



SCIENTISTS IN PARKS
Fellows
2021 Project Descriptions



NPS UNIT: SAGUARO NATIONAL PARK	PD #: 2021307
<p>Project Title: Wildlife and climate change in high elevation springs in Saguaro National Park Primary natural resource discipline: Biological Sciences Project keywords: Wildlife, springs, hydroperiod, trail camera, climate change Location: Tucson, Arizona</p>	
COVID-19 NOTICE	
<p>As the COVID-19 pandemic continues to change and evolve, project timelines and structure remain flexible and it may be necessary to postpone start dates, begin work remotely, or reformulate the project’s description. Should any development in the COVID-19 outbreak impair a project’s timeline or results, the SIP Team will work with the park and project mentors to assess the situation and determine the best course of action at that time.</p>	
PROJECT DESCRIPTION AND WORK PRODUCTS	
<p>Position Description: The Fellow selected for this project will coordinate with Saguaro National Park (SAGU) staff to investigate wildlife use of high elevation springs and how it varies across seasonal hydroperiod changes, habitat types, and other landscape and environmental factors. The Fellow will work closely with an SIP-DHA intern who will focus on helping the park develop management guidelines for these unique, sensitive resources in the context of their use by plants and animals.</p> <p>Although Saguaro National Park is best known for its desert landscape, it is also home to the high elevation Rincon Mountains, recognized as one of the “Sky Island” ranges between the Sierra Madre Mountains of northern Mexico and the Rocky Mountains. These isolated mountains rise to elevations over 8000ft across an ecological gradient of lowland deserts and grasslands, mid-elevation woodlands, and high elevation mixed conifer forests. This diversity of ecosystems creates a biodiversity hotspot that supports the convergence of northern, temperate species such as black bears as well as tropical species such as coatis, elegant trogons, and (historically) jaguars.</p> <p>Within this water limited landscape, high elevation natural springs provide an important water source to the local community, including endemic and threatened species. Despite their relatively small size, natural springs are keystone ecosystems that have a disproportionate influence on the surrounding landscape and biological community.</p> <p>The Fellow engaged in this project will ideally be a graduate student with a background in wildlife research, strong outdoor skills, experience with trail cameras (camera traps), and interest in interdisciplinary science. The major duties include:</p> <ol style="list-style-type: none"> 1. Hike long distances from the desert to high elevation forest in the Rincon Mountains. Saguaro is 78% designated Wilderness and most work will occur in remote, rugged areas. 2. Set up and maintain trail cameras at off-trail springs (not used by visitors) to document wildlife use. 3. Collect data on water quantity and quality at springs during pre- and post-monsoon seasons, as well as landscape and other environmental variables. 4. Mentor less experienced student intern who will assist in field work. Work closely with SAGU biologist and biological technician on research design, execution, and data management; 	

5. Assist in writing final report and provide an education product (talk to park interpreters or series of social media posts) on project goals, methods, and results.

The Fellow is expected to take on a high level of responsibility related to managing the field component of this project but will receive regular support from park staff, including logistical support (pack support, field kitchen and platform tents) at the Manning Camp back-country ranger station. Some flexibility will be required due to the potential for forest fires and other fire management activity that may affect schedules and study sites.

Although water is scarce at Saguaro, our small, isolated high elevation springs attract wildlife, support rare plants, and provide essential water for back-packers. Due to concerns over declining water levels in historic springs, since 2017 park staff have systematically searched for, discovered, and documented dozens of new springs. However, little is known about the wildlife that use them.

Climate change induced drought threatens the permanence of springs and the biological communities that depend on them. Future climate scenarios predict range shifts of species to cooler, wetter refugia at high elevations. The potential for springs to serve as refugia is important to conservation management but is confounded by data limitations. The data collected by this project will be used to inform and validate model-based scenarios that estimate the potential effects of climate change on springs and their biota and will help park managers prepare and adapt management strategies to effectively conserve natural resources in the future.

This project builds on previous research on wildlife in the Rincon Mountains as well as on the origin of water in springs and how their water dynamics vary in space and time. Data from the project will provide Saguaro National Park with options for managing springs and adapting to a changing climate; educate visitors about the importance of these rare but essential water sources; and contribute to a peer-reviewed paper on how wildlife community parameters respond to hydroperiod changes on a landscape scale. The Fellow will work closely with an SIP-DHA Intern who will develop management recommendations that will help the park provide water for back-country users while protecting sensitive natural resources.

This position is offered through the National Park Service's Scientists in Parks Program in partnership with Ecological Society of America.

Work Products: Deliverables from this project will include:

1. Photo data from trail cameras and hydroperiod data for a minimum of 15 springs, organized in an existing park database;
2. Weekly social media posts on the park's population Instagram and Facebook pages that share the project's best photos and highlight the project's major issues, opportunities, and results;
3. Report, written in a scientific format with park staff, that provides background, study design, methods, and results that will form the basis for a peer-reviewed scientific paper;
4. Management recommendations for each spring based on wildlife and water data that provide a range of options such as restoration, long-term monitoring, and protection (in collaboration with an SIP DHA Intern);
5. An interpretive product (to be determined by the fellow and supervisor) such as a poster or short video that can be displayed in the park's Visitor Center Science corner on the project.

NATURAL & PHYSICAL WORK ENVIRONMENT

Natural Environment: The park is adjacent to Tucson, a city of nearly one million people. There is no public transportation to the park unfortunately, but the park is only a few miles from major population centers. From the park, a grocery store is about a 20 minute drive. Tucson is very hot in the summer, with daily averages near 100 degrees F. However, in the higher elevations of the park, nighttime temperatures can get down to 32 degrees F in May and the intern should be prepared for both temperature extremes.

Physical Work Environment: It is anticipated that the majority of the work will be in the field, with approximately 10% in the office. Note that this is VERY physically demanding, and it is difficult to overestimate this point -- most people simply cannot handle the physical demands of the job. The Fellow will often hike 10+ miles a day, gaining over 5000ft of elevation. In the field, there are spiny plants, dangerous animals such as rattlesnakes, and very intense heat. We have extensive safety training before we start fieldwork and safety is the highest priority. However, it's important that applicants realize that they must have the capacity, in advance, for the intense physical difficulty involved.

QUALIFICATIONS

The Fellow engaged in this project must have strong outdoors skills and back-country safety skills. The work is physically demanding and involves hiking over 10 miles per day under hot conditions, in rugged terrain, and often off-trail. Hazards include heat, loose rocks, spiny plants, and venomous animals. Prior training such as Wilderness First Responder or Wilderness EMT is a definite plus.

The ideal candidate will be a graduate student in wildlife with a background in using trail cameras (camera traps) and hand-held computers in a research setting. A background with managing wildlife camera data is a plus but not necessary, but the fellow should have advanced organizational skills and experience in collecting and managing scientific data. They should have an interest in collaborative, interdisciplinary science.

The candidate should have the ability to work independently, but also to be a team player who enjoys working with a very diverse group of people in a back-country setting. Saguaro National Park has a diverse staff with employees, interns, and volunteers of many different ethnic, cultural, and work culture backgrounds ranging in age from high school to senior citizens.

Applicant must have a valid driver license and a good driving record. A valid driver license is necessary as trailheads to the high country are not located at the park headquarters where housing is available so the Fellow will be driving a park vehicle.

The applicant must be a U.S. citizen or U.S. National between the ages of 18 and 30 years old inclusive, or veterans up to age 35. Prior to starting this position, a government security background clearance will be required.

VEHICLE AND DRIVER LICENSE REQUIREMENTS

Applicant must have a valid drivers license and a good driving record.

A personal vehicle is RECOMMENDED but not required for this position.

HOUSING

Park housing is available and will be provided at no cost to the participant. Housing will be a private room in a house on park property with shared kitchen facilities and bathroom. We are anticipating that housing will be provided, but if for some reason (such as on-going Covid issues) park house is not available, the park will provide a housing stipend for housing in Tucson near the park. As a University city, Tucson has a large amount of

affordable housing less than 30 minutes from the park during the summer. At the backcountry site, the Fellow would camp in a platform tent (weatherport) with a cot and have access to a field kitchen with a gas stove, fridge, etc.

INTERNSHIP START/END DATES

Start Date: 5/17/2021

Eleven weeks of the internship will be in the park. A mandatory Professional Development Workshop will be held in Washington, D.C. from August 1 – 5, 2021.