Alabama Canebrake Pitcher-Plant
(*Sarracenia rubra* ssp. *alabamensis*)

5-Year Review:
Summary and Evaluation

January 2012

Photo: Wayne Barger, Alabama DCNR

U.S. Fish and Wildlife Service
Southeast Region
Mississippi Ecological Services Field Office
Jackson, Mississippi

5-YEAR REVIEW

Alabama canebrake pitcher plant (*Sarracenia rubra* ssp. *alabamensis*)

I. GENERAL INFORMATION

A. Methodology used to complete the review: In preparing this 5-year review, we relied on the best available information pertaining to historical and contemporary accounts on distribution, population dynamics, habitat preferences, disturbances, and potential threats of this species. We announced initiation of this review and requested information in a published *Federal Register* notice with a 60-day comment period (73 FR 43947). In an effort to acquire the most current information available, various resources were solicited, including data housed at the Alabama Natural Heritage Program, internet searches, and knowledgeable individuals associated with academia and state conservation departments. Specific sources included the final rule listing this species under the Endangered Species Act; the Recovery Plan; peer reviewed scientific publications; unpublished field observations by the U.S. Fish and Wildlife Service, state and other experienced biologists; unpublished studies and survey reports; and notes and communications from other qualified individuals. The initial draft of this review (excluding the status evaluation) was prepared by the Alabama Natural Heritage Program's botanist, Al Schotz. This initial draft was then completed by U.S. Fish and Wildlife Service (Service) lead field office staff and sent to other pertinent Service offices and three peer reviewers for their review (see Appendix A). Comments are incorporated into this final document as appropriate.

B. Reviewers

Lead Region – Southeast Region Office: Kelly Bibb, (404) 679-7132

Lead Field Office – Jackson, Mississippi: M. Scott Wiggers, (601) 364-6910

Cooperating Field Office – Daphne, Alabama: Shannon Holbrook, (251) 441-5837

C. Background

1. **Federal Register Notice citation announcing initiation of this review**: July 29, 2008 (73 FR 43947)

2. **Species status**: Stable (2011 Recovery Data Call) There are 11 populations known for this species; however, only 5 of these are of significant size (>10 clumps). Active management, through prescribed burning, is needed to maintain appropriate habitat for the species. The largest population is under The Nature Conservancy ownership and is thriving due to regular management. Another of the top 3 populations is a U.S. Natural Resources Conservation Service (NRCS) Wetland Reserve Program (WRP) easement

which should receive protection and consistent management. Other sites are on private lands and the Service assists with management at several of these sites. We are working with landowners to monitor and manage sites; however, funds for consistent management are unreliable. We have 2 voluntary protection agreements for this species. Population trends will be stable as long as consistent management is implemented.

3. **Recovery achieved**: 1 (1=0-25% recovery objectives achieved)

4. **Listing history**

   Original Listing
   FR notice: 54 FR 10150
   Date listed: April 10, 1989
   Entity listed: Species
   Classification: Endangered

5. **Review history**

   Recovery Plan: 1992
   Recovery Data Call: annually from 2000-2011
   Five-year review: November 6, 1991

   In the 1991 five-year review (56 FR 56882), different species were simultaneously evaluated with no species-specific, in-depth assessment of the five factors as they pertained to the different species' recovery. In particular, no changes were proposed for the status of this plant in the review.

6. **Species' Recovery Priority Number at start of review (48 FR 43098):** 6

   Degree of Threat: High
   Recovery Potential: Low
   Taxonomy: Subspecies

7. **Recovery Plan**

   Name of plan: Alabama Canebrake Pitcher Plant (*Sarracenia rubra* ssp. *alabamensis*) Recovery Plan
   Date issued: October 8, 1992

II. REVIEW ANALYSIS

A. Application of the 1996 Distinct Population Segment (DPS) policy

Not applicable. The Alabama canebrake pitcher-plant is a plant, and therefore, is not covered by the DPS policy.

B. Recovery Plan and Criteria

1. **Does the species have a final, approved recovery plan?** Yes

2. **Does the recovery plan contain objective, measurable recovery (i.e., downlisting or delisting) criteria**? Yes. Reclassification to threatened status could be considered when 10 viable populations are protected and being appropriately managed.

3. **Adequacy of recovery criteria**

   a. **Do the recovery criteria reflect the best available (i.e., most up-to-date) information on the biology of the species and its habitat?** Yes. Though the recovery criteria are not specific as to the number of individuals per population, the recovery criteria of 10 viable, protected populations are appropriate.

   b. **Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria?** The recovery criteria do take into account any threats to this species in association with the five listing factors, since the assurance that populations are self-sustaining and secure from any foreseeable threats, is part of the criteria.

4. **List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information.**

   Criteria: The plant species will be considered for reclassification to threatened status when there are at least 10 viable populations within the Coosa River drainage that are assessed as viable for at least a 15-year period. Populations should have appropriate legal protection and active management such that the sites are thriving and secure from any foreseeable threats. A viable population is defined as a population that is shown by monitoring data to be reproducing and relatively stable or increasing in size. No delisting criteria were established.

   Status: Criteria have not been met. Only three populations are considered protected from outright habitat destruction. Of these protected populations two are actively managed and likely self-sustaining, while the other is not actively managed and is in decline. Of the actively managed sites, one population occurs on landholdings of The Nature Conservancy (TNC), while the other population occurs on private property protected by a NRCS WRP easement. The third protected population is on private property protected with a conservation easement held by TNC, but lack of cooperation from the owners has limited management opportunities. In addition, TNC is cooperating with the Boy Scouts of America (BSA) to protect a fourth site owned by BSA. TNC has proposed to expand their Roberta Case Pine Hills Preserve to encompass an additional population in Autauga County, Alabama (Tassin *in litt.* 2011a,c). The remaining known sites are privately owned, several of

which are actively maintained to protect the plants through voluntary conservation agreements with the U.S. Fish and Wildlife Service and management assistance from TNC (Martin 2008, Byrd 2011).

Annual long-term monitoring of select sites by scientists and TNC personnel has shown that most populations appear to be stable or are increasing in size. Some populations have demonstrated decreased viability largely attributed to habitat degradation (e.g., fire exclusion and altered hydrology) (Byrd 2011). Continued long-term habitat management is essential to maintaining viable populations.

C. Updated Information and Current Species Status

1. Biology and Habitat

Surveys have been ongoing in an effort to locate additional populations since the plant was listed in 1989 (Schotz 2006). No new populations have been located since 2000 when the Alabama Natural Heritage Program (ALNHP) discovered two separate populations, each containing several plants near Prattville in Autauga County, Alabama.

Currently, the Alabama canebrake pitcher-plant is endemic to Alabama, having been documented from Autauga, Chilton, and Elmore Counties (Figure 1). Surveys since the species was listed in 1989 have resulted in the discovery of five populations, bringing the total number of known extant populations to 11, with six in Autauga County and five in Chilton County. Populations in Elmore County have not been observed since 1991 and are presumed extirpated. Historically, the species was documented from 28 sites (Alabama Natural Heritage Program 2011, Byrd 2011). Population size estimates from 2010 (most recent census data available for the species) range from two clumps at one site to nearly 170 clumps at another. Four sites contain 10 clumps or less; two are estimated to have between 10 and 50 clumps; and three populations have between 50 and 170 clumps (Alabama Natural Heritage Program 2011, Byrd 2011).

Three populations receive formal protection from adverse habitat modification: one site owned by TNC represents one of the finest occurrences known for the species and the other two are protected by easements. Another high quality site with a large population is owned by BSA. Currently, BSA is working with TNC to manage and protect this population. The remaining populations are privately owned, and several of these private landowners have entered into non-binding agreements with the Service and TNC to manage and maintain the plants (Martin 2008, Byrd 2011, Tassin *in litt.* 2011c).

Population censuses have been tabulated at selected sites and general biological information has been obtained for each site, including soil types, associated species, disturbances and potential threats, and general habitat characteristics (Murphy and Boyd 1999, Schotz 2006, Martin 2008, Byrd 2011). Only limited

detailed quantitative analyses have been done for this species (Brewer and Chesser 2009). Long-term monitoring has been implemented at selected sites to assess population trends. The U.S. Fish and Wildlife Service has provided annual funding to TNC to implement yearly monitoring of all populations and management actions on selected populations; however, Folkerts (*in litt*. 2011) has recommended a more aggressive fire management regime at these sites. Seeds have been obtained from several populations and placed under propagation at the Atlanta Botanical Garden, Georgia (Byrd 2011).

Sarracenia rubra ssp. *alabamensis* inhabits two distinct habitat types that share similar floristic composition. The majority of sites are characterized as hillside seepage bogs, permanently saturated areas that attain their greatest development where an impervious layer of clay lies in close proximity to the ground surface. Precipitation, once reaching this clay zone, becomes restricted and is gradually propelled along a sloping gradient until surfacing further downslope. The other habitat type occurs in association with bottomland or streamside vegetation. Unlike the foregoing habitat, moisture conditions are generally maintained with greater connection to topography and precipitation amounts.

All extant populations of *S. rubra* ssp. *alabamensis* occur in close association with the following combination of arborescent and herbaceous species (which therefore serve as the best indicators of suitable habitat): *Osmunda cinnamomea* (cinnamon fern), *Rhynchospora chalarocephala* (loosehead beak sedge), *Dichanthelium scoparium* (velvet panicgrass), *Xyris torta* (twisted yellow-eyed grass), *Eriocaulon decangulare* (tenangle pipewort), *Arundinaria gigantea* (giant cane), *Cleistes bifaria* (small spreading pogonia), *Calopogon tuberosus* (tuberous grass pink), *Platanthera ciliaris* (yellow-fringed orchid), *Viola primulifolia* (white violet), *Rhexia nashii* (maid Marian), *Eryngium integrifolium* (blue coyote-thistle), *Asclepias rubra* (red milkweed), *Magnolia virginiana* (sweetbay magnolia), *Solidago rugosa* (wrinkle-leaf goldenrod), *Eupatorium fistulosum* (joe pye weed), *Fuirena squarrosa* (hairy umbrella-sedge), and *Sphagnum* spp. Bottomland and streamside populations generally contain a greater proportion of woody species and *A. gigantea* (U.S. Fish and Wildlife Service 1992, Garrett 2004, Schotz 2006). More detailed information on the Alabama canebrake pitcher-plant's habitat and associated species can be found in Case and Case (1974, 1976), McDaniel and Troup (1982), Kral (1983), and Murphy and Boyd (1999).

Brewer and Chesser (2009) at the University of Mississippi recently completed a study correlating seedling recruitment and population dynamics in relation to site differences. They found that seedling recruitment was greater on sites with higher soil moisture content as opposed to drier sites. This correlation held true even when comparing unmanaged wet sites to managed dry sites.

2. Five Factor Analysis (threats, conservation measures, and regulatory mechanisms)

a. Present or threatened destruction, modification or curtailment of its habitat or range: Public outreach by the U.S. Fish and Wildlife Service, ALNHP, TNC, the Alabama Department of Conservation and Natural Resources, and the newly established Alabama Plant Conservation Alliance, has encouraged many conservation efforts by the private sector and government agencies. However, since its description as a valid taxon in 1974, 17 populations of the species have been destroyed as a result of human-related causes (Schotz 2006, Alabama Natural Heritage Program 2011). *Sarracenia rubra* ssp. *alabamensis* continues to be threatened by development, gravel excavation, agriculture, and livestock management (Godt and Hamrick 1998), all of which are directly correlated to two additional threats, fire exclusion and the invasion of exotic plant species. Plants have nearly disappeared at one site along a highway margin due to incompatible mowing operations and vegetation succession (Byrd 2011).

All populations occur in fire-maintained habitat, requiring an active prescribed burning regimen to sustain species viability and site integrity. As with all pitcher-plants, *S. rubra* ssp. *alabamensis* is intolerant of shade, quickly becoming depauperate and unable to reproduce with the encroachment of woody vegetation. Therefore, site integrity and viability of all populations are inherently linked to regular prescribed burning. Efforts by U.S. Fish and Wildlife Service, ALNHP, TNC, and Atlanta Botanical Gardens to adequately maintain specific populations have been hampered by difficulties in obtaining permission to apply prescribed fires at some of the known populations and unfavorable burning conditions.

In addition, altered hydrology may favor encroachment of competing species, thus causing habitats to become unsuitable for *S. rubra* ssp. *alabamensis*. Two populations have been subjected to hydrological alterations as a result of beaver (*Castor canadensis*) activities, one of which was noted to have been nearly extirpated by flooding. Gravel mining in close proximity to another population has adversely altered the hydrology of the site, further hampering recovery efforts (Byrd 2011, Tassin *in litt.* 2011b).

Alabama canebrake pitcher plant populations continue to be threatened by development and incompatible land use, such as drainage for agriculture and livestock grazing. The inability to regularly burn some sites has reduced habitat suitability by allowing continued encroachment of woody species that increase shade for this shade-intolerant species. Similarly, altered hydrologic regimes, whether increasing or decreasing water availability, have negatively impacted some populations and increased encroachment of competitors.

b. Overutilization for commercial, recreational, scientific, or educational purposes: The species has periodically been threatened by poaching in the

past, and overutilization continues to threaten this plant at some sites (Byrd 2011). However, most populations are fairly isolated and are monitored by the landowners.

c. Disease or predation: Disease and predation are not considered threats to this species at this time.

d. Inadequacy of existing regulatory mechanisms: Alabama has no state laws affording protection to *Sarracenia rubra* ssp. *alabamensis* and its habitat. Otherwise, the species is protected under section 7 and section 9 of the Endangered Species Act (ESA). It is also included in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

e. Other natural or manmade factors affecting its continued existence: The Alabama canebrake pitcher-plant continues to be extremely vulnerable due to the small number of populations and small population size at many of these sites. Most populations support less than 50 plants (Byrd 2011). Godt and Hamrick (1998) note that populations with a small number of plants likely have limited genetic diversity and are at greater risk of increased inbreeding and genetic drift, thus making their future survival uncertain.

Seedling recruitment was reported to be absent from the majority of populations (Brewer and Chesser 2009), further inhibiting recovery efforts, as well as long-term viability and evolutionary potential. Because the species can reproduce vegetatively, seedling recruitment may not be paramount at sites experiencing light to moderate levels of fire exclusion; however, vegetative reproduction may not compensate for mortality or the lack of sexual reproduction at some sites (Brewer and Chesser 2009).

Climate change may present a challenge to long-term recovery potential of this species, particularly within upland sites where ground water is more likely to become impacted by prolonged droughts (Tassin *in litt.* 2011a).

Together, limited numbers of populations, small population size, low seedling recruitment, and climate change all threaten the continued survival of not only individual populations, but the species as a whole.

D. Synthesis

When listed as endangered in 1989, there were 12 populations of the Alabama canebrake pitcher-plant found in three counties in central Alabama. While approximately half of these are no longer considered extant, five populations have been discovered since the time of listing. Therefore, there are currently 11 populations distributed between two counties (6-Autuaga, 5-Chilton); plants are now considered historic in Elmore County, having not been observed there since 1991 despite repeated searches.

Progress has been made in the recovery efforts for *S. rubra* ssp. *alabamensis*, with one of the largest and most viable populations (Autauga County) now permanently protected and managed by TNC. Cooperative efforts between BSA and TNC to protect another high quality population are underway. Furthermore, two additional populations have been protected through conservation easements. Although there is no formal protection for the remaining seven sites, several landowners have entered into non-binding agreements to manage and safeguard populations on their properties.

At this time, the Alabama canebrake pitcher-plant continues to meet the definition of endangered under the ESA. Three populations, including one of the largest populations, are protected and efforts are underway to protect a fourth population, but the remaining populations exist on privately owned landholdings where conservation efforts are subject to the discretion of the landowner. Six populations contain less than 50 clumps, with four of these having fewer than 10 clumps. Vegetation succession, incompatible forestry practices, and highway maintenance have been responsible for the decline of the species and continue as the most pervasive threats. The lack of formal protection for eight of the 11 sites illustrates this species' extreme vulnerability. However, since pitcher-plants are long-lived perennials (60+ years) that can exist in a relatively dormant state (1-2 small leaves appearing at a time), it is possible that some populations not witnessed in recent years could reappear under more favorable growing conditions.

III. RESULTS

A. Recommended Classification: No change is needed.

IV. RECOMMENDATIONS FOR FUTURE ACTION

A. Continue use of prescribed fires at protected sites and encourage owners of unprotected sites to conduct prescribed fires as frequently as possible.

B. Continue to track population trends and evaluate management needs as a means to gather baseline data and implement long-term monitoring efforts.

C. Continue surveys in vicinity of known populations and revisit all known historical sites regularly.

D. Work to secure protection, either through conservation easements or acquisition, of privately-owned populations.

E. Renew contact with state and county highway departments to ensure proper protective measures are implemented for those areas where plants occur on roadside rights-of-way.

F. Continue to preserve genetic material from all populations to the extent possible through long-term seed storage and propagation efforts at the Atlanta Botanical Gardens, Georgia.

G. Implement all other tasks identified in the recovery plan, as appropriate.

H. Update the recovery plan, as appropriate.

V. REFERENCES

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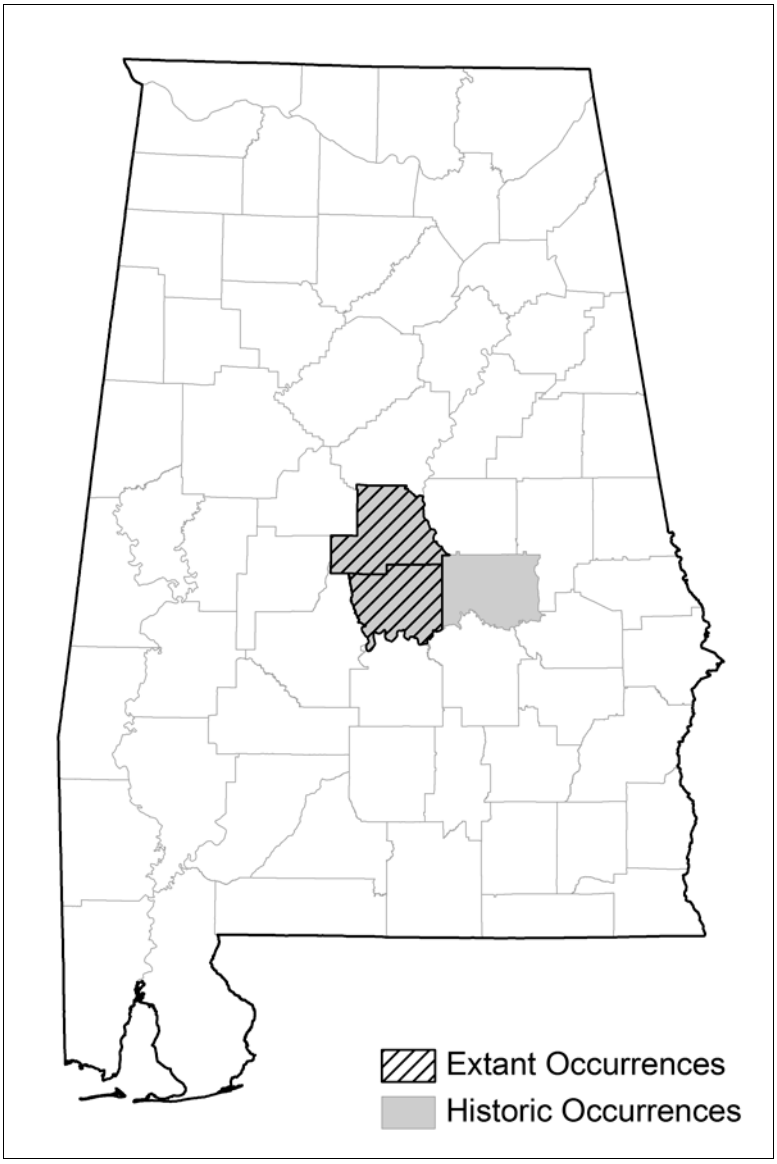
Peer Reviewers

Wayne Barger – Botanist, Natural Heritage Section, Alabama Department of Conservation and Natural Resources; Dr. Debbie Folkerts – Assistant Professor, Department of Biological Sciences, Auburn University; Keith Tassin – Director of Science and Stewardship, The Nature Conservancy of Alabama

Figure 1. Alabama canebrake pitcher plant range.



U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of ALABAMA CANEBRAKE PITCHER PLANT

Current Classification: Endangered

Recommendation resulting from the 5-Year Review:

____ Downlist to Threatened
____ Uplist to Endangered
____ Delist
_X_ No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: Not applicable.

Review Conducted By: M. Scott Wiggers

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service

Approve Cary Norquist Date 7/28/11

REGIONAL OFFICE APPROVAL:

Lead Regional Director, Fish and Wildlife Service

Approve Gavin Shire Date 1/2/12

APPENDIX A: Summary of peer review for the 5-year review of Alabama canebrake pitcher-plant (*Sarracenia rubra* ssp. *alabamensis*)

A. **Peer Review Method:** The draft 5-year review document was sent to biologists at the cooperating U.S. Fish and Wildlife Service office in Daphne, Alabama. In addition, the document was also sent to three independent peer reviewers including: Wayne Barger, Botanist with the Natural Heritage Section of the Alabama Department of Conservation and Natural Resources; Dr. Debbie Folkerts, Assistant Professor in the Department of Biological Sciences of Auburn University; and Keith Tassin, Director of Science and Stewardship for The Nature Conservancy of Alabama.

B. **Peer Review Charge:** The following cover letter was sent along with the draft 5-year review (excluding signature page) to the peer reviewers:

On July 29, 2008, the U.S. Fish and Wildlife Service published a notice in the Federal Register (73 FR 43947) announcing a 5-year review of 20 federally listed species, including the Alabama canebrake pitcher plant (*Sarracenia rubra* ssp. *alabamensis*). The purpose of the 5-year review is to ensure that the classification of species as threatened or endangered is accurate and reflects the best available information.

You have provided data used to review the status of this species and/or you have been identified as knowledgeable about this species. Therefore, in order to ensure that the best available information has been used to conduct this 5-year review, we now request your peer review of the attached document. Specifically we ask for comments on the validity of the data used, and identification of any additional new information on any of these species that has not been considered in this review. Please note that we are not seeking your opinion of the legal status of these species, but rather that the best available data and analyses were considered in reassessing their status.

We appreciate your interest in furthering the conservation of rare plants and animals by becoming directly involved in the review process of our Nation's threatened and endangered species. Your review and comments will become a part of the administrative record for this species, and you can be certain that your information, comments, and recommendations will receive serious consideration.

We hope that you view this peer review process as a worthwhile undertaking. Please give me a call (601-364-6910) or send me an e-mail (marion_wiggers@fws.gov) if you have any questions. Please feel free to respond by email or letter. Thank you for your assistance.

Sincerely,

M. Scott Wiggers
Botanist, U.S. Fish and Wildlife Service
6578 Dogwood View Parkway
Jackson, MS 39213

C. **Summary of Peer Review Comments/Report:** All peer reviewers supported analyses and information in the document. Some reviewers provided editorial comments. One reviewer encouraged increased use of fire management. Another reviewer provided additional information on protected populations, encouraged expanding conservation efforts to the larger landscape, and recommended establishing new populations.

D. **Response to Peer Review:** Suggested editorial changes were made to the document. Recommendations to increase use of fire management regimes were incorporated into the "Updated Information and Current Species Status" and "Recommendations for Future Actions" sections. Updated information regarding protected populations was incorporated into the document; however, comments regarding landscape conservation and

establishment of new populations were not incorporated into the 5-year review because the Recovery Plan already addresses these issues.