

SPRINGS: Life-sustaining resources in the desert

DESERT LANDSCAPE CONSERVATION COOPERATIVE EFFORTS TO CONSERVE DESERT SPRINGS

In the desert regions of the United States and Mexico where rains are limited, water is a cherished, critical, life-sustaining resource. Desert springs, in particular, are vitally important to life in the region.

When water stored beneath the earth's surface oozes out and collects above the ground, it can turn into a seasonal or perennial source of water. Such groundwater exposures, called springs, and some drier and more ephemeral 'tinajas' (water-filled depressions), provide basic water resources in an otherwise arid landscape.

Spring waters support an extensive array of microbial, plant and animal species, including many native and endangered species. Over 10% of the endangered species in the US depend on springs for their survival. They also provide unique recreational opportunities and serve as rich cultural resources.



Sonoran Desert spring in Saguaro National Park, Aimee Roberson, US Fish and Wildlife Service

CULTURAL VALUE OF SPRINGS

For generations, springs have helped sustain human communities and held immense cultural significance. Hohokam and Mogollon peoples used natural springs to water subsistence gardens in the difficult desert environment. In Mexico, Seri people living on the coast traveled long distances inland into the Sonoran Desert to collect vital freshwater and transported it back in handmade pottery. In addition, springs were a key cultural resource for many tribes due to their spiritual value. Paiute people considered springs in the Mojave Desert sacred and named springs as "living landscapes" that provided a place for people, plants, animals, and all other living beings.

CHALLENGES AND OPPORTUNITIES

Desert springs are among the most threatened ecosystems on the planet. They face numerous challenges, including: groundwater pumping, drought, increasing temperatures, and invasive species. In addition, there is a

lack of information on the exact number of springs, their locations, condition, and the species that depend on them. As a result, we do not know how much these desert freshwaters have changed over the recent decades, what the impacts of those changes are for the future, and how resilient springs are to landscape-scale pressures.

To determine how best to ensure the persistence of flowing water at springs, the diversity of plants and animals they support, and their role in sustaining urban and rural communities, additional information is needed to inform how to manage springs.

Enter the Desert Landscape Conservation Cooperative (Desert LCC)—an initiative facilitating collaboration among multiple resource management agencies and individuals to promote scientific knowledge and analysis of springs to support their conservation. The Desert LCC works with an array of partners such as tribal, federal and state government agencies, non-governmental organizations and utility providers to facilitate and fund key projects to address information needs and management challenges.



Springs Restoration Handbook, Sky Island Alliance

REPORT

Texas Tech University identified where connectivity between water sources is critical in the Sonoran Desert for various species. They recommend methods to create exclusion areas and site new waters to help mitigate increasing spread of invasive species like bullfrog while maintaining connectivity for economically important species like mule deer.

Springs inventory, assessment, and data management tools will be used to inform conservation across the region as well as within Landscape Conservation Design areas. Landscape Conservation Design identifies opportunities to protect species, habitats, and environmental processes across an entire landscape. Because springs have been identified as a priority resource by the Desert LCC, the information developed from these projects is critical for providing a solid foundation to achieve common conservation goals based on sound science.

INVENTORY AND ASSESSMENT

To better understand and communicate information about these critical resources, cooperators developed a comprehensive springs inventory and assessment. The Springs Online Inventory is an exhaustive geodatabase developed by the Springs Stewardship Institute and the Museum of Northern Arizona.

This vital resource allows managers and springs stewards to look at sites they are managing in a large-landscape context. Managers who enter information about springs in their jurisdiction can craft more effective management programs. The interactive, map-based database includes information about regional aquifers, ecology, biodiversity, sociocultural prehistory and history, and legal issues that may affect their management options. This information is vital both for those who manage a single springs ecosystem for domestic use and also those who manage large landscapes with hundreds, or even thousands of springs. Tribal land managers, government land managers, non-profit organizations, and private citizens are benefiting from this project's information and tools.

Citizen Science

The Sky Island Alliance has supported more than 150 citizen-scientist volunteers to survey and create an inventory of about 180 springs in the 'sky islands' mountains of southern Arizona. Sky Island Alliance trained private citizens alongside agency and local government personnel to use common inventory protocols, resulting in increased data sharing and new information on a broader range of springs.

Managers now know if and when water is present at a spring, along with the condition of the spring, helping them to prioritize

restoration activities according to time of year, likelihood of improved outcomes, and expected costs for restoration.

Standardized Data

Historically, almost every independent survey conducted on springs by different organizations was slightly different, making the data collected challenging to collate, corroborate, and fit into one database. In 2013, the US Fish and Wildlife Service promoted training to help standardize the collection of data on springs and help map aquatic resources in a uniform format throughout the Desert LCC region. The Springs Stewardship Institute and the Desert, Great Basin, and Southern Rockies LCCs are continuing to share these standards to promote consistent inventory and monitoring protocols.

NEXT STEPS

Desert LCC collaborators are paving the way for innovative and effective landscape-scale management strategies by:

- Identifying critical stressors threatening spring ecosystems.
- Developing a toolkit of adaptation strategies to combat these stressors and conserve and restore springs.
- Selecting indicators that allow stakeholders to monitor spring condition at the landscape-scale.
- Creating opportunities for citizen scientists to enhance inventory and condition assessments while learning about these critical resources.

SPRINGS PROJECTS

Developing a Geodatabase and Geocollaborative Tools to Support Springs and Springs-Dependent Species Management in the Desert LCC

Springs in the Sky Island Region: Inventory, Assessment and Management Planning Project

Fire and Water: Assessing Springs Ecosystems and Adapting Management to Respond to Climate Change

Mapping springs, seeps and aquatic habitat in the Desert LCC

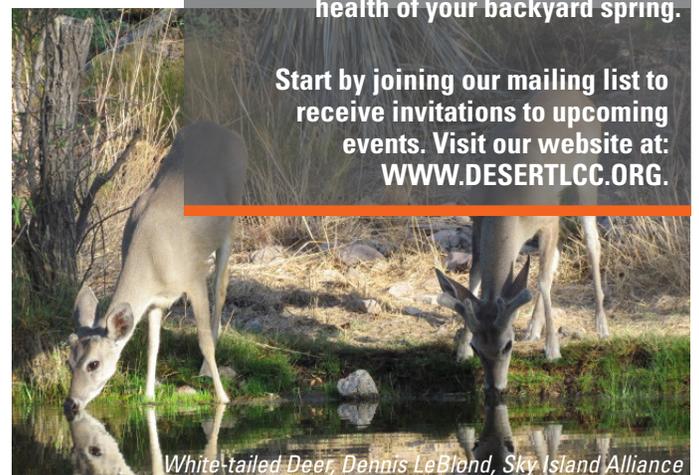
Landscape Connectivity of Isolated Waters for Wildlife in the Sonoran Desert

Environmental Characteristics of Great Basin and Mojave Desert Spring Systems

GET INVOLVED

Seize the chance to volunteer for a springs-related project near you, become a spring steward, spread the word, and help a resource manager collect the data needed to monitor the health of your backyard spring.

Start by joining our mailing list to receive invitations to upcoming events. Visit our website at: WWW.DESERTLCC.ORG.



White-tailed Deer, Dennis LeBlond, Sky Island Alliance