



Orchids

Resource Brief

Importance

The orchid family is one of the largest flowering plant families, with approximately 20,000 species across the globe. North America is home to more than 200 orchid species, and 51 of these are known in Maryland (Knapp and Wiegand 2014).

Orchids are good indicators of forest health. They thrive when a forest is healthy, and their disappearance is an early indication of declining forest health.

In 2016, the National Capital Region Network Inventory & Monitoring team (NCRN I&M) did a census of native orchids at sites in Catoctin Mountain Park (CATO) and Cunningham Falls State Park. The census was a follow-up on part of a 41-year demographic study of orchids in the Catoctin Mountains by Richard Wiegand. Wiegand's study showed that during his observation period (1968-2008) 19 of 21 orchid species populations experienced steep declines. At the same time, the regional deer population was booming. Wiegand suggests that the over-abundant deer population was largely to blame for the observed orchid declines.

Orchid Census

The NCRN team hoped to learn if orchid populations in and around Catoctin Mountain Park had begun to rebound following the reductions in deer density at CATO that started in 2010. We surveyed for populations of seven orchid species (listed below) at seven sites that were originally studied by Wiegand. Each site had its own unique list of focal species to census.

We surveyed each site twice, once at the beginning and once at the end of each orchid's peak flowering period. We

Orchid Species

- Cypripedium acaule* (pink lady's slipper)
- Galearis spectabilis* (showy orchid)
- Goodyera pubescens* (downy rattlesnake plantain)
- Liparis liliifolia* (lily-leaved twayblade) [state rare]
- Platanthera clavellata* (small green wood orchid)
- Platanthera grandiflora* (greater purple fringed orchid) [state threatened]
- Platanthera orbiculata* (large round-leaved orchid)

counted the number of orchids at each site and recorded the location/habitat of each orchid. In addition, we noted any signs of deer browse.

Results

Two focal orchid species were found at the seven sites. A total of 162 individual plants were recorded at the sites. These included the species *Goodyera pubescens* and *Platanthera grandiflora*. Both were more abundant in 2016 than in 2008 (Figure 1). *G. pubescens* for example surged from 12 individuals in 2008 to 129 in 2016. Similarly, the count of *P. grandiflora* grew from 19 individuals in 2008 to 33 in 2016.

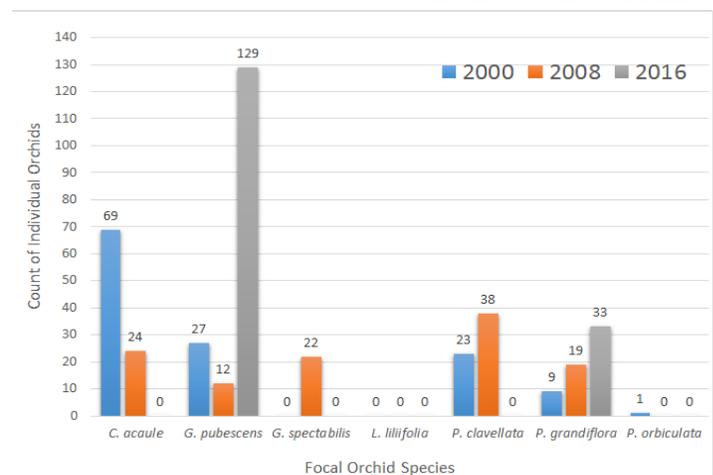
P. grandiflora is a Maryland-threatened species that likely remains in the park because of

Right. Downy rattlesnake plantain (*Goodyera pubescens*) was found frequently during 2016 sampling.

Below. Figure 1. Population size of orchid species across time at 7 sites in CATO and Cunningham Falls.



Photo: NPS/Gliss



More Information

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the efforts of CATO staff who placed deer protection (fencing) around the orchids to prevent browse on the species in years prior to our surveys.

Very little deer browse was detected on the orchids found. Of all 162 individuals recorded, only 4 individuals (all of them *G. pubescens*) showed signs of browse.

Galearis spectabilis was also found at many of the monitored sites in 2016, but not at the one site for which that species has historical data. *Galearis spectabilis* along with *Cypripedium acaule*, *Liparis liliifolia*, *Platanthera clavellata*, and *Platanthera orbiculata* were not found in 2016 at sites they occupied in 2008.

The team also encountered orchids outside of the 7 monitored sites including small green wood orchid (*Platanthera clavellata*) and the large round-leaved orchid (*Platanthera orbiculata*). Prior to 2015, *P. orbiculata* was thought to be extirpated from Catoctin Mountain Park. Yellow fringed orchid (*Platanthera ciliaris*) was also found outside of monitored sites and is a new addition to the orchids found in the CATO area.

Discussion

There are many possible factors affecting why some orchid species were not found. The fungi upon which the orchids are dependent may be absent. The symbiotic relationship orchids have with fungi provides nutrients at key life stages and enables seed germination. Without these fungi, orchids could suffer reproductive failures and seed bank depletion (Cameron 2006).

Longevity of seeds may also be a factor in orchid declines. Recent research suggests that orchid seeds are typically viable for 1 to 5 years. It is possible the last batch of seeds from some species are no longer viable and that the population of certain species may never rebound.



Greater purple fringed orchid (*Platanthera grandiflora*) protected from deer.

Photo: NPS

Some orchid species were particularly intriguing. *Galearis spectabilis* (showy orchid) and *Goodyera pubescens* (downy rattlesnake plantain) were found in almost every monitoring site. The observed abundance of these species could be due to availability of their needed symbiotic fungi in favorable habitat. *G. spectabilis* and *G. pubescens* were also found in more heavily disturbed areas and perhaps are more tolerant to changes in their environments than other focal species. They could also simply be less palatable to deer.

Whitetailed deer feed on a wide variety of plant species and plant parts, and deer typically favor orchids over less palatable plants like grasses. Yet, while pressure from deer browse is still present, recent deer management has reduced the number of deer in the park. This may have resulted in the surge of *G. pubescens* and *P. grandiflora* and in the absence of deer browse on most plants.

However, decades of deer-impacts as well as other forest changes have reduced the forests resilience to disturbance and may still be pushing the ecosystem into uncharted territory, changing it in ways not fully understood (Rawinski, 2016).

It can take years for a declining population to recover to stable levels. But with continued habitat protection and deer management, forest health should improve. This gives orchid populations a chance to recover and return their beauty to the Catoctin Mountains.



Large round-leaved orchid (*P. orbiculata*), previously thought to be extirpated from the park but rediscovered in 2015.

Photo: NPS/Schmit

References

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- Knapp, W. and Wiegand, R. 2014. Orchid (Orchidaceae) decline in the Catoctin Mountains, Frederick County, Maryland as documented by a long-term dataset. *Biodiversity Conservation*. Volume 23, Issue 8, pp. 1965-1976.
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