



Resource Brief



Documenting the floristic diversity of Southeastern Arizona: New findings in Leslie Canyon National Wildlife Refuge

Abstract

Botanical research in the Leslie Canyon National Wildlife Refuge in southeastern Arizona clearly illustrates that many botanically underexplored areas remain in the Madrean Archipelago in the United States. Drawing from the results of plant collection efforts at the refuge in September and October of 2014, this brief details our increasing knowledge of the flora in this understudied botanical gem. This research resulted in over 300 specimens collected and increased our documented knowledge of the refuge from 118 documented species to over 416 today. Many of these collections are rare and unique to both the region and the United States.



Ocotillo (*Fouquieria splendens*) and the view of Castle Dome from Leslie Canyon National Wildlife Refuge / FWS

Keywords

Leslie Canyon National Wildlife Refuge, Fish and Wildlife Service Inventory and Monitoring program, Flora Project, Madrean Archipelago, botany

Introduction

The Madrean Archipelago region in southeastern Arizona and northwestern Mexico has long appealed to naturalists of all kinds; birders, wildlife watchers and botanists have all been drawn to study or look for species rarely seen in the US. The area's diversity is a consequence of the intersection

of four major ecoregions: the Chihuahuan and Sonoran Deserts, the Sierra Madres, and the Rocky Mountains. The region is a mix of expansive desert grasslands, oak-pine woodlands, and forested sky islands. The area is known as the Madrean Archipelago because it provides a set of stepping-stones for subtropical species to migrate north out of the Sierra Madres of Mexico and into the United States.

The plant diversity of some areas in the southwest is still quite unknown and floristic inventories not only provide baseline data of the species in an area, they can answer many scientific questions, inform management, and often lead to important discoveries. These



Ipomoea cardiophylla, a vine rarely found in the US, was found in thickets covering fields of shrubs / FWS

include the detection of exotic introductions, distributions of plants important to wildlife, range shifts due to environmental change, new locations of threatened plants, and even the potential discovery of species new to science.

Since its beginning in 2009, the [Flora Project](#) has conducted floristic inventories of National Parks and Wildlife Refuges across the desert southwest. The goal is to provide species lists and field guides for managers, researchers, and the public. The information is shared through the online biodiversity portal known as the Southwest Environmental Information Network, or [SEINet](#).

In 2012, the Plants of Buenos Aires NWR was drafted and is a comprehensive 600+ page field guide for the 126,000-acre refuge southwest of Tucson. The Flora Project is currently at work on floras of both San

Bernardino and Leslie Canyon National Wildlife refuges in southeastern Arizona, along with one for the Kofa NWR in western Arizona.

Methods

For a floristic inventory, the data comes from specimens that are collected in the field and preserved in an herbarium. These specimens serve as both a physical record and to ensure the accuracy of identifications. We start the process by compiling a provisional species list from the known collections found in regional herbaria to assess the completeness of a flora of a given area. If it is obviously incomplete, we make collecting trips of our own to the area. In the field, we collect live plants and press them in a wooden plant press so they can be preserved and taken back to an herbarium for examination. In the herbarium, plants are identified by using dichotomous keys and compared with other herbarium accessions to confirm their identity. We then enter the specimen data into SEINet and combine the data with other historic collections to compile the complete portrait of a flora.



Notholaena aschenborniana, a rare fern, growing from limestone rock / FWS



Tecoma stans, a charismatic shrub whose closest relatives are in the tropics / FWS

Results

In September 2014, we began compiling the flora for Leslie Canyon, a small (2,770 acres) National Wildlife Refuge in southeastern Arizona. Management at the Fish and Wildlife Service (FWS) was working with a flora which combined both Leslie Canyon NWR and San Bernardino NWR and dated back to the 1980s. These two refuges are in very different ecological settings and the lists were seen as inadequate.

Subsequent searches in regional herbaria found only 118 species documented in and around Leslie Canyon. However, the refuge was in the middle of a large, under-collected area in the state of Arizona. In conjunction with monitoring efforts by the [Sonoran and Chihuahuan Deserts Zone \(SCDZ\)](#) of the FWS Inventory and Monitoring Program, we headed out to collect plants and made a representative sample of 20 different areas on the refuge.

In just over two months, our efforts resulted in the collection of over 300 specimens, 277 of which are newly documented species for the refuge. This brings the current number of species at Leslie Canyon to 416. The diversity of the area is extraordinary and each time we sampled a new section of the refuge, or collected in a different habitat, the plant community drastically changed and we discovered new additions to the flora.

Highlights

Notable findings from Leslie Canyon include range extensions, species rarely collected in the US or Arizona, and new localities for rare or endemic species. Many species we found are more common in subtropical Mexico but are rarely documented in Arizona or the United States. For example, heartleaf morning-glory (*Ipomoea cardiophylla*), has been found at less than ten localities in the US but was locally abundant. Another plant, poreleaf dogweed (*Adenophyllum porophyllum*) has been found in only four localities in the US, all within Arizona, yet it is frequent and even weedy in Mexico. Collections of this species in Arizona have increased since 1984, indicating it could be spreading north.

The region is known for its high diversity of desert-adapted ferns and thus far we have found 16 species within Leslie Canyon, an extraordinary number for such a small area. Two species, Maxon's cloak fern (*Notholaena neglecta*) and scaled cloak fern (*Notholaena aschenborniana*) grow only on limestone cliffs and are very rare, having only been found in only three other localities in the US.

Over 75 species we found at Leslie Canyon are endemic to the Madrean Archipelago region. Some of these are rare, found only on nutrient-poor limestone formations, and have adaptations allowing them to survive these inhospitable environments. One example is Tweedy's milkwort (*Polygala lindheimeri* var. *parvifolia*). Our collection in Leslie Canyon

represents the eighth known locality for this taxon in the world.

In addition, we found a large number of plants important to insects and wildlife. For example, many important pollinator plants were found and may provide crucial stops on migration routes. These include: Palmer's century plant (*Agave palmeri*), pollinated by the lesser long-nosed bat; desert honeysuckle (*Anisicanthus thurberi*), an important nectar plant for hummingbirds; and six species of morning glory (*Ipomoea* spp.), which are hummingbird, bee, and wasp pollinated.

Multiple host plants for moths and butterflies were detected such as the Monarch larval host plant milkweed (*Asclepias* spp.) with two species, members of the mallow family in the genera *Sphaeralcea* and *Hibiscus*, the legume family with over 20 genera including species like the Tahitian kidneywood (*Eysenhardtia orthocarpa*) and 9 species in the genus *Dalea*. And along drainages, there is the ubiquitous hackberry (*Celtis reticulata*) and its importance as a forage plant for a range of bird species.

Our efforts this year made significant contributions to our understanding of the flora at Leslie Canyon National Wildlife Refuge. Continued collecting will reveal new species and provide a more accurate sense of the diversity in this botanical gem.

This work to clarify the Leslie Canyon flora is being combined with other work



Echinocereus rigidissimus, Rainbow hedgehog, a frequent cactus in Leslie Canyon / FWS

documenting the flora of San Bernardino National Wildlife Refuge to produce a field guide that will be useful for this botanically rich corner of Arizona. As more wildlife refuges have their floristic inventories completed, we hope to reveal their floristic diversity and to continue making exciting botanical discoveries.

Additional collecting will take place in spring 2015 to clarify the spring flora and discussions are underway with the Bureau of Land Management to expand our efforts to include floristic surveys throughout the adjacent Swisshelm Mountains. Visit SEINet for a continually updated species list and to view information about all the [Leslie Canyon NWR](#) plant species.



Desert Research Learning Center

The Desert Research Learning Center (DRLC) delivers information about natural and cultural resources and presents the results of research and monitoring to land managers, students, researchers, policy makers, and the interested public.



Editors: Frankie Coburn, Steve Buckley, Bethany DeRango