

**Mountain Sweet Pitcher Plant
(*Sarracenia rubra* ssp. *jonesii*)**

**5-Year Status Review:
Summary and Evaluation**



Photo credit: Gary Peeples/USFWS

**U.S. Fish and Wildlife Service
Southeast Region
Asheville Ecological Services Field Office
Asheville, North Carolina**

June 2026

5-YEAR STATUS REVIEW
Mountain Sweet Pitcher Plant (*Sarracenia rubra* ssp. *jonesii*)

GENERAL INFORMATION

Current Classification: Endangered

Lead Field Office: Asheville Ecological Services Field Office

Review Author(s): Michelle Henson, Ph.D., Asheville Ecological Services Field Office,
U.S. Fish and Wildlife Service

Reviewers:

Lead Regional Office: Southeast Region, Carrie Straight

Cooperating Field Office(s): South Carolina Ecological Services

Date of original listing: October 31, 1988 (53 FR 38470; September 30, 1988)

Methodology used to complete the review:

In accordance with section 4(c)(2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a status review is to assess each threatened species or endangered species to determine whether its status has changed and if it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants ([50 CFR 424.11](#)). The U.S. Fish and Wildlife Service (Service) evaluated the best available information about mountain sweet pitcher plant's biology, habitat, and threats to inform this status review.

We announced initiation of this review in the Federal Register on November 25, 2025 (90 FR 53383) with a 60-day comment period and received no comments. The primary sources of information used in this analysis were the 1988 final listing rule (53 FR 38470), the 1990 recovery plan, peer-reviewed reports, agency reports, unpublished survey data and reports, and personal communication with recognized experts. This review was completed by the U.S. Fish and Wildlife Service, Asheville Ecological Services Field Office, Asheville, North Carolina. All literature and documents used for this review are on file at the Field Office. A completed draft of this 5-year review was sent to other affected Service offices in the species' range for review and comment. All recommendations resulting from this review are the result of thoroughly reviewing the best available information on mountain sweet pitcher plant.

FR Notice citation announcing the species is under active review:

November 25, 2025 (90 FR 53383)

Species' Recovery Priority Number at start of 5-year review ([48 FR 43098](#)):

5C, which reflects a high degree of threat and a low recovery potential.

Review History:

A previous 5-year review recommending no change in status was signed on May 21, 2013 (Service 2013) and June 10, 2021 (Service 2021).

REVIEW ANALYSIS

Listed Entity

Taxonomy and nomenclature

We are not aware of any changes to the taxonomy of this entity, and it is still considered valid by the Service.

Distinct Population Segment (DPS) ([61 FR 4722](#))

The Act defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listing of a DPS to only vertebrate species. Because the species under review is not a vertebrate, the DPS policy does not apply.

Recovery Criteria

Recovery Plan or Outline

Recovery Plan for Mountain Sweet Pitcher Plant (*Sarracenia rubra* ssp. *jonesii* [Wherry] Wherry), U.S. Fish and Wildlife Service

Date Issued: August 13, 1990

Recovery plans are not regulatory documents and intended to provide guidance to the Service, states, and others on ways to minimize threats to listed species and criteria that may be used to determine when recovery is achieved. If the recovery criteria defined in the plan are still valid, meeting recovery criteria can indicate that the species no longer requires protections under the Act. However, when recommending whether a listed species should be delisted, the Service must apply the factors in section 4(a) of the Act ([84 FR 45020](#)).

Criterion 1: It has been documented that at least four populations within each drainage (Enoree, French Broad, and Saluda Rivers) are self-sustaining and that necessary management actions have been undertaken by the landowners or cooperating agencies to ensure their continued survival.

Criterion 2: All 12 of the above populations and their habitat are protected from present and foreseeable human-related and natural threats that may interfere with the survival of any of the populations.

To assess the recovery criteria, the self-sustainability of existing populations was evaluated first, followed by an examination of their protection status (Table 1). There are currently nine identified populations within the French Broad watershed in North Carolina. Of these, five are located on protected lands, including those held in public ownership, managed by conservation organizations, or subject to formal management agreements. Additionally, four populations have been assigned North Carolina Natural Heritage Program (NCNHP) Element Occurrence (EO)

ranks of A (indicating excellent viability) or B (indicating good viability) (NCNHP 2025). EO ranks provide a succinct assessment of the estimated viability of occurrences of a given species. They provide an estimation of the likelihood that, if current conditions prevail, a species occurrence will persist for a period of time. A and B-ranked populations exhibit optimal characteristics with respect to population size and quality and quantity of occupied habitat. The French Broad River watershed meets the recovery criteria as written. However, it's important to note that ten populations have been extirpated since the listing rule.

Table 1. Summary of extant mountain sweet pitcher plant populations, number of protected populations, number of populations ranked A (excellent viability) or B (good viability), and recovery criteria status.

Watershed	Extant Populations	A or B-ranked Populations	Protected Populations	Meets Criteria
French Broad	9	4	5	Yes
Saluda	4	3	3	No
Keowee (Enoree)	1	0	1	No

There are four existing populations within the Saluda watershed; three populations are located on protected lands and have received A or B ranks from the South Carolina Heritage Trust Program (SCHTP 2025). The Keowee watershed, previously known as Enoree, currently supports a single remaining population that is under protection. However, based on this evaluation, these recovery criteria outlined in the recovery plan have not been met.

Biology and Habitat Summary

Abundance, trends, and demographics

For the purposes of this review, a population is defined as any grouping of sites within 2 kilometers (km) of each other, provided they occur within the same drainage or local watershed. Sites located within 2 km of each other but occurring in separate drainages are typically considered separate populations, particularly when separated by dispersal barriers such as perennially unsuitable habitat.

The original listing rule and recovery plan recognized 10 extant populations located in two counties in North Carolina (Henderson and Transylvania) and one county in South Carolina (Greenville) (Table 2). These documents did not provide estimates of the number of individual plants within these populations (Service 1988). The 2013 5-year review identified 12 extant populations across three counties in North Carolina (Buncombe, Henderson and Transylvania) and two counties in South Carolina (Greenville and Pickens) (Service 2013).

Table 2. Number of extant populations in each state and county for the listing rule (1988), recovery plan (1990), and the 2013, 2021, and 2026 (current) 5-year reviews. Introduced populations (in part or full) are denoted below.

State	County	1988 (Listing)	1990 (Recovery Plan)	2013 (5-Year Review)	2021 (5-Year Review)	2026 (Current)
North Carolina	Henderson	3	3	3	4 ^a	3 ^a

North Carolina	Transylvania	1	1	3	4	4
North Carolina	Buncombe	0	0	1 ^a	1	1
North Carolina	Macon	0	0	0	1 ^a	1 ^a
South Carolina	Greenville	6	6	4	4	4
South Carolina	Pickens	0	0	1	1	1
Total		10	10	12	15	14

^aIntroduced (in part or full)

The 2021 5-year review recognized 15 extant populations in four counties in North Carolina (Buncombe, Henderson, Transylvania, and Macon) and two counties in South Carolina (Greenville and Pickens). Three populations were added in the 2021 5-year review through assisted introductions and the discovery of one new native population (Service 2021).

Currently, 14 extant populations are known across four counties in North Carolina (Buncombe, Henderson, Transylvania, and Macon) and two counties in SC (Greenville and Pickens). One previously documented population in Henderson County has recently been confirmed extirpated. This population was introduced in 1998, when approximately 25-50 plants were established by Meadowview Biological Station around a lake at a youth camp. The last confirmed observation of this population was in 2010, and subsequent communication with the landowner has confirmed that the population is no longer extant.

A newly introduced population has been established in McDowell County, North Carolina, outside of the species' known native range. This population was introduced in 2023 by a private landowner using plant material obtained from Meadowview Biological Research Station. At this time, the Service does not have information on the original source population of these plants. The landowner also introduced several other *Sarracenia* species into the wetland, including mountain sweet pitcher plant (*Sarracenia purpurea* var. *montana*), which represents an ongoing threat due to the potential for hybridization and introgression (as discussed in detail below). Because this occurrence lies outside of the species' native range and functions as a cultivated garden rather than a naturally occurring population, it is not included in the count of known extant populations.

North Carolina

Within the French Broad River watershed, the North Carolina Plant Conservation Program (NCPCP) manages a plant conservation preserve in Transylvania County that supports one population of mountain sweet pitcher plant. Historically, this preserve has been considered one of the most pristine depression bog systems in the region and supports one of the largest populations of mountain purple pitcher plant (*Sarracenia purpurea* var. *montana*). Long-term monitoring is conducted annually, including tracking the single known hybrid individual at the site. In 2025, flowering stem abundance of mountain sweet pitch plant declined by approximately 30%, potentially due to fluctuations in site hydrology (NCPCP Sec 6. Report 2025).

Another important population within the French Broad River watershed occurs on privately owned land in Henderson County. Historical records indicate this is a naturally occurring population and one of the few remaining unhybridized populations of mountain sweet pitcher

plant (Walston 2026, pers. comm.), making it particularly important for species recovery. As of 2023, the number of clumps at the site had declined relative to 2013 observations. Recent information indicates that temporary changes to site hydrology have left the bog dry for several months. This prolonged loss of hydrology raises concern that a portion of the population may have experienced severe desiccation or mortality, although the extent of these impacts has not yet been assessed. Threats at this site are active and concerning, including altered hydrology, sedimentation, and gravel deposition associated with Helene storm impacts. Management needs include sediment removal and installation of a sediment basin upslope to reduce future inputs into the bog.

A third population within the French Broad River watershed also occurs on privately owned land in Henderson County. This site supports large populations of both mountain sweet pitcher plant and mountain purple pitcher plant. As of 2012, mountain sweet pitcher plant was estimated at approximately 150 individuals, representing one of the largest known populations in North Carolina. Ongoing threats include competition from invasive plant species and persistent woody encroachment, both of which may limit recruitment and long-term viability. Following Hurricane Helene, the bog also experienced sediment deposition and erosion, which may have dislodged plants and altered site hydrology.

South Carolina

There are no newly discovered or newly extirpated populations in South Carolina. Of the five EOs in the state, most appear to be stable. However, three populations have not been surveyed since 2013, and one population has not been surveyed since 1996. One population is in poor condition and consists of a very small number of individuals with no observed seed production. This occurrence is the only known population in South Carolina that is not under some form of protection. Most South Carolina populations are under active management, as the majority of populations occur on state preserves and are periodically daylighted or managed with prescribed fire. Following Hurricane Helene, Bartlett Tree Experts assisted with removing a fallen tree and repositioning the displaced stump and affected mountain sweet pitcher plants back into the seepage area.

Threats (Five-Factor Analysis) Summary

The status of a species is determined from an assessment of factors specified in section 4 (a)(1) of the Act. A summary of this assessment is detailed below.

Habitat or Range

The 2013 and 2021 5-year reviews identify woody encroachment, altered hydrology, habitat degradation, and development as threats to the species. These threats remain present across the species' range.

Woody encroachment continues to be a persistent threat to southern Appalachian fen systems and can reduce light availability, alter hydrologic conditions, and eventually eliminate suitable habitat if not actively managed. Most known populations require periodic habitat management, including daylighting or prescribed fire, to maintain the open seepage conditions necessary for

the species. Previous 5-year reviews noted that succession and shading can reduce habitat suitability and contribute to population decline (Service 2021). More recently, researchers at the University of North Carolina at Asheville have investigated the effects of daylighting (the removal of woody vegetation that shades substrate) on plant performance. Preliminary findings from the study suggest that daylighting significantly increased both the height and density of newly produced pitchers. These preliminary results support the continued use of daylighting as an important management tool to maintain suitable habitat conditions and improve plant vigor at occupied sites. Continued monitoring is needed to determine whether these increases in vegetative growth translate into improved flowering, seed production, and long-term population persistence.

Altered hydrology also remains an important threat and may affect populations through sedimentation, stormwater inputs, or changes in groundwater flow. Sedimentation associated with Hurricane Helene has been documented at least three sites in North Carolina and has been associated with anecdotal declines in flowering stem density. In South Carolina, one protected population also occurs adjacent to a dammed lake, which may influence local hydrologic conditions and affect the long-term suitability of the site.

Recent research by Walston and Hagedorn (2025) further emphasizes the species' sensitivity to habitat conditions. Their study found that occupied fen soils possess high total nutrient potential but extremely low plant-available nitrogen, reinforcing the species' reliance on carnivory. A key finding was a statistically significant positive relationship between the number of carnivorous pitchers and flower production, suggesting that increased prey capture provides the energy necessary for reproduction. In contrast, soil ammonium levels showed no significant influence on leaf morphology or flowering. These findings support continued canopy management to prevent lethal shading and protection from nutrient-rich runoff and stormwater inputs.

Development and associated land-use change continue to threaten the species by reducing and fragmenting suitable bog and fen habitat, altering surface and groundwater flow, and increasing stormwater runoff and sediment inputs from adjacent uplands. Although many remaining populations now occur on protected lands, changes in surrounding land use, including residential or infrastructure development upslope of occupied sites, may continue to affect habitat quality and long-term site hydrology.

Factor B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

The Service is not aware of any new information regarding overutilization since the 2021 5-year review. However, the species remains at risk for poaching, which continues to be a serious threat throughout the range. Partners working with the species should report any suspected collection or poaching incidents to the Service.

Factor C. Disease or Predation

The Service is not aware of any information indicating that disease currently poses a significant threat to the species. However, deer browsing of flowers has been observed at some populations in North Carolina and may reduce reproductive output at those sites.

Factor D. The Inadequacy of Existing Regulatory Mechanisms

The Service is not aware of regulatory protections afforded to plant species other than those already discussed in the 2013 and 2021 5-year reviews. While the Clean Water Act (33 U.S.C. §1251 et seq.) does protect wetlands from destruction without a permit, it does not limit upland development that can affect wetland hydrology. Additionally, the recent new rule (January 2020; 85 FR 22250) that defines what wetlands are protected under the Clean Water Act may limit protections for some *Sarracenia* wetlands in the future. The Clean Water Act does not provide adequate protection to mountain sweet pitcher plant.

Factor E. Other Natural or Manmade Factors

Climate change is an emerging and potentially significant threat to southern Appalachian bog ecosystems and the species that depend on them. Southern Appalachian bogs and fens occur as hydrologically isolated, groundwater-dependent systems that are highly sensitive to changes in temperature and moisture balance. Even modest increases in temperature may increase evapotranspiration and reduce water availability, particularly during seasonal drought periods.

A study by Schulteis et al. (2010) specifically evaluated the vulnerability of southern Appalachian *Sphagnum* bogs to climate change and concluded that projected warming, coupled with increased evapotranspiration, is likely to promote drying of these systems. The authors note that hydrologic drying may accelerate organic matter decomposition, reduce peat accumulation, and shift bogs from long-term carbon sinks toward carbon sources. Most importantly for habitat integrity, drying threatens the persistence of *Sphagnum* spp., which functions as ecosystem engineers by maintaining the acidic, nutrient-poor, saturated conditions required by many bog specialists. Loss or reduction of *Sphagnum* cover may also facilitate encroachment by vascular plants and woody shrubs, increasing competition and shading within open bog habitats. Such vegetation shifts can reduce habitat suitability for bog-dependent taxa such as *Sarracenia* species, which rely on the persistent wet, open conditions.

Because southern Appalachian bogs are already highly fragmented, climate-driven drying may disproportionately affect remaining populations of mountain sweet pitcher plant by reducing habitat quality and resilience to additional stressors such as succession, invasive species, and altered disturbance regimes.

Hybridization

As discussed in the 2021 5-year review, hybridization can occur between mountain sweet pitcher plant and mountain purple pitcher plant where the species occur in sympatry. Genetic analyses have confirmed introgression in both taxa (Stephens et al. 2015, Baldwin et al. 2023), indicating that reproductive barriers may not exist between them, allowing gene flow in areas of co-occurrence.

Although hybridization can represent a natural evolutionary process, uncertainty remains regarding whether some instances of co-occurrence reflect historical human-mediated translocations rather than natural range overlap. However, Chang et al. (2025) examined climatic niche differentiation between the two taxa and found that they occupy distinct climatic niches and elevational ranges, with natural co-occurrences estimated at only 3 percent of occupied sites. These findings suggest that syntopy is likely rare under natural conditions and raises concerns

that management actions involving translocation, augmentation, or introduction could inadvertently increase contact between taxa.

The authors further projected differential responses to climate change with suitable habitat for mountain sweet pitcher plant predicted to decline substantially and potentially disappear from much of its range by 2080, while habitat for mountain purple pitcher plant is projected to remain comparatively stable. These findings have important implications for conservation management. Specifically, managers should avoid introducing or translocating one taxon into sites already occupied by the other until the natural history of the co-occurrence is better understood, as such actions could increase the risk of hybridization and genetic swamping. Further, the authors suggest that the projected loss of suitable habitat further highlights the importance of ex-situ germplasm conservation through seed banking to preserve the species' genetic diversity.

Feral Hogs

Feral hog activity has also been documented in proximity to some South Carolina populations and has the potential to damage sensitive fen habitats through rooting and soil disturbance. Although direct impacts to pitcher plants have not been confirmed at this time, feral hog activity was identified in previous 5-year reviews and remains a potential threat in South Carolina.

Synthesis

Mountain sweet pitcher plant is a narrow endemic of southern Appalachian seepage bogs and fens in North Carolina and South Carolina. Currently, there are 14 occurrences across the species' range, and the distribution of this narrow-ranging endemic has not appreciably changed. Monitoring is infrequent and inconsistent, making an assessment of the overall status of the species difficult to determine. Protecting genetically intact native populations is becoming an increasingly important component of species recovery and long-term conservation. The species continues to face multiple ongoing threats across its range. The most significant threats remain habitat degradation and modification, particularly woody encroachment, altered hydrology, sedimentation, and development-related changes to groundwater and surface water flow. Recent storm impacts from Hurricane Helene have further emphasized the species' sensitivity to hydrologic disturbance and sediment inputs. Emerging threats, including climate variability, may exacerbate habitat stressors by increasing evapotranspiration and reducing the persistence of saturated seepage conditions necessary for long-term survival. Additional threats include hybridization and genetic introgression, particularly where mountain sweet pitcher plants occur in proximity to mountain purple pitcher plants, as well as potential impacts from feral hog disturbance and occasional herbivory. The limited number of viable populations within the Saluda and Keowee (formerly Enoree) watershed, combined with ongoing threats and uncertainty surrounding long-term population trends, indicate that mountain sweet pitcher plant continues to meet the definition of an endangered species under the Endangered Species Act.

RECOMMENDED FUTURE ACTIVITIES

Recovery Activities

- Develop and implement a standardized monitoring protocol to ensure consistent tracking of abundance, flowering, recruitment, and habitat quality.
- Continue active management including targeted daylighting, woody vegetation removal, and prescribed burning to maintain open fen and seep habitats.
- Prioritize protection and management of genetically intact native populations, particularly unhybridized occurrences.
- Restore and protect hydrologic integrity at occupied habitats through erosion control, stormwater management, and protection of upslope groundwater recharge areas.
- Avoid augmentations and translocations into sites occupied by closely related taxa (e.g. *Sarracenia purpurea* var. *montana*) to reduce the risk of hybridization and introgression.
- Expand ex-situ conservation measures, including seed banking, living collections, and propagation from genetically verified source populations to safeguard the species' genetic diversity.

Monitoring and Research Activities

- Establish long-term demographic monitoring focused on survival, clonal persistence, flowering frequency, seed production, and recruitment.
- Conduct range wide genetic analyses to assess population structure, identify genetically intact populations, quantify introgression risk, and inform propagation and translocation decisions.
- Investigate reproductive ecology including pollination success, seed viability, dispersal limitation, and seedling establishment.
- Continue research on hydrology, soil chemistry, nutrient availability, and canopy/light conditions to refine habitat management guidelines.
- Assess climate vulnerability and identify potential climatic refugia to support long-term conservation planning under future climatic scenarios.
- Monitor feral hog activity and storm-related disturbance impacts.

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RESULTS / SIGNATURES

U.S. Fish and Wildlife Service Status Review of Mountain Sweet Pitcher Plant

Status Recommendation:

On the basis of this review, we recommend the following status for this species ([50 CFR § 424.11](#)). A 5-year review presents a recommendation of the species status. Any change to the status requires a separate rulemaking process that includes public review and comment, as defined in the Act.

- ☐ Downlist to Threatened.
- ☐ Uplist to Endangered.
- ☐ Delist:
 - ☐ *The species is extinct.*
 - ☐ *The species is recovered.*
 - ☐ *New information indicates the species does not meet the definition of an endangered or threatened species.*
 - ☐ *The listed entity does not meet the statutory definition of a species.*
- ☒ No change needed.

FIELD OFFICE APPROVAL:

Acting for Field Supervisor, Asheville Ecological Services Field Office, U.S. Fish and Wildlife Service

Approve GARY PEEPLES Digitally signed by GARY PEEPLES
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