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Adapting to Drought in the Colorado River Basin: A Case Study of Indigenous Voices in Water Management

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Adapting to Drought in the Colorado River Basin: A Case Study of Indigenous Voices in Water
Management

Senior Project Submitted to
The Division of Social Studies
of Bard College

by
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Annandale-on-Hudson, New York

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This project is dedicated to my sister, who has always inspired me to make the most of my education and to be ambitious

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Introduction

In August of 2021, water levels in Lake Mead hovered at 1067ft. At just 35% of its capacity, Lake Mead was at its lowest level since it was created through the building of the Hoover Dam in 1931. This is the culmination of the Colorado River basin experiencing its driest 22-year period recorded in over 100 years (Udall & Overpeck, 2017). This megadrought has coincided with a population boom in the U.S. Southwest with cities like Phoenix, which has grown by a rate of 11.2% in the past 10 years, creating exponential increases in the demand for freshwater. Unfortunately, drought conditions will continue to persist due to the effects of climate change on the Colorado River's hydrological system. A recent article published in *Science* predicts the Colorado River's flow will decrease by 9.3% per degree Celsius of warming due to decreasing snowpack in the Rocky Mountains (Milly & Dunne, 2020). The increasing stress on the Colorado River due to climate change, increasing population growth, and a legacy of overallocation has resulted in the rapid depletion of water levels in Lake Mead, threatening the water supply of 40 million people.

In reaction to Lake Mead's rapid depletion, representatives from the seven basin states of the Colorado Compact, California, Nevada, Arizona, New Mexico, Colorado, Wyoming, and Utah, as well as Mexico, signed a set of agreements to address the issues caused by drought, the 2007 Interim Guidelines and the 2019 Drought Contingency Plan (DCP). These agreements intended to provide a temporary plan consisting of a series of voluntary reductions and increased conservation to address water shortage conditions. As agreed upon by the seven basin states in the DCP, the first of these voluntary reductions will be triggered when Lake Mead dips below an elevation of 1,090 ft. With Lake Mead currently hovering at 1,067ft, both Nevada and Arizona will be instituting cuts in their allocation from the Colorado River in 2022. This means that

Arizona will lose 192,000 acre-feet of its 2.8 million acre-feet allocation, enough water to cover 192,000 football fields in a foot of water and supply 384,000 households with water for a year (Bureau of Reclamation, 2019).

However, the agreements in place do not provide a long-term plan for managing the Colorado River under the increasing pressures of climate change and population growth. The 2007 Interim Guidelines were enacted in response to persistent drought conditions affecting the flow of the Colorado River and water levels in Lake Mead. The guidelines dictated that if Lake Mead dipped below 1075 ft, the Bureau of Reclamation would declare a shortage and states would face cuts to their water allocations. In 2016, a shortage was narrowly avoided, causing states to realize the Interim Guidelines were too ambiguous in their plan for implementing cuts to water in the case of a shortage. Therefore, the seven basin states reconvened and created the DCP in 2019. The DCP defined the exact amount of water that would be withheld from each state based on the level of water in Lake Mead, with the first cuts being implemented when Lake Mead dipped below 1090 ft. This clarified some of the ambiguity in operationalizing water cuts. These agreements provide a plan to respond to emergency shortage conditions, but they do not provide a framework for sustainably using the Colorado River to preserve it as a water source in the coming decades.

In response to this challenge, the Bureau of Reclamation will draft a plan in 2026 for the long-term management of the Colorado River. With forthcoming inter-state negotiations looming, the Arizona Department of Water Resources (ADWR) organized the Arizona Reconsultation Committee (ARC) to engage a variety of water users in a discussion to formulate Arizona's priorities. Since June of 2020, the Arizona Department of Water Resources has led nearly 40 stakeholders (SHs) through a series of public meetings to discuss the state of the

current agreement as well as discuss the concerns of SHs for the forthcoming interstate negotiations (Person, 2020).

In an attempt to ensure equity in the SH engagement process, ADWR has invited local politicians, private interests, municipal water professionals, and tribal authorities to provide their perspectives on instituting further water cuts and preserving the Colorado River. However, the extent to which ARC has created an inclusive SH engagement process that empowers the voices of all participants has yet to be determined.

This matters, particularly to indigenous communities, because SH engagement has the potential to uplift the voices of marginalized groups to create policies in which their concerns are recognized and addressed. However, the SH engagement process is fraught with challenges and often fails to meaningfully influence final policy decisions. Poorly structured SH engagement can include barriers, often unintentionally, that restrict the access of marginalized groups to the table, further empowering privileged voices and entrenching existing inequalities.

The Colorado River, being one of the most heavily regulated rivers in the world, has witnessed a multitude of attempts by state agencies to include SHs in the formation and implementation of regulations. Previous SH engagement initiatives attempted by Arizona and the other basin states to regulate the Colorado River have failed to take into account how time and financial constraints, poor communication about meeting times and location, unresolved differences in cultural views towards natural resource management, and a legacy of distrust of the state can potentially exclude SHs from the decision-making process (Karambelkar & Gerlak, 2020).

To analyze Arizona's SH engagement process in formulating the state's response to persistent drought conditions and water cuts, this senior project asks the following questions: to

what extent have SHs been meaningfully consulted in the formation of the DCP and forthcoming interstate drought agreements? How have power imbalances between SHs affected the inclusion of all voices in the policy formulation process? In particular, how have indigenous communities created coalitions with each other and other SHs, such as NGOs, to leverage their collective voice and influence the drought planning process? Has water scarcity in the Southwest created a window of opportunity for indigenous communities to draw attention to historical injustices in water distribution, or will it further entrench current inequalities in water access?

To address these questions, this senior project analyzes the extent to which the state of Arizona has attempted to develop a set of best practices to meaningfully engage SHs in the creation and implementation of interstate drought agreements, and to what degree power imbalances between SHs have restricted the inclusion of all voices in this process, further exacerbating inequalities in water access. To do so, the project will draw from scholarship discussing proposed frameworks for resource management such as integrated water resource management (IWRM) and adaptive governance (AG), previous cases of SH engagement and their best practices, and the literature on policy windows in facilitating governance shifts.

This project will examine two rounds of SH engagement to assess lessons learned regarding gaps in inclusion. The first round this project will assess is the Steering Committee, a SH engagement initiative overseen by the ADWR to discuss and implement the 2019 DCP. The second round examines ARC which is currently holding sessions to inform Arizona's position on the forthcoming 2026 operating guidelines for the Colorado River. Treating these two processes as cases, the project will use a mix of methods ranging from semi-structured and open-ended interviews to construct a case analysis. These interviews will be used to gather information on the experience of SHs represented in these processes and the attempts made by state agencies to

create an inclusive environment for these SHs. In addition, this project will pull on primary sources from the state of Arizona and secondary literature.

The project is structured as follows: Chapter one lays out the historical background of the Colorado River basin and will discuss the development of the “Law of the River” that governs water use in the Colorado River basin. Chapter Two is a literature review to create an analytic framework for understanding the case. This framework will draw on scholarship exploring best practices for SH engagement, integrated water resource management, adaptive governance, and policy windows. Chapter Three will introduce the case of SH engagement in Arizona, discussing Arizona’s current SH engagement initiative, the ARC, as well as the Steering Committee which concluded sessions after the DCP was implemented in 2019. Chapter Four is an analytical conclusion that ties the framework I develop from the literature to the case.

Chapter 1: The History of Governing the Colorado River

A complex series of state and national policies implemented throughout the past 100 years, referred to as the “Law of the River”, dictate the use of the Colorado River. These policies have attempted to divide the river equitably and sustainably, but have left the Colorado River overallocated and engendered competition between states over its use. This chapter will explore the history of governing the Colorado River, and how this governance structure has contributed to current shortages and influences policy-making in the Colorado River basin today. It will begin by discussing the development of the prior appropriation doctrine, which defines water rights in the US Southwest. It will continue to discuss important legislation and court cases such as the Colorado River Compact and *Arizona vs California*. Finally, this chapter will briefly introduce the recently passed 2007 Interim Guidelines and the 2019 Drought Contingency Plan.

The Prior Appropriation Doctrine: Water Rights in the US Southwest

The American Southwest ranges from semi-arid to arid regions. The average rainfall in the Southwest ranges from 12 inches a year in Arizona to approximately 20 inches per year in Colorado which, compared to the national average of 85 inches per year, demonstrates the aridity of the region (Sheppard et al, 2002). The limited quantity of water available quickly caused white settlers in the region to recognize that control over water rights was essential in establishing settlements and stimulating growth. During the early period of white settlement, the law of prior appropriation was developed as a model of structuring water rights unique from the riparian laws established in the wetter, eastern parts of the country. As the need to transfer water and irrigate farmland became a pressing issue in the Colorado territory in the 1860s, the territory passed a series of laws referred to as the Colorado Doctrine (Schorr, 2012; Summit, 2013).

Under the riparian water rights model, individuals owning property in proximity to streams or other bodies of water had priority to use the water in those streams. However, in the Southwest where bodies of water are few and far between, this model was ineffective in providing water for the growing number of farmers looking to irrigate their land. Under the model of prior appropriation, priority is given to individuals who were first to file a claim with the state instead of priority being given to those owning property adjacent to a water source (Schorr, 2013). In a climate where water is scarce, the drafters of the Colorado Doctrine recognized the importance of ensuring water was being used efficiently. Therefore, the law of prior appropriation also dictates that individuals can only be granted a claim to water if they can put that water to a “beneficial use” (Schorr, 2013). This was intended to ensure that water users would not make claims to more water than they would be able to utilize. The Colorado Doctrine served as a model for other territories and later states, establishing a system of water rights based on prior appropriation with its emphasis on temporal priority and beneficial use throughout the Southwest.

The Colorado River Compact: Dividing the River

In the 1920s, California’s exponential population growth and increasing demand for water caused concern among other states reliant on the Colorado River. In June of 1922, the Supreme court ruled in the case Wyoming vs Colorado that the law of prior appropriation applies regardless of state lines (Summit, 2013). At this time, California’s population greatly outnumbered the other states in the Colorado River basin, meaning California could easily establish control over the bulk of the available water and severely restrict the growth of the other states. As a result, representatives from the basin states called for negotiations to create a more equitable distribution of water between the basin states. From these negotiations, the states

signed and ratified the 1922 Colorado River Compact. Within the compact, the Colorado River System was defined as the whole portion of the Colorado River and its tributaries located within the borders of the United States. The states through which the river flows were split into the upper Colorado River basin and the lower Colorado River basin with the upper basin including Colorado, New Mexico, Wyoming, and Utah while the lower half includes California, Arizona, and Nevada (Hundley Jr., 1975).

Image 1: The Upper and Lower Colorado River Basins



Due to several abnormally wet years preceding the compact, the amount of water available for anthropogenic use was severely overestimated. The compact delegated an equal allocation of 7.5 million acre feet (maf) per year to each basin in order to ensure equity between the lower and upper basins (Hundley Jr., 1975). This number was based on hydrologic data collected by the Bureau of Reclamation that estimated the river's annual flow to be 16.4 maf. However, the flow of the Colorado River is subject to severe fluctuations, and the data that informed the Colorado River Compact was taken during a historically wet year. The overall average stream flow since the Bureau of Reclamation began collecting data is approximately 15 maf. However, due to the megadrought the Southwest has been experiencing for the past two decades, stream flow has been significantly lower, with the average flow over the past ten years being 13.6 maf (US DOI, 2020). Therefore, there is a discrepancy of over 3 maf between the stream flow data that informed the Colorado River Compact and the current ten year average. This overallocation of the river is partially to blame for the current decreasing water levels in Lake Mead and the increasing strain on the Colorado River.

Despite the attempt of the Colorado River Compact in the 1920s to create an equitable system of water allotments between the seven basin states, tension remained, especially among the Lower basin states. The compact only dictated the allocation between the upper and lower basins without detailing how the water would be divided among the states within each basin (Huxley Jr., 1975). This put Arizona at a disadvantage in the state's growing rivalry with California. California, who had already made significant strides in developing and using water from the Colorado River, had no set limit on the amount of water they could draw from the lower basin's 7.5 maf. Since California was rapidly developing and quickly putting water to "beneficial use", they were set to snatch up the bulk of the lower basins allotment, crowding out Arizona and

stunting the state's development (Poupeau, 2016). The Colorado Compact also failed to dictate whether or not states would be given the water rights to the tributaries that flowed within their borders. Arizona, home to the Colorado River's largest tributary, refused to sign the compact as a result of this ambiguity, and would not ratify it until 1944 (Summit, 2012). Therefore, the Colorado Compact, although intending to create an equitable division of water between the states, laid the groundwork for continued conflict among the lower basin states, specifically Arizona and California.

In addition to the ambiguity over individual state allocations, the compact failed to account for Native American reservations who collectively, due to the Winters Doctrine, had one of the largest claims to the Colorado River. The Winters Doctrine dictated that when congress created reserved land, they implicitly reserved enough water to satisfy all "current and future demand". The Winters Doctrine did not clarify how to calculate "current and future demand" nor did it provide funding for Reservations to develop their reserved water (Brougher, 2011). The Colorado Compact did little to settle these issues, with only one line included in the Compact addressing indigenous claims to the river: "Nothing in this compact shall be construed as affecting the obligations of the United States of America to Indian Tribes" (Huxley Jr., 1975). As a result, many tribes in the Colorado River basin turned to litigation in order to secure the allocation of water they were entitled to. Although they won many of these lawsuits, the resulting decisions led to more water rights that were guaranteed on paper, but no tangible infrastructure was built to deliver this water (Summit, 2012). This further perpetuated the federal and state government's delivery of "paper water" to Native American reservations without actually creating any plans to deliver "wet water".

Arizona vs California: Settling Disputes over the River

In 1929, congress passed the Boulder Canyon Project Act that allowed for the construction of the Boulder Canyon Dam, later renamed the Hoover Dam. The dam had the potential to greatly increase California's access to the Colorado River while simultaneously diminishing the amount of water that would flow through Arizona, further intensifying the tension within the lower basin (Summit, 2012). This sparked a legal battle between California and Arizona that would last for over 3 decades. After a series of lawsuits filed by Arizona against California, a decision was finally reached in 1964 by the Supreme court. *Arizona vs California* (1964) gave the federal government, acting through the Secretary of the Interior, power to dictate the amount of water allocated to each state within the upper and lower basins. California was allotted 4.4 maf, with Arizona and Nevada receiving 2.6 maf and 300,000 acre feet (af) respectively. The Secretary of the Interior was given the authority to institute cuts to each state's allocation in the case of a shortage (Poupeau, 2016). Thus, as a result of continuous disagreement between states, the Colorado River is governed both at the state level and on the federal level, with the Department of the Interior retaining the power to enter into contracts with and facilitate negotiations between states, set allocations, and declare cuts during water shortages.

The decision also ensured Native American reservations within the basin states would receive enough water from the Colorado River to irrigate all the irrigable parts of their reserved land, establishing the concept of practicable irrigable acreage (PIA). The concept of PIA allowed reservations to claim not only all the water they could currently use, but also the water that would potentially be needed after further development (Brougher, 2011). This provided a legal basis for tribes to potentially expand their access to the Colorado River, while also further entrenching indigenous water practices within the colonial governing regime (Curley, 2021). This water would be charged to the apportionment of the state in which the reservation is located.

Therefore, the water diverted from the Colorado River to Native American reservations within Arizona count towards the state's 2.4 maf allocation. The states were also charged with building the necessary infrastructure and providing the necessary funding for delivering the water to reservations, finally pushing the "paper water" that had long been promised to Native American tribes towards "wet water" (Summit, 201). Therefore, *Arizona vs California* helped settle long-standing interstate disputes as well as dictated states had the responsibility to deliver water to reservations.

Arizona vs California also paved the way for congressional approval of the Central Arizona Project (CAP). In order for Arizona to apply their allotment of the Colorado River to a "beneficial use", as mandated by the law of prior appropriation, it would have to transport the water from the Colorado River, located on the border of California and Arizona, to the center of the state where the growing metropolises of Phoenix and Tucson created the highest demand for water (Poupeau 2016). The original bill introduced to congress to create CAP included plans for a dam at Bridge Canyon that would potentially flood a large portion of the Grand Canyon, including Navajo, Havasupai, and Hualapai land. The Hualapai, once Arizona agreed to their demands for financial compensation and entitlement to the tourist revenue the dam would generate, gave their support for the dam (Pearson, 2000). However, the Navajo, who is the largest tribe of the Colorado River Indian Tribes, was not included in negotiations over the proposed dams. Joining forces with the Sierra Club, who wanted to maintain the natural flow of the Colorado River through the Grand Canyon, the Navajo launched a successful media campaign against the dam resulting in its removal from the CAP bill. CAP was eventually approved in 1968 and, instead of being built using hydroelectric power from the proposed dam, was fueled using coal power plants located on Navajo land (Summit, 2012). Although the power

plants provided an income for the Navajo community, the project disproportionately benefited the state of Arizona, which now had the necessary infrastructure to use 1.5 maf of its 2.5 maf allotment, while the environmental burden of building CAP was placed on the Navajo community (Curly, 2021).

Moving Away from Litigation

In the past two decades, governance of the Colorado River basin has moved away from a confrontational approach relying on litigation to work out disputes, to a more collaborative approach. *Arizona vs California* gave the Secretary of the Interior the ability to organize negotiations between states. From 2000 to 2007, Lake Mead's water levels dropped by 45%, prompting the Secretary of the Interior to exercise this power and convene the seven basin states. These negotiations lead to the 2007 Interim Guidelines, the first basin wide plan for instituting water cuts based on water levels in Lake Mead. In 2016, the states convened again to create the 2019 Drought Contingency Plan to supplement and clarify the 2007 Interim Guidelines. The details of these two policies will be outlined in Chapter 3, but they mark a departure from litigation between states to resolve conflicts in the Colorado River basin, toward collaboration.

Chapter 2: Review of the Literature

Over the past thirty years, an extensive literature on participatory water governance has emerged. This chapter traces the evolution of different frameworks and models of participatory water management that relate to water struggles in the Colorado River basin. It explores the literature of integrated water resources management (IWRM) and adaptive governance (AG). Given the asymmetries of power that characterize the set of stakeholders (SHs) that seek to engage in water management in the case of Arizona, this chapter also lays out best practices for structuring SH engagement and explores the conditions necessary to facilitate the voice of less powerful SHs to participate in water management. In addition, this chapter analyzes the conditions necessary to facilitate the shift of water governance structures to a more adaptive and participatory model. Through this review of the literature, I will build a framework of analysis to explore the case of adaptive and participatory governance in Arizona and the lower Colorado River basin, and the window of opportunity that is opening to facilitate a more inclusive and adaptive shift.

Integrated Water Resources Management

Over the past few decades, the United States has developed more inclusive approaches to governing water resources. Throughout the early to mid twentieth century, the US approached water governance from a single-sector, hydro-centric perspective. Favored by engineers and economists, this approach limited discussion of water management to a small group of technocrats who sought to produce maximum yields and access the full utility of rivers and other bodies of water (Hooper, 2013). During this period the US federal government invested in a series of major infrastructure projects to maximize the utility of water resources, including the Glen Canyon Dam and the Hoover Dam on the Colorado River (Gerlak, 2006).

The 1980s marked a shift away from a technocratic approach to water governance as water professionals realized the social and political complexity of water systems and the problems they faced. Water resources often exist in transboundary spaces and are connected to a variety of different water users who employ the water for a variety of different purposes. A top-down, sectoral approach to water management lacks the flexibility and representation to confront complex water management issues that are multi-sectoral and affect a diverse number of interests (GWP, 2000; Biswas, 2006).

Integrated Water Resource Management (IWRM) emerged as a governance framework to create a more inclusive and systematic approach to managing water resources. IWRM demands a multisectoral and cross-institutional approach to governing water resources (Gerlak, 2006). The Global Water Partnership, a network of over 3,000 institutions including United Nations agencies, NGOs, and government regulatory bodies from various countries, developed a framework for IWRM. They define IWRM as “a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (2000). IWRM emphasizes a shift of the scale of analysis from the administrative boundary to the level of the watershed or other hydrological boundaries (Savenji & Van Der Zaag, 2008). This allows management practices to align better with the ecological systems that impact water resources and addresses the “ecological integrity” policy principle of IWRM. It also requires coordination between different sectors and agencies of government, as hydrological boundaries rarely fall neatly within jurisdictional boundaries. Additionally, IWRM recognizes the connection between water resources and the economic, societal, and other environmental sectors (Hooper, 2003). Using an IWRM approach enables

water managers to confront the diverse and multi-sectoral problems facing water resources by integrating different sectors of government and approaching water management from the basin scale.

A key characteristic of IWRM is participatory governance and the inclusion of water users in the decision making process. This expands the process of water governance to include not just government actors, but also community members, business and industry organizations, NGOs, and other actors who have a “stake” or interest in a water resource (Hooper, 2003). By including a variety of water users, IWRM scholars argue water management decisions will be more cognisant of the interconnected relations of actors within a watershed and the variety of goals and agendas these water users have (Savenji & Van Der Zaag, 2008). The GWP emphasizes the difference between consultation and participation, and places the responsibility of creating venues for participation on the local, regional, and national levels of government (GWP, 2000). In the IWRM framework, participation in the decision making process must be integrated at all levels of government.

Despite the IWRM’s emphasis on ecological integrity, flexibility, and participation, scholars have criticized the approach for being vaguely defined. Biswas (2008 & 2004) analyzed the definition and framework laid out by the GWP. The GWP divides their framework of IWRM into three central components: ecological integrity, equity, and efficiency (GWP, 2000; Savenji & Van Der Zaag, 2008). He criticizes their use of the words “equitable”, “sustainable”, and “economic and social welfare” for benign empty signifiers that reference important values for good governance, making the concept attractive and popular among major international organizations. Moreover, the GWP does not fully define or explore the key terms of their definition, making IWRM difficult to operationalize as a governance framework and allowing for

a broad interpretation of the definition that can be adapted to fit a variety of different projects (Biswas, 2004; 2009).

IWRM is limited in its ability to grapple with the complexities of engaging SHs. IWRM attempts to move away from a top down, technocratic approach by engaging state and nonstate actors, but in its operationalization the problems water users are being consulted on are often defined by the state and experts. This excludes the perspective of non-state actors from the framing of the problem (Heitema et al, 2009). Furthermore, the framework assumes that power is centralized in the government, and the inclusion of SHs in the decision making process redistributes the imbalance of power between state and nonstate actors and democratizes the process (Butler & Adamowski, 2015). It does not examine the socio-political and historical context of different SHs, and therefore glosses over the power imbalances between different groups (Saravanan et al, 2009). Butler & Adamowski (2015) argue that the marginalization of some actors, such as indigenous groups, creates barriers to engaging in SH initiatives. Pulling from LeBlanc (2007), they define marginalization as:

“the process through which persons are peripheralized on the basis of their identities, associations, experiences, and environments’ (LeBlanc, 1997). Marginalization is experienced through having minimal access to resources, association to cultural norms, and representation (this includes cultural representation in things such as media, or decision-making bodies like governments, organizations, and corporations)” (Butler & Adamowski, 2015; LeBlanc, 2007).

Indigenous communities may lack the freetime, ability to travel to meeting locations, and access to information. These gaps need to be accounted for in planning for participatory programs to ensure marginalized groups are able to engage. Without addressing these barriers, the SH engagement process is seen by participants as a formality or a bureaucratic box to check, and often alienating SHs from the process and decreasing trust between state and non-state actors

(Wehn et al, 2018). IWRM fails to acknowledge the power dynamics between SHs, allowing for the potential exclusion of marginalized groups.

Over the past two decades, Arizona and other Southwestern states have begun moving from a technocratic approach to water management to a more participatory and collaborative approach. In recent drought negotiations, they have made an effort to include tribal nations, who have been historically barred from participating in water management decisions (Sullivan et al, 2019). The second chapter discusses that, in the process of trying to build a more participatory and inclusive water management system, Arizona's application of an IWRM approach demonstrated many of the gaps noted above. Specifically, the chapter demonstrates the state's failure to address historical legacies and asymmetries of power that continued to marginalize indigenous voices.

Adaptive Governance: Flexibility, Learning, and Creating an Equitable Process for Public Participation

By the 2000s, another conceptual model of water governance emerged. Like IWRM, adaptive governance (AG) emphasizes watersheds and river basins as the primary jurisdiction. Unlike IWRM, the literature informing AG recognizes that power imbalances between SHs must be addressed to create an effective participatory process. In addition, adaptive governance recognizes that water resources face uncertainty and unpredictability, and emphasizes flexibility and social learning in water management. IWRM strives to optimize for a specific ecosystem service to fit a current economic need or political goal (Savenji & Van Der Zaag, 2008). In contrast, Cosens & Williams (2012) define adaptive governance as an approach to managing transboundary water resources that addresses the inherent uncertainties in a system's response to

management changes. They argue that adaptive governance takes a more systems driven approach by discussing the connection between ecosystems and socio-economic systems.

AG is operationalized through the implementation of adaptive management to promote flexibility within the policies governing ecosystems. Adaptive management seeks to achieve the flexibility demanded by the scholarship of AG through the consistent monitoring and reevaluation of actions and policies that impact an ecosystem. This allows for a process of learning from experimental policies in which their effects on an ecosystem are recorded and analyzed, and the policy is adjusted based on this analysis in order to accommodate changes and surprises that occur within the system (Cosens & Williams, 2012; Folke et al 2005) Olsson, Folke & Hahn (2004) describes this process in their analysis of the Ecomuseum Kristianstads Vattenrike (EKV), which was established by the Municipality of Kristianstad to manage the Helgeå River in Sweden. The EKV maintained an inventory of bird populations to assess the effects of varying nutrient loads on the river's ecosystem. These inventories were shared with the public and a variety of other actors, including farmers who were able to adjust their land practices based on the information provided by EKV's inventories. This allowed for a process of learning by experimenting with different approaches to land and water management, and prompted information sharing between the government and water users to create collaborative solutions based on the available data. Learning and reevaluating past actions based on conclusions drawn from policy monitoring is an essential component of the implementation of AG.

Similar to IWRM, the scholarship on AG recognizes SH (SH) engagement as integral to the operationalization of adaptive governance to support collaboration between state and non-state actors. When done well, SH engagement includes SHs throughout the entire decision making process, including the process of knowledge production. Engaging SHs in the knowledge

generation process allows for social learning, or the process of learning from collectives or groups (Smyth et al, 2020; Wehn et al, 2018). Social learning enables SHs and policymakers to gain a better understanding of the issues being discussed and to gather a diverse set of experiences and perspectives from participants, creating a broader knowledge base for making informed decisions. Wehn et al (2018) describe the process of engaging SHs to discuss the future of water governance in England organized by the Department of Environment, Food and Rural Affairs (DEFRA). As part of this process, DEFRA showed a series of graphics and images displaying the current water governance structure in England. Participants were then asked to discuss and create a collective definition of the governance structure. As a result, participants had a clear understanding of how water regulation was operationalized by DEFRA. This allowed them to observe gaps and failures in the regulatory process, and create an informed opinion on their concerns and desired improvements.

Engaging SHs in knowledge production, however, comes with its own set of challenges. Smyth et al (2020) analyzed a variety of different research initiatives across various countries in North and Southern America that intended to engage SHs in the process of collecting scientific data on the effects of climate change on aquatic ecosystems. They found the process was more successful in cases where researchers had a long-standing history of involvement in ecosystem co-management programs. This provided a strong foundation of trust, inspiring a high degree of engagement from SHs and enabling communication between SHs and scientists. Smyth et al (2020) also stressed the importance of consulting SHs on the structure of the SH engagement process and the constant reevaluation of the process by participants. This connects to the broader goals of adaptive governance, which emphasizes the monitoring and analysis of programs and policies in order to adjust these based on the weaknesses and limitations observed.

The marginalization of certain SH groups is another challenge organizers face when crafting participatory approaches to the knowledge generation processes and SH engagement initiatives in general (Butler & Adamowski, 2015). In the U.S., indigenous communities face a set of conditions that have led to their economic and political marginalization. For example, in the Colorado River basin, reservations have not been supplied by federal or state governments with the funding necessary to develop the water they are entitled to. A report by the water and tribes initiative found, “Navajo residents are 67 times more likely than other Americans to live without access to running water” (2021). Historically, tribal nations have been unable to advocate for themselves, as they have been shut out of water governance discussions since the 1922 Colorado River Compact (Tulley-Cordova, 2022). This process of marginalization, especially in how it manifests within water governance as explored in the following chapter, must be considered by the state when designing SH engagement initiatives.

Indigenous peoples must be included in the design of the SH process so they are able to craft a process that will benefit them as much as the researcher and their affiliate institution. These initiatives are most successful when researchers and organizers undergo an extensive amount of prior research to understand the context of the nation they are engaging with, and must be aware of what knowledge tribal members may find inappropriate to share. This also allows the researcher to understand each specific tribal nation’s relationship with the resource under discussion, and gain a better understanding of indigenous knowledge systems (Chief et al, 2016). Although the inclusion of SHs throughout the entire SH process increases their engagement and the effectiveness of SH initiatives, the organizers of this process must consult SHs in the construction of the process and recognize the context of marginalized groups who are participating. This smoothing of inequities within a SH engagement process is critical to trust

building and, when done poorly, can have negative consequences for future collaborations, as demonstrated by Arizona's earlier SH engagement in the second chapter.

The Role of Policy Windows in Facilitating Adaptive Governance

The push for participatory, equitable, and flexible governance of water resources that is required to meet the complex and constantly evolving challenges facing watersheds is in large part due to specific political conditions that draw attention to the failures of the previous structure. The literature on social movements and policy formation provide a framework for how these transitions occur. Policy windows allow social movements and key individuals to reframe problems and enact policy change guided by their perspective. Focusing events contribute to creating a political environment that is receptive to change and motivates policy-makers to create or adjust regulations.

A policy window allows advocates of a proposed solution to a problem to propel their idea to the top of the agenda of policy makers and the public. John Kingdon (1984) describes a policy window as an opening or opportunity for reform or policy shifts created by the union of three streams: the problem stream, the policy stream, and the political stream. The problem stream identifies public matters requiring government intervention, such as the shrinking of Lake Mead. Most problems do not catch the attention of the government or the public. Kingdon argues they require a solution that can be implemented in order to be salient to policy makers. The policy stream is the stream of proposed ideas and solutions. In Arizona, the policy stream consists of the drafted DCP or the proposed idea for a "Sovereign Review Board" to guide governance of the Colorado River basin. Kingdon describes the political stream with a broad definition of "political" as "any activity related to the authoritative allocation of values"(1984, 145). In the case of Arizona, the political stream involves indigenous social movements for

representation in water governance or a declaration by the Bureau of Reclamation of a tier 1 shortage as a result of Lake Mead's water level.

A window of opportunity can appear when a solution that policy makers, scientists, or others have crafted is ready to be applied to remedy the problem at hand. These streams usually run parallel to each other, but a change in one of these streams, such as an election affecting the political stream, can cause them to align. At that moment, interest groups or savvy individuals are able to take advantage of the receptive political environment to push their proposed solution forward and enact change. For example, Arizona's sudden panic that it would not be able to meet its commitments to interstate drought agreements allowed the Gila River Indian Community and the Colorado River Tribes to bargain for a spot in SH meetings and claim some influence over proposed drought policy.

Sudden focusing events can draw the attention of the public or government to a problem that was previously low on the agenda, creating a window of opportunity. Thomas Birkland (1997) defines a focusing event as "an event that is sudden, relatively rare, can be reasonably defined as harmful or revealing the possibility of greater future harms, inflicts harms or suggests potential harms that could be concentrated on a definable geographical area or community of interest, and that is known to policy makers and the public virtually simultaneously." A focusing event can describe a variety of different occurrences, including a natural disaster, an aviation accident, an oil spill, etc. In the case of the basin, as noted above, the extreme drop in Lake Mead due to drought caused a spike in interest that groups or individuals use to illustrate the need for immediate actions and draw greater attention to the problem. If prepared with a policy solution able to address the problem highlighted by a focusing event, these actors can use the heightened

public and political interest to facilitate the implementation of their proposal (Kingdon, 1984). These sudden events act as catalysts to connect the three streams described by Kingdon.

Social Movements, the networks they facilitate, and the leaders who emerge from them, also play a key role in facilitating the opening of a policy window. Sidney Tarrow (1994) describes how networks begin at the local level consisting of interpersonal relationships between individuals and informal organizations who share a common opponent. These local networks connect with formal organizations, such as NGOs and Universities, to expand their reach to the state, national, or international level, gathering more interest in the problem they are facing and challenging the ability of elites to subvert the movement. Not only do these networks increase the scale of the movement, but they also facilitate exchanges of information (Olsson et al., 2006). Experts and everyday people connect creating an exchange of local knowledge and scientific knowledge that inspires possible policy solutions. As Kingdon (1984) argues, an applicable solution to a problem allows for the formation and exploitation of a policy window. The information that flows through the networks created by social movements provide both policy ideas and build coalitions of groups to support them, helping to craft the receptive environment for enacting change.

Kingdon (1984) describes the importance of individuals who act as leaders during the opening of a policy window to mobilize resources and push their preferred policy forward. He refers to these individuals as “policy entrepreneurs” who act as integral pieces to both the formation and exploitation of policy windows. These individuals hitch solutions to existing problems, draw the connection between focusing events and policy problems, and couple the momentum gathered by social movements with specific policy proposals. Policy entrepreneurs can be situated within the state, giving them access to official policy channels they can mobilize

when the opportunity arises. They can also be individuals located outside of the government, such as scientists, academics, and activists, who can draw on the networks they are connected to and the coalitions they are a part of to rally in support of a policy solution to a pressing problem. Individuals that operate outside of the state are also subject to less regulatory constraints and have the ability to push for major structural change, while those operating within the state are subject to bureaucratic regulation that steers them toward policy solutions that focus on incremental changes (Huiteima & Meijerink, 2010). While networks and coalitions are essential for invigorating support for a policy and creating pathways for exchanges of information, individual leaders help to couple these developments with specific problems and solutions to open and seize upon windows of opportunity.

Policy windows, as well as the movements and focusing events that assist in opening them, result in shifts of governance structures. Olsson et al (2006) describes how these transformations consisted of two phases, a preparation phase and a transition phase, linked by a window of opportunity. The foundation for this transition is supported by networks of scientists and other academics, interest groups, and individuals who recognize the failings of the current governance structure and the resulting problems in a social-ecological system. These informal networks identify knowledge gaps and create nodes of expertise of significance for ecosystem management that can be drawn upon at critical times. This provides a common understanding of the problem and puts in place policy ideas that can be mobilized when a window opens. In the case of AG, a window of opportunity often results from an ecological crisis (Folke, 2015; Olsson et al, 2006).

A crisis, such as an extreme weather event or extensive ecosystem damage, catches the attention of the public and the state. Policy entrepreneurs then have the opportunity to leverage

this attention to push for a transition to a more adaptive form of governance. Policy entrepreneurs are essential in this process, as they connect informal networks with government organizations, and provide leadership in rallying disparate groups to coalesce under one solution. The structure of AG consists of regulatory responsibility that is distributed between various levels of government, and across state and non-state organizations. The informal networks developed early on in the process can provide the basis for this structure, and can later be formalized to institutionalize AG (Chaffin, 2014; Folke, 2015).

Focusing events play a key role in creating a window of opportunity for policy intervention and a restructuring of governance systems. Periods of crisis allow for the implementation of a structure of adaptive governance. These moments of crisis make problems facing ecosystems a top priority on the policy agenda. Key individuals who act as leaders or policy entrepreneurs help to organize informal social networks that are able to identify knowledge gaps, policy failings, and develop new approaches to resolving resource problems unhindered by an obligation to an agency. Successful social transformations toward adaptive governance for ecosystem management seem to be preceded by the emergence of informal networks, orchestrated by key individuals, that help facilitate information flows, identify knowledge gaps, and create nodes of expertise of significance for ecosystem management that can be drawn upon at critical times (Folke, 2015; Chaffin, 2014).

Chapter 3: The Case of Arizona and the Colorado River Basin

This chapter will discuss the case of Arizona and the state's involvement with interstate-drought negotiations for the Colorado River. I will describe the Arizona Department of Water Resources' (ADWR) stakeholder engagement initiatives, including the Steering Committee that informed the 2019 DCP and the Arizona Reconsultation Committee (ARC) that is currently in progress. I will also explore the role of social movements and focusing events in creating the political climate necessary to move forward with a more participatory drought policy in Arizona.

The case narrative is based on primary data from interviews I conducted with Anne Castle, Crystal Tulley-Cordova, and Thomas Throssell. Anne Castle is a senior fellow at Getches-Wilkinson Center for Natural Resources, and is an expert on water issues in the US Southwest and Colorado River operating policy. From 2009 to 2014, she was the Assistant Secretary for Water and Science at the US Department of the Interior. Crystal Tulley-Cordova is a Principal Hydrologist in the Navajo Nation Department of Water Resources- Water Management Branch. Thomas Throssell is the outreach coordinator for tribal water users at the Central Arizona Project (CAP). The interviews I conducted with these water professionals provide varying perspectives on information I gathered through primary and secondary sources.

Climate Change and Drought in the US Southwest

The Colorado River depends on snowpack on the Rocky and Wasatch Mountain ranges as a stable source of runoff to maintain the river's flow. The melting of snow and ice allows water to percolate through the soil into underground aquifers. The water in these aquifers resurfaces as streamflow into the Colorado River. Milly & Dunne (2020) predicts the flow of the Colorado River to decrease by 9.3% for every 1°C of warming due to decreasing snowpack. Climate

change has triggered a reinforcing feedback loop in the mountains that causes more water to be lost to evapotranspiration. As temperatures increase, ice and snowpack on the mountains melt at a faster pace, and more precipitation falls as rain instead of snow. As a result there is less snow and ice covering the mountain. Ice and snow have a higher albedo, or surface reflectivity, than rock and dirt meaning surfaces covered by ice and snow reflect more heat rather than absorb it. The albedo of the surfaces of the mountains is decreasing as a result of shrinking snowpack, causing them to absorb more heat instead of reflecting it. Consequently, the ground and soils heat up causing water to evaporate before it can recharge underground aquifers. The decrease in surface albedo then causes more ice and snow to melt, decreasing the albedo even more and reinforcing the system.

This snow loss is coupled with climate change causing megadroughts throughout the US Southwest. Udall & Overpeck (2017) found the period 2000-2014 to be the worst 15 year drought on record in the Colorado River Basin. The average flow of the Colorado River during this period was 19.3% below the average flow from the between 1906-1999. The drought, which continues into 2022 as a 22 year drought, is a severe, multi-decade long drought called a “megadrought”. Ault et al (2016) modeled the risk of mega drought occurrences in the US Southwest throughout the end of the 21st century. According to their analysis, under a business as usual scenario in which emissions are not curbed to keep warming below 2°C, there is over a 99% risk that there will be a continued occurrence of megadroughts throughout the 21st century. Megadroughts, such as the one the Colorado River is currently experiencing, will therefore continue to occur throughout the next 100 years as a result of climate change, placing continued stress on the limited water resources available in the region.

Arizona’s Response to Drought

In 2000, the Colorado River entered into the worst drought conditions experienced in one hundred years of recorded history. Between the years 2000 and 2007, the river's reservoirs dropped from being near full to 55% capacity (US Bureau of Reclamation, 2007b). This megadrought brought to light the serious structural deficit built into the Colorado River compact. Under normal conditions, Lake Mead receives about 9 maf of water per year from tributaries and Lake Powell. However, in creating Lake Mead, the designers failed to realize that damming the river would increase the surface area of water exposed to heat and wind. Lake Mead now loses about 800,000 af to evaporation per year, which is about double Nevada's allocation from the river (Udall, 2017). Therefore, Lake Mead loses about 10.2 maf per year from supplying water to the lower basin states and evaporation, creating a deficit of 1.2 maf. The megadrought in the early 2000s intensified this deficit. Without intervention from the federal government to organize potential cuts to water users, it became likely the Lower Basin States would turn to litigation.

In 2007, the Secretary of the Interior along with the seven basin states agreed upon the 2007 Interim Guidelines detailing their response in the event a shortage is declared (Colorado River Research Group, 2015). A tier 1 shortage, as defined by the guidelines, is when water levels in Lake Mead are below or equal to 1075ft. California, being the first state of the lower basin states to appropriate water from the Colorado River, has priority water rights. Therefore, a tier 1 shortage results in cuts to Arizona and Nevada's water supply (US Bureau of Reclamation, 2007b). The Interim Guidelines also created a mechanism that allowed states to store water in Lake Mead to be used in future years. This initiative, called Intentionally Created Surplus, accounts for conservation initiatives implemented by states and the surplus in Lake Mead that these initiatives create, and allows states to access this surplus water in future years (Stern & Sheikh, 2021).

In 2016, water levels in Lake Mead dropped to 1071ft, and a shortage was narrowly avoided. The nearly avoided shortage brought into focus the ambiguous language that defines federal intervention in Colorado River management under a shortage scenario (Sullivan, 2019). The interim guidelines state, “the Secretary shall evaluate and take additional necessary actions, as appropriate, at critical elevations in order to avoid Lower Basin shortage determinations as reservoir conditions approach critical thresholds” (US Bureau of Reclamation, 2007b). The interim guidelines fail to define what the “additional necessary actions” are and the process for instituting cuts to state allocations in the event of a shortage. When the interim guidelines were originally implemented, the basin states agreed that their renegotiation would occur in 2020 (Colorado River Research Group, 2015). However, Lake Mead’s brief dip into a tier 1 shortage level and the lack of a clearly defined response incentivised states to begin this negotiation process in 2018. This negotiation process would lead to the 2019 Drought Contingency Plan (DCP).

The DCP negotiation process began with two separate negotiations between states in the lower basin and between states in the upper basin. As part of these negotiations, Arizona developed the Steering Committee, a group of SHs from tribal communities, municipal water agencies, agricultural organizations, and NGOs, to define Arizona’s priorities in the inter-state negotiation process. DCP negotiations came close to failure as the deadline for the agreement approached and Arizona, who had to first pass legislation in the state congress before their representative to the negotiations could sign the agreement, held up the process. In 2019, within minutes of the deadlines set by the DOI, Arizona passed the necessary legislation agreeing to the DCP conditions and allowing the state representative to sign the agreement (Stern & Sheik, 2021).

The DCP defines a tier 1 shortage as occurring when levels in Lake Mead are between 1,090ft and 1,045ft. A tier 2 shortage is defined as when levels in Lake Mead drop below 1,045ft. In the event of a tier 1 shortage, Arizona's allotment of water is cut by 192,000 af and Nevada's by 8,000 af. In the event of a tier 2 shortage, Arizona, Nevada, and California will all face cuts to their allotment amounting to 240,000 af, 8,000 af, and 200,000 af respectively (DCP Operating Agreement). Shortages are declared on January 1st of the year prior, after the Department of the Interior publishes its annual report on the operating levels of Lake Mead (USBR). Through clearly defined cuts to water users at different shortage levels, the DCP provided a much greater degree of certainty to the states and SHs on the process of implementing cuts in the face of a shortage.

The clarity provided by the DCP has proven useful, as a tier 1 shortage was declared for 2022, meaning Arizona and Nevada will both face cuts to their allocation of the Colorado River in the coming year. Although the DCP has defined the process of instituting water cuts under a shortage scenario, further challenges remain. As noted earlier, both the DCP and the interim guidelines are temporary plans that are set to expire in 2026. Plus, both agreements only dictate the process of protecting water levels in the Colorado River under emergency shortage scenarios, and do not create a long term plan to address the 2.2 maf deficit caused by evaporation in Lake Mead and the general overallocation of the Colorado River since the 1922 Colorado River Compact. In addition, climate change and increasing population will continue to increase stress on the water resources in the Southwest. To address these issues, the Department of the Interior will formulate a long term plan for conserving the Colorado River. The deadline for this plan is set to 2026, when the Interim Guidelines and DCP will expire, and many states have already begun formulating their agendas for the coming negotiations.

To organize the state’s agenda, Arizona has restarted the Steering Committee formed during the DCP negotiations, renaming it the ARC. The ARC will engage a variety of SHs in discussion in order to define Arizona’s priorities in the negotiations that will decide the future of conserving the Colorado River.

Table 1: Drought Guidelines for the Colorado River basin

Drought Plan	2007 Interim Guidelines	2019 Drought Contingency Plan (DCP)	2026 Operating Guidelines	AZ total cuts to allocation
Arizona SH Engagement Initiative	None	Steering Committee	Arizona Reconsultation Committee (ARC)	
SHs invited to participate	None	See appendix i	See appendix ii	
Tier 0 Shortage $\leq 1,090$	0	192,000af	-	192,000af
Tier 1 Shortage $\leq 1,075$	320,000af	192,000af	-	512,000af
Tier 2a Shortage \leq	400,000af	192,000af	-	592,000af
Tier 2b Shortage \leq	400,000af	240,000af	-	640,000af
Tier 3 Shortage \leq	480,000af	2400af	-	720,000af

Arizona’s Stakeholder Engagement

The ADWR created the Steering Committee to provide feedback on drafts of both the DCP and Arizona’s plan for implementing the DCP within the State. Thirteen meetings were

held between July, 2018 to February of 2019. These meetings were made up of 38 water professionals including members of ADWR, municipal water representatives, tribal leaders from three Arizona Tribal nations, and agricultural representatives, among others (see appendix i for full list of participants).

The first two meetings focused on creating a base level of understanding among participants. These meetings consisted of technical presentations to describe the state of the Colorado River, the policies already in place, and the structure of the SH engagement process. The first meeting dived into the hydrology of the Colorado River and the predicted effects of climate change on the river. The presentation then shifted to a discussion of the DCP, with questions being collected online from the SHs and members of the general public present. The following meeting addressed the questions collected. Note that the Bureau of Reclamation and the lower basin states had already created a potential draft of the DCP at the time these SH meetings began. SHs were not involved in the process of creating or informing the initial draft.

The following eleven meetings continued providing updates on hydrology and the status of operating guidelines, while also providing space for SH comments on the DCP draft. The meetings began with a brief introduction of each participant, followed by a presentation on the current levels of Lake Mead and Lake Powell. Then, the participants would focus on a selected section of the DCP draft for each meeting, and provide their concerns or desired changes to that particular part of the draft. These meetings lasted for up to three and a half hours, with the first two hours being dedicated to introductions and presentation materials, and the second hour and a half devoted to comments from participants.

ARC is structured almost identically to the Steering Committee, with the addition of a few new members and the Modeling and Analysis Work Group. ARC includes a representative

from the Tohono O’Odham Nation, the Gila River Indian Community, and the Colorado River Tribes, as the Steering Committee did, along with a lawyer from the Mohave County Water Authority to help represent tribal interests. In contrast to the Steering Committee meetings, as a result of COVID, ARC meetings are held virtually instead of in person. The committee is also accompanied by the Modeling and Analysis Work Group (MAWG). MAWG works on creating projections for the flow of the Colorado River in future years to help inform the Reconsulation Committee on different drought scenarios. With MAWG, the ADWR has the opportunity to include SHs in the knowledge generation process. All ARC members are invited to participate in MAWG meetings. Unfortunately, these meetings are not publicly available, making it difficult to assess their success in this endeavor, and signaling a lack of transparency in this part of the process. Apart from the addition of another representative to advocate for tribal nations and the formation of MAWG, the format for ARC meetings follow the same structure as the Steering Committee, with expert presentations followed by SH discussion.

Building an Inclusive SH Engagement Process

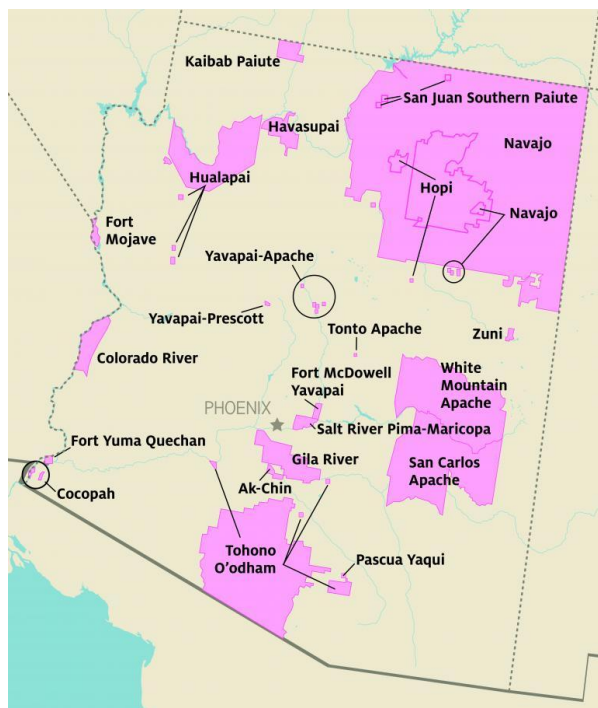
The inclusion of Indigenous SHs reflects some opening towards indigenous participation by the state of Arizona after tribal nations were completely excluded from the formation of the 2007 Interim Guidelines. According to Anne Castle, a legal expert and former Assistant Secretary of Water and Science at the DOI, tribal communities have been fighting for recognition and inclusion in Arizona’s SH engagement process since their exclusion from the Interim Guidelines. The Gila River Indian Community and the Colorado River Tribes were included on the Steering Committee, but their inclusion was largely influenced by the need for Arizona to strike a deal with these tribes to meet their DCP commitments. Arizona’s participation in the 2019 DCP was made possible through an agreement in which each tribe consented to leave

50,000 acre-feet of water in Lake Mead each year for three years. In exchange, each tribe will receive \$250 per acre feet, or \$12.5 million each year. At the time, this reduced the threat of a shortage being declared under the DCP that would result in cuts to Arizona's allocation from the Colorado River. According to Castle noted that:

“The Lower Basin, DCP agreement somewhat belatedly included some of the lower basin tribes, and interestingly, at least two lower basin tribes who were instrumental in contributing to the conditions that allowed the lower basin DCP to come together. They [the Gila River Indian Community and the Colorado River Indian Tribes] basically did deals for water that offset some of the reductions that Arizona was agreeing to take as part of the DCP. They made the whole thing work. But tribes were not initially involved in those discussions. They protested that exclusion and were able to achieve some broader participation, but it was not by any means all the tribes in Arizona. And I would say they didn't really shape the agreement” (Castle, 2022).

The Steering Committee ended up including these two tribes, along with the Tohono O'odham Nation, but it still excluded the 20 other federally recognized tribes located within Arizona. Recently, The ADWR has invited three tribes to participate in the ARC: The Gila River Indian Community, the Colorado River Indian Tribes, and The Tohono O'odham. These three tribes are members of the Intertribal Council of Arizona, an organization of 21 tribal nations located in Arizona that seeks to provide a united voice for tribal governments on common issues they are facing. The three tribes participating in ARC are expected to report back to the intertribal council on the affairs of ARC, and bring the concerns of the rest of the tribes to the table (Throssell, 2022). Although this demonstrates an attempted expansion of inclusion in the drought planning process, these three tribes are expected to be able to represent the voice of all 22 tribal communities in Arizona, who are each facing their own unique challenges and concerns.

Image 1: Federally Recognized Tribes in Arizona



Tribes in Arizona, and across the Colorado River basin as a whole, have been advocating for a spot at the table, as their exclusion has been the norm from the Colorado River Compact since its inception in 1922 to the 2007 Interim Guidelines. Tulley-Cordova explains the complexity of the situation indigenous groups are in:

“At least as far as participation is concerned, it has been a carbon copy since 1922. It was a federal and state process, tribes had no participation in that. And the real challenge now

is determining how you include people who were excluded previously? Granted, the history was that we should probably be dead because of the different orders that were done by the federal government to exterminate indigenous people. So those are hard conversations to have when you're the thorn in people's side for wanting to be included” (Tulley-Cordova, 2022).

Tulley-Cordova describes the resistance that exists within the state to include indigenous actors that further complicates an already complicated system as the state attempts to move away from a technocratic approach to water governance.

Castle describes the complexity the ADWR faces when engaging with tribal SHs in the state of Arizona. She says:

“And, you know, it's a difficult situation on both sides in that the state of Arizona has 22 tribes and, you know, you've got a Reconsultation committee that's like 15 or 20 people and you don't wanna double that by including every tribe and every tribe wouldn't participate, because they don't have the resources to participate. But, at the same time, you know, the white Mountain Apache will tell you that there's no way the Gila River Indian Community can represent their interest. And there's no organized forum that would allow a tribal representative or two or three

to be selected that would be empowered and required to represent the interests of more tribes” (Castle, 2022).

Including all the tribes on the ARC would double the amount of seats at the table. Importantly, Castle says not every tribe would even participate, specifically because they don’t have the resources.

On this point, Arizona was critiqued by indigenous SHs during the DCP process for not providing the resources required to facilitate the participation of tribal communities. In their article published midway in the DCP process, Sullivan et al (2019) pointed to socio-economic, distance, and time barriers that potentially deterred engagement in the Steering Committee meetings:

“While the meetings were formally open to any interested individual or group, they were largely held in the Phoenix, Arizona area and during multiple meetings, SHs mentioned traveling several hours to attend and have their voices heard. This was disproportionately mentioned by participants traveling from relatively remote Native American reservations in other parts of Arizona. Efforts were made to allow SHs to participate remotely, via teleconferencing, but it must be acknowledged that some interested SHs were likely excluded based on socio-economic variables that influence the ability to access either equipment or phone/internet connections required to participate remotely” (Sullivan et al, 2019).

They predicted that these barriers could lead to mistrust between SHs and between SHs and the state, and that this could undermine the success of DCP negotiations. Through interviews, Sullivan et al (2019) found significant disappointment among indigenous SHs. A representative of the Tohono O’odham nation expressed this sentiment saying, “Tribes were not consulted one bit on the DCP” (Tohono O’odham Nation Representative, June 2017; Sullivan et al, 2019). The Governor of the Gila River Indian Community stated in a letter to the CAP board: “... the board meeting appears to have been largely arranged, without prior consultation on schedules and I am unable to change my schedule...As an entity with both a Colorado River

water entitlement and entitlements from other water systems, the Community has a unique perspective on this need for coordination” (Governor of the Gila River Indian Community, June 2017; Sullivan et al, 2019).

Thomas Throssell, the outreach coordinator for tribal communities at CAP, described how the state of Arizona attempts to grapple with the challenges of engaging with tribal SHs. As part of his role at CAP, Throssell consults tribal members on how they wish the SH process to be structured and visits reservations to ask members “How do you want us to engage with you?”. He treats his role as an ambassador or delegation going abroad, respecting the sovereignty of tribal nations. The process of going to reservations and meeting with tribal members on their land is a valuable practice to counteract the barriers discussed above, as many of these individuals do not have the time or resources to travel to Phoenix for CAP’s public meetings (Throssel, 2022).

Unfortunately, this practice by Throssel as part of CAP’s general engagement with SHs was not institutionalized into the Steering Committee or ARC. As a part of these two specific SH processes, tribal members are still expected to either come to in person meetings, in the case of the Steering Committee, or attend virtually. Throssell explained virtual access to meetings does help tribal members who are located on remote reservations to join these discussions, but acknowledges internet access and technology remain as barriers to participation for low income individuals (Throssel, 2022). Arizona, specifically CAP, is working to meet with tribes on their land and receive their input on the engagement process, but the structure of the Steering Committee and ARC still include significant barriers to creating an inclusive participatory process.

ADWR's structure of participation for the Steering Committee did not demonstrate the flexibility required to be inclusive of a diverse set of SHs. Tribal representatives complained about poor efforts to accommodate schedules. They also complained about the lack of adequate consultation in crafting the DCP, as the DCP was already drafted by the time SHs were included in the process. SH meetings resulted in tweaks to a draft already created without their perspective having been included. This relates to the observations of Smyth et al (2020), Chief et al (2016), and Wehn et al (2016) that SH participation is necessary in all steps of the process, including the process of designing the structure of SH meetings, the knowledge generation process, policy drafting, and policy implementation. This not only allows for the perspective of SHs to inform the entire policy formation process, but also because it builds trust between SHs and between SHs and the state.

Policy Windows in Arizona and the Colorado River Basin

A series of water crises have occurred throughout the Colorado River basin that have sparked collaboration on policy solutions to current droughts conditions. Fleck & Castle (2022) express the stop and go movement of drought policy in the Colorado River Basin. They explain:

“In the Colorado River Basin, climate has played the role of a traffic light. When it delivers dry years, rapidly decreasing reservoirs create a “green light” condition to be monitored to a problem to be solved. The “red light” turns back on when a good snowpack delivers above-average flows to the reservoirs and refills depleted storage. The river game’s “green lights” and “red lights” create a classic opening and closing policy window, as described by Kingdon” (Fleck & Castle, 2022).

Castle & Fleck's analysis applies to the formation of the DCP, which the seven basin states and the DOI began the process of negotiating in 2014 after two years of constantly low runoff feeding the Colorado River (CRRG, 2020). The pressure to implement a drought plan intensified in 2016, when Lake Mead hovered at 1,071.56ft, a record low, reinvigorating DCP

negotiations that had begun to stagnate (Sullivan et al, 2019). In 2021, Lake Mead again reached dangerously low levels, dropping to 1061.55 ft, another record low and the lowest point the reservoir reached since its creation. 200 ft lower, and the reservoir would reach “deadpool” level at which water can no longer run through Hoover Dam to supply electricity to 1.3 million people across Nevada, Arizona, and California (Yetikyel, 2021). This recent drop in elevation, and the subsequent shortages declared by the DOI, highlighted the failings of both the interim guidelines and the DCP, and placed pressure on Arizona to begin discussions regarding the 2026 Operating Guidelines for the Colorado River. As Lake Mead stubbornly remains at critically low levels, the issue remains salient on the agenda of policy makers.

Social movements sparked by the COVID pandemic. Black Lives Matters and environmental justice have also contributed to an opening of a window of opportunity. This window of opportunity has the potential for the ADPW, on the state level, and the Department of the Interior, on the Basin scale, to increase equity in the SH engagement process and to expand water access on reservations. According to Castle:

“COVID really did shine a light on the disparity in access to clean drinking water on reservations. There was a lot of press attention to the disproportionate impact of COVID, both the hospitalization and deaths on reservations, and then some correlation, if not attribution, of that disparity to lack of access to clean drinking water. So all of that is happening and I think was influenced by the protests of the Black Lives Matter movement particularly after George Floyd's death.”

There is the convergence of two crises, COVID and drought, and at the intersection of these two crises lie indigenous communities who lack access to the clean water necessary to sanitize as recommended by the CDC. A report by the Water & Tribes Initiative, an organization formed to highlight the issues facing tribes in the Colorado River Basin, “Living in a Native household dramatically increases the odds of being plumbing poor, with Native households being 19 times more likely than white households to lack indoor plumbing with running water” (2021, pp. 15).

In 2021, tribal Nations were hit especially hard by the COVID pandemic, with the Navajo Nation surpassing the infection rates of hot spots like New York City. According to the report, “As of March 25, 2021, the Navajo Nation has had 30,031 confirmed cases and 1,243 deaths. With approximately 173,000 members residing on the reservation, the Navajo Nation is currently experiencing 17,359 cases per 100,000, nearly twice the national rate” (Water & Tribes Initiative, 2021, pp. 9). At the time of the outbreak, President Nez of the Navajo Nation stated, “the outbreak of COVID-19 on the Navajo Nation has largely been attributed to lack of water in the homes of Navajo people . . . clean water is a sacred and scarce commodity” (Water & Tribes Initiative, 2021, pp. 9). As Castle notes, COVID has spotlighted structural racism in the US and the lack of access to clean water on reservations for the general public and policy makers.

The connection drawn by policy makers and the general public between COVID and access to clean water has facilitated the distribution of targeted aid by the Federal Government in its COVID relief legislation. According to Tulley-Cordova:

“It's crazy that people have to die at a significant rate to be able to be acknowledged. So yes, the COVID 19 pandemic has a silver lining, meaning the correlation between COVID 19 cases and the correlation with water access. And so what it has helped with is being able to get funding through the Cares Act, the American Rescue Plan Act, and the Bipartisan Infrastructure law to develop that infrastructure”

As described in Chapter Two, most reservations hold a large share of “paper water” rights that require funding to build the infrastructure necessary to deliver this water to reservations. The explicit connection between water access and the COVID outbreaks centralized on reservations displayed the urgency of developing these water rights to the federal government. The Bipartisan Infrastructure plan freed up \$56 billion in small grants and low cost flexible loans for tribes and disadvantaged communities across the country to modernize water systems (Baltz, 2021). As drought and COVID emerged as two parallel crises, the spotlight shifted to highlight the

disparities of water access in Arizona, and allowed for targeted federal legislation to increase water access to underserved communities.

There has also been a shift to create more inclusive venues for indigenous participation in the drought planning process. Policy entrepreneurs have been busy putting together proposals to create new venues for indigenous participation in drought policy. Daryl Vigil is the water administrator of the Jicarilla Apache Nation and the co-facilitator of the Water & Tribes Initiative. In congressional testimony to the US Committee of Natural Resources, he proposed a framework for conducting the interstates negotiations that will result in the 2026 Operating Guidelines for the Colorado River. He proposes a Sovereign Governance Team made up of the seven basin states, the federal government, and the tribes of the Colorado River basin. Vigil says this could be created through a formalization of collaborative networks that are already forming: “This new paradigm has been emerging organically over the past decade in the form of many collaborations and partnerships among tribes, states, the federal government, SHs, and water users” (2021). He acknowledges that Arizona and other states in the Colorado River basin are moving towards collaboration in addressing issues of drought.

The connections being formed between the state and tribes needs to be institutionalized to create a venue that elevates tribal authorities to act alongside other sovereign powers. Currently, tribes are represented as SHs who participate in state level venues such as the ARC or the Steering Committee. The framework Vigil proposes would recognize the tribes as sovereign members to the same degree as states and the federal government, providing the tribes with the ability to directly influence the 2026 Operating Guidelines. Vigil argues, “Without this type of structure, tribes will continue to bear the impacts of the unrealistic expectation that federal and state sovereigns will effectively and responsibly represent tribal water interests along with their

own. Tribes themselves, not state and federal officials, are in the best position to advocate for and protect their own tribal interests" (2021). The Biden Administration will need to create a formal venue for conducting discussions on the 2026 Operating Guidelines that values states, tribes, and the federal government as equals. This will result in a governance structure that expands tribal sovereignty, instead of infringing upon it.

This chapter has laid out the case of Arizona as it engages SHs in the process of entering into interstate drought negotiations. Arizona has improved its SH engagement process by including more tribal voices in the decision making process, although scheduling, distance, and internet access remain as forces of exclusion to many tribal members. This shift towards a more inclusive SH engagement process resulted from persistent protests of tribal nations who have been historically excluded from participating in these venues. Along with this movement initiated by indigenous actors in Arizona, COVID and the Black Lives Matter movement have brought the attention of the state and federal government to the disparities of water access. These events have connected the issues of drought, water access, and public health in the eyes of the public and policy makers, loosening up much needed funding to move paper water rights to wet water. The availability of funding, the severity of drought, and the increasing public interest in disparities to water access have created a receptive political environment for implementing more inclusive structures for participation in the drought planning process. Lead actors such as Dryl Vigil have crafted new proposals for structuring the governance of the Colorado River Basin that emphasize the sovereignty of tribal nations by empowering tribal nations to enter into negotiations with the seven basin states and the federal government as equal players.

Chapter 4: Analytic Conclusion

The governance of the Colorado River Basin has shifted toward a more adaptive approach. Adaptive governance emphasizes the process of monitoring the effects of policies and making adjustments based on the knowledge gained through this process (Cosens & Williams, 2012; Folke et al 2005). In the case of Arizona, the Department of the Interior constantly monitors and reports on levels of Lake Mead and Lake Powell. Through this process, the DOI was able to recognize the 2007 Interim Guidelines were ineffective in addressing water loss in Lake Mead, and initiated discussion to create the DCP to address the weaknesses they found. As noted earlier, both the DCP and the 2007 Interim Guidelines are set to expire in 2026, allowing for a new set of operating guidelines to be put in place. By setting an expiration date, the DOI has institutionalized flexibility in their drought response, so problems discovered by monitoring the effectiveness of past policies can be addressed through updated operating guidelines. This displays the flexibility necessary for a governance structure to adapt to the unpredictable challenges that arise when managing drought.

An adaptive governance framework also emphasizes the role of SHs and recommends them to be included across the entire policy process. Including the perspective of SHs in crafting the SH engagement process builds trust between SHs, and between SHs and the State (Smyth et al, 2020; Wehn et al, 2018). Arizona has taken steps to move away from a technocratic approach to water governance. The Steering Committee and ARC display a departure from the top-down process that resulted in 2007 Interim Guidelines, in which indigenous SH were completely excluded.

However, both the participatory structure of the Steering Committee and ARC are limited by many of the issues identified by critiques of IWRM. These include a lack of recognition of

power imbalances between SH and the variety of barriers that can contribute to the exclusion of marginalized groups from participating SH meetings (Saravanan et al, 2009; Butler & Adamowski, 2015). Participatory processes under an AG framework encourages the role of the SH, not only in the process of policy drafting and revision, but also in the design of the SH process itself and the knowledge production being performed by the state.

These challenges identified in the literature reflect the structure of SH engagement in Arizona. In 2016, the Steering Committee was presented with a draft of the DCP already created by the basin states and the DOI, and were not consulted on the structure of the Steering Committee itself. The experience of participating in the Steering Committee resulted in SHs having little trust in the participatory process and feeling their perspective was not valued by the state. This sentiment was expressed by tribal leaders, who felt they're schedules were not taken into account when the ADWR was setting up Steering Committee meetings and their input did not have a significant impact on the final policy.

The SH engagement process in Arizona also failed to accommodate the needs of marginalized SHs and facilitate their participation. In addition to not acknowledging the time constraints of tribal representatives, the Steering Committee required participants to commute from remote reservation to Phoenix for meetings. Although participants are able to participate virtually in the Steering Committee and ARC, limited internet access or not having the necessary technology can still limit the participation of low income SHs.

The second round of SH engagement in Arizona, ARC, has made some efforts to address the challenges present to marginalized groups in the Steering Committee. The addition of a modeling and analysis group (MAWG) demonstrated the state's effort to further engage SHs in drought modeling and expand their understanding of the issues facing the Colorado River.

ADWR also invited another member to represent tribal interests on ARC, displaying an attempt to expand indigenous representation on the committee. These steps demonstrate growth, but ARC still fails to address the scheduling conflicts and the barriers to internet access present in previous stakeholder engagement initiatives.

The case of Arizona also demonstrates that the state is motivated to create participatory venues when it sees the transactional value of including SHs. The Gila River Indian Community and the Colorado River Tribes were belatedly added to the Steering Committee when the ADWR saw the DCP negotiations would fail without their support. Since these two tribes were able to commit to leaving 50,000 acre-feet of water in Lake Mead for three years, Arizona was able to meet its commitments under the proposed DCP guidelines. Only after recognizing how Arizona would benefit from including tribal representatives did the state make the effort to include them on the Steering Committee. One benefit to this transactional lens, is that it is likely that the state will continue to open up drought discussions to tribal members in the future since tribal nations in Arizona have the highest priority water rights in the state, and have claims to a significant amount of water from the Colorado River. Deals such as the one struck between Arizona and these two tribes allow Arizona to meet its commitment to interstate agreements, while buffering the impacts of water cuts on farmers and other SHs.

A clear policy window is currently open for increasing the adaptive structures of governance in Arizona and the Colorado River Basin as a whole. Sudden and potentially harmful occurrences act as focusing events that draw the attention of the public and policy makers to pressing issues (Birkland, 1997). These events play a pivotal role in motivating change in the Colorado River basin, with extreme drought conditions and Lake Mead's near deadpool levels prompting discussion between states and SHs within the Colorado River basin to create

solutions. Focusing events have coupled with other crises, such as COVID, and with social movements, such as BLM, causing the public and policymakers to view water access from an environmental justice lens. The federal government has passed targeted legislation as a result of this shift, helping to provide much needed funding to expand access to water on reservations. This demonstrates the role focusing events and social movements have in bridging the three streams described by Kingdon (1984) to create policy change, and in reframing problems to influence the formation of new policies.

The window of opportunity remains open in Arizona and the Colorado River basin. The recent tier 1 shortage declared by the Bureau of Reclamation in 2021 has affirmed the state's fears of facing the consequences of drought. The two drought plans operating, the 2007 Interim Guidelines and the 2019 DCP, are set to expire in 2026. With this deadline looming, a new system for governing the Colorado River must be agreed upon by the basin states and the DOI. With COVID and BLM spotlighting the inequalities present in the current water governance regime, the federal and state government is faced with pressure to both create operating guidelines that continue to provide funding for expanding water access on reservations and to design a governance structure that includes indigenous voices. Policy entrepreneurs have proposals ready to match with the pressing problems facing the state. For example, the Sovereign Review Board proposed by Daryl Vigil would provide a new framework for governing the Colorado River that expands tribal sovereignty by recognizing tribal nations as equal to the seven basin states. Existing problems, targeted policy solutions for these problems, and the building pressure on policy makers to enact change have created the potential for expanding adaptive and inclusive governance in the Colorado River basin.

The case of Arizona as a state engaged in the ongoing process of adapting to persistent drought in the Colorado River basin demonstrates the ability of governance structures to rapidly change as a result of the right political environment. Drought will remain a persistent problem in the basin as a result of climate change, and governance structures will continue to change in response to the unpredictable hydrology of the future. Arizona has continued to disappoint indigenous SHs who have been historically excluded from discussions surrounding water governance. Significant barriers remain that block their full engagement in the SH process. However, pressure from tribal communities and environmental justice movements have allowed a few tribes a seat at the table. As the governance of the Colorado River basin continues to change and adapt to drought, the opportunity remains for the state to learn from previous failures to engage indigenous SH and to create venues of participation that recognize and expand indigenous sovereignty.

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Appendix i: List of Full Participants on the Steering Committee

Delegates, Affiliation, (Alternante)

Co-Chairs

Tom Buschatzke, Arizona Department of Water Resources, (Clint Chandler)

Ted Cooke, Central Arizona Project, (Suzanne Ticknor)

Municipal

Kathryn Sorensen, City of Phoenix Water, (Cynthia Campbell)

Timothy Thomure, City of Tucson Water, (Andrew Greenhil)

Brian Biesemeyer, City of Scottsdale Water, (Kathy Rall)

Javier Setovich, City of Goodyear Public Works, (Dan Cotterman)

Joe Gysel, EPCOR Water US, (Troy Day)

William Garfield, Arizona Water Company, (Fred Schneider)

Joseph Olsen, Metropolitan Domestic Water Improvement District, (Wally Wilson)

Lois Wakimoto, Mohave County, (Jamie Kelley)

Agriculture Paul Orme, Pinal County Agriculture, (Dan Jones)

Wade Noble, Yuma Agriculture, (Meghan Scott)

Shane Leonard, Maricopa County Agriculture/Roosevelt Water Conservation District, (Richard Strader)

Jay Whetten, Arizona Cattlemen's Association, (David Brown)

Agriculture

Stefanie Smallhouse, Arizona Farm Bureau, (Chelsea McGuire)

Brian Wong, Pima County Agriculture/ Southern Arizona Water Users Association, (John Kmiec)

Home Builders/Development

Spencer Kamps, Home Builders Association of Central Arizona, (Rob Anderson)

David Godlewski, Southern Arizona Home Builders Association, (Dennis Rule)

Cheryl Lombard, Valley Partnership, (John Graham)

Ted Maxwell, Southern Arizona Leadership Council, (Kip Volpe)

Glenn Hamer, Arizona Chamber of Commerce, (Courtney McKinstry)

Tribes

Chairman Dennis Patch, Colorado River Indian Tribes Vice Chairman, (Keith Moses)

Chairman Edward Manuel, Tohono O'odham Nation, (-)

Gov. Stephen Roe Lewis, Gila River Indian Community, (-)

Industrial

Sandra Fabritz, Freeport-McMoRan, (Richard Bark)

NGO

Ted Kowalski, Walton Family Foundation, (Kevin Moran)

Miscellaneous

David Roberts, Salt River Project, (Chuck Podolak)

Virginia O'Connell, Arizona Water Banking Authority, (Terri Sue Rossi)

Laura Grignano, Central Arizona Groundwater Replenishment District, (Perri Benemelis)

Legislative Leadership

Sen. Gail Griffin, Arizona State Senate, Legislative District #14 Jeff Kros

Sen. Lisa Otondo, Arizona State Senate, Legislative District #4 Sen. Andrea Dalessandro

Rep. Rusty Bowers, Arizona House of Representatives, Legislative District #25, (Rep. David Cook)

Rep. Rosanna Gabaldon, Arizona State House of Representatives, Legislative District #2, (Andrew Loucks)

Central Arizona Project Board Champions

Lisa Atkins, Board President, Central Arizona Water Conservation District, (Jim Holway, Vice President)

Karen Cesare, Central Arizona Water Conservation District Pima County, (Mark Taylor)

Governor's Office

Kirk Adams, Governor's Office, (-)

Hunter Moore, Governor's Office, (-)

United States Bureau of Reclamation

Leslie Meyers, US Bureau of Reclamation, (Lisa Lance)

Appendix ii: Arizona Reconsultation Committee (ARC) members

Delegates, Affiliation, (Alternante)

Co-Chairs

Tom Buschatzke, Arizona Department of Water Resources, (Clint Chandler)

Ted Cooke, Central Arizona Project, (Patrick Dent)

Municipal

Cynthia Campbell, City of Phoenix Water Services

Timothy Thomure, City of Tucson Water, (Andrew Greenhill)

Brian Biesemeyer, City of Scottsdale Water, (Gretchen Baumgardner)

Javier Setovich, City of Goodyear Public Works, (Gretchen Erwin)

Joe Gysel, EPCOR Water US, (Troy Day)

William (Bill) Garfield, Arizona Water Company, (Fred Schneider)

Joseph (Joe) Olsen, Metropolitan Domestic Water Improvement District, (Wally Wilson)

Agriculture

Paul Orme, Pinal County Agriculture, (Dan Jones)

Wade Noble, Yuma County Agriculture, (Meghan Scott)

Shane Leonard, Phoenix AMA Agriculture, (Richard Strader)

Billy Elkins, Arizona Cattlemen's Association, (David Brown)

Stefanie Smallhouse, Arizona Farm Bureau, (Chelsea McGuire)

Brian Wong, Pima County Agriculture - SAWUA

Homebuilders/ Development

Spencer Kamps, Home Builders Association of Central Arizona, (Rob Anderson)

David Godlewski, Southern Arizona Home Builders Association, (Dennis Rule)

Cheryl Lombard, Valley Partnership, (John Graham)

Ted Maxwell, Southern Arizona Leadership Council, (Kip Volpe)

Vacant, AZ Chamber of Commerce & Industry, (Courtney Coolidge)

Tribes

Chairwoman Amelia Flores, Colorado River Indian Tribes, (Keith Moses)

Chairman Ned Norris Jr., Tohono O'odham Nation, (-)

Governor Stephen Roe Lewis, Gila River Indian Community, (Jason Hauter)

Chairman Jamie Kelly, Mohave County, (-)

Industrial

Sandra (Sandy) Fabritz, Freeport-McMoRan, (Richard Bark)

NGO

Kevin Moran, Walton Family Foundation, (Ted Kowalski)

Miscellaneous

David (Dave) Roberts, Salt River Project, (Colette Moore)

Virginia O'Connell, Arizona Water Banking Authority, (Simone Kjolsrud)

Laura Grignano, Central Arizona Groundwater Replenishment District, (-)

Legislative Leadership

Sen. Lisa Otondo, AZ State Senate Legislative District #4, (Sen. Andrea Dalessandro)

Sen. Sine Kerr, AZ State Senate Legislative District #13,

Rep. Gail Griffin AZ State Senate Legislative District #14, (Rep. Rusty Bowers)

Rep. Reginald Bolding, AZ State House of Representatives, LD #27

Central Arizona Project Board Champions

Terry Goddard, CAWCD Board President, (Mark Taylor)

Jim Holway, CAWCD Board, (Jennifer Brown)

Office of the Governor

Chuck Podolak, Office of the Governor

United States Bureau of Reclamation

Leslie Meyers, United States Bureau of Reclamation, (Lisa Lance)