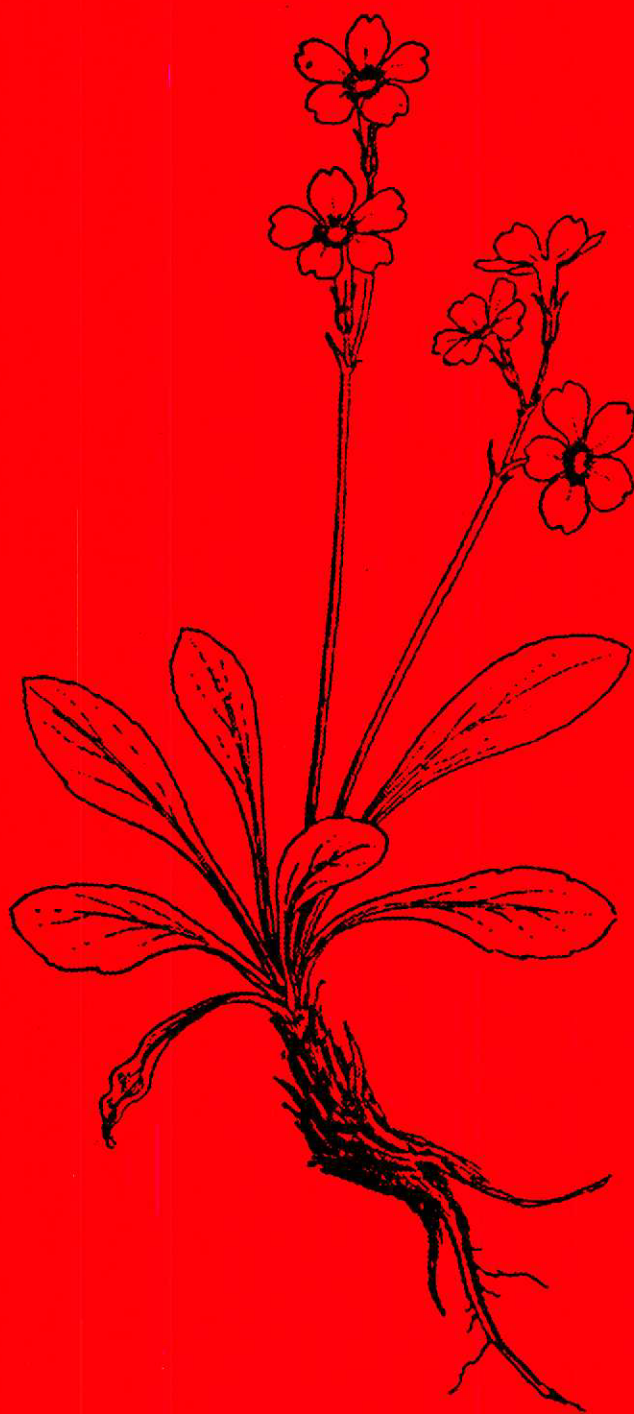


# Maguire Primrose

## Recovery Plan



**MAGUIRE PRIMROSE**

**(Primula maguirei)**

**RECOVERY PLAN**

Prepared by

Region 6

U.S. Fish and Wildlife Service

Denver, Colorado

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Regional Director, U.S. Fish and Wildlife Service

Date: SEPT. 27, 1990

## Disclaimer

Recovery plans delineate reasonable actions which are believed to be required to recover and/or protect the 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.

Literature Citation should read as follows:

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## EXECUTIVE SUMMARY

**Current Status:** Maguire primrose (Primula maguirei) is a perennial herbaceous plant with showy, reddish lavender flowers about 1 inch across, born on leafless stems up to 6 inches high. The species has an estimated population size of about 3,000 individuals in 6 known locations in Logan Canyon in northern Utah. The species' entire habitat is on Federal lands managed by the Logan Ranger District of the Wasatch-Cache National Forest. P. maguirei was listed as a threatened species on August 21, 1985 (50 FR 33731). The species has a high degree of vulnerability based on its small, restricted habitat and small population size. The species is threatened by current and potential habitat destruction or adverse modification by recreational activities and highway construction. The species is attractive and the potential for over-collecting and commercial exploitation exists.

**Habitat Requirements and Limiting Factors:** Maguire primrose is restricted to cool, moss-covered dolomite cliffs and boulders in the lower elevations of Logan Canyon and is restricted to and apparently dependent on the favorable temperature and moisture conditions of its microhabitat. In addition, the species also may be physiologically dependent on the calcium and magnesium carbonates of its soil substrate.

**Recovery Objective:** Indefinite protection of existing populations. Based on the species extremely small population size and vulnerable nature of the species' population and habitat, delisting P. maguirei does not seem possible in the foreseeable future.

### Recovery Criteria:

1. Ensure that the location and biological status of all populations of P. maguirei are known to all parties responsible for the species' management and its habitat and that these populations are monitored to ensure that no adverse activities or situations occur affecting this species.
2. Ensure that P. maguirei habitat is protected from environmental degradation through Section 7 of the Endangered Species Act.
3. Ensure that P. maguirei is protected from over-collecting and commercial exploitation.

### Actions Needed:

1. Inventory of suitable habitat for P. maguirei and determine with a reasonable degree of accuracy the population and distribution of the species.
2. Establish and conduct at least four minimum viable population studies on different subpopulations of P. maguirei.
3. Establish P. maguirei on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Enforce Federal and State laws and regulations controlling the unauthorized removal of plants.
4. Control activities which affect the habitat of P. maguirei through the Endangered Species Act and other relevant laws and regulations.

**Total Estimated Cost of Recovery:** As indicated above, recovery is not deemed to be possible.

**Date of Recovery:** As indicated above, recovery is not deemed to be possible.

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## I. INTRODUCTION

### A. Description

The Maguire primrose (Primula maquirei) was listed as a threatened species under the authority of the Endangered Species Act, as amended, on August 21, 1985 (50 FR 33731). The species is a perennial herbaceous plant growing 50 to 100 mm (2 to 4 inches) high. P. maquirei flower petals are red to purplish red in color with a yellow corolla tube throat. Flowers number one to three at the end of the flowering scape or stem. The corolla limb is 25 to 50 mm (0.5 to 1 inch) across with the corolla tube about 7 to 12 mm (0.3 to 0.5 inch) long and twice as long as the calyx. The leaves are oblong in shape and about 50 mm (2 inches) long and 12 mm (0.5 inch) broad. The leaves form a basal rosette at the base of flower scapes. The plant flowers in early spring (mid-April to mid-May). For a detailed discussion of the taxonomy of P. maquirei see Williams (1936) and Welsh et al. (1987).

### B. Distribution

Primula maquirei is restricted to very shallow soils derived from dolomitic rock of the Laketown and Fish Haven geologic formations. The species occurs at an elevational range of 1400 to 1800 meters (4,800 to 6,000 feet) along the lower canyon walls of Logan Canyon in Cache County, Utah. The plant usually occurs on northerly facing exposures, often on cliff or boulder faces, and almost always in areas with cool, moist microclimates. The species is known from six separate sites within Logan Canyon over a distance of about 19 km (12 miles) from the mouth of the canyon to Wood Camp (Padgett 1986; see Figure 1).

### C. Population Biology

Primula maquirei has a total estimated population of about 3,000 individuals. The six known separate stands can be divided into two populations; one at the mouth of Logan Canyon on a discontinuous series of dolomitic cliffs and boulders on the north facing canyon slope from about 0.8 km (0.5 mile) from the canyon mouth to a distance of about 3 km (2 miles) up the canyon, and one with five separate identified stands in the middle portion of the canyon from near the mouth of Card Canyon to Wood Camp (Padgett 1986).

Primula maquirei's reproduction is probably sexual. Flowering usually occurs from mid-April to mid-May and fruit development and seed dispersal occurs from May through June. Both bees and flies have been observed visiting the species flowers (Beedlow et al. 1980, and Padgett 1986). The specific pollinators; however, are not known. The environmental factors which govern the distribution of P. maquirei are not well understood, nor are the long-term population dynamics.

### D. Habitat

Primula maquirei populations occur on north facing cliffs and boulders of dolomite, a rock composed of magnesium and calcium carbonates, of the Laketown and Fish Haven geologic formations (upper Ordovician and lower Silurian). The

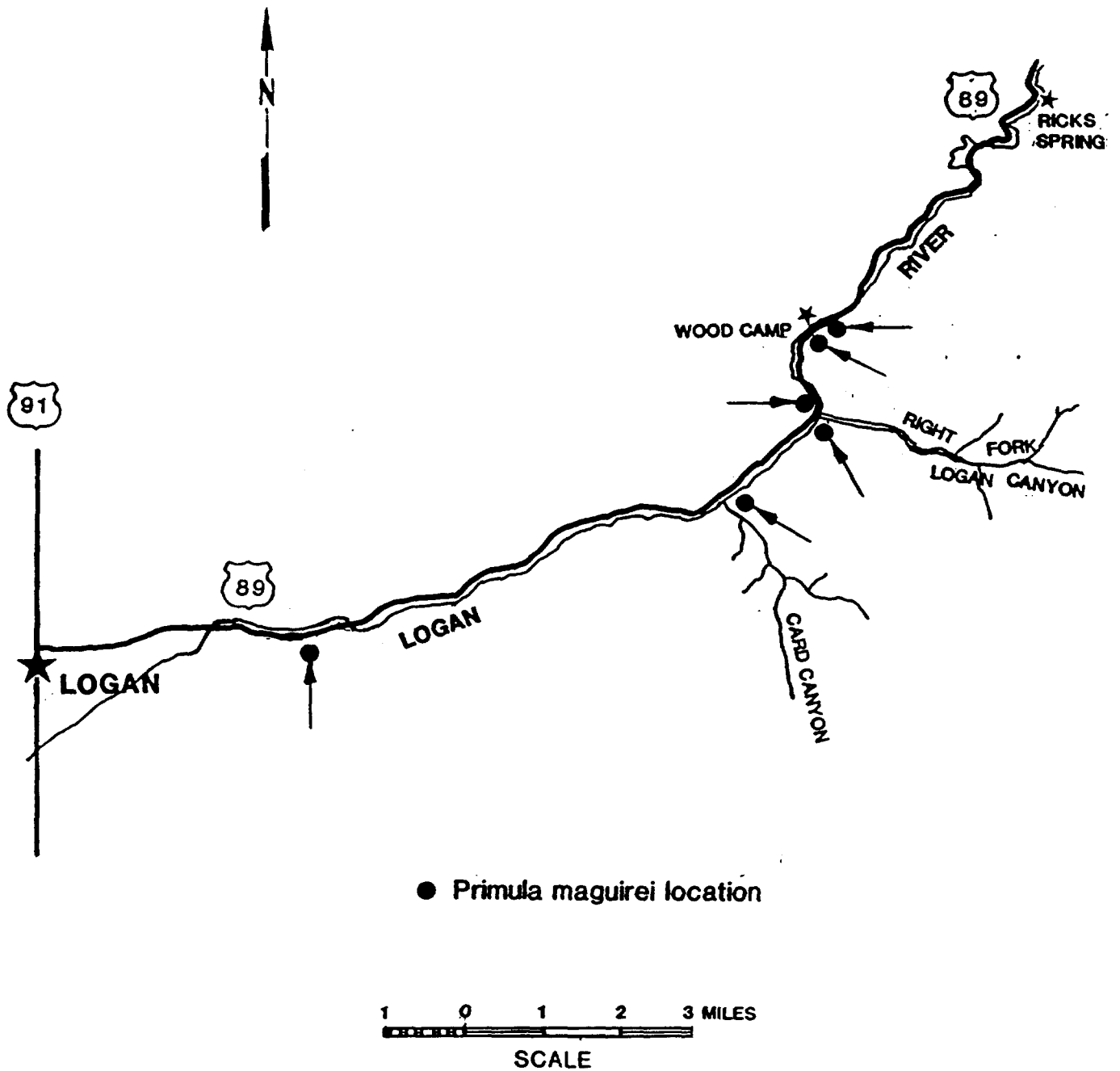


Figure 1. Distribution of *Primula maguirei* (Maguire primrose) in Logan Canyon, Cache County, Utah.



species is found growing in cracks and crevices or in a well-developed mat of moss species on those cliffs and boulders. P. maquirei grows in association with Huechera rubescens, Petrophytum caespitosum, Ranunculus ranunculinus, and Musineon lineare. The cliff face vegetation of P. maquirei is a small inclusion within the canyon vegetation of Logan Canyon which is a mosaic of mountain shrub, montane coniferous forest, and riparian vegetative communities, characteristic of the Wasatch Mountains (Cronquist et al. 1972).

#### E. Limiting Factors

Primula maquirei is restricted to cool, moss-covered dolomite cliffs and boulders in the lower elevations of Logan Canyon and is restricted to and apparently dependent on the favorable temperature and moisture conditions of its microhabitat. In addition, the species also may be physiologically dependent on the calcium and magnesium carbonates of its soil substrate. There is no evidence that the range of P. maquirei is any more restricted today than as indicated by historical botanical records. This is especially true given the scant information available regarding the species' range prior to rare plant inventories inspired by the Endangered Species Act of 1973. Habitat, similar to that occupied by the species in Logan Canyon, has been searched in other canyons in the Bear River and Wasatch Ranges of northern Utah and adjacent Idaho for additional populations of P. maquirei with no success (L. Shultz, Utah State University, pers. comm., 1984; and M. Franklyn, Utah Natural Heritage Program, pers. comm., 1990). Whether the species' present restricted range is a result of natural rather than man-induced factors is not known. Potential and actual habitat areas at the canyon floor may have been impacted significantly by human activity, especially nearer the canyon mouth where there are more developed areas.

Biologically, P. maquirei is, apparently, limited by the availability of suitable habitat. The amount of potential habitat with the environmental factors characterized by dolomitic limestone rock faces with the appropriate cool, moist microenvironmental conditions is extremely limited.

#### F. Threats

Current and potential threats to P. maquirei stem primarily from road construction, water development, recreation, and collecting (Beedlow et al. 1980, Padgett 1986, U.S. Fish and Wildlife Service 1985, Welsh 1979a, and Welsh 1979b).

The reach of Logan Canyon which harbors P. maquirei is very narrow with steep-sided slopes and low cliffs which border a narrowly constricted canyon floor and the Logan River. Through this canyon runs U.S. Highway 89 which is the main transportation route (and only direct all weather route) between the Bear Lake region of northeastern Utah and southeastern Idaho, and Cache Valley and the rest of northern Utah. There is strong sentiment, locally and regionally, to upgrade Highway 89 through Logan Canyon by improving the current 25 (+ or -) foot wide roadway to a straighter, wider highway. Some of these proposed highway improvements will directly impact some populations of P. maquirei. Other highway improvements could indirectly impact the species by modifying the

vegetative and geomorphological nature of the canyon with a resulting change in the microclimatic environment of P. maquirei habitat (Beedlow et al. 1980, CH2M Hill 1987, Federal Highway Administration 1987, Padgett 1986, U.S. Fish and Wildlife Service 1985, Welsh 1979a).

Primula maquirei habitat in Logan Canyon is adjacent to reservoirs and water pipelines. Potential future maintenance or improvements of these facilities have the potential to impact this species (Beedlow 1980, U.S. Fish and Wildlife Service 1985). Several campgrounds are adjacent to P. maquirei habitat and their development and use may have affected portions of the species' population (U.S. Fish and Wildlife Service 1985, Welsh 1979a). Rock climbing in P. maquirei cliff habitat is a recreational pursuit engaged in by many young adults from nearby communities (Logan, Utah, is the site of Utah State University). This activity directly affects portions of some of the species population (Beedlow et al. 1980, Padgett 1986, U.S. Fish and Wildlife Service 1985).

Primula maquirei is a very beautiful plant with showy reddish lavender flowers on a graceful stem with bright green basal leaves. The species has definite horticultural value for specimen plants in primrose collections and as a landscaping plant in rock gardens. The species has been casually collected for bouquets and attempts have made to introduce it into local gardens (L. Shultz, pers. comm. 1984; Welsh 1979b). The past success of gardening attempts with P. maquirei are thought to have been unsuccessful (see Shultz 1984 above). The current degree of collecting of this species is not known, though it is thought to be insignificant. This species, however, in addition to being beautiful, is very rare and highly endemic and, therefore, has a high potential to become a prize for plant collectors (U.S. Fish and Wildlife Service 1985, Welsh 1979a, Welsh 1979b). In the future this species may become further imperiled by unregulated commercial trade from specimens of wild origin.

## II. RECOVERY

### A. OBJECTIVE AND CRITERIA

The objective of this recovery plan is protection of the P. maquirei population and its habitat. The removal of P. maquirei from the list of endangered and threatened species may not be feasible given the species very small natural population, limited habitat, and the persistent nature of potential threats. Maintaining this species as threatened on the list of endangered and threatened species will ensure that this species and its habitat will receive the recognition and protection necessary to ensure their long-term survival. The following recovery and conservation criteria should ensure the continued existence of the species and the maintenance of its habitat:

1. Ensure that all populations of P. maquirei are known to all parties responsible for the management of P. maquirei and its habitat and that these populations are monitored to ensure that no adverse activities or situations occur affecting the species.
2. Ensure that P. maquirei habitat is protected from environmental degradation through Section 7 of the Endangered Species Act.
3. Ensure that P. maquirei is protected from over-collecting and commercial exploitation through Section 9 of the Endangered Species Act and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

It must be understood that the above objective and criteria are subject to change as more information becomes available. Since delisting does not seem possible in the foreseeable future, no date can be established for recovery.

### B. STEPDOWN OUTLINE

1. Inventory of all suitable habitat for P. maquirei.
  - 1.1. Identify, delineate, and census existing populations of P. maquirei.
  - 1.2. Identify potential habitat of P. maquirei.
2. Manage activities which affect the habitat and population of P. maquirei.
  - 2.1. Manage road building and maintenance.
  - 2.2. Manage recreational impacts.
  - 2.3. Manage water developments activities.
  - 2.4. Prevent collecting, commercial exploitation, and destruction of P. maquirei plants from wild populations.
3. Establish and conduct at least four minimum viable population studies.
4. Develop techniques necessary to establish populations of P. maquirei.

C. NARRATIVE OUTLINE

1. Inventory of all suitable habitat for P. maguirei.

Inventories will identify essential habitat and those populations which may best ensure the long-term survival of the species and areas with the potential for the establishment of additional populations.

1.1. Identify, delineate, and census existing populations of P. maguirei.

Inventories will yield precise locations and extent of all P. maguirei populations and an initial total population census. This information will provide the biological baseline information necessary for determining population trend and indications of obscure factors affecting the species population.

Inventories will provide information on age class distribution; population increases or decreases for each stand of plants; and the impact of plant collecting, recreational rock climbing and hiking, and any other natural or man-caused conditions on the species (U.S. Forest Service, 1986).

1.2. Identify potential habitat of P. maguirei.

Potential habitat in canyons adjacent to and tributary to the current distribution of P. maguirei will be studied to identify sites for future introduction. Additional populations of the species will increase abundance and will maintain the species in the event of a catastrophic loss of one or more of the existing populations or subpopulations. These sites may have harbored populations of the species in the past.

2. Manage activities which affect the habitat and population of P. maguirei.

Section 7 of the Endangered Species Act of 1973, as amended, requires that all Federal agencies ensure that activities they authorize, fund, or carry out do not jeopardize the continued existence of any endangered or threatened species. Through Section 7 of the Endangered Species Act and other relevant laws and regulations (including the National Environmental Policy Act, and the National Forest Management Act), Federal agencies can ensure that potential habitat disturbing activities are avoided or modified to the degree that they do not adversely affect P. maguirei and its habitat.

Section 9 of the Endangered Species Act makes it unlawful to maliciously damage or destroy any listed threatened or endangered plant species from areas under Federal jurisdiction or to remove, cut, dig up, damage, or destroy any such species in knowing violation of any law or regulation of any State or in the courses of any violation of a State criminal trespass law. These activities may be controlled through effective monitoring, law enforcement, and the judicious application of Section 10 penalties of the Endangered Species Act.

2.1 Manage road building and maintenance.

Proposed improvements to U.S. Highway 89 through Logan Canyon have the potential to significantly affect one or more stands of P. maquirei. Road construction and maintenance within habitat of P. maquirei is regulated by the Forest Service, which must give the necessary land use permits, and the Federal Highway Administration through the Utah Department of Transportation, which is responsible for planning and constructing those road projects. The Forest Service and Federal Highway Administration are required by Section 7 of the Endangered Species Act to ensure that all highway improvements and maintenance activities are designed and implemented to minimize adverse impacts to the species so that an activity will not jeopardize the species.

2.2. Manage recreational impacts.

Recreational activities and the potential development of recreational facilities may adversely affect certain populations of P. maquirei. Recreational facilities such as campgrounds and hiking trails must be designed and situated to avoid impacting P. maquirei and its habitat. Rock climbing activities should be prohibited on cliffs harboring populations of the species. Controlling these activities also will lessen the likelihood of incidental collecting of P. maquirei from its wild population (see recovery task 2.4).

2.3. Manage water development activities.

Water pipelines and impoundments in Logan Canyon have the potential to adversely affect certain stands of P. maquirei. The design of these projects should be done to minimize their impact on the species. The Bureau of Reclamation, the U.S. Army Corps of Engineers, and the Forest Service are required by Section 7 of the Endangered Species Act to ensure that water development activities will not jeopardize this species.

2.4 Prevent collecting, commercial exploitation, and destruction of P. maquirei plants from wild populations.

Section 9 of the Endangered Species Act makes it unlawful to remove and reduce to possession, maliciously damage or destroy any listed threatened or endangered plant species from areas under Federal jurisdiction, or to remove, cut, dig up, damage, or destroy any such species in knowing violation of any law or regulation of any State or in the course of any violation of a State criminal trespass law. The entire P. maquirei population is on Federal land under the management of the Forest Service.

The Fish and Wildlife Service and the Forest Service will be responsible to ensure that populations of P. maquirei on lands under

Federal jurisdiction are not affected by unauthorized collection. Control of this threat will be accomplished with periodic monitoring of the species populations by law enforcement agents of both agencies, and taking appropriate action when necessary.

Primula maquirei should be added to Appendix I of the CITES. This will make the international export of P. maquirei plants illegal unless the proper permits are obtained from the Fish and Wildlife Service. No permits should be issued for plants collected in the wild except for explicit conservation activities. After the species is added to Appendix I, the Fish and Wildlife Service's Office of Management Authority and Law Enforcement Division will monitor trade to ensure that this species is not illegally traded.

3. Establish and conduct at least four minimum viable population studies.

Minimum viable population studies will document demographic stability of the species' population plus allow monitoring of natural and man-caused impacts to the species and its habitat. A minimum viable population is defined as: a demographically stable population that is large enough to maintain genetic variation and to enable it to evolve and successfully respond to natural environmental variation (see Menges 1986). If, as a consequence of these studies, other factors, natural or man caused, are identified as possibly having a detrimental effect on the species' population, those factors will be addressed and the recovery plan revised accordingly. Little is known concerning natural threats such as disease, parasitism, and predation on P. maquirei. These studies also will include the measurement of the biotic and abiotic factors (such as microclimatic factors, pollinators, etc.) that define the species ecosystem. It is possible that many, if not most, populations of P. maquirei are at population levels that will not ensure long-term demographic viability. Two minimum viable population studies will be initiated within each of the two species' populations.

4. Develop techniques necessary to establish populations of P. maquirei.

The development of techniques necessary to propagate P. maquirei will enable the possible introduction/reintroduction of the species into additional potential habitat within or adjacent to the current range of the species. These introductions will lessen the natural vulnerability of the species to habitat disturbances. The availability of artificially propagated plants also should provide a source for any commercial demand for the species for garden or specimen plants and provide a source for specimens for educational instruction and scientific research.

The Fish and Wildlife Service will work with legitimate horticulturists to provide a source of P. maquirei plants to satisfy the horticultural demand for this species. This will be accomplished by using plants currently in cultivation and, if necessary, with seeds collected under permit from wild populations.

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### III. IMPLEMENTATION SCHEDULE

The Implementation Schedule that follows outlines actions and costs for the recovery program. It is a guide for meeting the objectives elaborated under II. Recovery of this plan. This schedule indicates the recovery plan tasks, task priorities, duration of tasks ("ongoing" denotes a task that once begun should continue on an annual basis), the responsible agencies, and lastly estimated costs. These actions, when accomplished, should bring about the conservation of P. maquirei and protect its habitat.



Priorities in column one of the following implementation schedule are assigned as follows:

1. Priority 1 - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.
2. Priority 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. Priority 3 - All other actions necessary to meet the recovery objective.

Key to acronyms used in implementation schedule

- COE - U.S. Army Corps of Engineers
- CPC - Center for Plant Conservation
- FHA - Federal Highway Administration
- FS- Forest Service
- FWS - Fish and Wildlife Service
- FWE - Fish and Wildlife Enhancement
- LE - Law Enforcement
- OMA - Office of Management Authority
- UT - State of Utah, including the Utah Natural Heritage Inventory

Primula maguirei (Maguire primrose) Recovery Implementation Schedule

Priority	Task	Task Description	Task Duration	Responsible Party			Cost Estimates			Comments
				Region	FWS Program	Other	FY-91	FY-92	FY-93	
2	1.1	Identify occupied habitat	3 years	6	FWE	FS,UT	2,000	2,000	2,000	
2	1.2	Identify potential habitat	3 years	6	FWE	FS,UT	included in task 1.1			
2	2.1	Manage road construction	ongoing	6	FWE	FS,FHA,UT	2,000	2,000	2,000	
2	2.2	Manage recreational activities	ongoing	6	FWE	FS	included in task 2.1			
2	2.3	Manage water development activities	ongoing	6	FWE	FS,COE,UT	included in task 2.1			
2	2.4	Protect from unauthorized removal and destruction	ongoing	6	LE,FWE OMA	FS,UT	included in task 2.1			
2	3	Establish and conduct minimum viable population studies	10 years	6	FWE	FS,UT	2,000	2,000	2,000	
2	4	Develop population establishment techniques	10 years	6	FWE	FS,UT,CPC	2,000	2,000	2,000	

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This recovery plan was made available to the public for comment as required by the 1988 amendments to the Endangered Species Act of 1973 (Act), as amended. The public comment period was announced in the Federal Register on June 27, 1990, and closed on August 13, 1990. Press releases were sent to over 50 print media in Utah.

One comment letter was received. The comments provided in this letter have been considered, and incorporated as appropriate. Comments addressing recovery tasks that are the responsibility of an agency other than the U.S. Fish and Wildlife Service have been sent to those agencies, as required by the 1988 amendments to the Act.