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Demystifying the complex nature of water availability and access in the Southwest

Introduction

Water availability and access in the American Southwest has long been shaped by a complex mix of historical, legal, and environmental factors. The West as a whole has developed unique water management systems in an effort to address both the scarcity of water resources and the growing demands from urban, agricultural, and industrial sectors. The efficacy and nature of these structures are under pressure from a changing climate, evolving social values and perceptions, and a shifting landscape of water policy at several jurisdictional levels. In this report, we explore these interwoven issues with a focus on how legal frameworks, resource management strategies, and climate-induced challenges intersect around water governance in the Southwest.

Historical Overview of Water Allocation in the American Southwest

In the American East the dominant doctrine of surface water allocation is the riparian system. This doctrine, which conveys water rights to those who own property adjacent to a body of water, is understandable considering the gradual development and plentiful precipitation that characterizes the Eastern states. In the American West, the doctrine of prior

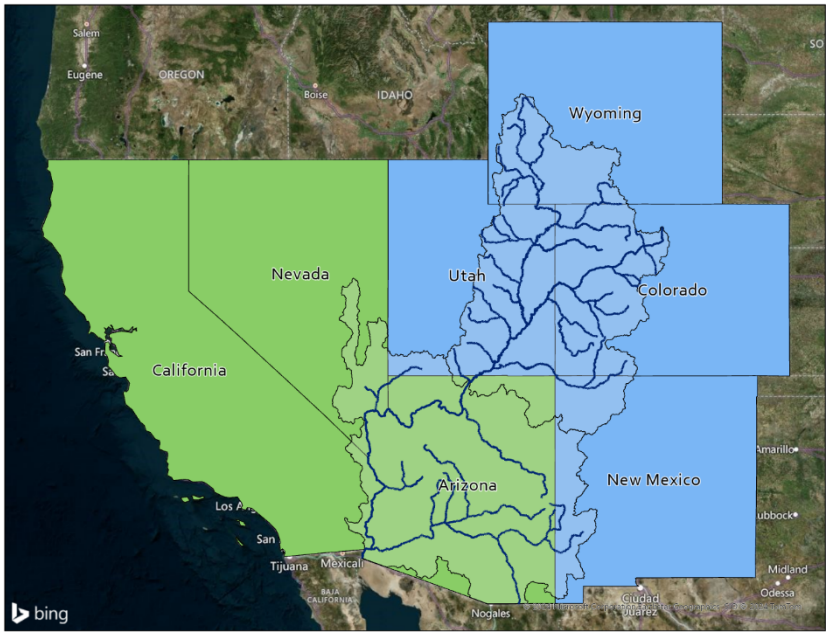

Figure 1 Map of the Colorado River and drainage. Blue represents Upper Basin state and green represents Lower Basin states.

appropriation is the most prevalent management of water allocations. Prior appropriation is based on the principle of "first in time, first in right," requiring claims of water usage and allocating seniority and usage based on the date and amount of first water use. This doctrine originated during the gold rush of the 19th century in California from the need to divert water for mining operations (Megdal, et al. 2011). The sudden and rapid development of the arid and expansive Western states created the need for such a doctrine to support water appropriations that did not depend on the land ownership principles that governed the East.

With the Arizona Organic Act of 1863 the Territory of Arizona was established. In 1864 the Howell Code was the first set of legislation governing the territory. The Howell Code established a broad set of laws and policy covering social, economic, administrative, military, and criminal regulations. Among them, Arizona adopted and formalized a variation of the prior appropriation doctrine for surface water (York et al., 2020).

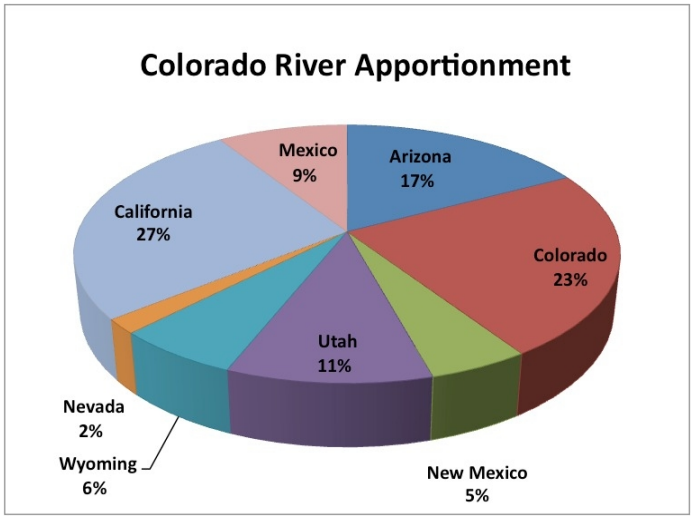

Figure 2 Colorado River water allocation by basin state. Source: Nature Conservancy Magazine

In 1922, the Colorado River Compact codified water distribution of the Colorado River among the seven Upper and Lower Basin states. There were significant concerns about this agreement between the Upper states, where most of the Colorado River water originates, and the Lower states, where demand was the fastest growing. The Upper Basin states were concerned that major proposed development projects downstream, like the Hoover Dam, would deprive them of seniority and access to water because of the doctrine of prior appropriation. The Lower Basin states were in turn concerned about having enough resources to support the fast-growing population and industries that required plentiful water, mainly agriculture and mining. A roughly equal division of 7.5 million acre-feet (maf) for both Upper and Lower Basin states was established as part of the Compact (Bureau of Reclamation, 2008).

The Boulder Canyon Project Act of 1928 followed up on the terms set by the Colorado

River Compact by allocating the Lower Basin's 7.5 maf among the Lower states, as well as establishing funding for the construction of a 20 maf reservoir that would become the Hoover Dam in Black Canyon (Bureau of Reclamation, 2008). Arizona received 2.8 maf or 37% of the Lower basin state allotment.

Most states in the Southwest also manage groundwater resources under similar principles of prior appropriation. California maintains a system of correlative rights and reasonable use. Arizona is the only Southwest state to have a blanket policy of reasonable use. The Arizona Groundwater Management Act of 1980 established active management areas (AMAs) and irrigation non-expansion areas (INAs) in areas of heavy reliance on groundwater withdrawal. Different AMAs were established with different goals ranging from net safe-yield of groundwater supplies to sustainable use practices aiming to extend agricultural economic use for as long as possible (ADWR, 2022; Megdal et al., 2011). For the Phoenix, Prescott, and Tucson AMAs, where the primary pressure on groundwater is population growth, the main management goal is safe-yield by 2025. Safei-yield is a long-term balance of annual groundwater inflow versus outflow. A major component of reducing groundwater outflows has been the conversion of agricultural land to high-demand residential areas, and the elimination of irrigated agriculture expansion. Recent evidence has shown reductions in aquifer overdraft and reduced subsidence of land thanks to growing recharge (ADWR, 2022; York et al, 2020).

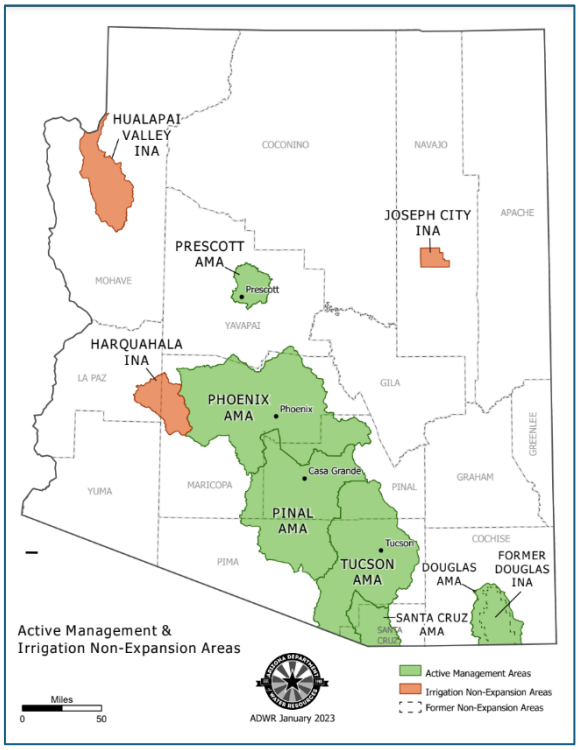

Figure 3 Active Management Area map of Arizona. Source: Arizona Department of Water Resources

Water rights and access in Arizona

State management and administration

State, federal, and tribal entities take up many roles in water resource management. The roles vary on jurisdictional scale, but ultimately all impact water availability and access in the Southwest in a variety of ways. State water laws are generally the most impactful when it comes

to water allocation and administration within the Southwestern states. The previously discussed doctrines of surface and groundwater rights, and state legislation like the Arizona Groundwater Management Act, are the primary devices that determine water access.

Arizona legal code states that "[the] waters of all sources, ... whether perennial or intermittent, ... belong to the public and are subject to appropriation and beneficial use" (Arizona Revised Statutes § 45-141). The doctrine of prior appropriation effectively makes water a private resource, prioritized to senior rights that have the most benefit from what should be a common-pool resource. During shortages junior water claimants are the first to reduce usage so as to not infringe on senior claims. The reduction is not spread equally across users of the resource, and the nature of the claims system limits newer users from gaining stake in sustainable use of the resource (Owen, 2017).

The Arizona definition of water as a public resource is in alignment with the historic common law doctrine of public trust for the management of natural resources. The public trust doctrine protects natural resources, like water, from intrusion of private property rights onto public rights. Traditionally this was for protection for fishing, navigation, and commercial purposes, but evolved in the twentieth century with growing environmental values to encompass recreational and ecological values as well (Megdal et al., 2011). In Arizona, the public trust doctrine is largely restricted to navigable waterways and water resources with commercial value. In 1992 the Arizona Navigable Stream Adjudication Commission (ANSAC) was established to make these determinations and continues to serve a role in adjudicating (ANSAC, n.d.). If the channel is determined not to be navigable then private land ownership rights supersede the public trust doctrine. The State would then have to pursue surface water appropriations through the same claimants process as any other entity.

In California the Supreme Court determined, during a 1983 case centered on diversions for power and water from Mono Lake, that the state's duty to protect public trust resources may supplant existing water use and rights. The case established a precedent of "continuing supervisory control" allowing them to revisit water allocations later as needed to protect environmental values (Megdal et al., 2011; Schlager and Blomquist, 2001). In contrast, the Arizona state legislature attempted to undermine the public trust doctrine and separate water resources and adjudications from its purview. The Arizona Supreme Court however found this amendment unconstitutional in 1999, and reinforced the public trust doctrine as a constitutional

check on the legislature's power (Megdal et al., 2011). This precedent supports the possibility of future water protections in Arizona based on public trust requirements of the State rather than relying on appropriations of water for environmental flows.

Federal governance and regulation

There are several ways that the federal government takes on participatory or governing roles in water throughout the Southwest. Federal legislation, such as the Clean Water Act, the Endangered Species Act, and the Wild and Scenic Rivers Act affect environmental, energy, economic, and public health water use management. Some legislation influences water regulation as one component of a greater management directive, while others directly empower the federal government with water rights.

The primary goal of the Clean Water Act (CWA), enacted in 1977, is to control point sources of pollution in surface water and require states to develop water quality standards (Zellmer, 2012). The CWA does not directly regulate groundwater contamination. A secondary component of the CWA is to establish Outstanding National Resource Waters (ONRWs) which are subject to strict protections to mitigate degradation. The Endangered Species Act (ESA) of 1973 compels federal land management agencies to consider listed species and associated critical habitat when making management decisions.

The Wild and Scenic Rivers Act of 1968 and Wilderness Act of 1964 both have roles in shaping federal water rights, particularly in the realm of natural resource management and conservation. The Wild and Scenic Rivers Act specifically and explicitly grants federal water rights for rivers that receive this designation. The justification for the right is in order to maintain the "outstandingly remarkable values" of the designated reach. The Wilderness Act is less direct and does not specifically grant federal reserve water rights. Rather, it restricts human development and activity that would impair the natural, recreational, scenic, or solitary character of the wilderness. Judicial precedent has however recognized implied reserve water rights for areas protected by the Wilderness Act based on the necessity of water to fulfill the Act's purpose of preserving natural and wild characteristics (Weiss, 1998; Zellmer, 2012).

The weak legal basis for water rights granted by the Wilderness Act has sometimes instead led to conflict and controversy over legal interpretation of the act and scope of rights. The Supreme Court case United States v. New Mexico (1978) covered the U.S. Forest Service's

claim for instream flow rights in a wilderness area of the Gila National Forest for ecological and recreational purposes. The court's decision was that these were not in line with the primary purpose of national forests, timber production and favorable flows for settlement, as established by the 1897 Organic Administration Act. Claims for secondary purposes, like instream flows for habitat, require the federal government to submit claims and apply for water rights like any other user (Weiss, 1998).

A result of this conflict is that Congress now often addresses the water rights issue when designating new wilderness areas. The establishment of the 1993 Colorado Wilderness Act included a determination that headwaters upstream of the wilderness, and the wilderness area themselves, lacked opportunity for development and so reserve water rights were not claimed for these areas (Weiss, 1998).

The case-by-case examination of the water needs of wilderness areas is a productive and forward-thinking step. It also allows for vulnerabilities when information for the area is incomplete or lawmakers make decisions based on their opinions and personal experiences rather than scientifically grounded truth. Wilderness areas in Arizona rely heavily on groundwater for sustaining base flow throughout the year. This makes them susceptible to groundwater pumping and development impacts in neighboring areas that have been overlooked during their protected designation.

Retaining water in streams and rivers supports natural flow regimes, and the species that rely on that water, food, or habitat as part of its reproductive life cycle. In the arid Southwest, that is not limited to aquatic and riparian species. Upland desert life also relies on connectivity and access to water (Mott Lacroix et al., 2016). Upland ecosystems that support listed species have become a high priority, which has led to confederal-state water conflict. The doctrine of prior appropriation necessitates that water is diverted for a beneficial use in order to establish the claim, and as such instream flows went entirely unrecognized. The rise in environmental values and associated environmental legislation in the 1970's made instream flows a priority for management agencies, and a topic of public interest.

Tribal rights and access

Tribal water rights are rooted in the Winters doctrine, as established by the 1908 Supreme Court case Winters v. United States. The core point of the Winters doctrine is that when the

United States established reservations for tribal communities they implicitly reserved water to fulfill the needs of the reservation (NNWRC, n.d.). These water rights are federal reserved water rights that supersede state and private rights within a basin. Tribal water rights have priority dates of the date the reservation was established, which make them senior to most other rights within a basin, and are not subject to loss due to non-use (Nabhan et al., 2023).

A unique element of tribal water rights is that after being established they still must be quantified, typically through negotiated settlements among the tribe, state, and federal government. Methods of quantifying water needs have varied throughout history such as determining potential irrigable agricultural land area, or by determining the amount necessary for developing of concentrated communities (Nabhan et al., 2023). Negotiated settlements are the preferable method for quantification of tribal rights by nearly all parties involved. The alternative is a litigation process through state and federal courts that tribes are hesitant to participate in for fear that an unfriendly court system will not evaluate their claims fairly.

Historically tribes have not been invited to participate in Colorado River water governance discussions and negotiations, despite many having direct ties and rights relating to the river. In 2007 the Colorado River Interim Guidelines were negotiated among state and federal agencies to manage and plan for uncertain availability of water in the Colorado River. The effects of climate change on the hydrology of the river began to become apparent and guidelines needed to be established to sustain the multiple uses of the river and reliant communities.

There were no tribes invited to participate in these negotiations despite their clear legal and social ties. Only in 2018 were tribal representatives included in the drafting of the Drought Contingency Plan (DCP). The Gila River Indian Community (GRIC) and Colorado River Indian Tribes (CRIT) ended up being pivotal to the success of the DCP by proposing a lease of over one billion cubic meters of water to the Central Arizona Groundwater Replenishment District (CAGRD). This provision led the private sector housing and economic development stakeholders to back the DCP, as it enabled homebuilders to continue to be able to demonstrate 100 year water supply (York et al., 2020; Nabhan et al., 2023).

Tension surrounding issues of competition and sovereignty continue to pose very real challenges to cooperative governance of water in the Southwest involving tribal entities. Interviews with non-tribal agriculturalists found common framings of distrust and negative

connotations relating to tribal agriculture posing a threat to their future water access (York et al., 2020). During DCP negotiations GRIC refused to support a proposed lease of their water to Pinal county agriculture because of an existing water rights conflict on the Gila River. The Arizona House of Representatives Speaker Russel Bowers responded to this with anger, saying "[this] is just showing their mentality to everybody who gets in their way… it's [their] way or no way" (York et al. 2020).

Tribal rights in the Southwest are still part of a changing landscape. In Arizona the Navajo, Hopi, San Juan Southern Paiute, and Yavapai-Apache tribes are currently engaged in settlement agreements that would finalize the quantification of their tribal water rights. These settlement agreements would allocate tens of thousands of acre-feet per year of water to the various tribes. The agreements also encompass the construction of pipelines and public water distribution systems to supply water to reservation communities (NNWRC, 2024). Several other federally recognized tribes have not yet begun to seek quantification and settlements as they wait for a favorable political landscape.

Solutions for more sustainable water management

Conjunctive water management in the Southwest

During the expansion period of the West, the typical response to limited water availability was the construction of massive dams, reservoirs, and distribution systems. These are no longer viable due to cost and immense ecological impact. Alternative means of increasing water supply have considerable potential to address deficits in the current political and cultural disposition. Especially where many institutions have begun to prepare and plan for the growing effects of climate change and ever-growing population demands.

Conjunctive water management refers to coordinated use of surface and groundwater. The goals are to lower costs of use, decrease environmental costs, and increase water resource reliability. The manner in which these management schemes can be implemented are often framed by the existing regulations and institutional arrangements present at the state level. Examples of conjunctive water management in Colorado and California and their associated challenges are examined by Schlager and Blomquist (2001) in *Protecting the Commons*. It presents potential for application in Arizona and other states experiencing high demand and unreliable supply.

Efficient and coordinated water use can reduce vulnerability to prolonged drought. It can meet peak water demands with fewer facilities and lower energy costs. Groundwater can supplement surface water flows to meet claims. Overdraft of groundwater can be reduced by returning water to aquifers. Conjunctive management methods include incentivizing surface or groundwater use based on availability. Groundwater can be used to augment surface flows. Surface water storage can support groundwater resources. Storing surface water underground can free up facilities for recharge and flood control (Schlager and Blomquist, 2001).

The applicability of conjunctive water management strategies varies greatly depending on physical characteristics. This may include precipitation, permeability of soil, and aquifer storage capacity. Conflict can emerge between users that rely primarily on groundwater or surface water rather than both, and who perceive new uses as potentially threatening their resources. The greatest impediment to conjunctive water management however is the existing rights, administration, and entities that manage water within a state. Separate systems and multiple levels of governance with potential for conflict creates uncertainty for some water users regarding the security of their rights under new conjunctive use strategies. This can deter some users from participation even when the outcome is likely to be advantageous to their water use (Schlager and Blomquist, 2001, p. 140, 144).

Colorado is somewhat unique among Western states in that claims and appropriations are administered at local jurisdictional levels rather than a state agency. The state of Colorado also recognizes the hydrologic connectivity between groundwater and surface water. The way in which water is enforced makes it such that conjunctive management projects in Colorado have been possible on smaller, basin-scales. Local water user associations and municipalities have participated in management projects like intentional pumping and storage in upstream reservoirs in order to ensure surface flow is available for downstream users throughout the year (Schlager and Blomquist, 2001).

In California surface and groundwater are managed and adjudicated by a highly complex collection of doctrines, and administered by a variety of local and state authorities. Three of the largest surface water systems are excepted from the typical prior appropriation doctrine because their flows are controlled by large scale water storage and hydropower projects. Conjunctive management projects in California are typically larger scale and often implemented as underground storage of surplus surface or imported water to serve high demand urban areas.

These kinds of flow augmentation and replacement projects allow for coordinated use of the two different water resources depending on availability and need, but are far from a long-term fix as they remain subject to the seniority arrangement of the prior appropriation doctrine. In the event of sustained drought these agreements are likely to fail as senior claimants defend their rights, and junior holders must fight for adequate access to meet their needs, rather than continuing to work collaboratively to sustain multiple uses (Schlager and Blomquist, 2001, pp. 141-150).

A prime example of conjunctive management strategy applied in Arizona is the Arizona Water Banking Authority (AWBA). The AWBA was established in 1996 to mitigate groundwater depletion and prevent future shortages that would impact water users. The primary method employed by the AWBA is incentivization of aquifer recharge, similar to the aforementioned projects utilized by California to store surplus water. Unused surplus of Arizona's Colorado River surface water allocations can be banked in central and southern Arizona aquifers for storage. Users are incentivized to store water during times of surplus. Long-term storage credits allow those users to later withdraw water, or trade and sell the right to water, during times of shortage to avoid increased costs associated with shortage (Milman, et al. 2020).

Complexity in institutions and regulations is arguably becoming a barrier to implementation of these sorts of projects. The organizational structure of water administration means that projects will necessarily include major state water operators, regional water contractors, and local water supply agencies. The institutional arrangements surrounding these agencies that moderate flows and storage mean that conjunctive management projects generally must accommodate all of their varying interests in order to be implemented. (Schlager and Blomquist, 2001, pp. 156-157).

Climate Change Impacts to Future Water Availability

In the often drought stricken Colorado River states, the impacts of climate change are especially profound when it comes to their considerably scarce water resources. These climate related impacts tend to take the form of reduced snowpack and evaporation which the Colorado River so greatly depends upon (Gao et al., 2011). Without this crucial input, the flow of the river stands to endure a reduction in flow, with the potential for significant drought years that may further stress the system. With current consumption levels already placing immense stress on the

river, the potential for devastating alterations to its ecology remains a potent possibility. It is worth noting that the Colorado River has already experienced many years of poor flow, a trend which is likely to continue under current climate projections (Water Education Foundation, 2024). This is of notable concern to the states which utilize the river extensively in their current models of consumption. Additional stresses placed upon this already scarce resource is likely to result in longstanding resource shortages with a variety of system-level impacts.

Despite the growing limitations to water supplies in these states, it is presumed that their resource demands are bound to increase in future years. With growing populations, particularly in the state of Arizona, the possibility of continually lowering water consumption rates becomes especially challenging (). With Colorado River water being utilized for a variety of Arizona's municipal and agricultural purposes, these continually diminishing supplies of water are greatly concerning. Reliance upon the provisions of the river has led to struggles to effectively partition water amongst these sectors, a struggle which may be bound to continue should current conditions continue to worsen (Water Education Foundation, 2024). With the state struggling to effectively and sustainably provide water for its current population, the impacts of continued shortage and population growth start to compound and complicate the conflict management process. While it may be possible to explore other avenues of water collection, many of these may not be sustainable and further reduce water availability in the long term.

With the need for water to fuel municipal and agricultural needs, the impacts of reduced water availability may be most evident in the riparian ecosystems of the Colorado River states. These ecosystems were already known to be undergoing stress, which may be exacerbated by climate projections and a lack of sustainable development in water usage (Gao et al., 2011). The reduced flow and continued overconsumption of the river's water is likely to cause irreparable damage to plant species already undergoing additional stresses. This is also the case for many fish species of the Colorado River, with species such as the razorback sucker and Colorado pikeminnow requiring healthy flow to flourish (Dibble et al., 2023). With both water levels and flow depleting, these species are likely to become more vulnerable and undergo diminishing populations. Efforts to recover these species will likely face challenges as well, as the conditions with which they need to thrive are becoming increasingly uncommon across the river.

Nature Based Solutions

Current conditions indicate that the health of the Colorado River and the ecosystems it supports are at risk of considerable degradation unless groundbreaking strategies are developed to better utilize the water resources it provides. That said, efforts to work in tandem with natural processes that may better restore hydrologic cycles and enhance water availability have been underway in the states which the river runs through. With Arizona being one of the driest Colorado River states, many communities have expressed desire to engage in nature based solutions that better capture water and improve groundwater recharge. The ability of these solutions to increase access to water while simultaneously mitigating climate effects makes their efficacy rather impressive. While engineered infrastructure for water storage remains prominent in Arizona and other arid states, the need for natural solutions has continued to gain prominence in the wake of continued resource scarcity.

Many of the nature based solutions practiced in Arizona involve efforts to restore ecosystems and promote sustainable agricultural practices. This is most evident in the Salt River area, where restoration efforts of riparian and wetland habitats have been conducted alongside agroecological practices to preserve their water resources (Davidson, n.d.). Efforts to restore wetland and riparian habitats along the Salt River have been observed to improve the retention of water that runs through it, all while reducing water that has traditionally been lost to evaporation. Similarly, through the adoption of cover cropping and no-till practices in the agricultural sectors along the agricultural regions of Arizona, consumption of water resources has been lessened and even contributed to groundwater recharge (Mpanga et al., 2020). With the continuation of these practices, it is likely that the agricultural regions of Arizona may require less water over time, while better utilizing the water they receive naturally. These practices reinforce the efficacy of sustainable water use, thus negating the need to import additional resources.

Though nature based solutions may take a different shape in the urban areas of Arizona, their importance cannot be overlooked as the state aims to maximize the capturing of all available water. Reducing stormwater runoff remains a high priority for the urban centers of Arizona who otherwise would continue to heavily rely on inputs from the Colorado River (Goldstein, 2024). Capturing rainwater and allowing it to infiltrate has been prominent in many of the green infrastructure programs of Phoenix, which contributes to groundwater recharge and increases water storage within the city (City of Phoenix, n.d.). The city of Tucson also engages in similar practices, with rainwater catchment systems being commonplace amongst residential and

commercial buildings in the city (Goldstein, 2024). These inputs of stormwater, which would have otherwise been lost due to runoff, can instead be utilized by these cities for a variety of purposes. Most beneficial of all is that capturing stormwater can aid in reducing the overall dependency of the state on Colorado river water, thus allowing it some reprieve in times of climate-related stress.

The current state of water availability and distribution within the basin states of the Colorado River has stemmed from an extensive history of legal disputes, long standing policy, and ever changing environmental conditions. While the policies that governed water usage in these states was assumed to be sustainable in decades prior, current scenarios point toward a future in which water provisions may become increasingly scarce. As such, innovative practices toward water conservation and capture are gaining attention from community to interstate levels. Urban centers in these arid Colorado River states have found themselves leading the charge in developing methods of reducing water consumption and runoff in hopes to dampen their impact. While these solutions are certainly worth commending and exploring further, their overall utility can only be supplemental and must be bolstered through profound changes in policy.

Modern Solutions to Historical Policy

In addition to the effects of climate and booming populations in many lower basin states, many concerns surrounding the sustainable use and governance of Colorado River water stem from historic policies and the legacies left by them. Many of the doctrines that characterized the Colorado River Compact in its early years were predicated upon principles of extensive and unsustainable use (Water Education Foundation, 2024). This is evident in the policy of prior appropriation that incentivized protective attitudes toward the water provided by the river. These attitudes made basin states especially protective of their shared water resources which has hindered the development of effective co-governance strategies (Powell, 2023). However, recognizing the need to develop more effective governance strategies has prompted basin state governments to consider novel approaches to how they manage water both independently and cooperatively.

Within the Colorado River Compact there exists a shared desire to develop more equitable legal frameworks. At the forefront of this discussion is the potential for revised water

allocations or even a potential revision of the compact itself (Verdusco, 2023). Rather than drawing water allocations in strictly volumetric terms, it has been suggested that they should be predicated upon the actual flow of the river. Given the many years of climate-related stresses the river has undergone, this proposed revision toward allocations should promote more sustainable water use that minimizes ecological damage (Verdusco, 2023). Should allocations come to reflect current conditions, the path toward sustainable use of Colorado River water could become a greater possibility.

The health and continued flow of the Colorado River has gained considerable interest amongst policy makers in basin states. Granting legal rights toward the river itself has the potential to improve ecosystems and contribute to more effective groundwater recharge (Tillman et al., 2017). Given the recent sensitivity of the Colorado River to changing climates and continual drought years, situational reductions in the use of its water may become more common. Utilizing hydrological conditions through an adaptive management framework holds the potential to manage for both human and broader ecosystem necessities (Cross et al., 2011). While municipal and agricultural needs have historically superseded the benefits of ecosystem health, many of these proposed changes in policy emphasize the ability for both to be protected simultaneously.

Conclusion

The American southwest has a complex and evolving history of water policy and management. Water policy in the southwest has been shaped by historical policies, legal frameworks, and the growing challenge of climate change and population induced pressures. The initial framework put forth by the doctrine of prior appropriation is no longer sufficient for ensuring equitable and sustainable use of water as a resource. The region has faced many challenges of water scarcity and overallocations that have paved the path towards more adaptive management strategies and water policy. Groundwater management initiatives, tribal water rights settlements, and federal conservation measures have aided in the progression of water policy, but are often fraught with conflict and difficult to implement. Emerging solutions such as conjunctive water management and nature-based practices show promise for enhancing water reliability and minimizing environmental impacts, but will likely not be enough to overcome allocation and water scarcity issues. Efforts to revise outdated policies, such as the Colorado

River Compact, may be the only truly sustainable solution to ensure water users continue to receive the resources they need while also protecting environmental flows and keeping enough water within rivers and streams for sustainable use. The relationship between federal, state, and tribal entities has and continues to influence management practices on various spatial scales and highlights the complexity of balancing the needs of different communities across the southwest. By integrating equitable policies and innovative strategies, the potential to navigate water related challenges and secure a sustainable future in the southwest is well within reach.

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