Morefield's leather flower
Clematis morefieldii

5-Year Review:
Summary and Evaluation

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

5-YEAR REVIEW

Morefield's leather flower (*Clematis morefieldii*)

I. GENERAL INFORMATION

A. Methodology used to complete the review: In conducting this 5-year review, we relied on the best available information pertaining to historic and current distributions, life history, and habitats of this species. We announced initiation of this review and requested information in a published Federal Register notice with a 60-day comment period (70 FR 34492). We conducted an internet search, reviewed all information in our files, and solicited information from all knowledgeable individuals including those associated with academia and State conservation programs. Our sources include the final rule listing for this species under the Act; the recovery plan; peer reviewed scientific publications; unpublished field observations by Service, State and other experienced biologists; unpublished survey reports; and notes and communications from other qualified biologists or experts. The completed draft was sent to three peer reviewers for their review. Comments were incorporated into this final document as appropriate (see Appendix A).

B. Reviewers

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

Lead Field Office – Jackson, MS: Cary Norquist, 601-321-1128

Cooperating Field Offices – Daphne, Alabama: Dan Everson, 251-441-5837
Cookeville, Tennessee: Geoff Call, 931-528-6481

C. Background

1. **Federal Register Notice citation announcing initiation of this review:** June 14, 2005 (70 FR 34492)

2. **Species status:** Stable (2010 Recovery Data Call)

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

4. **Listing history**

Original Listing
FR notice: 57 FR 21562
Date listed: May 20, 1992
Entity listed: Species
Classification: Endangered

5. Review History
Recovery Plan 1994
Recovery Data Call: 2010, 2009, 2008, 2007, 2006, 2005, 2004, 2003, 2002, 2001, 2000

6. Species' Recovery Priority Number at start of review (48 FR 43098): 8
Degree of Threat: Moderate
Recovery Potential: High
Taxonomy: Species

7. Recovery Plan
Name of plan: Morefield's Leather Flower (*Clematis morefieldii*) Recovery Plan
Date issued: May 3, 1994

II. REVIEW ANALYSIS

A. Application of the 1996 Distinct Population Segment (DPS) policy: Not applicable. Morefield's leather flower is a plant, and therefore, 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 recovery (i.e. downlisting or delisting) criteria? Yes: Reclassification to threatened when 10 viable populations are protected from any foreseeable threats.

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 number of individuals/population, the recovery criteria of 10 viable, protected populations is appropriate.

b. Are all of the 5 listing factors that are relevant to the species addressed in the recovery criteria (and there is no new information to consider regarding existing or new threats)? The recovery criteria do take into account the 5 listing factors. Possible new threats were brought to light with recent surveys: quarrying (Bailey 2005), exotics (Schotz 2007), and roadside maintenance (Carman *in litt*. 2007). However, these threats are covered by the existing recovery criteria which require protection of populations from any foreseeable threats and a determination that populations are viable.

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.

Reclassification will be considered when at least 10 viable populations are protected to the degree that they are secure from any present or foreseeable threats. A viable population is one which is reproducing and stable (or increasing) in size. Population viability will be determined through long-term periodic monitoring for at least a 10-year period.

Status: Criteria have not been met. Seven populations are considered protected from outright habitat destruction due to their occurrence on The Nature Conservancy (TNC) land or City or State natural areas. However, observations indicate low numbers of plants and low reproduction at a number of sites. Research is needed to gather information on possible limiting factors to ensure that populations are secure from any foreseeable threats.

Sporadic visits to selected sites show stability in some populations and loss or decrease in number of plants at others. However, since there has been no long-term monitoring at any of the sites, the viability of the individual populations is unknown. Long-term monitoring over a 10-year period is needed before the viability of any of these populations can be assessed.

C. Updated Information and Current Species Status

Surveys have been ongoing in an effort to locate additional populations since this plant's listing in 1992 (Bailey 2005; Crabtree *in litt*. 2010a,b; Schotz 2007; Weber 1994). A survey in Alabama was successful in locating an additional five populations (Schotz 2007). In addition, the first occurrence of this species outside of Alabama was reported in 2003 in Tennessee in Franklin County (Merritt *in litt*. 2004). In 2005 and 2009, surveys were undertaken in Tennessee within this county and in surrounding counties, resulting in the location of 10 additional populations in Franklin County and one population in adjacent Grundy County (Bailey 2005, Crabtree *in litt.* 2010a, Lincicome *in litt*. 2006, Rhinehart *in litt*. 2007).

Population size has been estimated at selected sites and general information has been obtained on habitat including soil types, associated species, and general habitat condition (Bailey 2005, Crabtree *in litt*. 2010a, Emanuel 2000, Schotz 2007, Weber 1994). No detailed habitat analysis has been done for this species at this point. Occasional visits have been made to selected sites but no long-term monitoring has been implemented over a sufficient time period to assess long range population trends. In 2009, Section 6 funds were received by Tennessee Department of Environment and Conservation (TDEC) to implement a long-term monitoring plan on the Tennessee populations (Crabtree *in litt*. 2010b).

Currently, Morefield's leather flower is known from Madison and Jackson Counties, Alabama and from Franklin and Grundy Counties, Tennessee. Overall, surveys since this species' listing have resulted in the location of additional populations for this species bringing the total number of populations known at this time to 22 with 10 in Alabama and

12 in Tennessee. Two populations, including one in Madison County, Alabama and one in Franklin County, Tennessee were not relocated in recent years (Schotz *in litt*. 2007, Crabtree *in litt*. 2010a). Population sizes in Alabama range from one plant at one site to as many as 500 individuals at another. At the Alabama sites, two sites have 17 or less plants; four are estimated to have 40 to 60 plants; and another four populations have from 300 to 500 individuals (Alabama Heritage Program 2007, Emanuel 2000, Schotz 2007). A census of populations in Tennessee by TDEC in 2009 and 2010, documented the following: four populations had 20 or fewer plants; four others had approximately 40 to 100 plants; two had several hundred plants; and one each had counts of 954 and 4,494 individual plants (Crabtree *in litt*. 2010a).

In Alabama, four populations receive some form of protection from development or adverse habitat modification: one site has 50% of the population protected in a TNC Preserve and another is wholly protected in this Preserve; two others are in city ownership (Huntsville Land Trust) (Alabama Natural Heritage Program 2007, Schotz 2007). This species was not relocated at a fourth protected Alabama site in Monte Sano State Park (Schotz *in litt*. 2007). Three populations in Tennessee occur on State natural areas managed by the Tennessee Wildlife Resources Agency (Bailey 2005, Crabtree *in litt*. 2010a), and are protected from habitat destruction. Protection / management plans addressing specific needs of *Clematis morefieldii* need to be drafted for all sites.

Clematis morefieldii is often found near seeps in rocky limestone woodlands on south and southwest facing mountain slopes. This species is typically under a partially open to filtered canopy of oak (*Quercus muehlenbergii, Quercus shumardii)*, hickory (*Carya carolinae-septentrionalis)*, ash (*Fraxinus americana*, *Fraxinus quadrangulata)*, smoke tree, (*Cotinus obovatus)* and cedar (*Juniperus virginiana* var. *virginiana*). The most prevalent indicator species is smoke tree; however, other common associates of Morefield's leather flower are *Rhus aromatica, Forestiera ligustrina, Silphium brachiatum, Solidago auriculata, and Hypericum frondosum* (Schotz 2007, Bailey 2005). More detailed information on Morefield's leather flower's habitat and associated species can be found in Weber (1994), Emanuel (2000), Schotz (2007), Bailey (2005), and Crabtree (*in litt*. 2010a).

A student at Auburn University, Alabama has recently initiated ecological studies on this species in Alabama (Boyd *in litt*. 2010).

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

a. Present or threatened destruction, modification or curtailment of its habitat or range: Since its discovery, three populations of this species have been destroyed by residential development in Alabama (Alabama Natural Heritage Program 2007, Boyd *et al*. 2008, Emanuel 2000, Weber 1994). *Clematis morefieldii* continues to be threatened by habitat destruction from development, particularly for those sites located in the Huntsville area (Boyd *et al*. 2008, Schotz 2007). One of the largest populations in this area consists of pockets of plants on lots slated for development

within the city limits. Long-term protection of these populations in the Huntsville vicinity population is precarious.

One population in Tennessee is owned by a quarrying company. Thus, quarrying is considered a potential threat to this population (Bailey 2005).

Incompatible forestry practices and logging have also been noted to pose a threat to a number of the Alabama sites (Alabama Natural Heritage Program 2007, Schotz 2005, 2007). Schotz (2007) found that 3 of the 5 new sites located in Alabama since its listing were threatened by timber harvesting activities. Disturbance from logging activities also allow for the encroachment of exotic species (see Factor E).

A Franklin County, Tennessee population, which was located near a road, is believed to have been extirpated when this road was widened within the last few years (Crabtree *in litt*. 2010a). Several other populations in Alabama and Tennessee are located near roads and roadside maintenance involving herbicide spraying, or mowing at inappropriate times poses a threat to these also.

A number of populations of *Clematis morefieldii* are secure from outright habitat destruction or detrimental habitat modification due to their location on preserves. In Alabama, 50% of the largest population is located in The Nature Conservancy's Keel Mountain Preserve (Tassin *in litt*. 2007) and a population of several hundred plants located in 2007 is also within a TNC preserve (Schotz in litt. 2007). Two other Alabama populations are located within preserves operated by city of Huntsville (Huntsville Land Trust); however neither of these are vigorous populations.

In Tennessee, three populations are located within State natural areas or management areas and are considered secured, including the largest populations with several thousand plants (Bailey 2005, Crabtree *in litt*. 2010a).

b. Overutilization for commercial, recreational, scientific, or educational purposes: There was concern, at the time of listing, that publicity from its listing would generate an increased demand for this species, resulting in over-collecting in the wild. However, indications thus far are that this has not materialized as a significant threat to this species.

c. Disease or predation: Insect predation was noted on selected populations and continues to be of concern. Insect infestation was thought to be the cause in the decline in a population in Alabama (Weber 1994). Bailey (2005) observed mealy bug infestation on numerous individuals at several locations in Tennessee and suggested that the damage from the insects may inhibit reproductive capacity of plants. However, further investigation is needed to document insect predation as a valid threat to this species throughout its range.

d. Inadequacy of existing regulatory mechanisms: *Clematis morefieldii* is listed as

Endangered by the Tennessee Department of Environment and Conservation. Regulations under the Rare Plant Protection and Conservation Act of 1985 require persons to obtain written permission from a landowner or manager before knowingly removing or destroying a state listed species. In addition, a scientific collecting permit is required before taking any state listed species from TDEC lands (TDEC 2008). Protection is also afforded to this species under Section 7 and Section 9 of the ESA. The seven populations located within TNC or state/city preserves are considered sufficiently protected from outright habitat destruction; however, no such protection is afforded to the remaining 15 populations.

e. Other natural or manmade factors affecting its continued existence: A number of the populations remain vulnerable due to the small number of plants. Approximately half (45%) of the known populations (10 of 22) have less than 50 plants including 6 populations which have no more than 20 individuals (Alabama Natural Heritage Program 2007, Bailey 2005, Crabtree *in litt*. 2010a, Schotz 2007). Maintaining genetic diversity within populations is the best protection against future environmental changes (Boyd *et al*. 2008). Those populations with small number of plants likely have limited genetic diversity which makes their persistence into the future precarious.

There is little information on the ecological requirements of this species and investigation is needed to determine if habitat management is needed at sites. Weber (1994) and Emanuel (2000) noted that the most vigorous populations, and those with the most flowering, were observed in areas where the canopy was partially opened. However, Schotz (2007) cautioned that while selective canopy removal may be temporarily beneficial, the increase in light and disturbance may encourage growth of aggressive weedy species that would out-compete the clematis. Encroachment of exotics, most notably Japanese honeysuckle (*Lonicera japonica*) and fragrant honeysuckles (*Lonicera. fragrantissima*) are posing a problem for some populations, particularly those within the Huntsville city limits (Schotz 2007).

D. Synthesis – There has been progress in recovery efforts for Morefield's leather flower, particularly with the intensive surveys which have resulted in additional populations. At the time of listing, this species was only known from five sites in Alabama. Recent survey efforts have now brought the total number of known populations to 22 with distribution in two counties in Alabama and two counties in Tennessee. Seven populations, four in Alabama and three in Tennessee, are on protected lands but only five of these are reportedly vigorous populations. Though these seven populations are likely protected from outright habitat destruction, information on other possible natural limiting factors (i.e. insect predation, restricted ecological requirements) is lacking as number of plants and reproduction appear to be low at a number of sites. Approximately half of the populations for this species have less than 50 plants and 6 of these have 20 or fewer individuals. Habitat destruction or modification due to urban development, timber management, roadside maintenance or other activities have caused the loss or decline of populations and these threats continue to pose concern to the remaining populations

which are not under secure ownership. At this time, *Clematis morefieldii* continues to meet the definition of an endangered species under the Act.

III. RESULTS

A. Recommended Classification:

No change is needed. Recovery criteria have not been met. Additional populations need to come under ownership which ensures their protection into perpetuity. At least 10 populations must be determined to be viable (stable or increasing) and no long-term monitoring has been initiated at this point to assess population viability. Additional information is provided above under "Synthesis".

IV. RECOMMENDATIONS FOR FUTURE ACTIONS

1. Gather base-line data on all populations and initiate long-term monitoring on sites, particularly on the secure, protected sites.
2. Continue surveys in Alabama and adjacent Tennessee (survey reports in "V. References" below identify target areas for surveys).
3. Work to obtain protection for sites on privately-owned lands.
4. Investigate habitat parameters.
5. Develop protection and management plans for all sites as indicated by information acquired from habitat studies.
6. Evaluate significance of insect predation on populations.
7. Conduct species biology studies (i.e reproductive biology etc.)
8. Implement all other tasks identified in the recovery plan, with exception of #7,(Establish additional populations) which is not likely needed in light of the discovery of new populations.
9. Revise recovery plan.

V. REFERENCES AND LITERATURE CITED

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Emanuel, C.M. 2000. Monitoring Report for Morefield's leather flower, *Clematis morefieldii*. Alabama Natural Heritage Program, Montgomery, Alabama. Unpublished report to U.S. Fish and Wildlife Service, Jackson, Mississippi. 8 pp.

Lincicome, David. 2006. *Clematis morefieldii*. Tennessee Department of Environment& Conservation. 11/27/06 email, announcing discovery of new population in Franklin County, Tennessee.

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Tassin, Keith. 2007. *Clematis morefieldii*. The Nature Conservancy, Alabama Field Office. 01/16/07 email, providing information on Keel Mountain Preserve in Alabama.

Tennessee Department of Environment and Conservation. 2008. Rules of Tennessee Division of Ecological Services, Chap 0400-6-2, Rare Plant Protection and Conservation Regulations. 11 pp.

U.S. Fish and Wildlife Service. 1992. Endangered and threatened wildlife and plants; determination of *Clematis morefieldii* (Morefield's leather flower) to be an endangered species. Federal Register 57 (98):21562-34420.

U.S. Fish and Wildlife Service. 1994. Recovery Plan for Morefield's leather flower (*Clematis morefieldii*). Atlanta, Georgia. 15 pp.

Peer Reviewers:

Al Schotz, Botanist, Alabama Natural Heritage Program, Auburn University

David Lincicome, Botanist, Tennessee Department of Conservation & Natural Resources, Division of Natural Heritage

Dr. Robert Boyd, Plant Ecologist, Auburn University

U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW OF CANBY'S DROPWORT

Current Classification: Endangered
Recommendation resulting from the 5-Year Review

__X_No change is needed

REVIEW CONDUCTED BY: Ed EuDaly (retired) and Craig Aubrey

Lead Field Supervisor, Fish and Wildlife Service

Approve _____ Date 8/31/10

REGIONAL OFFICE APPROVAL:

for

Lead Regional Director, Southeast Region, Fish and Wildlife Service

Approve Aaron L Valer Date 9-13-10

APPENDIX A: Summary of peer review for the 5-year review of Morefield's leather flower (Clematis morefieldii**)**

A. **Peer Review Method:** The draft 5-year review document was sent to biologists at affected FWS field offices (Daphne, AL and Cookeville, TN). In addition, the document was also sent to three independent peer reviewers including: Al Schotz, botanist with the Alabama Natural Heritage Program; David Lincicome, botanist with the Tennessee Department of Conservation and Environment; and Dr. Robert Boyd, botanist/ecologist on staff at Auburn University, AL.

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

On June 14, 2005, the U.S. Fish and Wildlife Service published a notice in the Federal Register announcing a 5-year review of 25 federally listed species, including Morefield's leather flower (Clematis morefieldii). 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 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 this species, but rather that the best available data and analyses were considered in reassessing its 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 if you have any questions (601-321-1128). Please feel free to respond by email or letter. Thank you for your assistance.

Sincerely,

Cary Norquist
Assistant Field Supervisor/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. Editorial comments were provided by one peer reviewer.

D. Response to Peer Review – Only editorial comments were provided and these changes were made in the document. There was no disagreement expressed by any of the reviewers.