Tribal Water Reliability in the Context of Climate Risk:
A Workshop for Tribal Environmental Professionals
March 18 & 19, 2026 | Virtual via Zoom

Workshop Summary

Introduction

The Arizona Tri-University Recharge and Water Reliability Project (ATUR) co-hosted a virtual workshop with the UA Indigenous Resilience Center (IRes) and the Inter Tribal Council of Arizona (ITCA) to explore Tribal opportunities for water-related climate resilience and adaptation. One of the goals of the workshop was to share ATUR project findings, including groundwater basin profiles, recharge strategies, and decision-support tools, and understand how these findings can support Tribal environmental professionals in their resilience and adaptation efforts. The workshop also focused on increasing awareness of climate-related risks to water resources and centering Indigenous knowledge and experience in adaptation as long-standing stewards of the land. In all, over 70 participants attended the two-day, six-hour workshop and engaged in discussions on water resources challenges and potential opportunities for enhancing water supply reliability on Tribal lands. This summary details the central themes from each of the presentations as well as the breakout discussions. Workshop agenda, presentation slides, and recordings are available at this link.

Day 1: March 18, 2026

Introduction to the Indigenous Resilience Center (IRes):
Karletta Chief, Director, Indigenous Resilience Center

The Indigenous Resilience Center (IRes) is a community-centered research and engagement hub focused on addressing environmental challenges in partnership with Tribal communities. The center is built on long-standing relationships with Tribal partners and operates through a co-designed research approach, where projects are developed collaboratively to ensure they reflect community needs and priorities. The role of IRes is to amplify and support Tribal knowledge while connecting them with scientific research and institutional resources.

Background on the ATUR Project:
Neha Gupta, Assistant Research Professor, Arizona Institute for Resilience

The ATUR project team presented an overview of their multi-year research effort focused on enhancing water supply reliability in Arizona through enhanced groundwater recharge. The project integrates hydrologic modeling, climate

projections, evaluation of capture and recharge strategies, and stakeholder engagement to better understand water availability and identify opportunities for recharge.

Several key findings were emphasized:

- Evapotranspiration (ET) dominates the water balance, accounting for over 95% of annual precipitation, making it the primary pathway of water loss.
- Groundwater recharge is very limited, representing less than 3% of precipitation statewide, though it can vary regionally from <1% to >10% of precipitation.
- Recharge is strongly seasonal, typically peaking in early spring due to snowmelt, with regional variations in timing.
- Precipitation intensity influences how much water infiltrates into the ground surface. In some cases, intense storms increase runoff rather than local recharge.
- Hydrologic processes vary significantly across Arizona's physiographic provinces, with differences in recharge and water availability between Basin & Range, Colorado Plateau, and Transition Zones.
- Climate change is expected to intensify water challenges, with rising temperatures increasing evapotranspiration, uncertain precipitation patterns, and shifts in the timing of runoff and recharge.

The team also introduced several tools and products, including groundwater basin profiles, a recharge opportunities and constraints matrix, and a decision-support framework. These tools are intended to help practitioners evaluate where and how recharge strategies may be most effective.

Groundwater Basin Profiles:
Marlana Hinkley, Engagement Lead, ATUR Project

The groundwater basin profiles were designed to translate complex hydrologic modeling results into information that is accessible and useful for decision-makers. The goal of these profiles is to provide a clear, location-specific understanding of water availability, hydrologic processes, and recharge potential across Arizona's 51 groundwater basins.

Each basin profile includes a combination of summary statistics, temporal patterns, and spatial data, including precipitation, evapotranspiration, runoff, and recharge, allowing users to understand how water moves through a system. In addition to temporal trends, the profiles include maps that show how water balance components vary within a basin. These maps help identify areas with higher precipitation, greater runoff, or increased recharge potential, often associated with mountainous regions or specific geologic conditions.

Preliminary climate projections for each basin show how precipitation and temperature may change in the future. Early results suggest drier conditions in certain seasons and increasing temperatures, which could further reduce natural recharge and increase evaporative losses.

Participants were encouraged to consider how this type of information could support

Tribal needs and to provide feedback on what additional data or formats would be most useful. One suggestion was the use of StoryMaps as a more accessible and interactive way to present the information; the team confirmed that StoryMaps are in development and there is one available in draft form for the decision-support framework.

Options for Enhancing Capture & Recharge of Rainfall & Snowmelt:
Fern Bromley, Natural Landscapes Lead, ATUR Project

This presentation focused on how to enhance the capture and infiltration of water across different landscapes. Given very limited natural recharge rates, intentional strategies are necessary to increase the amount of water that can reach groundwater systems. A range of potential approaches was introduced, considering different land-use settings such as rural and developing areas, agricultural lands, and natural landscapes (including forests, grasslands, shrublands, and deserts). The discussion highlighted that recharge strategies must be tailored to local conditions, taking into account factors such as topography, soil properties, land use, and hydrologic behavior. In rural and developing areas, protecting existing natural recharge locations and thoughtfully designing developments to turn nuisance floodwaters into recharge were two highlighted goals. In agricultural areas, some strategies discussed include using fallowed lands for recharge, strategically using unlined irrigation canals, and shading canals to reduce evaporative losses. Strategies in natural landscapes focus on enhancing recharge while supporting native vegetation and ecosystems. Forests can be managed strategically to enhance recharge, especially in areas where the underlying surface is suitable for recharge. While recharge is limited due to lower precipitation in grasslands, shrublands, and deserts, rock structures can be used to enhance infiltration and recharge in sandy and gravelly channels with shallower water tables. The strategies featured in this presentation are part of a broader set of recharge opportunities identified in the ATUR recharge opportunities and constraints matrix.

Breakout Session 1: Feedback and Questions on ATUR Project Approach and Findings

In addition to asking clarifying questions about the information presented, participants discussed the capture and recharge strategies that resonated with them given the ongoing work in their communities and how ATUR findings, such as the hydrologic information in the Groundwater Basin Profiles, could support that work.

Participants shared that many communities are actively engaged in some of the land and water management practices discussed in the presentations, including:

- Managed aquifer recharge;
- Watershed management and restoration (e.g. watershed management plans, erosion control structures such as Zuni bowls and media lunas, vegetation management including tree thinning and revegetation of native plants, stream restoration, among others);
- Using timber from thinned forests for mulching and compost in grasslands and fallowing farmland to help retain moisture.

The breakout groups also highlighted that lack of access to data and technical information limits communities' abilities to make informed decisions. In addition to understanding the hydrologic cycle and water management practices, participants indicated that understanding water rights and prior appropriation rules were also of high importance. One other important theme discussed was the importance of protecting cultural relationships to water, as water is viewed as a relative, and relatives are to be treated well. Water is life and is central both to community well-being and the plant and animal life that make up culturally important ecosystems.

Many participants expressed concern about the high evaporative losses in Arizona and how it affects overall dynamics in ecosystems. It was mentioned that information generated through the ATUR project can be used in an educational setting to increase awareness of high evaporative losses and the different strategies available for reducing those losses and enhancing groundwater recharge. Further, the Groundwater Basin Profiles can serve as tools for potential funders to better understand the basins and provide supporting information for watershed restoration and groundwater recharge projects. The groups also expressed interest in accessing final ATUR project deliverables, including additional information on climate projections and the effects of increased temperatures and precipitation variability on water supply availability. Potential opportunities for future collaboration were also discussed, including the presentation of ATUR findings for the ITCA Tribal Leaders Water Policy Council and coordination with the SW Climate Adaptation Science Center (CASC) on their work with Tribal water managers.

Overview of Lessons Learned in Tribal Climate Adaptation:
Karletta Chief, Director, Indigenous Resilience Center

In 2015, CCASS and the Native Nations Climate Adaptation Program convened 19 Tribes that had Council-approved climate adaptation plans for a Tribal Leaders Summit to learn about how they developed their plans and how they leveraged support and resources from the Tribal government as well as outside institutions. Eight Tribes presented their plans, representing Tribes from all over the present-day United States in various stages of adaptation plan development and implementation. During the presentation, Dr. Selso Villegas, Tohono O'odham Nation Water Resources Department Executive Director, was honored. He recently passed away, and was a leader in water resources and adaptation planning and led the Climate Adaptation Guidebook for the Tohono O'odham Nation.

Lessons learned from the 2015 Tribal Leaders Summit include:

- Time, accountability, patience, and trust were considered cornerstones of good adaptation plans and partnerships.
- Understanding and incorporating traditional knowledge into adaptation planning was key.
- Excellent opportunity for Tribes to determine their future and promote a resurgence of language and culture. There was a lot of work with elders and traditional knowledge holders incorporated into the Climate Adaptation Plans.
- Change, migration, and adaptation are always important themes for Tribes. Plans focused on the resiliency of the Tribe and not what is lacking.

Dr. Chief provided examples of climate adaptation plans from specific Tribes, including the Swinomish Indian Tribal Community, which faces the threat of their lands and ways of life being impacted by flooding caused by sea level rise, and the Yupik/Newtok Tribe, which developed a strategic plan for working with federal and state agencies to guide their relocation due to sea level rise inundating their lands. Dr. Chief described how the Red Lake Band of Chippewa used a SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis to come up with risks and opportunities, and how the Oglala Lakota Plan was based in culturally traditional ways of community engagement. In summary, all the Tribes' political structure and natural resource concerns are unique and **there is no one-size-fits-all model**. A Tribal adaptation plan should be considered a working document; climate projections help with planning, but plans should be adjusted as additional information is available. Obtaining buy-in from Tribal Councils and Native Nation governments and engaging different outside partners to work collectively to develop the plan has been helpful to many of the examples provided.

Collaboration in Watershed Restoration: Tribal Forest Protection Act:
David Seibert, Watershed Restoration Ecologist, Range Management, San Carlos Apache Tribe

The Land Operations and Range Management Program for the San Carlos Apache Tribe (SCAT) supports independent Cattle Associations and focuses on improving range and forest health, restoration, fire and flood mitigation, and cross-boundary collaboration. In 2023, the SCAT secured a Tribal Forest Protection Act (TFPA) agreement with the 3 National Forests that share a border with the SCAT Reservation: Apache-Sitgreaves, Coronado, and Tonto National Forests. Funds were allocated under the TFPA to hire staff, heavy equipment, and other resources to be shared across the boundaries to do fire risk reduction through thinning and moisture retention as well as pre- and post-fire restoration through combining Western and Indigenous best scientific practices.

The SCAT also has a long-standing relationship with the USGS, which has provided scientific support for watershed restoration projects (modeling, remote sensing, watershed analyses and identifying locations for restoration, etc.). USGS helps conduct the research, which the SCAT then uses for grants to keep the restoration work going. Dr. Seibert showed several examples of Natural Infrastructure in Dryland Streams (NIDS) that have been implemented across the Reservation that help detain and slow down water and enhance infiltration while controlling erosion (retaining sediment, capturing debris, and reducing nonpoint source pollution, etc.). This work has been done in consultation with community members as well as in collaboration with outside groups such as the TapRoot Collaborative, where they have been able to learn from past restoration work in the area to inform future efforts.

Dr. Seibert noted that people take ownership for the restoration/erosion-control structures that they build and continue strengthening connections with the land, and that there are many overlaps and benefits to this type of restoration work, including:

- Burned trees can become healing erosion control structures;
- Roads become water harvesting features rather than sluices;
- Erosion control can create ephemeral pools and support values at risk;
- Protection of culturally important species such as Emory oak, wildlife survey work, and building a Native Plant Materials program;
- Skill building, job training, and job creation can be normalized as a means of caring for the places we live.

Breakout Session 2: Discussion/Identification of Potential Opportunities on Tribal Lands

The second breakout session focused on the discussion of water supply availability, climate resilience, and adaptation challenges faced by participants' communities and how Tribal Nations are working to address and adapt to these challenges. Some of the main challenges discussed include:

- **Climate change impacts, including drought, declining water availability, and impacts on culturally important species**: Climate change is disrupting some Tribal communities' relationships with water. Some Tribes have noticed decreasing surface water flows, which impact water available for irrigation and hydropower in addition to drinking water supplies. Others have experienced the disappearance of natural springs and declines in other historically reliable water sources. Climate change has also impacted culturally important practices; e.g., harvesting times for culturally important plants, such as saguaro fruit and cholla buds, are shifting.
- **Infrastructure and water access limitations**: Some Tribal communities are experiencing limited water availability due to infrastructural constraints. Aging water infrastructure combined with limited supplies lead to water outages in some community water systems. Some communities rely on a single well, need to haul water to their homes, or have difficulty maintaining water treatment systems.
- **Water quality**: Resource extraction, such as mining, has not only led to significant water depletion, but has also affected water quality in some cases. In other areas, naturally occurring contaminants, such as arsenic, limit water supplies available for consumption. Some participants expressed concern with regard to urban stormwater runoff and river water quality when considering capture and recharge strategies of surface water supplies and wastewater reuse.
- **Uncertainty of groundwater recharge**: Participants highlighted the complexity of groundwater recharge, noting that not all water that infiltrates actually contributes to recharging the aquifer. Groundwater recharge can be difficult to achieve, particularly in areas with deep aquifers.
- **Financial and capacity constraints**: Participants noted that it can sometimes be difficult to collaborate and obtain buy-in and funding for climate adaptation and water resources management projects. Often, work cannot be done unless there are grants available. Furthermore, it can be difficult for Tribal leaders that may have limited time in office to quickly understand and support these types of initiatives. For natural resource managers, there is a lot of work to be done and many departments do not have the staff to do it all.

Many Tribal Nations are finding ways to address and adapt to these challenges. Some opportunities discussed include:

- **Developing adaptation and watershed management plans**: Some Tribes have developed and plan to update their own climate adaptation plans that focus on water-related challenges and resource management. Others have worked in collaboration with outside organizations to develop a watershed management plan. ITCA, for example, provides technical assistance to Tribes to apply for grants.
- **Watershed restoration and opportunistic recharge enhancement**: Many participants shared the ongoing watershed restoration efforts on their Tribal lands. One participant described how their Tribe is using surface water supplies to recharge areas around local rivers and springs that had previously dried up; others are also involved in work that focuses on restoring and protecting areas around existing springs. Natural Infrastructure for Dryland Streams (NIDS) were discussed as a practical solution for restoration and protection of watersheds, with participants confirming that in-channel structures have worked to restore soil moisture and native vegetation in the areas where they work. Opportunistic recharge enhancement, or locating and prioritizing land management activities such as NIDS in areas suitable for groundwater recharge, can have meaningful impacts both locally and in downstream areas.
- **Focusing on local solutions, community engagement, and education**: Educational initiatives, such as community engagement around local water resources challenges, and what individuals can do to contribute to the solutions (e.g. conservation practices, implementing NIDS for erosion control, or residential rainwater harvesting to help mitigate flooding) were also highlighted as opportunities. Youth engagement was discussed as a way to raise awareness and empower local action to protect natural resources.

Day 2: March 19, 2026

Considering Traditional Knowledge in Climate Adaptation:
Karletta Chief, Director, Indigenous Resilience Center (IRes)

Climate change has cascading impacts on the environment, changing water availability and timing. This impacts the livelihoods, economies, and connections to Mother Earth and Father Sky for Tribal Nations. Climate change impacts Tribal Nations in several ways: (1) socioeconomic, (2) political, (3) infrastructure, (4), ecosystem services & land use, and (5) spirituality & culture. Traditional knowledge (TK) encompasses the *dynamic knowledge systems and lifeways referring to Indigenous ways of knowing resulting from close relationship to the environment and developed over thousands of years*. It is tied to the different relatives (plants, animals, water, etc.) in the environment and their seasonality and events. Traditional knowledge from elders and community members can be valuable in filling in the knowledge gaps of past records that scientists may encounter when studying climate change and adaptation strategies. While western science emphasizes facts, Indigenous TK emphasizes relationships to spiritual and biophysical components; the combination of these approaches can be very powerful in creating a better

understanding of climate change.

Critical principles of engagement with TK holders are “Cause No Harm” and “Free, Prior, and Informed Consent.” It is important to avoid the loss or misappropriation of TK (“Cause No Harm”) and follow guidelines and governing systems around Tribal Consultation to ensure TK is protected. In 2014, Dr. Chief and others developed Guidelines for Considering Traditional Knowledges in Climate Change Initiatives as a guide for Tribal partners, universities, and federal agencies to ensure that TK is protected in their collaborations.

Water, Climate Change & Protection of Culturally Important Species:
Kathy Jacobs, Director, Center for Climate Adaptation Science and Solutions (CCASS)

We are already seeing the impacts of climate change on the water cycle: earlier snowmelt, a lower peak in runoff, large impacts on surface water flows, and loss of storage in reservoirs due to sedimentation (an impact from post-fire erosion) and high levels of evaporation. We think about our future climate being hotter and drier, but extreme events are also becoming more intense and involve the potential for flooding, which can have dramatic impacts on communities and ecosystems. Climate change isn’t the only driver of what’s happening, and risk management requires a multi-faceted approach. The decisions we’re making with land use need to be integrated with the decisions we’re making about how we’re managing water supplies and climate adaptation. We need to figure out what we value most in our environment and work to protect those things, whether it is traditional food sources or things that are of cultural and religious importance. Some adaptation ideas that came out of the Tribal Adaptation Workshop in 2024 include:

- the importance of storytellers who can explain in their own words and images what is happening in their local communities;
- incentive programs might work better than penalties for promoting adaptation practices, like buying back grazing permits and paying people to help protect resources;
- being more explicit about how to handle soil and water erosion and managing livestock given the land’s carrying capacity; and,
- making sure people are educated about what is changing and why it’s changing.

The Tribal Climate Adaptation Menu is another resource that may help provide a structure for putting together a plan for how to manage natural resources in the face of climate change. Some sections of the menu include learning through careful and respectful observation, supporting the way the ecology functions in a particular area and how culture functions in relationship to those ecological functions, and maintaining and enhancing community and ecological diversity.

Opportunities for Floodplain & Riparian Recharge:
Holly Richter, Principal, Resilient Rivers, LLC

As a result of groundwater pumping and drought, we see changes in Arizona’s riparian ecosystems from wet, healthy ecosystems with perennial flows and abundant vegetation that provide important migratory corridors to ephemeral,

intermittent, or completely dry washes where groundwater storage has been depleted to below the root zone and the streambed itself. In Southeastern AZ, there has been a collaboration between local and federal agencies to keep the San Pedro River habitat healthy. Regional groundwater modeling was used to help locate recharge projects along the river in areas that could derive the greatest benefit from additional recharge. Recharge occurs naturally during the natural flood flows in the floodplain (particularly during the monsoon season in Southeastern AZ), and it's easier to protect this natural recharge and minimize pumping than to recharge groundwater after dewatering.

Urbanization also has impacts on flood flows and groundwater and natural systems. Urban areas have impervious surfaces that deliver more water to natural channels than would have normally occurred without development, raising both water quantity and quality concerns. Recharging this urban enhanced runoff can have multiple benefits, including erosion and sediment control. Projects such as detention basins can capture high flood peaks and slowly release them to the channel downstream, which enhances the natural, in-channel recharge by allowing more time for infiltration. **Lessons learned from several projects on the San Pedro River include**:

- Pre-development and existing runoff volumes can be quantified and compared;
- The number, duration, and magnitude of storm flows can increase due to urbanization and/or changing watershed conditions, and this problem can also be a solution if you approach it creatively;
- Urban runoff provides source water for aquifer recharge and multiple benefits all at once if designed thoughtfully; and,
- These projects increase groundwater storage while also restoring natural flood flows; flood disturbance is a natural process and is essential to support and shape these riparian ecosystems.

In summary, the challenges of riparian ecosystems are that they require unaltered flood flows, access to shallow groundwater, and adequate water quality to thrive. Urbanization impacts all of these through increased runoff, flood peaks, and erosion, while groundwater pumping leads to declining groundwater levels. **Potential solutions to these challenges include**:

- Increase the infiltration of urban runoff for groundwater storage near streams;
- Retire high volume pumping near streams where impacts are most direct;
- Preserve open space within active floodplains where recharge is already occurring naturally;
- Create a diverse portfolio of water sources for recharge; complement unpredictable stormwater with high-quality treated effluent.

Gila River Indian Community: Innovation in Water Management:
David DeJong, Director, Pima-Maricopa Irrigation Project

Gila River Indian Community (the "Community") is located just south of Phoenix and home to the Akimel O'otham ("The River People") and Pee Posh peoples. The Gila River runs through the Community and has been central to their culture and lifeways

since time immemorial. Water rights settlements, totaling to over 600,000 acre-feet per year, have allowed the Community to do managed aquifer recharge (MAR) projects in support of their desires for a free-flowing Gila River, restoring the natural flora and fauna along the river, and expanding agricultural production, while maintaining options for monetizing water credits in the Phoenix Active Management Area (AMA). These MAR projects provide the Community with the flexibility to store water when excess surface water is available and use it when supplies are short while ensuring safe yield of groundwater use.

The first water at the MAR 5 facility was discharged in 2015, and over the years, in consultation with Community elders, an Interpretative Trail was built for the Community and visitors to enjoy and learn from. While much of the vegetation came back naturally, the Community also planted willow and cottonwood that naturally grew in this area. In 2019, the MAR 5 site won four awards, including the Arizona Forward Crescordia Award and President's Awards. The Community has since constructed several other MAR sites along the Gila River, resulting in the recharge of over 200,000 AF of water across five recharge sites since 2015, which has made observable impacts on groundwater levels. In summary, the Community has taken a holistic approach to water management in seeking restoration of Keli Akimel, or the Gila River, restoring the aquifer to balance groundwater extraction, monetizing water for flexibility, and reinvigorating and growing an agricultural economy, all culminating in cultural compatibility, adaptation, and renewal in the 21st century.

Feasibility Studies for Groundwater Recharge and Water Supply Resiliency Projects:
Stephen A. Smith, Hydrogeologist, Smith Consultants

Costs of groundwater recharge projects can range from tens of thousands of dollars to several million dollars, so it's helpful to do a pre-feasibility study with the data available before committing to a full, site-specific feasibility study. Feasibility studies generally require outside funding and involve soil testing, aquifer testing, groundwater modeling, and may cost tens of thousands of dollars or more. Pre-feasibility studies can be conducted by in-house staff from the water utility and environmental departments, potentially with assistance from ITCA or other technical assistance providers. Pre-feasibility studies can help answer how the water supply system will benefit from increased recharge, if existing wells can be used for recovery, which are the most practical ways to recharge water, and if suitable land is available for recharge.

Data needed for a pre-feasibly study include maps of geology and soil, historical and current land uses, and well data. Geology and soil maps are available from the USGS and are useful for estimating the infiltration capacity of soils. The best soils for infiltration are clean sand or gravel (such as in-channel alluvium), and the best rocks are karst limestone and permeable basalt. It's important to understand both the historical, current, and future planned uses of land that are under consideration for groundwater recharge to avoid soils that might be contaminated from prior uses (i.e. landfills), and avoid conflicts with existing land use plans. In terms of well data, as-builts (schematic showing construction of the well), water levels, hydraulic tests

(pumping tests), and geologic logs are all useful for understanding the viability of groundwater recharge, storage, and recovery.

Funding & Partnership Opportunities:
Karletta Chief, Director, Indigenous Resilience Center (IRes)

Given current events, including the elimination of EPA programs and changes in policies and funding availability, Tribes need to think more broadly about their funding landscape and consider what might be coming next and how to prepare. It's a difficult space to be in: departments are losing funding, some have had to lay off staff, and Tribes are trying to figure out how to still run their programs with less resources. Tribes are also considering how to engage Tribal leadership in these questions. It's important to diversify the funding portfolio to make sure Tribal programs are not completely dependent on federal funding. Tribes can also think about philanthropy, foundations, and corporations as potential funders. While it can take a lot of time and energy to build relationships with outside funders, grant writers should network with these organizations to become aware of potential opportunities. There are also state and local governments and non-profits that are supporting Tribes. The Arizona Governor's Office has a funding listserv, so it's recommended that Tribes subscribe to that listserv to make sure they are aware of the upcoming funding opportunities. The current trends in funding include gap funding, conservation, and AI/energy/defense (Note: it's important for Tribes to think about protection of Indigenous knowledge and data in this context). Tribes have been seeing a quick turnaround time on grants so it's helpful to have template text ready and the systems in place to submit grants quickly. Philanthropies and foundations like to fund innovative projects, so staff should be encouraged to think of new ideas and innovative approaches to their funding needs.

Breakout Session 3: Developing Tribal Water Reliability Project Ideas

This session focused on synthesizing the discussions and presentations from the workshop and identifying opportunities for enhanced recharge.

Overall, participants felt inspired by the presentation of the work along the San Pedro River and the Gila River Indian Community's MAR 5 project to restore riparian corridors, and there was excitement around how we can enhance the recharge that is naturally occurring in floodplain areas. Participants discussed some of their experiences with recharge projects on Tribal lands, where they have seen increases in groundwater levels and surface water flows. The challenges of the legacy of the General Allotment Act (Dawes Act) on Tribal lands was highlighted, since a Tribe may need to get approval from several hundred allottees (landowners) for a specific recharge project. One group discussed how historical projects from the Army Corps of Engineers and Bureau of Reclamation have impacted Tribes, and how Tribes can reclaim their water sovereignty through holistic management practices, including dam decommissioning projects focused on enhancing biodiversity and balancing habitat restoration with evapotranspiration losses. Partnerships were also highlighted as important resources given the current difficulties of the funding landscape. Incorporating recharge as a co-benefit with new partnerships for planned

land management projects may yield the potential for more funding. Community buy-in for recharge projects is critical, particularly given the challenge of moving from project planning to implementation. Participants discussed how there is often more funding available for planning than for implementation of recharge or restoration projects. In many cases, funding is the largest barrier, not technical resources.

Participants were excited to see how to move from the high-level findings of the ATUR project to onsite discussions of how to solve water reliability problems in a specific community. Some participants reviewed the ATUR Decision Support Framework and found it helpful for understanding recharge project development, indicating it might be a beneficial step-by-step tool to help with scoping and identifying funding sources. In discussions of potential water sources for recharge, one group discussed the cultural aspects of using wastewater effluent. While recharging wastewater effluent might be a viable part of future recharge source water portfolios, it is important to consider this thoughtfully alongside other sources such as stormwater. In addition, recognizing that agriculture is important to many Tribes, some groups discussed transitioning to less water intensive crops as an option to improve water security and the technical assistance partnerships that might be available to assist with this.

Attendees

Thank you to all of the participants! The workshop had a broad range of attendees from across Tribal Nations, NGOs, federal agencies, and academic institutions, including:

- Cahto Tribe of the Laytonville Rancheria
- Choctaw Turtle Tribe
- Fallon Paiute Shoshone Tribe
- Fort McDowell Yavapai Nation
- Fort Mojave Indian Tribe
- Gila River Indian Community
- Habematolel Pomo of Upper Lake
- Hopi Tribe
- Kletsel Dehe Wintun Nation
- Navajo Nation
- Pascua Yaqui Tribe
- San Carlos Apache Tribe
- Susanville Indian Rancheria
- Tejon Indian Tribe
- Tohono O'odham Nation
- White Mountain Apache Tribe
- Yavapai-Apache Nation
- Atux Forever (Saskinax̂ am Alaiit Unceded Nation)
- Bureau of Indian Affairs
- Environmental Education and Empowerment Initiative
- Institute for Tribal Environmental Professionals (ITEP)
- Inter Tribal Agriculture Council
- Inter Tribal Council of Arizona (ITCA)*
- Southwest Climate Adaptation Science Center (SW CASC)
- UA Cooperative Extension
- UA Center for Climate Adaptation Science and Solutions (CCASS) / Arizona Tri-University Recharge and Water Reliability Project (ATUR)*
- UA Indigenous Resilience Center*
- United International Indigenous Nations
- U.S. Forest Service-Apache Sitgreaves
- Utah Dine Bikeyah

**Co-hosts of the workshop*