Appendix S1:

Botany Biological Assessment

Appendix S1: Plants Biological Assessment

Biological Assessment
For Threatened and Endangered Plant Species

Modoc National Forest Noxious Weed Treatment Project
Final Environmental Impact Statement

flowers of slender Orcutt Grass, Modoc National Forest

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Noxious Weed Treatment Project
MODOC NATIONAL FOREST

THREATENED AND ENDANGERED PLANTS BIOLOGICAL ASSESSMENT

January 23, 2006

Summary

The USDA Forest Service, Modoc National Forest, proposes noxious weed treatments designed to control or eliminate noxious weed species found on the Forest. The project would include physical, cultural, and/or herbicide treatments of 14 noxious weed species across the Forest. A Biological Evaluation has been prepared for Forest Sensitive Species, and a Biological Assessment (BA) would be prepared if Threatened or Endangered plant species were suspected in the treatment areas.

One Threatened plant species, Slender Orcutt grass, *Orcuttia tenuis,* occurs on the Forest. It is found near vernal pools or vernal pool like drainage edges. During review it was determined that this species and habitat for this species does occur near proposed noxious weed treatment areas. This Biological Assessment evaluates the effects to this species of the proposed actions documented in the Modoc National Forest Noxious Weed Treatment Project Final Environmental Impact Statement (FEIS).

Slender Orcutt grass was first found on the Forest in July 2003, and surveys were made in suitable habitat during July and August of that year. Nine populations were found within three districts on the Forest. It is possible that more populations may be found in the future.

Based on the analysis of the effects of the Project, it is my determination that:

- **Implementation of the Preferred Alternative and Design Standards as detailed in the action alternatives of the Final Environmental Impact Statement for the Noxious Weed Treatment Project would result in "No Effect" to individuals or populations of the Threatened plant species, slender Orcutt grass (*Orcuttia tenuis*).**
- **No Endangered plant species or habitat is known to exist on the Modoc National Forest, and therefore there will be "No Effect" to Endangered plant species.**
- **No Proposed plant species is known to exist on the Modoc National Forest, and therefore there will be "No Effect" to Proposed plant species.**
- **Critical habitat units (CHU) have not been designated within the Modoc National Forest for slender Orcutt grass, and therefore, there will be "No Effect" to CHU of slender Orcutt grass.**

Prepared by:

Cheryl Beyer, Forest Botanist

File Code: 2670

Date: September 22, 2005

Curt Mullis, Field Supervisor

United States Department of Interior

Fish and Wildlife Service

Klamath Falls Fish and Wildlife Service Office

6610 Washburn Way

Klamath Falls, OR 97603

Dear Mr. Mullis:

The U.S. Forest Service, Modoc National Forest is requesting your concurrence pursuant to Section 7 of the Endangered Species Act of 1973, as amended, on the Modoc National Forest Noxious Weed Strategy Implementation Project. Informal consultation has been ongoing for the past several months between Rick Hardy, Tony Hawkes and representatives of the Modoc National Forest staff. It is our understanding that this project falls within the streamlined consultation process.

We will transmit copies of the two Biological Assessments supporting the Modoc National Forest Noxious Weed Strategy Implementation Project for terrestrial wildlife species and plants within the week. Since this project occurs in various locations throughout the Modoc National Forest, the analysis included all of the species listed on your most recent correspondence dated 11 July 2005 (1-10-05-105-SP).

Informal consultation with the Modoc National Forest personnel and your staff has led to a determination of "NOT LIKELY TO ADVERSELY AFFECT" for bald eagle and *Orcuttia tenuis*. This determination was based on the potential for disturbance to nesting bald eagles and the concerns for the welfare of the slender Orcutt grass.

These Biological Assessments contain management requirements and constraints that should remove any adverse effects from the implementation of physical or chemical noxious weeds treatments when fully applied. We hereby request concurrence on the actions proposed for the FEIS including treatment buffers. The Forest Botanist and Terrestrial Biologist assigned to the project will continue to incorporate the comments from your office.

We appreciate your attention to this matter, and especially like to thank Rick Hardy and Tony Hawkes for their continued assistance. If we can provide additional information, please contact Cheryl Beyer for plant species at (530) 233-8827 or Mary Flores for terrestrial species at (530) 279-6116.

Sincerely,

/s/ Stanley G. Sylva

STANLEY G. SYLVA

Forest Supervisor

ccRick Hardy
USFWS
Tony Hawkes
USFWS

Introduction

This Biological Assessment (BA) serves as written request, under the provisions of Title 50 Code of Federal Regulations (CFR) Part 402.14, for U.S. Fish and Wildlife Service (USFWS), concurrence on a determination of "No Effect" as discussed in Chapter V of this document.

This BA has been prepared for the Modoc National Forest Noxious Weed Treatment Project. The project is located on the Modoc National Forest (NF) in Modoc, Siskiyou, and Lassen Counties, California. This BA describes the potential effects of the alternatives of the proposed project on federally listed or proposed species on MDF.

Resources on the Forest are described in the Land and Resource Management Plan (LRMP) for the Modoc National Forest (USDA Forest Service 1991). The LRMP was amended by the Record of Decision (ROD) for Amendments to Planning Documents Within the Range of the Northern Spotted Owl (USDA Forest Service and USDI Bureau of Land Management 1994), hereafter known as the Northwest Forest Plan (NWFP). The NWFP ROD was further amended in 2004. The LRMP was also amended by the ROD for the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2001), and more recently, by the ROD for the Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement (USDA Forest Service 2004).

Consistency with Laws, Plans and Policies

All alternatives would be consistent with direction in the Modoc National Forest Plan as amended, with the Endangered Species Act, the Modoc National Forest Integrated Weed Management Strategy (2005), and other laws.

Purpose

The purpose of this biological assessment, hereafter referred to as the BA, is to describe and evaluate the effects of proposed federal land management activities for noxious weed treatment activities on US Fish and Wildlife Service (USFWS) federally Threatened (T), Endangered (E), and proposed (P) plant species and designated critical habitat that occur or may occur in the project vicinity.

These activities will be implemented under the alternative chosen by the decision maker, Forest Supervisor Stan Sylva, of the Modoc NF. Any alternative, or parts thereof, can be chosen for implementation. This assessment is to meet the legal requirements set forth under Section 7 of the Endangered Species Act of 1973, as amended (ESA) {19 U.S. C. 1536 (c)}.

Project Summary

Project Overview

The Modoc National Forest Noxious Weed Treatment Project sets forth six alternatives. Alternative 1 is the No Action Alternative. All other alternatives would authorize treatment of 14 species of noxious weeds. Treatment methods could include manual, cultural, or herbicide methods, or a combination. Alternatives 2, 4, and 6 include herbicides. Alternatives 3 and 5 exclude the use of herbicides. Number of sites and number of acres, as well as treatment methods, vary according to alternative. The project will not include aerial spraying of herbicides, treatment of aquatic species of noxious weeds, or, except in Alternative 6, applications of herbicides within 10 feet of water. Mitigations for the alternatives can be found in the alternative-specific Design Standards and in Mitigations that apply to all alternatives (see FEIS). Design Critera specific to listed plants can be found in Table 1 below.

To reduce effects from herbicides to slender Orcutt grass, discretionary Design Standards (please see the section on Design Standards further in this document) address separately Alternatives 2 and 4, and Alternative 6. These Standards are intended to be incorporated in the project to further reduce any adverse affects (LAA). The Design Standards for all alternatives, from the standpoint of reducing effects to slender Orcutt grass, are the ones written for Alternative 6.

Table 1: Design Standards for Threatened and Endangered Plants

Code	Design Standards in Alternatives 2-6	2	3	4	5	6
DS-31	TES Plants: Vehicle-based herbicide application will not take place within 50 feet of any TES plant location. Hand spraying or non-herbicide treatment may be conducted.	X	n/a	X	n/a	n/a
DS-33	Threatened and Endangered Plants: Herbicide treatments will not take place within 100 feet of Threatened or Endangered plant locations, however, non-herbicide treatments may be conducted.	n/a	n/a	n/a	n/a	X

The Design Standards for Alternative 6 do not permit herbicide treatments within 100 feet of Threatened, Endangered, and Proposed (TEP) plant species. This buffer would reduce the risk from drift, runoff or leaching of herbicide. Felsot (2001) found that in most cases, off-site effects of herbicide volatilization drift are usually limited to 100 feet. Manual treatments may be used within this 100-foot buffer.

Currently, 6,908 acres of noxious weeds are known on the Forest. Depending on alternative, an estimated 300 to 3,000 acres per year could be treated over a period of 5-10 years. A description of the alternatives can be found in Chapter 2 of the FEIS. The alternatives are explained in more detail in the Modoc National Forest Noxious Weed Treatment Project FEIS.

Lead Agencies

The Federal lead agency for this project is USDA Forest Service, Modoc National Forest.

Environmental Review

The environmental impacts of the proposed project have been addressed in a *Draft* Environmental Impact Statement that has been prepared to comply with the National Environmental Policy Act (NEPA). The Draft EIS (DEIS) was published and released for public comment in January, 2005 (USFS 2005). The FEIS for this project is projected to be published in spring of 2007. The FEIS and resulting Record of Decision (ROD) will address the public and agency comments received on the DEIS.

The DEIS identified and evaluated four alternatives for the project. Alternative 4 consisted of Early Detection – Rapid Response principles applied to annual weed management treatments that include physical/manual, cultural, and herbicide. Early Detection – Rapid Response Strategy allows minor project variations to meet site-specific conditions or landscape objectives.

The three alternatives besides Alternative 4 were identified as alternatives and were designated as Alternatives 1-3. Alternative 1 was “no action,” Alternative 2 was “ proposed action,” consisting of annual weed management treatments that included physical/manual and/or herbicide treatment, and Alternative 3 was manual treatment only.

Following public input, two additional alternatives were added, Alternative 5 that consists of manual and cultural treatments, and Alternative 6 that consists of manual, cultural, and herbicide treatments, with the addition of chlorsulfuron and two herbicide mixes.

Consultation

Formal consultation for listed plants is required when a project that may adversely affect listed plants or their habitat (1) occurs on Federal land or (2) is a private action with a Federal "nexus" (e.g., a Federal permit is required or Federal funding is involved) (CNPS 2005).

Federal agencies must also consider Proposed taxa in biological assessments (documents required by Section 7 of the Act for certain Federal projects or actions). Federal agencies must also "confer" with the Service regarding any action or project "likely to jeopardize the continued existence" of a proposed

species. During such a "conference," the Service typically reviews proposed project plans and determines the likely effects of a Federal action on a proposed species. Like the technical assistance provided by the Service for candidates, a conference is only an advisory process. Any recommendations to modify or abandon the project and/or undertake protective measures for proposed species are not mandatory on the Federal agency conferring with the Service. There are no known Proposed plant species on the Modoc National Forest (CNPS 2005).

Section 7(a)(2) consultation may be "informal" or "formal." Most agency consultations are resolved informally. Informal consultation is used to determine (1) whether formal consultation will be required or (2) if the project can be modified to reduce or remove adverse impacts to listed species. If a proposed activity that depends on a Federal action may adversely affect a listed species or designated critical habitat, formal consultation is required. Formal consultation concludes when the Service issues a "biological opinion" on the effects of the project on listed species. Modification, or rarely abandonment, of a proposed Federal action or project may be necessary if the Service determines that such activity is likely to jeopardize the species or adversely modify its critical habitat. Under such a scenario, the Service must provide a "reasonable and prudent alternative" to the consulting Federal agency (CNPS 2005).

Consultation to Date

Consultation to date includes a list prepared by the Klamath Falls office of USFWS of Threatened, Endangered, Proposed, and Candidate species that may be present on, or suspected in the area, of the Modoc NF. This letter was dated July 7, 2004. Informal consultation for slender Orcutt grass has taken place by phone, email and a meeting in Klamath Falls between February 18 and September 1, 2005. Personnel consulted were Rick Hardy, 541-885-2504 and Tony Hawkes 541-885-8481, both of the Klamath Falls USFWS office.

Project Design Standards

Project Design Standards (PDSs) are conservation measures incorporated into a project to minimize or avoid effects to endangered or threatened species and other resources. PDSs usually include seasonal restrictions (such as LOPs—Limited Operating Periods) and may also include such things as clumping of retention trees around nest trees, establishment of buffers, dropping the unit (s)/portions, or dropping the entire project.

In some cases, application of PDSs may reduce the impact of the projects to listed species and may change the effects determinations (from LAA to NLAA, or from LAA or NLAA to NE).

Project Design Standards specifically for TE plants are shown below. The full list of PDSs can be found in the FEIS, Chapter 2. Many of these will help minimize potential effects to slender Orcutt grass, such as some of the soil and water PDSs. All are consistent with the direction contained within the Modoc National Forest Land and Resources Plan, and they are incorporated by reference into the action alternatives.

Table 2: Project Design Standards in the Specified Alternatives

Code	Design Standards in Alternatives 2-6	2	3	4	5	6
DS-31	TES Plants: Vehicle-based herbicide application will not take place within 50 feet of any TES plant location. Hand spraying or non-herbicide treatment may be conducted.	X	n/a	X	n/a	n/a
DS-33	Threatened and Endangered Plants: Herbicide treatments will not take place within 100 feet of Threatened or Endangered plant locations, however, non-herbicide treatments may be conducted.	n/a	n/a	n/a	n/a	X

Some Mitigation Measures for hydrologic resources have also been incorporated into the FEIS. The difference between the PDSs and Mitigation Measures, are that the PDSs are alternative specific, and the Mitigation Measures apply to all the action alternatives.

Proposed Action

This chapter of the BA presents information about the alternatives. The first section identifies the purpose of the project. The second section describes the alternatives. More detailed descriptions of the alternatives can be found in the FEIS.

Purpose of Project

The purpose of the project is to aggressively and efficiently eradicate, or control and contain 14 specific noxious weed species on the Modoc NF utilizing manual, chemical, or manual and/or chemical treatments. Please see the FEIS, Chapter 1, for more information on the purpose.

This action will help preserve the native biodiversity of the Forest and promote the ecosystem health of forested and rangeland habitats by maintaining or improving native forbs and grass communities.

Description of the Alternatives

(Also, please see Appendix A – Comparison Table of Alternatives)

Alternative 1 – No Action

Under the No Action alternative, current management plans would continue to guide management of the project area. No aggressive treatment activities would be implemented to accomplish the purpose and need. The alternative provides a baseline for comparison of effects and analysis of effects.

Alternative 2

The Modoc NF proposes to treat 14 species of noxious weeds on 520 sites comprising approximately 5,995 acres to eradicate, control, or contain the occurrences; treating between 300 to 1,500 acres annually for the next five years; herbicides to be applied by directed spray treatments and backpack application utilizing the treatment methods of physical (hand-pulling), individual plant herbicide treatment, or physical and/or individual herbicide treatment.

Table 3. Targeted Noxious Weeds

Canada thistle	Mediterranean sage
Common crupina or bearded creeper	Musk thistle
Dalmatian toadflax	Plumeless thistle
Diffuse knapweed	Perennnial pepperweed or tall whitetop
Spotted knapweed	Scotch thistle
Squarose knapweed	Klamathweed or St. Johnswort
Dyers woad or Marlahan mustard	Yellow starthistle

Alternative 3

Alternative 3 was developed in response to scoping comments to provide an alternative that did not include herbicides. It does not completely meet the purpose and need because some weed species may be spread as a result of ground disturbance or incomplete removal. The Alternative consists of treating between 300 to 1,500 acres (494 sites) annually for the next five years utilizing physical (hand-pulling) methods.

Alternative 4

This alternative was developed to reflect scoping comments on the need to provide flexibility in treatment methods to eradicate, control, or contain the current occurrences and expanding or new infestations of the selected noxious weeds over a 10 year time period. In this alternative, the Modoc NF proposes to authorize annual treatments of weed infestations ranging from an estimated 300 to 3000 acres at 520 sites. Treatment includes physical (hand-pulling, digging, grubbing), individual plant herbicide treatment (directed spray treatment by backpack sprayer or wick applications of herbicides), physical and/or individual plant herbicide treatment, and Early Detection – Rapid Response. Herbicides proposed in Alternative 4 include clopyralid, dicamba, glyphosate, triclopyr and 2,4-D.

Adaptive management, defined as "…the process of continually adjusting management in response to new information, knowledge, or technologies," will provide the opportunity to treat sites of the identified

species that have developed or expanded using the same treatments as outlined in the EIS. This strategy recognizes that unknowns and uncertainty exist in the course of achieving any natural resource management goals. Early Detection – Rapid Response, as a part of adaptive management, is used in this project.

Early Detection – Rapid Response in Alternatives 4, 5, and 6 consists of treating the same or expanded sites, new sites, and the same and new species of weeds, using the same treatments as outlined in that alternative.

Alternative 5

Alternative 5 was developed in response to public comments. This alternative is a no-herbicide alternative utilizing a range of manual and cultural methods to eradicate, control, or contain approximately 532 acres of known sites by treating between 300 to 1,500 acres annually for the next 10 years.

Early Detection – Rapid Response would allow eradication of new infestations of the identified species along with adapting the methods outlined in this alternative, while utilizing the Design Standards, to remove infestations of new noxious weed species which have been proven to be eradicated, controlled, or contained by the methods evaluated. Early Detection – Rapid Response may be used on an additional 200 acres above the currently known locations annually.

Alternative 6

Alternative 6 was also developed in response to public comments. This alternative utilizes non-herbicide and herbicide treatment methods, adding a new herbicide and two mixes. It proposes to treat approximately 538 acres and treatments may include use of surfactants and dyes, as in all alternatives that use herbicides. Surfactants increase the absorption of herbicide by the weeds, and dyes assist the applicator in efficiently treating target weeds.

Early Detection – Rapid Response would allow treating new occurrences of the 14 identified weed species utilizing adaptive management within the identified Design Standards and the full range of treatment methods listed for this alternative in the FEIS.

Description of Treatments

Physical/manual treatment – This includes hand pulling, grubbing, and excavation of plants with a shovel at or just below the soil surface. All alternatives except the No Action Alternative include physical/manual treatments.

Herbicide treatment – Alternatives 2, 4, and 6 permit use of certain herbicides. Table 4 compares the herbicides proposed in each of Alternatives. Table 5 displays trade names and typical application rates of those herbicides.

Table 4. Herbicides Proposed In The Alternatives

	Herbicides	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
	Herbicides	X		X		X
1	Clopyralid	X		X		X
2	Dicamba	X		X		X
3	Glyphosate	X		X		X
4	Triclopyr	X		X		X
5	2-4-D	X		X		X
6	Chlorsulfuron					X
7	Chlorsulfuron and 2,4-D (Mix 1)					X
8	Dicamba and 2,4-D (Mix 2)					X

Table 5. Herbicides and Typical Application Rates Proposed For Use in the Noxious Weed Treatment Project

	Chlorsulfuron	Clopyralid	Dicamba	Glyphosate	Triclopyr	2,4-D	Mix 1	Mix 2
Trade Name(s)	Telar	Transline	Banvel, Vanquish	Round-up Ultra RT, Round-up Original, Rodeo, Accord, others	Garlon 3A, Pathfinder II, Remedy RTU	20 formulations approved	Chlorsulfuron and 2,4-D	Dicamba and 2,4-D
Typical Application Rates	0.75-1.0 oz/ai/ac[1]	0.10 to 0.25 lbs/ae/ac	0.25 – 2 lbs/ae/ac	0.50 – 3.75 lbs/ae/ac	0.5 – 1.5 lbs/ae/ac	0.5 – 2 lbs/ae/ac	Chlorsulfuron 0.75 – 1.0 + 2,4-D 0.5 1.5 lbs/ae/ac	Dicamba 0.25 – 1.0 + 2,4-D 0.5 – 1.5 lbs/ae/ac

[1] ae = acid equivalent, ai = active ingredient

Existing Environment

This chapter presents an overview of the vegetation types that are found in the project area. This chapter also includes a discussion of the ecology, habitat requirements, and distribution of the listed plant species that occur or have the potential to occur in the project area. This chapter is divided into four sections:

Vegetation types in the Project Area

Permeable Soil types on the in the Project Area

Federally listed species in the Project Area

Critical habitat for federally listed plant species on the Modoc NF

Vegetation Types in the Project Area

According to the Modoc National Forest Land and Resource Management Plan (USDA 1991), there are 17 major vegetation types found on the Forest, based on the classification of California Vegetation, CALVEG and the Wildlife Habitat Relationship Program. The Forest is dominated by juniper and eastside pine. Western juniper covers approximately 28 percent of the Forest. Sagebrush is the third most dominant vegetation type. California Department of Fish and Game has delineated vernal pool communities within Modoc County, some of which are located on the Modoc NF

(http://maphost.dfg.ca.gov/wetlands/vp_asses_rept/modoc.htm).

Permeable Soil Types in the Project Area and the Possibility of Leaching

On soils with a high permeability, there is a potential to leach herbicide through the soil profile into the groundwater table, possibly impacting non-target plants. Design Standards are included in the FEIS to restrict herbicide applications in areas of these sensitive soils. See the Soils Specialist Report for a discussion of the permeable soils on the Forest.

Federally Listed Plant Species in the Project Area

An **Endangered** plant is one that is in danger of extinction throughout all or a significant portion of its range. A **Threatened** plant is one that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. A

Proposed plant is one that has been officially proposed by the USFWS for listing as Threatened or Endangered under the Endangered Species Act (ESA). A **Candidate** plant is one that the USFWS has on file sufficient information on biological vulnerability and threats to support proposals to list it as Endangered or Threatened.

Threatened and Endangered plants are determined and listed by the USDI Fish and Wildlife Service in 50 CFR Part 17 (USDI Fish and Wildlife Service 1994; 1996; 1997; 1999; 2002).

There is one **Threatened** plant species known to occur or have habitat on the Modoc NF. This species is slender Orcutt grass, *Orcuttia tenuis*, a vernal pool species found in specialized habitat that is inundated for a period during the spring and summer months.

No other listed plant species are suspected or known to occur on lands administered by the Modoc NF. This information is based on documentation obtained from the USFWS, and from documents related to rare plant surveys on file at the USFS Modoc NF Supervisors Office, Alturas, California.. On July 7, 2004, the USFWS sent a list of species that may occur in the area or be affected by projects on the Modoc NF (USFWS reference code: 1-10-04-FE-171).

Table 6. Federally Listed Plant Species Occurring InThe Project Area

Species[1]	Status
slender Orcutt grass (*Orcuttia tenuis*)	T Federal; E, 1B California

[1] Only Federally listed species are discussed in this BA; for a complete listing of USFS Sensitive species that occur or may occur in the project area, see the Biological Evaluation (BE) for this project.

Slender Orcutt grass was first located on the Modoc NF in 2003, occurring in vernal pool-like habitats, usually within juniper/pine woodlands or sagebrush flats. On the Modoc NF, it is limited to relatively deep pools with clay soil. Members of the Orcutt plant family (Orcuttieae) usually occur in patches within the pools that are essentially devoid of other plant species (Federal Register 2003). The main habitat requirement for slender Orcutt grass is standing water of sufficient depth and duration to drown out most competition from other plants and meet the physiological requirements for prolonged inundation, followed by a period of gradual (becoming total) desiccation.

During review, it was determined that habitat exists within the project area. Vernal pools are inhabited by an endemic flora that has adapted to the seasonal extremes of prolonged inundation in winter and spring and complete dryness by mid-summer. Because of this, most species that grow in vernal pools are not found in any other habitat and most non-adapted species, even aggressive, introduced weeds, do not have habitat in the vernal pools. Therefore, vernal pools have unusual vegetation in that is composed almost entirely of native plants (Corbin and Schoolcraft 1990).

Slender Orcutt grass seeds require special conditions to germinate; enough standing water to allow the growth of a soil fungus over the seed is required to break dormancy. This adaptation insures that slender Orcutt grass will germinate only when sufficient water is present in the pool to complete its life cycle. The seeds germinate in the spring while under water, as they are able to tolerate the anaerobic (oxygen deficient) conditions that occur in the winter and early spring when the pools are flooded and the seedlings are underwater. As temperatures rise in mid-spring, the plants send up long, floating leaves. As the pool dries, plants put out shorter terrestrial leaves, and then flowering stalks. Plants generally mature later than other native vernal pool annuals, so often they are the only vegetation still green by mid-summer on the vernal pool bed (Corbin and Schoolcraft 1990).

Species Description:

Description: Annual grass often covered with sticky, aromatic secretions with a tuft of short basal leaves. Stems mostly erect, one to several, 7-15 cm tall. Slender Orcutt grass flowers in the summer; flower heads are on short branchlets on the main stem; each head with several florets. Flowers with a five-toothed lemma. This species is wind pollinated, but pollen may not be carried long distances between occurrences. As an annual, slender Orcutt grass depends on seed set to replenish the seed bank for continued survival. The seeds can remain dormant for an undetermined amount of time, but at least for 3-4 years. Germination is under water after a prolonged period of immersion. Populations may express themselves cyclically, and thus, many years of observation are necessary to determine whether any occurrence is increasing, stable, or declining. (FR 2003 46692).

Status: Slender Orcutt grass is listed by the state of California as Endangered. Slender Orcutt grass was listed as Threatened by the USFWS on March 26, 1997 (62FR 14338) and critical habitat was designated on September 24, 2002 (67 FR 59884), along with other members of the Orcuttieae grass tribe and two vernal pool herbs.

Habitat: Vernal pools and similar habitat, occasionally on reservoir edges or stream floodplains, on clay soils with seasonal inundation in valley grassland to coniferous forest or sagebrush scrub. Median area of pools occupied by slender Orcutt grass on the Modoc Plateau in 1989 (these were pools located where Shasta, Lassen, and Modoc County come together, and are not on Modoc NF land) ranged from 5 to 100 acres and were typically at least 11.8 inches deep. This species is restricted to the deepest areas of these pools (FR 2003 46695). Plants sprout while pools are full, but grow and flower when soil of pool bed is dry.

Lassen NF pools containing this species may be found in transition (between eastside pine and westside foothill vegetation) conifer forests, eastside pine forest, sagebrush flats, or westside pine-dominated mixed conifer stands. Occurrences in the Central Valley are in vernal pools within blue oak woodlands or valley grasslands.

Elevation: 100 to 5,700 ft.
Flowering Period: June to July
Identification Period: June to October

Threats: Threats to these species identified in the listing notice include urbanization and agricultural land conversion as primary factors, and competition with non-native plants, highway projects, off-highway vehicle use, incompatible grazing practices, landfill projects, and other human impacts as secondary factors. The Regional Forester, Region 5 of the Forest Service, previously listed it as a Sensitive Species, but that status has been superseded by the USFWS listing.

In the Sierra Nevada FEIS rare plant assessment, slender Orcutt grass was ranked as a moderate vulnerability species, occurring in the vernally wet ecological guild. Nine threats were identified for slender Orcutt grass: noxious weeds, roads, grazing, stock trampling, fire-fighting/suppression activities, OHV, trails/hikers, development, and hydrologic alteration (FEIS 2001). The trend for this plant, according to the FEIS (2001) is stable on National Forest and BLM lands. Some private land occurrences have been extirpated.

Current conditions on Lassen NF: As of 1990, three of the five populations of slender Orcutt grass on the Lassen NF and Susanville BLM district had been fenced to protect them from impacts from grazing and off-highway vehicle use. Since 1990, six additional populations located on BLM administered land had been fenced to protect populations from grazing. Grazing has been discontinued in some instances FR 1997 14348).

Current condition on the Modoc NF: A review of the documentation for the nine Modoc NF occurrences found that 2/3 of the occurrences were in fair condition, and 1/3 were in good condition. The following disturbances were enumerated near or in habitat: recent waterfowl habitat construction with access roads, grazing and overgrazing, trampling by cows with hoof prints throughout habitat and up to 12" deep, road construction, vehicular use nearby, railroad operations, noxious weeds in the vicinity but not in habitat, and OHV use.

There is not a Species Management Guide for slender Orcutt grass in effect on the Modoc NF. However, the Guide developed for the Lassen NF and the Susanville BLM prescribes that all occurrences within the boundaries of those two agencies be protected from "excessive grazing." Threats to slender Orcutt grass enumerated in that Guide include hydrologic alteration, overgrazing, livestock trampling, OHV's, and other recreation.

The Modoc NF Land and Resource Management Plan (LRMP 1990), which was written before slender Orcutt was known on the Forest, encouraged the development of wetlands for waterfowl nesting habitat. The Plan states, "The goal of this Plan is to develop all suitable wetlands as waterfowl nesting habitat by the end of the 2nd decade…….… Livestock grazing continues in seasonal flooded wetlands, with nesting islands or areas protected by fencing." This development may have affected, positively or negatively, the vernal pools on the Forest.

The *Draft* Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon was published in October 2004 (U.S. Fish and Wildlife Service 2004). Grazing direction in the Draft Plan does not call for exclusion of grazing or fencing off of vernal pools from cows, as was presented in the Lassen NF Management Guide (Corbin and Schoolcraft 1990).

Species Distribution: Slender Orcutt grass, first collected by Alice Eastwood in 1912 in Shasta County, and described by Albert Hitchcock in 1934, is limited to northern California, and found mostly in the northern part of the Central Valley and the western edge of the Modoc Plateau. Seventy-nine occurrences were documented in 2001, of which 73 were presumed to be extant (Cypher 2000). The majority of these are in Tehama and Shasta Counties, and many are on private lands. Nine occurrences were first discovered on the Modoc NF in Modoc County in 2003. National Forest and BLM management can have a significant effect on the continued viablility of the species (Corbin and Schoolcraft 1990).

The nine recently discovered occurrences on the Modoc NF are located on the USGS quads Donica Mountain, Happy Camp Mountain, Knobcone Butte, and Spaulding Butte and within three of the four Ranger Districts: Doublehead, Devils Garden, and Big Valley. It is unknown if occurrences exist on private lands adjacent to the Forest. The GPS (geographical positioning system) polygons of these occurrences can be sprawling, and cover several to many individual small patches. Furthermore, the GPS polygons may broadly outline the occurrences within their boundaries, but not tightly adhere to the outlines of each patch within the population. Because of the broad inclusiveness of these GPS'd boundaries, it is possible that some weed occurrences may be falsely reported as closer to the actual plants of slender Orcutt grass than is fact. The occurrences of slender Orcutt grass, an annual grass no taller than 6", are estimated in 7 out of the 9 locations to be a half million plants or more.

Table 7. Slender Orcutt Grass On The Modoc National Forest

Occurrence	District and Assigned Name	USGS Quad	Estimated plants
MDF-ORTE-001	DG - Whitney Res.	Spaulding Butte	1,000,000
MDF-ORTE-002	DH - Upper Mud Lk.	Spaulding Butte	1,000,000
MDF-ORTE-003	BV - McKay Flat	Happy Camp Mtn.	500,000
MDF-ORTE-004	DG - Hackamore	KnobCone Butte	2,000,000
MDF-ORTE-005	DG - West of Hog Lk	KnobCone Butte	5,000
MDF-ORTE-006	DG - Spaulding Res.	Spaulding Butte	2,000,000
MDF-ORTE-007	BV - Whalen	Donica Mtn.	50,000
MDF-ORTE-008	DG - Quaking Aspen	KnobCone Butte	200
MDF-ORTE-009	BV - Upper Roberts Res.	Donica Mtn.	500,000

Current Management Direction

Threatened and Endangered (TE) species are federally designated because low population levels and loss of habitat may eventually render them extinct. The Forest Service must manage habitat to achieve recovery levels of TE species . Additionally, the National Forest Management Act states that National Forests will "provide for diversity of plant and animal communities based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives" (USDA 1991).

Slender Orcutt grass was first found on the Modoc NF during the 2003 field season. The only other National Forest with known slender Orcutt grass occurrences is the Lassen NF. Current management on the Lassen is as follows: All populations will be protected from direct disturbance by Forest Service management activities. Disturbance here includes excessive grazing, vehicle traffic within vernal pools, and hydrologic manipulation within pools. When necessary, fencing will be the primary method of protection. Vernal pool hydrology of all pools containing slender Orcutt grass will be maintained by designing all earth-moving projects within the drainage area to allow unchanged drainage into the vernal pools. From consultation on grazing allotments in 1999, no more than 5% trampling in occupied slender Orcutt grass habitat will be allowed before seed set, and no more than 15% trampling of occupied slender Orcutt grass habitat after seed set. Trampling is defined as soil displacement or compaction that would be capable of killing or dislodging the slender Orcutt grass plants, or compacting the seed so it would not be viable.

In the Overview Discussion in the *Draft* Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon the following points were brought out.

Use of herbicides, fertilizers, and other herbicides are common in urban and agricultural settings. Although there is a general lack of specific studies to assess effects of herbicides, fertilizers, and other herbicides on vernal pool species, such herbicides could have detrimental impacts on these species if such herbicides reach seasonal wetlands via storm or nuisance sheet flow.

Contamination of vernal pools from adjacent areas may injure or kill vernal pool crustaceans and plants either directly or indirectly via pathways including the alteration of herbicide properties of pool (e.g., pH) and inhibiting and/or disrupting biochemical processes creating less suitable conditions for reproduction or germination and growth.

Use of such herbicides in nearby areas may result in drift or runoff into vernal pools.

The specific effects of such contamination are difficult to ascertain unless an accurate assessment can be made regarding the assimilation rate, or rate of decay, of such herbicides in route to the vernal pool.

Considering the historic grazing of native ungulates and other herbivores in vernal pool ecosystems, properly managed livestock grazing can play a significant role as a process surrogate in the protection and enhancement of vernal pool ecosystems.

Inappropriate levels of grazing, from overgrazing, undergrazing, or inappropriately-timed grazing, can result in significant adverse effects to vernal pool ecosystems.

Physical trampling by livestock seriously can affect the viability of a species, especially if the species is restricted to a small area or if grazing occurs during sensitive parts of the growing season, such as during periods when the plants bloom or set seed.

Although experts maintain that the relationship between grazing livestock and vernal pool habitat condition is difficult to quantify, the prevailing belief is that livestock grazing can play an important role as a management tool in vernal pool habitat.

In areas where grazing has been a historic land use, the removal of grazing may actually prove to be a significant threat to the species.

Critical Habitat For Federally Listed Plant Species In The Project Area

Critical habitat is defined in section 3 (5) (A) of the ESA as: (i) The specific areas within the geographic area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species. "Conservation" as defined in section 3(3) of the Act means the use of all methods and procedures needed to bring the species to the point at which listing under the Act is no longer necessary.

On August 6, 2003 the U.S. Fish and Wildlife Service issued its final rule on the Critical Habitat designation for 15 vernal pool species. The original proposal was for 1.7 million acres in 36 counties. The final rule covers only 740,000 acres and has completely eliminated the counties of Butte, Merced, Madera, Sacramento, and Solano for economic reasons. For Modoc County, the proposed acreage was 2,239 acres. The final acreage is 285. However, none of those acres of critical habitat within Modoc County have been designated on Modoc National Forest lands. This final rule was made before slender Orcutt grass was known to exist on the Forest.

Effects of the Action Alternatives on Listed Plant Species

This section describes the potential direct, indirect, and cumulative effects (past, present, and reasonably foreseeable future impacts) from project activities on Federally listed plant species that occur in the project area. This chapter begins by presenting a discussion of the potential project effects on the listed species, and the factors, such as Design Standards, considered in the determination.

The action alternatives in the Noxious Weed Treatment Project would treat 300 to 3000 acres per year for 14 noxious weed species currently known on approximately 6,908 acres of National Forest land. Treatments include manual, herbicide, a combination of manual/herbicide, and cultural. Potential effects to slender Orcutt grass near these treatments could include effects from drift, runoff, or lateral flow of herbicide, potentially killing some individuals; physical damage from manual weed treatment if the weed is immediately next to the listed plant; or aggressive, planted species out-competing the listed plant following cultural treatment (seeding) in areas where noxious weeds have been eliminated.

Because of the unique habitat that slender Orcutt grass occupies, which has standing water into the early summer, it is unlikely that noxious weeds will be able to grow in such harsh conditions, and therefore, it is unlikely that there would be manual treatments immediately next to slender Orcutt grass.

However, noxious weeds may be found in habitats nearby. Vernal pools, which exist because of clay soil layers, unfractured rock, or caliche, act as an impermeable barrier to water percolation, may act as sinks for herbicides that are applied in adjacent habitats. Those herbicides could come from drift, runoff, or lateral flow. Drift of herbicide has been calculated in Table 12. The Hazard Quotient (HI), or estimated exposure, calculated in the table shows that the effect to a surrogate, an annual species in this case, is low. A surrogate species is one that is tested in place of the species of interest. Potential runoff, leaching, and lateral flow are addressed in the section on permeable soils and in Table 9 under the column Mobility. Herbicides that could potentially affect the taxonomic group of which the species is a member, can be seen also in Table 9.

Factors Considered in the Effects Determination

Proximity of the action – how close to listed plant species is the weed treatment, including similarity of habitat of the listed species and the noxious weed species being treated

Distribution – what is the distribution of the listed plant and the distribution of the proposed action in relation to the listed plant species

Timing – the phonologic stage of the listed species when the weed treatment would take place

Nature of effect – what is the nature of the action and its effect

Duration – how long would the treatment last

Disturbance frequency – how often would the treatment be done

Disturbance intensity – how intense would the treatment be

Disturbance severity – what is the severity of the weed treatment

Proximity - There are three known occurrences of noxious weeds within a 100 foot buffer zone of the known occurrences of slender Orcutt grass. These weed occurrences do not overlap the listed species habitat, but encroach on the edge of the habitat. The two weed species found at these noxious weed sites are Scotch thistle (Onopordum acanthium) and Dyer's woad (Isatis tinctoria) (see Table 8 below), both of which occur on drier habitat than where slender Orcutt grass grows.

Table 8. Noxious Weed Sitings Within 100' of slender Orcutt grass

MDF ORTE#	Noxious Weed Species	Noxious Weed ID	Size of Infestation	Distance apart	TRS	ORTE Occurrence Location	Allotment
4	Dyers woad	DG001ISTI	1.0 acre/200 plants	1319 feet	T43N R7E S23	Hackamore Res.	Mowitz
4	Scotch thistle	DG059ONAC	1.43 acres	1480 feet	T43N R7E S23	Hackamore Res.	Mowitz
7	Scotch thistle	BV303ONAC	0.10acre/40 plants	unknown	T40N R7E S5	Whalen Spring	Crank Springs

Distribution - The distribution of noxious weeds are across the Forest, however, none are known to survive in vernal pool habitats. Slender Orcutt grass has only been found in vernal pool-like habitats on the Doublehead, Devils Garden, and Big Valley Ranger Districts of the Modoc NF. Although some noxious weeds may grow in the general area of slender Orcutt grass, habitat for noxious weeds addressed in the FEIS and habitat for slender Orcutt grass do not coincide.

Habitat for Scotch thistle is natural or disturbed areas, along roads, in fields, and especially on fertile soils. On the Modoc NF, it is not uncommon to see this noxious weed in moist areas near reservoirs, on earth dams, and on waterfowl nesting islands. However, it is not known to grow on sites that are inundated well into the early growing season, which is the main habitat requirement for slender Orcutt grass, whose habitat is standing water of sufficient quantity and duration to drown out most competition from other plants and meet the physiological requirements for prolonged inundation, followed by a period of gradual desiccation.

Dyer's woad is found mostly on disturbed sites, such as range, cropland, dry areas, burned areas, woodlands and pasture sites. It will invade native communities in these habitats. The habitat for Dyer's woad is a drier habitat than that of slender Orcutt grass, although this weed can be found nearby, on well-drained soils.

Timing - Flowering of slender Orcutt grass is May-July. Both Dyers woad and Scotch thistle may also be flowering at the same time. However, if the noxious weeds are treated in the rosette stage, most likely the vernal pools will still have water, and slender Orcutt grass would be submerged.

Nature of the Action:

Physical Weed Treatments – This treatment includes hand pulling, digging, and grubbing (selectively removing noxious plants from a native plant population), mulching and tarping, clipping and weedeating. In the unlikely case that a noxious weed is in such close proximity to the listed species, individuals of the listed species could be damaged or killed. However, the listed species has a very harsh habitat that drowns out most competition from other plants, and the chances are very low that a noxious weed would grow that close that its removal would inflict harm to the listed species. Physical treatments would be short in duration, depending on size of the infestation. Tarping or mulching is expected to occur on a very limited number of infestations of small size (see FEIS). Impact from this type of treatment is estimated to be "0."

Duration - Most likely, it would last no longer than one day, with subsequent visits (once or twice a year, and then on a yearly basis until the seed bank is exhausted) to treat new plants growing from the seed bank. Intensity and severity depend on how large and dense the infestations are.

Cultural Treatments – This treatment includes seeding or planting of native species following the removal of noxious weeds. It also includes goat grazing. This treatment would be done on a site-by-site basis, and, therefore, not every site would undergo cultural treatment. Duration - Because the listed species grows in such a specialized habitat, where few other plants are adapted to germinating and growing in an inundated situation, it is unlikely that cultural treatments of seeding would occur or have the potential of being successful in proximity to the listed species, and therefore, duration would be "0."

Herbicide Treatments – Herbicide selection considerations include, among other things, the proximity to sensitive areas, including Threatened plants, such as slender Orcutt grass. Additionally, the Design Standards include several buffers. For slender Orcutt grass, no herbicide weed treatment will occur within a 100-foot buffer. No broadcast spraying is proposed in this project. Only directed spray treatments and direct application, where the herbicide is applied directly to the weed via wicks, would be used. Risk from horizontal movement of herbicides from off-site are reduced by Design Standards, such as those for soils. Duration - Herbicide treatments would most likely be shorter in duration than manual treatments, however, two or three treatments a year may be necessary to control new plants germinating from the seedbank, as with manual treatments.

Disturbance Frequency, Intensity, and Severity Summarized – In summary of the above discussion, cultural treatments most likely would not occur in slender Orcutt habitat, as they would not be needed. Manual and herbicide treatments also would most likely not occur in the listed species' habitat. However, manual treatments in general are more likely to be more intense and severe than herbicide treatments, as manual treatments would be ground disturbing, whereas herbicide treatments would entail a person walking among the weeds with a backpack sprayer or wick applicator with no ground disturbance. Both manual treatments and herbicide applications might require one or two visits a year over a number of years.

Risk Assessment - Herbicides Proposed in the Alternatives

Three known occurrences of noxious weeds to be treated in this action are within 100 feet of slender Orcutt grass. The noxious weeds are located on railroad rights-of-way and near a "two-track" road.

Herbicides proposed for use in Alternatives 2, 4, and 6 are found in Table 4. These herbicides vary in selectivity to plant families and have different effects on native vegetation. A description of expected toxicity to slender Orcutt grass, and the mobility and translocation activity of the herbicide are found in Tables 9 and 10.

The choice of herbicide depends upon mode of action, the weed species involved and what life stage it is in (eg, rosette, seedling, juvenile, flowering, etc) and relative costs of the materials. No single herbicide is effective against all weed species, so tank-mixed combinations are commonly in use. Two tank mixes are proposed in Alternative 6. Toxicity information is unknown for these mixes, as mixing may be synergistic. Bakke discusses synergistic effects in the Specialist Report. His conclusion is that instances of herbicide combinations that cause synergistic effects are relatively rare at environmental exposure levels.

Post-emergence (i.e., after the plant comes up through the soil) herbicides kill existing weeds either by desiccation or by translocation to all growing points. Both types must be applied in sufficient volume to thoroughly wet the vegetation. Coverage and efficiency are enhanced by the use of surfactants, and severe weed infestations are more easily controlled if the weeds are mowed a couple of weeks prior to herbicide use. Most post-emergence herbicides have limitations on the time interval between application and rainfall.

The desiccants simply burn existing vegetation upon contact, which limits their use to annual weeds and seedling perennials. Established perennials have extensive underground storage organs which can quickly regrow new tops, so translocated herbicides are necessary to kill the entire plant. This difference in mode of action precludes the use of the two types of materials together.

Clopyralid (Stinger, Transline, Curtail) is a selective herbicide proposed for use on thistles, yellow starthistle, diffuse knapweed, spotted knapweed, dyer's woad, Mediterranean sage, squarrose knapweed, and common crupina. It affects members of four plant families: Asteraceae (sunflower), Fabaceae (bean), Solanaceae (nightshade), and Polygonaceae (buckwheat). Clopyralid does not affect plants in the Poaceae (grasses), such as slender Orcutt grass (http://tncweeds.ucdavis.edu/products/handbook/11.Clopyralid.pdf).

Dicamba (Clarity, Banvel, others) is a selective broadleaf herbicide, and is labeled for use in grains such as wheat, barley, oats, and in corn, all of which are monocots. It is not effective on grasses (http://www.co.larimer.co.us/publicworks/weeds/herbicide.htm#dic).

2,4-D is a short-residual herbicide that remains active for 10 to 14 days. It can kill or injure many broadleaf plants depending on site conditions, plant growth stage, and herbicide application rate. However, broadleaf plants germinating from seed, or initiating growth more than 10 days following

application should remain unaffected (USDA 2003c). It does not affect grasses (http://www.co.larimer.co.us/publicworks/weeds/herbicide.htm#dic).

Glyphosate, such as Roundup, is a broad spectrum herbicide, affecting both monocots and dicots. It can affect annual and perennial grasses (http://www.co.larimer.co.us/publicworks/weeds/herbicide.htm#dic).

Still the safest herbicides for use in residential and environmentally sensitive areas, glyphosate is a non-selective, foliar-applied herbicide, with Rodeo being licensed for use over water. Accord is the glyphosate formulation that is labeled for forestry applications. Glyphosate is not as effective as most of the other herbicides proposed, and many years of persistent treatment will be necessary to achieve eradication.

Triclopyr is a selective systemic herbicide used for control of woody and broadleaf plants along rights-of-way, in forests, on industrial lands, and on grasslands and parklands. Triclopyr does not injure grasses at recommended rates (http://www.fs.fed.us/r6/nr/fid/pubsweb/tri.pdf). Broad-leaf plants (dicots) have different biochemistry than monocots. Triclopyr affects the family of broad-leafed plants or dicots. Although triclopyr has high solubility, it is not toxic to monocots. (http://www.ecy.wa.gov/programs/wq/pesticides/final_pesticide_permits/noxious/triclopyr_faq.pdf site accessed 9/28/2005).

Chlorsulfuron is a selective herbicide that acts on primarily broadleaf weeds especially mustard spp., pigweed spp., and several thistles. Most perennial grasses are tolerant to chlorsulfuron making it a good herbicide choice for use in range and wildland settings dominated by perennial grasses. However, it may potentially have activity on some annual grass weeds (http://pmep.cce.cornell.edu/profiles/herb-growthreg/cacodylic-cymoxanil/chlorsulfuron/herb-prof-chlorsulfuron.html accessed 9/26/2005).

Mix 1 is a mix of chlorsulfuron and 2,4-D. Toxicity is unknown (due to possible synergist effects), however chlorsulfuron may potentially effect annual grasses, and therefore, this mix has the possibility of negatively affecting slender Orcutt grass if it should come in contact with it.

Mix 2 is a mix of dicamba and 2,4-D. Toxicity is unknown (due to possible synergist effects). Both dicamba and 2,4-D are used to treat broadleaf weeds. With that in mind, this mix most likely would not harm slender Orcutt grass if it should come in contact with it.

Grasses and other monocots are generally not susceptible to auxin-mimic herbicides Auxin is a plant hormone, and auxin-mimic herbicides have a mode of action similar to auxin. The reason that monocots display this selectivity is unclear because there are no apparent differences between the binding sites targeted by auxins in monocots and dicots. It may, however, be due to differences in vascular tissue structure or differences in ability to translocate or metabolize the herbicide (http://tncweeds.ucdavis.edu/products/handbook/08.HerbicideProperties.doc).

Glyphosate will cause harm to both monocots and dicots.

Situations can occur in which a plant may be injured by an herbicide to which it is normally tolerant. This often occurs because environmental stresses such as hot or cold temperatures, high relative humidity, or hail decrease a plant's natural ability to reduce herbicide uptake or deactivate a herbicide. An excessive application of herbicide, due to misapplication, can also injure a tolerant plant by overwhelming the plant's herbicide degradation and deactivation systems (http://www.estension.umn.edu/distribution/cropsystems/DC3832.html). Some herbicide applications may come from the mixing of two herbicides. Synergistic effects, those resulting from exposure to a combination of two or more herbicides that are greater than the sum of the effects of each herbicide alone (additive) are possible. However, Dave Bakke's Specialist Report in support of the FEIS states that instances of herbicide combinations that cause synergistic effects are relatively rare at environmental exposure levels (USDA 2005).

Table 9. Risk Assessment – Herbicides Proposed in the FEIS

HERBICIDE	ACTIVITY CATEGORY[1],	MODE OF ACTION (biochemical or physical mechanism by which it kills plants)	MOBILITY	TRANSLOCATION[3]	TOXICITY TO SLENDER ORCUTT GRASS	LIKELY EFFECT ON SLENDER ORCUTT GRASS USING DESIGN STANDARDS[2]
Clopyralid	Herbicides with foliar activity on broadleaved plants (dicots) only	Auxin mimic	Moderate in soil; very persistent	Systemic	Non-toxic, no effect	NLAA
Dicamba	Herbicides with foliar activity on broadleaved plants (dicots) only	Auxin mimic	Mobile in soil and water; easily degraded by microbes	Systemic	Non-toxic, no effect	NLAA
Glyphosate	Broad spectrum foliar active herbicides with systemic or contact activity and without pre-emergent or residual soil activity	Inhibits the shikimac acid pathway depleting aromatic amino acids	Strongly adsorbed to soil particles; low mobility; rapidly degraded by soil microbes	Systemic	Toxic	NLAA (although glyphosate is a broad spectrum herbicide, the 100' buffer and following the Design Standards should reduce any effects to NLAA)
Triclopyr	Herbicides with foliar activity on broadleaved plants (dicots) only	Auxin mimic	Potential to be mobile; not strongly adsorbed to soil particles; fairly rapidly degraded by soil micro-organisms	Systemic	Non-toxic, no effect	NLAA
2,4-D	Herbicides with foliar activity on broadleaved plants (dicots) only	Auxin mimic	High mobility in soils; weak binding to soil particles; rapid microbial degradation in 1-4 weeks (http://soils.usda.gov/sqi/files/05table.pdf accessed 9/26/2005)	Systemic	Non-toxic, no effect	NLAA
Chlorsulfuron	Chlorsulfuron is used to control many broadleaf weeds and some annual grass weeds. Some weeds may be resistant to chlorsulfuron	Chlorsulfuron is absorbed by the leaves and roots and moves rapidly through the plant; it prevents the plant from producing an	Fairly mobile in soil due to pH and pressure of Aluminum (Al) and Iron (Fe), more mobile at higher pHs and absence of Al and Fe, not expected	Translocation through xylem and phloem	May be toxic to some annual grasses	NLAA (although chlorsulfuron may be toxic to some annual grasses, the 100' buffer and

HERBICIDE	ACTIVITY CATEGORY[1],	MODE OF ACTION (biochemical or physical mechanism by which it kills plants)	MOBILITY	TRANSLOCATION[3]	TOXICITY TO SLENDER ORCUTT GRASS	LIKELY EFFECT ON SLENDER ORCUTT GRASS USING DESIGN STANDARDS[2]
		essential amino acid,(amino acid biosynthesis inhibitor) inhibiting cell division in the root tips and shoots of sensitive plants. It is broken down to inactive products in tolerant plants.	to reach ground water due to rapid degradation and low rates (http://soils.usda.gov/sqi/files/05table.pdf accessed 9/26/2005)			following the Design Standards should reduce any effects to NLAA)
Mix 1 – Chlorsulfuron + 2,4-D	Chlorsulfuron is used to control many broadleaf weeds and some annual grass weeds. Some weeds may be resistant to chlorsulfuron. 2,4-D herbicides control with foliar activity on broadleaved plants (dicots) only.		Mobile in soil.?		May be toxic as chlorsulfuron may be toxic to some annual grasses	NLAA
Mix 2 – Dicamba _ 2,4-D	Herbicides with foliar activity on broadleaved plants (dicots) only		Mobile in soil.?		Separately these two herbicides are non-toxic	NLAA

[1] California Department of Pesticide Registration : http://www.cdpr.ca.gov/docs/es/espdfs/25pe1299.pdf

[2] Design Standards are listed on page 9, 10 and 11 of this document.

[3] Herbicide translocation refers to the movement of a herbicide once inside the plant. Systemic herbicides are translocated throughout the plant, and are therefore more effective in controlling perennial weeds. Xylem-mobile herbicides move in the direction of water from roots to top of plant. Phloem-mobile herbicides are translocated throughout the plant.

Table 10. Comparison of offsite drift rates to observed toxicity values at the given application rate and appropriate buffers[1] to prevent damage to annual grass species; application by boom. Table from information provided by T. Hawkes, USFWS, 2005, and species toxicities from Ecotox 2005.

Herbicide	Application Rate[1] (lb / ac)	Annual Grass Surrogate[2] (NOAEL)[3]	Offsite Application Rate in lb/ac at 100 ft.	Hazard Quotient[3] for individual chemicals at 100 ft Buffer[5]	Hazard Quotient[4] mixes at 100 ft Buffer[5]
Chlorsulfuron	0.05 – 0.0625	0.000105	0.0003	0.178	N/A
Clopyralid	0.1 – 0.25	0.05	0.0011	0.006	N/A
Dicamba	0.25 – 2.0	0.57	0.0088	0.030	N/A
Glyphosate	0.5 –3.75	10	0.0166	0.006	N/A
Triclopyr	0.5 – 1.5	0.176	0.0066	0.051	N/A
2,4-D	0.5 – 2.0	4.2	0.0088	0.004	N/A
Mix 1 – Chlorsulfuron + 2,4-D	0.05-0.0625 (chlorsulfuron)	0.000105	0.0003	0.18	0.1824
	0.5 – 1.5 (2,4-D)	4.2	0.0066	0.0024	
Mix 2 – Dicamba + 2,4-D	0.25 – 1.0 (dicamba)	0.57	0.0044	0.0077	0.0087
	0.25 – 1.0 (2,4-D)	4.2	0.0044	0.0010	

[1] active ingredient application rate based on active ingredient concentration (or acid equivalent) reported on product labels.

[2] Most toxicity testing utilizes surrogate species. Surrogate species serve as a substitute for the species of interest, because all species of interest could not be tested. Surrogate species are typically organisms that are easily tested using standardized methods, are readily available, and inexpensive. Rare species are not tested.

[3] NOAEL = No Observed Adverse Effect Level, the highest level of continual exposure to a chemical which causes no significant adverse effect on morphology, biochemistry, functional capacity, growth, development or life span of individuals of the target species used in the toxicology study.

[4] HI = The ratio of the potential exposure to the substance and the level at which no adverse effects are expected. If the Hazard Quotient is calculated to be less than 1, then no adverse health effects are expected as a result of exposure. If the Hazard Quotient is greater than 1, then adverse health effects are possible. The Hazard Quotient cannot be translated to a probability that adverse health effects will occur, and is unlikely to be proportional to risk. It is especially important to note that a Hazard Quotient exceeding 1 does not necessarily mean that adverse effects will occur. http://www.epa.gov/ttn/atw/nata/gloss.html (accessed 9/20/2005)

[45] Buffers are based on drift as a result of application by a mechanical low boom sprayer, operated on the ground.

No drift estimates exceeded available effect thresholds. The aerial drift estimates are based on data from broadcast spray using boom applicators and therefore represent an overestimate of expected drift. The action in this project will utilize directed spray treatment using backpack sprayers and direct application to the weed using wipes. Therefore, drift values for this project are expected to be substantially less than predicted in the table.

Direct Effects

Direct effects from management activities to Threatened or Endangered plant species must be minimized or eliminated unless they are designed to maintain or improve plant populations (Forest Service Manual 2670, USDA 1995c).

No Action Alternative

Potential adverse effects to slender Orcutt grass from not controlling the spread of noxious weeds could include competition for resources from noxious weeds and change of fire regime if flammable noxious weeds move in. However, slender Orcutt grass occupies a specialized habitat that is inundated for part of the year, a situation that few other plants are adapted to. It is likely that the No Action Alterative would have no effect on slender Orcutt grass.

Action Alternatives that include physical/physical+ treatments

Some plants may be damaged by foot traffic-- trampling and crushing plants--, or, possibly but unlikely, by vehicular traffic, as workers access nearby noxious weed sites. Manually removing nearby noxious weeds by grubbing and digging could accidentally injure or kill some stems of slender Orcutt grass. If noxious weeds are in direct competition for resources with slender Orcutt grass, the removal of the noxious weeds would be a benefit to the threatened plant. However, noxious weeds within 100 feet of slender Orcutt grass, are known from only three sites. Therefore, direct effects are expected to be minimal.

Action Alternatives that include herbicide treatments

Two herbicides proposed in the Modoc National Forest Noxious Weed Treatment Project FEIS are lethal to annual grasses such as slender Orcutt grass: glyphosate and chlorsulfuron. The other herbicides target broadleaf herbs. If the herbicide is transported off-site, direct effects to non-target plants can originate from aerial drift, runoff, or lateral movement of groundwater.

Drift is the movement of the herbicide in the air from the target site to an area unintended for treatment. Formulation, droplet size, wind speed and direction, temperature, and height above ground at which the herbicide is applied are parameters in determining if drift sends herbicide onto untargeted plants. Amine formulations do not vaporize readily and should replace ester formulations in sensitive areas.

Table 10 supports the conclusion that a no herbicide buffer of even 25 feet may be sufficient to prevent drift of herbicide to non target plants when applied by boom (applications on the Forest will be directed spray or wick treatments, and therefore, effects would be even less than what the table shows.) Design Standards for soils and water quality minimizes runoff or lateral movement of groundwater.

Slender Orcutt grass occurs in vernal pool-like habitats that may be slightly depressed from the surrounding landscape. Minimizing any potential runoff or lateral flow is important from the viewpoint that its habitat is generally somewhat lower than the surrounding land surface. Glyphosate is tightly adsorbed to soil and rapidly degraded by microbes. Chlorsulfuron also undergoes microbial and herbicide degradation relatively rapidly. However, it can carry over if rates are exceeded, and trace amounts can be significant due to extreme bioactivity (http://pested.unl.edu/catmans/row/chapter8.pdf accessed 9/27/2005).

The Modoc NF tes_poly04 coverage for slender Orcutt grass was buffered by 100', then that was clipped to the Weedspoly_eis_gt5ac and weeds_woother_less5ac coverages. This Geographical Information Systems (GIS) search came up with three occurrences of noxious weeds within a 100-foot buffer of slender Orcutt grass occurrences. Treatment of these three weed occurrences is scheduled for manual treatment.

Mitigations to avoid affects of herbicide on slender Orcutt grass include Design Standards, Best Management Practices, and proper application methods. Additionally, the three weed occurrences currently known to be within 100 feet of slender Orcutt grass are scheduled for manual treatment.

Action Alternatives that include cultural treatments

Cultural treatments proposed in the FEIS include seeding with plant species on areas that have been denuded by noxious weed treatments. It also includes goat grazing, mulching and tarping. Cultural treatments would have no impact on slender Orcutt grass, as only three noxious weed sites are close, but not overlapping, to this threatened species; if seeding is implemented in nearby sites, only appropriate, species and methods as determined by resource specialists would be used; use of goats includes confining them within the noxious weed site and away from native plants by fences; tarping and mulching would only be used on weeds, not on slender Orcutt grass.

Early Detection – Rapid Response (EDRR) Strategy

Alternatives 4, 5, and 6 include adaptive management. EDRR allows minor project variations to meet site-specific conditions or landscape objectives.

Table 11. Early Detection – Rapid Response Strategy (EDRRS) by Alternative

Alternative 2 and 3 – no EDRRS	Alternatives 4, 5 and 6 - EDRRS
same species of noxious weeds, same sites, same treatments	same and new species of noxious weeds, same and expanding or new sites, same treatments

Because of the harsh environment that slender Orcutt grass grows in, it is unlikely that noxious weeds addressed in this FEIS will occupy that habitat, and effects to the listed species are expected to be minimal from the Early Detection –Rapid Response proposals for Alternatives 4, 5, and 6.

Surfactants, Inerts, Dyes and Synergistic Effects

Surfactants are used in herbicide formulations to increase the absorption of the herbicide by lowering the surface tension of the targeted plants. Since herbicides are used to kill plants, using a surfactant to make it more effective is a moot point. **Inerts** are used to improve the performance of a pesticide, and are 'confidential business information' of the chemical companies, and analysis of these herbicides is therefore impossible. **Dyes** will be used in herbicide treatments to show where the herbicide has been administered. Its effect on non-target terrestrial and aquatic species is unknown; however, its use has not resulted in any known problems. Using dyes can be an aid to making sure that only the target species is treated, and it is here recommended that dyes be used in the administering of herbicides. A **synergistic** effect is any effect of two herbicides acting together which is greater than the simple sum of their effects when acting alone: such herbicides are said to show synergism. The synergistic effect of the two mixes has been covered in Dave Bakke's Specialist Report in support of the FEIS.

Indirect Effects

Indirect effects to TEP plant species from herbicide use could include accidental spills, spray drift, surface runoff, subsurface runoff or a combination of these factors. Herbicide use could also indirectly affect TEP plant species by impacts to invertebrate pollinator species such as bees and butterflies. However, slender Orcutt grass is wind pollinated.

Pesticide spills could potentially impact TEP plant species. Should the spill occur near water, plant members of meadows and seeps, vernally wet, riparian woodland, riparian forest, bog and fen, and non-forested lakeshore and streamside habitats might be exposed to much higher concentrations of herbicides than would be expected from drift, runoff, or even direct deposition of herbicide at the label concentration.

Cumulative Effects

Cumulative impact is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative effects would include past, present and ongoing impacts associated with forest management. Past and present activities, and ones that may continue into the reasonably foreseeable future that potentially affect slender Orcutt grass include other previously approved weed treatment programs, grazing activities on Forest allotments, timber management and fuel reduction, pile burning, railroad construction and concomitant weed eradication, road construction, recreation (such as OHV), any impacts from firewood gathering along the periphery of the vernal pool, dam construction and repair, goose nesting island construction, excavation of borrow material such as proposed for Lauer Reservoir, stock pond construction such as by deepening one place in vernal pool as was accomplished in T44N R14E NW ¼ Section 17 (near Lauer Reservoir) .

Herbicide treatments on noxious weeds or for brush control had been used on the Modoc NF, prior to 2002, at which time they were discontinued (Moreo 2005). Herbicides have the capacity to accumulate in the soil or in ground water. However, no such accumulation has been detected. Within the vernally wet habitat itself, there has been waterfowl nest construction, grazing and vehicular use. Hydrologic alterations have also occurred, such as dam creation and repair (Irvin 2004 Pers. comm.). Past management activities may have affected slender Orcutt grass or habitat, however, the treatments to noxious weeds should have no or miniscule effect to this plant.

Projects planned for the Modoc NF that may impact a portion of slender Orcutt grass occurrences and habitat include continued grazing. Cows also use slender Orcutt grass habitat in the early season as a water source, and later in the summer for trailing and resting. Cows have used this habitat for many years (Irvin 2004 Pers. Comm.).

Future recreational activities may impact some listed plant habitat and individuals, the most severe effects arising from unregulated OHV use. Off-highway vehicle damage has been reported to one population of slender Orcutt grass in Plumas County and threatens two additional populations in Shasta and one population in Madera County (CNDDB 1996). Vehicles driving on habitat or individuals may alter habitat and likely kill individuals by crushing.

Hydrologic alterations of habitat, including dam repair or removal, water development maintenance, borrowing material (such as clay to build up dams), and possibly excessive OHV or cattle damage, could impact habitat and entire populations by changing the water regime, lowering one part of the vernal pool so that the rest of the pool does not hold water, or removing water, or damming water and subsequently creating reservoirs too deep to dry out over the growing season. Slender Orcutt grass was first located on the Forest in 2003. Its previous extent on the Forest is unknown. A delineation of vernal pools on the Forest has been contracted. Once the information is gathered and put into a Forest GIS layer, management of vernal pools and slender Orcutt grass will be facilitated.

Natural events such as climate change could impact slender Orcutt grass by lack of sufficient water, or too much water. The change would have to be of such duration as to outlast seed viability of the listed species. At this time, there is no evidence that effects from noxious weed treatment would cause a downward trend for the listed plant species when coupled with the above cumulative effects.

Beneficial Effects

If listed plant species are in close proximity to treatment sites, the indirect effects of either physical or herbicide treatments could be that of decreasing weed competition and lessening the chance of possible future site conversion to the aggressive and competitive noxious weeds. When the weeds are removed from a site, essential resources (water, space, sunlight, and nutrients) will be more readily available to the native plants. The ‘sacrifice’ of a few individuals in a TEP plant population in order to eradicate or limit the spread of an advancing noxious weed is ultimately a beneficial action for the native species. However, since only three sites of noxious weeds are within 100 feet of slender Orcutt grass, there is no anticipated sacrifice of individuals that would lead to such a great loss as causing an adverse affect.

Based on the above discussions, the following determinations have been made as to effects of the Action Alternatives on the listed plant species:

Table 12. Determination of Affects of Project Weed Treatments on slender Orcutt grass

WEED TREATMENT	AFFECT ON LISTED PLANT SPECIES
Physical/Manual	NE[1]
Cultural	NE[1]
Herbicide:	(see specific herbicides below)
Clopyralid	NE[1]
Dicamba	NE[1]
Glyphosate	NE[1]
Triclopyr	NE[1]
2,4-D	NE[1]
Chlorsulfuron	NE[1]
Mix 1	NE[1]
Mix 2	NE[1]

[1] No Effect.

Rationale for Determination

Based on the analysis of the effects of the Project, and on the concerns for the welfare of the slender Orcutt grass:

There are no known noxious weeds that grow in the habitat occupied by slender Orcutt grass (inundated part of the year, dry part of the year).

Design Standards have been included to prevent any possible inadvertent impact to this species. It is determined that there would be No Effect to individuals or the 9 populations on the Forest which include more than 7 million plants total.

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Appendix A

Summary Comparison of Alternatives for the Noxious Weed Treatment Project

Alternatives / Alternative Features	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Treatment Timeframe	**Ongoing**	**5 years**	**5 years**	**10 years**	**10 years**	**10 years**
Treatment Sites and Acres	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**
Total Inventoried Weeds (2004)	541/6908	541 / 6908	541 / 6908	541 / 6908	541 / 6908	541 / 6908
Inventoried Weeds Fully Treated	**20-30** ac/yr[1]	520 / **5,995**	494 / **5,993**	520 / **5,995**	520 / **180**	538/ **241**
Inventoried Weed Sites Receiving Partial Treatment2	0/0	16/904[2]	0/0	16/904[2]	0/0	0/0
Inventoried Weeds Receiving Limited Treatment3	0/**0**	0/**0**	0/**0**	0/**0**	9/**100**[3]	3/**100**[3]
Inventoried Weeds Not Treated4	6,878[1]	5/9[4]	47/916[4]	5/9[4]	5/5515	0/6,567[4]
Proportion of Inventoried Weeds Treated	0.4%	na / 87%	na / 87%	99 % / 99 %	100 % / 4 %	100 % / 5 %
Noxious Weeds Treated Through Early Detection – Rapid Response (acres)5		0 acres	0 acres	Up to **200** acres (100 ac max/yr)	Up to **200** acres (100 ac max/yr)	Up to **200** acres (100 ac max/yr)
Total Acres of Weeds Treated	**20-30** ac/yr1	**6,899** acres	**5,993** acres	**7,099** acres	**480** acres	**541** acres
Treatment Methods for Inventoried Noxious Weeds (2004)	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**
Physical – hand pulling, hoeing, grubbing	0/0	161/31	494/5,993	161/31	0/0	0/0
Physical+ – Physical plus, clipping seed head or plant, weed eater, mulch/tarp	20-30 ac/yr1	0/0	0/0	0/0	527/139	116/19
Physical and/or Herbicide Treatments	0/**0**	333/**5,961**	0/**0**	333/**5,961**	0/**0**	371/**116**
Herbicide	0/**0**	42/**907**	0/**0**	42/9**07**	0/**0**	46/**65**
Limited Treatment3	0/0	0/0	0/0	0/0	9/100	3/100
Goat Grazing (potential) (physical/herbicide)	0/0	0/0	0/0	0/0	5/41 **(no herbicide)**	5/**41**
Total Acres Potentially Treated with Herbicides (includes ED-RR acres)6	0/**0**	355/**6,868**	0/**0**	355/**7,068**	0/**0**	425/**522**

[1]Under Current Management (Alt. 1), approximately 20 to 30 acres of noxious weeds are treated each year through other site specific NEPA decisions as part of other projects in accordance with the Modoc NF Integrated Weed Management Strategy (2005).

[2]These sites are rhizomotous species that occur within 10 feet of H2O. Those sites that are within 10 feet of H2O would not be treated. Sites with acreage ooutside of this 10 foot no treatment zone would receive partial treatment. The acreage within the 10 foot zone would not be treated, the acreage outside the 10 foot zone would be treated with herbicides.

[3]Includes treating along borders of infestations to prevent spread using the methods specific to each alternative. Treatment is estimated at 100 acres to be proportionally distributed based on the size of the individual infestations. These acres are included in the Inventoried Noxious Weeds Treated acreage.

[4]Excluded in Alt. 2 and Alt. 4: 5 sites of rhizamotous species that are within 10' of live water and partial acreage of 16 sites of rhizamotous species that are within 10' of live water. Rhizamotous species will not be treated by physical methods in these alternatives. Excluded in Alt. 3: 47 sites of rhizamotous species. Excluded in Alt. 5: 5,658 acre Dyer's woad, 850 acre Dalmatian toadflax, 159 acre crupina, and 6 sites of rhizamotous species. These sites will receive limited treatment around the perimeter estimated at 100 acres proportionally distributed based on the size of these sites. Excluded in Alt. 6: 5,658 acre Dyer's woad, 850 acre Dalmatian toadflax, 159 acre crupina. These sites will receive limited treatment around the perimeter estimated at 100 acres proportionally distributed based on the size of these sites.

[5]May use any of the methods approved for use in this NEPA decision.

[6]For Alt. 2 this includes the acres under the physical and/or herbicide method plus the herbicide treated acres. Alt. 4 adds the same categories as Alt. 2 plus adds in the potentially treated 200 acres through early detection rapid response. Alt. 6 includes the Physical and/or Herbicide acres, the herbicide acres, the acres under goat grazing, the acres under the limited treatment category, and the 200 acres under Early Detection-Rapid Response.

Appendix S2:

Botany Biological Evaluation

Appendix S2.1: Plants Biological Evaluation

Modoc National Forest Noxious Weed Control Project

MODOC NATIONAL FOREST
SENSITIVE PLANT BIOLOGICAL EVALUATION

December 16, 2002

Summary

The Modoc National Forest proposes to limit the spread of noxious weeds by treating known occurrences with mechanical and chemical control methods.
A Biological Assessment would be prepared if threatened or endangered plant species were suspected in the treatment areas. One Threatened species, *Orcuttia tenuis* is suspected to occur on the Modoc National Forest. This species is found near vernal pools or vernal pool like drainage edges usually in oak and/or pine woodlands. During review it was determined that no habitat for this species occurs within the proposed treatment areas, therefore these activities will have "No Effect". No Endangered plant species are suspected or known to occur on lands administered by the Modoc National Forest, therefore proposed activities would have "No Effect" on these species. No Biological Assessment will be prepared for this project.
This biological evaluation analyzes the potential effects of the proposed alternatives on sensitive plant species as listed by the Regional Forester. The purpose of this biological evaluation is to review the alternatives in sufficient detail to determine the effects of the proposed action on these species.
Surveys for Threatened, Endangered and Sensitive (TES) plants have been conducted in many areas across the Modoc National Forest. Although surveys are not complete in all proposed treatment areas, sufficient analysis of the risks to TES plants can be accomplished with current information. Even though they may exist, there are no known instances where sensitive plants and noxious weeds occur in such close proximity that the proposed control measures would impact the sensitive plants.

Both the Proposed Action and the No Action alternatives may affect sensitive plants, but in different ways. The effect from the Proposed Action will be that some sensitive plants may be directly damaged or even killed by the weed control activities, but preventing further spread of the weeds will ultimately have a beneficial effect. Not implementing weed control activities may affect sensitive plants indirectly, resulting in high competition from the weeds and possible loss of individuals, occurrences or susceptible populations.

It is my determination that:

- **Implementation of the Proposed Action "may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the populations or species" for all 19 Modoc National Forest sensitive plants.**

- **Implementation of the No Action alternative "may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species" for all 19 Modoc National Forest sensitive plants.**

Prepared by: Bruce Davidson, Botanist

Reviewed by: Jim Irvin, Range Program Manager

INTRODUCTION

Botanical Review for Modoc National Forest Noxious Weed Control Project has been completed. All areas identified for manual and chemical treatments were considered.
This biological evaluation analyzes the potential effects of the proposed project activities on threatened, endangered and sensitive plant species as listed by the Regional Forester. The purpose of this biological evaluation is to review the proposed project alternatives in sufficient detail to determine the effects of the proposed activity on the species.

THE PROJECT

Location

The proposed noxious weed treatment areas are scattered over much of the Modoc National Forest.

Project description

Treatment will occur to noxious weeds spread geographically over <1% of the Forest, at known infestation sites, by a variety of treatment methods. Sites planned for treatment range in size from single plants to infestations covering up to 1,500 acres. Actual treatment would not exceed 1,500 acres per year. Physical treatment includes hand pulling, digging, and grubbing. These treatments will be applied to small, isolated populations of 100 plants or less and where deemed necessary for other resource concerns.
Herbicide application will occur directly to weed leaves and stems. Two types of foliar applications will be used: Spot applicators –herbicide is sprayed directly onto target plants only; other desirable plants are avoided. These applicators include motorized rigs with spray hoses, backpack sprayers, and hand-pumped spray or spray bottles that can target very small plants or parts of plants, and Wick (wipe-on) applicators –A sponge or wick on a handle wipes herbicide onto weed foliage and stems. The wick generally prevents drift or droplets from falling onto non-target plants and soil. All herbicides proposed for use are registered in the U.S. and California and have a label certifying that the Federal Environmental Protection Agency (EPA) and the California Department of Pesticide Regulation (DPR) have approved the chemical for use. All label directions will be followed.

BIOLOGICAL EVALUATION PROCESS

The activity proposed for this project requires a Biological Evaluation to be completed (FSM 2672.4). The intent of the Biological Evaluation process is to conduct and document activities necessary to ensure that the proposed management actions will not jeopardize the continued viability or cause adverse modification of habitat for: A) Species listed or proposed to be listed as threatened or endangered by the USDI-Fish and Wildlife Service. B) Species listed as sensitive by USDA-Forest Service Region 5.

The Biological Evaluation is a 4-step process. Evaluation of impacts on a given species may be complete at the end of Step #1 or may extend through Step #4. The review process for this project included a Prefield Review for Threatened, Endangered, and Sensitive (TES) plants.

This assessment examines the potential effects to TES plant resources that may result from implementation of proposed activities. Information was obtained from several sources including file records at the Modoc National Forest Supervisors Office, Interdisciplinary Team specialist reports, and numerous journal articles and reports addressing forest and weed management. The following table (Table 1) summarizes the species suspected to occur in the analysis area and the results of surveys performed in the area.

Table 1 Summary of Biological Evaluation Process

SENSITIVE PLANT SPECIES	Step #1 Prefield Review (Habitat Present?)	Step #2 Reconnaissance Assessment (Species Present?)	Step #3 Risk (Conflict?)	Step #4 Biological Investigation (Required?)
Astragalus anxius	YES	YES/limited surveys	YES	NO
Astragalus pulsiferae var. suksdorfii	YES	YES/limited surveys	YES	NO
Botrychium ascendens	YES	limited surveys	YES	NO
Botrychium crenulatum	YES	limited surveys	YES	NO
Botrychium lineare	YES	limited surveys	YES	NO
Botrychium montanum	YES	limited surveys	YES	NO
Calochortus longebarbatus var. longebarbatus	YES	YES/limited surveys	YES	NO
Cypripedium montanum	YES	YES/limited surveys	YES	NO
Eriogonum prociduum	YES	YES/limited surveys	YES	NO
Eriogonum umbellatum var. glaberrimum	YES	limited surveys	YES	NO
Galium glabrescens ssp. modocense	YES	limited surveys	YES	NO
Galium serpenticum ssp. warnerense	YES	limited surveys	YES	NO
Iliamna bakeri	YES	YES/limited surveys	YES	NO
Ivesia paniculata	YES	YES/limited surveys	YES	NO
Mimulus evanescens	YES	limited surveys	YES	NO
Phacelia inundata	YES	limited surveys	YES	NO
Pogogyne floribunda	YES	limited surveys	YES	NO
Polygonum polygaloides ssp. esotericum	YES	limited surveys	YES	NO
Rorippa columbiae	YES	YES/limited surveys	YES	NO

DISCUSSION

Threatened, Endangered Plants

One Threatened species, Orcuttia tenuis is suspected to occur on the Modoc National Forest. This species is found in vernal pools or vernal pool like drainage edges usually in oak and/or pine woodlands. During review it was determined that no habitat for this species occurs within the proposed treatment areas, therefore these activities will have “No Effect”. No Endangered plant species are suspected or known to occur on lands administered by the Modoc National Forest, therefore proposed activities would have “No Effect” on these species.

Sensitive Plants

There are 19 Region 5 Sensitive plant species suspected or documented on the Modoc National Forest. Many of them are restricted to specific habitat types and elevations. Prefield review suggested that habitat might be present in the proposed treatment areas for all 19 sensitive plants. Surveys have been conducted in many areas across the Forest for a variety of projects. If potential habitat areas are assumed occupied by the sensitive plants, an evaluation of effects can be done without additional surveys due to the overall beneficial effect of controlling noxious weeds.

CURRENT MANAGEMENT DIRECTION

Current management direction comes from several different Forest Service documents. The Modoc National Forest Land Management Plan outlines desired future conditions, management requirements and monitoring requirements. With the signing of the Sierra Nevada Framework the Forest Plan has

been amended to include additional management direction. Direction is also included in the Forest Service Manual and Handbook.
Current policy for sensitive plants as stated in the Forest Service Manual (FSM 2670.32) includes the following:

1. Avoid or minimize impacts to species whose viability has been identified as a concern.
2. If impacts cannot be avoided, analyze the significance of the potential adverse effects on the population or its habitat within the area of concern and on the species as a whole.
3. Establish management objectives for Federal Candidate species.

Viable occurrences are defined as "(A) population that has the estimated numbers and distribution of reproductive individuals to ensure the continued existence of the species throughout its existing range within the planning area" (FSM 2670.5).

Current management direction for sensitive plants species by Forest:

Modoc National Forest – "All sensitive plant locations are managed according to the policy direction of the Forest Service Manual (FSM 2670) and the R-5 handbook on threatened and endangered species. Where known occurrences or sensitive plant habitats exist on the Forest, a botanical survey is conducted prior to any land disturbing or land exchange activity. Survey procedures and finding are documented in project environmental analysis records. Projects are modified to maintain the integrity of the habitat (p. 3-61, FEIS)

Species management guides have not yet been prepared for any species likely to be affected by the proposed action. Direction to manage and monitor sensitive plant occurrences according to interim and/or existing species management guides exists in the Forest-wide Standards and Guidelines, (p. 4-21, LRMP) and in the monitoring chapter (p. 5-11, LRMP)

Forest-wide Standards and Guidelines are as follows:

1. Manage and conserve sensitive plant species and their habitats to ensure that viable occurrences are maintained.
   a. Develop and implement a consistent, systematic, biologically sound program for sensitive plant species and their habitat so that federal listing as threatened or endangered is unnecessary.
   b. Prior to project implementation, conduct inventories if potential habitat or known population locations are identified. The reporting procedures for this process are outlined in the Forest Service Sensitive Plant Handbook.
   c. Complete interim management recommendations for all sensitive plant species.
   d. Allow no new disturbance of identified sensitive plant habitat without an environmental analysis.
   e. Allow scientific studies if no detrimental effects on sensitive species occur.
   f. Within the planning period, develop Species Management Guides for all species in the Forest sensitive plant list. These documents will provide information on background and present status of the species; new population locations; potential enhancement opportunities; key area necessary for long-term protection; and maximum impact levels. Use information from the California Natural Diversity Database, and State, federal and private organization.
2. Use partnerships and cooperative programs whenever possible to conserve and enhance sensitive plants and their habitats (p. 4-21, LRMP).

The Sierra Nevada FEIS adds four additional Standard and Guideline directives for threatened, endangered, proposed and sensitive species.

1. Conduct field surveys for threatened, endangered, proposed or sensitive species (TEPS) early enough that the project can be designed to conserve or enhance TEPS plants and their habitat. Conduct surveys according to procedures outlined in the Forest Service

Handbook (FSH 2609.25.11). If additional field surveys are to be conducted as part of project implementation, surveys results must be documented in the project file.

2. Minimize or eliminate direct or indirect impacts from management activities to TEPS plants unless project is designed to maintain or improve occurrences (FSM 2670).

3. All projects involving revegetation (planting or seeding) will adhere to the Regional Native Plant Policy.

4. Prohibit or mitigate ground-disturbing activities that negatively affect hydrological processes that maintain water flow, water quality, or temperature critical to sustaining bog and fen ecosystems and the plant species dependent on them. During project analysis, survey, map and protect bogs, and fens from activities such as trampling by livestock, pack stock, humans and from wheeled vehicles. Criteria for defining bogs and fens include but are not limited to: presence of sphagnum moss (Sphagnum spp.), presence of mosses in the genus Meesia, or presence of sundew (Drosera ssp.). Complete initial inventories of fens and bogs within active grazing allotments prior to re-issuing permits.

EXISTING ENVIRONMENT

Project Area Description
The proposed treatment areas include most habitat types on the Forest, from sagebrush steppe and juniper woodlands to dense conifer forests. Streamside occurrences of Canada thistle are present, as well as Scotch thistle at disturbed sites at a few reservoir edges.

Sensitive Species Information
Habitat Requirements/Range and Distribution
All nineteen sensitive species suspected for the Modoc National Forest were identified as having potential to occur in the treatment areas. Following is a summary of these species, the habitats in which they will most likely occur, physiology and phenology information.

Astragalus anxius – Ash Valley milkvetch

Description: Perennial, + matted; hairs sparse. Stems growing low to the ground, 3-20 cm. Leaflets 9-15, narrow at base and broadening toward tip. Flowers, 7-15, crowded, pea-like. Petals purple to white, with pale lilac veins. Fruit, egg shaped, weakly compressed side-to-side, thinly papery; base not stalk-like; with sparse, stiff, flattened hairs; chamber 1.

Habitat: Gravelly volcanic soil among easide pines barrens and juniper/sagebrush flats.
Elevation: 5,000 to 5,400 feet

Flowering Period: May to July Identification Period: May to August

Astragalus pulsiferae var. suksdorfii - Suksdorf's milkvetch

Description: Perennial, with fine, sub-appressed hairs on upper stem and flower stalk. Stems lying on the ground. Leaves, 1-5.5 cm; leaflets 7-13, crowded, small, moderately hairy. Flowers, 3-13, pea-shaped, petals whitish, lavender - veined. Fruit, 1-2 cm, 6-11 mm wide, + spheric, inflated, papery, translucent; base not stalk-like; hairs 0.5 mm, wavy; chamber 1.

Habitat: Found in open ponderosa pine forests and sagebrush plains or valley floors, in loose porous volcanic gravels and sands.

Elevation: 4,800 to 6,400 ft.

Flowering Period: May to August Identification Period: May to August

Botrychium ascendens, B. crenulatum, B. lineare & B. montanum –moonworts

Description: Perennial herbaceous plants, 2-20 cm tall, producing one above ground "leaf" each year, divided into a variously dissected portion with expanded green blades and a variously branched spore producing portion with clusters of round sporangia.

Habitat: Meadows, springs and seeps, usually at higher elevations.

Elevation: 5,000 to 10,000 ft.

Flowering Period: July to August Identification Period: July to September

Calochortus longebarbatus var. longebarbatus - long-haired star tulip

Description: Bulbiferous perennial 10-30 cm, with a small bulblet near the base of the stem above a narrow, inconspicuous leaf. 1-4 flowers, bell-shaped, 3 lavendar-pink petals with a deep purplish-red band and long hairs above the nectar gland. Petals 2-3 cm, broadly rounded near the tip and somewhat narrowed at the base. Sepals shorter than the petals, narrow, green and pointed. Fruit 20-25 mm, winged.

Habitat: Drying edges of seasonally wet meadow in yellow pine and scattered juniper, in full sun or partial shade, in heavy clay soil.

Elevation: 4,000 to 6,200 ft.

Flowering Period: June to August Identification Period: June to August

Cypripedium montanum - mountain lady's slipper

Description: Herbaceous perennial orchid, 25-70 cm, with 4-6 alternate leaves 5-15 cm, linear to round, often twisted or wavy, sessile. 1-4 flowers, with upper sepal and lateral petals purplish and twisted or wavy, and the lip a large white pouch. Staminode 8-12 mm, yellow, red to purple-spotted.

Habitat: Moist areas, dry slopes, mixed evergreen or coniferous forests..

Elevation: 650 to 7,200 ft.

Flowering Period: May to June Identification Period: May to July

Eriogonum prociduum - prostrate buckwheat

Description: Densely woody and branched, with flowers growing above. Leaves are widest at the top, growing basal, clustered on low stems. Both surfaces covered with dense wooly hairs. Flowers growing on stems in a dense head, bright yellow with reddish-brown midribs and teeth, bell-shaped, thinly hairy.

Habitat: Dry, rocky volcanic slopes and hills mostly in yellow pine or pinion woodlands, but also found in sagebrush scrub.
Elevation: 4,200 to 8,200 feet.

Flowering Period: May to August Identification Period: May to September

Eriogonum umbellatum var. glaberrimum - green buckwheat

Description: Densely woody and branched with flowers growing above leaves. Leaves without hairs, widest at the top, bright green, 1-2 cm long, clustered on low stems. Flowers growing on long hairless stems in an umbel, cream. Most flowering stems have a whorl of small leaves near the middle of the flower stem.

Habitat: Sandy or gravelly soil within sagebrush scrub or juniper woodlands.

Elevation: 5,200 to 7,600 feet.

Flowering Period: July to September Identification Period: May to September

Galium glabrescens ssp. modocense – Modoc bedstraw

Description: Plants frow 8-31 cm high from a woody base, grayish-green with microscopic hair. Leaves egg-shaped, coming to sharp tip, 12 mm long, in whorls of 4. Flowers very small and flat, pale yellow to reddish. Fruits nut-like, hairs long, straight, spreading.

Habitat: Gravelly slopes and under the edges of rocks.

Elevation: 5,200 to 9,200 feet.

Flowering Period: June to July Identification Period: May to September

Galium serpenticum ssp. modocense - Warner Mountains bedstraw

Description: Plants 7-33 cm with a woody base, may have soft short hairs. Leaves in whorls of 4, <15 mm long, lanceolate to elliptic, widest below the middle, the tip abruptly reflexed. Flowers very small, whitish, with 4 spreading corolla lobes. Fruit with 2 nutlike parts, yellowish, surrounded by long, straight hairs.

Habitat: Steep talus sloopes around the bases of rocks.

Elevation: 4,700 to 9,000 ft.

Flowering Period: June to July Identification Period: June to August

Iliamna bakeri - Baker's globe mallow

Description: Fairly large herbaceous plant with stiff stellate hairs along the stem and leaf. Leaves bright green, shallowly three lobed, stem 1-6 cm, blade 1.5-4.5 cm. Flowers large growing at base of leaf stems, calyx 9-12 mm, petals 1-3 cm, rose-purple. Very fragrant.

Habitat: Volcanic loam or lava beds especially after a burn in juniper woodlands and sagebrush scrub.

Elevation: 3,200 to 8,200 ft.

Flowering Period: July to September Identification Period: May to November

Ivesia paniculata - Ash Creek ivesia

Description: This plant is low matted, greyish-green, and densely hairy with branched woody stems. Leaves are mousetail-like, with flat lying straight hairs. Individual leaflets have greater than 5 lobes. The inflorescence is open with white to pale yellow flowers which grow in clusters on stalks. Individual flowers have 5 stamens and from 1-3 pistils. The fruit is 1-1.5 mm, smooth, brown.

Habitat: Open volcanic ridges, gravelly flats, and openings within yellow pine and juniper woodlands.

Elevation: 4,900 to 6,300 feet.

Flowering Period: June to July Identification Period: May to September

Mimulus evanescens – ephemeral monkeyflower

Description: Annual herb, more or less succulent, covered with short, gland-tipped hairs, moist and slimy to the touch. Stems slender, 10-25 cm tall, erect, branched. Leaves sharp-tipped, oval to sword shaped, 1-3.8 cm long, 0.7-2.9 cm wide; the lower leaves have a petiole while the upper leaves do not. Flowers growing at leaf bases, inconspicuous, yellow, with hairs on inside of petals. Fruit enclosed in calyx, 4.8-9.0 mm long.

Habitat: Occurs in sagebrush juniper dominated vegetation zones. Scattered among rock fragments and alongside small boulders, in moist, heavy gravel and clay that has been inundated earlier in the spring. Can also be found in rocky stream banks or drying watercourses.

Elevation: 3,900 to 5,600 feet.

Flowering Period: June to July Identification Period: June to July

Phacelia inundata - playa phacelia

Description: Annual 10-40 cm. Stem branched at the base, short-stiff-hairy, glandular. Leaves 1-3 cm, deeply lobed, segments rounded. Flower stalk 1-4 mm, calyx lobes 3-4 mm, 5.5-8 mm in fruit, short-hairy; corolla 3-5 mm, narrowly bell-shaped, yellow, remaining in fruit; stamens without hairs; style hairy. Fruit 4-7 mm, hairy. Seeds 5-30, 1-1.8 mm, with ridges and furrows throughout.

Habitat: Alkaline flats, dry lake margins.

Elevation: 4,900 to 6,650 ft.

Flowering Period: May to July Identification Period: May to August

Pogogyne floribunda - profuse-flowered pogogyne

Description: Annual less than 10 cm tall, with a pungent, mintlike aroma. Usually branched at the base with few to many upright stems, densely flowered throughout. Leaves linear to round, bristly. Flower and calyx hairy, corolla 4.5-6 mm, two-lipped, white with three purple spots at base of lower lobe.

Habitat: Seasonal wetlands such as vernal pools, and swales mainly within silver sage basins.

Elevation: 3,200 to 5,000 ft.

Flowering Period: June to August Identification Period: June to August

Polygonum polygaloides ssp. esotericum – Modoc County knotweed

Description: Annual herb with stems 5-12 cm. Leaves less than 4 cm long, sessile, linear to lanceolate. Inflorescence 2-7 cm long, 5-7 mm wide; bracts 3-6 mm long, lanceolate to elliptic, growing close to the stem, with a narrow white margin, if any. Flowers white with 5 or 8 anthers. Fruit 2-3 mm, brown, smooth, shiny and lanceolate.

Habitat: Vernal pools, swales and seasonally wet areas, in heavy clay.

Elevation: 4,900 to 5,200 ft.

Flowering Period: April to July Identification Period: June to August

Rorippa columbiae - Columbia yellow cress

Description: Low herbaceous perennial with spreading, branched stems 10-40 cm long. Rhizomatous and finely hairy with unbranched hairs. Leaves 3-10 cm long, lobed to divided, the lower ones stalked. Flowers in short racemes. Petals 4, light yellow, 2.5-4 mm; sepals 2-3.5 mm, hairy, persistent in fruit. Seed pods widely oblong, plump, 3-6 mm long, finely hairy, with a short but visible style tip.

Habitat: Drying lake beds and stream banks in various soil textures, but seasonal saturation is required.

Elevation: 4,000 to 5,900 ft.

Flowering Period: May to September Identification Period: May to October

ENVIRONMENTAL CONSEQUENCES

Proposed Action

Approximately 500 treatment areas are proposed for noxious weed control. 25 treatment sites are within 300 feet of known sensitive plant occurrences. A distance of 300 feet is used to account for varying levels of mapping accuracy for both the weed and sensitive plant locations. Effects specific to known locations are described below.

Astragalus anxius – Ash Valley milkvetch
One known site of Ash Valley milkvetch is in the vicinity of a Scotch thistle occurrence. Physical control is proposed for the Scotch thistle, and the weed site is about 250 feet from the milkvetch. No impacts are likely for this milkvetch occurrence.

Astragalus pulsiferae var. suksdorfii - Suksdorf's milkvetch

One known site of Suksdorf's milkvetch is in the vicinity of a Scotch thistle occurrence. Physical and/or chemical control is proposed for the Scotch thistle, and the weed site is about 200 feet from the milkvetch. No impacts are likely for this milkvetch occurrence.

Calochortus longebarbatus var. longebarbatus - long-haired star tulip

Two occurrences of Calochortus longebarbatus var. longebarbatus (CALOL) are within 300 feet of proposed weed treatment areas. Klamath weed is present within the mapped boundary of one occurrence and is also about 200 feet from the other. Physical control (grubbing) is proposed for all Klamath weed sites. In the summer of 2002, the Forest Botanist visited a CALOL site and reported the occurrence of Klamath weed within the mapped boundary. At that time Chrysolina beetles (introduced biological control agents) were observed on the weeds. Their impact to the weed patch was evident; the plants were wilting and discolored. On that same visit the CALOL plants were not found, but only a portion of the mapped CALOL site was searched. Grubbing the weed patch may impact a very few CALOL individuals. If CALOL plants are disturbed by grubbing, it is likely that direct competition from the weeds was already affecting them. Controlling the spread of the weed patch within the CALOL site will ultimately result in a benefit to the CALOL occurrence by decreasing competition from more aggressive species.
At the second CALOL occurrence, both Klamath weed and Mediterranean sage are growing together about 200 feet from the mapped CALOL site. Physical and/or chemical control is proposed for the Mediterranean sage. No direct effects to this CALOL occurrence are expected from the proposed treatments.

Cypripedium montanum - mountain lady's slipper

Two species of noxious thistles are near one known occurrence of Cypripedium montanum (CYMO2). The area is an undeveloped campsite with a spring. CYMO2 grows near the spring, and Scotch thistle grows in the disturbed area associated with the campsite, about 50 feet from the closest CYMO2 plants. Musk thistle occurs on the opposite side of a road, 50-100 feet from the closest CYMO2 plants. Physical and/or chemical treatments are proposed for both thistles here. The short distance between the thistles and CYMO2 plants is still enough separation that direct impacts to the CYMO2 plants are unlikely.

Eriogonum prociduum - prostrate buckwheat
Scotch thistle occurs adjacent to one known occurrence of Eriogonum prociduum (ERPR9), and is proposed for treatment by physical and/or chemical means. Even though Scotch thistle is not likely to invade the very harsh site that supports ERPR9, it is possible that the two plants co-exist where the mapped boundaries overlap. At this site, effects to ERPR9 from physical or chemical treatment of the Scotch thistle may include the loss of some individual plants. Grubbing or the application of herbicide could kill ERPR9 where the plants are interspersed with Scotch thistle, but most of the occurrence would be unaffected.

Iliamna bakeri - Baker's globe mallow

Known sites of Iliamna bakeri (ILBA) that are within 300 feet of proposed weed treatments occur in the Damon/Long Fire area. Burned in 1996, many thousands of ILBA plants have since sprouted and become established; the ILBA in the fire area is divided into eleven loosely defined occurrences. Known sites of dyer's woad (4), Scotch thistle (2) and spotted knapweed (4) are proposed for treatment here. Physical control is proposed for the two Scotch thistle sites and three of the dyer's woad sites. A combination of physical and chemical control is proposed for one larger dyer's woad site and the spotted knapweed sites. No sites where these noxious weeds and ILBA are actually growing together are known, but there is the possibility that some exist. Individuals of ILBA could be affected by the proposed treatments, but even where they might occur together, the likelihood of significant damage to any individual would be small. When grubbing, persons would not accidentally dig up ILBA; they are large plants and would require some effort to unearth. Likewise, when applying chemical to target weeds, it is unlikely that ILBA plants themselves would be sprayed. Still, there is the chance that some ILBA plants would be affected, maybe even killed during implementation of these weed control treatments. Overall benefits to ILBA from reducing the effects of noxious weed spread would outweigh the possible losses of a few individuals.

Ivesia paniculata - Ash Creek ivesia

The habitat of Ivesia paniculata (IVPA) is a very harsh environment for most plants. As with Eriogonum prociduum, even noxious weeds are not likely to invade these habitats. However, along the edges of these open gravelly barrens and especially in disturbed areas, weeds can compete directly with IVPA. Scotch thistle exists within 300 feet of four IVPA sites, and exists within the mapped boundary of one additional IVPA site. A combination of physical and chemical control methods is proposed for these Scotch thistle sites. Where the weeds and IVPA are growing together, there may be impacts to IVPA individuals. Grubbing and chemical applications could result in the injury or mortality of IVPA plants as the weeds are attacked. The overall benefit of eradicating or controlling the spread of the weeds will outweigh the possible loss of a few IVPA individuals.

Rorippa columbiae - Columbia yellow cress

Three sites of Canada thistle exist near or within the mapped boundary of a Rorippa columbiae (ROCO3) occurrence. The Canada thistle may not actually be near specific ROCO3 locations, as the mapped area is one and a half miles long and ROCO3 is only present in scattered locations along the stream. Still, there is a chance that the thistles may be close enough that ROCO3 could be affected by the proposed chemical treatment. If ROCO3 were in close proximity enough to be affected by the chemical application, the plants would already be suffering from competition from the weeds. Eradicating or controlling the spread of the Canada thistle would benefit the rest of the ROCO3 occurrences, protecting them from being overrun by the aggressive and competitive thistle.

DIRECT EFFECTS

Surveys are not complete throughout the proposed treatment areas; therefore it must be assumed that some undiscovered sensitive plant occurrences exist. Effects to undiscovered occurrences can be addressed without further surveys.

Sensitive plants may be damaged or killed by grubbing, digging and pulling noxious weeds, but only if the plants are interspersed with the weeds. In the same regard, chemical treatment may also damage or kill sensitive plants. There are no known situations on the Modoc National Forest where A, B or C rated noxious weeds are actually growing this close to sensitive plants, but it is possible. If the situation were known to exist, appropriate control measures, including possible chemical treatment, would still be recommended for the benefit of the sensitive species. Some plants may be damaged by foot traffic and vehicle traffic as workers access the sites. Overall, direct effects may initially have a negative impact on a small portion of sensitive plant occurrences.

INDIRECT EFFECTS

If sensitive plants are in close proximity to treatment sites, the indirect effects of both physical and chemical treatments will be that of decreasing competition and lessening the chance of possible future site conversion from the more aggressive and competitive noxious weeds. When the weeds are removed, essential resources (water, space, sunlight and nutrients) will be more readily available to the sensitive plants that remain. A weed-free site will be more likely to be re-colonized by the sensitive plants. Even the "sacrifice" of a few individuals in a sensitive plant population in order to eradicate or limit the spread of an advancing noxious weed is ultimately a beneficial action for the sensitive species.

CUMULATIVE EFFECTS

Other projects planned for the Modoc National Forest will be impacting a portion of sensitive plant populations and habitat. Some of the current project proposals and continuing actions are Blue Fire Restoration, Hackamore Thinning, herbicide application in Long/Damon area, Modoc Complex Fire Restoration, and prescribed fire programs. In addition, livestock grazing will go on throughout the range of most of the suspected sensitive plants, and effects from herbivory and trampling will continue. Recreational activities may impact some sensitive plants, the most severe effects arising from unregulated OHV use. The current proposal is to treat only A, B and C rated noxious weeds. Other noxious weeds, as well as other aggressive non-native plants, do exist throughout the Forest and have been documented in some sensitive plant occurrences. These other weeds (two examples are medusahead and cheatgrass) will continue to affect sensitive plants by competing for resources. Natural disturbances, such as wildfire, drought, flooding, and natural erosion processes will continue, with varying effects. Iliamna bakeri will be rejuvenated from wildfire; Calochortus longebarbatus var. longebarbatus populations will fluctuate with drought and wetter conditions; our annual sensitive plants, Mimulus evanescens, Phacelia inundata, Pogogyne floribunda, and Polygonum polygaloides ssp. esotericum, will experience population swings in response to varying climatic conditions. At this time, there is no evidence that these cumulative effects, coupled with effects from the current proposal, will cause a downward trend for any of the sensitive plants.

No Action

DIRECT/INDIRECT EFFECTS

Without active noxious weed control, the weeds will continue to spread unchecked. Prevention measures, such as equipment washing and restricting access to infested sites, will be implemented as projects occur, but there will be no control measures. The existing weed sites will expand and spread to new areas by wind, vehicle traffic, animal movement and other means. Because of their competitive advantage, when the weed sites are already near or within sensitive plant occurrences, the weeds can be expected to displace sensitive plants within the reasonably foreseeable future (10-20 years). Over a longer period of time (30+ years), entire sensitive plant occurrences could be lost, the plants not able to effectively compete for the limiting resources of water, space, sunlight and nutrients. As the noxious weeds spread to new areas, additional sensitive plant occurrences would be affected.
Are these effects severe enough to cause loss of viability to sensitive plant populations or to cause a trend toward federal listing? Certainly, some occurrences could be lost, and given enough time (50-100 years or more of no noxious weed control), it is reasonable to assume that some sensitive plant populations could lose viability and eventually be lost. Especially at risk are those species that occur only at one or very few sites, with a low number of plants, and exist in sites that are susceptible to weed invasion. Species with these criteria are Botrychium ascendens, Mimulus evanescens, and Rorippa columbiae. These species are not likely to lose population viability from noxious weed invasion in the next 10-20 years, but as time goes on and there is no attempt to actively control the weeds, there will

come a time when it will become likely that these populations will lose viability from the effects of weed competition. Loss of population viability in the long term is not likely for the remaining sensitive plants, which occur in larger numbers, at several locations, and/or in habitats that are less susceptible to weed invasion. My determination for this project is based on the relatively short time frame of the lifespan of a NEPA decision (<10 years).

CUMULATIVE EFFECTS

Effects from other management activities and natural processes are the same as described above for the Proposed Action. With the No Action Alternative, these effects will contribute to a somewhat faster rate of spread for the noxious weeds. For instance, weed seeds will be carried to new sites by continued livestock grazing, recreational OHV use and everyday vehicle traffic on roads.

DETERMINATION

Proposed Action

It is my determination that implementing physical and chemical noxious weed control measures for the currently known A, B and C rated weed sites "**may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species**" for all 19 Modoc National Forest sensitive plants.

No Action

It is my determination that not implementing physical and chemical noxious weed control measures for the currently known A, B and C rated weed sites "**may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species**" for all 19 Modoc National Forest sensitive plants.

Table 3. Summary of Effects

Species Suspected on the Modoc NF	Common Name	Proposed Action	No Action
Astragalus anxius	Ash Valley milkvetch	MAIH	MAIH
Astragalus pulsiferae var. suksdorfii	Suksdorf's milkvetch	MAIH	MAIH
Botrychium ascendens	upswept moonwort	MAIH	MAIH
Botrychium crenulatum	crenulate moonwort	**MAIH**	**MAIH**
Botrychium lineare	slender moonwort	**MAIH**	**MAIH**
Botrychium montanum	western goblin	**MAIH**	**MAIH**
Calochortus longebarbatus var. longebarbatus	long-haired star tulip	**MAIH**	**MAIH**
Cypripedium montanum	mountain lady's-slipper	**MAIH**	**MAIH**
Eriogonum prociduum	prostrate buckwheat	**MAIH**	**MAIH**
Eriogonum umbellatum var. glaberrimum	green buckwheat	**MAIH**	**MAIH**
Galium glabrescens ssp. modocense	Modoc bedstraw	**MAIH**	**MAIH**
Galium serpenticum ssp. warnerense	Warner Mountains	**MAIH**	**MAIH**
Iliamna bakeri	Baker's globe mallow	**MAIH**	**MAIH**
Ivesia paniculata	Ash Creek ivesia	MAIH	MAIH
Mimulus evanescens	ephemeral monkeyflower	MAIH	MAIH
Phacelia inundata	playa phacelia	**MAIH**	**MAIH**
Pogogyne floribunda	profuse-flowered	**MAIH**	MAIH

Species Suspected on the Modoc NF	Common Name	Proposed Action	No Action
Polygonum polygaloides ssp. esotericum	Modoc County knotweed	**MAIH**	**MAIH**
Rorippa columbiae	Columbia yellow cress	**MAIH**	**MAIH**

NE = No effects
MAIH = May affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.
WAIFV* = Will affect individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or loss of viability to the population or species.
* Trigger for a Significant Issue as defined in NEPA

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Appendix S2.2: Plants Biological Evaluation Addendum

Addendum to the Botany Biological Evaluation for Modoc National Forest Noxious Weed Treatment Project

Modoc National Forest, California
Sensitive Plant Species
1/29/2006

Summary

The USDA Forest Service, Modoc National Forest proposes to treat noxious weeds on the Forest.

A Biological Assessment (BA) has been prepared for threatened and endangered plant species suspected or occurring within the project area. *Orcuttia tenuis*, slender Orcutt grass, a Threatened species, occurs on the Forest. This species is found near vernal pools or vernal pool-like drainage edges. No Endangered or Proposed plant species are suspected or known to occur on lands administered by the Modoc National Forest.

A Biological Evaluation (BE) has been prepared for Forest Sensitive plant species. However, since 2003 when the BE was finalized, three species have been added to the Modoc National Forest Sensitive Plant Species List from the Northwest Forest Plan Survey and Manage Program, one species name has been updated, and one species has been removed. Additionally, two new alternatives have been added to the Final Environmental Impact Statement for the Modoc National Forest Noxious Weed Treatment Project. The purpose of this document is to update the BE as to the sensitive species list and to review effects of the alternatives on the twenty-one species on that list.

Information in this report is based on the Modoc National Forest Threatened, Endangered and Sensitive (TES) plant GIS layer, internal field documents, and in-house correspondence.

It is my determination that:

- **Implementation of the Preferred Alternative and Design Standards as detailed in the Final Environmental Impact Statement for the Noxious Weed Treatment Project - is "may effect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the populations or species" of all sensitive plant species on the Modoc National Forest Sensitive Plant Species List.**

Prepared by: Cheryl Beyer, Forest Botanist

Introduction

Noxious weeds cover approximately 6,908 acres on the Modoc National Forest (NF). The Forest would like to eradicate or control a number of those noxious weeds through implementation of those portions of the Modoc National Forest Integrated Weed Management Strategy that are economically feasible. In addition to a No Action Alternative, several other alternatives have been set forth, including ones constructed from public input.

This Addendum to the Biological Evaluation (BE) for the Modoc National Forest Noxious Weed Treatment Project updates the original BE (2002) with the addition of two new alternatives, totaling six alternatives. These alternatives were developed in response to public comments and provide for a range of treatments.

This addendum includes the addition of species added to the Sensitive Species Plant List, Region 5, U.S. Forest Service, from the Northwest Forest Plan, in a letter dated April 26, 2004, with subsequent correction memo dated May 12, 2004, and direction letter dated August 4, 2004 (Blackwell 2004). This BE also includes a species name change; and the dropping of one species from the 2003 list.

Proposed Action

A description of the alternatives can be found below in the chapter: Alternatives and Their Effects on Sensitive Plant Species. The Proposed Alternative is Alternative 2.

Purpose of Project

The purpose of the project is to aggressively and efficiently eradicate, or control and contain, 14 specific noxious weed species on the Modoc NF utilizing manual, chemical, or manual and chemical treatments. Please see the FEIS for more information.

This action will help preserve the native biodiversity of the Forest and promote the ecosystem health of forested and rangeland habitats by maintaining or improving native forbs and grass communities.

Consistency with Laws, Plans, and Policies

All alternatives would be consistent with direction in the Modoc National Forest Plan as amended, the Modoc National Forest Integrated Weed Management Strategy (2005).

Sensitive Species List Updates

Species Name Change

It has recently (2002) been determined that the plants on the Modoc NF formerly identified as *Astragalus pulsiferae* var. *suksdorfii*, Suksdorf's milkvetch, are more correctly identified as *A. pulsiferae* var. *coronensis*, crown milkvetch (Welsh 2002). This variety is found only on the Modoc Plateau in Modoc and Lassen Counties and on volcanic inclusions in the Sierra

Nevada Range in Plumas County, California, and in Washoe County, Nevada. *A. pulsiferae* var. *coronensis* is a sensitive plant on the Modoc National Forest Sensitive Plant List.

Plant Species Added to the Sensitive List from the Northwest Forest Plan

The Northwest Forest Plan, Record of Decision, has placed three plant species on the Modoc National Forest Sensitive Plant list. These plants are described below.

Botrychium minganense **Mingan moonwort, and**
Botrychium pinnatum **Northwest moonwort**

Description: Perennial herbaceous plants, 2-20 cm tall, producing one above ground "leaf" each year, divided into a various dissected portion with expanded green blades and variously branched spore-producing portion with clusters of round sporangia.

Habitat: Meadows, springs and seeps, usually at higher elevations.

Elevation: 5,000 to 10,000 ft.

Flowering Period: July to August Identification Period: July to September

Threats: Timber harvest may pose indirect impacts in those portions of the range where *Botrychium* appears to be closely associated with old-growth, because of significant changes in light regime, hydrology, temperature, and microclimate that may occur. Direct impacts from timber harvest would occur if logs are yarded across *Botrychium*.

Habitat degradation of native plant communities resulting from exotic weed invasion is a well-documented concern and may pose a threat to the habitat of *Botrychium*.

Trampling by recreational users would probably be harmful to this species. *Botrychium* is a small herbaceous plant that is easily crushed.

Soil compaction would presumably have an adverse effect on the underground buds of this species.

Botrychium may respond poorly to fire; however, the reaction is unknown at the current time.

Livestock may have an adverse impact on *Botrychium* for several reasons. Native species in the Pacific Northwest have not co-evolved to be well adapted to large grazing herbivores, and generally do not respond well to this impact. While there is evidence that *Botrychium* species have been grazed by deer, the impacts from these animals are not equivalent to domestic stock because the latter weigh significantly more. Cattle and horse grazing may impact *Botrychium* due to increased trampling, soil compaction, hydrological alternation, and possible introduction of exotic weeds.

Burial by surface deposition (resulting from erosion, flooding, or other events) could directly impact *Botrychium* because of the small size of this species.

Buxbaumia viridis **Bug-on-a-stick Moss**

Description: Moss, with persistent protonema, yellow green to dark green, dense and felty, coating the substrate in a nearly solid mat. Leafy plant drastically reduced to a tiny cluster of bracts surrounding the gametangia. Seta 5-12 mm long, dark brown. Capsule ovoid, 4.5-6 X 2.5-3.5 mm, nearly erect, or pointing at about a 45° angle from the seta, sometimes horizontal. Mature capsule splits longitudinally along the top, and peels back toward the sides of the capsule, like a scroll of parchment. There is a lack of gloss on the capsule.

Habitat: Rotten logs, peaty soil and humus, in dense, shady and humid coniferous forest, low elevation to subalpine. The logs and stumps will be in an advanced stage of decay, the kind you can stick your foot into with little exertion.

Elevation: unknown

Flowering Period: late summer to fall Identification Period: potentially year-round

Threats: Bug-on-a-stick moss is dependent on shade and a supply of moist logs in an advanced state of decay. Activities that open up the canopy and deplete inputs of logs in various decay classes could diminish long-term viability of this species. It is considered an old growth forest associate. This moss may disappear if suitable substrate or microclimate is not available, or if sources of propagules no longer exist.

Plant Species Removed From the Sensitive List

Botrychium lineare, narrow-leaved moonwort, appeared on the Modoc NF sensitive list between 1998 and 2004. This plant was not on the Survey and Manage list, nor, at this time, is it known or suspected to occur on the Modoc National Forest. In California it was reported only from the Sierra National Forest, where attempts to relocate it have been unsuccessful.

Sensitive Species

Forest Service Manual (FSM) 2670.5 defines sensitive species as "those plants and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers, density, or habitat capability that reduce a species existing distribution."

In FSM 2670.22, management direction for sensitive species is, in part, to ensure that species do not become threatened or endangered because of Forest Service actions, and to maintain viable populations of all native species (U.S. Forest Service 1990a). In addition to Forest Service Region 5 sensitive species, the State of California keeps current listings for all state-sensitive species.

The sensitive species listed for the Modoc National Forest may have the potential to occur in

treatment areas. The table below summarizes these species and the habitats in which they will most likely occur.

Table 1: Sensitive Plant Species within the Modoc National Forest

Code	Species	Common Name	Habitat
ASAN18	Astragalus anxius	Ash Valley Milk-vetch	Dry, volcanic slopes and hills often in pine forests
ASPUC	Astragalus pulsiferae var. coronensis	Crown Milk-vetch	Loose, often rocky volcanic soils with pines and sagebrush.
BOAS	Botrychium ascendens	Upswept Moonwort	Fields, meadows, fens, creek sides
BOCR	Botrychium crenulatum	Scalloped Moonwort	Fields, meadows, fens, creek sides
BOLI7	Botrychium lunaria	Moonwort	Fields, meadows, fens, creek sides
BOMI	Botrychium minganense	Mingan Moonwort	Fields, meadows, fens, creek sides
BOMO	Botrychium montanum	Western Goblin	Fields, meadows, fens, creek sides
BOPI	Botrychium pinnatum	Northwestern Moonwort	Fields, meadows, fens, creek sides
BUVI	Buxbaumia viridis	Bug-on-a-stick	Rotting old-growth logs
CALOL	Calochortus longebarbatus var. longebarbatus	Long-haired Star Tulip	Seasonally wet meadow margins, often on the edges of pine forests.
CYMO2	Cypripedium montanum	Mountain Lady's-Slipper	Moist woods below 5,000 feet, mixed evergreen to pine forests
ERPR9	Eriogonum prociduum	Prostrate Buckwheat	Dry, rocky volcanic slopes and hills mostly in pine forests.
ERUMG	Eriogonum umbellatum var. glaberrimum	Green Buckwheat	Sand and gravel.
GAGLM	Galium glabrescens ssp. modocense	Modoc Bedstraw	Gravelly slopes and under the edges of rocks.
GASEW	Galium serpenticum ssp. warnerense	Warner Mountain Bedstraw	Steep serpentine talus slopes.
ILBA	Iliamna bakeri	Baker's Globe Mallow	Volcanic loam or lava beds, especially after a burn. Juniper woodlands, sagebrush, and pine forests.
IVPA	Ivesia paniculata	Ash Creek Ivesia	Open volcanic ridges, gravelly flats, and openings.
MIEV	Mimulus evanescens	Ephemeral monkeyflower	In gravelly and rocky areas around the edges of reservoirs.
PHIN3	Phacelia inundata	Playa Phacelia	Sub alkaline flats, inundated early in the season within sagebrush and pine habitats
POFL17	Pogogyne floribunda	Profuse-flowered Pogogyne	Vernal pools and similar habitats.
POPOE	Polygonum polygaloides	Modoc County	Vernal pools and swales.

Code	Species	Common Name	Habitat
	ssp. esotericum	Knotweed	
ROCO3	Rorippa columbiae	Columbia Yellow Cress	Moist areas generally along rivers, lakeshores and other wet sites.

Alternatives and Their Effects on Sensitive Plant Species

Below is a brief description of the Alternatives. Complete descriptions can be found in the Final Environmental Impact Statement for the Noxious Weed Treatment Project on the Modoc National Forest.

Alternative 1 – No Action

Under the No Action alternative, current management plans would continue to guide management of the project area. No aggressive noxious weed treatment activities would be implemented. The alternative provides a baseline for comparison and analysis of effects.

Direct and Indirect Effects:

- Identified noxious weed occurrences and new occurrences can continue to expand and compete with sensitive plants for space and resources.
- New noxious weed species may become established and compete with sensitive plants.
- Noxious weeds that produce allelopathic substances (toxic chemicals produced that have a negative impact on other organisms) can prevent other plants from growing in those locations.

Cumulative Effects

- Natural events (fire, flood, drought, disease, insects, landslides, climate change) have affected sensitive plants in the past, and continue to do so. Where, normally, native ruderale plants, including sensitive plants of that successional stage, would reinvade after a natural disturbance, and, gradually, later-stage seral natives would move in, now noxious weeds, highly adapted to infesting disturbed sites, are just as likely to invade and take over these places, and change the conditions on those sites so that they remain inhabited primarily by the weeds themselves, not giving natives and sensitive plants a chance to grow on the site.
- The effects from many past actions may have affected sensitive plants and habitats and may continue to impact them. Effects of reasonably foreseeable future actions include effects from projects that are on the schedule of proposed actions (SOPA).
- Road construction and use, railroad construction and use, and powerline construction and maintenance have created pathways and vectors that facilitate weed spread and infestation, while at the same time possibly injuring or killing sensitive plants. Not only have these activities created conditions allowing noxious weeds to invade, spread along these corridors, and compete with native vegetation, but these corridors may also have isolated some native communities from one another by creating barriers across which some sensitive plants cannot easily share pollen, possibly leading to long-range genetic problems in small populations of sensitive species. Habitat change is one such a barrier, and can occur, for example, when a long, wide,

open swathe is cut for a power line, creating hot, dry, open habitat where it had previously been cool, moist, and shaded.

- Some past road maintenance has spread noxious weeds that were in the cinders and gravel of the borrow material, creating, in some cases, monocultures of weeds in place of native communities that may have included sensitive plants. This is especially true of medusahead, a C-rated noxious weed in Modoc County, which will not be treated as part of this project at this time. However, any weed that competes with native flora can create a similar situation.
- Past fire suppression continues to allow non-fire-adapted species to thrive, while selecting against fire-adapted species such as Baker's globemallow, a sensitive plant. Past fire suppression may be one cause for the invasion of native grasslands and sagebrush steppe by western juniper, changing these areas to juniper woodlands with loss of understory plant biodiversity. Ash Valley milkvetch and crown milkvetch, both sensitive species, utilize this sagebrush steppe habitat.
- Canopy cover removal during past timber management and fuels reduction has changed understory soil moisture and light conditions possibly affecting some cool-forest communities and sensitive plants such as mountain lady's slipper (*Cypripedium montanum*). Those plant communities and the plant species within them that require low light and moist soil have subsequently been selected against in these places. In some cases, plantation-like conditions may have replaced more diversified native communities.
- Past road construction and trampling by cattle may have changed hydrologic function and connectivity of springs and seeps, drying habitats and causing enough change in plant communities dependent upon special aquatic features (such as peatlands) that, where once sensitive plants such as moonworts, two sensitive species of hump moss, and bug-on-a-stick moss had habitat, habitat no longer exists. Cattle trails have, in the past, cut across sensitive plant habitat, trampling individuals and degrading habitat, even if the plants themselves are not grazed; this has happened occasionally in Ash Creek ivesia occurrences. Dam building, goosenest island construction, dug-outs for watering holes and stock ponds have likely changed the hydrology in the Devil's Garden and Doublehead areas. Subsequently, some vernal pool plant communities have been inundated, and others dried up, while vernal pool habitat may have been inadvertently created by other actions. Vernal pool sensitive plant species include profuse-flowered pogogyne, playa phacelia, and Modoc County knotweed.
- Pile burning has the potential to sterilize the soil and kill the native seedbed, creating disturbed openings where weeds can invade intact native communities and begin to disperse their propagules. It follows that pile burning can also potentially eliminate the sensitive plant seedbank.
- The proposed sagebrush steppe ecosystem restoration project will most likely change the native plant communities over a large area of the Forest back to one that is less dominated by juniper.
- Grazing will continue on Forest allotments. Where critical aquatic features that support plant communities such as peatlands, fens, and seeps are found within allotments, there is the potential for trampling, which can change micro-topography and may subsequently alter the conditions upon which plant communities depend. Inadvertent trampling by cattle has the potential to expose organic soils to eroding

processes, creating gullies that facilitate the loss of these fine-textured soils, as has happened in some moonwort habitat. Sensitive plants of these habitats include sensitive moonworts and sensitive mosses. Cattle will continue to congregate in shady areas during hot summer months, including under trees or along creeks and at springs. This may lead to trampling and stressing of native vegetation and degrading of sensitive plant habitat in those areas. Sensitive species growing in shady areas include long-haired star-tulip and mountain lady's slipper.

- Recreation (OHV, horseriding, hiking, camping), firewood gathering, and many other activities have the potential to affect sensitive plants from trampling, the bringing in weed seeds, and picking or collection. Lady's slipper orchids are especially prone to collection by rare plant enthusiasts and casual pickers. In the long-term, this gradual degradation of native and sensitive plant communities and habitats could lead to loss of some of these species from the Forest. In the foreseeable future, however, it is unlikely that Alternative 1 would lead to a listing of any sensitive plant species on the Forest.
- Some of the weed infestations that form monocultures may have different fire regimes than the original native community. These changed fire regimes may select against native communities and sensitive plants that are not adapted to these new regimes, and noxious weed communities may in this way be perpetuated.

Alternative 2 Proposed Action

The Modoc NF proposes to treat 14 species of noxious weeds on 520 sites comprising approximately 5,995 acres to eradicate, control, or contain the occurrences, treating between 300 to 1,500 acres annually for the next five years; herbicides are to be applied by directed spray treatments and backpack application, utilizing the treatment methods of manual (hand-pulling), individual plant herbicide treatment, or manual and individual herbicide treatment. However, vehicle-based herbicide application will not take place within 50 feet of any TES plant location under the Proposed Alternative. Hand spraying or non-herbicide treatment may be conducted.

Direct and Indirect Effects:

- Herbicides are designed to kill plants; some damage to non-target plant species is possible despite cautious planning and implementation.
- Herbicide spray, drift, runoff, leaching, or groundwater movement may result in mortality to individuals, reduce their productivity, or lead to abnormal growth patterns. However, it is highly unlikely that such movement would take place.
- For ground applications of herbicides, the closer the non-target species is to the application site, the greater is the likelihood of damage.
- During herbicide application, the level and extent of damage to non-target plants depends, in part, on site-specific conditions, including wind speed and foliar interception. Design Standard DS-34 is for the control of drift or herbicide migration.
- Herbicides can move off-site in water, soil and wind. Site-specific soil and water characteristics, as well as herbicide formulation characteristics, affect this movement. Effects from herbicide movement are anticipated to be minimal to non-existent.

- The potential to harm non-target species is dependent on herbicide characteristics. Herbicides vary as to their potency, selectivity, and persistence. These factors all play a role in how much harm can occur.
- Measures taken to limit exposure, such as selective herbicide application methods may reduce herbicide movement off-site.
- To provide additional protections and help to avoid direct impacts, site-specific surveys would be conducted prior to implementation of project activities (DS-1).
- Identified noxious weeds may be contained, controlled, or eliminated over a 5-year period.
- No Early Detection Rapid Response Strategy would be included in this alternative, and therefore new sites, expanded sites, or new noxious weeds would not be treated, allowing for untreated expanding noxious weed infestation, and most likely, additional competition to sensitive plants.
- Some bare ground may be exposed during manual treatments as the weeds are removed, and noxious weeds may again invade these bare places. Herbicide treatment is less likely to be ground disturbing, exposing fresh soil for invasion.
- As noxious weeds are removed, natives have the chance to replace them, or natives may be reseeded at sites that are too large to reseed naturally in a timely fashion, before weeds again take over.
- Some native plants, including sensitive species, may be injured or killed by the treatment methods, both manual and herbicide, either directly or indirectly, as analyzed further in this document. However, this is highly unlikely due to Design Standards and other constraints placed on this project.
- The limited number of herbicides proposed in this alternative could pose some roadblocks to control if plants become adapted to those few chemicals, or if those chemicals are not efficiently effective.
- Alternatives 2 through 4 include the most acres to be treated. Based on this, these alternatives have the highest potential to harm non-target plants and native communities. However, this potential is significantly reduced through Design Standards.

Cumulative Effects

- There could be an additive cumulative effect to susceptible non-target species if herbicide use is repeated over time on the same site. This cumulative effect would be most likely where the treatment toolbox is most limited (as in Alternatives 2 and 4).
- Over a five-year period, noxious weed acreage should diminish and sensitive plant habitat would be less threatened by noxious weeds.
- After five years, if a new decision document to control noxious weeds is not implemented, noxious weeds may again start to encroach on sensitive plant habitat.
- Also, see Cumulative Effects under Alternative 1.

Alternative 3

Alternative 3 was developed in response to scoping comments to provide an alternative that did not include herbicides. It does not completely meet the purpose and need because some weed species may be spread as a result of rhizomes, tubers, or root buds that have not been

sufficiently removed to prevent regrowth. This Alternative consists of treating between 300 to 1,500 acres annually for the next five years utilizing manual (hand-pulling) methods.

Direct and Indirect Effects:

- Alternative 3 would result in the reduction of some noxious weeds, and consequently reduction in competition with sensitive plants. However, only non-rhizomatous weeds would be treated, and, therefore, rhizomatous species such as Canada thistle or dalmatian toadflax would continue to grow - possibly expanding in occurrence size - and produce propagules that could spread those weeds. Several occurrences of sensitive plants are within 50' of rhizomatous noxious weeds. These occurrences could be extirpated if weeds are not controlled.
- No Early Detection Rapid Response Strategy would be included in this alternative, and therefore new sites, expanded sites, or new noxious weeds would not be treated, allowing for untreated expanding noxious weed infestation, and most likely, additional competition to sensitive plants.
- Some bare ground may be exposed during manual treatments as the weeds are removed, and noxious weeds have the potential to invade these bare, disturbed places. Or, as noxious weeds are removed, natives also have the chance to replace them, or may be reseeded at some sites.
- To provide additional protections and help to avoid direct impacts, site-specific surveys would be conducted prior to implementation of project activities (DS-1).
- Some native plants, including sensitive species, may be injured or killed by the treatment methods either directly or indirectly, as by trampling or inadvertent mechanical injury.

Cumulative Effects

- Manual treatment of noxious weeds could create more disturbed ground that is prime habitat for aggressive noxious weeds. Unless this project is continued to outlast the seedbank, and desirable species seed in naturally or from cultural treatments, these areas could become dense weed patches upon termination of the project, effectively keeping out sensitive species.
- Rhizomatous noxious weeds would continue to grow and occurrences may increase in size. New sites and expanded sites may continue to grow unimpeded and new noxious weeds that invade would be allowed to grow and infest the Forest. Weed seedbanks will not be treated, and these may be a continuing source of noxious weeds. Noxious weeds would most likely continue to compete with sensitive plants.
- Also, please see Cumulative Effects under Alternative 1.

Alternative 4

This alternative was developed to reflect scoping comments on the need to provide flexibility in treatment methods to eradicate, control, or contain the current occurrences and expanding or new infestations of the selected noxious weeds over a 10 year time period.

In this alternative, the Modoc NF proposes to authorize annual treatments of weed infestations ranging from an estimated 300 to 3000 acres. Treatment includes manual (hand-

pulling, digging, grubbing), herbicide, and manual and herbicide treatment, and Early Detection Rapid Response – new or expanded infestations of the same plants with the same treatments. Herbicides proposed in Alternative 4 include clopyralid, dicamba, glyphosate, triclopyr and 2,4-D. (Please also see the effects section for Alternative 2.)

Direct and Indirect Effects:

- This alternative is the most beneficial to sensitive plants, as it proposes to treat all acreages of noxious weeds, including new weeds and new or expanded sites. This alternative also has a wide array of Design Standards that will help protect against unintentional injury.
- Identified noxious weeds may be contained, controlled, or eliminated over a 10-year period.
- Through Early Detection Rapid Response Strategy new noxious weeds or expanded infestations may also be contained, controlled, or eliminated in this time period.
- Some bare ground may be exposed during manual treatments as the weeds are removed, and noxious weeds may again invade these bare places.
- As noxious weeds are removed, natives have the chance to replace them, or natives may be reseeded at some sites.
- Some native plants, including sensitive species, may be injured or killed by the treatment methods, both manual and herbicide, either directly or indirectly, as analyzed further in this document.
- Alternative 2 through 4 include the most acres to be treated. Based on this, these alternatives have the highest potential to harm non-target plants and native communities.
- Currently, we do not know all the sites that might be treated in this alternative because of the Early Detection – Rapid Response Strategy. However, to provide additional protections and help to avoid direct impacts, site-specific surveys would be conducted prior to implementation of project activities (DS-1).

Cumulative Effects:

- Rhizomatous noxious weed infestations will most likely diminish across the Forest, which would improve the situation for sensitive plants that are competing with those species. Only the largest occurrences of rhizomatous species may still have plants at the end of 10 years, and thus noxious weeds may still be in proximity to and competitive with individuals of the sensitive plants Columbia yellow cress and scalloped moonwort. Due to the aggressive noxious weed treatment, overall noxious weed infestations will diminish across the Forest, as will overall competition with sensitive plants.
- Manual treatment of noxious weeds could create more disturbed ground -- prime habitat for aggressive noxious weeds. Unless this treatment is continued to outlast the seedbank, these areas could become dense weed patches upon termination of the project in 10 years, and provide a new flush of competition with sensitive plants several years later.
- Weed seedbanks will not be treated (this is the case in all alternatives), and these may be a continuing source of noxious weeds.
- Also, please see Cumulative Effects under Alternatives 2 and 1.

Alternative 5

Alternative 5 was developed in response to public comments. This alternative is a no-herbicide alternative utilizing a range of manual and cultural methods to eradicate, control, or contain approximately 280 acres of known sites over 10 years.

Early Detection Rapid Response Strategy would allow eradication of new infestations of the identified weed species, and infestations of new noxious weed species, utilizing the Design Standards. Early Detection Rapid Response Strategy may be used on an additional 200 acres with no more than 100 treated in any one year.

Direct and Indirect Effects:

- Some identified and new noxious weed species may be contained, controlled, or eliminated over a 10 year time period.
- The acreage to be treated is reduced, allowing some of the larger infestations (e.g. Dyers woad, Dalmatian toadflax, and common crupina) to remain unless additional NEPA is completed. Some sensitive plant habitat within these larger areas may become degraded with no treatment of weeds. However, it is unlikely that the occurrences of the sensitive species, Bakers globemallow, will be affected, as that species is mainly a fire-follower, and fire suppression will probably be the main factor for its germination and survival.
- Only small infestations of rhizomatous weeds would be treated, and, therefore, the larger occurrences of rhizomatous species would continue to grow - possibly expanding in occurrence size - and produce propagules that could spread those weeds. Expanding populations of these species could compete with the nearby species, Columbia yellow cress and scalloped moonwort, two sensitive species within 50' of larger infestations of Canada thistle.
- Although the periphery of three Canada thistle sites would be treated, this member of the Asteraceae family produces seed that can travel with the wind, and expansion of the population can still occur even though the border undergoes treatment.
- Some bare ground may be exposed during manual treatments as the weeds are removed, and noxious weeds may again invade these bare places.
- As noxious weeds are removed, natives have the chance to replace them, or natives may be reseeded at some sites
- Some native plants, including sensitive species, may be injured or killed by the treatment methods, either directly or indirectly, as analyzed further in this document.
- New sites and expanded sites and new noxious weeds can be treated in this alternative through Adaptive Management. This will eliminate any increase in competition to sensitive plants from new information.
- No effect to sensitive plants is expected from treatment of noxious weeds by goat grazing. Use of goats will be limited and the goats will be controlled by fences and herders.

Cumulative Effects:

- Over 10 years noxious weed acreage may diminish and sensitive plant habitat may be improved.
- Manual treatment of noxious weeds could create more disturbed ground that is prime habitat for aggressive noxious weeds to reinfest, and compete with sensitive plants.
- However, the large untreated sites could become a source for many, new satellite sites if careful, annual inventory is not performed. These new sites may degrade sensitive plant habitat before they are discovered in inventories.
- Also, please see Cumulative Effects under Alternative 1.

Alternative 6

Alternative 6 was also developed in response to public comments. This alternative utilizes non-herbicide and herbicide treatment methods, adding a new herbicide (Telar) and two mixes. It proposes to treat approximately 341 inventoried acres over a 10-year time period, and treatments, as in Alternatives 2 and 4, may include use of surfactants and dyes.

Early Detection - Rapid Response Strategy would allow treating new and expanding occurrences of the 14 identified weed species and new species of weeds using the identified Design Standards and the full range of treatment methods listed for this alternative in the Final Modoc National Forest Noxious Weed Treatment Project Environmental Impact Statement (FEIS). (Please also see the effects section for Alternatives 2 and 4.)

Direct and Indirect Effects:

- Identified noxious weeds may be contained, controlled, or eliminated over a 10 year time period.
- Herbicides are designed to kill plants; some damage to non-target plant species is possible despite cautious planning and implementation.
- Herbicide spray, drift, runoff, leaching, or groundwater movement may result in mortality to individuals, reduce their productivity, or lead to abnormal growth patterns.
- The closer the non-target plant species is to the treatment site, the greater is the likelihood of damage.
- The potential to harm non-target plants is dependent on herbicide characteristics. Herbicides vary as to their potency, selectivity, and persistence (see tables 6, 7, and 8)
- Measures taken to limit exposure, such as selective application methods (wicking), may reduce herbicide movement off-site.
- By virtue of a greater variety of possible herbicides, this alternative would be less likely to result in repeated use of the same ones at the same sites over a long period of time.
- Through Early Detection Rapid Response Strategy, new noxious weeds may also be contained, controlled, or eliminated in this time period.
- However, the reduced acreage of noxious weeds to be treated may allow some of the larger infestations to remain unless additional NEPA is completed. It is possible, that sensitive plant habitat within these larger areas may become degraded.

- Some bare ground may be exposed during manual treatments as the weeds are removed, and noxious weeds may possibly invade these bare places.
- As noxious weeds are removed, natives also have the chance to replace them, or natives may be reseeded at some sites.
- An additional herbicide and two herbicide mixes proposed in this alternative may provide better control of some noxious weeds and allow for more opportunities for rotation of herbicides to prevent noxious species adapting to specific chemicals.
- Alternative 6 includes the most herbicides in the toolbox. If a sensitive plant of a particular family is located near a noxious weed site to be treated with herbicide, it may be possible in this alternative to chose an herbicide that would effectively treat the weed, yet not harm the sensitive plant (for example, using Telar, which is affects primarily species in the mustard family, near a sensitive plant in the pea family).

Cumulative Effects:

- Over 10 years noxious weed acreage may diminish and noxious weeds may become less of a threat to sensitive plant habitat.
- Please also see cumulative effects analysis under Alternative 1.

Early Detection Rapid Response Strategy

Early Detection Rapid Response Strategy is a first line of defense against invasions where efforts would increase the likelihood that invasions would be addressed successfully while populations are still localized and levels are not beyond that which can be contained and eradicated. This strategy has been included in alternatives 4, 5, and 6. Treatment of new sites may affect additional sensitive plant individuals (see Appendix C). However, it has been determined that implementation of the action alternatives will not lead to a listing of any of the sensitive plant species on the Forest, because all occur elsewhere besides the Modoc National Forest, and because such a low number of occurrences would be affected by this project (please see Appendix C, Sensitive Plant Risk Assessments for these seven species). Additionally, Design Standards have been included in the FEIS that protect sensitive plants, eg. DS-01, DS-31-34. Early Detection Rapid Response Strategy is the same for Alternatives 4, 5 and 6.

Direct, Indirect and Cumulative Effects of Early Detection Rapid Response Strategy:

- The main beneficial effect to sensitive plants from Early Detection Rapid Response Strategy found in Alternatives 4, 5 and 6 is the removal of the competition (non-native aggressive noxious weeds in this case) for sunlight, water, nutrients, and other plant requirements while noxious weed occurrences are still small and any competition has resulted in very little stress to sensitive plants. As competition increases for these requirements, sensitive plants may become stressed and weakened, and recovery may be impaired.
- There is the potential for treatments under Early Detection Rapid Response Strategy, both manual and chemical, to impact sensitive species. Although this is unlikely, especially with the Design Standards and the small number of occurrences known to be near noxious weed sites, some individuals, for example, might be stepped on. However, the potential impacts from competing invasive species is more likely to

alter sensitive plant communities in the long run, and degrade habitat, than are the potential but unlikely impacts from weed treatments.

Design Standards for Sensitive Plants

Project Design Standards (PDSs) are conservation measures incorporated into a project to minimize or avoid effects to endangered or threatened species and other resources. Project Design Standards (USDA 2005) for the action alternatives include several specifically for sensitive plants:

Table 3. Design Standards for Sensitive Plant Species

Code	Design Standard	2	3	4	5	6
DS-31	TES Plants: Vehicle-based herbicide application will not take place within 50 feet of any TES plant location. Hand spraying or non-herbicide treatment may be conducted.	X	n/a	X	n/a	n/a
DS-32	Sensitive Plants: No spraying of herbicides within 50 feet of sensitive plant species. Wicking and manual treatments may take place within 50 feet of sensitive plants.	n/a	n/a	n/a	n/a	X
DS-33	TES Plants: Herbicide treatments will not take place within 100 feet of Threatened or Endangered plant locations, however, non-herbicide treatments may be conducted.	n/a	n/a	n/a	n/a	X

Noxious Weeds Targeted

Noxious weeds are those plant species designated as noxious by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease (FSM 2080.5).

Fourteen identified noxious weeds are targeted for treatment on the Modoc National Forest. These species cover approximately 6,908 acres on the Forest.

Table 4: Noxious Weeds Targeted For Control in Alternatives 2-6

Canada thistle	Mediterranean sage
Common crupina or bearded creeper	Musk thistle
Dalmatian toadflax	Plumeless thistle
Diffuse knapweed	Perennnial pepperweed or tall whitetop
Spotted knapweed	Scotch thistle
Squarose knapweed	Klamathweed or St. Johnswort
Dyers woad or Marlahan mustard	Yellow starthistle

Discussion of the Environmental Consequences of the Action Alternatives

There are important *benefits* to sensitive plants from control and eradication of noxious weeds. Weeds compete aggressively with the native flora for light, water, nutrients,and space. For example, medusahead, *Taeniatherum caput-medusae*, an aggressive, invasive,

non-native annual grass identified as a "C" rated noxious weed in Modoc County but not included in this document because it is already so widespread, has overtaken native plant communities in many places on the Modoc National Forest, and is crowding out such rare California natives as volcanic daisy, *Erigeron elegantulus* (Beyer 2005).

Treatments proposed vary by Alternative (please see Table below), and includes manual/mechanical/cultural and chemical treatments. See Table 4 below for treatment methods in the action alternatives to control noxious weeds.

Treatment Methods	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Physical – hand pulling and use of hand tools -pulling grubbing, chopping, digging,	X	X	X	X	X
Physical + - clipping by hand PLANT OR SEED POD, Weed Eaters, mulching (tarping, mulching, covering very small areas)				X	X
Cultural – Limited Goat Grazing (>4 ACES AND < 25 Acres for thistle flowers).				X	X
Cultural – Seeding	X	X	X	X	X
Herbicides	X		X		X
Clopyralid	X		X		X
Dicamba	X		X		X
Glyphosate	X		X		X
Triclopyr	X		X		X
2-4-D	X		X		X
Telar					X
Mix 1					X
Mix 2					X

Manual, mechanical, cultural and herbicide treatments may have a negative effect on sensitive plants.

Herbicides are designed to kill plants. Therefore, the risk presented to sensitive plants is perhaps the greatest risk to a biological entity. But not all herbicides are lethal to all plants. Except for glyphosate, which is a broad-spectrum herbicide, the other chemicals proposed in the alternatives affect a more narrow set of plants. Most are specific to particular families within the dicots, such as chlorsulfuron (Telar) which mainly affects those plants in the Chenopodiaceae and Brassicaceae. That is why Telar is so effective on the noxious weed, Tall whitetop, a species that occurs on the Modoc National Forest. But it is also why the Hazard Quotient (HI), a measure of risk, would be high for Columbia yellow cress, *Rorippa columbiae*, a sensitive plant in the Brassicaceae.

Physical and mechanical treatments may also negatively affect sensitive plants. If the manual treatments create bare soil where noxious weed seeds in the soil bank or from nearby sources can germinate, then a denser occurrence of noxious weed could potentially arise. If manual treatments do not completely remove root or stem material of certain species, those plants can be stimulated rather than killed. Trampling can be more intense during manual rather than herbicide treatments as the workers generally may have to spend more time per plant during removal. Trampling can injure sensitive plants if they are nearby, and trampling can also compact soil, which could give a competitive edge to aggressive weed species. Table 4 shows how manual and mechanical treatments might negatively affect

sensitive plants. The positive effect is, of course, removal of plants that compete with sensitive plants for light, nutrients, water, and space.

Treatment of a monoculture of noxious weeds or a weed-infested site with few native species may not result in the proliferation of suppressed desirable species because the composition of desirable species could be too low to exert dominance. It is likely that viable seeds of both desirable native species and noxious weeds would remain in the soil following weed treatment. On sites dominated by noxious weeds, it is likely that the highest proportion of seeds in the soil would be those of noxious weed species. Therefore, it is likely that seed germination and growth would occur in proportions similar to the composition of the plant community before weed treatment. Sites dominated by noxious weeds prior to treatment, would likely become dominated by noxious weeds following treatment without seeding to establish desirable species. Following treatment of a monoculture or nearmonoculture of noxious weeds, desirable species may have to be seeded (**cultural treatment**) to establish a vigorous stand and prevent re-invasion by noxious weeds. As long as native plants or sterile non-native plants are used, there would be no negative impacts (USDA 2006a).

Manual Treatment Methods	Possible Effects
Physical – hand pulling and use of hand tools -pulling grubbing, chopping, digging	**Inadvertent removal or injury to a nearby plant, trampling of plant or compacting soil by trampling**
Physical - clipping by hand PLANT OR SEED POD	**Inadvertent clipping of sensitive plant or seed pod**
Mechanical – Weed Eaters	**Inadvertent cutting of nearby plants**
Cultural – Limited Goat Grazing (>4 ACES AND < 25 Acres for thistle flowers).	**Goats eating or trampling plants**
Cultural –mulching (tarping, mulching, covering very small areas)	**Mulch inadvertently covering plants and killing them**
Cultural – Seeding	**As long as locally adapted native plants or sterile non-native plants are used, there would be no negative impacts**

Alternatives That Treat Only Known Sites

Alternatives 2 and 3 treat only known sites. Design Standard DS-31 addresses TES Plants for those two alternatives: Vehicle-based herbicide application will not take place within 50 feet of any TES plant location. Hand spraying or non-herbicide treatment may be conducted.

A number of known sensitive plant occurrences are within 50 feet of some noxious weed treatment sites. This buffer of 50 feet does not prohibit herbicide treatments but restricts the application method of the herbicide. Directed spray and wick application can greatly reduce or eliminate drift to non-target plants. The method that has no drift is wick application. Aerial spray, **which is not proposed in this project**, has the greatest probability of drift. Wind direction, height above ground of application, and droplet size of the chemical also are important factors in whether or not drift happens and whether or not drift reaches sensitive plant populations, or drifts in a different direction. All label directions are to be followed when applying herbicides, including adherence to requirements for wind speed.

Bakers globemallow and Dyers woad occur within 50’ eleven times in the Long Damen area. These are places where the two species occur within 50’ of each other. These overlaps are for the same weed site, and also for the same sensitive plant occurrence. These overlaps are all within the large Dyers woad infestation that in Alternatives 4-6 would only be treated along the perimeter to prevent spread. It should be noted that Baker’s globemallow is being delisted from sensitive beginning October 1, 2006.

Seven additional sensitive plant species covering eleven total occurrences are within 50 feet of a noxious weed. Six of these occurrences are scheduled for possible herbicide treatment (see table below). The sensitive species include Ash Valley ivesia, prostrate buckwheat, mountain ladys slipper, long-haired star-tulip, crenulated moonwort, and Columbia yellowcress.

Even if manual or herbicide treatment injured or killed some plants, implementation of the action alternatives would not lead to a listing of any of these sensitive species because all occur elsewhere besides the Modoc National Forest, and because such a low number of occurrences would be affected by this project (please see Appendix C, Sensitive Plant Risk Assessments for these seven species). Additionally, annual review will be conducted by the Forest Botanist of sites to be treated that season. Necessary actions will be implemented if any treatments will be determined to so affect sensitive plant species as to lead to a listing of that species.

Table 7: Sensitive Plant Species At or Within 50' of Weed Treatment Sites

Sensitive species	Number of occurrences on Forest	Number of occurrences at or within 50 feet noxious weeds	Number of occurrences that are at or within 50 feet of noxious weeds that may be treated with herbicides
Ash Valley ivesia	41	2	1
Prostrate buckwheat	21	1	1
Mountain lady's slipper	34	3	2
Long-haired star-tulip	97	1	0
Crenulated moonwort	7	1	0
Columbia yellowcress	3	2	1
Bakers globemallow (delisted from sensitive 10/1/2006)	47	1	1

Alternatives That Include Adaptive Management That Would Treat New Sites

Because we do not know what new noxious weed species might invade the Forest, nor where those species might take root, the entire list of sensitive species on the Modoc NF was investigated for possible listing due to implementation effects of the alternatives that include Early Detection Rapid Response Strategy with treatment of new weeds and new sites.

A review of all sensitive species was done through individual risk assessments for those species (See Appendix A for all assessments). Risk criterion included endemism, number of occurrences on the Forest, percent of total occurrences that are located here, habitat vulnerability, threats, whether a noxious weed was currently located nearby (within 50'), habitat alteration and increased vectors expected from the project, and consideration of the sensitive plant Design Standards for those alternatives.

Although some sensitive plants had High ratings in some categories, because of some Low factors, such as location of that sensitive plant habitat, the overall rating was Low. Ratings for all the sensitive species came out Moderate to Low. Therefore, the

determination was made that even under alternatives that include adaptive management, a "may effect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the populations or species" was made.

Effects to Sensitive Species From Treatments of Noxious Weeds

Benefits of Noxious Weed Removal:

Benefits can be realized to sensitive species from the removal of noxious weed species, as when the weeds are removed, essential resources, such as water, light, space and nutrients, will be more readily available to the sensitive species that remain.

Under the action alternatives any control of noxious weed species will benefit sensitive plant species within the reasonably foreseeable future (5-10 years). Allelopathic substances that are sometimes produced by noxious species, preventing native species from growing at those sites, would not be produced, and native plant populations would not be reduced or eliminated from growing at the site.

Invasive plants threaten ecological diversity at varying scales by potentially changing the structure and function of native plant communities. Monocultures are being created where a heterogeneous landscape once naturally existed (USDA 2005a).

The impacts of invasive plants on native plants occur at multiple levels, including effects on individuals, genetics, populations, communities and ecosystem processes (USDA 2005a). Invasive plants can often impede the germination, growth, and development of native plants. They can reduce the vigor of, or eliminate, individual native plants through competition. Invasive plants often use more than their share of nutrients, thereby limiting opportunities for natives to establish and thrive (USDA 2005a).

Some researchers have suggested that alteration of disturbance regime may be the most profound effect that an invasive species can have on an ecosystem. The best regional example of this may be the changes in fire frequency and intensity that result from the invasion of cheatgrass, which has been shown to alter historic fire intensity (USDA 2005a).

Herbicide Treatments:

Direct and Indirect Effects

Herbicides can kill or injure plants through direct contact (http://www.epa.gov/docs/OPPTS_Harmonized/850_Ecological_Effects_Test_Guidelines/Drafts/850-4000.pdf). However, different herbicides target different plant groups, and therefore, herbicide contact with a plant does not necessarily mean that that plant will be killed (please see Table 8). The potential to harm non-target species is dependent on herbicide characteristics. Herbicides vary in their potency, selectivity, and persistence. And, the closer the non-target plant is to the treatment site, the greater is the likelihood of damage.

Herbicides have the potential to shift species composition and reduce diversity of native plant communities, as less herbicide-tolerant species are replaced by more herbicide-tolerant species. Certain herbicides and the methods by which they are applied could also harm plant pollinators (USDA 2005a).

Unintended direct spray should be regarded as an extreme accidental form of exposure that is not likely to occur in Forest Service applications (SERA 2005). More likely impacts to sensitive species would occur indirectly from drift, surface runoff, leaching, accidental spills, or a combination of these factors. Potentially, herbicide use could also indirectly affect sensitive plant species by impacts to invertebrate pollinator species such as bees. Herbicide risk to bees, a surrogate for pollinators, can be found in the Risk Assessments for the individual herbicides in the appropriate appendices.

Drift

Drift is the movement of any herbicide through the air to areas not intended for treatment. Drift includes volatilization, where some herbicides may be rapidly lost as vapors after application (http://weeds.cas.psu.edu).

Drift depends on droplet size, wind speed and direction, height above ground of the application, herbicide formulations and adjuvants, and ambient temperature. Effects to sensitive plants from drift, such as injury or death, will be controlled and minimized by proper application of the herbicide using the label information and by adherence to the Design Standards in the FEIS. Herbicide effects to native species can be extrapolated from risk assessments and herbicide labels (such as what the target species are for any particular chemical).

The maximum drift values at 50 feet for dicamba and chlorsulfuron exceeded EPA (Environmental Protection Agency) effect thresholds for the monocot surrogate (a species that represents the sensitive species in question). No other drift estimates exceeded available effect thresholds. It is important to note that although thresholds were exceeded, this does not necessarily mean that adverse effects will occur.

Aerial drift estimates are based on available data, which is from broadcast spray using boom applicators -- and therefore represent an overestimate of expected drift. The action in the FEIS will utilize directed spray treatment, and, therefore, drift is expected to be substantially less than predicted in the table.

There is only one sensitive plant species on the Modoc National Forest that is a monocot – long-haired star lily, and for that species, only one noxious weed occurrence is within 50 feet, and that is Klamathweed, which is scheduled for manual treatment only. The data suggest that adverse impacts to sensitive species from drift will be minimal with a 50-foot buffer.

For application of herbicides closer than 50 feet, use of wicks will apply herbicide directly to weed surfaces, and there should be no drift. Directed spray within 50 feet may affect individual sensitive plants, however, for this limited number of sites, it would not cause a listing of any of the sensitive species.

Table 8. Maximum Application Rates and Offsite Application Rates for Proposed Herbicides in the FEIS, and Toxicity Values (NOEL[1]) for Surrogate[2] Monocots and Dicots Representing Sensitive Plant Species on the Modoc National Forest.

Herbicide	Maximum Application Rate ($^{lb}/_{ac}$)	NOEL		Offsite Application Rate in $^{lb}/_{ac}$ at a Representative Distance[3]
		Monocot Surrogate	Dicot Surrogate	50 feet
Chlorsulfuron	0.05 – 0.0625	0.000035	0.000013	0.0005
Clopyralid	0.1 – 0.25	0.05	0.006	0.0021
Dicamba	0.25 – 2.0	0.06	0.044	0.0166
Glyphosate	0.5 –3.75	0.85	0.14	0.0311
Triclopyr	0.5 – 1.5	0.166	0.182	0.0125
2,4-D	0.5 – 2.0	0.166	0.14	0.0166
Mix: Chlorsulfuron	0.5 – 1.0 (chlorsulfuron)	0.000035	0.000013	0.0005
+ 2,4-D	0.5 – 1.5 (2,4-D)	0.166	0.14	0.0125
Mix: Dicamba	0.25 – 1.0 (dicamba)	0.06	0.044	0.0083
+ 2,4-D	0.25 – 1.0 (2,4-D)	0.166	0.14	0.0083

Table based on T. Hawkes (2005) and Ecotox (2005).

[1] No Observed Effect Level (NOEL) is the highest level of continual exposure to a chemical which causes no significant adverse effect on morphology, biochemistry, functional capacity, growth, development or life span of individuals of the target species used in the toxicology study.

[2] Most toxicity testing utilizes surrogate species. Surrogate species serve as a substitute for the species of interest, because all species of interest could not be tested. Surrogate species are typically organisms that are easily tested using standardized methods, are readily available, and inexpensive. Rare species are not tested.

[3] Rates at Representative Distances are based on drift (AgDrift) as a result of application by a mechanical low boom sprayer.

Q: *What does this all mean?*

A: This table shows three important things: 1) the Application Rate, 2) the Offsite Application Rates, and 3) the NOEL's. Simply explained:

1) The "Application Rate" is the manufacturer-recommended amount of herbicide sprayed per unit area. This is the maximum rate at which the weeds will be sprayed. Some treatments will occur using lower concentrations of herbicide.

2) The "Offsite Application Rate" shows the concentration of herbicide that, through drift, lands on surfaces *x* feet away from the spray site.

3) The "NOEL" is the greatest concentration of herbicide at which the plant in question (monocot or dicot) is not affected. That is to say, a concentration of herbicide above the NOEL will have an effect upon the plant.

Q: *I'm still confused. How do I use this table? Can you give an example?*

A: Certainly. Let us say that you are concerned about the well-being of a particular plant, a dicot. It is 50 feet away from a noxious weed that will be sprayed with Glyphosate. So, you look on the table at "50 ft" and "Glyphosate," and you see that the concentration of glyphosate drift 50 feet away from the spray site will be 0.0311 $^{lb}/_{ac}$. Multiply this number by the maximum application rate for Glyphosate, 3.75 $^{lb}/_{ac}$, and divide the result by the dicot NOEL for Glyphosate, 0.14. The resulting number is called the Hazard Quotient (HI). If it is less than 1, lab tests show that there will be no adverse effects upon your plant.

Table 9 carries out the hazard quotient calculations for 50 feet, but using the data in the table above, you may do your own calculations for plants at other distances from spray sites.

Table 9. Calculated Hazard Quotients (HI) at 50´ for Surrogate[1] Monocots and Dicots based on data from Table 3.

Herbicide	Maximum Application Rate	Offsite Application Rate at 50 ft	Monocot Surrogate		Dicot Surrogate	
			NOEL[2]	HI[3]	NOEL[2]	HI[3]
Chlorsulfuron	0.0625	0.0005	0.000035	0.89	0.000013	2.4[4]
Clopyralid	0.25	0.0021	0.05	0.01	0.006	0.09
Dicamba	2	0.0166	0.06	0.6	0.044	0.75
Glyphosate	3.75	0.0311	0.85	0.14	0.14	0.83
Triclopyr	1.5	0.0125	0.166	0.11	0.182	0.10
2,4-D	2	0.0166	0.166	0.2	0.14	0.24
Mix chlorsulfuron/2,4-D[5]	0.0625/1.5	0.0005/0.0125	0.000035/0.166	0.89+.1=0.99	0.000013/0.044	2.4+.6=3[4]
Mix dicamba/2,4-D2	1.0/1.5	0.0083/0.0125	0.06/0.166	.1+.1=0.2	0.044/0.14	.2+.1=0.3

[1]Surrogate species are species that are used in place of the sensitive species of interest. Most surrogate plants are crop plants, because research on herbicide effects to non-target plants was done primarily for agricultural purposes.

[2] Toxicity values from Ecotox, 2005.

[3] HI = The ratio of the potential exposure to the substance and the level at which no adverse effects are expected. If the Hazard Quotient is calculated to be less than 1, then no adverse health effects are expected as a result of exposure. If the Hazard Quotient is greater than 1, then adverse health effects are possible. The Hazard Quotient cannot be translated to a probability that adverse health effects will occur, and is unlikely to be proportional to risk. It is especially important to note that a Hazard Quotient exceeding 1 does not necessarily mean that adverse effects will occur. http://www.epa.gov/ttn/atw/nata/gloss.html (accessed 9/20/2005)

[4]Only members of the mustard family, the Brassicaceae, were available as surrogates for chlorsulfuron in the Ecotox database for dicots. Chlorsulfuron is known to be especially toxic to plants in this family, and hence the higher HI. For dicots in other families, this herbicide is probably not as toxic.

[5]For a description of the mixes, see the FEIS, Table 2-9. For mixes, the effect s are additive (Dirkin 2005 pers. comm.)

Q: *What does this table mean?*

A: This table shows Hazard Quotients (HI) for both monocots and dicots for each herbicide at 50 feet from the spray site. It also includes all of the relevant data for

calculating the HI. The method for calculating the HI is discussed in a footnote for Table 8.

1) The "Site Application Rate" is the manufacturer-recommended amount of herbicide sprayed per unit area. Keep in mind: this is the maximum rate at which the weeds will be sprayed. Spraying may occur at lower rates.

2) The "Offsite Application Rate at 50 ft" is the concentration of herbicide that, through drift, lands on surfaces at various distances away from the spray site. In Table 9 this distance is 50 feet. The off-site drift rates are based on AgDrift (see Hawkes 2005).

4) The "HI" is the Hazard Quotient, a number obtained by multiplying the Application Rate by the Offsite Rate and dividing the result by the NOEL (species toxicity). If the HI is less than 1, there will be no adverse effects to the plant. In Table 9, if the HI is less than one, than there will be no adverse effects to the plant 50 feet away from the spray site. Only two HIs are greater than 1. Those are for a dicot receiving drift at 50 feet from chlorsulfuron, or the Mix 1 (chlorsulfuron and 2,4-D) at the maximum application rate. As discussed previously, for dicots, only mustard-family surrogates had been tested, and chlorsulfuron is especially toxic to plants in the mustard family. Only one sensitive plant is in the mustard family, Columbia yellow cress.

5) Not included in the table is the herbicide Triclopyr BEE. Hazard Quotients for both monocots and dicots using this ester form of Triclopyr are generally just above 1. Because boom sprayers are used, it can be argued that the Hazard Quotients in these cases, using the proposed wick and directed spray treatments, would actually be below 1.

Q: *Why was the H.I determined at 50 feet from application of the herbicide?*

A: In the Design Standards for sensitive plants, 50 feet is the distance within which, in Alternatives 2 and 4, no vehicle-based herbicide application will take place. In Alternative 6, 50 feet is the distance within which there will be no spraying.

Code	Design Standard	2	3	4	5	6
DS-31	TES Plants: Vehicle-based herbicide application will not take place within 50 feet of any TES plant location. Hand spraying or non-herbicide treatment may be conducted.	X	n/a	X	n/a	n/a
DS-32	Sensitive Plants: No spraying of herbicides within 50 feet of sensitive plant species. Wicking and manual treatments may take place within 50 feet of sensitive plants.	n/a	n/a	n/a	n/a	X
DS-33	TES Plants: Herbicide treatments will not take place within 100 feet of Threatened or Endangered plant locations, however, non-herbicide treatments may be conducted.	n/a	n/a	n/a	n/a	X

Q: *Can you clarify this for me? What is the point of this table?*

A: The point of this table is, as stated above, to show Hazard Quotients for representative surrogate monocots and dicots for each herbicide, at 50 feet from the spray site. Let us say that you are concerned about a plant, a monocot in this instance, that is located 50 feet from a weed that will be sprayed with Clopyralid. You look at the HI and see that it is 0.01, much less than 1. You understand what this means: since the HI is so much less than 1, there will be no adverse effect upon your monocot.

Q: *What is a 'surrogate?'*

A: A surrogate is something used in the place of another. Humans are usually not used in research trials, but laboratory animals are. For plants, crop plants were typically tested because of the emphasis on agricultural applications for herbicides. These crop plants are surrogates for the non-target plants. Because taxonomy is the important predictor of effects for plants, a monocot and a dicot were used in the analysis of possible effects on non-target plants.

Q: *Are the HI's calculated here set in stone? Can they be applied universally?*

A: These HI's are calculated from the best available data, but they are not universally applicable. For one, the application rates used for these calculations are the maximum that will be used; lower application rates will naturally result in lower off-site drift rates, and consequentially lower HI's. Also, the application method used in the experiments that provided us with these data was spraying by boom; we shall be using directed spray and wick treatments, which should significantly reduce drift. Wick treatments, in fact, should produce no drift at all. Finally, please note that our data was collected using surrogate species. The actual effects upon particular sensitive species may vary; however, this information allows us determine possible effects to our non-target species based upon the sensitive species' taxonomic relationship to the surrogate.

Q: *What if, in spite of efforts to the contrary, some sensitive plants are actually sprayed?*

A: Only in very few instances are noxious weeds in close proximity to known sensitive plant sites. Also, few of our sensitive species are endemic to this forest – the rest occur elsewhere as well as here. Even if some sensitive plants are injured or killed, there is no expectation that the species (nor even the various populations of those species) will suffer loss of viability as a result.

Herbicides are designed to kill plants, and therefore, some sensitive plants that are near noxious weeds to be treated in this FEIS, may be impacted. However, overall effects to these "nontarget" species (species are not intended to be controlled, injured, killed, or detrimentally-affected in any way by an herbicide) would not negatively impact the species, as only 10 populations other than those of Baker's globe-mallow are close enough to incur impacts from weed treatments, and in no instance would impacts to these few populations for these species cause a trend towards listing.

There are thirty-six occurrences of Baker's globe-mallow close enough to weed treatments to be affected. However, in reviewing the most recent literature showing a

large number of occurrences and large number of plants per occurrence of this species, the effects to this species, even with this number of possible impacts, is determined to be not of such magnitude that it would lead to a listing of this species. Additionally, this species is being removed 10/1/2006 from the sensitive species list on national forests and BLM districts in California.

Herbicide impacts to sensitive plants are to be additionally minimized by implementation of Design Standards, described in the FEIS, such as buffers to water bodies, limited operating periods (LOPS), and Design Standards for permeable soils.

Surface Runoff

Surface runoff is water moving over the surface of a field or treated area that can carry herbicide with it (http://weeds.cas.psu.edu). The greatest loss of herbicide occurs when the herbicide is applied to the soil surface and is washed off by the first rain after application. Applying herbicide to the soil surface is not one of the treatment methods in this Project. Effects to sensitive plants from runoff, such as uptake by roots, and translocation to plant organs that injure or kill the plant, will be controlled and minimized by using the application methods presented in the FEIS, and by adherence to the Design Standards. Design Standards for several of the action alternatives include the provision that on soils with rapid permeability and/or excessive drainage, do not use herbicides with high leaching potential to treat noxious weeds (please refer to the Hydrology Specialist Report). Additionally, some of the herbicides proposed in this project are broken down by microbes quickly.

Table 10. Risk Assessment – Herbicides Proposed in the FEIS[1]

HERBICIDE	ACTIVITY CATEGORY	MODE OF ACTION (biochemical or physical mechanism by which it kills plants)	MOBILITY	TRANSLOCATION
Clopyralid	Herbicides with foliar activity on broadleaved plants (dicots) only	Auxin mimic	Moderate in soil; very persistent	Systemic
Dicamba	Herbicides with foliar activity on broadleaved plants (dicots) only	Auxin mimic	Mobile in soil and water; easily degraded by microbes	Systemic
Glyphosate	Broad spectrum foliar active herbicides with systemic or contact activity and without pre-emergent or residual soil activity	Inhibits the shikimac acid pathway depleting aromatic amino acids	Strongly adsorbed to soil particles; low mobility; rapidly degraded by soil microbes	Systemic
Triclopyr	Herbicides with foliar activity on broadleaved plants (dicots) only	Auxin mimic	Potential to be mobile; not strongly adsorbed to soil particles; fairly rapidly degraded by soil micro-organisms	Systemic
2,4-D	Herbicides with foliar activity on broadleaved plants (dicots) only	Auxin mimic	High mobility in soils; weak binding to soil particles; rapid microbial degradation	Systemic

HERBICIDE	ACTIVITY CATEGORY	MODE OF ACTION (biochemical or physical mechanism by which it kills plants)	MOBILITY	TRANSLOCATION
			in 1-4 weeks	
Chlorsulfuron	Chlorsulfuron is used to control many broadleaf weeds, esp. those in the families Chenopodiaceae and Brassicaceae, and some annual grass weeds. Some weeds may be resistant to chlorsulfuron	Chlorsulfuron is absorbed by the leaves and roots and moves rapidly through the plant; it prevents the plant from producing an essential amino acid,(amino acid biosynthesis inhibitor) inhibiting cell division in the root tips and shoots of sensitive plants. It is broken down to inactive products in tolerant plants.	Fairly mobile in soil due to pH and pressure of Aluminum (Al) and Iron (Fe), more mobile at higher pHs and absence of Al and Fe, not expected to reach ground water due to rapid degradation and low rates	Translocation through xylem and phloem

[1] Information for this table obtained from the following site: (http://soils.usda.gov/sqi/files/05table.pdf accessed 9/26/2005)

Leaching

Leaching is when water carries herbicides into and ultimately out of the root zone. The portion lost to leaching depends on soil texture, herbicide solubility, and amount and intensity of rainfall (http://weeds.cas.psu.edu). Impacts from leaching to sensitive plants, such as uptake by roots and translocation to plant organs where it may injure or kill the plant, will be minimized by restricting application of water-soluble herbicides to soils that are not permeable. Permeable soils are discussed under the "Soils" topic in the FEIS. Additionally, to reduce impacts to sensitive plants from leaching, applications of herbicide will adhere to the relevant Design Standards, Table 2-4, FEIS.

Spills

Herbicide spills could potentially impact plants of all habitats. Herbicide spilled directly on the plant may injure or kill it. Herbicide spilled on the ground could be leached into the soil, or be moved by rain in runoff, and eventually reach plant roots where it is taken up and translocated to plant organs, eventually injuring or killing the plant. Should the spill occur near water, plants in those habitats (meadows, seeps, vernally wet, riparian, fen, lakeshore and streamside) might be exposed to high concentrations of herbicides. To lessen impact to non-target species, an herbicide spill contingency plan has been developed (see Appendix C: Spill and Safety Management of the FEIS). However, some potential effects cannot be fully mitigated, and spills could possibly injure plants, or kill non-target species, even though a spill plan is in place, and therefore the determination of a "may effect."

Cumulative Effects

Cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future

actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Herbicide use and other activities or influences, both natural and human-caused, on all land ownerships in Modoc, Lassen, and Siskyou Counties pose risks to non-target plants. Projects planned for the Modoc National Forest in addition to noxious weed treatments may impact a portion of sensitive plant populations and habitat, by removal or injury of plants, disturbing plants or soil, reducing canopy cover, or altering sensitive plant habitat in other ways.

Some of the past, present, and upcoming projects and continuing actions that will contribute to cumulative effects include roads, which will continue to be major conduits for invasive plants, previously approved weed treatment programs, sagebrush steppe ecosystem restoration and juniper removal, forest health projects, hazard tree removal, pile burning, fuel reduction, timber salvage, vegetation treatments, thinning, road construction, maintenance, and improvements, railroad and powerline construction, firewood gathering, decorative rock removal, guzzler installation and maintenance, dam construction, repair, or removal, creation of waterfowl habitat, weir building, livestock developments such as watering holes, and special uses such as hydroelectric, geothermal and wind energy developments.

In addition, livestock grazing will go on throughout the range of most of the sensitive plants and effects from herbivory and trampling will continue. Herbivory can alter successional patterns and rates when selective foraging favors survival, growth, and reproduction of plants with low palatability, although the impact can differ greatly among ecosystems (USDA 2005a). Hummocks created by cow hooves in wet to moist meadows and other special aquatic features has changed topography in sensitive plant habitat, and may continue to change this habitat.

Recreational users such as hikers, OHV (off-highway vehicle) operators, special camps and rides, and individual equestrians may impact some sensitive plants by trampling or running over them. Horses and pack stock may impact sensitive areas where they are picketed, left to graze, or brought to water. Medicinal and edible plant collectors may take parts or remove whole plants of some sensitive species.

The current project is to treat only certain A-, B-, and C-rated noxious weeds. Other noxious weeds, as well as other aggressive non-native plants, do exist throughout the Forest, and have been documented in some sensitive plant occurrences. These other weeds (such as medusahead and cheatgrass) will continue to affect sensitive plants by competing for resources.

Natural disturbances, such as wildfire, drought, flooding, and natural erosion processes will continue, with varying effects on sensitive plants. *Iliamna bakeri* will be rejuvenated by wildfire; *Calochortus longebarbatus* var. *longebarbatus, Mimulus evanescens*, *Phacelia inundata*, *Pogogyne floribunda*, and *Polygonum polygaloides* ssp. *esotericum* will experience population swings in response to varying climatic conditions.

Pollinators

Herbicides may affect pollinators to sensitive plants (see Special Report, Invertibrates). Very little information is available on the effect of herbicides on native pollinators. Most information is about the non-native honeybee (USDA 2005a). However, the accidental spraying of pollinators and any subsequent injuries to these pollinators, compared to the available number of pollinators, is expected to be a small percentage. No effect to the overall pollination of sensitive plants is expected from the action alternatives.

Manual Treatments

Manual/physical methods proposed in the action alternatives include:

Physical/Physical+ – hand pulling and use of hand tools, clipping by hand of the PLANT OR SEED POD, Weed Eaters, mulching (tarping, mulching, covering very small areas)
Cultural – Limited Goat Grazing (>4 ACES AND < 25 Acres for thistle flowers).

Direct and Indirect Effects

In the unlikely case that a noxious weed is in such close proximity to sensitive species, individuals of the sensitive species could be damaged or killed by trampling or mechanical means as the noxious weeds are treated. During tarping or mulching, some sensitive plants could be covered and consequently die. Mulching with plastic or organic materials can be used in relatively small areas (less than 0.25 ac), but will also stunt or stop growth of desireable native species (USDA 2005a). Goats could eat plants that weren't protected from them by fences or herding. Seeded species in cultural plantings could potentially outcompete the sensitive species, however, fertile non-natives are not being proposed in any seed mixtures, so this is unlikely. Additionally, manually treated areas may disturb soil that then becomes available to invading species, including the noxious weeds that already have seeds in the seed bank waiting for a germination opportunity.

Hay mulch was used in Idaho to reduce flowering of Canada thistle, but most rhizomatous perennial invasive plants cannot be controlled by this method or by shading because extensive root reserves allow regrowth through and around mulch or shad materials (USDA 2005a).

Cumulative Effects

Please see Table below and Cumulative Effects under the heading, Herbicide Treatments.

Table 11. Examples of Cumulative Effects for Action Alternatives

Type of Impacts	Source of Impact	Possible Results of Impact
Herbivory	Grazing by stock, cows, or sheep	Removal of plant parts, resulting in death of plant or loss of competitive ability
Breaking off plants parts	Trampling from recreation, stock or grazing animals, running over by vehicles	Loss of chlorophyllous tissue, and thereby weakening plant system

Type of Impacts	Source of Impact	Possible Results of Impact
	such as permittee's or recreational ohv or fire wood gathers vehicles	
Removal of plant	Medicinal plant collectors, inadvertent digging by manual noxious weed removal, siting of energy facilities	Loss of plant, weakening viability of that population
Change in canopy coverage and solar radiation	Timber and fuels projects	Too much solar radiation, changing habitat, and therefore the plant species that occupy that space
Killing seed bank	Hot fires, pile burning	Sensitive plant seeds in the soil bank will be killed, removing that plant from the site
Loss of saturation level, and/or organic soil	Hoof action in critical aquatic refuges from stock, cows and sheep	Loss of sensitive plant habitat
Competition from noxious weeds	No noxious weed treatments	Loss of sensitive plants to aggressive, competing noxious weeds
Habitat manipulation	Manipulation of water by guzzler, nest island, or dam construction	Sensitive plant not able to survive in that new habitat
Habitat fragmentation	Road building, habitat loss from management activities	Loss of viability of sensitive plant populations
Habitat loss	Decorative rock removal, heavy trampling by grazing livestock in critical aquatic features	New habitat not able to be occupied by previous species

Determination of Effects To Sensitive Plant Species

It is my determination that implementing the Preferred Alternative and Design Standards "may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species" of all sensitive plant species on the Modoc National Forest Sensitive Plant List.

Table 12. Summary of Effects for Preferred Alternative

Code	Species	Common Name	Environmental Effect
ASAN18	Astragalus anxius	Ash Valley Milk-vetch	MAIH
ASPUC	Astragalus pulsiferae var. coronensis	crown Milk-vetch	MAIH
BOAS	Botrychium ascendens	Upswept Moonwort	MAIH
BOCR	Botrychium crenulatum	Scalloped Moonwort	MAIH
BOLI7	Botrychium lunaria	Moonwort	MAIH
BOMI	Botrychium minganense	Mingan Moonwort	MAIH
BOMO	Botrychium montanum	Western Goblin	MAIH
BOPI	Botrychium pinnatum	Northwestern Moonwort	MAIH
BUVI	Buxbaumia viridis	Bug-on-a-stick	MAIH
CALOL	Calochortus longebarbatus var. longebarbatus	Long-haired Star Tulip	MAIH
CYMO2	Cypripedium montanum	Mountain Lady's-Slipper	MAIH
ERPR9	Eriogonum prociduum	Prostrate Buckwheat	MAIH
ERUMG	Eriogonum umbellatum var. glaberrimum	Green Buckwheat	MAIH
GAGLM	Galium glabrescens ssp. modocense	Modoc Bedstraw	MAIH
GASEW	Galium serpenticum ssp. warnerense	Warner Mountain Bedstraw	MAIH
ILBA	Iliamna bakeri	Baker's Globe Mallow	MAIH
IVPA	Ivesia paniculata	Ash Creek Ivesia	MAIH
MIEV	Mimulus evanescens	Ephemeral monkeyflower	MAIH
PHIN3	Phacelia inundata	Playa Phacelia	MAIH
POFL17	Pogogyne floribunda	Profuse-flowered Pogogyne	MAIH
POPOE	Polygonum polygaloides ssp. esotericum	Modoc County Knotweed	MAIH
ROCO3	Rorippa columbiae	Columbia Yellow Cress	MAIH

NI = No impact.
MAIH = May affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.
WAIFV* = Will affect individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or loss of viability to the population or species.

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Appendix A

Exhibit A: Direction Letter for the Regional Forester's Sensitive Species List

File Code: 1900/2670 **Date:** August 4, 2004

Route To: (2400)

Subject: Additional Direction for the Regional Forester's Sensitive Species List

To: Forest Supervisors
Thru:

During the preparation of the *Supplemental Environmental Impact Statement to Remove or Modify the Survey and Manage Mitigation Measure Standards and Guidelines*, a review was conducted to identify which species designated as Survey and Manage (S&M) met the criteria for addition to the Regional Forester's Sensitive Species List. The species that met sensitive species criteria were added to the sensitive species list in a letter dated April 26, 2004 and a subsequent correction memo dated May 12, 2004. Forests within the scope of the Northwest Forest Plan (NWFP) were directed to consider all these new species as sensitive immediately. Forests outside the NWFP area were requested to provide information on the distribution and status of species on forests, and any training needs to effectively evaluate potential project impacts on these species in Biological Evaluations.

Evaluating new sensitive fungi species on forests outside the Northwest Forest Plan area

Evaluation of responses from forests outside the Northwest Forest Plan area indicates that units lack distribution information for the new fungi species and that training is needed to effectively identify, analyze and manage them. Identifying and understanding fungi habitat requirements pose special challenges to forests that have not previously managed these species. As a result, I will not require forests outside the Northwest Forest Plan to manage the new fungi as sensitive until after the FY 05 sensitive species list revision process is completed. Training sessions will be held during the fall of 2004 to assist forests to manage these unique organisms more effectively. Fungi added to the sensitive species are known to fruit during the fall and training at this time makes the most biological sense. Upon completion of the training, forests should begin evaluating where they may have habitat for the new fungi species. This information will be used to develop a more complete distribution for the region. New habitat and occurrence information will be incorporated into the sensitive species list revision process. Upon completion of the revision, forests will include the new sensitive fungi species to their forest lists, as appropriate.

In this interim period, forests should manage any known occurrences of the sensitive fungi using the available information on fungal habitat requirements. Useful reference documents include the *Handbook to the Strategy 1 Fungal Species in the Northwest Forest Plan* and *Handbook to Additional Fungal Species of Special Concern in the Northwest Forest Plan*. Copies of these documents are being sent to forests that have reported sensitive fungi or habitat for these species. Additional information is available in the 1997 "*Management Recommendations for Survey and Manage Fungi,* version 2.0. This document is available online at the BLM-hosted Survey and Manage website http://www.or.blm.gov/surveyandmanage/mr.htm.

For all other species

The currently known distribution of the new sensitive species by forest is displayed in enclosure one. We have considerably broader experience in managing vascular plants, bryophytes, lichens, salamanders and mollusks across the Region, so where any Region 5 forests have identified known or potential habitat, these species should be treated as sensitive immediately. National Environmental Policy Act (NEPA) decisions signed after the date of this letter must include an evaluation of effects of proposed management actions on all species on the list that have habitat or may occur within the analysis area. For projects with NEPA decisions signed prior to the date of this letter there is no need to assess the effects to the new sensitive species. Although these species are sensitive, their status is not critical. The limited number of ongoing projects that could affect these species would result in negligible to minor effects. Conservation measures designed to minimize effects to these species from future projects are expected to ensure their persistence. Projects currently under contract, permit or other authorizing instrument, are not affected by the revised sensitive species list. However, projects may be modified to adopt all or part of this direction when line officers deem it appropriate. For projects under development, refer to the following NEPA decision process documented below for guidance on when to incorporate the new species in your analysis.

CE

Has proposed action been scoped?	Yes	Does the addition of these new sensitive species have a significant bearing on the proposed action or its effects per 40 CFR 1502.9?	Yes > Update analysis/BE as appropriate and rescope if necessary. No > Update analysis/BE as appropriate.
	No	Update BE/specialist reports as appropriate > Proceed to scope.	

EA

Has the 30-day Notice & Comment Period begun or been completed?	Yes	Does the addition of these new sensitive species result in substantial changes to the proposed action per 40 CFR 1502.9?	Yes > Revise proposed action and BE to reflect changes and re-start Notice & Comment. No > Update analysis/BE, document why new info has no bearing on the proposed action and proceed.
	No	Update analysis/BE/proposed action, as needed, and proceed with Notice & Comment.	

EIS

Has the DEIS Comment Period begun or been completed?	Yes	Does the addition of these new sensitive species have a significant bearing on the proposed action or its effects per 40 CFR 1502.9?	Yes > Supplement DEIS as appropriate and re-circulate DEIS for comment. No > Update analysis/BE, document why new info has no bearing and proceed to FEIS.
	No	Update analysis/BE/proposed action, as needed, and proceed with Notice & Comment.	

Has the FEIS Comment Period* begun or been completed? **note: Circulating a FEIS for comment is optional.*	Yes	Does the addition of these new sensitive species have a significant bearing on the proposed action or its effects per 40 CFR 1502.9?	Yes > Supplement FEIS as appropriate and re-circulate a Draft EIS for comment. No > Update analysis/BE, document why new info has no bearing and proceed to ROD.
	No	Update analysis/BE/proposed action, as needed, and circulate FEIS for comment.	

Comprehensive Revision of the Sensitive Species List

The forests and the regional office will work together to revise the regional sensitive species list during FY 05. All forests will be expected to implement the revised and approved sensitive species list at the completion of this process. Should a sensitive species, or suitable habitat within the range/distribution for that species, be located on a forest where it was not previously known to occur, the forest is responsible for informing the regional office TES or botany program managers so that the distribution account for the fungi species can be updated. When suitable habitat occurs for a species occurs on a forest, that species should be considered sensitive on the forest.

If you have questions, you may contact the following people for more information:

Diane Macfarlane, for salamanders or Regional TES program (707) 562 8931
Acting Regional Botany Program Manger at (707) 562-8938
Joseph Furnish, for aquatic and terrestrial mollusks (707) 562-8952
Lisa Hoover, Six Rivers NF, for recently added bryophytes, lichens or fungi (707) 441-3612
John McRae, Six Rivers NF, for recently added vascular plants (707) 441-3513

/s/ Barbara J. Rate (for)
JACK A. BLACKWELL
Regional Forester

cc: Dave R Gibbons, Diane Macfarlane, Stephen Bishop, Sarah Madsen, Kathy Anderson, George Lottritz

Appendix B

Summary Comparison of Alternatives for the Noxious Weed Treatment Project

Alternatives / Alternative Features	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Treatment Timeframe	**Ongoing**	**5 years**	**5 years**	**10 years**	**10 years**	**10 years**
Treatment Sites and Acres	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**
Total Inventoried Weeds (2004)	541/6908	541 / 6908	541 / 6908	541 / 6908	541 / 6908	541 / 6908
Inventoried Weeds Fully Treated	**20-30** ac/yr[1]	520 / **5,995**	494 / **5,993**	520 / **5,995**	532 / **180**	538/ **241**
Inventoried Weed Sites Receiving Partial Treatment2	0/0	16/904[2]	0/0	16/904[2]	0/0	0/0
Inventoried Weeds Receiving Limited Treatment3	0/**0**	0/**0**	0/**0**	0/**0**	9/**100**[3]	3/**100**[3]
Inventoried Weeds Not Treated4	6,878[1]	5/9[4]	47/916[4]	5/9[4]	5 / 5515	0/6,567[4]
Proportion of Inventoried Weeds Treated	0.4%	n.a. / 87 %	91% / 87%	99 % / 99 %	100 % / 4 %	100 % / 5 %
Noxious Weeds Treated Through Early Detection – Rapid Response (acres)5		0 acres	0 acres	Up to **200** acres (100 ac max/yr)	Up to **200** acres (100 ac max/yr)	Up to **200** acres (100 ac max/yr)
Total Acres of Weeds Treated	**20-30** ac/yr1	**6,899** acres	**5,993** acres	**7,099** acres	**480** acres	**541** acres
Treatment Methods for Inventoried Noxious Weeds (2004)	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**
Physical – hand pulling, hoeing, grubbing	0/0	161/31	494/5,993	161/31	0/0	0/0
Physical+ – Physical plus, clipping seed head or plant, weed eater, mulch/tarp	20-30 ac/yr1	0/0	0/0	0/0	527/139	116/19
Physical and/or Herbicide Treatments	0/**0**	333/**5,961**	0/**0**	333/**5,961**	0/**0**	371/**116**
Herbicide	0/**0**	42/**907**	0/**0**	32/**907**	0/**0**	46/**65**
Limited Treatment3	0/0	0/0	0/0	0/0	9/100	3/100
Goat Grazing (potential) (physical/herbicide)	0/0	0/0	0/0	0/0	5/41 **(no herbicide)**	5/**41**
Total Acres Potentially Treated with Herbicides (includes ED-RR acres)6	0/**0**	355/**6,868**	0/**0**	355/**7,068**	0/**0**	425/**522**

[1]Under Current Management (Alt. 1), approximately 20 to 30 acres of noxious weeds are treated each year through other site specific NEPA decisions as part of other projects in accordance with the Modoc NF Integrated Weed Management Strategy (2005).

[2]These sites are rhizomotous species that occur within 10 feet of H2O. Those sites that are within 10 feet of H2O would not be treated. Sites with acreage ooutside of this 10 foot no treatment zone would receive partial treatment. The acreage within the 10 foot zone would not be treated, the acreage outside the 10 foot zone would be treated with herbicides.

[3]Includes treating along borders of infestations to prevent spread using the methods specific to each alternative. Treatment is estimated at 100 acres to be proportionally distributed based on the size of the individual infestations. These acres are included in the Inventoried Noxious Weeds Treated acreage.

[4]Excluded in Alt. 2 and Alt. 4: 5 sites of rhizamotous species that are within 10' of live water and partial acreage of 16 sites of rhizamotous species that are within 10' of live water. Rhizamotous species will not be treated by physical methods in these alternatives. Excluded in Alt. 3: 47 sites of rhizamotous species. Excluded in Alt. 5: 5,658 acre Dyer's woad, 850 acre Dalmatian toadflax, 159 acre crupina, and 6 sites of rhizamotous species. These sites will receive limited treatment around the perimeter estimated at 100 acres proportionally distributed based on the size of these sites. Excluded in Alt. 6: 5,658 acre Dyer's woad, 850 acre Dalmatian toadflax, 159 acre crupina. These sites will receive limited treatment around the perimeter estimated at 100 acres proportionally distributed based on the size of these sites.

[5]May use any of the methods approved for use in this NEPA decision.

[6]For Alt. 2 this includes the acres under the physical and/or herbicide method plus the herbicide treated acres. Alt. 4 adds the same categories as Alt. 2 plus adds in the potentially treated 200 acres through early detection rapid response. Alt. 6 includes the Physical and/or Herbicide acres, the herbicide acres, the acres under goat grazing, the acres under the limited treatment category, and the 200 acres under Early Detection-Rapid Response.

Appendix C
Direct, Indirect and Cumulative Effects by Sensitive Species

Prepared by F. Gauna
1/29/2006

Definitions

Direct, indirect, and cumulative effects are defined in NEPA (40 CFR 1508.7 and 1508.8).

- A cumulative effect is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."
- A direct effect "is caused by the action and occur at the same time and place."
- Indirect effects "are caused by the action and are later in time or farther removed in distance, but are reasonably foreseeable. They may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."

Direct, indirect, and cumulative effects for each alternative are discussed below for each of the 21 Sensitive species on the Forest.

Astragalus anxius (ASAN18)

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Scotch thistle, diffuse knapweed, lens-podded hoary-cress, Klamath weed, Mediterranean sage, and yellow star-thistle all inhabit the same ecological unit as *A. anxius*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavorable weather conditions (DS-34). Since DS-35 also calls for ensuring that no herbicide droplets travel outside the drip zone from the target weed, vehicle-based herbicides would cause no direct effect upon known population of *A. anxius*. However, hand-spraying or non-herbicide treatments are allowed within 50′ of TES plants; therefore, *A. anxius* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects upon *A. anxius* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *A. anxius* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *A. anxius* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *A. anxius* (the closest known weed to any population is a Scotch thistle site 70 meters away), it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *A. anxius*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *A. anxius* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Alternative 3 does not admit the use of pesticides. *A. anxius* would consequently not suffer from any herbicide overspray. Manual treatment of Scotch thistle might cause trampling, but the closest occurrence is 70 m away and would not likely cause any harm; additionally, Scotch thistle is not a high priority species for treatment.

Since Scotch thistle is the weed closest to all sites of *A. anxius*, and since it is not a high priority species, this weed has the potential to invade *A. anxius* territory because of lack of timely or sufficient treatment. However, since in this alternative the potential for Scotch thistle treatment is greater than in Alternative 1, there may be benefits to *A. anxius* if any treatment of Scotch thistle does take place.

Cumulative Effects

Given that Scotch thistle, as a non-high priority species, may not be treated sufficiently, it is possible that it can spread to *A. anxius* sites and out-compete it there. However, if the Scotch thistle were treated, the opposite would be true.

Alternative 4

Direct and Indirect Effects

Alternative 4 allows herbicide use. Again, Scotch thistle is not a high priority for treatment. Therefore, while the weed remains untreated, there will be no direct effects to *A. anxius*. When or if treatment does occur, some damage may result to the sensitive plant due to control methods, but overall treatment would be beneficial. DS-31 provides that there will be no vehicle-based praying within 50 feet of any TES plant location, and DS-34 provides that herbicides will not be applied on rainy and windy days, and that applicators will insure that no herbicide droplets travel farther than 10 feet from the plant. Thus, there will be no effect to *A. anxius* from vehicle-based herbicide application. As in Alternative 2, however, hand-spraying or non-herbicide treatments are allowed within 50′ of TES plants; therefore, *A. anxius* may suffer from inadvertent herbicide spray and/or trampling.

Again, because of its low priority for treatment, it is foreseeable that this weed may take over habitat of *A. anxius* and begin competing with the species in the future. Killing weeds would safeguard sensitive plant habitat.

Cumulative Effects

See the paragraph describing cumulative effects for Alternative 2.

Alternative 5

Direct and Indirect Effects

Like Alternative 3, this alternative does not allow the use of pesticides, but rather expands upon the possibility of using alternative methods for weed control. This alternative would allow goat grazing on Scotch thistle. Goats might eat our sensitive plants and cause damage or death. This alternative would also attempt clipping, weed-whacking, mulching, or tarping; if care is not exercised, the sensitive plant might get weed-whacked or buried under mulch or a tarp, or trampled upon by workers doing these activities to noxious weeds.

Indirect effects would include the possibility for invasion by weeds of *A. anxius* habitat due to weed control activities (soil disturbance, people moving seeds). Weed control could also safeguard the sensitive plant by inhibiting weed spread.

Cumulative Effects

Should the areas around ASAN18 be treated for weeds, *A. anxius* habitat would be less threatened by weed encroachment, and future projects or people in the area would be less likely to spread noxious weed seed from infested to uninfested sites.

Alternative 6

Direct, Indirect, and Effects

Scotch thistle, the most common weed in ASAN18 areas, is a priority species for treatment in Alternative 6. Manual treatment of this weed might cause minor physical stress to some plants of *A. anxius*, especially if the nearby Scotch thistle infestation spreads more closely to the sensitive plant site. Herbicides would not be sprayed within 50 feet of any

Sensitive species, so there would be no adverse effects upon *A. anxius* due to spraying (DS-32). Wicking with herbicides would be allowed to take place within this 50-foot buffer, but with care taken to insure that there are no sensitive plants directly beneath the weed, the plant should suffer minimal adverse effect.

Indirect effects, like always, include the possibility that *A. anxius* communities might suffer some decreased ability to survive or set seed due to trampling by weed controllers, but any treatment of weeds would safeguard habitat and improve chances for our Sensitive species.

Cumulative Effects

Cumulative effects upon *Astragalus anxius* from Alternative 6 include a reduced probability that weeds will be able to spread into its habitat or be tracked in by people visiting or working in the area or by grazing cattle.

***Astragalus pulsiferae* var. *coronensis* (ASPUC)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no treatment would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Uncontrolled weeds would have the opportunity to invade and degrade sensitive plant habitat.

Cumulative Effects

Cumulative effects upon *A. pulsiferae* var. *coronensis* resulting from the "No Action" alternative would be possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Scotch thistle, common crupina, Mediterranean sage, Klamath weed, yellow star-thistle, lens-podded hoary-cress, diffuse knapweed, dyer's woad, spotted knapweed and Canada thistle all inhabit the same ecological units as ASPUC. Grazing, OHV's, juniper removal, road maintenance, or other future forest projects could easily move weed seeds from untreated weeds in the area, making it more likely that weeds could invade sensitive plant habitat.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon known populations of ASPUC. However, hand-spraying or non-herbicide treatments are allowed within 50′ of TES plants; therefore, *A. pulsiferae* var. *coronensis* may suffer from inadvertent herbicide spray and/or trampling.

Negative indirect effects upon *A. pulsiferae* var. *coronensis* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds.

On the positive side, weed control near *A. pulsiferae* var. *coronensis* may reduce the risk that seeds or rhizomes from nearby plants might invade their habitat, and compete with sensitive plants for resources. Control would also reduce the risk that future projects or people in the region could unwittingly transport weed seeds into *A. pulsiferae* var. *coronensis* habitat.

Cumulative Effects

Since treatment of existing weed occurrences is far enough away from any known occurrences of *A. pulsiferae* var. *coronensis* (the closest known weed to any population is a Scotch thistle site 60 meters away), it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *A. pulsiferae* var. *coronensis*, and help prevent future projects such as grazing, OHV use, juniper removal, road maintenance, *etc*. in the area from moving weed seed into the same.

Alternative 3

Direct and Indirect Effects

Alternative 3 does not allow pesticide use. *A. pulsiferae* var. *coronensis* would consequently not suffer from any herbicide overspray. Manual treatment of Scotch thistle might cause trampling, but the closest occurrences are 60 m and 235 m away respectively and would not likely cause any harm; additionally, Scotch thistle is not a high priority species for treatment.

Since Scotch thistle is the weed closest to all sites of *A. pulsiferae* var. *coronensis*, and since it is not a high priority species, this weed has the potential to invade *A. pulsiferae* var. *coronensis* territory because of lack of timely or sufficient treatment. However, since in this alternative the potential for Scotch thistle treatment is greater than in Alternative 1, there may be benefits to *A. pulsiferae* var. *coronensis* if any treatment of Scotch thistle does take place.

Cumulative Effects

Given that Scotch thistle, as a non-high priority species, may not be treated sufficiently, it is possible that it can spread via future projects such as juniper removal, grazing, or use by recreationists, to *A. pulsiferae* var. *coronensis* sites and out-compete it there.

Alternative 4

Direct and Indirect Effects

Alternative 4 allows herbicide use. Again, Scotch thistle is not a high priority for treatment. Therefore, while the weed remains untreated, there will be no direct effects to *A. pulsiferae* var. *coronensis*. When or if treatment does occur, some damage may result to the sensitive plant due to control methods, but overall treatment could be beneficial over

time. DS-31 provides that there will be no vehicle-based praying within 50 feet of any TES plant location, and DS-34 provides that herbicides will not be applied on rainy and windy days, and that applicators will insure that no herbicide droplets travel farther than 10 feet from the plant. Thus, there will be no effect to *A. pulsiferae* var. *coronensis* from vehicle-based herbicide application. As in Alternative 2, however, hand-spraying or non-herbicide treatments are allowed within 50′ of TES plants; therefore, *A. pulsiferae* var. *coronensis* may suffer from inadvertent herbicide spray and/or trampling. Since the closest known weed occurrence is about 180 feet away from any known plant of ASPUC, this should not realistically be an issue.

Again, because of its low priority for treatment, it is foreseeable that this weed may take over habitat of *A. pulsiferae* var. *coronensis* and begin competing with the species in the future. Killing weeds would not likely improve *A. pulsiferae* var. *coronensis* habitat, but would at least safeguard it.

Cumulative Effects

See the paragraph describing cumulative effects for Alternative 2.

Alternative 5

Direct and Indirect Effects

Like Alternative 3, this alternative does not allow the use of pesticides, but rather expands upon the possibility of using alternative methods for weed control. This alternative would attempt goat grazing on Scotch thistle. If not properly fenced or herded, goats might eat our sensitive plants and cause damage or death. This alternative would also attempt clipping, weed-whacking, mulching, or tarping; if care is not exercised, the sensitive plant might get weed-whacked or buried under mulch or a tarp, or trampled upon by workers doing these activities to noxious weeds.

Indirect effects would include competition from noxious weeds. There is the possibility for invasion by weeds of *A. pulsiferae* var. *coronensis* habitat due to weed control activities (soil disturbance, people moving seeds). Weed control could also safeguard the sensitive plant by inhibiting weed spread.

Cumulative Effects

Should the areas around ASPUC be treated for weeds, *A. pulsiferae* var. *coronensis* habitat would be less threatened by weed encroachment. Future projects or people in the area would be less likely to spread noxious weed seed from infested to uninfested sites.

Alternative 6

Direct and Indirect Effects

Scotch thistle, the most common weed in ASPUC areas, is a priority species for treatment in Alternative 6. Manual treatment of this weed might cause physical stress to some plants of *A. pulsiferae* var. *coronensis*, especially if nearby Scotch thistle infestations spread more closely to the sensitive plant site. Herbicides would not be sprayed within 50 feet of any Sensitive species, so there would be no adverse effects upon *A. pulsiferae* var. *coronensis* due to spraying (DS-32). Wicking with herbicides would be allowed to take

place within this 50-foot buffer. With care taken to insure that there are no sensitive plants directly beneath the weed, ASPUC plants should suffer minimal adverse effect.

Indirect effects include the possibility that *A. pulsiferae* var. *coronensis* plants might suffer some decreased ability to survive or set seed due to trampling by weed controllers, but any treatment of weeds would safeguard habitat and improve chances for our Sensitive species.

Cumulative Effects

Cumulative effects upon *Astragalus pulsiferae* from Alternative 6 include a reduced probability that weeds will be able to spread into its habitat or be tracked in by people visiting or working in the area. (*Cumulative more)*

Sensitive *Botrychium* spp. (BOTRY)
excepting *Botrychium crenulatum* (see below)

Note: because of similarities in habitat, growth form, *etc.*, these species are treated jointly here.

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed management would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Uncontrolled weeds would have the opportunity to invade and degrade sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonize disturbances to sensitive plant habitat. Dyer's woad, Canada thistle, Scotch thistle, globe-podded hoary-cress, tall whitetop, and Mediterranean sage all inhabit the same ecological units as sensitive *Botrychium* spp.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon known sensitive *Botrychium* population. However, hand-spraying or non-herbicide treatments are allowed within 50′ of TES plants; therefore, *Botrychium* may suffer from inadvertent herbicide spray and/or trampling. Negative indirect effects upon *Botrychium* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during

weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Positively, weed control near *Botrychium* may reduce the risk that seeds or rhizomes from nearby plants might invade their habitat, and reduce the risk that future projects or people in the region could unwittingly transport weed seeds into *Botrychium* habitat.

Cumulative Effects

Continued cattle grazing in *Botrychium* habitat can potentially spread weed seeds due to moving cattle and their disturbance to the ground in areas with *Botrychium*. Weed treatment will help reduce the number of weeds whose seeds the cattle could carry into *Botrychium* habitat. This is true of other forest projects as well: OHV use, road maintenance, and other forest workers would also have a lesser chance of bringing in weed seed if current infestations are treated.

Alternative 3

Direct and Indirect Effects

Alternative 3 does allow pesticide use. *Botrychium* would consequently not suffer from any herbicide overspray. Although noxious rhizomatous weeds occur near some plants of *Botrychium*, DS-06 requires that manual treatments not be utilized on them; therefore, sensitive plants would not be damaged by manual treatments of rhizomatous plants. No other weeds occur close enough to *Botrychium* to cause damage due to manual treatments.

Treatment of non-rhizomatous plants near *Botrychium* species might cause harm to these delicate plants, but there are not any non-rhizomatous weeds within 50′ of any sensitive plants. Failure to treat aggressive rhizomatous plants can be detrimental to this species: these aggressive noxious weeds can spread from underground rhizomes and compete successfully with native plants.

Cumulative Effects

Non-treatment of rhizomatous species near *Botrychium* might cause irreversible damage to sensitive plant habitat: these species can expand their occupied area and change the habitat sufficiently to exclude *Botrychium* spp. Further use of these areas by other Forest projects may disturb the ground and allow noxious weeds to grow, especially those not allowed to be treated by DS-06 and by the prohibition against herbicide. In efforts to save *Botrychium* from weed-causing disturbances, it may be necessary to prohibit further use of those sensitive areas.

Alternative 4

Direct and Indirect Effects

Alternative 4 allows herbicide use. DS-31 provides that there will be no vehicle-based spraying within 50 feet of any TES plant location, and DS-34 provides that herbicides will not be applied on rainy and windy days, and that applicators will insure that no herbicide droplets travel farther than 10 feet from the plant. Thus, there will be no effect to *Botrychium* from vehicle-based herbicide application. As in Alternative 2, however,

hand-spraying or non-herbicide treatments are allowed within 50′ of TES plants; therefore, *Botrychium* may suffer from inadvertent herbicide spray and/or trampling.

Treatment of weeds of any variety would be beneficial in conserving the uncommon and small areas where *Botrychium* grows.

Cumulative Effects

See the paragraph describing indirect effects above. With treatment, future projects that disturb the ground will not bring in as many weeds as otherwise.

Alternative 5

Direct and Indirect Effects

Like Alternative 3, this alternative does not allow the use of pesticides, but rather expands upon the possibility of using alternative methods for weed control. This alternative would attempt goat grazing on Goats, if not properly or effectively controlled, might eat our sensitive plants and cause damage or death. This alternative would attempt clipping, weed-whacking, mulching, or tarping; if care is not exercised, the sensitive plant might get weed-whacked or buried under mulch or a tarp, or trampled upon by workers doing these activities to noxious weeds.

Indirect effects would include the possibility for invasion by weeds of *Botrychium* habitat due to weed control activities (soil disturbance, people moving seeds).

Weed control could also safeguard the sensitive plant by inhibiting weed spread from noxious weeds that may have been nearby.

Cumulative Effects

Reduction in noxious weed propagules in the local area would help prevent future projects in the area from spreading noxious weeds. See also the cumulative effects for Alternative 3.

Alternative 6

Direct, Indirect, and Effects

Herbicides would not be sprayed within 50 feet of any Sensitive species, so there would be no adverse effects upon *Botrychium* due to spraying (DS-32). Wicking with herbicides would be allowed to take place within this 50-foot buffer, but with care taken to insure that there are no sensitive plants directly beneath the weed, the plant should suffer no adverse effect.

Indirect effects, like always, include the possibility that *Botrychium* communities might suffer some decreased ability to survive or reproduce due to wicking or trampling by weed controllers, but any treatment of weeds would safeguard habitat and improve chances for our Sensitive species. Since it would be impossible to treat the *B. crenulatum* site with Canada thistle, we face the danger of losing that site to Canada thistle takeover.

Cumulative Effects

Cumulative effects from Alternative 6 include a reduced probability that weeds will be able to spread into *Botrychium* habitat or be tracked in by people visiting or working in the area.

***Botrychium crenulatum* (BOCR)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken the native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Canada thistle, a rhizomatous noxious weed, occurs within 50´of a known *Botrychium crenulatum* occurrence.

Alternative 2 - Proposed Action

Direct and Indirect Effects

1 occurrence of Canada thistle (050953CIAR4012) occurs within a polygon of *Botrychium crenulatum*; In order to ensure that there are no negative effects to *Botrychium* plants due to herbicide use, Canada thistle should be treated either before the plants emerge or after they wither.

Indirect effects upon *B. crenulatum* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *B. crenulatum* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *B. crenulatum* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *B. crenulatum*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *B. crenulatum*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

Treatment of noxious weeds in the area might prevent them from invading *Botrychium* habitat in the future, and help prevent projects in the area from moving weed seed into it. As this site is within an active allotment, cows may spread weed seeds from infested areas to uninfested locations. By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *B. crenulatum* habitat through grazing, workers

for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *B. crenulatum* due to herbicides. DS-06 prohibits manual treatment of rhizomatous weeds, so no *B. crenulatum* plants would be injured near the Canada thistle occurrence, since it would not be treated.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *B. crenulatum*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. By not treating the nearby Canada thistle occurrence, this weed could eventually invade the entirety of this *B. crenulatum* occurrence. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *B. crenulatum*, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *B. crenulatum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. See also Cumulative Effects section for Alternative 2.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing, allowed in this alternative, may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking,

mulching, and tarping may be utilized on some weeds; *B. crenulatum* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future. Treatment of Dalmatian toadflax and yellow star-thistle, high priority species for treatment, should make it more possible to defend sensitive plants from these nearby noxious weeds.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *B. crenulatum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed (or rhizome) bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Herbicides would not be sprayed within 50 feet of any Sensitive species, so there would be no adverse effects upon *Botrychium* due to spraying (DS-32). Wicking with herbicides would be allowed to take place within this 50-foot buffer, but with care taken to insure that there are no sensitive plants directly beneath the weed, the plant should suffer no adverse effect, especially in the instance of Canada thistle occurring near *B. crenulatum*. Some individuals might be impacted, but overall the treatment of Canada thistle would be beneficial to the sensitive plant. Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50´ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc., are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *B. crenulatum* plants will be harmed by their use.

Indirect effects include the possibility that *Botrychium* communities might suffer some decreased ability to survive or reproduce due to accidental herbicide impacts or trampling by weed controllers, but any treatment of weeds would safeguard habitat and improve chances for our Sensitive species. Since the *B. crenulatum* site with Canada thistle would not be treated, Canada thistle may further invade this site.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *B. crenulatum* such as

grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Buxbaumia viridis* (BUVI2) – come back to this species**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed management would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Uncontrolled weeds would have the opportunity to invade and degrade sensitive plant habitat.

Cumulative Effects

The only cumulative effect upon *Buxbaumia viridis* resulting from the "No Action" alternative would be possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel beyond the drip zone of the target weed, vehicle-based herbicides would cause no direct effect upon known sensitive *Buxbaumia viridis* population. However, hand-spraying or non-herbicide treatments are allowed within 50′ of TES plants; therefore, *Buxbaumia viridis* may suffer from inadvertent herbicide spray and/or trampling.

Negative indirect effects upon *Buxbaumia viridis* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Positively, weed control near *Buxbaumia viridis* may reduce the risk that seeds or rhizomes from nearby plants might invade their habitat, and reduce the risk that future projects or people in the region could unwittingly transport weed seeds into *B. viridis* habitat.

Cumulative Effects

might prevent them from invading *Buxbaumia viridis* habitat, and help prevent future projects in the area from moving weed seed into it.

Alternative 3

Direct and Indirect Effects

Alternative 3 does not allow the use of pesticides. *Buxbaumia viridis* would consequently not suffer from any herbicide overspray.

Treatment of non-rhizomatous plants near *Buxbaumia viridis* species might cause harm to these delicate plants, but there are not any non-rhizomatous weeds within 50′ of any sensitive plants. Failure to treat aggressive rhizomatous plants will be detrimental to this species.

Cumulative Effects

Non-treatment of rhizomatous species near *Buxbaumia viridis* might cause irreversible damage to sensitive plant habitat. Further use of these areas will disturb the ground and allow noxious weeds to grow, especially those not allowed to be treated by DS-06 and by the prohibition against herbicide. In efforts to save *Buxbaumia viridis* from weed-causing disturbances, it may be necessary to prohibit further use of those sensitive areas.

Alternative 4

Direct and Indirect Effects

Alternative 4 allows herbicide use. DS-31 provides that there will be no vehicle-based spraying within 50 feet of any TES plant location, and DS-34 provides that herbicides will not be applied on rainy and windy days, and that applicators will insure that no herbicide droplets travel farther than 10 feet from the plant. Thus, there will be no effect to *Buxbaumia viridis* from vehicle-based herbicide application. As in Alternative 2, however, hand-spraying or non-herbicide treatments are allowed within 50′ of TES plants; therefore, *Buxbaumia viridis* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects from herbicide spraying near these plants are unknown – I do not know how *Buxbaumia viridis* reacts to herbicides intended for such distantly related plants as anthophytes. However, I feel fairly certain that herbicides would be detrimental to their reproductive ability. However, treatment of weeds of any variety would be beneficial in conserving the uncommon and small areas where *Buxbaumia viridis* likes to live.

Cumulative Effects

See the paragraph describing indirect effects above. With treatment, future projects that disturb the ground will not bring in as many weeds as otherwise.

Alternative 5

Direct and Indirect Effects

Like Alternative 3, this alternative does not allow the use of pesticides, but rather expands upon the possibility of using alternative methods for weed control. This alternative would attempt goat grazing as goats might eat our sensitive plants and cause damage or death. This alternative would also attempt clipping, weed-whacking, mulching, or tarping; if care is not exercised, the sensitive plant might get weed-whacked or buried under mulch or a tarp, or trampled upon by workers doing these activities to noxious weeds.

Indirect effects would include the possibility for invasion by weeds of *Buxbaumia viridis* habitat due to weed control activities (soil disturbance, people moving seeds). Weed control would also safeguard the sensitive plant by inhibiting weed spread.

Cumulative Effects
Future projects in the area would not spread weeds as much with treatment as without.

Alternative 6

Direct, Indirect, and Effects
Herbicides would not be sprayed within 50 feet of any Sensitive species, so there would be no adverse effects upon *Buxbaumia viridis* due to spraying (DS-32). Wicking with herbicides would be allowed to take place within this 50-foot buffer, but with care taken to insure that there are no sensitive plants directly beneath the weed, the plant should suffer minimal adverse effect.
Indirect effects, like always, include the possibility that *Buxbaumia viridis* communities might suffer some decreased ability to survive or reproduce due to wicking or trampling by weed controllers, but any treatment of weeds would safeguard habitat and improve chances for our Sensitive species.

Cumulative Effects
Cumulative effects from Alternative 6 include a reduced probability that weeds will be able to spread into *Buxbaumia viridis* habitat or be tracked in by people visiting or working in the area.

***Calochortus longebarbatus* var. *longebarbatus* (CALOL)**

Alternative 1 - No Action

Direct and Indirect Effects
Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.
Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects
Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Scotch thistle, lens-podded hoary-cress, Mediterranean sage, musk thistle, squarrose knapweed, spotted knapweed, Klamath weed, and Canada thistle are all within 1 mile of *Calochortus longebarbatus* var. *longebarbatus*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more beyond the drip zone of the target weed, vehicle-based herbicides would cause no direct effect upon known population of *C. l.* var. *longebarbatus*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *C. l.* var. *longebarbatus* may suffer from inadvertent herbicide spray and/or trampling. Since manual treatment of rhizomatous weeds is not allowed (DS-06), extra care should be taken when treating Canada thistle occurrences near CALOL.

Indirect effects upon *C. l.* var. *longebarbatus* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *C. l.* var. *longebarbatus* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *C. l.* var. *longebarbatus* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *C. l.* var. *longebarbatus*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading *C. l.* var. *longebarbatus* habitat, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *C. l.* var. *longebarbatus* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *C. longebarbatus* due to herbicides. Knapweeds occur within 1 mile of several occurrences of CALOL; since they are a high priority for treatment, manual removal may cause local disturbance to the soil and create opportunities for weed invasion, but will also reduce the danger that knapweeds will invade CALOL habitat. Other weeds close to CALOL, however, are not high priorities for treatment and, as a result of being left untreated, may invade CALOL habitat and out-compete the sensitive

plants. Of especial concern are rhizomatous weeds like Canada thistle, which are not allowed to be pulled (*q.v.* DS-06).

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with CALOL, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. The only high-priority weeds near (within one mile of) CALOL to be treated are the knapweeds. Overspray, runoff, or leaching of herbicides may affect some individuals of CALOL, but as most weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of these weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with CALOL such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well-supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; CALOL plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *Calochortus*

longebarbatus var. *longebarbatus*, such as grazing, timber harvesting, etc. will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-40) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that CALOL plants will be harmed by it.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with CALOL such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Cypripedium montanum* (CYMO2)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Scotch thistle, lens-podded hoary-cress, musk thistle, Mediterranean sage, and dyer's woad are all within 1 mile of CYMO; Canada thistle, crupina, diffuse knapweed, Klamath weed, spotted knapweed, and yellow star-thistle also exist within the same ecological units as CYMO.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon known population of *C. montanum*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *C. montanum* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects upon *C. montanum* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *C. montanum* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *C. montanum* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *C. montanum*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *C. montanum*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *C. montanum* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

<u>Alternative 3</u>

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *C. montanum* due to herbicides. Knapweeds occur within 1 mile of several occurrences of *C. montanum*; since they are a high priority for treatment, manual removal may cause local disturbance to the soil and create opportunities for weed invasion, but will also reduce the danger that knapweeds will invade *C. montanum* habitat. Other weeds close to *C. montanum*, however, are not high priorities for treatment and, as a result of being left untreated, may invade *C. montanum* habitat and out-compete the sensitive plants.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *C. montanum*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Again, the only high-priority weeds within one mile of *C. montanum* to be treated are the knapweeds. Overspray, runoff, or leaching of herbicides may affect some individuals of *C. montanum*, but as most weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of these weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *C. montanum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; *C. montanum* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *C. montanum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years

may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *C. montanum* plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *C. montanum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Eriogonum prociduum* (ERPR9)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Scotch thistle, globe-podded hoary-cress, and Canada thistle are all within 1 mile of ERPR; Dyer's woad, Med sage, lens-podded hoary-cress, diffuse knapweed, yellow star-thistle, Klamath weed, and tall whitetop exist within the same ecological units as ERPR.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel beyond the drip zone of the target weed, vehicle-based herbicides would cause no direct effect upon known population of *E. prociduum*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *E. prociduum* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects upon *E. prociduum* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *E. prociduum* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *E. prociduum* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *E. prociduum*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *E. prociduum*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *E. prociduum* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *E. prociduum* due to herbicides. No weeds within 1 mile of *E. prociduum* are considered high-priority; therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *E. prociduum*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *E. prociduum*, but as most weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of these weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *E. prociduum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; *E. prociduum* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *E. prociduum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50´ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *E. prociduum* plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *E. prociduum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Eriogonum umbellatum* var. *glaberrimum* (ERUMG)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Dyer's woad and Canada thistle each exist within 1 mile of *E. umbellatum* var. *glaberrimum*; Mediterranean sage and Scotch thistle also inhabit the same ecological units as *E. umbellatum* var. *glaberrimum*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon known population of ERUMG. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, ERUMG may suffer from inadvertent herbicide spray and/or trampling. DG013CIAR4, a Canada thistle occurrence, is the closest weed that will be treated with herbicide, at about 365 m distant from the Sensitive plant.

Indirect effects upon ERUMG under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to ERUMG include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into ERUMG habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of ERUMG, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of ERUMG, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby ERUMG habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon ERUMG due to herbicides. No weeds within 1 mile of ERUMG are considered high-priority; therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with ERUMG, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of ERUMG, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of these weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with ERUMG such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds); ERUMG plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with ERUMG such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50´ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that ERUMG plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with ERUMG such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Galium glabrescens* ssp. *modocense* (GAGLM)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Scotch thistle, Canada thistle, and yellow star-thistle each exist within 1 mile of *G. glabrescens* ssp. *modocense*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon known population of GAGLM. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, GAGLM may suffer from inadvertent herbicide spray and/or trampling. Canada thistle, which will be treated chemically, is within 1 mile of at least 1 *G. g.* ssp. *modocense* occurrence.

Indirect effects upon GAGLM under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to GAGLM include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into GAGLM habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of GAGLM, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of GAGLM, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby GAGLM habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon GAGLM due to herbicides. No weeds within 1 mile of GAGLM are considered high-priority; therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with GAGLM, but may cause disturbances that increase their populations. Future actions that disturb the

ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of GAGLM, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of these weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with GAGLM such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose; however, neither Scotch nor mush thistles are known within 1 mile of *G. g.* ssp. *modocense*. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; GAGLM plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with GAGLM such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that GAGLM plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with GAGLM such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Galium serpenticum* ssp. *warnerense* (GASEW)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Dalmatian toadflax, dyer's woad, and Canada thistle each exist within 1 mile of *G. serpenticum* ssp. *warnerense*; spotted knapweed, Scotch thistle, and Mediterranean sage all inhabit the same ecological zones as Gasew.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-39) and no spraying in unfavourable weather conditions (DS-45). Since DS-45 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon any known population of GASEW. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore,

GASEW may suffer from inadvertent herbicide spray and/or trampling. Canada thistle, which will be treated chemically, is within 1 mile of at least 1 *G. s.* ssp. *warnerense* occurrence.

Indirect effects upon GASEW under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to GASEW include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into GASEW habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of GASEW, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of GASEW, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby GASEW habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon GASEW due to herbicides. Dalmatian toadflax, a high-priority weed, is within one mile of *G. serpenticum*; treatment will be beneficial to GASEW, but will likely cause little damage due to manual treatment as the closest sensitive plant site to the weed is 400 meters away. Many noxious weeds that are close-by sensitive plants are not on the high-priority treatment list (see Tables 2-13 and 2-14, FEIS); therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with GASEW, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of GASEW, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. However, since some Dalmatian

toadflax sites are within 400 m of sensitive plant habitat, care should be exercised if herbicides are used. Manual treatments of these weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with GASEW such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose; however, neither Scotch nor mush thistles are known within 1 mile of *G. s.* ssp. *warnerense*. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; GASEW plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future. Treatment of Dalmatian toadflax and yellow star-thistle, high priority species for treatment, should make it more possible to defend sensitive plants from these nearby noxious weeds.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with GASEW such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are

addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that GASEW plants will be harmed by their use. Care should still be exercised when treating the populations of Dalmatian toadflax that are close to sensitive plants.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with GASEW such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Iliamna bakeri* (ILBA)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken the native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Dyer's woad, diffuse knapweed, spotted knapweed, Scotch thistle, wavyleaf thistle, globe-podded hoary-cress, Dalmatian toadflax, and Canada thistle each exist within 1 mile of *I. bakeri*; essentially all of the weeds on the Forest inhabit the same ecological zones as *Iliamna bakeri*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon any known population of *I. bakeri*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *I. bakeri* may suffer from inadvertent herbicide spray and/or trampling. Canada thistle, which will be treated chemically, is within 1 mile of at least 1 *I. bakeri* occurrence.

Indirect effects upon *I. bakeri* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment.

Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *I. bakeri* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *I. bakeri* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *I. bakeri*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *I. bakeri*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *I. bakeri* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *I. bakeri* due to herbicides. Dalmatian toadflax, a high-priority weed, is within one mile of *I. bakeri*; treatment will be beneficial to *I. bakeri*, but will likely cause little damage due to manual treatment as the closest sensitive plant site to the weed is 400 meters away. Many noxious weeds that are close-by sensitive plants are not on the high-priority treatment list (see Tables 2-13 and 2-14, FEIS); therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *I. bakeri*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *I. bakeri*, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. However, since both Dalmatian toadflax and Canada thistle are within 1 mile of sensitive plant habitat, care should be exercised if herbicides are used. Manual treatments of these weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *I. bakeri* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; *I. bakeri* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future. Treatment of Dalmatian toadflax and yellow star-thistle, high priority species for treatment, should make it more possible to defend sensitive plants from these nearby noxious weeds.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *I. bakeri* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *I. bakeri* plants will be harmed by their use. Care should still be exercised when treating the populations of Dalmatian toadflax or Canada thistle that are close to sensitive plants.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *I. bakeri* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Ivesia paniculata* (IVPA)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken the native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Several infestations of Scotch thistle exist within 1 mile of *Ivesia paniculata*; Med sage, lens-podded hoary-cress, Klamath weed, yellow star-thistle, and Canada thistle all inhabit the same ecological zones as *I. paniculata*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon any known population of *I. paniculata*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *I. paniculata* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects upon *I. paniculata* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *I. paniculata* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *I. paniculata* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *I. paniculata*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might

prevent them from invading habitat of *I. paniculata*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *I. paniculata* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *I. paniculata* due to herbicides. Many noxious weeds that are close-by sensitive plants are not on the high-priority treatment list (see Tables 2-13 and 2-14, FEIS); therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *I. paniculata*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *I. paniculata*, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *I. paniculata* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites

(Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; *I. paniculata* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future. Treatment of Dalmatian toadflax and yellow star-thistle, high priority species for treatment, should make it more possible to defend sensitive plants from these nearby noxious weeds.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *I. paniculata* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50´ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *I. paniculata* plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *I. paniculata* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Mimulus evanescens* (MIEV)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken the native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Several infestations of Scotch thistle, dyer's woad, spotted knapweed, and Klamath weed, exist within 1 mile of *Mimulus evanescens*; Dalmatian toadflax, yellow star-thistle, squarrose knapweed, musk thistle, and diffuse knapweed all inhabit the same ecological zones as *M. evanescens*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon any known population of *M. evanescens*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *M. evanescens* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects upon *M. evanescens* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *M. evanescens* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *M. evanescens* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *M. evanescens*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *M. evanescens*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *M. evanescens* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *M. evanescens* due to herbicides. Many noxious weeds that are close-by sensitive plants are not on the high-priority treatment list (see Tables 2-13 and 2-14, FEIS); therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *M. evanescens*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *M. evanescens*, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *M. evanescens* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; *M. evanescens* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future. Treatment of Dalmatian toadflax and yellow star-thistle, high priority species for treatment, should make it more possible to defend sensitive plants from these nearby noxious weeds.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *M. evanescens* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50´ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *M. evanescens* plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *M. evanescens* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Phacelia inundata* (PHIN)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken the native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Known infestations of Scotch thistle, musk thistle, Canada thistle, and squarrose knapweed exist within 1 mile of *Phacelia inundata*; Dyer's

woad, Dalmatian toadflax, Klamath weed, yellow star-thistle, Russian knapweed, plumeless thistle, Mediterranean sage, and heart-podded hoary-cress all inhabit the same ecological zones as *Ph. inundata*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon any known population of *Ph. inundata*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *Ph. inundata* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects upon *Ph. inundata* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *Ph. inundata* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *Ph. inundata* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *Ph. inundata*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *Ph. inundata*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *Ph. inundata* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *Ph. inundata* due to herbicides. Many noxious weeds that are close-by sensitive plants are not on the high-priority treatment list (see Tables 2-13 and 2-14, FEIS); therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *Ph. inundata*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or

projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *Ph. inundata*, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *Ph. inundata* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; *Ph. inundata* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future. Treatment of Dalmatian toadflax and yellow star-thistle, high priority species for treatment, should make it more possible to defend sensitive plants from these nearby noxious weeds.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *Ph. inundata* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc.are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *Ph. inundata* plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *Ph. inundata* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Pogogyne floribunda* (POFL)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken the native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Known infestations of Scotch thistle, musk thistle, Canada thistle, and squarrose knapweed exist within 1 mile of *Phacelia inundata*; Dyer's woad, Dalmatian toadflax, Klamath weed, yellow star-thistle, Russian knapweed, plumeless thistle, Mediterranean sage, and heart-podded hoary-cress all inhabit the same ecological zones as *P. floribunda*.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-39) and no spraying in unfavourable weather conditions (DS-45). Since DS-45 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herb-

icides would cause no direct effect upon any known population of *P. floribunda*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *P. floribunda* may suffer from inadvertent herbicide spray and/or trampling. Canada thistle, musk thistle, squarrose knapweed, and Scotch thistle, which exist within 1 mile of *P. floribunda*, may be treated with herbicides: care must be exercised to insure that no sensitive plants are inadvertently sprayed or otherwise damaged.

Indirect effects upon *P. floribunda* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *P. floribunda* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *P. floribunda* habitat. Since treatment of existing weed occurrences is far enough away from any known occurrences of *P. floribunda*, it is unlikely that they will suffer from either overspray or trampling. Treatment of noxious weeds in the area might prevent them from invading habitat of *P. floribunda*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *P. floribunda* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *P. floribunda* due to herbicides. Squarrose knapweed, a high-priority species for treatment, lives within 1 mile of a POFL occurrence: treatment of this weed site may cause mechanical injury to sensitive plants if care is not exercised. Many nearby weeds are not high-priority; therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *P. floribunda*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *P. floribunda*, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *P. floribunda* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing (DS-32) may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds (DS-33); *P. floribunda* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future. Treatment of Dalmatian toadflax and yellow star-thistle, high priority species for treatment, should make it more possible to defend sensitive plants from these nearby noxious weeds.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *P. floribunda* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-40) and would thus cause minimal harm to them. Reduced herbicide use in the future would

further reduce harm to sensitive plants. DS-32 and 33 are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *P. floribunda* plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *P. floribunda* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Polygonum polygaloides* ssp. *esotericum* (POPOE)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken the native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-39) and no spraying in unfavourable weather conditions (DS-45). Since DS-45 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon any known population of *P. p.* ssp. *esotericum*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *P. p.* ssp. *esotericum* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects upon *P. p.* ssp. *esotericum* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *P. p.* ssp. *esotericum* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could

unwittingly transport weed seeds into *P. p.* ssp. *esotericum* habitat. Treatment of noxious weeds in the area might prevent them from invading habitat of *P. p.* ssp. *esotericum*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *P. p.* ssp. *esotericum* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *P. p.* ssp. *esotericum* due to herbicides. Squarrose knapweed, a high-priority species for treatment, lives within 1 mile of a POFL occurrence: treatment of this weed site may cause mechanical injury to sensitive plants if care is not exercised. Many nearby weeds are not high-priority; therefore, delayed treatment of these weeds may endanger sensitive plant habitat.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *P. p.* ssp. *esotericum*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and non-priority weed species left untreated may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *P. p.* ssp. *esotericum*, but since all known weed sites are more than 50′ from sensitive plants, this is unlikely. Manual treatments of weeds located far from sensitive plants are also unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *P. p.* ssp. *esotericum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; *P. p.* ssp. *esotericum* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known. Larger weed sites, if left untreated, may potentially degrade sensitive plant habitat in the future. Treatment of Dalmatian toadflax and yellow star-thistle, high priority species for treatment, should make it more possible to defend sensitive plants from these nearby noxious weeds.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *P. p.* ssp. *esotericum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc, are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *P. p.* ssp. *esotericum* plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *P. p.* ssp. *esotericum* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

***Rorippa columbiae* (ROCO)**

Alternative 1 - No Action

Direct and Indirect Effects

Under the "No Action" alternative, no weed treatments would take place. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken the native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Possible future competition from noxious weeds. Without treatment of existing weed populations in the area around this species, the weeds would be able to colonise any disturbances to sensitive plant habitat. Three sites of Canada thistle, a rhizomatous noxious weed, exist within 1 mile of *Rorippa columbiae*. With no action taken, this weed has the potential to invade and outcompete *R. columbiae* in its habitat.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Proposed Action, weeds could be sprayed with herbicides, but there would be no vehicle-based herbicide spraying within 50 feet of sensitive plants (DS-31) and no spraying in unfavourable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel more than 10 feet from the target weed, vehicle-based herbicides would cause no direct effect upon any known population of *R. columbiae*. However, hand-spraying or manual treatments are allowed within 50′ of TES plants; therefore, *R. columbiae* may suffer from inadvertent herbicide spray and/or trampling.

Indirect effects upon *R. columbiae* under Alternative 2 include possible damage to viability or reproductive ability of plants that are trampled upon or sprayed during weed treatment. Disturbance of ground near sensitive plants may provide an opening for invasion by competitive weeds. Beneficial effects to *R. columbiae* include control of nearby noxious weeds that may reduce the risk that weed seeds or rhizomes might invade their habitat, and reduce the risk that future projects or people in the area could unwittingly transport weed seeds into *R. columbiae* habitat. Treatment of noxious weeds in the area might prevent them from invading habitat of *R. columbiae*, and help prevent future projects in the area from moving weed seed into the same.

Cumulative Effects

By reducing noxious weeds, weed treatments will reduce propagules that could spread to nearby *R. columbiae* habitat through grazing, workers for the Sagebrush Steppe project, OHV's, and recreationists. If a new decision document is not approved after 5 years, noxious weeds may regain ground and threaten sensitive plant habitat.

Alternative 3

Direct and Indirect Effects

Since there will be no herbicide use under Alternative 3, there will be no direct or indirect effects upon *R. columbiae* due to herbicides. DS-06 prohibits the use of manual treatments upon rhizomatous weeds like Canada thistle; therefore, no injury would result to *R. columbiae* because the closest noxious weeds are rhizomatous.

Cumulative Effects

Noxious weed treatment should reduce the number of noxious weeds in areas with *R. columbiae*, but may cause disturbances that increase their populations. Future actions that disturb the ground may cause noxious weeds to gain new ground after treatment stops, and untreated weed species may be further spread by any future use or projects in the area. If a decision document is not approved in five years, weeds may again encroach upon sensitive plant habitat.

Alternative 4

Direct and Indirect Effects

Alternative 4, like 2, allows the use of herbicides. Overspray, runoff, or leaching of herbicides may affect some individuals of *R. columbiae*. Manual treatments of weeds located far from sensitive plants are unlikely to cause any harm due to trampling. Weed treatment should reduce weeds and provide more and better habitat for sensitive plant species.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *R. columbiae* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Alternative 5

Direct and Indirect Effects

Herbicides are not allowed in this alternative; therefore, there shall be no direct effects upon sensitive plants due to them. Goat grazing may damage plants that are near weed sites (Scotch and musk thistles) to be treated with goat grazing, especially if they are not well supervised or get loose. Clipping, weed whacking, mulching, and tarping may be utilized on some weeds; *R. columbiae* plants will suffer direct impacts if they are inadvertently clipped, weed whacked, mulched, or tarped.

Treatment of weeds will reduce the risk that they will invade sensitive plant habitat in the future. Sensitive plants that are trampled, grazed, clipped, whacked, mulched, or tarped may suffer an impaired ability to reproduce, especially if new weed sites come up closer than those now known.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *R. columbiae* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas. Untreated areas may serve as a seed bank for future weed infestations, and mitigation measures for any projects in those areas will be necessary in order to help reduce weed spread.

Alternative 6

Direct, Indirect, and Effects

Alternative 6 allows herbicide use and adds another herbicide and two mixes. Because of the expanded number of weed-combating tools, continued herbicide use throughout the years may both reduce the amount of weeds present and reduce the amount of herbicide needed in the future. Herbicide use will be prohibited within 50′ of sensitive plants (DS-32) and would thus cause minimal harm to them. Reduced herbicide use in the future would further reduce harm to sensitive plants. Goat grazing and weed whacking, etc. are addressed in Alternative 5 above. Herbicide use is reduced from Alternative 2 and 4, making it less likely that *R. columbiae* plants will be harmed by their use.

Cumulative Effects

Management of noxious weeds will reduce their numbers and better the chances for survival of sensitive plants and their habitat. Future projects in areas with *R. columbiae* such as grazing, timber harvesting, *etc.* will be less likely to spread noxious weeds into those areas.

Appendix S2.3: Plants Biological Evaluation Addendum Supplement

Supplement to the Addendum to the Botany Biological Evaluation for Modoc National Forest Noxious Weed Treatment Project

Modoc National Forest, California
Sensitive Plant Species
04/25/2007

Summary
A new Sensitive Plant List was approved by the Pacific Southwest Regional Forester in October 2006. This list removed two species from the Forest Sensitive list and added ten others. This document will analyse effects upon these new sensitive species. All proposed actions will remain as described in the Modoc National Forest Noxious Weed Treatment Final Environmental Impact Statement.

It is my determination that:
Implementing the Preferred alternative and Design Standards "may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viablility to the population or species" of all 10 sensitive plant species analyzed in this document.

Prepared by: _____ Date: 4/25/2007
Julie Laufmann TEAMS

Prepared by: Forest Jay Gauna, Botany Intern

Reviewed by: Cheryl Beyer, Forest Botanist

Introduction

This supplement to the addendum to the Botany Biological Evaluation for the Modoc National Forest Noxious Weed Treatment Program analyzes ten Sensitive plant species that are known or suspected to occur on the Modoc National Forest. These species were added to the regional Sensitive Species list in a letter dated July 27, 2006 (Appendix A). The new list became effective October 1, 2006.

Purpose of this Addendum

What this Addendum does:

- Updates the existing BE and addendums to the BE by analyzing direct, indirect and cumulative effects to 10 new species recently added to the regional sensitive plant list.
- Provides determination statements of impacts to each newly added species for each alternative proposed in this Environmental Impact Statement (EIS).

What this Addendum does not do:

- Does not change any of the proposed actions in the Environmental Impact Statement
- Does not include any new project design features
- Does not address any new treatment methods, strategies, or new weed species
- Does not change any determinations of the previously analyzed species

Proposed Action

A description of the alternatives may be found under the heading "Alternatives and their Effects upon Sensitive Plants" in the addendum to the Botany Biological Evaluation for Modoc National Forest Noxious Weed Treatment Project (1/29/2006, pg.5). The preferred alternative is alternative 6.

Purpose of Project

The purpose of the project is to aggressively and efficiently eradicate, or control and contain, 14 specific noxious weed species on the Modoc National Forest utilizing manual, chemical, or manual and chemical treatments. Please see the Final EIS (FEIS) for more information.

This action will help preserve the native biodiversity of the Forest and promote the ecosystem health of forested and rangeland habitats by maintaining or improving native forbs and grass communities.

Consistency with Laws, Plans, and Policies

All alternatives would be consistent with direction in the Modoc National Forest Land and Resource Management Plan as amended, and the Modoc National Forest Integrated Weed Management Strategy (2005).

Sensitive Species List Updates

Species removed from list

Two species formerly considered Sensitive have been removed from the list and placed on the Forest Watchlist: *Iliamna bakeri* (Baker's globemallow) and *Pogogyne floribunda* (profuse-flowered pogogyne).

Species added to list

Ten species have been added to the Modoc National Forest Sensitive Plant Species List. These are: *Astragalus lemmonii* (Lemmon's milkvetch), *Botrychium pumicola* (pumice moonwort), *Bruchia bolanderi* (Bolander's candlemoss), *Helodium blandowii* (Blandow's bogmoss), *Lomatium roseanum* (adobe parsley), *Lupinus latifolius* var. *barbatus* (bearded lupine), *Meesia triquetra* (threeranked humpmoss), *Meesia uliginosa* (broadnerved humpmoss), *Ptilidium californicum* (Pacific fuzzwort), and *Thelypodium howellii* ssp. *howellii* (Howell's thelypody) (see Table 1 below). No surveys for these specific plants have been conducted since they were just added to the list October, 2006 (Appendix A).

Table 1: Ten new sensitive plant species added to the Modoc National Forest Sensitive Plant Species List (*October, 2006- Appendix B)*

Code	Sensitive Species	Common Name	Habitat
ASLE6	*Astragalus lemmonii*	Lemmon's milkvetch	Usually occurs in wetlands, in Great Basin sagebrush scrub.
BOPU2	*Botrychium pumicola*	pumice moonwort	Pumice gravel in openings in lodgepole or whitebark pine, moist in late spring.
BRBO2	*Bruchia bolanderi*	Bolander's candlemoss	High mountain meadows in lodgepole pine; on moist, organic soil.
HEBL2	*Helodium blandowii*	Blandow's bogmoss	Bogs and fens in subalpine coniferous forest.
LORO7	*Lomatium roseanum*	roseflowered desertparsley	Open, dry, basalt overlying clay soils within low sagebrush.
LULAB	*Lupinus latifolius* var. *barbatus*	bearded lupine	Wet places in mesic upper montane coniferous forest.
METR70	*Meesia triquetra*	threeranked humpmoss	Mineral fens and wetland sites within mesic upper montane forest.
MEUL70	*Meesia uliginosa*	broadnerved humpmoss	Meadows, fens, seeps in upper montane coniferous forest; damp soil.
PTCA5	*Ptilidium californicum*	Pacific fuzzwort	On bark, in moist mature hemlock or white fir, not burned for 30 yrs.
THHOH	*Thelypodium howellii* ssp. *Howellii*	Howell's thelypody	Great Basin scrub, alkaline adobe meadows and seeps.

Astragalus lemmonii **Lemmon's milkvetch**

Description: Perennial, from a somewhat fleshy to woody taproot, loosely matted to open and widely branched, herbage green but sparsely strigose, with basifixed hairs. Stems slender, several to many, radiating from a superficial root-crown. Several inflorescences often paired in the axils. Pods are small producing few seeds.

Habitat: Within sagebrush scrub: Moist grassy, sedgy, or rushy flats bordering streams and lake shores; vernally moist summer-dry alkaline meadows, seeps, marshes and swamps; occasionally found in non-wetlands. Forms rare and scattered colonies. Found in Lassen, Mono, Modoc, Plumas, and Sierra Counties; Nevada, and Oregon.

Elevation: 4,200 – 7,225 feet.

Flowering Period: late May to early August Identification Period: late May to early August

Threats: Land conversion and pipeline construction.

Botrychium pumicola **pumice moonwort**

Description: Perennial herbaceous plants, 6-14 cm long producing one or sometimes two above ground leaves. Trophophore stalk 0--10 mm, 0.1--0.5 times length of trophophore rachis. The blade is dull, and leathery. Sporophores 1--3-pinnate, 1--1.5 times length of trophophore.

Habitat:
Botrychium pumicola typically grows in loose volcanic (pumice) soils, often, at lower elevations, in frost pockets or comparable areas that retain moisture into late spring. Plants occur on dry, fine to coarse pumice gravel and scree without any admixture of humus in relatively open to fully exposed sites with little competing vegetation on sparsely vegetated pumice fields and gently rolling slopes, from subalpine lodgepole forest to above timberline that are covered in winter by several feet of snow (Abrams; Camacho; Coville; Farrar 2006; Kozloff; Wagner '86; Wagner '93; Willamette). *Botrychium pumicola* has been found growing with *B. lanceolatum* and *B. simplex*. *It* has been found in southwestern Oregon where approximately 118 populations have been reported. About 60% have less than 20 plants/stems; less than 15,000 plants in total (www.natureserve.org 2007). There is one 1941 siting of a juvenile plant on Shastina, a secondary cone of Mt. Shasta in California, "in a basin near the spur on the south bank of Diller Canyon, west side of Shastina near timberline" (Farrar 2006).

Elevation: 5,900 ft. to 8,850 ft.

Sporulating Period: Unknown. Identification Period: July-September (PacifiCorp)

Threats: Fern collecting; habitat disruption by recreational use, timber harvesting, pumice mining. About 30,00 tons of pumice and pumicite are mined each year from northeastern California, with almost all coming from deposits at Glass Mountain, Medicine Lake Highlands, Modoc National Forest. Quarrying these deposits began in this region in the mid-1940's.

Bruchia bolanderi **Bolander's candlemoss**

Description: Plants tiny, 5.1–12 mm tall. Leaves short, linear, narrowly acuminate to subulate, serrulate, green to light brown, 1.1–2.8 mm long. Capsules are the most conspicuous part of the plants. Spores papillose.

Habitat: Occurring as individual plants among grasses, or forming large colonies in openings, on moist, disturbed soil with organic content, shaded to partial sun in the alpine or subalpine zones. Montane meadows and streambanks within mixed conifer or lodgepole forest are favoured habitat. The species is opportunistic, taking advantage of minimal competition from other vegetation and disturbed sites, such as the vertical soil banks of small meadow streams or headcuts. Associated species include *Pinus contorta* and the mosses *Aulacomnium palustre* and *Pohlia* spp. *Bruchia bolanderi* is found in Fresno, Maiposa, Modoc, Nevada, Plumas, Tehama, Tulare, and Tuolume Counties in California. It is also found in Oregon (CNPS 2001). On the Modoc National Forest it has been found at two locations within the same drainage in the north Warner Mountains.

Elevation: 5,575 ft. to 9,200 ft.

Growing Period: Summer Identification Period: Late Summer.

Threats: The ephemeral nature of this species and its occurrence in disturbed sites allow some flexibility in management. It is sometimes found growing on the steep banks of headcuts. Restoration of these streams may impact plants. Trampling along recreation trails has the potential to decimate populations.

Helodium blandowii **Blandow's feathermoss**

Description: Plants yellow-green, in loose tufts: with a growth pattern that simulated the look of a feather. Stems 4–11 cm long, more or less erect, densely clothed in unbranched (but lobed) green filamentous paraphyllia becoming brown below. Branches unequal, simple, widely spaced on stem, about 1 cm long. Stem leaves large, more or less triangular. Branch leaves small (about 0.8 mm long) and contorted when dry, broadly ovate-acuminate to ovate-lanceolate. Capsules rare; when present, smooth, oblong-cylindric.

Habitat: Forming mats and small hummocks in montane "minerotrophic" or "moderately rich" fens, usually with calcareous groundwater. Sometimes under sedges and shrubs around the edges of mires, or along streamlets in mires. Associated vascular species include *Agrostis idahoensis*, *Betula glandulosa*, *Salix geyeriana*, *Carex limosa*, *Eleocharis pauciflora*, and *Scheuchzeria palustris*. Associated mosses include *Aulacomnium palustre*, *Calligeron stramineum*, *Hamatocaulis vernicosus*, *Meesia triquetra*, *Tomenthypnum nitens*, *Philonotis fontana*, *Drepanocladus vernicosus*, *Hypnum lindbergii*. *Helodium blandowii* is known from California, Nevada, Oregon, Utah, Washington, and elsewhere (CNPS 2001).

Elevation: 6,550 ft. to 8,875 ft.

Flowering Period: Unknown. Identification Period: Unknown

Threats: Peatlands are fragile ecosystems which are impacted by trampling from domestic stock, water diversion and impoundment, drain-age projects, road construction and continued use, and the commercial harvest of peat and sphagnum moss. Hydrologic alteration caused the "well-documented extinction" of this species in Britain.

Lomatium roseanum **Adobe Parsley**

Description: Long-lived perennial usually over 10 cm tall. Root tuberous, thick. Flowers yellow, aging to whitish. Fruit only very narrowly laterally winged; dorsal ribs wingless.

Habitat: Loose, rocky habitat. Specifically: open, dry basalt talus stripes and scree fields overlying clay soils on gentle slopes in low sagebrush vegetation with *Artemisia arbuscula, Poa secunda, Elymus elymoides, Arenaria aculeata, Phlox* spp., *Erigeron linearis*, etc.

Elevation: 5,750 ft. to 6,175 ft.

Flowering Period: April-June Identification Period: April-June

Threats: No literature available.

Lupinus latifolius **var.** ***barbatus*** **Bearded Lupine, Klamath Lupine**
Description: Perennial forb arising from a stout stem (commonly several to many) 2 or more feet high. Flowers 8–10 mm, scattered, mostly pale. Ovules 6–7. Fruit 2–4½ cm, quite densely hairy. Seeds 3–4 mm, mottled dark brown.

Habitat: Mesic; wet, shady to open, sunny clay banks along streams and on the margins of meadows, within upper montane coniferous woodlands (CNPS; Jepson; Henderson; Hitchcock). Found in Lassen and Modoc Counties in California, and in Oregon.

Elevation: 4,925 ft. to 8,200 ft.

Flowering Period: June-July Identification Period: June-July

Threats: Threatened by grazing

Meesia triquetra **Three-ranked humpmoss**

Description: In small tufts or cushions. Plants acrocarpous, dioicous, often large, dark-green to grass-green above, occasionally red-brown below due to dense rhizoids. Stems not or little branched, pale-brown to yellow-brown, closely foliate, 2–14 cm high. Leaves decurrent, squarrose (spreading) when moist, triangular to ovate to lanceolate, somewhat crispate (contorted), 2–3½ mm long, tristichous (in three obvious ranks). Capsule asymmetrical, 2¾–5½ mm long including the neck. Spores finely papillose. Circumboreal distribution. Infrequently encountered

in California; most likely in relict habitats. Currently known on the Modoc NF from one location in the south Warner Mountains.

Habitat: Mosses of wetland sites, specifically, within wet woods in the wettest portions of extreme rich fens.

Elevation: 3,975 ft. to 9,000 ft.

Sporulating Period: unknown Identification Period: July-September

Threats: Rich fen habitat is easily modified; surface water chemistry of rich fens is sensitive to climatic and anthropogenic influences. Threatened by trampling from domestic stock.

Meesia uliginosa **broadnerved humpmoss**

Description: Plant autoicous. Stems 1–4 cm long, often branched. Leaves erect, linear to ligulate-lingulate, somewhat contorted when dry. Capsule up to 4 mm long including neck; neck long, often wrinkled when dry. Spores finely papillose.

Habitat: Fens, peaty soil banks, seeps, meadows, rock fissures upon exposed, damp down decorticated logs and organic soil within upper montane to subalpine coniferous forest. Specifically, upon calcareous substrates; usually in alpine or arctic regions, but occurring at lower elevations in rich fens. Circumboreal distribution with scattered occurrences in California. On occurrence has been found on the Modoc National Forest in the north Warner Mountains.

Elevation: 3,950 ft. to 8,550 ft.

Sporulating Period: October Identification Period: August-October

Threats: Trampling from livestock and hydrologic alteration

Ptilidium californicum **Pacific fuzzwort**

Description: Dioicous, small to medium-sized liverwort. Golden-green to golden, but more typically reddish-brown, can also be purplish-red, or coppery red, resembling a dense fuzzy mat, occurring in small or large patches. Leaves deeply bi-lobed; with underleaves prominent, wider than the stem but about or less than half the size of the leaves. Sporophytes abundant from May to August.

Habitat: This plant has a narrow environmental specificity: it is found in (and serves as an indicator species of) old-growth forest. It is typically epiphytic on bark at the base of standing mature to old-growth trees (*Abies concolor, A. magnifica*, and *Pseudotsuga menziesii*) or recently fallen logs; rarely on other organic substrates such as decaying logs and stumps, or humus covering boulders. At the southern end of its range (Oregon and California) this species is distinctly restricted to middle elevation forests; Survey and Manage). World-wide distribution with nar-

row environmental specificity. Uncommon in Northern California, found just west of the Modoc National Forest.

Elevation: 1,275 ft. to 5,725 ft.

Sporulating Period: May-August Identification Period: year-round

Threats: The survival of *Ptilidium californicum* in the southern end of its range (i.e., northern California) depends upon the protection of the known sites as dispersal sources (Christy). The major threat facing *P. californicum* is loss of popu-lations due to management activities that directly or indirectly impact the habitat or populations by disrupting stand conditions necessary for its survival. These include treatments such as: removal of colonized substrate, stand treat-ments that result in changes in microclimatic conditions or forest structure, or harvest of special forest products that may include individuals of this taxon. Spray paint used to mark 'leave,' 'take,' and 'wildlife' trees within project areas severely impact this species (Survey and Manage).

***Thelypodium howellii* ssp. *howellii* Howell's thelypody**

Description: *Thelypodium howellii* ssp. *howelli* is a waxy, biennial or annual 4 to 35 in. (1-9 dm) tall that is generally branched above the middle. The plant may be completely hairless, or have short, stiff hairs at the base. The inflorescence (flower cluster) is elongated and open. The flowers are lavender to purple with a greenish base. The seeds are plump.

Habitat: Open wet to dry meadows and flats, pastures, moist alkaline soils, swamps, sandy banks, river valleys, and at the margins of ponds and lakes. Found in California, Oregon, and Washing. Known in California from fewer than twenty occurrences. Endangered in Oregon. Occurrences noted in Lassen, Modoc, and Shasta Counties.

Elevation: 4,000 to 5,100 feet.

Flowering Period: May-July Identification Period: May-July

Threats: Grazing by livestock

Sensitive Species Effect Analysis Methodology

The Forest Service Manual (FSM) 2670.5 defines sensitive species as those plants and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers, density, or habitat capability that reduce a species existing distribution.

The management direction for sensitive species as outlined in FSM 2670.22 is in part, to ensure that species do not become threatened or endangered because of Forest Service actions, and to maintain viable populations of all native species.

The sensitive species evaluated in this supplement may have the potential to occur in treatment areas. Because it is unknown if all of these species occur on the forest and limited surveys have been conducted, effects analysis will be based on the presence of potential habitat based on CalVeg (US Forest Service 1981). Design Standards to minimize or avoid effects to endangered, threatened or sensitive species include surveys for sensitive plants prior to treatment. Design Standards that benefit sensitive plants can be found in Chapter 2 of the FEIS and the Addendum (pg 14).

For a brief description of the alternatives and direct and indirect effects on Sensitive plants see Addendum to Botany Biological Evaluation for Modoc National Forest Noxious Weed Treatment Project (1/29/2006, pg. 6-14).

Noxious Weeds Targeted

No additional noxious weeds are targeted that apply to this supplement. For a complete discussion of species targeted see pg 14-15 of the Addendum to the Botany Biological Evaluation for Modoc National Forest Noxious Weed Treatment Project (1/29/2006).

Environmental Consequences of Action Alternatives

This section of the document will address environmental consequences of alternatives with respect only to the species identified within this document. No changes to the proposed actions or alternatives will occur, therefore, the discussion of treatment methods discussed in pages 15-28 of the Addendum to the Botany Biological Evaluation for Modoc National Forest Noxious Weed Treatment Project (1/29/2006) will be similar to the discussion of sensitive species evaluated in this supplement. All tables related to treatment methods, discussion on herbicide drift, Maximum Application Rates and offsite application rates for proposed herbicides in the FEIS and Toxicity Values (Table 8), Calculated Hazard Quotients (Table 9), and Risk Assessment for Herbicides Proposed in the FEIS (Table 10) will apply to this addendum and will not be duplicated within this document.

Direct, Indirect and Cumulative Effect for Species Evaluated in this Addendum.

Definitions:

Direct, indirect, and cumulative effects are defined in NEPA (40 CFR 1508.7 and 1508.8).

A direct effect "is caused by the action and occur at the same time and place."

Indirect effects "are caused by the action and are later in time or farther removed in distance, but are reasonably foreseeable. They may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."

A cumulative effect is "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future ac-

tions regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Direct, indirect, and cumulative effects for each alternative are discussed below for the 10 Sensitive species evaluated within this document and on the Forest.

Because these species were just added to the forest's sensitive plant list and no surveys have been conducted, potential habitat for these 10 species was derived from current literature, cross-linked to the Cal-Veg layer then intersected with known noxious weed locations. The number of noxious weed sites within 100 feet of these 10 sensitive plant habitats are presented in table 2.

Lack of fine-scale habitats within CalVeg results in a coarsely-defined sensitive plant potential habitat on the Modoc National Forest. For example, CalVeg does not have fen alliances, and therefore, habitat for sensitive plants that are obligate fen species had to be modelled using wet meadows, which includes some inappropriate or unsuitable habitat. Additionally, noxious weeds can thrive and persist in very broadly categorized habitats as well, and therefore, sensitive species and noxious weeds listed within table 2 represent a very coarse representation of potential sensitive plant occurrences/habitats and proximity and potential impacts from noxious weeds. Project Design Standards would be implemented to ensure sensitive plant potential habitat was surveyed for plants prior to treatment.

Table 2: Sensitive Plant Species With Potential Habitat Near Documented Noxious Weed sites.

Sensitive species	Number of noxious weed sites within 100' of potential sensitive plant habitat[1]	Number of noxious weed sites within 100' of potential sensitive plant habitat that may be treated with herbicides	Noxious weeds identified within 100' of potential sensitive plant habitat
Astragaluslemmonii	20	6	Scotch thistle, Mediterranean sage, Dyer's woad, crupina, Dalmatian toadflax, Canada thistle
Botrychium pumicola	2	2	Dyer's woad, Scotch thistle
Bruchia bolanderi	7	7	Scotch thistle, Canada thistle
Helodium blandowii	1	1	Canada thistle
Lomatium roseanum	5	5	Scotch thistle, Dyer's woad, Canada thistle
Lupinus latifolius var. barbatus	11	11	Scotch thistle, Canada thistle, Dyer's woad
Meesia triquetra	11	10	Scotch thistle, Dalmatian toadflax, Canada thistle
Meesia uliginosa	11	10	Scotch thistle, Dalmatian toadflax, Canada thistle
Ptilidium californicum	0	0	none
Thelypodium howellii ssp. howellii	67	13	Scotch thistle, Klamath weed, yellow starthistle, Mediterranean sage, Dyer's woad, Dalmatian toadflax, Canada thistle, Crupina

Direct Indirect and Cumulative Effects

Alternative 1 - No Action

Direct and Indirect Effects

For the "No Action" alternative, no weed treatments would take place under this FEIS. Therefore, sensitive plants would not sustain any direct physical damage due to weed management activities.

Indirect effects to this sensitive plant might result from noxious weeds competing for sunlight, minerals, water, and other resources. This competition could weaken native plants, and noxious weeds could eventually out-compete sensitive plants and take over sensitive plant habitat.

Cumulative Effects

Sensitive plant species may sustain possible future competition from noxious weeds. Without treatment of existing weed populations in the area around areas where these sensitive plants may exist, weeds would likely continue to colonize impacting the areas.

Alternative 2 - Proposed Action

Direct and Indirect Effects

Under the Preferred Action, physical methods such as hand pulling and use of hand tools, cultural methods such as seeding, and herbicides as listed in the FEIS could be used on currently identified noxious weed sites.

The removal of invasive plants using manual techniques (i.e. handpulling, digging with hand tools) could directly affect sensitive plants in situations where the invasives are co-located with these species. Direct negative effects would be unintentional injury to these species. These effects should be minimized with Design Standards in place and adequately trained field crews. These short-term impacts, if kept to a minimum in relation to population size, would be more than compensated by the long-term positive benefits of removal of aggressive, competitive noxious weeds. Manual control crews could potentially directly impact sensitive plants through trampling of individuals or creation of erosive conditions within or upslope of populations. These impacts may have a more long term negative impact, but again if minimized, the benefit to the species would be more positive than negative.

Herbicide impacts could only occur if sensitive plants are identified within known noxious weed sites. Design Standards stipulate that there would be no herbicide spraying within 50 feet of sensitive plants, although wicking can take place (DS-32), and no spraying in unfavorable weather conditions (DS-34). Since DS-34 also calls for ensuring that no herbicide droplets travel outside the drip zone from the target weed, vehicle-based herbicides would cause no direct effect on these 10 sensitive species if they occur within the identified weed sites. There is a potential that inadvertent trampling may occur to these 10 sensitive plants, however, Design Standard – 01 provides for site specific surveys to be conducted prior to implementation of project activities, and any sensitive plants present could be avoided.

Impacts of invasive species to lichens, bryophytes, and fungi is not widely documented in the literature, likely due to taxonomic problems, lack of experts, the small size and intermixing of taxa in the field and the life history and variation of species. It is however, widely recognized that alteration or loss of habitat resulting from invasive species infestations likely would affect these species. Unknown effects from herbicide treatments are possible. Treatment of common bryophytes and lichens with glyphosate and triclopyr indicated loss of species abundance and richness in northwest Ontario 2 years post treatment

(Newmaster et al. 1999). However, bryophytes and lichens show species-specific responses to herbicides. Colonists and drought-tolerant species are somewhat resistant even when subjected to twice the normal application rate. And recovery of these species via the soil spore bank or spore dispersal from local refugie needs further investigation (Newmaster et al. 1999).

Indirect negative impacts from manual control could be attributed to soil disturbance. This could cause shifts in microsite condition such as reduction in soil moisture, disruption of mychorrhizal associations and cause an increase in surface temperatures. All of these indirect effects could lead to a shift in species composition away from the native community upon which listed plants depend, however, this is unlikely. One possible scenario is that the removal of one invasive species would encourage another invasive to take its place through various means of introduction (e.g. windblown seeds, human transport, breaking dormancy of other species seeds). It is likely that these impacts would occur at a small scale (less than 1 acre patches or scattered in small patches across an area) and follow-up monitoring of the treated sites and additional treatments or restoration methodologies would likely reduce negative impacts. The implementation of cultural methods (DS-20: Areas with bare soil resulting from noxious weed treatments that are greater than ¼ acre in size will be assessed for need for rehabilitation, and, DS-21: Areas with bare soil created by the treatment of noxious weed, the site would be evaluated for rehabilitation.) would help to reduce the potential of this happening in the future.

Positive benefits from the removal of the invasive species overshadows the indirect negative impacts. Sensitive plant populations would be affected positively by providing the space for increased growth in population size. One possible scenario is that removal of invasives will encourage native seed dormant in the soil to germinate due to less competitive conditions. Dremann and Shaw (2002) documented the success of converting live oak woodland from 99 percent exotic species cover to 85 percent native plant cover through a strategy of timed manual/mechanical removal that released the native seed bank. No reseeding was necessary

Cumulative Effects

Present and reasonably foreseeable future actions will continue to provide opportunities for invasive species to establish. Roads will continue to be a major conduit for invasive plants. Forest Service projections suggest that recreation uses of National Forests will continue to increase. Other land management and use activities such as grazing, vegetation management, fuels management (Healthy Forest Initiative), and fire suppression will continue to cause ground disturbances that can contribute to the introduction, spread and establishment of invasive plants on National Forest system lands (USDA, 2005).

While past activities may have contributed to the impact on these newly added sensitive species forest wide, neither the pre-disturbance condition nor previous sensitive species occurrences are known. Therefore, the baseline for comparison of effects to these sensitive plants is the current *inventory (which at this time is two known sites for Bruchia bolanderi, and one each for* Meesia triquetra and *M. uliginosa*, and zero for all other species evaluated in this document). While some adverse effects to future identified sensitive plants and their habitat are possible from treatments they are unlikely to be significant because the extent and threats posed by treatment are generally very small compared to the known range of sensitive species habitats forest-wide. Project design standards mitigate known risks and the monitoring and adaptive management plans would ensure uncertain risks are also mitigated.

<u>Alternative 3 –</u>

Direct and Indirect Effects

Under this alternative only physical methods such as hand pulling and hand tools can be used. Cultural methods such as reseeding with native seed is also allowed. Direct and indirect effects would be the same as described in Alternative 2 for impacts from physical and cultural methods.

No impacts from herbicide treatments would occur with this alternative.

Cumulative Effects

Cumulative effects would be the same as those discussed in Alternative 2, however, the potential for noxious weed to spread into sensitive plant habitat is likely to be considerably higher due to the lower effectiveness of treatments used with this alternative, especially for large infestations and those infestations of rhizomatous species.

Alternative 4 –

Direct and Indirect Effects

Alternative 4 is the similar to Alternative 2, however; it also proposes the use of early detection rapid response (EDRR) techniques to treat future unknown noxious weeds on the forest. Project design standards that require sensitive plant surveys prior to treatment in identified habitat (DS-01) as well as design standards to protect sensitive plant occurrences would be implemented. Direct and indirect effects would be the same as those discussed in Alternative 2.

Cumulative Effects

Cumulative effects would be the same as those discussed in Alternative 2; however, long-term benefits from EDRR would be higher because new noxious weed sites would be treated in a timelier efficient manner. For a complete review of EDRR effectiveness see Chapter 2 of the FEIS.

Alternative 5 –

Direct and Indirect Effects

Alternative 5 provides a non-herbicide alternative that contains the same physical methods as described in all other alternatives (hand pulling and use of hand tools – pulling grubbing, chopping, digging) but adds additional physical methods such as: clipping by hand, weed eaters, and mulching. Goat grazing is proposed on >4 and <25 acres for thistle. Early detection rapid response strategies are also proposed in this alternative using above stated methods. No herbicide use is proposed.

Direct and indirect effects would similar to those described in alternative 3. Additional potential effects from the added physical methods could be unintentional clipping or cutting of sensitive plant flower heads or plant parts which may impact vigor (reduction in photosynthesis ability) and/or subsequent decrease in reproduction potential (seed production). However, this is highly unlikely, as none of the sensitive species resemble any of the 14 noxious weed species. Mulching techniques have the potential to have negative effects on soil microorganisms and non-target species' seed viability in areas where treatments occur. Sensitive plant vigor could also be diminished by field crews trampling nearby plants. As with other alternatives these impacts should be minimal with properly trained crews.

Design Standards that require sensitive plant surveys prior to treatments in potential habitat would reduce most impacts and any short-term impacts would be more than compensated by the long-term positive benefits of removal of aggressive, competitive noxious weeds

Cumulative Effects

Cumulative effects would be the same as those discussed in Alternative 2; however, long-term benefits from EDRR would be higher because new noxious weed sites would be treated in a timelier, more efficient manner. For a complete review of EDRR effectiveness see Chapter 2 of the FEIS.

Alternative 6 –

Direct and Indirect Effects

Alternative 6 provides the opportunity to use three additional herbicide formulations not included in alternatives 2 and 4. This alternative also includes the additional manual treatment methods as described in alternative 5 as well as EDRR strategy.

Direct and indirect effects would similar to those described in alternative 5 for the added non-herbicidal methods and effects described in alternative 2 for herbicidal treatment effects.

Cumulative Effects

Cumulative effects would be the same as those discussed in Alternative 2 and Alternative 5, however, long-term benefits from EDRR and the addition of more herbicide choices that target and effectively treat specific noxious weed would be greater because new noxious weed sites would be treated in a timelier, more efficient manner. For a complete review of EDRR effectiveness see Chapter 2 of the FEIS.

Determination statement

It is my determination that implementing the Preferred Alternative and Design Standards "may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species" of all 10 sensitive plant species analyzed in this document.

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Appendix A

File Code: 2670 **Date:** July 27, 2006
Route To:

Subject: 2006 Sensitive Plant Species List

To: Forest Supervisors

Enclosed is the FY06 Revision of the Regional Forester's List of Sensitive Plant Species. This supercedes all previous lists, and goes into effect as of October 1, 2006. Forest Service policy (FSM 2670.3) states that Biological Evaluations (BEs) must be completed for Sensitive Species, and signed by a journey-level biologist or botanist. The BE must be signed prior to any National Environmental Policy Act (NEPA) decision document. Projects with BEs signed prior to October 1, 2006 do not need to analyze effects to the newly-listed sensitive plant species. BE's signed after October 1, 2006, must include an evaluation of effects of proposed management actions on these species or their habitats occurring within the analysis area.

The National Forest Management Act (NFMA) requires the Forest Service to "provide for a diversity of plant and animal communities" [16 U.S.C. 1604(g)(3)(B)] as part of our multiple use mandate. For forests that have plans developed under the 1982 NFMA planning rule, we must maintain "viable populations of existing native and desired non-native species in the planning area" (36 CFR 219.19 Source: 47 FR 43037, September 30, 1982). The Sensitive Species program is designed to meet this mandate and demonstrate our commitment to maintain biodiversity on National Forest System lands. The program is our proactive approach to conserving species to prevent a trend toward listing under the Endangered Species Act of 1973, and to ensure the continued existence of viable, well-distributed populations.

Species on the Sensitive Species Lists are considered sensitive for every forest where they occur in the region. Forest level distribution information is included for clarity and ease of reference. Should a sensitive species or suitable habitat within the range/distribution for that species be located on a forest where it was not previously known to occur, the forest must inform the Regional TES Program Manager (animals) or Regional Botanist (plants) who will update the distribution section.

This revision of the Sensitive Plant Species List began with The NatureServe's Heritage Database rankings to ensure consistency in species included on the list across federal agencies nationally and locally, and between regions within each agency. The list is expected to be dynamic, with review and possible revision occurring on a five-year cycle to more accurately reflect the changing management situation. Complete criteria for the review process are included as electronic Enclosure #1 for these plant species. Botanists across the region contributed their time and expertise to the evaluation process. The revision would not have been possible without their efforts.

Evaluation forms are available for every species examined for potential inclusion on the list. To provide basic information supporting concerns for viability or trend toward federal listing for the

species, evaluation forms are available for all plants determined to be sensitive. Forests should already have copies of these forms for these plant species.

Forests have the option to establish a "Watch List" for plants. Several forests have already established such lists through their Forest Land and Resource Management Plans. These species do not meet all the criteria to be included on the Regional Forester's Sensitive List but are of sufficient concern that they should be considered in the planning process. To avoid confusion with CDFG's "Special Plants," we recommend the term, "Watch List." Watch Lists are dynamic and may be updated to reflect changing conditions and new information. The Watch List and supporting documentation should be retained in the planning file and considered during project planning. To analyze potential impacts to these species, consider the context, intensity, and duration of likely effects. Appropriate analysis may range from formal surveys to simple documentation of a lack of potential habitat. Do not incorporate analysis for the Watch List species into the Biological Evaluation, which is reserved for Sensitive Species.

For forests with plans developed under the 1982 NFMA planning rule, we will update the sensitive plants list on a five-year cycle. We will assist forests initiating their plan revision under the new planning rule by providing a database of all G1-3 ranked species and T1-3 ranked species. Regular updates to the Sensitive Species Lists and Forest Watch Lists are key steps in demonstrating our commitment to maintaining biologically diverse and healthy ecosystems. I commend you for the efforts you have made in compiling the information to make this revision possible.

If you have any questions, you may contact Art Gaffrey, Director, Ecosystem Conservation, at (707) 562-8719, or Diane Ikeda, Regional Botanist, at (707) 562-8938.

/s/ Beth G. Pendleton (for)
BERNARD WEINGARDT
Regional Forester

Enclosures

cc: Chris Knopp
Diane Ikeda
Diane Macfarlane

Appendix S3:

Botanical Report

Appendix S3.1: Botanical Report

File Code: 2600, 2080

Date: December 23, 2002

To: Irene Davidson - Interdisciplinary Team Leader

Subject: Botanical Report - Modoc National Forest Noxious Weed Control Project

INTRODUCTION

Botanical Review for the proposed Modoc National Forest Noxious Weed Control Project has been completed. The review process for this project included a Prefield Review for Threatened, Endangered, and Sensitive (TES) plants. Previous survey work discovered many of the weed locations proposed for treatment. Surveys for TES plants have been accomplished in many areas across the Forest for a variety of projects. Many of the proposed treatment sites remain without TES surveys.

MANAGEMENT SPECIES

As defined here, Management Species include those for which management requirements have been specifically defined through the Threatened and Endangered Species Act of 1973, the Sierra Nevada Forest Plan Amendment, or other Forest Service direction. These species include TES, Watch List and Noxious Weeds. In addition to summarizing the Biological Evaluation and Noxious Weed Risk Assessment, this report addresses Watch List species.

THREATENED AND ENDANGERED PLANTS

A biological assessment would be prepared if threatened or endangered plant species were suspected in the project area. One Threatened species, Orcuttia tenuis is suspected to occur on the Modoc National Forest. This species is found near vernal pools or vernal pool like drainage edges usually in oak and/or pine woodlands. During review it was determined that no habitat for this species occurs within the proposed treatment areas, therefore these activities will have “No Effect”. No Endangered plant species are suspected or known to occur on lands administered by the Modoc National Forest, therefore proposed activities would have “No Effect” on these species. No Biological Assessment will be prepared for this project.

SENSITIVE PLANTS

Surveys for Threatened, Endangered and Sensitive (TES) plants have been conducted in many areas across the Modoc National Forest. Although surveys are not complete in all proposed treatment areas, sufficient analysis of the risks to TES plants can be accomplished with current information. Even though they may exist, there are no known instances where sensitive plants and noxious weeds occur in such close proximity that the proposed control measures would impact the sensitive plants.

Both the Proposed Action and the No Action alternatives may affect sensitive plants, but in different ways. The effect from the Proposed Action will be that some sensitive plants may be

directly damaged or even killed by the weed control activities, but preventing further spread of the weeds will ultimately have a beneficial effect. Not implementing weed control activities may affect sensitive plants indirectly, resulting in high competition from the weeds and possible loss of individuals, occurrences or susceptible populations.

EFFECTS ANALYSIS

Proposed Action

DIRECT EFFECTS

Surveys are not complete throughout the proposed treatment areas; therefore it must be assumed that some undiscovered sensitive plant occurrences exist. Effects to undiscovered occurrences can be addressed without further surveys.

Sensitive plants may be damaged or killed by grubbing, digging and pulling noxious weeds, but only if the plants are interspersed with the weeds. In the same regard, chemical treatment may also damage or kill sensitive plants. There are no known situations on the Modoc National Forest where A, B or C rated noxious weeds are actually growing this close to sensitive plants, but it is possible. If the situation were known to exist, appropriate control measures, including possible chemical treatment, would still be recommended for the benefit of the sensitive species. Some plants may be damaged by foot traffic and vehicle traffic as workers access the sites. Overall, direct effects may initially have a negative impact on a small portion of sensitive plant occurrences.

INDIRECT EFFECTS

If sensitive plants are in close proximity to treatment sites, the indirect effects of both physical and chemical treatments will be that of decreasing competition and lessening the chance of possible future site conversion from the more aggressive and competitive noxious weeds. When the weeds are removed, essential resources (water, space, sunlight and nutrients) will be more readily available to the sensitive plants that remain. A weed-free site is more likely to be re-colonized by the sensitive plants. Even the “sacrifice” of a few individuals in a sensitive plant population in order to eradicate or limit the spread of an advancing noxious weed is ultimately a beneficial action for the sensitive species.

CUMULATIVE EFFECTS

Other projects planned for the Modoc National Forest will be impacting a portion of sensitive plant populations and habitat. Some of the current project proposals and continuing actions are Blue Fire Restoration, Hackamore Thinning, herbicide application in Long/Damon area, Modoc Complex Fire Restoration, and prescribed fire programs. In addition, livestock grazing will go on throughout the range of most of the suspected sensitive plants, and effects from herbivory and trampling will continue. Recreational activities may impact some sensitive plants, the most severe effects arising from unregulated OHV use. The current proposal is to treat only A, B and C rated noxious weeds. Other noxious weeds, as well as other aggressive non-native plants, do exist throughout the Forest and have been documented in some sensitive plant occurrences. These other weeds (two examples are medusahead and cheatgrass) will continue to affect sensitive plants by competing for resources.

Natural disturbances, such as wildfire, drought, flooding, and natural erosion processes will continue, with varying effects. Iliamna bakeri will be rejuvenated from wildfire; Calochortus longebarbatus var. longebarbatus populations will fluctuate with drought and wetter conditions; our annual sensitive plants, Mimulus evanescens, Phacelia inundata, Pogogyne floribunda, and Polygonum polygaloides ssp. esotericum, will experience population swings in response to varying climatic conditions. At this time, there is no evidence that these cumulative effects,

coupled with effects from the current proposal, will cause a downward trend for any of the sensitive plants.

No Action

DIRECT/INDIRECT EFFECTS

Without active noxious weed control, the weeds will continue to spread unchecked. Prevention measures, such as equipment washing and restricting access to infested sites, will be implemented as projects occur, but there will be no control measures. The existing weed sites will expand and spread to new areas by wind, vehicle traffic, animal movement and other means. Because of their competitive advantage, when the weed sites are already near or within sensitive plant occurrences, the weeds can be expected to displace sensitive plants within the reasonably foreseeable future (10-20 years). Over a longer period of time (30+ years), entire sensitive plant occurrences could be lost, the plants not able to effectively compete for the limiting resources of water, space, sunlight and nutrients. As the noxious weeds spread to new areas, additional sensitive plant occurrences would be affected.

Are these effects severe enough to cause loss of viability to sensitive plant populations or to cause a trend toward federal listing? Certainly, some occurrences could be lost, and given enough time (50-100 years or more of no noxious weed control), it is reasonable to assume that some sensitive plant populations could lose viability and eventually be lost. Especially at risk are those species that occur only at one or very few sites, with a low number of plants, and exist in sites that are susceptible to weed invasion. Species with these criteria are Botrychium ascendens, Mimulus evanescens, and Rorippa columbiae. These species are not likely to lose population viability from noxious weed invasion in the next 10-20 years, but as time goes on and there is no attempt to actively control the weeds, there will come a time when it will become likely that these populations will lose viability from the effects of weed competition. Loss of population viability in the long term is not likely for the remaining sensitive plants, which occur in larger numbers, at several locations, and/or in habitats that are less susceptible to weed invasion. My determination for this project is based on the relatively short time frame of the lifespan of a NEPA decision (<10 years).

CUMULATIVE EFFECTS

Effects from other management activities and natural processes are the same as described above for the Proposed Action. With the No Action Alternative, these effects will contribute to a somewhat faster rate of spread for the noxious weeds. For instance, weed seeds will be carried to new sites by continued livestock grazing, recreational OHV use and everyday vehicle traffic on roads.

DETERMINATION

Proposed Action

It is my determination that implementation of the Proposed Action “may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the populations or species” for all 19 Modoc National Forest sensitive plants.

No Action

It is my determination that Implementation of the No Action alternative “may affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species” for all 19 Modoc National Forest sensitive plants.

Table 1: Sensitive Plant Summary of Determinations

Sensitive Species Suspected on the Modoc NF	Common Name	ProposedAction	No Action
Astragalus anxius	Ash Valley milkvetch	MAIH	MAIH
Astragalus pulsiferae var. suksdorfii	Suksdorf's milkvetch	MAIH	MAIH
Botrychium ascendens	upswept moonwort	MAIH	MAIH
Botrychium crenulatum	crenulate moonwort	MAIH	MAIH
Botrychium lineare	slender moonwort	MAIH	MAIH
Botrychium montanum	western goblin	MAIH	MAIH
Calochortus longebarbatus var.	long-haired star tulip	MAIH	MAIH
Cypripedium montanum	mountain lady's-slipper	MAIH	MAIH
Eriogonum prociduum	prostrate buckwheat	MAIH	MAIH
Eriogonum umbellatum var. glaberrimum	green buckwheat	MAIH	MAIH
Galium glabrescens ssp. modocense	Modoc bedstraw	MAIH	MAIH
Galium serpenticum ssp. warnerense	Warner Mountains bedstraw	MAIH	MAIH
Iliamna bakeri	Baker's globe mallow	MAIH	MAIH
Ivesia paniculata	Ash Creek ivesia	MAIH	MAIH
Mimulus evanescens	ephemeral monkeyflower	MAIH	MAIH
Phacelia inundata	playa phacelia	MAIH	MAIH
Pogogyne floribunda	profuse-flowered pogogyne	MAIH	MAIH
Polygonum polygaloides ssp. esotericum	Modoc County knotweed	MAIH	MAIH
Rorippa columbiae	Columbia yellow cress	MAIH	MAIH

NE = No effects

MAIH = May affect individuals or habitat, but will not likely contribute to a trend towards federal listing or loss of viability to the population or species.

WAIFV* = Will affect individuals or habitat with a consequence that the action may contribute to a trend towards federal listing or loss of viability to the population or species.

* Trigger for a Significant Issue as defined in NEPA

WATCH LIST PLANTS

Watch list species have been thus categorized because they do not meet all the criteria to be included on the Regional Forester's Sensitive List, but are of sufficient concern that we need to consider them in the planning process. These include species that are locally rare (as opposed to declining throughout their range), are of public concern, occur as disjunct populations, are newly described taxa, or lack sufficient information on population size, threats, trend or distribution. Such species make an important contribution to forest biodiversity and are addressed as appropriate through the NEPA process. To better identify these species, Forests have been encouraged to develop "watch lists" of species. These watch lists are dynamic and updated as the need arises to reflect changing conditions and new information. The creation of the sensitive species and watch lists are key steps in meeting our commitment as an agency to maintain biologically diverse and healthy ecosystems (CNPS Inventory, 2001).

Three watch list species are known to exist within 300 feet of proposed weed treatment sites. Gratiola heterosepala, Bogg's Lake hedge-hyssop, exists near two proposed treatment sites for Scotch thistle. Potentilla newberryi, Newberry's cinquefoil, exists near one proposed treatment site for Canada thistle. Scutellaria galericulata, marsh skullcap, is documented about 200 feet from another proposed treatment site for Canada thistle. Undiscovered occurrences of watch list plants may be present near proposed weed treatment sites. The effects to these watch list species will be similar to those described for sensitive plants. There is a small chance that some individuals will be affected, but viability of populations will be maintained.

NOXIOUS WEEDS

The risk assessment process has eight factors to consider when analyzing projects. A matrix was used to look at pre-existing conditions in the planning area and to consider factors generated by the implementation of the proposed action. Details of the assessment are found in the Noxious Weed Risk Assessment document in the project file.

Noxious weeds are present in and near the planning area in locations that have been previously disturbed by human activity. Species found during field surveys and those present nearby or along access routes are listed in Table 1 below. All plants listed in this section have the potential to dominate and out-compete native or other desirable species.

Table 2: Noxious Weed Species

Common Name	Scientific Name	State Rating	Extent of Infestation
Crupina	Crupina vulgaris	A	1 site
Dalmatian toadflax	Linaria dalmatica	A	10 sites
Diffuse knapweed	Centaurea diffusa	A	11 sites
Musk thistle	Carduus nutans	A	12 sites
Plumeless thistle	Carduus acanthoides	A	1 site
Scotch thistle	Onopordum acanthium	A	329 sites
Spotted knapweed	Centaurea maculosa	A	13 sites
Squarrose knapweed	Centaurea squarrosa	A	3 sites
Wavyleaf thistle	Cirsium undulatum	A	1 site
Canada thistle	Cirsium arvense	B	25 sites
Dyer's woad	Isatis tinctoria	B	56 sites
Mediterranean sage	Salvia aethiopis	B	23 sites
Tall whitetop	Lepidium latifolium	B	1 site
Klamathweed	Hypericum perforatum	C	3 sites
Yellow starthistle	Centaurea solstitialis	C	8 sites

Seven of the eight factors were rated and a risk level was assigned to each factor. When the assessment for this project was completed it had three high risk, one moderate risk and three low risk factors. The final factor is an overall rating based on the rated factors.

Mitigation Measures

For this project, prevention is very important for reducing the risk of noxious weed spread. OHV use is the only factor related to this project that carries significant risks for introducing or spreading weeds. Specifically, the risk is the possible transport of weed parts or seeds into the project from areas previously traveled, and transport of weeds out of the area. The following mitigation measures will be applied during project implementation.

The Proposed Action includes a specific prevention measure for the control of noxious weeds.

OHVs will be clean before initial entry into a treatment area, so that no mud or other debris that could carry weed seeds remains attached to the equipment. The equipment will be visually

inspected and attached mud or debris that could carry weed seeds will be removed at the treatment area before moving to a new site.

Table 3: Risk Assessment Summary

Factors	Current condition	Risk
Weed spread factors not connected to Proposed Action (pre-existing circumstances)		
1. Inventory	Complete	Low
2. Known noxious weeds	Present	High
3. Habitat vulnerability	Previous disturbance, low cover	High
4. Vectors unrelated to proposed project	Existing roads, livestock	Moderate
Weed spread factors related to the Proposed Action		
5. Habitat alteration expected as a result of the project	Limited ground disturbance	Low
6. Increased vectors as a result of project implementation	Occasional use of off-road equipment	Low
7. Mitigation measures	Implement all relevant mitigation measures	Low
Overall assessment of Risk for Project Numerous High risk factors = High overall risk Few High risk factors = Moderate overall risk No High risk factors = Low overall risk		
Anticipated weed response to proposed action		Moderate
Comments: Two factors remain at high risk – Presence of high priority weed species, and high habitat vulnerability. With mitigation measures implemented during the project the risk is lowered, but the project still carries a MODERATE risk for increasing the spread of noxious weeds.		

NOXIOUS WEEDS EFFECTS ANALYSIS

No Action (Prevention Measures allowed, but No Control Measures)

DIRECT/INDIRECT EFFECTS

This alternative would not implement noxious weed control measures. Prevention measures would still be employed as appropriate for all Forest activities. No direct effects to noxious weeds would occur. By not actively controlling noxious weeds, currently known weed sites would be allowed to regenerate themselves and spread to new areas. Weed seeds that may not have been produced if control measures were implemented would then be available for dispersal to new sites. The methods of dispersal vary by species. Seeds are carried to new sites by vehicle traffic (both on and off-road), wind and animals. Several weed species, including diffuse knapweed, Mediterranean sage, form a somewhat round structure (similar to tumbleweed) that can be tumbled by the wind for long distances, scattering seed along the way. Eventually, healthy native plant communities would be infiltrated. Even now, a significant effort is required to keep the advance of noxious weeds in check, much less to actually eradicate them. If they are allowed to spread further into the various plant communities across the Forest, that effort will be multiplied.

CUMULATIVE EFFECTS

Modoc County Agricultural Department (County) has a treatment plan for treating noxious weeds in the county. Their first priority is to treat State of California "A" rated species. Some noxious weed species, such as Yellow Starthistle are "C" rated species but are not predominant in the County and are also treated, to eradicate them from the County. Under an agreement with the Modoc National Forest, the County has treated Scotch thistle, Dalmatian toadflax, dyer's woad and knapweed occurrences on National Forest Land in the past. These treatments will no longer be allowed with the selection of the No Action alternative. Some of the gains from past treatments will be lost in a few years of unchecked weed seed production.

Many projects carrying a risk of noxious weed spread are currently being implemented across the Forest. These include timber management actions (site preparation, planting, thinning, harvesting), prescribed fire, juniper removal and aspen enhancement projects, wetlands creation and maintenance programs, and recreational development and site maintenance. Ground disturbance creates exposed soil and decreases native plant cover. Noxious weeds colonize these disturbed areas easily. Equipment can move soil containing weed seeds from one area to another. Increased traffic along access routes gives weeds an additional opportunity to spread along roads. Even with preventive measures incorporated into project design and implementation, all of these activities create disturbed conditions that are more vulnerable to weed establishment, and all may still provide dispersal routes for hitchhiking weed seeds.

Grazing occurs across most of the Forest. The effects of grazing include vegetation trampling, herbivory, and potential for weed spread from their movements. Seeds and plant parts can become lodged in their hooves and hair and be distributed anywhere the cows move in an area. For the most part, livestock do not eat noxious weeds. When the desired plants at a site are grazed, their competitive ability is decreased, giving a further advantage to noxious weeds. When cows congregate, they can cause damage to vegetative cover. The resulting disturbed soil provides a good place for noxious weeds to establish. Livestock may not only spread noxious weeds within their allotments, they can bring weeds with them when they arrive and take weeds with them when leaving the Forest. This can then increase weed occurrences in the county and in other areas of the Forest.

With the exception of the County weed treatments, all of the above activities will likely continue into the foreseeable future and will likely result in the establishment of new noxious weed sites.

Proposed Action (Implementation of Physical and Chemical Treatments)

DIRECT/INDIRECT EFFECTS

Noxious weeds will be killed (treated) in this alternative. As with the No Action alternative, prevention measures will be implemented. Control of the spread and production of seeds is the key to weed management for most of our noxious weeds. Only a portion of the sites will be treated each year, so seed production will continue at the untreated sites, adding to the seed bank in the soil. When a weed site is treated the plants will be killed, but seed will remain in the soil and will germinate and grow in future years. Repeated treatments over the course of many years are required to eradicate weed populations. Persistent efforts, effectively killing the plants or at least preventing seed production, will eventually deplete the seed bank in the soil. Skipping even one year of treatment will allow the weeds to replenish the seed bank, adding years to the time required for eradication.

It soon becomes apparent that eradication of all noxious weeds is not a feasible goal. Particular sites may be targeted for eradication efforts, but the main strategy must be to set a realistic goal of preventing the spread of the existing weeds. Control, rather than eradication, means that treatments will prevent or reduce seed production some years, but not every year. Limited

funding and resources for accomplishing weed control restrict the number of sites that may be treated. Without an army of weed warriors battling the spread of these well-adapted plants, it becomes clear that even stopping the increase of weeds is not attainable. So, our real goal is to slow the spread of these invasive plants.

The control of perennial noxious weed species requires more than preventing seed production. Our perennial noxious weeds proposed for treatment are Canada thistle, Dalmatian toadflax, Klamathweed, tall whitetop, spotted knapweed, squarrose knapweed, and wavyleaf thistle. Except the two knapweeds, these all reproduce by creeping rootstocks in addition to seed. Hand-pulling alone will not effectively control well-established populations of these plants, so chemical treatments are often recommended. Continued treatments, even if not done every year, will slow the spread of the weeds.

CUMULATIVE EFFECTS

The effects of ongoing actions and those of the foreseeable future are the same as described for the No Action alternative, with one exception. Physical and chemical treatments will be allowed; the work will be performed by the County, private contractor or Forest Service personnel. Continuing to control the weeds at these sites would maximize the benefit of previous treatments.

Prepared by: _____ Date: _____

Bruce Davidson, Botanist

Appendix S3.2: Botanical Report Addendum

Addendum to the Botanical Report for Modoc National Forest Noxious Weed Treatment Project

Modoc National Forest, California

5/23/2006

Summary

The USDA Forest Service, Modoc National Forest proposes to treat noxious weeds on the Forest.

A Biological Assessment (BA) has been prepared for threatened and endangered plant species suspected or occurring within the project area. *Orcuttia tenuis*, slender Orcutt grass, a Threatened species, occurs on the Forest. This species is found near vernal pools or vernal pool-like drainage edges. No Endangered or Proposed plant species are suspected or known to occur on lands administered by the Modoc National Forest.

A Biological Evaluation (BE) had been prepared for Forest Sensitive plant species in 2002, and an Addendum updated that report in 2006. A Botany Report had been prepared in 2002 which summarized the 2002 BE and 2002 Noxious Weed Risk Assessment, and addressed watchlist species. This report updates the information on watchlist species and evaluates the effects of the Noxious Weed Treatment Project on diversity of native plant communities and diversity of native plant species on the Modoc National Forest. This information is based on the Forest rare plant GIS layer and reports, Project Design Standards, alternative descriptions in the Final Environmental Impact Statement, and the BE for this project.

It is my determination that:

- **Implementation of the Preferred Alternative and Design Standards as detailed in the Final Environmental Impact Statement for the Noxious Weed Treatment Project – will not adversely affect the viability of watch list plant species, diversity of native species, or diversity of native plant communities.**

Prepared by: Cheryl Beyer, Forest Botanist

This Addendum to the Botany Report presents an update of the Watchlist species and a discussion of the diversity of native plant communities and species. For a comparison of the actions in the Alternatives, please see Appendix B.

Watchlist Species Update

These species make an important contribution to forest biodiversity and should be maintained under the provisions of NFMA, and addressed as appropriate through the National Forest Policy Act (NEPA) process. Forests are encouraged to establish and maintain a "Watch List" of such species (Davidson 2002). These watch lists are dynamic and updated as the need arises to reflect changing conditions and new information. The creation of the sensitive species and watch lists are key steps in meeting our commitment as an agency to maintain biologically diverse and healthy ecosystems (CNPS Inventory, 2001).

A number of plant species reviewed for Regional Sensitive Species list revision did not meet the criteria to be included on the Region 5 List, but are of more localized concern and need to be considered in the planning process. These include species that are locally rare (as opposed to declining throughout their range), are of public concern, occur as disjunct populatins, are newly described taxa, lack sufficient information on population size, threats, trend, or distribution, etc.

Two watchlist species are known to exist within 50 feet of proposed weed treatment sites. The watchlist species that have a noxious weed site within 50 feet are Bogg's Lake hedge-hyssop and silvery false lupine, in the figwort and pea family, respectively.

Although these are the only sites currently known where watchlist species occur within 50 feet of a noxious weed, new sites could be found in the future. Given a conservative rate of spread of noxious weeds (10%), additional watchlist occurrences could be at risk for impact from noxious weeds. Under alternatives that contain Early Detection – Rapid Response clauses, new sites within 50 feet of watchlist species could be treated. Early Detection – Rapid Response treatments as proposed in Alternatives 4, 5, and 6 may occur at places not currently known, and may, in the future, affect other watchlist species or sites.

As shown in the Biological Evaluation, the Hazard Quotient (HQ) at 50 feet is below 1 for all herbicides except chlorsulfuron, which targets mustard (Brassicaceae) and pigweed (Chenopodiaceae) family plants. Only two watchlist species (Masonic rockcress and many-flowered thelypodium) are in the mustard family, and none in the pigweed family. Chlorsulfuron would most likely be used for Tall whitetop, a noxious weed usually occurring in moist to wet habitats. Neither of these two watchlist species occurs in that type of habitat.

Hazard Quotients are a way of estimating ecological risk. When the HQ is below 1, harmful effects are not likely. If the HQ equals 1, the contaminant alone is not likely to cause ecological risk. If the HQ is greater than 1, the harmful effects are likely due to the contaminant in question. Bogg's Lake hedge-hyssop (*Gratiola heterosepala*) exists near two proposed treatment sites for Scotch thistle at Emigrant Springs, DG036ONAC and DG037ONAC. Habitat for this watchlist

species is marshes and swamps (lake margins), vernal pools/clay. The Forest has 18 occurrences of this species, ranging in size from 2 to more than 10,000 individuals.

Silvery false lupine (*Thermopsis californica* var. *argentata*) exists near the proposed treatment sites for Dalmatian toadflax near Lava Lake, BV006LIDA. Habitat for this species is lower montane coniferous forest, and juniper woodland. This occurrence is located within an old timber sale (1957) in which the forest canopy has been removed and seeding of wheatgrass appears to have taken place.

Effects to watchlist species are similar to those addressed for Diversity of Native Plant Communities and Native Plant Species below. The Project Design Standards for soils, water quality, control of drift, the application methods proposed, and adherence to label instructions for herbicides will reduce herbicide effects to watchlist species. Please see "**Effects To Watchlist Species**" for full discussion of effects to watchlist species.

Discussion of Diversity of Native Plant Communities and Native Plant Species Diversity

Regulations written to implement the National Forest Management Act (NFMA) define diversity as "the distribution and abundance of different plant and animal communities and species within the area covered by a land and resource management plan" (USDA 1991). Diverse plant communities depend on a diversity of species. By maintaining vegetative diversity in a natural dispersion pattern and in sufficient amounts, the Forest can meet another regulatory obligation: to maintain viable populations of the Forest's animal species by providing suitable habitat conditions (USDA 1991).

Plant communities, as found in the Calveg GIS coverage, with the smallest acreage, on the Modoc NF, and therefore at greater risk of being lost (S.Smith, pers. comm. 2006), are those potentially associated with wetlands: Willow, Perennial Grass, Annual Grass-Forb, Wet Meadows, and Water (as named in the Forest GIS layer). A query of the Modoc NF GIS layer showed that no noxious weed occurrences are within the Willow or Perennial Grass communities. Tables that show what weed occurrences are found in wetland communities of Annual Grass-Forb, Wet Meadow, and Water, are located in Appendix A. The largest acreage is in Dalmatian toadflax (850.8 acres), which is listed in both the 'wet meadow' and 'water layers.' This occurrence of a noxious weed will have minimal treatment (treatment of the periphery) in Alternatives 5, and 6. However, overall loss of any particular plant community is not expected from treatments in any of the action alternatives. Loss of plant community would be more likely under climate change.

Continuous broadcast use of one herbicide or a combination will often select for plant species that have the greatest tolerance, say grass species if the herbicides target broad-leaf plants (http://wric.ucdavis.edu/yst/manage/management10.html). If this happens, species diversity could be reduced. However, in the action alternatives that use herbicides (Alternatives 2, 4, and 6), broadcast spraying is not an option. Application methods are by wick or directed spray treatment.

Additionally, 'continuous' spraying is not proposed in the FEIS. Therefore, the native plant diversity of the Forest will not be compromised in this regard from treatment by herbicides in this Project.

Population shifts through repeated use of a single herbicide may reduce plant diversity and cause nutrient changes. Thus, a variety of integrated treatments would most likely avoid adverse impacts to native plant diversity (USDA 2005). Alternative 6 is the alternative that is the most integrated, including both manual, cultural, and herbicide treatments; Alternative 6 includes the most variety of chemicals in the toolbox.

Broadcast of herbicides has the potential to shift species composition and reduce diversity of native plant communities, as less herbicide-tolerant species are replaced by more herbicide-tolerant species. However, broadcast is not a treatment method in this project. Certain herbicides and the methods by which they are applied have the potential to harm plant pollinators (USDA 2005). Please see Beyer (2006a).

In the absence of a healthy plant community composed of desirable species, one noxious weed may be replaced by another equally undesirable species (http://wric.ucdavis.edu/yst/manage/management10.html). Therefore, to encourage native plants to restock larger areas that have become bare ground due to noxious weed treatments, seeding of desirable species (plants native to the area, or sterile non-natives) may be done if a large area of bare ground is left after noxious weed treatment and if a nearby healthy native plant community is not available. See Design Standards tables that address bare areas in the Modoc National Forest Noxious Weed Treatment Project (e.g. DS-20)..

Invasive plants themselves threaten ecological diversity at varying scales by potentially changing the structure and function of native plant communities. Potentially, noxious weeds are creating monocultures where a heterogeneous landscape once naturally existed (USDA 2005).

Please see "**Effects to Native Plant Communities and Native Plant Species Diversity**" for a discussion of effects to native plant communities and native plant species diversity.

Effects To Watchlist Species

Alternative 1-No Action:

Direct and Indirect Effects: Identified noxious weeds can continue to grow and compete with watchlist plants for space and resources. New noxious weed species may become established and compete with watchlist plants. Noxious weeds that produce allelopathic substances (toxic chemicals produced that have a negative impact on other organisms) can prevent other plants, including watchlist plants, from growing in those locations. As weeds increase, there would be a corresponding increase in weed propagules, such as seeds and rhizomes that could continue to spread the infestations, further reducing plants, populations, and/or habitat of watchlist species.

Cumulative Effects: Natural events (fire, flood, drought, disease, insects, landslides, climate change) have affected watchlist plants in the past, and continue to do so. Where, normally, native ruderale plants would reinvade after a natural disturbance, and, gradually, later-stage seral natives, including watchlist plants, would move in, now noxious weeds, highly adapted to infesting disturbed sites, are just as likely to invade and take over these places, and change the conditions on those sites so that they remain inhabited primarily by the weeds themselves, not giving natives and watchlist plants an opportunity to grow or compete on the site.

The effects from many past actions may have affected watchlist plants and may continue to impact them. Roads, railroads and powerline construction and maintenance have created vectors or pathways where weeds may have found a route for infestation, in addition to the injury or removal of watchlist plants during those activities, such as when roads were created, plants may have been killed or injured. Not only have these vectors created conditions that may have allowed noxious weeds to invade, compete and spread along these corridors, but also these corridors may have isolated some native communities from one another by creating barriers such as habitat change -- open, dry and hot vs. shaded, moist, cool (such as a wide open swath for a powerline) -- across which some watchlist plants cannot easily share pollen, leading to possible long-range genetic problems in small populations of watchlist species.

Some past road maintenance had spread noxious weeds that were in the cinders and gravel of the borrow material, creating, in some cases, monocultures of weeds in place of native communities that may likely have included watchlist plants and other plants of diversity concern. This is especially true of medusahead, a C-rated noxious weed in Modoc County, which will not be treated as part of this project at this time. However, similar situations can occur with any weed that competes with native flora.

Fire suppression has allowed, in the past, for non-fire-adapted species to thrive, selecting against fire-adapted species. Past fire suppression and overgrazing most likely is one cause for the western juniper to invade native grasslands and sagebrush steppe, and changed these areas to juniper woodlands having little understory.

Canopy cover removal during past timber management and fuels reduction most likely has changed understory soil moisture and light conditions – possibly affecting some cool-forest communities and watchlist plants such as sphagnum (*Sphagnum* spp.). Only one small occurrence of sphagnum, a watchlist species, is known on the Modoc NF, occurring in the upper Lassen Creek area within a plantation. Plant communities and their accompanying species that require low light and moist soil may have subsequently been selected against in these places. Plantation-like conditions may have replaced more diversified native communities in some cases.

Road construction and trampling by cows, in the past, most likely has changed hydrologic function and connectivity of springs and seeps, drying habitat and causing enough change in plant communities dependant upon special aquatic features (such as peatlands) so that, where once these plants had habitat, this habitat no longer exists for watchlist plants such as sundew and sphagnum. Cow trails have in the past cut across watchlist plant habitat, trampling individuals and degrading habitat. Past actions of dam building, goosenest island construction, and dug-outs for watering holes and stock ponds have likely changed the hydrology in some cases. Subsequently, some vernal pool plant communities most likely may have been inundated, and others dried up, while vernal pool habitat may have been inadvertently created by other actions. Vernal pool plant watchlist species include Boggs Lake hedge hyssop, Downingia, and Newberry's cinquefoil.

Similar projects on the Forest may continue into the present to effect watchlist plants and habitat. Additionally, pile burning has the potential to sterilize the soil and kill the native seedbed, creating disturbed openings where weeds can invade and begin to disperse their propagules. Pile burning can also potentially eliminate the watchlist plant seedbank.

Effects of reasonably foreseeable future actions from projects that are on the schedule of proposed actions (SOPA) include plant community changes from the proposed sagebrush steppe ecosystem restoration project. This project covers a large area of the Forest, and plans are to revert back to a landscape less dominated by juniper. Grazing will continue on allotments on the Forest. Where critical aquatic features that support plant communities such peatlands and seeps are found within allotments, there is the potential for trampling, which can change micro-topography and subsequently alter the conditions on which a plant community may depend. Trampling has the potential to expose the organic soils; this may facilitate loss of these fine-textured soils via gullies created when cows inadvertently expose these soils to eroding processes, as in some moonwort habitat. (Common moonwort, *Botrychium simplex*, is a watchlist plant.) Watchlist plants of these habitats include sundew, moonwort, bog birch, sphagnum, and flat-leaved bladderwort.

Most likely, cows will continue to congregate in shady areas during hot summer months, including under trees or along creeks and at springs. This may lead to trampling and stressing native vegetation and degrading watchlist plant habitat in those areas. Many watchlist species grow in shady areas. Recreation (OHV, horseriding, hiking, camping), firewood gathering, and many other activities have the potential to affect watchlist plants and habitat by trampling,

spreading weed seeds, and picking or collection. In the long-term, this potential gradual degradation of native and watchlist plant communities and habitats could lead to loss of some of these species from the Forest. In the foreseeable future, however, it is unlikely that Alternative 1 would lead to a listing onto the sensitive list of any watchlist plant species on the Forest. This determination is based on the fact that none of these plants is rare enough to be on the sensitive list, which would be the first change in status before a plant is recommended for listing as Threatened or Endangered.

Alternative 2:

Direct and Indirect Effects: Alternative 2 would allow for an aggressive treatment program for noxious weed control. Reductions in occurrences of the treated weeds, and in size of the occurrences would be expected. Since new weeds and new or expanding occurrences would not be treated, the overall area occupied by noxious weeds on the Forest may actually be able to increase. If this happens, noxious weeds will most likely compete aggressively for resources with some watchlist plant species.

Production of weed propagules would be reduced on the sites treated, although there still would be viable noxious weed seed in the seedbank on termination of this 5-year program, as many weed seeds remain viable for years – up to 30 years for Scotch thistle. With the removal of competitive noxious weeds at the treated sites, watchlist plants and habitat could be enhanced in those areas.

Since herbicides are designed to kill plants, and, therefore, some damage to watchlist plant species is possible despite cautious planning and implementation. Some native plants, including watchlist species, may be injured or killed. Plants could also be damaged or removed during manual or herbicide treatment, either directly or indirectly, such as by trampling or exposing roots.

Herbicide spray, drift, runoff, leaching, or groundwater movement may result in mortality to individuals, reduce their productivity, or lead to abnormal growth patterns. For ground applications of herbicides, the closer the watchlist species is to the application site, the greater is the likelihood of damage. Specific Design Standards for the different alternatives address how close herbicide treatments can come to water and ephemeral pools. Soil Design Standards address sensitive soils. These Design Standards for water and soils should be sufficient to protect Boggs Lake hedge hyssop. Even if plants were injured or killed, in no case is this determined to lead to a listing of any watchlist plant species on the Forest.

During herbicide application, the level and extent of damage to watchlist plants depends, in part, on site-specific conditions, such as wind speed. Application instructions for each herbicide must be followed by the applicator, and can be found in the label directions. Herbicides can move off-site in water, soil and wind. Site-specific soil and water characteristics, as well as

herbicide formulation characteristics, affect this movement. Effects from herbicide movement are reduced by Design Standards (please see FEIS for a listing by alternative).

The potential to harm watchlist species is also dependent on herbicide characteristics. Herbicides vary as to their potency, selectivity, and persistence. These factors all play a role in how much harm can occur. Measures taken to limit exposure, such as application methods may reduce herbicide movement off-site.

Some bare ground may be exposed during manual treatments as the weeds are removed, and noxious weeds, since they are aggressive invaders, may again take over these bare places. Herbicide treatment is less likely to be ground disturbing, and thereby, less likely to exposing fresh soil for invasion.

New noxious weed species, and new and expanded sites, will not be treated in this alternative. This potentially leaves these weeds and locations as sources of weed plants and propagules that may compete with watchlist plants.

As noxious weeds are removed, natives, including watchlist plants, have the chance of replacing them, or natives may be reseeded at sites that are too large to reseed naturally in a timely fashion, before weeds again take over. These seeded species could potentially compete with watchlist species. However, care in choice of seed mixtures is part of the Design Standards.

Cumulative Effects:

There could be an additive cumulative effect to susceptible non-target species if herbicide use is repeated over time on the same site. This cumulative effect would be most likely where the treatment toolbox is most limited (as in Alternatives 2 and 4). However, this effect is generally only found where spray is broadcast, and the treatment methods in this project are directed spray and wick.

Over a five-year period, watchlist plants would have to compete less with noxious weeds, and noxious weeds would be less of a threat to watchlist plant habitat. After five years, if a new decision document to control noxious weeds is not approved, noxious weeds may again start to encroach on watchlist plant habitat.

Also, see Cumulative Effects under Alternative 1.

Alternative 3:

Direct and Indirect Effects: Alternative 3 would result in the reduction of some noxious weeds, and consequently reduction in competition with watchlist plants for a period of five years. However, only non-rhizomatous weeds would be treated, and, therefore, the rhizomatous species (for example, canadian thistle or dalmatian toadflax) would continue to grow - possibly expanding in occurrence size - and produce propagules that could spread those weeds.

No Early Detection – Rapid Response Strategy would be included in this alternative, and therefore new sites, expanded sites, or new noxious weeds would not be treated, allowing for

untreated expanding noxious weed infestation, and most likely, additional competition to watchlist plants.

Some bare ground may be exposed during manual treatments as the weeds are removed, and noxious weeds may again invade these bare, disturbed places. Or, as noxious weeds are removed, natives have the chance to replace them, or may be reseeded at some sites.

Some native plants, including watchlist species, may be injured or killed by the treatment methods either directly or indirectly, as by trampling or inadvertent mechanical injury.

Cumulative Effects: Manual treatment of noxious weeds could create more disturbed ground that is prime habitat for aggressive noxious weeds. Unless this project is continued to outlast the seedbank, and desirable species seed in naturally or from cultural treatments, these areas could become dense weed patches upon termination of the project, effectively keeping out watchlist species.

Rhizomatous noxious weeds would continue to grow and occurrences may increase in size. New sites and expanded sites may continue to grow unimpeded and new noxious weeds that invade would be allowed to grow and infest the Forest. Weed seedbanks will not be treated, and these may be a continuing source of noxious weeds. Noxious weeds would most likely continue to compete with watchlist plants. Also, please see Cumulative Effects under Alternative 1.

Alternative 4:

Direct and Indirect Effects: Alternative 4 provides for aggressive treatment of noxious weeds, utilizing a wide range of treatment methods. All known noxious weed infestations, including rhizomatous species, will be treated by herbicide or manual methods. This alternative would be in effect for 10 years, instead of the 5 years of Alternatives 2 and 3, and therefore, the chances for complete removal of occurrences of noxious weeds would be more likely, especially for smaller infestations. Early Detection – Rapid Response Strategy would allow treatment of the same weeds with the same treatments on new sites or sites that have expanded, which will provide more effective treatment, and could result in the complete removal of many sites of the 14 known noxious weeds.

As noxious weeds are removed, watchlist plants have the chance to replace them, if the habitat is appropriate. Watchlist plants and habitat would be enhanced by this alternative. Some watchlist plants may be injured or killed by the treatment methods, both manual and herbicide, either directly or indirectly. Please see Direct Effects under Alternative 2.

Cumulative Effects: Due to the aggressive noxious weed treatment, overall noxious weed infestations will diminish across the Forest, which would improve the situation for watchlist plants that are competing with those species. Only the largest occurrences of rhizomatous species may still have plants at the end of 10 years.

Manual treatment of noxious weeds could potentially create more disturbed ground -- prime habitat for aggressive noxious weeds. Unless this treatment is continued to outlast the seedbank, these areas could become dense weed patches upon termination of the project in 10 years, and provide a new flush of competition with watchlist plants several years later.

Weed seedbanks will not be treated, and these may be a continuing source of noxious weeds. Also, please see Cumulative Effects under Alternative 2.

Alternative 5:

Direct and Indirect Effects: Alternative 5 would result in the reduction of some noxious weeds, with the accompanying reduction in competition to watchlist plants and degradation of their habitat. However, two large infestations – one of Dyers woad and one of common crupina – will not be treated. Watchlist plants within those two infestations may experience reduced vigor, and their habitat may become degraded. This alternative would be in effect for 10 years, instead of the 5 years of Alternatives 2 and 3, and therefore, the chances for complete removal of occurrences of noxious weeds would be more likely, especially for smaller infestations.

Only small infestations of non-rhizomatous weeds would be treated, and, therefore, the larger occurrences of rhizomatous species would continue to grow - possibly expanding in occurrence size - and produce propagules that could spread those weeds. Rhizomatous noxious weeds that have not been eliminated completely would be expected to re-infest areas, and possibly come back in denser stands, competing aggressively with any watchlist plants.

Manual treatments have been found to stimulate the roots of rhizomatous species, and even the small occurrences treated in this alternative, unless treated persistently over a long time, may not effectively control or eliminate these species, providing no relief if watchlist plants are nearby.

New sites and expanded sites and new noxious weeds can be treated in this alternative through Early Detection – Rapid Response Strategy. This will eliminate any increase in competition to watchlist plants from new information. It is unknown what new sites might be discovered under Early Detection – Rapid Response Strategy. It has been determined that none of the alternatives in this project would cause a listing of any of the watchlist species. This determination is based on the fact that none of these plants is rare enough to be on the sensitive list, which would be the first change in status before a plant is recommended for listing as Threatened or Endangered.

No effect to sensitive plants is expected from treatment of noxious weeds by goat grazing. Grazing will be limited, and fences and herders will control the goats.

Also, please see Direct and Indirect Effects for Alternative 3.

Cumulative Effects: The large untreated sites could become a source for many, new satellite sites if careful, annual inventory is not performed. Manual treatment of noxious weeds could

create more disturbed ground that is prime habitat for aggressive noxious weeds to reinfest and compete with watchlist plants. Unless this treatment is continued to outlast the seedbank, and desirable species seed in naturally or from cultural treatments, these areas could become dense weed patches upon termination of the project.

Untreated rhizomatous noxious weeds would continue to grow and occurrences may increase in size. New sites and expanded sites and new noxious weeds can be treated in this alternative, and therefore these new occurrences most likely will be controlled or eliminated since they most likely will be small. Weed seedbanks will not be treated, and these may be a continuing source of noxious weeds. Also, please see Cumulative Effects under Alternative 3.

Alternative 6 – Preferred Alternative:

Direct and Indirect Effects: Due to the number of weed control techniques available under Alternative 6, it would be expected to provide for the most variable and aggressive treatment and control of noxious weeds, on those acres treated, and enhancement for those watchlist species that occur near those treated sites, as competition from noxious weeds would be removed. However, the treated acres would be much less than in Alternatives 2 and 4. On the 6000 acre Dyers woad site, the 850 acre Dalmatian toadflax site, and the large common crupina site only the periphery would be treated in this alternative, and, therefore, large acreages would be left untreated, and watchlist plant habitat within those areas could continue to become degraded as noxious species increased in density.

On the sites where treatment would take place, it is expected that noxious weed populations would be greatly reduced, and watchlist plants and habitat would be enhanced. This alternative would be in effect for 10 years, instead of the 5 years of Alternatives 2 and 3, and therefore, the chances for complete removal of occurrences of some noxious weeds would be more likely, especially for smaller infestations.

Manual treatment of weeds will remove noxious weeds where that treatment will be used, but has the potential to increase noxious weed infestation by disturbing the soil and providing ideal conditions for the germination of the weed seed. Although watchlist plants would benefit from weed removal, if germination of weed seeds is enhanced on the disturbed soil, the benefit may be lost.

New sites and expanded sites and new noxious weed species can be treated in this alternative, and therefore these new occurrences most likely will be controlled or eliminated. Please see discussion under Direct Effects for Alternative 2, 4, and 5.

Cumulative Effects: Noxious weeds on the large untreated sites will probably increase in density, further degrading habitat for native species and watchlist plants. These sites could also become a source for many, new satellite sites if careful, annual inventory is not performed, and subsequently provide aggressive competition to watchlist plants. However, the perimeter of the large infestations would be treated to provide containment of the site.

Untreated rhizomatous noxious weeds within the large Dalmatian toadflax site would continue to grow and occurrences may increase in density. Watchlist plants within this site could be negatively affected by increased competition for resources. New sites and expanded sites and new noxious weed species can be treated in this alternative, and therefore these new occurrences most likely will be controlled or eliminated since they most likely will be small.

Weed seedbanks will not be treated, and these may be a continuing source of noxious weeds. Also, please see the Cumulative Effects discussion under Alternatives 2, 4, and 5.

Effects To Native Plant Communities and Native Plant Species Diversity

Alternative 1-No Action:

Direct and Indirect Effects: Under the No Action Alternative, it is anticipated weeds would continue to spread within the Modoc National Forest. As weeds increase, there would be a corresponding decrease in native plant cover and, subsequently, a decrease in intact native plant communities, and in plant diversity, especially where weeds spread to the point of becoming monocultures. Plant communities are aggregations of individual plants, and are somewhat stable, but do evolve over time. What affects the species, and species diversity, will also affect the communities in which they are included, and subsequently, diversity of plant communities. Soil erosion may increase because the root systems of weeds are generally less binding of soil particles, and those eroding and disturbed landscapes will be more susceptible to continued invasion by weeds.

Cumulative Effects: Natural events (fire, flood, drought, disease, insects, landslides, climate change) have affected plant communities in the past, and continue to do so. However, where native ruderale plants would reinvade after a natural disturbance, and, gradually, later-stage seral natives would move in, new noxious weeds, highly adapted to infesting disturbed sites, are just as likely to invade and take over these places, and change the conditions on those sites so that they remain in an early seral stage, inhabited primarily by the weeds themselves.

The effects of many past actions continue to affect native plant communities and plant diversity. Roads, railroads and powerline construction and mainenance have created vectors or pathways for continuing weed infestation, and have essentially isolated some native communities from one another by creating barriers (isolating sections of a vernal pool, for example, by the raised bed of the track) or by changing intervening habitat -- open, dry and hot vs. shaded, moist, cool (such as a wide open swath for a powerline) -- across which unadapted plants cannot easily pass. Some past road maintenance has spread noxious weeds that were in the cinders and gravel of the borrow material, creating, in some cases, monocultures of weeds in place of native communities. Grazing by cows selectively removed and continues to remove palatable species such as native bunchgrasses, and leaves less palatable species such as noxious weeds to benefit from the reduced competition. Canopy cover removal during timber management and fuels reduction has changed understory soil moisture and light conditions – conditions necessary for some cool-forest communities. Plant communities that require low light and moist soil have subsequently been selected against in these places. Plantation-like conditions have replaced native communities in some cases. Road construction and trampling by cows has changed hydrologic function and connectivity of springs and seeps, drying habitat and causing enough change in special aquatic features (such as fens) so that many no longer support communities they once had, such as sphagnum or three-ranked hump moss. Dam building, goosenest island construction, dug-outs for watering holes have changed the hydrology in the Devils Garden area,

and subsequently, some vernal pool plant communities had been inundated, and others dried up, while vernal pool habitat may have been inadvertently created by other actions.

Projects on the Forest continue to effect native plant communities and plant diversity. Pile burning can sterilize the soil and kill the native seedbed, creating disturbed openings where invasives can invade intact native communities and begin to disperse their propagules. Fire suppression continues to allow non-fire-adapted species to thrive, squeezing out fire-adapted species. Juniper has invaded native grasslands and sagebrush steppe, and changed these areas to juniper woodlands with little understory.

Effects of reasonably foreseeable future actions include effects from projects that are on the schedule of proposed actions (SOPA). The proposed sagebrush steppe ecosystem restoration project could change the native plant communities over a large area of the Forest back to one that is less dominated by juniper. Grazing will continue in the Warner Mountains, where critical aquatic features such as fens and seeps are drying and their organic soils are being lost from trampling by cows. Cows will continue to congregate in shady areas under trees or along creeks and at springs, trampling and stressing native vegetation, leading to a change in species composition. Recreation (OHV, horseriding, hiking, camping), firewood gathering, and many other activities have the potential to affect native communities and plant diversity. In the long-term, this gradual degradation of native communities could lead to a downward trend in extent and diversity of native plants and communities.

Alternative 2:

Direct and Indirect Effects: Alternative 2 would allow for an aggressive treatment program for noxious weed control, resulting in positive impacts to native plant communities and native plant diversity. Inadvertent trampling and injury of native plants and thus plant communities by the treatment crews, could result, but the benefits from reduced competition for sunlight, water, space, and nutrients should outweigh these inadvertent side-effects of treatment.

Depending on the herbicide used, there may be some loss of vitality or even death of some native plants if drift, runoff or subsurface movement moves herbicide to non-target areas and it is taken up by native plants. Some herbicides are specific to certain groups (dicots vs. monocots) or families (grass or mustard family for example), and widespread spraying could selectively remove some of these. However, widespread spraying is not proposed. Herbicide treatments in this project will be by directed spray or wick. Therefore, although some individual plants may be effected, widespread removal of certain groups or families from plant communities would not result, nor would changes in direction of communities, from say mixed forb/grass to an all-grass community.

Although manual treatment of weeds will remove individual plants, this treatment has the potential to increase noxious weed infestation by disturbing the soil and providing ideal conditions for the germination of the weed seed or overlooked rhizomes in the soil. New noxious

weeds and new sites would not be treated, and in these places, native plant communities may become degraded during the project and plant diversity reduced.

Cumulative Effects: The 5-year life span of this project would most likely not be sufficient to outlast the viability of most of the seeds of noxious weeds. Most likely weeds would begin to germinate after termination of the project, and over time, they could again become a source of competition with native plants and subsequently, communities. Also see Cumulative Effects under Alternative 1.

Alternative 3:

Direct and Indirect Effects: Alternative 3 could have beneficial impacts to native communities and native plant diversity as there would be some weed control implemented, and therefore native plant and weed competition would be reduced, and communities would remain intact. However, because some weed species may be spread as a result of ground disturbance or incomplete removal, there are caveats with this manual treatment only alternative, especially since the life of the project is only 5 years, much less than the length of time that many noxious weeds seeds and propagules can still remain viable and reinfest the site. Manual treatment of weeds has the potential to increase weed infestation by disturbing the soil and thereby providing ideal conditions for the germination of the weed seed in the soil. New noxious weeds and new sites would not be treated, and in these places, native plant communities may become degraded even during the project, and native plant diversity reduced. As an example, cheatgrass and medusahead have invaded sagebrush communities within the Forest. These communities have been changed by the replacement of native grasses and many forbs with these non-native, invasive grasses, even though sagebrush is still there. The communities have changed in many places from sagebrush/native grass and forb to sagebrush/cheatgrass or sagebrush/medusahead. Some negative effects, such as inadvertent trampling by the treatment crews, could also result.

Noxious weeds with rhizomes will not be treated in this alternative. Consequently, native communities and diversity in those areas could continue to be negatively impacted from competition with these aggressive weeds.

Areas with bare soil resulting from weed treatments that are greater than ¼ acre in size will be evaluated to assess a need for rehabilitation. Re-vegetation seed mixes have the potential to unbalance native communities nearby if not carefully chosen. However, these mixes will be designed on a site-specific basis to consider objectives and conditions at each site, and if there is any negative effect, it should be minimal.

Cumulative Effects: The 5-year life span of this project would most likely not be sufficient to outlast the viability of most of the seeds of noxious weeds. Most likely weeds would begin to germinate after termination of the project, and over time, again become a source of competition with native plants and subsequently, communities. Disturbance of the soil during implementation of this alternative could provide a ready site for reinvasion of noxious weeds, or stimulate the weed seedbank. It is possible that on some sites the density of noxious weeds, over time, could

become greater than at the beginning of the project. Also see Cumulative Effects under Alternative 1.

Alternative 4:

Direct and Indirect Effects: Alternative 4 allows for the aggressive treatment of noxious weeds, utilizing a wide range of treatment methods. Due to the aggressive noxious weed treatment, Alternative 4 would, overall, be beneficial to native plant communities and diversity. Although some negative effects, such as inadvertent trampling by the treatment crews, could result, the benefits from reduced competition for sunlight, water, space, and nutrients should outweigh these inadvertent side-effects of treatment.

Depending on the herbicide used, there may be some loss of vitality or even death of some native plants if drift, runoff or subsurface movement moves herbicide to non-target areas. Manual treatment of weeds has the potential to increase noxious weed infestation by disturbing the soil and providing ideal conditions for the germination of the weed seed in the soil. Some herbicides are specific to certain groups (dicots vs. monocots) or families (grass or mustard family for example), and widespread spraying could selectively remove some of these. However, widespread spraying is not proposed. Herbicide treatments in this project will be by directed spray or wick. Therefore, although some individual plants may be effected, widespread removal of certain groups or families from plant communities would not result, nor would changes in direction of communities, from say mixed forb/grass to an all-grass community.

All known sites and new sites of the known 14 weeds would be treated over a period of 10 years, which is long enough to exhaust the seedbank of many of the 14 noxious weeds. This alternative would be beneficial to native plant communities and plant diversity across the Forest. However, new weeds would not be treated, and native communities and plant diversity may therefore become degraded over time if new noxious weeds invade. Also see Direct and Indirect Effects under Alternative 2.

Cumulative Effects: The 10-year life span of this project would most likely be insufficient to outlast the viability of many but not all of the seeds and propagules of noxious weeds. Most likely weeds would begin to germinate after termination of the project, and over time, again become a source of competition with native plants and subsequently, communities. Also see Cumulative Effects under Alternative 1.

Alternative 5:

Direct and Indirect Effects: As with Alternative 3, Alternative 5, a manual-treatment-only alternative would have benefits to native plant communities and diversity. Occurrences of non-rhizomatous species other than the infestations over 500 acres would be treated, and over time, some of these treated occurrences would be contained, controlled, or eradicated. The 913 acres of rhizomatous weeds would not be treated, and competition could be intense between native communities and weeds, with invasives taking over in many cases. Although new weeds and

new sites could be treated for non-rhizomatous species, those that reproduce vegetatively would continue to grow, spread, and compete.

Bare areas created by the treatment of noxious weeds would be evaluated for rehabilitation. Appropriate seed mixes and certified weed free mulch would be applied as needed so as not to compete or unbalance local native communities.

Effects from the treatment of noxious weeds by goat grazing may include some removal or injury to native plants, but should not injure communities or native plant diversity. All goat grazing treatments would be carefully monitored to ensure that weed treatment objectives are met without damaging nearby native plant communities through trampling or overgrazing. Removal of noxious weeds by goats would eventually have a beneficial effect as native plant communities are restored to the site. See also, Direct and Indirect Effects under Alternative 3.

Cumulative Effects: The 10 year life span of this project would most likely be insufficient to outlast the viability of most of the seeds of noxious weeds on treated sites, thus benefiting native plant communities and diversity at first, but, unless a new decision extends the treatment time period, benefits may be lost. Seeds will remain viable on untreated sites, and the noxious weed seedbank will continue to accumulate there. Disturbance of the soil during implementation of this alternative could provide a ready site for reinvasion of noxious weeds, or stimulate the weed seedbank if treatments are not done in a timely fashion. It is possible that on untreated sites the density of noxious weeds, over time, could become greater than at the beginning of the project. Also see Cumulative Effects under Alternative 1.

Alternative 6 – Preferred Alternative:

Direct and Indirect Effects: Alternative 6 would provide for the most variable and aggressive treatment of noxious weeds. Due to the number of weed control techniques available under Alternative 6, it would be expected to provide the most control of invasive species for treated sites. In the long term, outside of the 6000 acre Dyers woad site, the 850 acre Dalmatian toadflax site, and the large common crupina site, it is expected that noxious weed populations would be greatly reduced, and in many cases, eradicated. In the long term, it is expected that native plant communities will have less competition for available water and nutrients, resulting in stable, healthy native plant communities. However, in the two large untreated infestations, native plant communities could become severely degraded and reduce native plant diversity.

Cumulative Effects: The 10 year life span of this project would most likely be insufficient to outlast the viability of most of the seeds of noxious weeds on treated sites, thus benefiting native plant communities and diversity at first, but, unless a new decision extends the treatment time period, benefits may be lost. Seeds will remain viable on untreated sites, and the noxious weed seedbank will continue to accumulate there. Disturbance of the soil during implementation of manual treatments in this alternative could provide a ready site for reinvasion of noxious weeds by stimulating the weed seedbank or weed rhizomes still in the soil. It is possible that on

untreated sites the density of noxious weeds, over time, could become greater than at the beginning of the project. Also see Cumulative Effects under Alternative 1.

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Appendix A

'At-Risk' Plant Communities (Cover Type) with Noxious Weeds

Table 1 – Weed Occurrences in Annual Grass-Forb Alliance (HG) Vegetation Type

COVER TYPE	VEG. TYPE	NAME	ID NUMBER	T	R	S	ACRES
HEB[1]	HG	DALMATIAN TOADFLAX	BV006LIDA	T42N	R6E	28	860.00
HEB	HG	DIFFUSE KNAPWEED	DH001CEDI3	T45N	R6E	22	0.70
HEB	HG	SCOTCH THISTLE	BV122ONAC	T39N	R10E	33	0.10
HEB	HG	SCOTCH THISTLE	BV180ONAC	T40N	R8E	28	0.10
HEB	HG	SCOTCH THISTLE	BV188ONAC	T41N	R8E	28	0.10
HEB	HG	SCOTCH THISTLE	BV211ONAC	T41N	R9E	17	0.75
HEB	HG	SCOTCH THISTLE	BV282ONAC	T41N	R9E	26	25.00
HEB	HG	SCOTCH THISTLE	DH033ONAC	T45N	R6E	22	0.27

Table 2 – Weed Occurrences in Wet Meadows (Grass-Sedge-Rush) Alliance (HJ) Vegetation Type

COVER TYPE	VEG. TYPE	NAME	ID NUMBER	T	R	S	ACRES
HEB	HJ	CANADA THISTLE	DG009CIAR4	T46N	R11E	7	0.10
HEB	HJ	CANADA THISTLE	DG014CIAR4	T47N	R11E	31	0.10
HEB	HJ	CANADA THISTLE	DG018CIAR4	T44N	R10E	29	0.10
HEB	HJ	DALMATIAN TOADFLAX	BV006LIDA	T42N	R6E	28	860.00
HEB	HJ	DIFFUSE KNAPWEED	DG004CEDI3	T46N	R11E	18	0.10
HEB	HJ	DYERS WOAD	BV008ISTI	T39N	R11E	18	0.10
HEB	HJ	DYERS WOAD	BV020ISTI	T37N	R10E	20	?
HEB	HJ	SCOTCH THISTLE	BV018ONAC	T36N	R8E	17	0.10
HEB	HJ	SCOTCH THISTLE	BV040ONAC	T36N	R8E	3	0.10
HEB	HJ	SCOTCH THISTLE	BV043ONAC	T37N	R8E	34	0.10
HEB	HJ	SCOTCH THISTLE	BV226ONAC	T39N	R10E	14	0.10
HEB	HJ	SCOTCH THISTLE	BV256ONAC	T39N	R11E	18	0.10
HEB	HJ	SCOTCH THISTLE	BV280ONAC	T41N	R9E	17	0.09
HEB	HJ	SCOTCH THISTLE	BV307ONAC	T36N	R8E	17	?
HEB	HJ	SCOTCH THISTLE	DG053ONAC	T42N	R9E	16	0.10
HEB	HJ	SCOTCH THISTLE	WM006ONAC	T45N	R15E	4	0.07

Table 3 – Weed Occurrences in Water (WA) Vegetation Type

COVER TYPE	VEG. TYPE	NAME	ID NUMBER	T	R	S	ACRES
WAT[2]	WA	CANADA THISTLE	DG004CIAR4	T43N	R9E	12	0.10
WAT	WA	CANADA THISTLE	DG006CIAR4	T43N	R9E	1	0.10
WAT	WA	CANADA THISTLE	DG009CIAR4	T46N	R11E	7	0.10
WAT	WA	CANADA THISTLE	DG015CIAR4	T43N	R9E	12	0.10
WAT	WA	DALMATIAN TOADFLAX	BV006LIDA	T42N	R6E	28	860.00
WAT	WA	SCOTCH THISTLE	BV040ONAC	T36N	R8E	3	0.10
WAT	WA	SCOTCH THISTLE	BV306ONAC	T36N	R8E	6	?
WAT	WA	SCOTCH THISTLE	DG036ONAC	T43N	R12E	2	0.10
WAT	WA	SCOTCH THISTLE	DG039ONAC	T43N	R13E	7	0.10

[1] Herbaceous [2] Water

APPENDIX B

Summary Comparison of Alternatives for the Noxious Weed Treatment Project

Alternatives / Alternative Features	Alternative 1 No Action	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
Treatment Timeframe	**Ongoing**	**5 years**	**5 years**	**10 years**	**10 years**	**10 years**
Treatment Sites and Acres	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**
Total Inventoried Weeds (2004)	541/6908	541 / 6908	541 / 6908	541 / 6908	541 / 6908	541 / 6908
Inventoried Weeds Fully Treated	**20-30** ac/yr[1]	520 / **5,995**	494 / **5,993**	520 / **5,995**	520 / **180**	538/ **241**
Inventoried Weed Sites Receiving Partial Treatment2	0/0	16/904[2]	0/0	16/904[2]	0/0	0/0
Inventoried Weeds Receiving Limited Treatment3	0/**0**	0/**0**	0/**0**	0/**0**	9/**100**[3]	3/**100**[3]
Inventoried Weeds Not Treated4	6,878[1]	5/9[4]	47/916[4]	5/9[4]	5 / 5515	0/6,567[4]
Proportion of Inventoried Weeds Treated	0.4%	n.a. / 87 %	91% / 87%	99 % / 99 %	100 % / 4 %	100 % / 5 %
Noxious Weeds Treated Through Early Detection – Rapid Response (acres)5		0 acres	0 acres	Up to **200** acres (100 ac max/yr)	Up to **200** acres (100 ac max/yr)	Up to **200** acres (100 ac max/yr)
Total Acres of Weeds Treated	**20-30** ac/yr1	**6,899** acres	**5,993** acres	**7,099** acres	**480** acres	**541** acres
Treatment Methods for Inventoried Noxious Weeds (2004)	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**	**Sites/Acres**
Physical – hand pulling, hoeing, grubbing	0/0	161/31	494/5,993	161/31	0/0	0/0
Physical+ – Physical plus, clipping seed head or plant, weed eater, mulch/tarp	20-30 ac/yr1	0/0	0/0	0/0	527/139	116/19
Physical and/or Herbicide Treatments	0/**0**	333/**5,961**	0/**0**	333/**5,961**	0/**0**	371/**116**
Herbicide	0/**0**	42/**907**	0/**0**	32/**907**	0/**0**	46/**65**
Limited Treatment3	0/0	0/0	0/0	0/0	9/100	3/100
Goat Grazing (potential) (physical/herbicide)	0/0	0/0	0/0	0/0	5/41 **(no herbicide)**	5/**41**
Total Acres Potentially Treated with Herbicides (includes ED-RR acres)6	0/**0**	355/**6,868**	0/**0**	355/**7,068**	0/**0**	425/**522**

[1]Under Current Management (Alt. 1), approximately 20 to 30 acres of noxious weeds are treated each year through other site specific NEPA decisions as part of other projects in accordance with the Modoc NF Integrated Weed Management Strategy (2005).

[2]These sites are rhizomotous species that occur within 10 feet of H2O. Those sites that are within 10 feet of H2O would not be treated. Sites with acreage ooutside of this 10 foot no treatment zone would receive partial treatment. The acreage within the 10 foot zone would not be treated, the acreage outside the 10 foot zone would be treated with herbicides.

[3]Includes treating along borders of infestations to prevent spread using the methods specific to each alternative. Treatment is estimated at 100 acres to be proportionally distributed based on the size of the individual infestations. These acres are included in the Inventoried Noxious Weeds Treated acreage.

[4]Excluded in Alt. 2 and Alt. 4: 5 sites of rhizamotous species that are within 10' of live water and partial acreage of 16 sites of rhizamotous species that are within 10' of live water. Rhizamotous species will not be treated by physical methods in these alternatives. Excluded in Alt. 3: 47 sites of rhizamotous species. Excluded in Alt. 5: 5,658 acre Dyer's woad, 850 acre Dalmatian toadflax, 159 acre crupina, and 6 sites of rhizamotous species. These sites will receive limited treatment around the perimeter estimated at 100 acres proportionally distributed based on the size of these sites. Excluded in Alt. 6: 5,658 acre Dyer's woad, 850 acre Dalmatian toadflax, 159 acre crupina. These sites will receive limited treatment around the perimeter estimated at 100 acres proportionally distributed based on the size of these sites.

[5]May use any of the methods approved for use in this NEPA decision.

[6]For Alt. 2 this includes the acres under the physical and/or herbicide method plus the herbicide treated acres. Alt. 4 adds the same categories as Alt. 2 plus adds in the potentially treated 200 acres through early detection rapid response. Alt. 6 includes the Physical and/or Herbicide acres, the herbicide acres, the acres under goat grazing, the acres under the limited treatment category, and the 200 acres under Early Detection-Rapid Response.