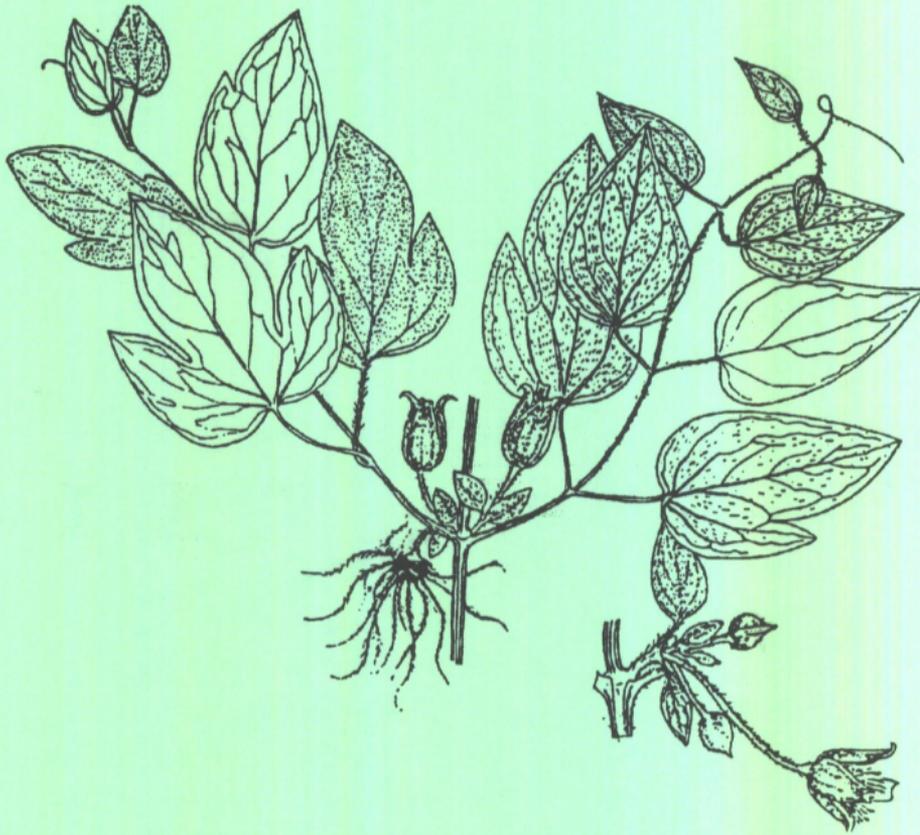


RECOVERY PLAN

Morefield's leather flower

(*Clematis morefieldii*)



U.S. Fish and Wildlife Service
Southeast Region
Atlanta, Georgia



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Jackson Field Office
6578 Dogwood View Parkway, Suite A
Jackson, Mississippi 39213

May 23, 1994

Dear Recovery Plan Recipient:

Enclosed for your information and use is the recovery plan for Morefield's leather flower (*Clematis morefieldii*). This recovery plan was approved by the U.S. Fish and Wildlife Service on May 3, 1994. We appreciate the many contributions made by the reviewers. This plan is subject to revision as new information becomes available or as recovery tasks are accomplished. Please direct any questions or new information to Cary Norquist of this office, telephone 601/965-4900.

Sincerely,

Robert G. Bowker
Field Supervisor

Attachment

Morefield's leather flower
Clematis morefieldii

Recovery Plan

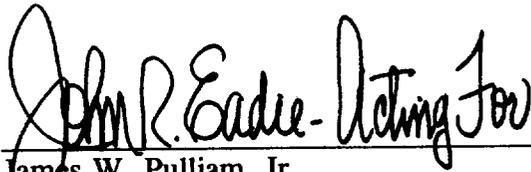
Prepared by

Cary Norquist
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for

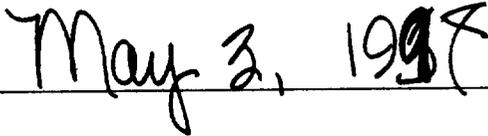
Southeast Region
U.S. Fish and Wildlife Service
Atlanta, Georgia

Approved:



James W. Pulliam, Jr.
Regional Director, U.S. Fish and Wildlife Service

Date:



Recovery plans delineate reasonable actions which are believed to be required to recover and/or protect the listed species. Plans are prepared by the U.S. Fish and Wildlife Service, sometimes with the assistance of recovery teams, contractors, State agencies, and others. Objectives will only be attained and funds expended contingent upon appropriations, priorities, and other budgetary constraints. Recovery plans do not necessarily represent the views nor the official positions or approvals of any individuals or agencies, other than the U.S. Fish and Wildlife Service, involved in the plan formulation. They represent the official position of the U.S. Fish and Wildlife Service only after they have been signed by the Regional Director or Director as approved. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks.

Acknowledgment

The cover sketch of Morefield's leather flower was done by Dr. Robert Kral of Vanderbilt University.

Literature citations should read as follows:

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

Additional copies may be purchased from:

Fish and Wildlife Reference Service
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

Telephone: 301/492-6403 or
1/800/582-3421

Fees for recovery plans vary, depending on the number of pages.

EXECUTIVE SUMMARY

Current Status: *Clematis morefieldii* is only known from five sites in north Alabama (all within Madison County). Only two sites support large populations and one of these is imminently threatened by residential development. Two small sites occur on land owned by the City of Huntsville, others occur on private land. This species is listed as endangered without critical habitat.

Habitat Requirements and Limiting Factors: Populations occur near seeps or springs in rocky limestone woods, typically on south and southwest facing slopes of mountains. Populations have been destroyed and two others are threatened due to residential development. This species is also vulnerable due to its limited range, small population sizes, and decreased vigor at sites which are excessively shaded.

Recovery Objective: Reclassification to threatened.

Recovery Criteria: This species will be considered for reclassification to threatened when a total of 10 viable populations are protected to the degree that all foreseeable threats have been removed. Viability of populations will be assessed through long-term monitoring for a period not less than 10 years.

Actions Needed:

1. Protect populations and habitat.
2. Survey for new populations.
3. Gather habitat data and monitor sites.
4. Investigate management techniques.
5. Study species biology and life history.
6. Preserve genetic stock.
7. Establish additional populations, if found to be necessary.
8. Develop public awareness program.

Total Estimated Cost of Recovery: The immediate and more realistic goal at this time is reclassification of this species to threatened. Cost estimates for tasks to be implemented for the first few years toward this goal total \$72,000.

Date of Recovery: Unable to determine at this time.

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I: INTRODUCTION

A. Background

On May 20, 1992, the U.S. Fish and Wildlife Service (1992) officially listed *Clematis morefieldii* Kral (Morefield's leather flower), as an endangered species under the Endangered Species Act of 1973, as amended. *Clematis morefieldii*, a vine, is known only from several locations in north Alabama, all within Madison County. Populations have been lost, and others have been affected by residential development.

B. Description and Taxonomic Status

Clematis morefieldii is a perennial vine in the buttercup family (Ranunculaceae). It was first collected by Morefield in the early 1980's from Round Top Mountain in Madison County, Alabama and later described by Kral (1987). This species is a member of the *Viornae* subsection of *Clematis*, which is noted for its narrow endemics (Kral 1987). *Clematis* in this subsection are distinguished by urn-shaped flowers which occur singly, or in few-flowered groups, in leaf axils. Their primary flower stalks (peduncles) are subtended by leafy bracts. *Clematis morefieldii* is closely related to *C. viorna*, a more variable species. However, *C. morefieldii* is distinguished from this species by the dense white hairs on the shoot, the velvety lower leaf surfaces, and stouter, usually shorter (15 to 25 millimeters (mm) or 0.6 to 1.0 inch long) peduncles with sessile to nearly sessile bracts at the base (Kral 1987). *Clematis morefieldii* attains heights up to 5 meters (16 feet) and has compound leaves reaching lengths of 2 decimeters (8 inches). Leaves have 9 to 11 leaflets and the terminal 1 to 3 leaflets form tendrils. The flowers, which are present from May to July, are pinkish in color and 20 to 25 mm (0.8 to 1.0 inch) long. Fruits are clusters of hairy achenes.

C. Distribution and Habitat

Clematis morefieldii, a north Alabama endemic, occurs in the Cumberland Plateau physiographic region in Madison County (Figure 1). It occurs in patches near seeps and springs in rocky limestone woods, typically at elevations of 800 to 1100 feet, on the south and southwest facing slopes of mountains (Weber 1991). Currently, it is known from a total of five sites with populations on Huntsville, Keel, and Monte Sano Mountains. Populations tend to occur on limestone of the Monteagle formation with a sandstone cap (Weber 1991). Plants are rooted in basic clay-loam soils and are often found sprawling over shrubs and boulders or climbing understory shrubs and trees (Kral 1987). *Clematis morefieldii* occurs locally within a open to dense juniper-hardwoods community. Dominant

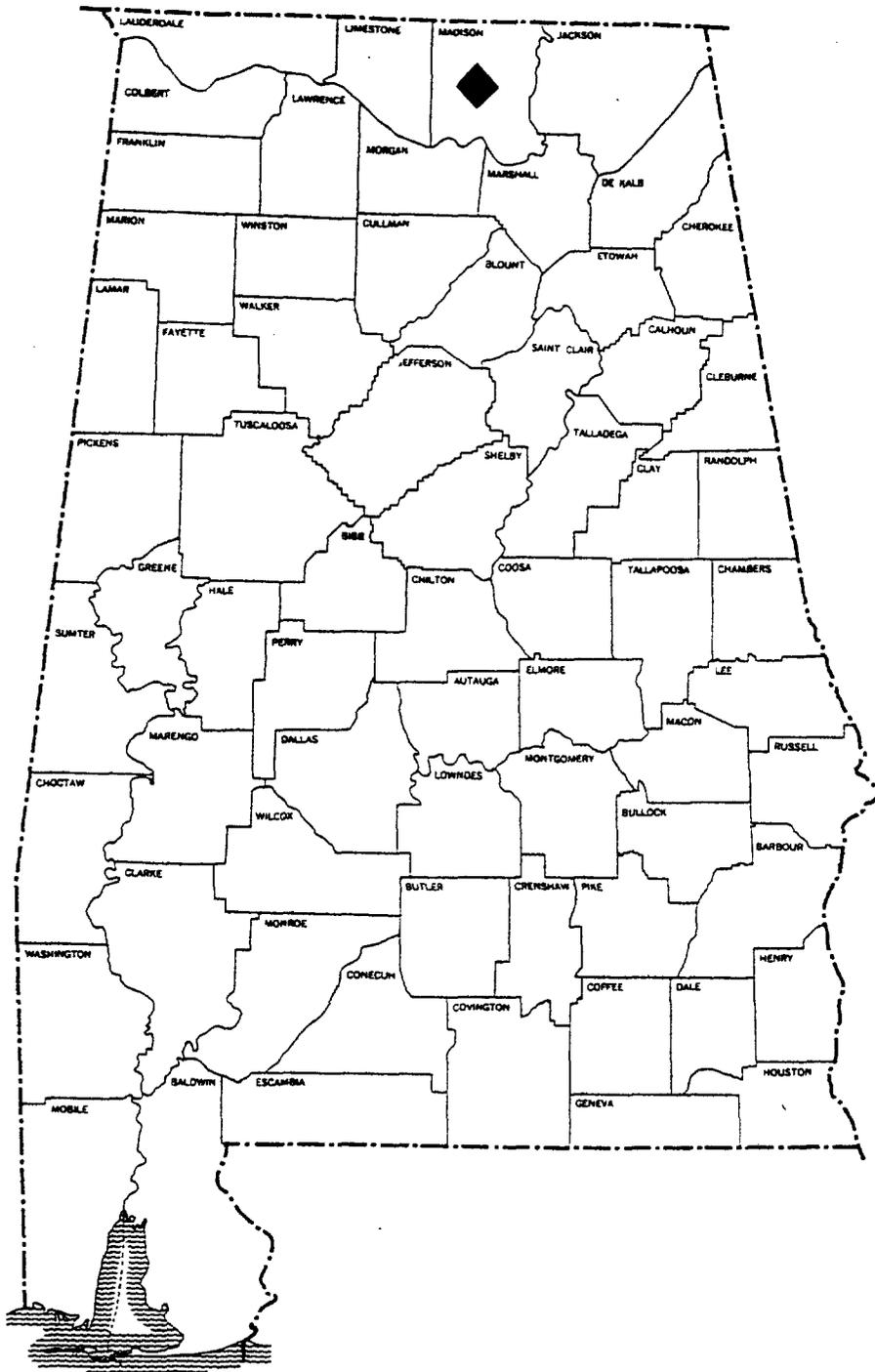


Figure 1. Known range of Morefield's leather flower

hardwoods include *Carya carolinae-septentrionalis*, *C. ovata*, (hickories), *Quercus shumardii*, *Q. muhlenbergia*, *Q. alba*, *Q. stellata* (oaks), *Ulmus* (elms), *Celtis* (hackberry), *Acer saccharum* (sugar maple), *Cercis canadensis* (red bud), and *Fraxinus americana* (white ash); however, *Cotinus obovatus* (smoke tree) is a principal indicator of *C. morefieldii* sites. Prominent shrub species include *Rhus aromatica* (fragrant sumac), *Symphoricarpos* (coral-berry), *Hypericum frondosum* (St. John's wort), *Callicarpa americana* (french mulberry), *Rhamnus caroliniana* (buckthorn), *Forestiera ligustrina* (swamp privet), and *Viburnum rufidulum* (blue haw). Notable herbaceous species are *Polymnia canadensis* (leaf-cup), *Silphium brachiatum* (rosinweed), and *Solidago auriculata* (golden-rod) (Kral 1987, Weber 1991).

D. Reasons for Listing

Much of this species' habitat has been destroyed by residential development. On Huntsville Mountain, three previously reported populations have been lost by road building, clearing, and herbicide use in association with residential development. Two of the remaining sites are imminently threatened due to their location on unimproved lots for sale in an established residential area. Adjacent lots have been sold and relandscaped, leaving little of the native vegetation intact. Two small sites (totalling 22 plants) on Monte Sano Mountain appears to be secure as it is in public ownership (City of Huntsville) and land managers are supportive of this species' protection.

This species is extremely vulnerable because of its limited range, few sites, and low numbers of plants at several areas. Only two populations are considered to be vigorous populations (100 to 300 plants); the other populations have 20 or fewer plants. One of these larger populations is imminently threatened, as is one of the smaller sites.

Clematis morefieldii appears to have restricted ecological requirements. Plants are locally distributed and seem to require areas where shale seeps are moist for a good part of the year (Weber 1991). Populations under a closed canopy appear less vigorous (i.e., fail to bloom, do not produce multiple-stemmed vine characteristic of those in more open habitat) (Weber in litt. 1994). Active management may be needed to maintain appropriate habitat for this species.

II: RECOVERY

A. Recovery Objective

The immediate recovery goal is to reclassify this species to threatened status. *Clematis morefieldii* will be considered for reclassification 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.

These recovery criteria are preliminary and may be revised on the basis of new information. Reclassification appears to be the more realistic goal at this time due to the small number of populations and limited amount of protection for those sites on private land.

B. Narrative Outline

1. Protect populations and habitat. The protection of the few existing sites is critical to ensuring the survival of this species.
 - 1.1. Ensure protection of publicly-owned sites. Two small sites are located on land owned by the City of Huntsville. Land managers are aware of its occurrence there and supportive of its protection. The Fish and Wildlife Service, and others, should work with the City to develop protection/management plans to ensure its long-term survival at these sites.
 - 1.2. Secure plants on private lands. All landowners should be contacted and encouraged to protect populations on their properties. Since the populations are located on private land, habitat protection opportunities through the Endangered Species Act are limited unless there is a federally funded or permitted project (Section 7). Permanent long-term protection should be sought for sites through land acquisition or conservation easements. However, if this option is not available, conservation agreements and other voluntary non-binding protective measures should be pursued. Those populations located on lots slated for development in a residential area pose a particularly challenging protection issue.

2. Search for additional populations. Limited surveys have been conducted by Kral (1987), Weber (1991), and the author; however, a thorough systematic survey for new populations is needed. Suitable habitat should be identified through an analysis of habitat supporting extant populations. Current sites occur near seeps and springs at elevations of 800 to 1100 feet in Monteagle Limestone with overlying shales and sandstones. Particular attention should be focused on sites with *Cotinus obovatus*, which appears to be a principal indicator species for *Clematis morefieldii* habitat. Surveys should continue in north Alabama (Limestone, Madison, Morgan, Jackson Counties) and extend into Franklin and Marion Counties in Tennessee (Kral 1987). Possible sites which have good potential include the south/southwest faces of the plateau region between Huntsville (AL) and Carter Mountain (TN) in Monteagle limestone and Brindley Mountain in Morgan County, AL (Weber in litt. 1994). The location and protection of additional sites is essential for reclassification to threatened and future recovery. The location of other populations will perhaps yield important information on this species' habitat requirements. In addition, documentation of apparently suitable habitat, which lacks the plants, will be important to any future plans to establish additional populations.

3. Gather baseline data on populations and habitat and conduct long-term monitoring. An understanding of this species' distribution within populations and its habitat needs is essential to determining limiting factors.
 - 3.1. Analyze plant distribution within populations. A thorough survey should be conducted in all potential habitats in the immediate vicinity of known populations. General information should be gathered for each site including size of populations, numbers of plants, and indications of vigor. Individual plant locations should be plotted on to maps to enable future relocation.

 - 3.2. Determining habitat parameters. Some preliminary analyses of habitat have been conducted; however, a more thorough investigation is needed. Habitat information should be gathered from all known sites. Data to be gathered should include: soil type and geologic formation; elevation; any microtopographic relations; canopy closure; plus information on community composition and structure, including associated species' lists for each site.

- 3.3. Conduct periodic monitoring of populations. Using baseline information gathered from Task 3.1, a monitoring program should be devised and implemented on a periodic basis. With monitoring, population trends can be tracked and recovery progress can be evaluated.
4. Investigate potential management techniques. Weber (1991) reported reduced vigor for plants under extremely shaded conditions. Populations appear to have been enhanced at sites where the canopy was more open from a limited amount of selective logging. Test plots to evaluate this species' response to different light levels and competition will assist in determining appropriate management for this species. Information gathered from Task 3 will aid in determining if management will be needed.
5. Study species' biology and conduct life history studies. No research on this particular species' life history has been conducted. An understanding of this species' biology and life history is essential to identifying limiting factors and understanding the dynamics of the populations. Information gained will ensure that populations are appropriately protected and managed.
 - 5.1. Initiate demographic studies. Basic demographic data should be obtained on populations where there are a sufficient number of plants. Studies should obtain information on all aspects of this species' life cycle. These studies will aid in identifying those stages most important to population growth and will be essential to predicting future population trends.
 - 5.2. Study reproduction and pollination biology. At several sites, only a small number of plants have been observed and such may be an indication of a reproductive problem. Information should be gathered on all aspects of this species' reproduction including breeding systems and pollination biology.
 - 5.3. Study seed biology and seed germination. Various aspects of seed biology and germination should be investigated including seed set, seed viability, dispersal, longevity, and seed banking, as well as germination requirements. According to McCartney (Woodlanders, pers. comm., 1994), seed of *Clematis morefieldii* readily germinates and appears to have good viability.

- 5.4. Conduct genetic analyses of populations. An assessment of genetic variability within populations, and the species as a whole, is needed through electrophoresis or DNA chloroplast studies. Few populations are known and several of these have low numbers of plants which may be genetically depauperate. Genetic information is an essential criterion for determining viability of a population.
- 5.5. Determine parameters of a viable population. This task is essential to defining recovery criteria, specifically what constitutes a viable population. The components of a viable population which need to be determined include minimum number of individuals and size and quality of habitat. Information gained from species' biology studies, particularly the genetic analyses, will be helpful to completing this task.
6. Preserve genetic stock. This species is extremely vulnerable due to such few populations. Protection of the gene pool should be accomplished through seed bank storage and by maintaining material in cultivation. This will provide material for research, propagation, and horticultural interests. Such activities should be conducted under the guidance of the Center for Plant Conservation. Roles which could be played by local botanical gardens (Huntsville-Madison County Botanical Garden) in this task should also be explored.
 - 6.1. Establish seedbank. Seeds should be collected from all populations, where there is a sufficient number of plants, at the appropriate time. Some seeds should be maintained in a long-term storage facility and tested for viability on a regular basis.
 - 6.2. Maintain material in cultivation. Populations should be maintained in cultivation to provide material for research, education, and possible reestablishment. It is important to maintain the genetic integrity of populations in cultivation.
7. Establish additional populations, if found to be necessary. Establishment of additional populations should be considered only after extensive searches for new populations have been conducted and there has been ample time to assess the progress of management actions on existing populations. Establishment of new populations should be considered as a means of decreasing the vulnerability of this species, which is restricted to only a few

sites. Established populations and their habitat will likely require active management and long-term monitoring to assess success of efforts. The number of populations to be established will be determined at the time the necessity of this task is assessed.

8. Develop public awareness program. Public support is an important part of recovering listed species. General information on this species and its conservation needs should be provided to landowners, governmental agencies, local parks, and nature centers, as well as the media. The recovery of this species will depend largely on the voluntary protection from private landowners and local governments. Education efforts will lead to a public more informed of the conservation needs of endangered species and possibly to the location of additional populations.

C. Literature Cited

Kral, R. 1987. A new "Viorna" *Clematis* from northern Alabama. *Ann. Missouri Bot. Gard.* 74:665-669.

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.

Weber, S.F. 1991. Status report on *Clematis morefieldii*. Unpublished report to U.S. Fish and Wildlife Service, Southeast Region, Jackson. 10 pp. + appendix.

PART III: IMPLEMENTATION SCHEDULE

The following Implementation Schedule outlines recovery actions and their estimated costs for the first 3 years of the recovery program. It is a guide for meeting the objective discussed in Part II of this plan. This schedule indicates task priorities, task numbers, task descriptions, duration of tasks, the responsible agencies, and lastly, estimated costs.

Priorities in column one of the following Implementation Schedule are assigned as follows:

- 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.
- 2 - An action that must be taken to prevent a significant decline in species population/habitat quality or some other significant negative impact short of extinction.
- 3 - All other actions necessary to provide for full recovery of the species.

Key to acronyms used in Implementation Schedule

USFWS - U.S. Fish and Wildlife Service

TE - Endangered Species Division, U.S. Fish and Wildlife Service

HC - Habitat Conservation, U.S. Fish and Wildlife Service

ALNHP - Alabama Natural Heritage Program

TNC - The Nature Conservancy (Alabama Field Office)

HLT - Huntsville Land Trust, City of Huntsville Planning Division

TDCE - Tennessee Department of Conservation and Environment -
Ecological Services Division

CPC - Center for Plant Conservation

IMPLEMENTATION SCHEDULE										
PRIORITY #	TASK #	TASK DESCRIPTION	TASK DURATION	RESPONSIBLE PARTY			COST ESTIMATES (\$K)			COMMENTS/NOTES
				USFWS		Other	FY 1	FY 2	FY 3	
				Region	Division					
1	1.1	Ensure protection of publicly-owned sites.	Ongoing	4	TE, HC	ALNHP, TNC, HLT	1.5			
1	1.2	Secure plants on private lands.	Ongoing	4	TE, HC	ALNHP, TNC	4.0	3.0	1.0	Intensive effort for 2 years to make contacts and draft agreements.
1	2	Search for additional populations.	2 years	4	TE	ALNHP, TDCE, Contractor	7.0	7.0		
2	3.1 3.2	Gather baseline data on populations and habitat.	2 years	4	TE	ALNHP, Contractor	8.0	8.0		
2	3.3	Conduct periodic monitoring.	Ongoing	4	TE	ALNHP, Contractor	-	-	3.0	3K/year estimated thereafter
2	4	Investigate management techniques.	5-10 years	4	TE	ALNHP, Contractor	-	-	3.5	Cost will vary/year depending on treatment. Total estimated for task is 25K.
2	5.1	Demographic studies	3 years	4	TE	ALNHP, Contractor	8.0	5.0	5.0	
2	5.2	Study reproduction and pollination biology.	2 years	4	TE	ALNHP, Contractor	5.0	5.0		

IMPLEMENTATION SCHEDULE										
PRIORITY #	TASK #	TASK DESCRIPTION	TASK DURATION	RESPONSIBLE PARTY			COST ESTIMATES (\$K)			COMMENTS/NOTES *
				USFWS		Other	FY 1	FY 2	FY 3	
				Region	Division					
2	5.3	Seed biology and seed germination studies	3 years	4	TE	CPC	5.0	5.0	5.0	
3	5.4	Genetic analyses	2 years	4	TE	Contractor	-	-	5.0	
3	5.5	Determine viable population parameters.	1 year	4	TE	ALNHP	-	-	-	To be completed after completion of other tasks. Estimated cost of 5K.
3	6	Preserve genetic stock.	Ongoing	4	TE	CPC	5.0	3.0	3.0	
3	7	Establish additional populations.	3 years	4	TE	ALNHP, CPC				Necessity of task to be determined at a later date.
3	8	Public education efforts	Ongoing	4	TE	ALNHP, HLT, TNC, CPC	2.5	2.5	2.5	

PART IV: APPENDIX

List of Reviewers

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