

Roadmap for Considering Water for Arizona's Natural Areas



In Arizona, as with many other arid regions, there is a dichotomy in the way residents think about natural resources. On one hand, Arizonans take great pride in the natural beauty of the state's landscapes, and on the other, communities rely on the use of those landscapes for economic prosperity. Nowhere is this dichotomy more pronounced than in the demands residents place on the ribbons of green that snake through arid landscapes. Arizona's water resources support crops, cities, and allow industries to tap into other natural resources, like copper. Yet, citizens also want that water to stay in the environment for outdoor activities in and around streams, and for the sake of the ecosystems that depend upon those streams.

In an effort to more deeply understand the relationship between existing water management and Arizona's riparian and aquatic ecosystems, the University

of Arizona Water Resources Research Center (WRRC) developed the Connecting the Environment to Arizona Water Planning (EnWaP) project with funding from the Nina Mason Pulliam Charitable Trust. The culmination of this project, the *Roadmap for Considering Water for Arizona's Natural Areas*, was released in December 2014. The Roadmap was designed to examine possible routes, as well as roadblocks, to considering the water needs of riparian and aquatic ecosystems in Arizona water management and planning decisions. As there is little in Arizona's legal framework to compel the consideration of water for natural areas, the WRRC sought throughout the project to foster dialogue among water users about voluntary, stakeholder-driven options for addressing natural areas. This was done within the context of limited water supplies and existing water rights and claims.

The EnWaP project began with an analysis of 121 studies on the water needs of riparian (along the stream) and aquatic (within the stream) ecosystems conducted throughout Arizona over the past three decades. This investigation revealed that 78% of perennial (those that flow year-round) and intermittent (those that flow part of the year) river miles have *not* been studied for the water needs of riparian and aquatic species. Further exploration also found that there are very few analyses of the surface water and groundwater requirements for intermittent or ephemeral (those that flow only in response to a storm event) river systems. Even in the more specific context of aquatic species, there are only limited generalizable data. Similarly, few data are available on the flow requirements for vegetation, with the exception of a

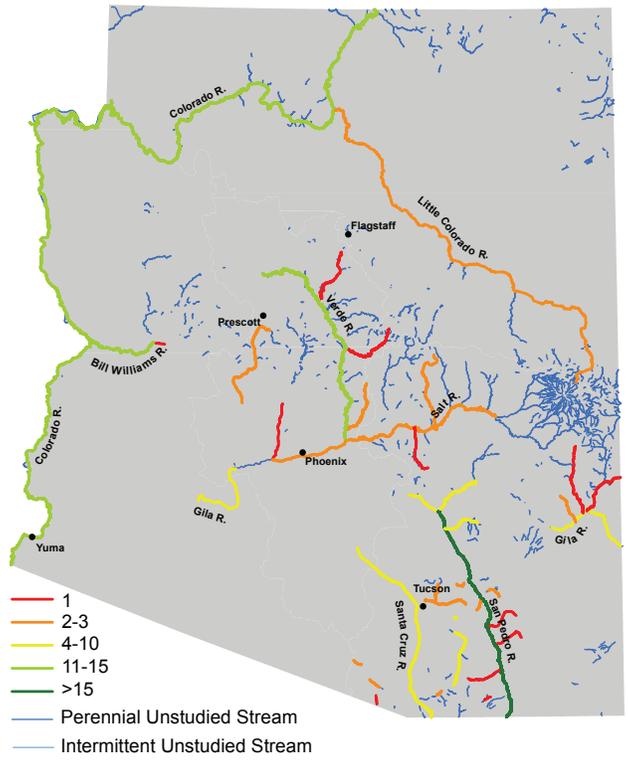
The Roadmap for Considering Water for Arizona's Natural Areas contains information on the current scientific understanding of water for natural areas and existing legal considerations for providing water to natural areas, examples of where natural areas are already included in water management decisions, and an overview of available paths forward for including natural areas alongside human uses.

few species, such as Cottonwood (*Populus fremontii*) and Willow (*Salix gooddingii*). Statewide, the water needs of only 25% of species have been studied more than once. Gaps in data make it difficult to consider ecosystems in water management; however, a paucity of information on water needs is not the only barrier to considering water for natural areas in management. Perhaps even more challenging is understanding the perspectives of water users and managers toward the consideration of water for riparian and aquatic ecosystems.

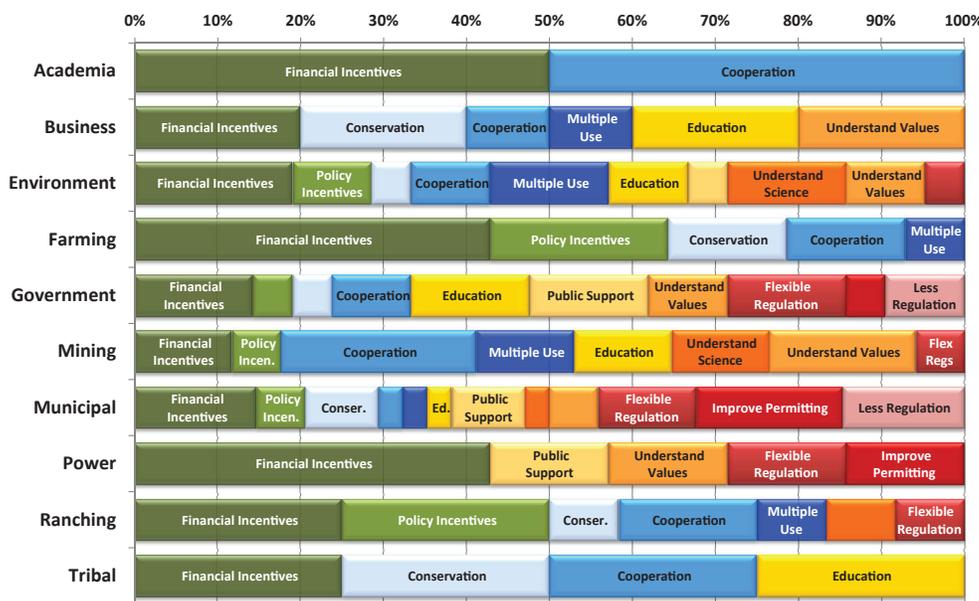
Given the scarcity and sometimes competing uses of water, an open discussion about water for natural areas is complex. All water-using sectors, whether municipal, industrial, or agricultural, have an interest in preserving existing water rights and uses for future growth, new applications, and continued supply reliability. Discussions are further complicated by the variance among and within water sectors on how to consider water for natural areas.

In an effort to gather a broad sample of the many perspectives and ideas on considering water for natural areas, the EnWaP project engaged more than 1,000 stakeholders in project activities, including a survey, individual interviews, focus groups, workshops, and presentations. During this project, participants from academic, business, environmental, farming, government, mining, municipal, power, ranching, and tribal interests volunteered approximately 1,900 hours of their time, with many participating in multiple activities.

At the beginning of this Roadmap-building process, a widely-circulated survey indicated that 67% of respondents believed that a lack of data was the driver most likely to discourage consideration of water for natural areas. Further, 83% of respondents indicated that an increased understanding of the connections between water in ecosystems and human well-being would encourage consideration of water for natural areas. More than 90% of survey respondents agreed that changes in climate, growing communities near riparian areas, and rapid expansion of agricultural or industrial water demand threatened water for natural areas.



Streams with quantified or described water needs for riparian and aquatic species or ecosystems. Colors indicate the number of studies conducted for each stream.



Themes from answers to the focus group question: What would make considering water for natural areas more attractive to you?

Many of these concerns were echoed in subsequent Roadmap focus group discussions. For example, 58% of participants were concerned about water security and cited water quality, climate change, increasing human demand, neighboring populations, and cost as the primary reasons for their concern. In response to questions about how they think water should be provided to natural areas, participants most frequently discussed the need for cooperation, financial incentives, priority setting, education, and ways to find multiple benefits for each water use. During focus group meetings, participants from all water interest groups expressed frustration over laws that were meant to protect people and natural resources, but ended up pitting water users against

one another. Participants from environment, government, mining, municipal, power, and ranching interests indicated that a solution to providing water for natural areas was to create flexibility within, or reduce the amount of, regulation. Others from environment, government, municipal, power, academia, and tribal interests indicated the opposite, and thought additional regulation that requires water for ecosystems was the best way forward. Perhaps most significantly, no focus group participant said that Arizona should not allocate at least some water to natural areas; however, some participants from the business, farming, mining, municipal, and ranching interests noted that it should not be done at the expense of human populations.

These highlights demonstrate the diversity of ideas presented on how to consider water for natural areas and emphasizes the need for multiple routes forward. Some of these routes will intertwine and overlap, some will run parallel, and others may require the construction of new avenues or the removal of roadblocks. Four principal routes forward, as identified through the Roadmap building process, are to: 1) improve education on the history and importance of water for riparian and aquatic ecosystems; 2) provide funding to maintain water in natural areas; 3) set priorities for water in natural areas through an assessment of how Arizonans value these ecosystems; and 4) manage water supplies for multiple benefits, including benefits to natural areas.

Roadmap Recommendations

1. Improving Education on Water Resources and Water for Natural Areas

Although the need for education was a common theme throughout the Roadmap building process, recommended strategies for how to go about education varied among regions and within discussion groups. There was, however, consensus that any educational program should make use of existing resources and involve simple, clear messaging. Two frequently discussed themes were education on: 1) how all water-using sectors benefit natural areas, as well as how they use and conserve water; and 2) the history, heritage, and importance of Arizona's riparian and aquatic ecosystems. The primary recommendation that emerged during the Roadmap development process for improving education on water resources and water for natural areas is to bring people together to identify funding sources, set curriculum, and prioritize desired audiences for an educational campaign. Participants indicated that this should be done by forming a statewide water-education advisory committee, made up of educators, community members, and organizations that have experience communicating information about natural resources. This group could then identify existing programs and resources appropriate for providing the public with foundational water knowledge.



Roadmap Case Study: Las Cienegas National Conservation Area includes a large educational component that has contributed to the project's success. Photo: LCNCA landscape by Shela McFarlin.

2. Providing Funding to Maintain Water in Natural Areas

Stakeholders throughout the Roadmap development process agreed that a financial mechanism is needed to address the disincentives to conserving or discharging water to natural areas. These concerns were based on Arizona's "first-in-time, first-in-right" system of water law, and the difficulty of identifying individuals or organizations with funding and/or water rights to contribute to a program. Additional concerns centered around the longevity of water allocations, incentive programs, and funding sources. To overcome these obstacles, participants cited a need for conversations among senior water rights holders and claimants (including municipalities, agriculture, and industry), natural resource managers, community leaders, and other interested organizations. Recommended strategies for how funding could be used to provide water to natural areas centered around two approaches: 1) connecting water conservation to the preservation of natural areas by allocating the conserved water, or financial savings, to enhance or preserve natural areas; and 2) offering financial compensation to encourage more efficient use and/or leave water flowing through natural areas. Near-term actions for these strategies include a focused conversation on sustainable funding mechanisms for water for natural areas, and an evaluation of an existing mechanism, called Conserve2Enhance™, to gauge whether a program like this could be successful as a large-scale funding source for natural areas.



Roadmap Case Study: Conserve2Enhance provides an example of a mechanism to encourage voluntary water conservation and allocate saved dollars to natural areas. Photo: Before (black and white) and after (color) transformation of Tucson C2E Atturbury Wash enhancement site by WRRC.

3. Setting Priorities and Assessing Values

The need for establishing priority areas was clear in all aspects of Roadmap development. Though the vast majority of Roadmap participants agree that natural resources should be considered, determining what areas should receive priority, and how community values should be assessed, can be complex. The lack of a central organization or formal process for assessing priorities and values, and a lack of funding to enable the establishment of either, were noted as weaknesses in Arizona's current ability to provide water for natural areas. Many participants agreed that prioritizing water for natural areas should be tied to regional conditions and community values. Priorities could be set based on contribution to the local economy, cultural or historical importance, vulnerability of water for the ecosystem, valuation of the ecosystem itself, or likelihood of conflict between human needs and the water natural areas need to survive. Recommended strategies for establishing priorities and assessing values include: 1) establishing a localized, voluntary process for all water-using sectors to promote cooperation and collaboration among regional stakeholders; 2) examining how other states have established community or regional priorities; and 3) conducting a stakeholder survey. To implement these strategies, a statewide survey could be conducted to assess public values for water and natural areas. Results from this survey could be used by communities to set regional action items in motion, including a more detailed exploration of regional priorities and valuation of water for natural areas. This effort should be led by regional working groups that can facilitate an iterative dialogue to identify pilot projects based on problems, goals, and objectives for considering the water needs of natural areas in the region.



Roadmap Case Study: Yuma East and West Wetlands Restoration is an example of how the local community used priority setting to benefit residents as well as the region's aquatic and riparian ecosystems. Photo: Aerial photo of Yuma Wetlands by Fred Phillips.

4. Managing Water Supply for Multiple Benefits, Including Natural Areas

In discussing how to achieve water management for multiple benefits, participants identified the need for cooperation and partnerships among water interest groups. In forming these partnerships, participants noted that it is particularly important to do so equitably. Recommended strategies to achieve water management for multiple benefits include: 1) increasing reclaimed water use and rainwater harvesting, 2) providing incentives for near-stream recharge, 3) discharging effluent into natural areas, 4) considering natural areas in stormwater management, and 5) linking land use planning and water planning for multiple benefits. One near-term option for implementation of these strategies is bringing local stakeholders together to identify opportunities for allocating water to natural areas through changes in water management practices. Another proposed action is conducting case studies on existing partnerships that provide water, especially reclaimed water, to natural areas.



Roadmap Case Study: Bill Williams River Corridor Steering Committee provides an example of water management for multiple benefits where cooperation and partnerships were important for project success. Photo: Bill Williams River by The Nature Conservancy

The voluntary participation of over 1,000 stakeholders, 400 of whom directly contributed to building the recommendations in the Roadmap, demonstrates that there is significant interest in providing water to natural areas in Arizona. While opinions on how to provide water to riparian and aquatic ecosystems vary, there is general agreement that any approach should involve cooperation across different water-using groups and should focus on local priorities and solutions. Although our understanding of how much water riparian and aquatic ecosystems need remains incomplete, there are opportunities to take available information and use it to explore how to manage water resources with natural areas in mind. While this Roadmap is the culmination of three years of stakeholder engagement and learning, the WRRC hopes that the *Roadmap for Considering Water for Arizona's Natural Areas* marks only the beginning of a journey toward understanding and inclusion of water for natural areas in Arizona's water management and planning decisions.

For more information about this project contact Kelly Mott Lacroix (klacroix@email.arizona.edu).

The full *Roadmap for Considering the Water for Arizona's Natural Areas* can be downloaded at: wrrc.arizona.edu/waterrapids

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