

# Rare Species Memo

National Park Service  
U.S. Department of the Interior

Southwest Exotic Plant Management Team  
Desert Research Learning Center



## *Graptopetalum bartramii* at Chiricahua National Monument

Surveys for *Graptopetalum bartramii* or the Patagonia Mountain leatherpetal, have been attempting to locate all known populations of this species (Figure 1). There are less than 20 known populations of this species in southeastern Arizona and northwestern Mexico. It is a small succulent species in the family Crassulaceae. Characterized by its blue-green rosettes, the species flowers in the fall and winter, the opposite of the other co-occurring species in the region, *Graptopetalum rusbyi* which flowers in the spring and summer.

There are two historic collections of the species from the northern Chiricahua Mountains. There is a 1970 collection from Indian Creek Canyon near Cochise Head, which is just to the northeast of Chiricahua NM. Its collector is unknown. The second is a 1975 collection by T. Reeves from Echo Canyon, an area that is entirely within the boundaries of Chiricahua NM. The collection was noted as being in the “upper portion of Echo Creek between dam and parking lot.” It was this second collection we sought to relocate.

An NPS botanist and biologist, an archaeologist, and two SCA interns visited Echo Canyon on September 30, 2014 to survey for *Graptopetalum bartramii*. Echo Canyon is a narrow canyon with extremely difficult access and sustained significant fire damage from the 2011 Horseshoe Two fire. It is an extremely sensitive habitat and is the only location of the species known in the park. Two plants were located on our survey. A large flowering specimen 15 cm across and a 3 cm specimen immediately below. The single flowering stalk had six open flowers and 48 buds.



Figure 1, *Graptopetalum bartramii* flowering in Echo Canyon, NPS/Steve Buckley



Figure 2, Close up of *Graptopetalum bartramii* flowering, NPS/Steve Buckley

The canyon is composed of rhyolitic tuff with hundred foot sheer cliff faces and is of very narrow width in the bottom of the canyon. There is sculpted bedrock, so water movement is a nearly constant feature. It appears to be this ambient temperature and moisture interaction in south-trending but deep narrow canyons that provides the necessary conditions for *Graptopetalum bartramii*.

The subtle moisture-temperature interaction has been a defining characteristic of fourteen populations found across the US-Mexico Borderlands. This population is one of very few that are not found on granitic substrates. In the fourteen populations, slightly elevated water at the surface as either a spring or seep has been present. It also appears that the narrow canyons confer protection from the deepest and coldest of freezes on account of the canyon's aspect. The same appears true about the Echo Canyon population.

The characteristic suite of plants found around the *Graptopetalum bartramii* in the US-Mexico Borderlands is composed of several different species (Figure 3). Two characteristic species, the *Cheilanthes*, or beaded lipferns, along with *Sellaginella rupincola*, rockloving spikemoss are often found on narrow shelves of soil sitting just above or below the bedrock.

The populations have generally been found above the floodline in the bottom of canyons in the Madrean pine-oak (*Pinus-Quercus*) woodlands of the Sky Islands in southeastern Arizona. In the Chiricahua NM population, the two specimens that were located in the crack in a bedrock outcrop, about three meters upslope from a narrow set of pools that fill the bedrock canyon bottom. Surveys up and down the canyon yielded no other specimens.

For the upstream survey, only two people were able to access the canyon because of the old dam. It had a four foot deep pool at the base which blocked the route on account of being surrounded by smooth vertical rock. The area



Figure 3, *Graptopetalum bartramii* in its type locality on granitic substrate, Flux Canyon in the Patagonia Mountains, NPS/ Steve Buckley

above the dam, accessed by a longer route up a side canyon was a narrow upward scramble through continued rock for about 50 m (Figure 4). No plants were located within 10 m of the canyon bottom along any of this section. Where the canyon opens up, it had extreme fire severity and looks to have burned to bare soil in many places (Figure 5). There were no additional *Graptopetalum bartramii* specimens located within 50 m of the top of the narrows and the travel was extremely difficult with all the fire and flood debris.

Down below the two specimens in Echo Canyon, a side canyon was explored until it came to an impassable overhang where several 30 m tall *Cupressus arizonicus*, or Arizona cypress trees indicated that the fire was highly variable, having spared all of these enormous trees but a single one at the canyon mouth. No additional *Graptopetalum* were located here.



Figure 4, Narrows above the dam, NPS/Steve Buckley

The two specimens that were found are located immediately above a large cliff face that marks the entrance to Echo Canyon. It was later discovered there is easier access directly from a point on the Echo Canyon trail. The potential access is a distinct threat to this population. So long as off-trail hiking is discouraged, access is unlikely given the challenging and moderately dangerous down climb on sheer rock to get into that part of the canyon. Regardless, the location data for this population should not be shared widely. The plants are located at 0658411 E and 3542547 N in the NAD 83 datum.

Further surveys in the monument are planned, as the area surveyed was very small in relationship to the topographic complexity of the landscape. Additional distribution modeling using GIS might be worthwhile to limit the search area but

would require fairly high resolution. LiDAR being obtained for Chiricahua NM in the near future might be of sufficient resolution to aid in any modeling. Additional surveys up Echo Canyon into narrower sections might yield additional specimens and will be undertaken later this fall.

The importance of the Chiricahua NM population depends almost on its size and whether the Indian Creek population is ever located. Regardless, it is one of very few populations in the world and only one of two in a national park unit, so its presence in the park confers a basic degree of protection. The other population known on NPS land is found in Saguaro National Park and has not been visited since collections were made last in 1982 with observations in 1975 and 2001. These populations are expected to be visited in November 2014.

The population in Indian Creek, just to the east of Chiricahua NM presents a unique conservation challenge. While the area is managed by the US Forest Service, the trail through this area is used extensively for smuggling and interdiction operations. This results in mainly heavy foot traffic and other localized impacts, but remains a contentious area in which to survey. There is no information available about this population and surveys are highly recommended but will require law enforcement assistance to complete.

*Graptopetalum bartramii* is a curious species throughout the borderlands for the reasons best exemplified by the Indian Creek population. In numerous locations throughout its range,



Figure 5, Example of fire severity in Echo Canyon, NPS/Steve Buckley

*Graptopetalum bartramii* is found along smuggling routes. These routes are often in the deepest canyons to avoid detection by surface patrols of the Border Patrol, or aerial patrols by drone. Anecdotal information suggests the routes also have some correlation with the movement of large cats including jaguars, ocelots, and jaguarundi. The subtropical deep narrow canyon with water—what appears to be the preferred habitat for rare cats, rare *Graptopetalum*, and frequent smuggling.

This is also a fascinating species because it appears to be very susceptible to climate change. There is a correlation with nearby water and the presence of the species. None of the fourteen visited populations are found in entirely dry sites.

Always at the bottom of canyons, always near springs. Water is never far below the surface in *Graptopetalum bartramii* habitat, which is often where canyons pinch and springs exist. These systems are uniquely susceptible to the kinds of drying predicted in most climate change models. If surface water changes and the floodline rises as extreme rainfall totals also increase in single events, the plant will be very susceptible to extinction in the wild.

The pollination biology of the species includes a rare species of butterfly that is thought to be a specialist, this too deserves further attention. Surveys for *Graptopetalum bartramii* will continue at Chiricahua NM and Saguaro NP until the end of 2014.



Chiricahua National Monument, NPS/Steve Buckley

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## No. 2 *Graptopetalum bartramii* at Chiricahua NM

The Southwest Exotic Plant Management Team (SW-EPMT) works in national park units across the desert southwest to locate, protect, and restore native plants.

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