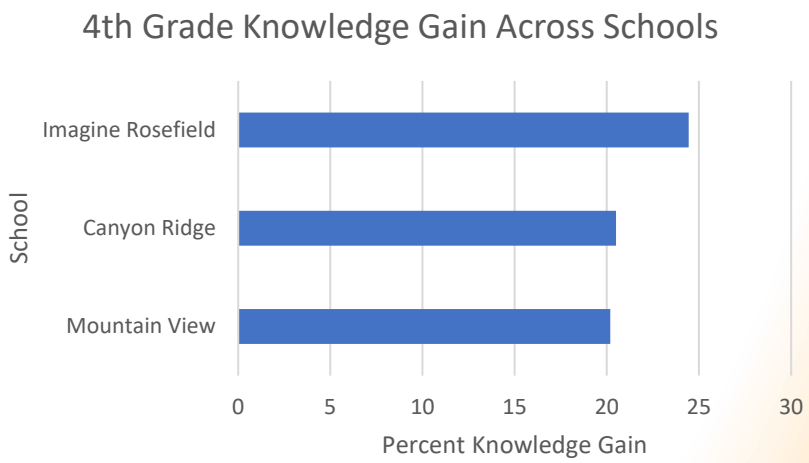
APW will conduct 35 groundwater presentations for students in the Phoenix AMA.

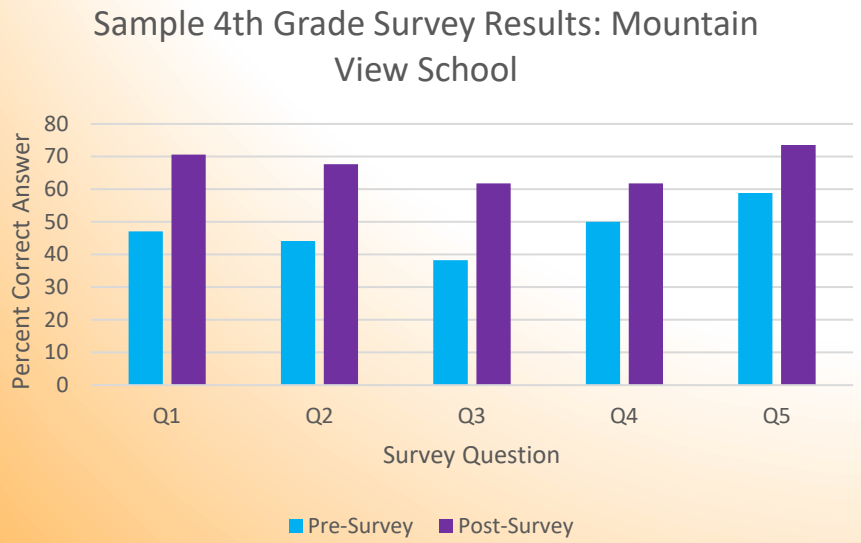
Deliverable: The semi-annual report will include number of students, student assessment, and evaluation data from each teacher. This report will also include images from the 3 Water Festivals and images of the refreshed Groundwater System Model and/or replacement.

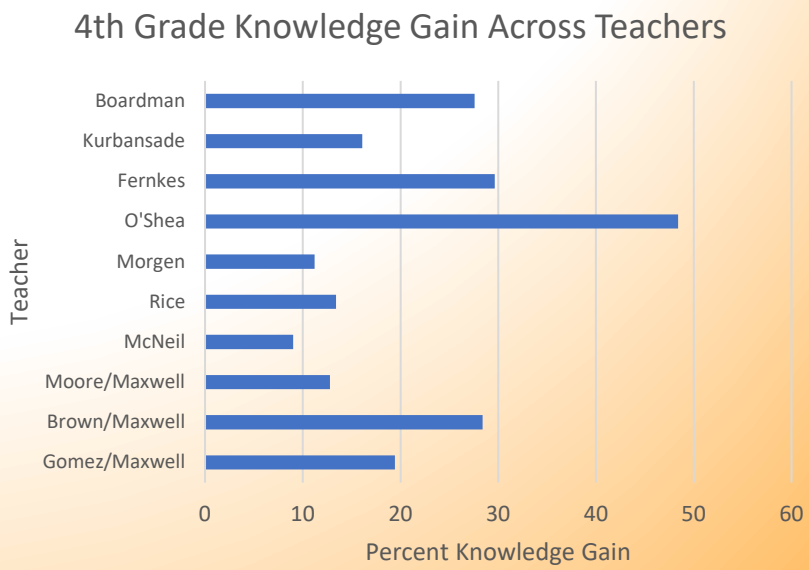
35 Groundwater presentations delivered to 19 Teachers and 984 Students

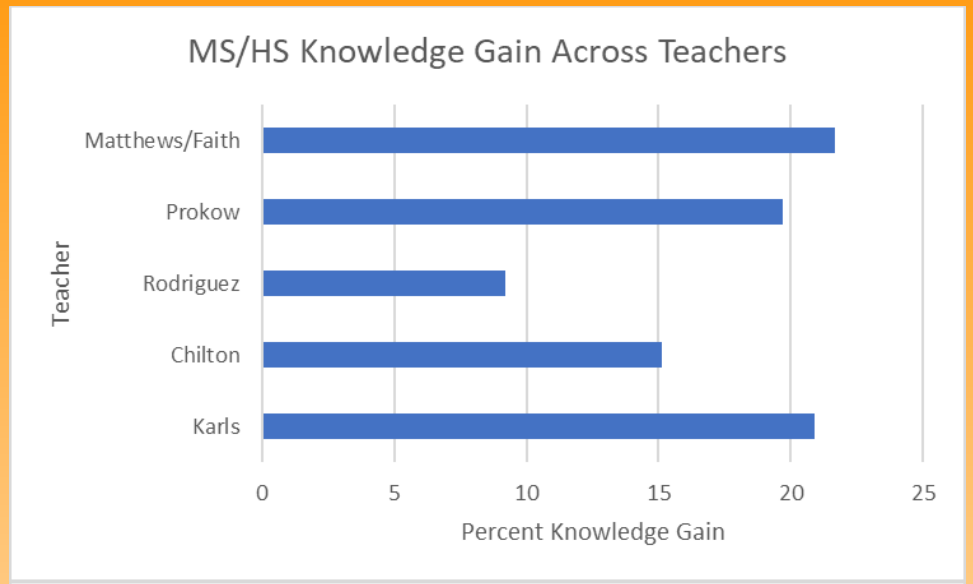

great Writers do? They
• End marks
• Juicy Words
• Finger Spacing
Bring to Class:
-Math Packet 5B
- Writing/Articles
-Pencil Box
-Chromebook
What is Culture?
Definition: The customs, arts, social beliefs, and
In a specific place or
background
ancestors
heritage
Country or group

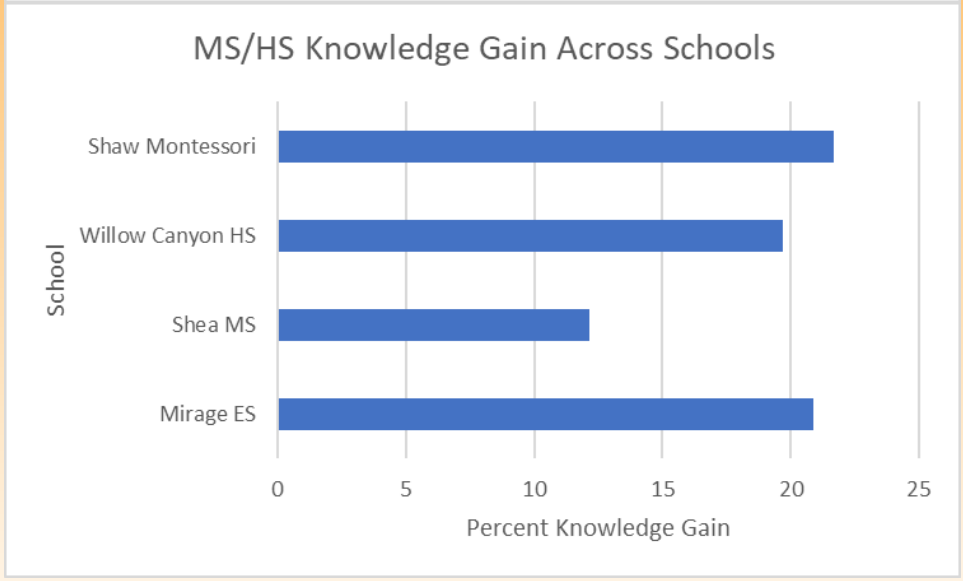

4th Grade Knowledge Gain Across Teachers: Sunset Hills
Macias
Baker
Owen
Teacher
0
5
10
15
20
25
Percent Knowledge Gain

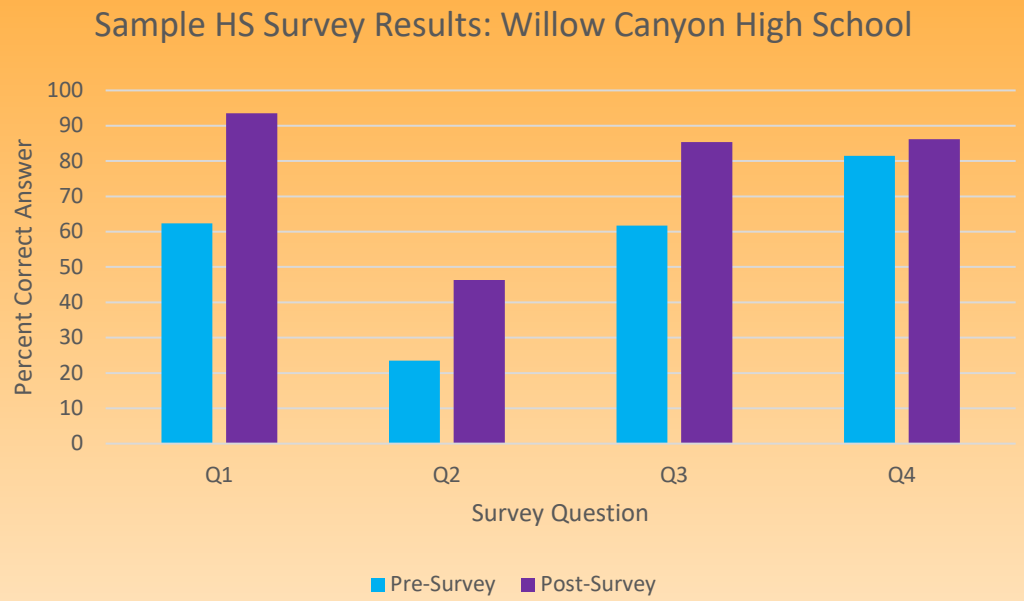

4th Grade Knowledge Gain Across Schools
Imagine Rosefield
Canyon Ridge
Mountain View
School
0
5
10
15
20
25
30
Percent Knowledge Gain


Sample 4th Grade Survey Results: Mountain View School
Percent Correct Answer
80
70
60
50
40
30
20
10
0
Q1
Q2
Q3
Q4
Q5
Survey Question
Pre-Survey
Post-Survey


4th Grade Knowledge Gain Across Teachers
Boardman
Kurbansade
Fernkes
O'Shea
Morgen
Rice
McNeil
Moore/Maxwell
Brown/Maxwell
Gomez/Maxwell
Teacher
0
10
20
30
40
50
60
Percent Knowledge Gain


MS/HS Knowledge Gain Across Teachers
Matthews/Faith
Prokow
Rodriguez
Chilton
Karls
Teacher
0
5
10
15
20
25
Percent Knowledge Gain


MS/HS Knowledge Gain Across Schools
Shaw Montessori
Willow Canyon HS
Shea MS
Mirage ES
School
0
5
10
15
20
25
Percent Knowledge Gain


Sample HS Survey Results: Willow Canyon High School
Percent Correct Answer
100
90
80
70
60
50
40
30
20
10
0
Q1
Q2
Q3
Q4
Survey Question
Pre-Survey
Post-Survey

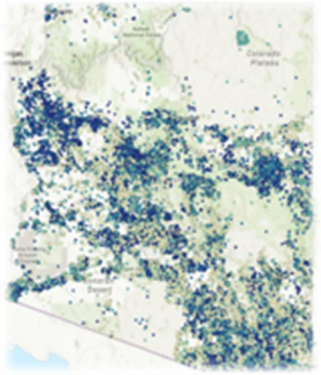
Groundwater Then…

- Arizona's unique hydrological cycle and its impact on groundwater
- The components and composition of the groundwater system
- How water moves through diverse substates within the ground
- Key terms: overdraft, subsidence, safe-yield, recharge, discharge
- The importance of groundwater and the impacts of human use

Groundwater Basics:
Cracking the Code of Arizona's Water Cycle

Groundwater Guardians:
Defending Arizona's Aquifers from Pollution

Groundwater Connections:
Mapping Arizona's Water Journey from CAP to Tap

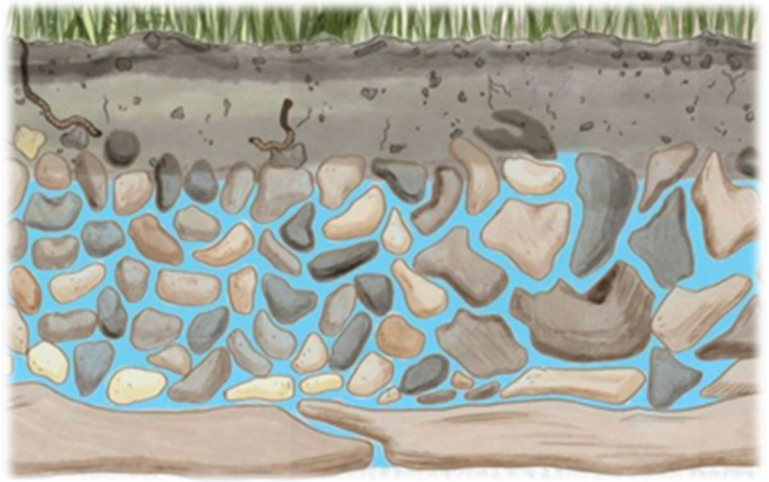


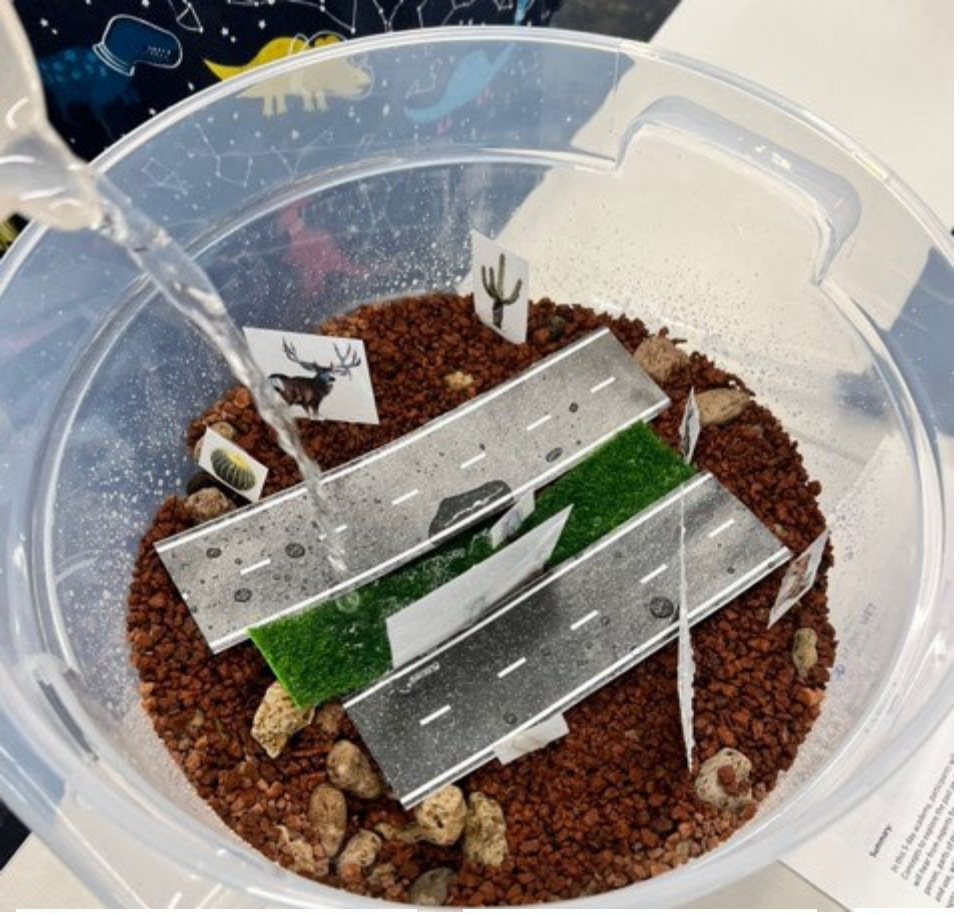
Groundwater NOW…

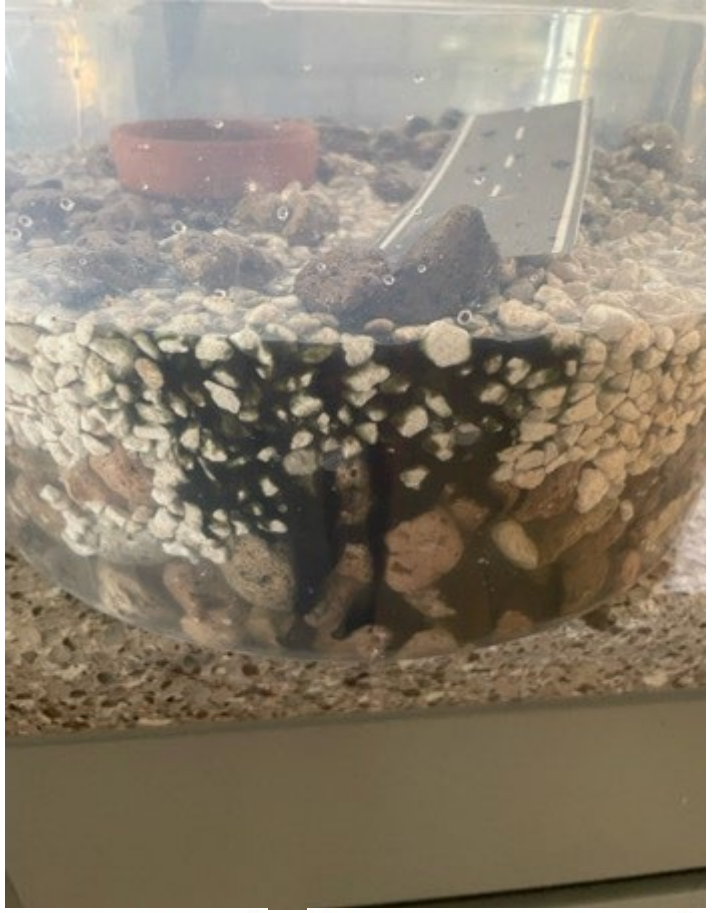
Summary:
All hydrological elements in our Arizona landscape impact available groundwater. Participants in the *Groundwater Classroom Program* explore the Arizona water cycle and unearth their watershed's surface to groundwater connection to deepen their understanding of how this intricate system works. Students recognize the human impacts on this system and are empowered to act as groundwater stewards in their communities.

Guiding Question:
What is our relationship with groundwater?
Is the relationship built to last?

<u>Learning Objectives:</u>
Model parts of the groundwater system within the watershed.
Understand the relationship between surface water and ground water.
Identify impacts of human activity on aquifers.
Recognize the importance of groundwater health and **advocate** for sustainability.








Cooperative Extension
project WET
Water Wise or Water Waste?
Look at the pictures and circle the option that is waterwise:


Cooperative Extension
project WET
SUSTAINABILITY ACTIONS
Place a check ✓ next to each item YOU can do to help conserve and keep our water clean.
I PLEDGE to be a water steward, to do my best to make smart choices and take actions that help conserve and keep our water supply clean.
Name:
Date:


Cooperative Extension
project WET
Water Wise Technologies
These are things you can try to use at home!
High Efficiency Shower Head
Hose Nozzle
Aerator
Toilet Flapper


Cooperative Extension
project WET
LIMIT LINGERING LEAKS
Toilet Leak Experiment:
Toilet Flapper
tank
bowl


Cooperative Extension
project WET
WATER STEWARDSHIP PUZZLE


Cooperative Extension
project WET
DID YOU KNOW?
Everything we use and do requires water! Direct water use is when we use it for drinking, bathing, or cooking. But what is indirect water use? This is the water that is needed to make something or used during the process of providing a service.
Put the letter "D" for the examples below that are direct water use and put the letter "I" for the examples of indirect water use. Also note how many gallons of water are used, it might surprise you!

Direct Student Outreach

Task 2b: The Groundwater System

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 also deliver at least 3 Water Festivals for 4th grade students within the Phoenix AMA.

Deliverable: The semi-annual report will include number of students, student assessment, and evaluation data from each teacher. This report will also include images from the 3 Water Festivals and images of the refreshed Groundwater System Model and/or replacement.

Chandler Water Festival – November 2nd & 3rd, 2023

Gilbert Water Festival – March 6th & 7th, 2024: 1,659 Students, 64 teachers, 117 volunteers

Apache Junction Water Festival – May 2nd, 2024: 200 students, 8 teachers, 38 volunteers


WATER CONSERVATION

Task 3: Rainwater Harvesting Program Development

Arizona Project WET Instructional Specialists will develop materials and STEM units for a new Rainwater Harvesting program, and support teachers who attend our professional development sessions in facilitating the delivery of these new STEM units in their classrooms. APW will implement a pilot Rainwater Harvesting Program in 1 school in the Phoenix AMA.

Planting for a Rainy Day (PfaRD)

Summary:

Students identify a "hot, dry" patch of pavement in their personal watershed (home/school/community) and determine storm water drainage patterns. By calculating the amount of runoff that can be collected in the area, and then applying rainwater harvesting and smart landscaping techniques, students will design a water-wise, biodiverse garden.

Guiding Question(s):

How can we harvest rainwater to transform an impermeable plot into an outdoor oasis?

Learning Objectives:

- **Analyze** the watershed, determining rainwater drainage patterns, surface porosity, and temperature.
- **Develop** strategies for natural cooling and remediating "hot pockets".
- **Identify** native plants that are appropriate for the space.
- **Demonstrate** the connections between groundwater, riparian habitats, and biodiversity.
- Create design drawings for a garden with supporting details and documentation (species list, water use, plant hardiness, wildlife interaction, and seasonal implications).

ARIZONA project WET WATER EDUCATION TODAY

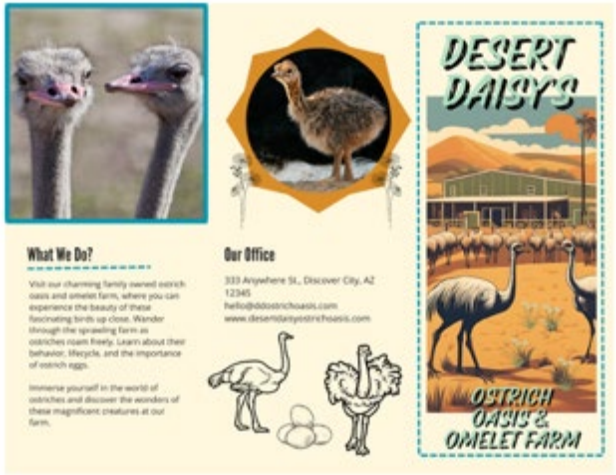
Task 4: Water Scene Investigations Program Re-Development

These STEM units will be redeveloped to engage students in collecting data through a scientific process and calculating water savings based on the application of behavioral approaches to water conservation. Arizona Project WET Instructional Specialists will redevelop course material and support teachers who attend our professional development sessions in facilitating these STEM units in their classrooms. APW facilitators will implement a pilot for the redeveloped Water Scene Investigation Program in 1 school in the Phoenix AMA.

Daisy's
starting to ge
died unexpectedly. The
acting the strangest with an
appears to be muscle weakness and loss
weight loss in some. Many eggs are starting to
prematurely, and there is a higher rate than expected
not hatching. This documented evidence can be seen in **Exhibit A.**
A vet has been out and has taken some preliminary blood and
ests, and you can see the veterinary medical examiner's
hibit B. Please look over the file and see if you can
what could be causing the ostriches to get sick and
s farm.

aisys's Ostrich Oasis & Omelet Farm. First noticed birds
ifferently and some symptoms on May 3rd, 2024.
see Desert Daisy's brochure for more information about
m's practices and the site map for the layout of the
ty. **Exhibit C**
located on a large strip of land spanning from Pinal
y into Pima County.
ground:
h more research detectives have discovered that the Ostrich
m used to be Desert Daisy's Demolition Derby back in the late
50s. Please see **Exhibit D.** This was quite the gathering place
it hosted weekly races along with great cookouts and decent
estroom facilities considering the times. Because of the use of
he site, this area was never fully tarmacked but rather much of

Exhibit C:



Water Scene Investigation (WSI)

Summary:

You're on the scene with WSI. In this campy but complex Unit of Study, juvenile detectives of the ***Cold-Water Case Squad*** investigate and identify the cause of a calamity in the community. Student sleuths work together, finding the clues that protect lives and livelihood; answering the question, "What's in the WATER?" before time runs out!

Guiding Question(s):

How is water contaminated, both underground and within our watersheds, and how can we reduce human caused pollution and contaminants from entering and affecting these systems?

Learning Objectives:

- Analyze data to solve a mystery and identify potential groundwater pollutants and the flow of contaminants in water throughout a watershed.
- Identify urban forms of pollution and consider ways to reduce urban runoff and become water stewards.
- Identify the role of water in human/animal illness and connect environmental health challenges to threats associated with a changing climate.
- Conclude that past solutions, developed with the best intentions, may create contemporary problems.

ARIZONA project WET WATER EDUCATION TODAY

Let's Keep the Knowledge FLOWING

- Professional Development Academies & Series
- Groundwater Programs
- Arizona Water Festival – Supporting Growth & Expansion
- Planting for a Rainy Day – Rainwater Harvesting
- WSI: Water Scene Investigation

We gratefully acknowledge your support and appreciate your further consideration.

Arizona Project WET in respectfully requests:

$75,000 over a period of 12 months to meet and grow our goals in partnership with Arizona Department of Water Resources in the Phoenix Active Management Area.

Thank you!

Contact Information

Lisa Townsend
Director
Arizona Project WET
lisatownsend@arizona.edu

Kirstyn Kay
Senior Coordinator
Arizona Project WET
kkay@arizona.edu

@AZProjectWET

@ArizonaProjectWET

@arizonaprojectwet

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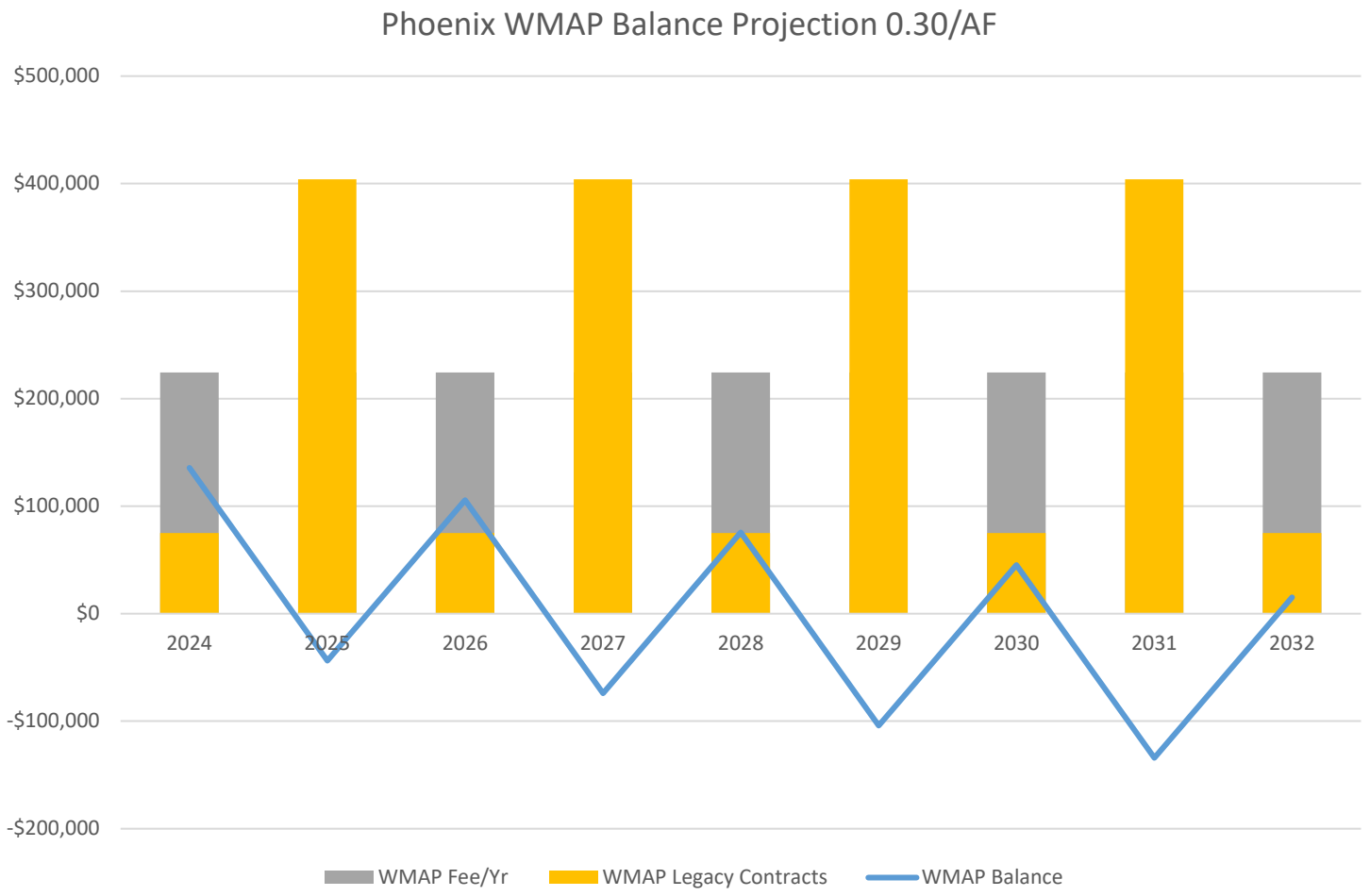
12. **Adjournment** – *Chair*

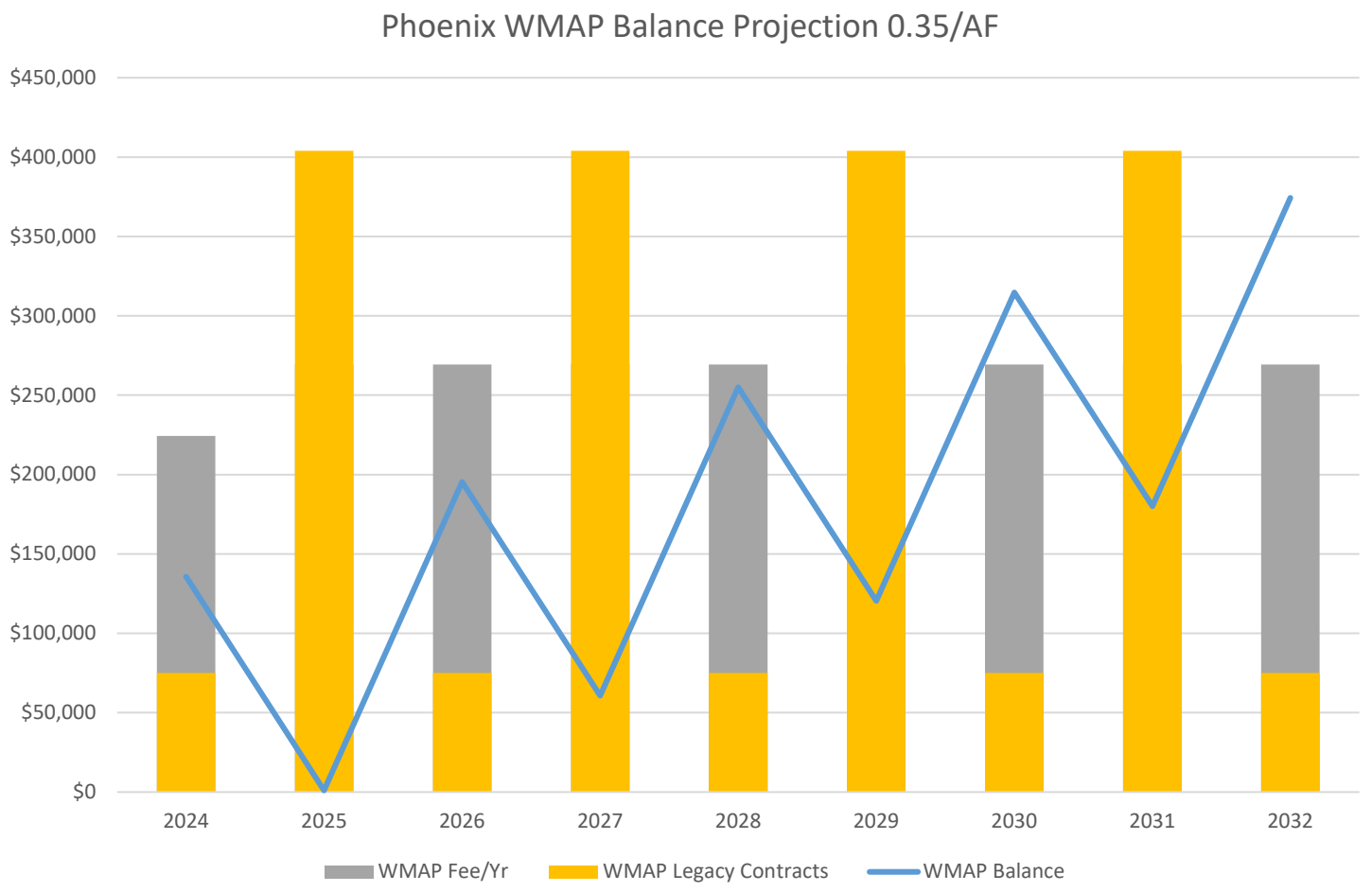
PHOENIX ACTIVE MANAGEMENT AREA
WMAP FEE Projections $0.30:

Year	WMAP Fee/AF	WMAP Fee/Yr	WMAP Legacy Contracts	WMAP Balance
2024	0.3	$224,400	$75,000	$135,661
2025	0.3	$224,400	$403,896	-$43,835
2026	0.3	$224,400	$75,000	$105,565
2027	0.3	$224,400	$403,896	-$73,931
2028	0.3	$224,400	$75,000	$75,469
2029	0.3	$224,400	$403,896	-$104,027
2030	0.3	$224,400	$75,000	$45,373
2031	0.3	$224,400	$403,896	-$134,123
2032	0.3	$224,400	$75,000	$15,277



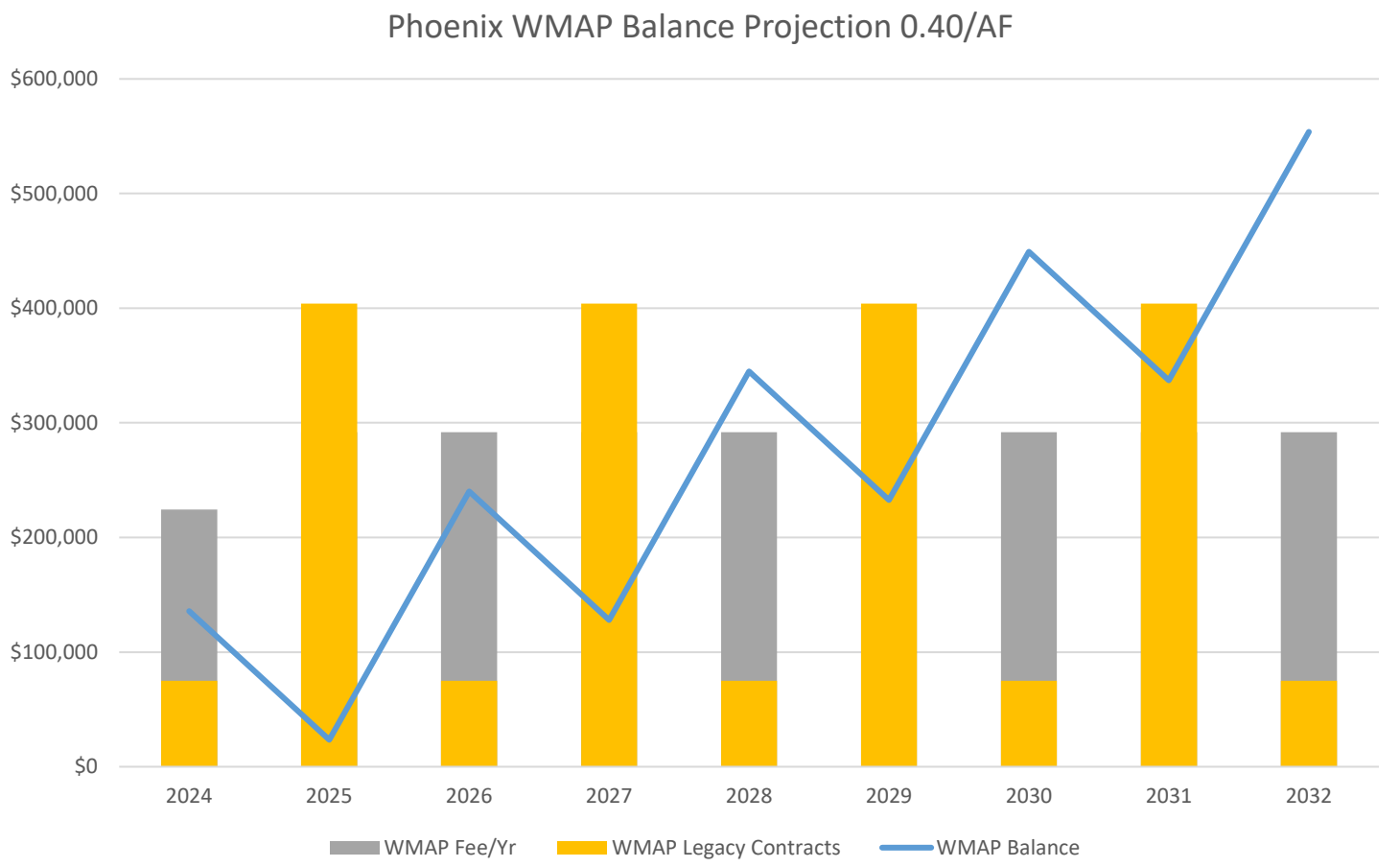
PHOENIX ACTIVE MANAGEMENT AREA
WMAP FEE Projections $0.35:

Year	WMAP Fee/AF	WMAP Fee/Yr	WMAP Legacy Contracts	WMAP Balance
2024	0.30	$224,400	$75,000	$135,661
2025	0.35	$269,280	$403,896	$1,045
2026	0.35	$269,280	$75,000	$195,325
2027	0.35	$269,280	$403,896	$60,709
2028	0.35	$269,280	$75,000	$254,989
2029	0.35	$269,280	$403,896	$120,373
2030	0.35	$269,280	$75,000	$314,653
2031	0.35	$269,280	$403,896	$180,037
2032	0.35	$269,280	$75,000	$374,317



PHOENIX ACTIVE MANAGEMENT AREA
WMAP FEE Projections $0.40:

Year	WMAP Fee/AF	WMAP Fee/Yr	WMAP Legacy Contracts	WMAP Balance
2024	0.30	$224,400	$75,000	$135,661
2025	0.40	$291,720	$403,896	$23,485
2026	0.40	$291,720	$75,000	$240,205
2027	0.40	$291,720	$403,896	$128,029
2028	0.40	$291,720	$75,000	$344,749
2029	0.40	$291,720	$403,896	$232,573
2030	0.40	$291,720	$75,000	$449,293
2031	0.40	$291,720	$403,896	$337,117
2032	0.40	$291,720	$75,000	$553,837



PHOENIX ACTIVE MANAGEMENT AREA
Groundwater Withdrawal Information

Year		2020	2021	2022	2023	2024	2025
WMAP	Fee	$0.25	$0.25	$0.25	$0.25	$0.30	Max. $2.00
	Collected	$192,269	$189,094	$204,201	$160,261	N/A	
Admin & Enforcement	Fee	$0.50	$0.50	$0.50	$0.50	$0.50	Min. $0.50 Max. $1.00
	Collected	$385,250	$380,914	$408,401	$320,522	N/A	
Water Bank	Fee	$2.50	$2.50	$2.50	$2.50	$2.50	$2.50
	Collected	$1,925,479	$1,904,572	$2,042,004	$1,603,011	N/A	
Total	Fee	$3.25	$3.25	$3.25	$3.25	$3.30	TBD
	Collected*	$2,730,644	$2,731,949	$2,867,164	$2,319,182	N/A	

*In addition to WMAP, Admin & Enforcement and Water Bank, amount includes late fees, recovery wells fee, and Water Quality Fund fee

ACTIVE MANAGEMENT AREAS
Groundwater Withdrawal Information:

AMA	Administration & Enforcement	AZ Water Bank Authority	Pinal Irrigation & Efficiency Fund	Water Management Assistance Program*	Total
Phoenix	$0.50	$2.50	-	$0.30	$3.30
Pinal	-	-	$2.35	$0.65	$3.00
Prescott	$0.75	-	-	$1.25	$2.00
Santa Cruz	$1.00	-	-	$2.00	$3.00
Tucson	$0.50	$2.50	-	$0.50	$3.50

Meeting Agenda

1. **Call to Order – Welcome & Introductions** – *Chair*
2. **Meeting Logistics** – *Nicholas Mason, ADWR*
3. **Elect GUAC Chair & Vice Chair** – *Council Members, Phoenix GUAC*
4. **Arizona Water Banking Authority –** *Rebecca Bernat, AWBA*

   Rebecca will present the AWBA 2025 Preliminary Plan of Operation
5. **Water Management Assistance Program Updates.** –Francesca Pfingstler, *ADWR*

   Melissa will review withdrawal fee rates and money collected in past five years, current projects, and remaining balance.
6. **WMAP Completed Project Presentations**

   a. Using Project-Based STEM Education to Enhance Groundwater Conservation in Maricopa County Schools – *Lisa Townsend & Kirstyn Kay, University of Arizona*
7. **WMAP Contract Renewal**

   a. Arizona Project Wet – *Lisa Townsend & Kirstyn Kay, University of Arizona*
8. **Groundwater Withdrawal Fee Recommendation**

   The Council will discuss and recommend to ADWR Director groundwater withdrawal fee rates for the reporting year 2025.
9. **AMA Deputy Director Report –** *Ryan Melson, ADWR*

   Ryan will provide an update on ADWR activities & staffing.
10. **Call to the Council –** *Council*
11. **Call to the Public** – *Chair*
12. **Adjournment** – *Chair*

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