DRAFT

HELIOTROPE MILKVETCH

ASTRAGALUS MONTII

RECOVERY PLAN

Prepared by

Region 6, U.S. Fish and Wildlife Service

Approved: _____

Regional Director, U.S. Fish and Wildlife Service

Date: _____

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 or 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:

U.S. Fish and Wildlife Service. 1995. Heliotrope milkvetch (*Astragalus montii*) recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado. 11 pp.

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EXECUTIVE SUMMARY

Current Status: The Heliotrope milkvetch (Astragalus montii) is known from three populations with a total range of about 8 miles across on the Manti-LaSal National Forest in central Utah. The total population of A. montii is estimated to be about 200,000 individuals with an occupied habitat of about 400 acres.

Habitat and limiting Factors: Astragalus montii occurs in a very limited habitat of shale barrens at timberline. The species habitat is underlain by coal and petroleum deposits. Future development of oil and gas wells and ancillary facilities has the potential to endanger the continued existence of A. montii. The species habitat is grazed by domestic sheep. Overuse of the species habitat has the potential to destroy significant portions of the species population and degrade its habitat.

Recovery objective: Delisting

Recovery Criteria: Delisting of the species may be considered when:

1. A total population of 200,000 A. montii individuals is documented for 5 consecutive years.

2. All three populations have been maintained at minimum viable population levels for 5 consecutive years.

3. Establish and implement formal land management designations and resource management plans for each of the three populations to assure their continued long-term protection.

Actions Needed:

1. Control activities which affect the habitat of A. montii through Sections 7 and 9 of the Endangered Species Act and other relevant laws and regulations.

2. Inventory suitable habitat for A. montii and determine with a high degree of accuracy the population and distribution of the species.

3. Determine the biological and ecological factors critical to the species conservation and conduct minimum viable population studies in each of the species known populations.

4. Establish and implement formal Forest Service land management designations and habitat management plans which will provide for long term, undisturbed protection for A. montii and its habitat.

5. Develop public awareness, appreciation, and support for the conservation of A. montii.

Date of Recovery: 2005
Total Cost of Recovery: Unknown

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I. INTRODUCTION

The Heliotrope milkvetch (Astragalus montii) was listed as a threatened species under the authority of the Endangered Species Act, as amended, (Act) on November 6, 1987 (52 FR 42657). Critical habitat has been designated for the species western Heliotrope Mountain population (Figure 1). Astragalus montii has a recovery priority of 17 which indicates it is a species with a low degree of threat and a low recovery potential. Astragalus montii was first discovered by Mont Lewis and Robert Thompson in July, 1976. Dr. Stanley Welsh recognized it as a species new to science and named it in Lewis' honor in 1978 (Welsh 1978). The species has also been treated as a variety of A. limnocharis (Isely 1983). The most recent regional Flora (Welsh et al. 1993) treats the entity at full species rank.

A. Description

Astragalus montii is a perennial, herbaceous plant in the legume family (Fabaceae). The species is very low growing nearly stemless plant approximately 1 to 5 centimeters (cm) (0.4 to 2 in.) tall arising from a branched caudex. Stems are ascending to erect. Leafs are pinnately compound with 5 to 13 leaflets and connate stipules sheathing the stem. Leaf length is 1.3 to 4.8 cm (0.5 to 2.0 in), stipule length is 2 to 4 millimeters (mm) (0.08 to 0.16 in), leaflets are lanceolate to elliptic or oblong 2 to 8 mm (0.08 to 0.32 in) long and 1 to 2 mm (0.04 to 0.08 in) wide. Stems and leaves are pubescent with basalfixed hairs, leaflets are glabrous above and strigose beneath (Welsh et al. 1993).

Astragalus montii has two to eight flowers borne in a racemose inflorescence. The peduncle is 0.8 to 4.5 cm (0.3 to 1.8 in) long and is ascending to erect while the flowers are in anthesis and reclining in fruit. Flowers are ascending to spreading during anthesis. The pedicle is 0.8 to 1.5 mm (0.03 to 0.06 in) long. The calyx is campanulate with strigose pubescens, 3.3 to 4.0 mm (0.13 to 0.16 in) long with the tube 2.2 to 2.5 mm (0.09 to 0.10 in) long, the teeth are triangular-subulate 0.6 to 1.5 mm (0.02 to 0.06 in) long. The species has papilionaceous flowers; with large dorsal banner, two lateral wings and smaller ventral keel; characteristic of the legume family. The flowers are pinkish purple with white wing-tips, 7.2 to 8.0 mm (0.28 to 0.31 in) long. The pods are ovoid, bladdery-inflated, 11 to 18 mm (0.43 to 0.71 in) long and 8 to 12 mm (0.31 to 0.47 in) thick, with mottled pinkish brown coloration and strigose pubescens borne sessile on the peduncle. Ten ovules are borne in the unilocular pod (Welsh et al. 1993).

B. Distribution

Astragalus montii is known to occur in three populations, all on public land in the Manti-LaSal National Forest (Figure 2). Two populations are on Heliotrope Mountain in southern Sanpete County, Utah. The third population is on White Mountain in northern Sevier County. The western Heliotrope Mountain

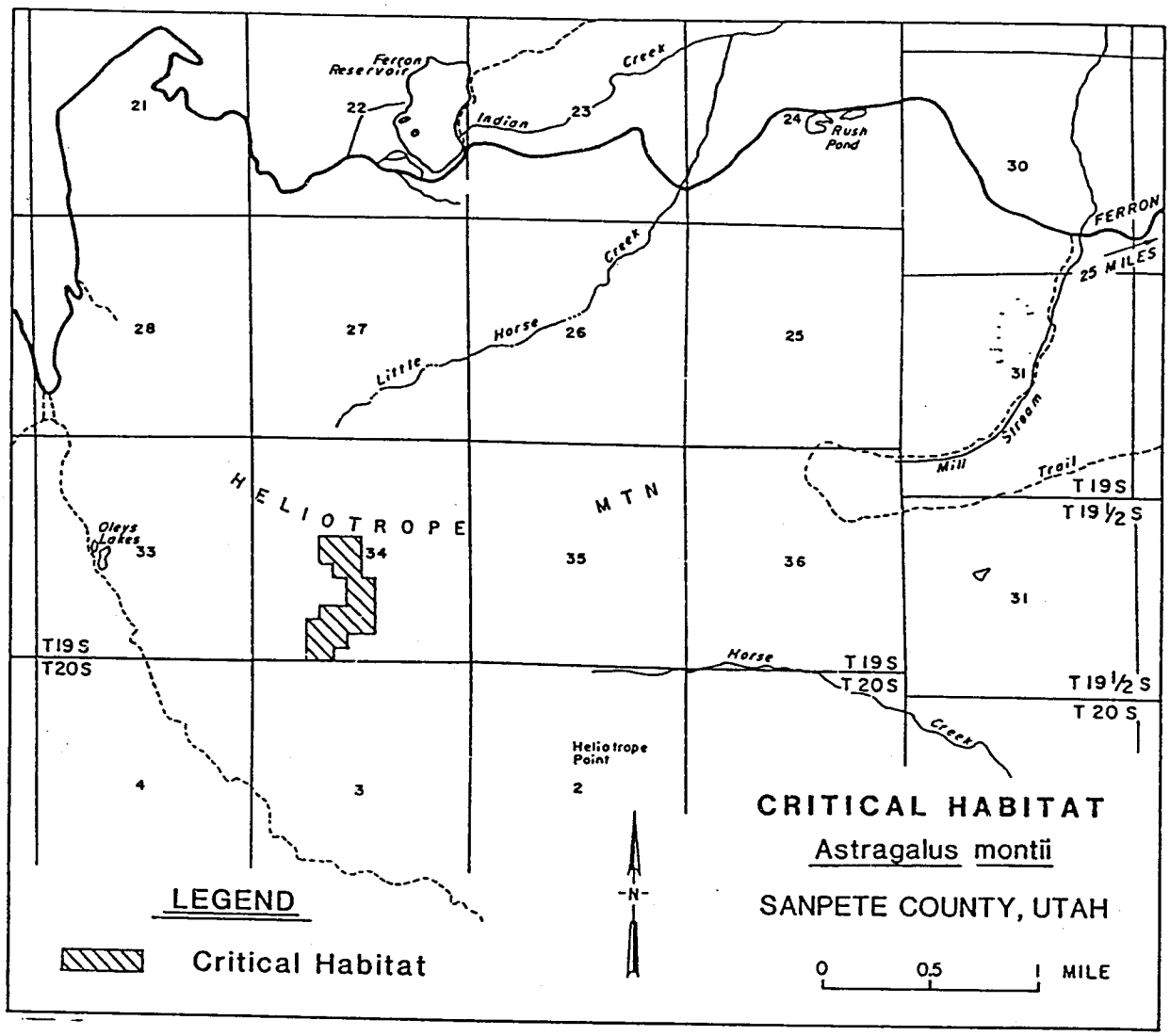

Figure 1. Critical Habitat for the Heliotrope milkvetch (Astragalus montii). Utah, Sanpete County, western Heliotrope Mountain. T.19S., R.4E., Sec. 34. The primary constituent element is the white limestone barrens of the Flagstaff Formation.

In preparation

Figure 2. Distribution of Astragalus montii. (Map to be prepared under contract)

population has an estimated 40,000 individuals occupying about 20 hectares (50 acres) of habitat. The eastern Heliotrope Mountain population, about 3 km (kilometers) (2 mi.) east of the western Heliotrope Mountain population, has an estimated 100,000 individuals occupying about 16 hectares (40 acres) of habitat. The White Mountain population, about 11 km (7 mi.) south of Heliotrope Mountain, has an estimated 60,000 individuals, occupying a discontinuous series of small stands within an area of about 120 hectares (300 acres).

C. Life History and Population Biology

Astragalus montii reproduction is sexual. Asexual reproduction is unknown. The plants begin flowering immediately after winter snows melt in their subalpine habitat, usually about mid-June. The stigmas are receptive during the first three days of anthesis. The species is capable of self-fertilization but has significantly higher seed production and presumed higher vigor from cross-fertilization (Geer and Tepideno 1993). The species is pollinated by wild bees of the family Megachilidae, especially those of the genus Osmia (Tepideno and Griswold 1990). The seeds are shed beginning in July and continuing into August.

The population numbers of A. montii have been variously estimated by different researchers. Tuhy (1990) estimates a total A. montii population of nearly two million based on quadrate sampling and extrapolating the measured density to the entire occupied habitat. This population value is three orders of magnitude greater than that estimated by Welsh (1978) and Thompson (1985). The population values cited in this plan are intermediate between the two extremes. The population A. montii must be more precisely measured. The factors which govern the distribution of A. montii are not well known, nor are the long-term population dynamics (Thompson 1985, Tuhy 1990).

D. Habitat and Limiting Factors

The habitat of A. montii is high elevation, 3,200 to 3,352 meters (10,500 to 11,000 ft), limestone barrens derived from the Flagstaff Geological Formation. The species habitat type is an inclusion within a subalpine mixed grass-forb plant community with scattered stands of subalpine fir (Abies lasiocarpa) and Engelmann spruce (Picea engelmannii) krummholz. All suitable sites for this species have been surveyed for populations of this species. Except for the three populations described above, none have been found. The plant community associated with A. montii include the following species: Phlox pulvinata, Eriogonum brevicaule, Draba oligosperma, Senecio canus, Potentilla concinna, Erigeron leiomerus, Poa interior, Arenaria rubella, Silene petersonii, Cymopterus lemmonii, and Townsendia montana.

The soil characteristics of A. montii habitat are shallow and poorly developed. Over 90 percent of the ground surface is covered with rocks or rock fragments. Soil material and plant roots extend down into fractured rock 2 to 8 decimeters (dm) (8 to 32 in). Less than ten percent of the total mantle is soil material, most is exposed bedrock or rock fragments. Soil

texture is clay loam to a silty clay loam with a light gray to grayish brown color. Soil pH ranges from 7.5 to 8.0. Astragalus montii abundance and distribution is limited by its very restrictive habitat. The species is vulnerable to any event which could cause the local extirpation of one or more of its isolated stands within its three small populations (Thompson 1985).

E. Threats

Oil and gas exploration, drilling, and production, are past, existing and potential threats to the habitat of A. montii. The population of A. montii is underlain by petroleum deposits associated with the "Overthrust Belt" of the western United States. Given the very limited distribution of A. montii, habitat disturbance associated as a consequence of oil and gas exploration and production that did not plan for the species could have a serious impact on its survival. General off-road vehicle use is not allowed in the species occupied habitat.

Limited sheep grazing under grazing management plans occur in the habitat of A. montii. Actual detrimental impacts to this species resulting from direct grazing or trampling have not been observed. The Wasatch Plateau was more intensely grazed historically, but Forest Service grazing management plans have reduced grazing to levels believed to be compatible with the conservation of A. montii and its immediate plant community. The harshness of the alpine environment (short growing season, intense sunlight, extremely variable temperatures, etc.) contributes to the fragility of the A. montii ecosystem. Disturbances may have catastrophic and as yet unknown long-term consequences to such a narrow endemic occupying these subalpine habitats.

II RECOVERY

A. Objective and Criteria

The objective of this recovery plan is to maintain viable populations of Astragalus montii at its known sites, and delisting when the following criteria have been met.

Recovery Criteria:

1. A total population of 200,000 A. montii individuals is documented for 5 consecutive years.

2. All three populations have been maintained at minimum viable population levels for 5 consecutive years.

3. Establish and implement formal land management designations and resource management plans for each of the three populations to assure their continued long-term protection.

Actions Needed:

1. Control activities which affect the habitat of A. montii through Sections 7 and 9 of the Endangered Species Act and other relevant laws and regulations.

2. Inventory suitable habitat for A. montii and determine with a high degree of accuracy the population and distribution of the species.

3. Determine the biological and ecological factors critical to the species conservation and conduct minimum viable population studies in each of the species known populations.

4. Establish and implement formal Forest Service land management designations and habitat management plans which will provide for long term, undisturbed protection for A. montii and its habitat.

5. Develop public awareness, appreciation, and support for the conservation of A. montii.

The above objectives and criteria are subject to change as more information becomes available. The estimated date for accomplishing the recovery of A. montii is 2005.

The total cost of recovery is unknown.

B. Stepdown Outline for Recovery Tasks Addressing Threats

1. **Control activities which affect the habitat of A. montii through Section 7 of the Endangered Species Act and other relevant laws and regulations.**

   1.1 Regulate and control mineral development activities.

   1.2 Control other activities which may affect the species.

2. **Inventory of all suitable habitat for A. montii and determine with a high degree of accuracy its population and distribution.**

3. **Establish and conduct a minimum viable population study on each of the three populations of A. montii.**

4. **Establish and implement formal land management designations and plans which would provide for long term, undisturbed habitat for each of the three populations of A. montii.**

5. **Conduct life history, biological, and ecological research.**

6. **Propagate individuals in horticultural facilities.**

7. **Develop public awareness, appreciation, and support for the conservation of A. montii.**

C. Narrative for Recovery Tasks Addressing Threats

1. Control activities which affect the habitat of A. montii through Section 7 of the Endangered Species Act and other relevant laws and regulations. The entire known habitat of A. montii occurs on Manti-LaSal National Forests. Section 7(a) of the Act, as amended, requires Federal agencies to evaluate their actions with respect to any species that is proposed or listed as endangered or threatened. Regulations implementing this interagency cooperation provision of the Act are codified at 50 CFR Part 402. Section 7(a)(2) requires Federal agencies to insure that activities they authorize, fund, or carry out are not likely to jeopardize the continued existence of such a species or to destroy or adversely modify its critical habitat. If a Federal action may affect a listed species or its critical habitat, the responsible Federal agency must enter into formal consultation with the Fish and Wildlife Service.

   1.1 Regulate and control mineral development activities. Astragalus montii was listed as an endangered species in part because of the potential of oil and gas development actions adversely impacting this species. The Forest Service and the Bureau of Land Management (the agency responsible for mineral leasing on Federal lands) will be the agencies primarily responsible to ensure that mineral development activities do not adversely affect A. montii.

1.2 Control other activities which may affect the species. The monitoring of the A. montii population will enable the identification of other factors affecting the species population. When and if these are identified they will be evaluated and action implemented to prevent adverse impact to the species' population.

2. Inventory of all suitable habitat for A. montii and determine with a high degree of accuracy its population and distribution. An inventory of all suitable habitat is needed to identify essential habitat and to verify those stands for which protection is required to best ensure the long term survival of the species. These surveys will include age class distribution, documentation of losses, and population increases or reductions for each population will be quantified. These surveys will also document impacts such as trampling, grazing, disease, parasitism, etc. on the species. This activity will be the responsibility of Forest Service.

3. Establish and conduct a minimum viable population study on each of the three populations of A. montii. Minimum viable population studies will document demographic stability of the species population. 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 (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 which would preclude its eventual delisting, those factors will be addressed and the recovery plan revised to accommodate them. Little is known concerning natural threats such as disease, parasitism, and grazing by native species on A. montii. No known diseases have been reported in this species. Erosion and vegetative competition from exotic (and some native) species as a result of a past over-grazing disclimax may adversely affect A. montii. It is not known if the populations of A. montii are at population levels that will assure long term demographic and genetic viability. This activity will be the responsibility of the Forest Service with assistance from the Fish and Wildlife Service.

4. Establish and implement formal land management designations and plans which would provide for long term, undisturbed habitat for each of the three populations of A. montii. Such designations may include the following: Research Natural Areas, Botanical Areas, or Essential Habitat. Special protected areas similar to those mentioned above should ensure the long term protection of all populations of A. montii to ensure its survival as a vigorous reproducing species into the foreseeable future after the possible delisting of the species.

5. Conduct life history, biological, and ecological research. Various types of research may be needed to determine any unidentified factors limiting the current population. Specific research needed has not yet been identified, but may include studies on pollination, soil preferences, and habitat requirements.

6. Propagate individuals in horticultural facilities. Individual living specimens of A. montii are currently being housed at the Flagstaff Arboretum for the purpose of maintaining a refuge garden population for the species and for conducting future research beneficial to the species recovery, including techniques necessary for the establishment or re-establishment of the species' populations in suitable habitat.

7. Develop public awareness, appreciation, and support for the conservation of A. montii. Education is a vital part of the recovery process. The cooperation of the public is essential in the ultimate success of the above recovery measures. This can be started with educational programs such as pamphlets and audio-visual programs for use in schools and groups interested in conservation. The introduction and maintenance of A. montii in recognized botanical gardens will assist in both public education of the significance and importance of this species and provide for a reserve of seeds and plants for reintroduction into the wild should wild populations be lost. The Fish and Wildlife Service with assistance from the Forest Service, public and private conservation groups will be primarily responsible for this activity.

D. References

Geer S.M. and V.J. Tepedino. 1993. Breeding systems of the rare Heliotrope milkvetch (Astragalus montii Welsh: Fabaceae) and two common congeners. Proceedings of the Southwestern Rare and Endangered Plant Conference. Santa Fe, New Mexico. 390 pp.

Isely, D. 1983. New combinations and two new varieties in Astragalus, Orophaca, and Oxytropis (Leguminosae). Systematic Botany 8:420-426.

Menges, E. S. 1986. Predicting the future of rare plant populations: demographic monitoring and modeling. Natural Areas J. 6(3): 13-25.

Tepedino, V.J. and T.L. Griswold. 1990. Pollination biology of threatened and endangered plants. Unpublished Report, USDA-ARS Bee Biology & Systematics Laboratory, Utah State University, Logan. 20 pp.

Thompson, R. 1985. Astragalus montii summary report. U.S. Forest Service, Price, Utah. 29 pp.

Tuhy, J.S. 1990. Astragalus montii Welsh (Heliotrope milkvetch) on the Ferron Ranger District, Manti-LaSal National Forest. Utah Natural Heritage Program, Salt Lake City. 52 pp.

Welsh, S.L. 1978. Utah flora: Fabaceae (Leguminosae). Great Basin Naturalist 38:225-367.

Welsh, S.L., N.D. Atwood, S. Goodrich, L.C. Higgins. 1993. A Utah Flora. Brigham Young University Press, Provo, Utah. 986 pp.

III IMPLEMENTATION SCHEDULE

The Implementation Schedule that follows outlines the actions and costs for the recovery program. It is a guide for meeting the objectives elaborated under the Recovery section of this plan. This schedule indicates task priorities, task numbers, task descriptions, 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 recovery of Astragalus montii 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 of, 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

- UT - State of Utah, including the Utah Natural Heritage Inventory
- BLM - Bureau of Land Management
- CPC - Center for Plant Conservation
- FS - Forest Service
- FWS - Fish and Wildlife Service
  - ES - Ecological Services
  - LE - Law Enforcement

Heliotrope Milkvetch (Astragalus montii) Recovery Implementation Schedule

Priority	Task	Task Description	Task Duration	Responsible party			Cost			Comments
				FWS						
				Region	Program	Other	FY-01	FY-02	FY-03	
2	1.1	Regulate and control mineral development activities	ongoing	6	ES	BLM, FS				ongoing land management programs
2	1.2	Control other activities which may affect the species	ongoing	6	ES	FS				ongoing land management programs
3	2	Inventory suitable habitat	1 year	6	ES	FS, UT	5,000			
3	3	Establish MVP monitoring studies	10 years	6	ES	FS	2,000	2,000	2,000	
3	4	Establish and implement land management plans and designations	2 years	6	ES	FS				to be incoroprated into periodic Forest Plan review and revision
3	5	Conduct life history, biological, and ecological research	3 years	6	ES	FS	5,000	5,000	5,000	
3	6	Propagate individuals in horticultural fracilities	ongoing	6	ES	FS, CPC	2,000	1,000	1,000	
3	7	Develop public awareness	ongoing	6	ES	FS, UT, CPC	3,000			FY-01 cost for development of brochure. minimal incidental staff time costs FY-02 and FY-03

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

IN REPLY REFER TO:

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228

ES/TE/Heliotrope Milkvetch
Recovery Plan
Mail Stop 60120

OCT 2 1995

Dear Reviewer:

Enclosed is the Public and Agency Review Draft of the Heliotrope Milkvetch Recovery Plan. This Recovery Plan has completed an internal technical review for biological accuracy and sufficiency. The Fish and Wildlife Service is now expanding the review to provide Government Agencies and the public the opportunity to comment on all aspects of the Recovery Plan.

"Responsible" agencies are identified for all of the recovery tasks in the Implementation Schedule. The Service believes the designated agencies have the necessary authority to carry out the identified tasks. The Implementation Schedule serves to alert those agencies to the need for these actions and to justify seeking funds to carry out the actions.

Comments should be submitted to the Field Supervisor, U.S. Fish and Wildlife Service, 145 E. 1300 South, Suite 404, Salt Lake City, Utah 84115. All comments should be received by November 27, 1995, so they can be considered during preparation of the final Recovery Plan. Comments will be made available to appropriate Federal Agencies for their use in implementing the Recovery Plan.

Thank you in advance for your assistance.

Sincerely,

Terry Terrell

TERRY TERRELL
DEPUTY Regional Director

Enclosure