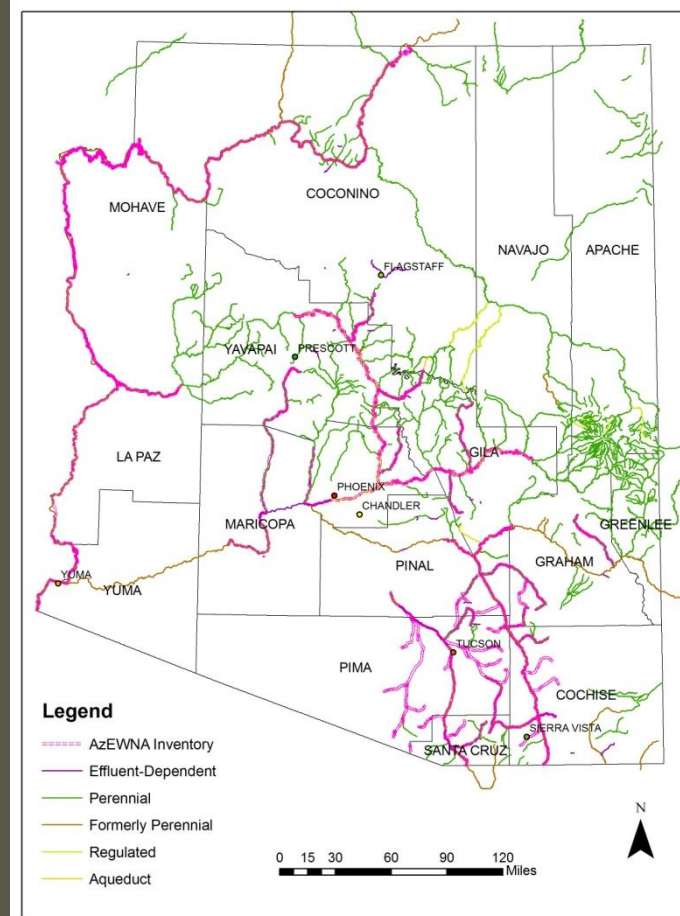


Looking Forward

Protecting Arizona's natural environment, water supply, and open spaces is a high priority for Arizona citizens. The Arizona Environmental Water Needs Assessment systematically assembled technical information about the environment's water needs that can be used in water planning and policymaking statewide. AzEWNA documents and inventory data are intended to improve scientific understanding by Arizona's public and decision makers. Efforts like the Water Resources Development Commission's (WRDC) to look at water demands statewide may provide opportunities for introducing the environment's water needs into a dialogue with all water sectors. Ultimately, the hope is that by explaining the state of knowledge about Arizona's environmental water needs, AzEWNA will support the work of those seeking to protect desert rivers and streams.

The AzEWNA Guidebook and Assessment Report are publicly available on the Water Resources Research Center's Website (cals.arizona.edu/azwater).



Extent of AzEWNA inventory stream segments

Arizona Environmental Water Needs Assessment and Methodology Guidebook

A University of Arizona Water Resources Research Center Project
2011

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Introduction

The University of Arizona Water Resources Research Center (WRRRC) has developed an Arizona Environmental Water Needs Assessment (AzEWNA) Report and Methodology Guidebook. The purpose of AzEWNA is to increase public awareness of environmental flow (e-flow) needs, help policy makers understand the science behind e-flow studies, and identify information gaps in understanding environmental water needs. The primary resource for quantifying Arizona's water demands has been the Arizona Department of Water Resources' Water Atlas. However, the Water Atlas provides limited information on environmental water needs. AzEWNA set out to identify some of this missing information and in doing so, bring the environment to the table when it comes to negotiating water allocation and policy decisions. This was accomplished by conducting a technical and spatial assessment of 93 studies on environmental flow needs and responses. In February of 2011, a number of resources were released from this project: an assessment summary report and a guidebook of the existing methodologies, which include a decision tree for determining appropriate study strategies in a given environment and GIS maps of the study information.



Salt River, Mesa, AZ. Photo credit: Brittany Choate



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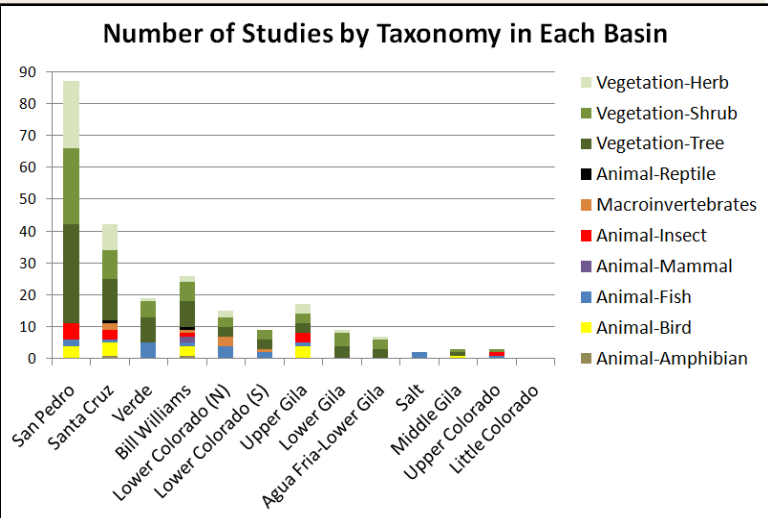




Sonoita Creek Natural Area. Photo credit: Arizona State Parks

Assessment Results

- All studies demonstrated a connection between water availability and ecological health of rivers and riparian areas.
- Those studies that document ecological flow responses provide the most insight into how an ecosystem functions.
 - Ecosystem alterations, such as changing groundwater depth and diminished surface flows, were shown to directly influence species diversity, abundance, and reproductive success.
- The amount of water needed to sustain an environment was quantified in eighty-nine (89) of the 93 studies.
 - 64 for riparian elements, 12 for aquatic, 13 for both riparian and aquatic
- Most studies on Arizona environmental water needs look at plants.
 - 64 for riparian trees and 53 for shrubs
- Seventy-five (75) of the 93 studies focused on the environmental water needs of a single river basin with only eighteen (18) looking at multiple rivers.



Process

1. Twenty-three (23) methods of assessing environmental flow needs were identified within three method classes: aquatic, riparian, and holistic.
2. Criteria for evaluating the methods were established with assistance from project's Advisory Committee to ensure relevance to decision makers.
3. Published literature on e-flow methods was reviewed to provide a foundation for evaluating each method's strengths, weaknesses, and appropriate uses.

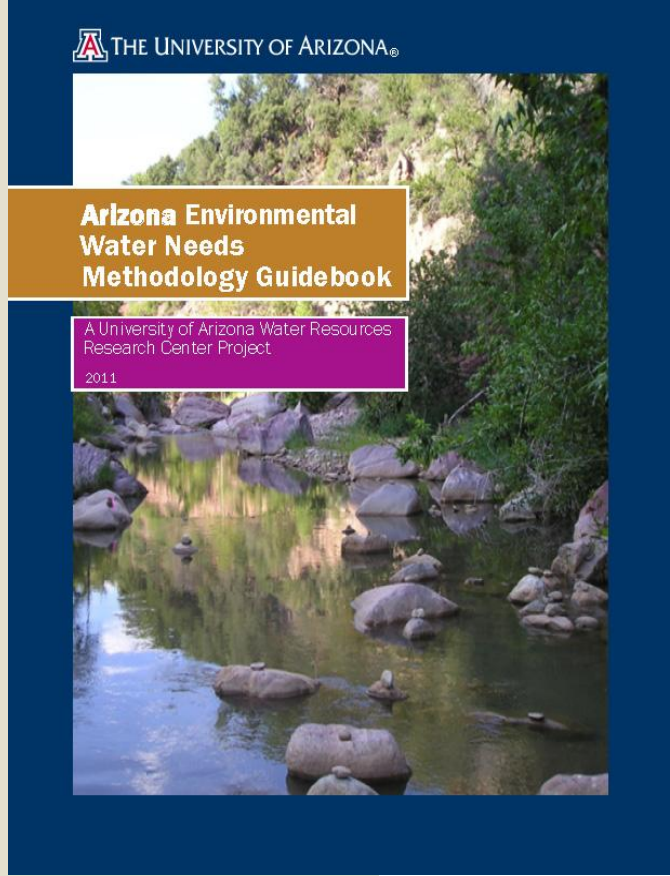


Slide Rock, Sedona, AZ. Photo credit: Brittany Choate

Main Products

The AzEWNA project resulted in the creation of a Guidebook and an Assessment Report to assist in the ongoing effort to quantify environmental water needs. The Report and Methodology Guidebook contain:

- A compilation of 93 Arizona e-flow studies including information about
 - Study method
 - Location of studies
 - Taxa observed
 - Study findings
 - Information gaps
- Evaluation of environmental flow methods used in Arizona
 - Definitions and suggested uses of 23 methodologies
- Recommendations for the future
 - Research agenda/areas for analysis
- A decision tree to help identify appropriate methods for future e-flow studies, with guiding questions such as:
 - What is the hydrological context?
 - What are the management goals?
 - Do you need quantitative or qualitative information?
 - What level of resources are available to the study?



AzEWNA Methodology Guidebook Cover

Conclusion

- The environmental water needs of many river basins in Arizona are not well understood—rivers like the Lower Gila, Salt, Middle Gila, Upper Colorado, and Little Colorado are associated with fewer than 5 studies each.
 - This presents a barrier to developing *statewide* flow needs.
- Future studies are needed on underrepresented streams and taxa.
 - These e-flows studies should use methods that reflect the fact that riparian and aquatic species rely on multiple components of the flow regime for survival.
- Water-related ecological objectives need to be quantitatively, consistently defined so they can be integrated with water management objectives.
 - Quantitative examples of environmental water needs are necessary to bring the environment into statewide water policy decisions.