

BIOLOGICAL EVALUATION
THREATENED, ENDANGERED, AND SENSITIVE PLANTS

OPINE PROJECT

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DATE: November 21, 2006

PROJECT LOCATION: Bend/Ft. Rock Ranger District, Deschutes National Forest

SUMMARY OF FINDINGS

The analysis of effects on species viability found the following:

For the no action alternative:

No impact to CACH or BOPU.

For the two action alternatives:

The Opine project may impact CACH individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

The Opine project will have no impact on BOPU individuals or habitat.

INTRODUCTION

This Biological Evaluation documents the review and review findings of Forest Service planned programs and activities for possible effects on species (1) listed or proposed for listing by the USDI Fish and Wildlife Service (USFWS) as Endangered or Threatened; (2) designated by the Pacific Northwest Regional Forester as Sensitive. It is prepared in compliance with the requirements of Forest Service Manual (FSM) 2630.3, FSM 2672.4, FSM 10/89 R-6 Supplement 47 2670.44, and the Endangered Species Act (ESA) of 1973 (Subpart B; 402.12, Section 7 Consultation).

Proposed, Endangered, Threatened, or Sensitive (PETS) species considered in this evaluation are those listed in FSM 2670.4 Region 6 list dated April 1999 as suspected or documented to occur on the Deschutes National Forest. Listed plant species and their listing status are in Appendix A.

This document is organized as follows:

1. PROPOSED ACTION AND ALTERNATIVES--Description of the project and its alternatives
2. EVALUATION--Evaluation of effects on listed plant species
3. RECOMMENDATIONS--Recommendations to minimize minor effects on non-Federally listed Sensitive species viability

4.COMMUNICATION--Communication with personnel during the evaluation

5.REFERENCES--Documents referred to during the evaluation

6.APPENDICES--Appendices of sensitive species that are suspected to occur on the Bend/Ft. Rock Ranger District, and habitat descriptions of species suspected to occur within the project area

NO ACTION

None of the actions proposed in alternative 2 or 3 would occur.

PROPOSED ACTION (Alternative 2)

The purpose of the proposed action is to sustain, enhance, and protect long-term productivity and resiliency of the ecosystem, maintain and enhance wildlife habitat and recreational opportunities, protect improvements and other resources from high-intensity wildfire, and provide a new and updated master plan and special use permit for the Pine Mountain Observatory. Except for .42 miles of Road 2300-080, no roads are identified for closure under the proposed action at this time.

The proposed action would:

- Treat 7,874 acres of fuels with mechanical shrub treatment using machine piling, pile burning, and underburns
- Treat 192 acres of fuels with mechanical shrub treatment using mowing
- Burn 7,326 acres beneath drip line of trees (underburn)
- Treat 146 acres by regeneration harvest
- Treat 3,917 acres with commercial harvest thinning
- Treat 190 acres by culturing
- Treat 567 acres with juniper and shrub reduction
- Treat another 2,347 acres with non-commercial thinning
- Subsoil about 58 acres over 12 harvest units
- About 10 miles of local system roads would be subsoiled and decommissioned from the transportation system following their use.
- 991 acres would receive detrimental soil disturbance from mechanical vegetation treatments.
- Replace existing toilets at the Sand Springs Campground with vault toilets and other campground improvements
- Relocate about 2.7 miles of existing trails
- Construct about 0.1 miles of tie trail from the East Fort Rock OHV Trail System to Pine Mountain for non-motorized events.
- Reconstruct about 2.2 miles of road/trail 2300-125 from Road 23 to Road 2017-540 to repair the treat and re-install erosion control devices.
- Close and rehabilitate about 3.78 miles of existing access to Pine Mountain from the end of Road 2300-080 to the top of Pine Mountain. This would include closing about 0.60 miles of existing system roads and about 3.18 miles of user-created road/trail.
- Designate Road 2017 as a Shared Use Road from Pine Mountain Campground to Road 2017-100
- Construct about 3/8 mile of new water pipelines to two existing water troughs in the Sand Springs Allotment.
- Construct wildlife escape ramps as necessary in four water troughs in the Sand Springs Allotment.
- Maintain/repair two trick tanks on Pine Mountain.

- Develop a 20-year management plan and update the existing special use permit.
- Construct a gate on Road 2017 to prohibit four-wheel drive access to the Observatory during winter months.

Alternative 3

Under this alternative:

- 7174 acres would be treated to reduce stand densities and reduce fuel loadings.
- About 1 mile of temporary road would be built to facilitate commercial harvest, then closed and obliterated.
- Subsoiling would occur on about 48 acres spread over 12 harvest units.
- About 2 miles of machine-constructed fireline would be built.
- 27 miles of roads will be closed with obliteration.
- About 10 miles of local system roads would be subsoiled and decommissioned from the transportation system following their use.
- 1,128 acres would receive detrimental soil disturbance from mechanical vegetation treatments.

- **EVALUATION**

This evaluation of the project area includes:

- X A pre-field review
- X A field survey
- X An effects analysis
- X Management recommendations (if a sensitive plant population exists).

PREFIELD REVIEW - METHODS AND RESULTS

Project area description: Soils on Pine Mountain are mainly comprised of volcanic ash and some pumice lapilli over loamy colluvium and residual soils, as well as sandy volcanic ash and sandy to loamy residual soil on the ridgetops. Elsewhere within the project area, soils are generally comprised of sandy, pumiceous volcanic ash and pumice lapilli over sandy to loamy buried soils.

The plant associations that dominate Pine Mountain are big sagebrush-bitterbrush/bunchgrass, ponderosa pine/bitterbrush-manzanita/fescue, and ponderosa pine/bitterbrush/fescue. Elsewhere, plant associations include ponderosa/bitterbrush-sagebrush (rhyolite), ponderosa/bitterbrush/squirreltail (rhyolite), ponderosa/bitterbrush-sagebrush/fescue, lodgepole/bitterbrush (rhyolite), and big sagebrush/bunchgrass.

Elevations within the project area range from about 6500' on top of Pine Mountain to a low of about 4700', with butte tops somewhere in between. Average annual precipitation ranges from approximately 15-20". As for water-related habitats, there are no creeks or lakes within the project area. There are a few wildlife guzzlers and a couple ponds near the Sand Springs substation.

The potential for sensitive plant species' habitat to occur in the project area was evaluated using the preceding information. Resources used to identify potential sensitive plant habitat were aerial photo interpretation, vegetation map information, as well as personal knowledge of the project area.

Based on the preceding information, a comparison with the habitat requirements of Bend/Ft. Rock Ranger District potential sensitive species, including three mosses, two lichens, and one fungus added to the list in summer 2004, indicates that the following two species are known to exist within the project area and additional unsurveyed habitat also existed prior to survey:

<u>Species</u>	<u>Probability</u>
<i>Botrychium pumicola</i>	High
<i>Castilleja chlorotica</i>	High



Pumice grape-fern (BOPU)



Green-tinged paintbrush (CACH)

No habitat for Threatened, Endangered, Proposed, or Candidate plant species (these species, and their habitats, are listed in Appendices C and D) exists within the project area, with the possible wildcard exception of *Botrychium lineare*, a Candidate species. Its range distribution is very wide and its habitat varies just as widely. However, it has not been found on the Deschutes National Forest, (nor more specifically in the project area), after 15 years of project-level surveys, which include complete lists of plants encountered. The nearest known site lies in northeastern Oregon, in Wallowa County.

As for the new lichens, mosses, and fungus added in summer 2004, there is no habitat present for them in the project area. They are associated either with flowing streams in moist, high-elevation forests, and/or moist, high-elevation forests in the Cascades.

FIELD RECONNAISSANCE

Threatened, Endangered, and Sensitive (TES) plant surveys have been conducted over roughly 75% of the project area, and for virtually 100% of potential habitat on Pine Mountain. Surveys have been conducted in the area over the past 14 years for various projects such as Pine Mountain fuels project, various prescribed burns, and the Cinderhill Environmental Assessment; any potential habitat in the project area that hadn't been surveyed was visited within the past five years.

SURVEY RESULTS

Surveys located 21 sites/populations of the pumice grape-fern (*Botrychium pumicola*, BOPU) for a total of roughly 2600 plants within the project area. This comprises about 10% of the global population (estimated at 25,700 plants).

Surveys located 225 sites/populations of the green-tinged paintbrush (*Castilleja chlorotica*, CACH) for a total of roughly 26,000 plants within the project area. This

comprises the lion's share of CACH on the Deschutes National Forest. There are about 30,000 total on the DNF, another 500,000 on the Fremont National Forest (Robert Wooley, pers. comm.), and an unknown but relatively small number on Bureau of Land Management lands (Ron Halvorson, pers. comm.). Therefore, the plants located within the Opine boundary constitute about 5 percent of the global population and 87 percent of the Deschutes National Forest population.

PROJECT EFFECTS

This section discusses what effects may occur as a result of the proposed project and what risks the effects may have on the viability of proposed, threatened, endangered, and sensitive species.

No Action Alternative

Effects on *Botrychium pumicola*:

Direct and Indirect Effects: There are no expected direct or indirect effects in the absence of treatments within the project area.

Other Current Activities and Reasonable and Foreseeable Actions

Other current actions or activities include the Cinderhill Range Analysis (Decision made 2004) and Cluster II Range Analysis (Decision made 2006); grazing on adjacent BLM lands; Pine Mtn Observatory Master Plan; OHV activity in the East Fort Rock and Millican (BLM) trail systems; timber harvest and fuels reduction in the Fuzzy planning area to the west; utility line maintenance to the Antelope and Pine Mtn electronic sites and Pine Mtn Observatory; right of way maintenance along the BPA power line corridor; illegal firewood cutting; handgliding and paragliding; dispersed recreation. Also occurring is off-road vehicles cutting through undisturbed areas.

Actions or activities that are "reasonable and foreseeable" are: designation of a Class II OHV trail on Pine Mtn and designation of a new high-voltage transmission corridor either east or west of the current Sand Springs corridor.

Cumulative Effects: There is a BOPU population at the base of Pine Mountain which is in proximity to a cattle water set. Effects to the population have not been documented but cattle had walked through the population in 2000 (Don Sargent, pers. comm.). The continued presence of this water set poses a threat to this population, which numbers about 25 plants. This situation is planned to be rectified by the construction of a fence as part of the Cinderhill Environmental Assessment.

Applicable to all alternatives, for BOPU and CACH: The list of current projects, with the exceptions of illegal firewood cutting, dispersed camping, and off-road vehicle use, have all been analyzed under other NEPA documents and if threats were posed to TES plants, they were mitigated, usually by avoidance of sites, or in the case of Cluster II, by altering the timing of grazing to avoid conflicts with BOPU. **Illegal**

firewood cutting, dispersed camping, and off-road vehicle use pose considerable threats to BOPU in particular, because of the habitat it prefers—open sandy frost pockets. These activities also are a threat to CACH, but because it generally prefers habitats with a shrub component, the plants are often more protected, though by no means do the shrubs confer total protection from these activities which pose a continuing threat to the well-being of high quality TES plant habitat.

The reasonable and foreseeable actions pose threats to TES plants in this area: designation of a Class II OHV route, and especially construction of a new powerline corridor, have likely (in the case of the OHV route) taken or will take (in the case of the powerline) TES plant sites out.

Effects on *Castilleja chlorotica*:

Direct and Indirect Effects: There are no expected direct or indirect effects in the absence of treatments within the project area.

Cumulative Effects: The cumulative effects of continuing the status quo may have a positive and a negative effect upon CACH. Ironically, in this fire-prone environment, fire is felt to be the biggest threat to the continued persistence of CACH (meeting of CACH managers Robert Wooley, Ron Halvorson, Charmane Levack, and Katie Grenier on 3/12/02). Years of fire exclusion in the project area have allowed shrubs to grow and proliferate, a situation which *Castilleja chlorotica* prefers; it is found in mid- to late-seral stage shrubs in this portion of its range and therefore would benefit from fire exclusion. However, should a catastrophic wildfire get started in these older shrubs, it would most likely kill the CACH present by eliminating its host; this has been observed both on Forest Service administered land and Bureau of Land Management lands (Ron Halvorsen, pers. comm.) where prescribed fire has escaped and run through CACH populations, also in management treatment monitoring of prescribed fire within CACH populations. In the absence of fuel-reduction treatments such as mowing and prescribed fire, a fire could conceivably rip through CACH populations and habitat. This would likely eliminate any CACH plants that may exist there.

See the section called “Current Activities and Reasonable and Foreseeable Actions” listed in the No Action alternative for a discussion of effects these activities may have on TES plants in the project area.

Alternative 2

Effects on *Botrychium pumicola*:

Direct, Indirect, and Cumulative Effects: There are no known direct, indirect, or cumulative effects to BOPU populations within the project because these populations do not overlap with proposed activities.

An exception is fuels unit F29, which on paper appears to slightly coincide with a BOPU population along Road 23. Any disturbance of this population would likely harm the population.

See the section called “Current Activities and Reasonable and Foreseeable Actions” listed in the No Action alternative for a discussion of effects these activities may have on TES plants in the project area.

Effects on *Castilleja chlorotica*:

Direct Effects: There is a significant overlap of CACH populations with proposed burning units. As already stated, should CACH burn it will most likely die. The following listed project design criteria must be followed carefully in order to prevent that. Even with project design criteria in place, it is important to recognize that an unknown number of CACH plants will be killed as a result of project implementation. This is because of the large number of units with CACH populations, and because fire will creep beyond the intended treatment areas into CACH populations (personal experience of the author); and, because human beings are doing the implementing, misunderstandings/oversights will occur, even with the best of intentions.

There are roughly 5,000 CACH plants that lie within these units. If all should die as a result of project implementation, this constitutes about 19 percent of the local population, 17 percent of the Deschutes National Forest population, and about one percent of the global population.

PROJECT DESIGN CRITERIA FOR ALTERNATIVE 2

1. These fuels treatment units on Pine Mountain have CACH within them and the populations will be avoided during all actions associated with the treatment (e.g. includes fireline construction): F01, F04, F07, F09, F10, F17, F18, F22, F37, F38, and F39. The populations will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.
2. One fuels treatment unit on Pine Mountain has CACH adjacent to its boundary and personnel involved with implementation will be made aware of its presence. This may entail the botanist flagging those populations. Unit involved is F11.
3. These fuels treatment units elsewhere have CACH within them and the populations will be avoided during all actions associated with the treatment (e.g. includes fireline construction): F02, F03, F05, F08, F13, F21, and F33.

The populations will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.

4. Silvicultural treatment units P15 and H01 have CACH population overlaps and will be avoided during treatment. The populations will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.
5. Ensure that the treatment of fuels unit F29 does not enter the BOPU population. The population will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.

Indirect Effects: There may be beneficial effects and negative effects as regards wildfire and fuel reduction treatments; the beneficial effects would be that the risk of catastrophic wildfire, and ensuing potential harm to CACH populations, would be reduced through fuel reduction treatments. The negative effects would be that any potential, currently uninhabited CACH habitat would be compromised by burning. This is because of this species' preference for mid- to late-seral shrub layers in this portion of its range. It is felt that CACH will not re-enter a site until such time as a suitable host plant is well established. The amount of time needed for this is not clearly known, however an estimate of 20 years at the earliest is not out of the question (from 3/12/02 CACH meeting between Robert Wooley, Ron Halvorson, Charmane Levack, and Katie Grenier).

Subsoiling would not interfere with CACH. It is proposed in selected skid trails and other disturbed areas; if anything, because of its objective of rehabilitating the soils to improve vegetation establishment, in suitable habitat it would help re-establish the plant community that CACH prefers.

Cumulative Effects: Potential CACH habitat in the Opine project has been affected by previous activities; the effects are more likely negative than positive because except for the past 12 years, when the general distribution of CACH has been known in the area, activities occurred without knowledge that the plants were there, let alone what the habitat requirements were for this species. Thus the positive effects likely happened by accident rather than design prior to 1991. Activities that occurred in the area include livestock grazing, electronic site development, road construction, and development of the observatory, all with their attendant soil and vegetation disturbance. (There was also commercial tree harvest, but it likely did not occur within CACH habitat). Because of these things, effects on the distribution and abundance of local populations appear to have been inevitable.

A check with the Silver Lake Ranger District botanist, Jeanette Wilson, on October 20, 2003 brought no further concerns to light regarding projects the Fremont National Forest may be proposing in CACH habitat. There was a massive fire on that Forest in the summer of 2002, in the core of the world's CACH population, but miraculously the vast majority escaped burning, and there are no salvage or other types of projects which would cause further loss of plants.

The Bureau of Land Management (BLM) has just released (October 2003) a draft of their Upper Deschutes Resource Management Plan and EIS; there are no significant shifts in current BLM policies in this programmatic document (John Davis, pers. comm.) which would be of concern to the CACH populations which abut the Forest Service populations.

Looking into the future, it would seem that the tightrope land managers must walk in this area must continue to encompass the seemingly incongruous ideas of maintaining the middle-aged and old shrubs that CACH loves while trying to prevent the whole thing from going up in one huge conflagration. There must be areas that are allowed to grow into mature shrubs while other areas must be treated to reduce the fuels; some sort of ecosystem balance is necessary in order for CACH to continue within the Opine project, for without some reduction of the fuel buildup within the shrubs it loves, fire will take it out eventually.

See the section called “Current Activities and Reasonable and Foreseeable Actions” listed in the No Action alternative for a discussion of effects these activities may have on TES plants in the project area.

Alternative 3

Effects on *Botrychium pumicola*

Direct, Indirect, and Cumulative Effects: There are no known direct, indirect, or cumulative effects to BOPU populations within the project because for the most part these populations do not overlap with proposed activities.

The exception is fuels unit F29, which on paper appears to slightly coincide with a BOPU population along Road 23. Any disturbance of this population would likely harm the population.

See the section called “Current Activities and Reasonable and Foreseeable Actions” listed in the No Action alternative for a discussion of effects these activities may have on TES plants in the project area.

Effects on *Castilleja chlorotica*

Direct Effects: As with Alternative 2, there is a significant overlap of CACH populations with proposed burning units. If burned, CACH will most likely die. There will be a small but unknown number of CACH fatalities even with the best of intentions and project design criteria (see Alternative 2 direct effects discussion). The figures stated in that alternative are the same for this alternative: if all plants within units die, this constitutes about 19 percent of the local population, 17 percent of the Deschutes National Forest population, and about one percent of the global population. The following project design criteria must be followed to prevent this from happening.

Mowing is not expected to result in measurable effects on the paintbrush under either alternative, because this activity will be mitigated by avoidance within paintbrush populations. (In a current management treatment plot involving mowing just west of the planning area, this activity has reduced the number of plants within the treatment plot {relative to the control plot} of the paintbrush population that received this treatment).

PROJECT DESIGN CRITERIA FOR ALTERNATIVE 3

1. These fuels treatment units on Pine Mountain have CACH within them and the populations will be avoided during all actions associated with the treatment (e.g. including fireline construction): F01, F04, F10, F17, F21, F22, F37, F38, and F39. The populations will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.
2. These fuels treatment units on Pine Mountain have CACH adjacent to their boundaries and personnel involved with implementation will be made aware of their presence. This may entail the botanist flagging those populations. Units involved are F07, F09, and F18.
3. These fuels treatment units elsewhere have CACH within them and the populations will be avoided during all actions associated with the treatment (e.g. including fireline construction): F02, F03, F05, F13, F21, and F33. The populations will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.
4. These silvicultural treatment units have slight overlap with CACH populations and prior to treatment the populations will be flagged out and treated either as a “leave area” or excluded from the unit entirely: P325, P309, C303, and C301.
5. Ensure that the treatment of fuels unit F29 does not enter the BOPU population. The population will be flagged out prior to treatment and coordination will occur between the botanist and the implementers.

Indirect Effects: The same discussion as for Alternative 2.

Cumulative Effects: The same discussion as for Alternative 2.

See the section called “Current Activities and Reasonable and Foreseeable Actions” listed in the No Action alternative for a discussion of effects these activities may have on TES plants in the project area.

COMPARISON OF ALTERNATIVES

Botrychium pumicola

There is little difference between the no action and action alternatives as regards BOPU, because there is no treatment proposed in their habitat or populations. However, the treatment of the lodgepole pine stands proposed in the action alternatives near some of the BOPU populations and habitat help to reduce the input of lodgepole seedlings into its habitat, which is good for BOPU.

Castilleja chlorotica

Although the acres being proposed for treatment are massive, and although they overlap significantly with CACH habitat and populations, either of the two action alternatives is likely to give this species its best shot at long-term maintenance. Catastrophic fire will come; and although some plants will be lost in the implementation of these alternatives, the reduction of fuels will ultimately help save many populations from certain eventual wipe-out otherwise.

It is difficult to see any significant differences between the two action alternatives in terms of benefits to CACH.

The No Action alternative is less attractive because no treatments are planned to reduce the threat of catastrophic wildfire, although it is offset somewhat by the maintenance/encouragement of mid- to late-seral shrub habitat that CACH prefers.

PROJECT DESIGN CRITERIA

There are specific project design criteria for each alternative. Refer to the effects section for each alternative for project design criteria relative to the selected alternative.

FINDINGS

The analysis of effects on species viability found the following:

For the no action alternative:

No impact to BOPU or CACH.

For the two action alternatives:

The Opine project may impact CACH individuals or habitat, but will not likely contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

The Opine project will have no impact on BOPU individuals or habitat.

CONTACTS

DESCHUTES NATIONAL FOREST – SENSITIVE PLANT CONTACTS

Forest Botanist – Katie Grenier (388-5564)

Crescent District Plant Coordinator – Carolyn Close (433-3234)

Bend/Ft. Rock District Plant Coordinator – Charmane Powers (383-4730)

Sisters District Plant Coordinator – Maret Pajutee (549-7727)

REFERENCES

GIS layers (weeds and TES plants) for Bend/Ft. Rock Ranger District

Bend/Ft. Rock Ranger District Sensitive Plant Sightings Atlas

Bend/Ft. Rock Ranger District Cleared Areas Atlas

Larsen, 1976. Deschutes National Forest Soil Resource Inventory.

Davis, John. Bend/Ft. Rock Ranger District NEPA writer/editor. Personal communication 10/23/03.

Halvorsen, Ron. BLM botanist, Prineville, Oregon. Personal communication, 3/12/02.

Sargent, Don. Bend/Ft. Rock Ranger District Range Specialist. Personal communication, Fall 2001.

Wilson, Jeanette. Silver Lake Ranger District botanist, Fremont National Forest. Personal communication, 10/20/03.

Wooley, Robert. Fremont National Forest Ecologist. Personal communication, 3/12/02.

APPENDIX A

DESCHUTES NATIONAL FOREST SENSITIVE PLANT LIST

Thirty-one plants are currently on the Regional Forester's Sensitive Species List (FSM 2670.44, 7/04) for the Deschutes National Forest, as follows (BFR = Bend/Fort Rock District, CRE = Crescent District, SIS = Sisters District):

Scientific Name	Common Name	Listing Status	District		
			BFR	CRE	SIS
<i>Agoseris elata</i>	Tall agoseris	ONHP List 2	S	S	D
<i>Arabis suffrutescens</i> var. <i>horizontalis</i>	Crater Lake rockcress	Sp. Of Concern ONHP List 1	---	S	---
<i>Arnica viscosa</i>	Shasta arnica	ONHP List 2	D	S	S
<i>Artemisia ludoviciana</i> ssp. <i>estesii</i>	Estes' artemisia	Sp. Of Concern ONHP List 1	D	S	---
<i>Aster gormanii</i>	Gorman's aster	Sp. Of Concern ONHP List 1	S	S	S
<i>Astragalus peckii</i>	Peck's milk-vetch	Sp. Of Concern ONHP List 1	D	D	S
<i>Botrychium pumicola</i>	Pumice grape-fern	Sp. Of Concern ONHP List 1	D	D	---
<i>Calamagrostis breweri</i>	Brewer's reedgrass	ONHP List 2	S	S	S
<i>Calochortus longebarbatus</i> var. <i>longebarbatus</i>	Long-bearded mariposa lily	Sp. Of Concern ONHP List 1	S	S	S
<i>Carex hystricina</i>	Porcupine sedge	ONHP List 2	S	S	S
<i>Carex livida</i>	Pale sedge	ONHP List 2	S	S	S
<i>Castilleja chlorotica</i>	Green-tinged paintbrush	Sp. Of Concern ONHP List 1	D	S	S
<i>Cicuta bulbifera</i>	Bulb-bearing water-hemlock	ONHP List 2ex	S	S	S
<i>Collomia mazama</i>	Mt. Mazama collomia	Sp. Of Concern ONHP List 1	S	S	S
<i>Dermatocarpon luridum</i> (LICHEN)			S?	S?	S?
<i>Gentiana newberryi</i> var. <i>newberryi</i>	Newberry's gentian	ONHP List 2	D	S	D
<i>Leptogium cyanescens</i> (LICHEN)			S?	S?	S?
<i>Lobelia dortmanna</i>	Water lobelia	ONHP List 2	S	S	D
<i>Lycopodiella inundata</i>	Bog club-moss	ONHP List 2	S	D	S
<i>Lycopodium complanatum</i>	Ground cedar	ONHP List 2	S	S	S
<i>Ophioglossum pusillum</i>	Adder's-tongue	ONHP List 2	S	S	S
<i>Penstemon peckii</i>	Peck's penstemon	Sp. Of Concern ONHP List 1	S	S	D
<i>Pilularia americana</i>	American pillwort	ONHP List 2	S	S	---
<i>Ramaria amyloidea</i> (FUNGUS)			D?	D?	D?
<i>Rorippa columbiae</i>	Columbia cress	Sp. Of Concern ONHP List 1	S	S	S
<i>Rhizomnium nudum</i> (MOSS)			D	D?	D?
<i>Scheuchzeria palustris</i> var. <i>americana</i>	Scheuchzeria	ONHP List 2	D	S	S
<i>Schistostega pennata</i> (MOSS)			S	D	S
<i>Scirpus subterminalis</i>	Water clubrush	ONHP List 3	S	D	S
<i>Scouleria marginata</i> (MOSS)			S?	S?	S?
<i>Thelypodium howellii</i> ssp. <i>howellii</i>	Howell's thelypody	ONHP List 2	S	S	S

* CODES:

D = Documented

S = Suspected

Species of Concern = Federal Designation; neither Endangered or Threatened

ONHP List 1 = Oregon Natural Heritage Program List: Contains species which are endangered or threatened throughout their range or which are presumed extinct.

ONHP List 2 = Oregon Natural Heritage Program List: Contains species which are threatened, endangered or possibly extirpated from Oregon, but more common or stable elsewhere.

ONHP List 3 = Oregon Natural Heritage Program List: Contains species for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.

ONHP List 4 = Oregon Natural Heritage Program List: Contains species of concern which are not currently threatened or endangered.

APPENDIX B

Deschutes National Forest Sensitive Plant Habitat Descriptions

Vascular Plants

Agoseris elata. This species occurs in nonforest areas and openings in ponderosa pine forest between 3000 and 4800 feet elevation. Habitat includes dry edges of moist ecotones adjacent to moist meadows, lakes, stream courses, and riverbanks. The closest known sighting is on the Sisters Ranger District.

Arabis suffrutescens var. *horizontalis*. Crater Lake rockcress is found in meadows, woods, summits, ridges, and steep, exposed rock outcrops between 5500-8900'. Oregon Natural Heritage records (as recent as 1993) are only from Crater Lake National Park, Lake of the Woods, and Mt. McLoughlin, all in south-central and southern Oregon.

Arnica viscosa. Shasta arnica is found on the Bend/Ft. Rock Ranger District. Typical habitat is rock, scree, talus, and lava flows, between 6500-9200'. May be w/in moraine lake basins or crater lake basins. At or above subalpine mixed conifer in western white pine and mountain hemlock, sparsely vegetated openings.

Artemisia ludoviciana ssp. *estesii*. This robust herbaceous perennial is found within the Deschutes River floodplain habitat amidst sparse vegetation in sandy pockets among rocks and river gravel. It has been found on the Bend/Ft. Rock Ranger District.

Aster gormannii. A perennial member of the sunflower family that is found on dry cliffs, open rocky ridges, steep rocky washes, or fine gravelly andesic scree in subalpine and alpine areas at elevations of 5000 to 6100 feet. Dry SW, S, ESE, E exposures are most common. The closest documentation of this species is in the Mt. Jefferson Wilderness on the Willamette National Forest.

Astragalus peckii. A perennial legume that is found in non-forested areas, forest openings, and open forest. It is most commonly found in shrub-steppe plant associations, but has also been reported from common juniper woodlands, ponderosa pine forest edge and lodgepole pine forest openings. It grows in loose, deep pumice, loamy sand, or sandy soils with flat to gentle slopes. It has often been found in or along dry watercourses, old lakebeds (basins), pumice flats and other natural openings. It has been found in previously-disturbed areas on the Crescent Ranger District, namely in a powerline corridor and between berms in a lodgepole pine plantation.

Botrychium pumicola. This inconspicuous plant is a perennial which may regrow from a bud located 1-3 inches below the ground surface. It reproduces through spore dispersal, and, vegetatively, through the formation of tiny underground buds called gemmae. This species is endemic to Central Oregon open-canopy pumice soils at high elevations in the Oregon Cascades and Newberry Crater, and at lower elevations within a lodgepole pine matrix. Within the lodgepole pine matrix, it prefers relatively flat, open basins where frost heaving tends to prevent the establishment of tree seedlings and most other vegetation as well.

Calamagrostis breweri. A perennial tufted grass found in moist to dry alpine and subalpine meadows, open slopes, streambanks, and lake margins.

Calochortus longebarbatus var. longebarbatus. Also known as the long-bearded mariposa lily, it is found in dry portions of low meadows and grassy openings in pine forest or in moist open ground along rills at 1800-3600 feet. It has not been found on the Deschutes National Forest.

Carex hystricina. Porcupine sedge is found in wet to moist conditions in riparian zones, and in or along ditches/canals in prairies and wetlands, and is associated with *Carex-Juncus* communities within true fir-douglas-fir-ponderosa pine forests and juniper woodlands between 3400-4300'.

Carex livida. Pale sedge is found within all forest types in peatlands including fens and bogs, as well as wet meadows with still or channelled water.

Castilleja chlorotica. Also known as the green-tinged paintbrush, this species is a perennial eastern Oregon endemic, known only from Deschutes, Lake, and Klamath Counties. It occurs on the Bend/Ft. Rock Ranger District in numerous populations. It has been found at 4300' to 8200' elevation in open and forested ponderosa, lodgepole, and mixed conifer. It has also been found in nonforested sagebrush-bitterbrush types. Soils are often very poor and rocky.

An important life history factor to note about the *Castilleja* genus is that it is hemiparasitic, which means it contains chlorophyll and may or may not be able to complete its life cycle without a host species; hemiparasites primarily draw water and minerals from the host. It is not known which species is the host for CACH, although it is suspected to be a shrub (Dr. Richard Everett, pers. comm.). On the Fremont National Forest, upon which the majority of the known CACH population exists, the host is suspected to be sagebrush; on the Deschutes National Forest sites, it may be bitterbrush. Successful CACH reestablishment after a fire or other disturbance may depend upon the reestablishment of its host.

Cicuta bulbifera. Considered by Oregon Natural Heritage ranking to be extirpated from Oregon. Shoreline marshes. Only Nature Conservancy records are for margins of Klamath Lake in 1902 and 1950. Persistence at these sites considered doubtful.

Collomia mazama. Meadows (dry to wet, level to sloping); stream banks and bars; lakeshores and vernal pool margins; forest edges and openings; alpine slopes. Numerous recent sites within Klamath, Jackson, and Douglas Counties.

Gentiana newberryi var. newberryi. Newberry's gentian is a perennial species occurring between 4700 and 8700 feet in subalpine and alpine meadows in moist to moderately dry sandy loam, on level to moderate slopes. It is also found in mesic to moderately well-drained meadows or mesic grassy borders and flats adjacent to lakes and streams. It occurs on the Bend/Ft. Rock Ranger District.

Lobelia dortmanna. Water lobelia is a fibrous rooted aquatic perennial species, found in water of lake, pond, slow river or stream, or wet meadow. Sisters Ranger District site is the only Oregon locality.

Lycopodiella inundata. Deflation areas in coastal back-dunes; montane bogs, including sphagnum bogs; less often, wet meadows. Known on Deschutes National Forest from the Crescent Ranger District.

Lycopodium complanatum. Edges of wet meadows; dry, forested midslope with 25% canopy cover. Associated with Englemann spruce, Douglas-fir on the Wallowa-Whitman National Forest. Has been found on the Sisters Ranger District.

Ophioglossum pusillum. Northern adder's tongue is a fernlike plant associated with dune deflation plains, marsh edges, vernal ponds, and stream terraces in moist meadows. In Oregon, only known from Lane County; chiefly on the Siuslaw and Willamette National Forests. Not yet found on the Deschutes National Forest.

Penstemon peckii. Peck's penstemon occurs on the Sisters Ranger District in ponderosa pine openings, open ponderosa pine forests, pine/mixed conifer openings, recovering fluvial surfaces (streambanks, overflow channels, inactive floodplains), seeps, rills, springs, vernal pools; draws, ditches, skid roads; dry or intermittent stream channels; moist-wet meadows.

Pilularia americana. American pillwort is a small grasslike plant that is found in alkali and other shallow vernal pools; not recently used stock ponds; reservoir shores. In Oregon, recent collections have been made in Deschutes, Klamath, and Jackson Counties. There is an historical site from about 100 years ago from the extreme eastern edge of the Bend/Ft. Rock Ranger District, but targeted surveys in recent years has not re-discovered it.

Rorippa columbiae. This perennial from the mustard family occurs in wet to vernal moist sites, meadows, fields, playas, lakeshores, intermittent stream beds, banks of perennial streams, along irrigation ditches, river bars and deltas. In Oregon, this species is found in Klamath, Lake, and Harney Counties.

Scheuchzeria palustris ssp. americana. Open canopied bogs, fens, and other wetlands where often in shallow water. Pacific silver fir and douglas-fir forests (in west Cascades).

Scirpus subterminalis. Generally submerged to emergent in quiet water 2-8 decimeters deep, in peatlands, sedge fens, creeks, ditches, ponds and lakes.

Thelypodium howellii ssp. howellii. Considered by Oregon Natural Heritage ranking to be extirpated from Oregon. No recent collections; closest Nature Conservancy sites are Paulina Marsh, Tumalo State Park (approx.), Camp Polk, and Big Summit Prairie.

Bryophytes

Schistostega pennata. On mineral soil in damp caves and crevices and on the soil-bearing root masses of fallen trees. Often near streams or other wet areas. Requires humid, heavily shaded microsites. Most commonly found within silver fir plant series but also common in western hemlock and mountain hemlock series. Also in lodgepole pine stands near water. Stands are typically late seral or old growth.

Lichens

Leptogium cyanescens. On trees in humid forests; widely scattered. On mossy trees and rocks or directly on rock when near water. Considered riparian through 2001. Recently documented in upland settings on vine maple, big leaf maple, and in moss on white oak. Associated with Western Hemlock and Pacific Silver Fir Zones in mixed conifer stands, mature big leaf maple and Douglas-fir stands, maple and willow thickets.

Surveys impractical or known sites likely managed

Ramaria amyloidea. Fungus. Coral-like fungi on moist humus or wood, or under duff. May favor hemlock. Fall species. Associated with *Abies* spp., *Pseudotsuga menziesii* and *Tsuga heterophylla*.

Dermatocarpon luridum. Lichen. Usually submerged most of the year. Rocks or bedrock in streams, rivers, or seeps, usually submerged or inundated for most of the year. Associated with *Alnus rubra*, *Pseudotsuga menziesii*, *Tsuga heterophylla*, *Acer* spp., subalpine or alpine meadow vegetation.

Rhizomnium nudum. Moss. On humus or mineral soil in seepages, vernal (at least) wet depressions or intermittently wet, low gradient channels. Exposure varies from full sun to full shade. On Deschutes NF, associated conifer types include lodgepole pine, Engelmann spruce, mountain hemlock and western white pine.

Scouleria marginata. Moss. Often forming dark mats on exposed to shaded rocks in streams; seasonally submerged or emergent.

APPENDIX C

List of Federally Endangered, Threatened, and Candidate Plant Species*

Plants listed as Endangered

Arabis macdonaldiana
Astragalus applegatei
Erigeron decumbens var. *decumbens*
Fritillaria gentneri
Lilium occidentale
Limnanthes floccosa ssp. *grandiflora*
Lomatium bradshawii
Lomatium cookii
Plagiobothrys hirtus
Stephanomeria malheurensis

Plants listed as Threatened

Castilleja levisecta
Howellia aquatilis
Lupinus sulphureus ssp. *kincaidii*
Mirabilis macfarlanei
Sidalcea nelsoniana
Silene spaldingii
Thelypodium howellii ssp. *spectabilis*

Candidate Plants for listing

Artemisia campestris var. *wormskioldii*
Botrychium lineare
Calochortus persistens

* Source: Oregon Natural Heritage Program web site, February 2005.

APPENDIX D

List of Federally Endangered, Threatened, and Candidate Plant Species' Habitats and Ranges*

Plants listed as Endangered

Arabis macdonaldiana

Habitat Description

Open rocky areas, outcrops and cliffs, with little associated vegetation.

Range Description

Del Norte, Trinity, and Mendocino counties; along north fork of Smith River and at Red Mountain, California. Also in Curry and Josephine Counties, Oregon.

Astragalus applegatei

Habitat Description

Occurs in meadows and moist ground along wayside ditches and along the Klamath River at ca. 1250 m. Primarily in grasslands dominated by *Puccinella lemmonii* and *Poa juncifolia*, with *Chrysothamnus nauseosus* usually present. Alfalfa and other weeds also common.

Range Description

Found only in Lower Klamath Basin, e.g., near the city of Klamath Falls, in Klamath County, Oregon. Perhaps in adjacent Siskiyou County, California ('to be sought', Barneby 1964).

Erigeron decumbens var. decumbens

Habitat Description

Erigeron decumbens ssp. *decumbens* is found in all native grasslands in the Willamette Valley, including the wet tufted hairgrass bottomland prairies, and the well drained, deep soiled red fescue grasslands. Associated species: *Aster hallii*, *Festuca rubra*, *Danthonia californica*, *Deschampsia cespitosa*, *Fragaria virginiana*, and the other WV endemic plants.

Range Description

Occurs only in the southern end of the Willamette Valley, Oregon.

Fritillaria gentneri

Habitat Description

Inhabits dry open woods of fir or oak at lower elevations. Associated species: *Brodiaea* spp., *Ceanothus cuneatus*, *Phacelia* spp., *Microseris* spp., and *Erythronium* spp.

Range Description

Scattered localities in southwest Oregon along the Rogue and Illinois River drainages in Josephine and Jackson Counties, Oregon.

* © 2004 Oregon Natural Heritage Information Center. This is the source for all species listed except for *Botrychium lineare* and *Calochortus persistens* (their source listed on final page of this appendix).

APPENDIX D (continued)

Lilium occidentale

Habitat Description

Occurs in forest or thicket openings, often along the margins of ephemeral ponds and small channels, and usually established under cover of shrubs. Associates are Gaultheria shallon, Myrica californica, Vaccinium spp., Rubus spp, Lonicera involucrata, Ledum glandulosum, Pinus contorta, Picea sitchensis, Chamaecyparis lawsoniana, Salix hookeriana, Calamagrostis nutkaensis, Carex lyngbyei, Cornus canadensis, Tofieldia glutinosa, Gentiana sceptrum, Sphagnum spp., and Darlingtonia californica.

Range Description

Extremely limited distribution: a 2-mile wide strip of land along the coast in northern California and southern Oregon. Endemic to three counties. Historical occurrence in Coos County, Oregon and extant occurrences in Curry County, Oregon. One extant occurrence in Humboldt County, California.

Limnanthes floccosa ssp. grandiflora

Habitat Description

Inhabits the periphery of vernal pools at ca 375-400 m, near the wetter, inner edges as opposed to the drier outer fringes like the sympatric ssp. floccosa. Assoc. species: Lupinus sp., Trifolium sp., Myosurus minimus & Baeria chrysostoma.

Range Description

Endemic to the Rogue River Valley of Jackson County. Most populations centered in the Agate Desert region near the city of Medford, Oregon. Known populations occur within an 8 x 15 km area (5 x 9 mile area).

Lomatium bradshawii

Habitat Description

Occurs in flat bottomlands, usually Deschampsia cespitosa valley prairies, with heavy clay soils. Grows in depressions or seasonal channels or rarely in vernal pools. In the northern sites, it occurs in moist, vernal stream corridors with minimal soil over basalt.

Range Description

Regional endemic; found mainly in the south end of the Willamette Valley, in two counties. A large population has recently (1994) been discovered in Clark County, in the state of Washington.

Lomatium cookii

Habitat Description

Occurs along the margins of vernal pools in the Agate Desert, usually with native forbs and introduced annual grasses. In the Illionis Valley, it occurs in moist alluvial floodplains, with native bunchgrasses (Poa scabrella and Danthonia californica) adjacent to Pinus ponderosa - Quercus garryana savanna with Ceanothus cuneatus and Arctostaphylos species.

Range Description

Narrow, local endemic. Restricted to two counties in the southwestern portion of the state of Oregon. It is limited to two small areas: the Agate Desert area north of the city of Medford, Jackson County, and the Illinois River Valley area near Cave Junction, Josephine County. Both are highly developed valley bottoms.

APPENDIX D (continued)

Plagiobothrys hirtus

Range Description

Plagiobothrys hirtus occurs only in Douglas County, Oregon, near the towns of Sutherlin and Yoncalla, although habitat in the valley 50 miles to the north appears to be appropriate for this species.

Stephanomeria malheurensis

Habitat Description

Found only on the top of a broad hill above surrounding flats. The soil is derived from volcanic tuff layered with thin crusts of limestone. The surrounding soils are derived from basalt. Assoc. species: *Artemisia tridentata*, *Chrysothamnus nauseosus*, *C. viscidiflorus*, *Salsola kali*, and most recently, *Bromus tectorum*. The closest similar substrate is miles away. *S. malheurensis* seems to be one of the few species able to survive near harvester ant hills.

Range Description

Endemic to central Harney Co., Oregon, U.S.A. near Malheur and Harney lakes.

Plants listed as Threatened

Castilleja levisecta

Habitat Description

Inhabits gravelly prairies at low elevations, generally where damp in the winter but not from standing water. Associated species: *Sidalcea campestris*, *Camassia* spp., *Potentilla* spp., *Delphinium pavonaceum*, *Aster hallii*, & *Deschampsia* sp.

Range Description

Historically known from low elevations west of the Cascades from Vancouver Island south through the Puget Trough of Washington to the Willamette Valley in Oregon. Currently thought to have been extirpated from Oregon and southwestern Washington.

Howellia aquatilis

Habitat Description

Inhabits low elevation ponds or sloughs, submersed or partially floating on the surface of slow moving water. Seasonal pools in *Fraxinus latifolia* woodland is one known locality in Clark County, WA. Associated species include *Spiraea douglasii*, *Callitriche heterophylla*, *Fontinalis antipyretica*, *Ranunculus aquatilis*, and *Veronica* spp. Absent from pools with introduced carp. Carp muddy water and eat all aquatic vegetation.

Range Description

W Washington and NW Montana; Idaho?; 6-10 sites recently found in Mendocino County, California (K. Wolcott, Northern Central Valley Fish and Wildlife Office, pers. comm. to K. Maybury, 7/97). Possibly extirpated in Oregon.

Lupinus sulphureus ssp. kincaidii

Habitat Description

Grasslands and open woodlands at low elevations in the Willamette and Umpqua Valleys.

Range Description

Willamette and Umpqua Valleys, Oregon.

APPENDIX D (continued)

Mirabilis macfarlanei

Habitat Description

Prefers steep slopes with sunny exposure at approx. 330-450m elevation. The substrate is talus loosely covered with soil. Assoc. species: *Agropyron spicatum*, *Balsamorhiza sagittata*, *Phacelia heterophylla*, *Phacelia linearis*, *Cryptantha* sp.

Range Description

Mirabilis macfarlanei is narrowly endemic to portions of the Snake, Salmon, and Imnaha river canyons in Wallowa County in northeastern Oregon, and adjacent Idaho County in Idaho. The species global range is approximately 28.5 miles (46 km) by 17.5 miles (28.5 km).

Sidalcea nelsoniana

Habitat Description

Inhabits gravelly, wet soils. Once an undisturbed wet prairie species, now it's found primarily where remnant patches of native grassland species still occur, often where prairie merges with deciduous woodland.

Range Description

75-80% are in Oregon's Willamette Valley; the rest are in the Coast Range (except for 1 pop. in WA, which may have been introduced).

Silene spaldingii

Habitat Description

Inhabits undisturbed prairie on loessal hills, at low to mid elevations. Occasionally found in sagebrush scabland or open woodland. Associated species: *Crataegus douglasii*, *Symphoricarpos albus* & *Festuca idahoensis*. In Oregon, most sites are east or northeast slopes, in the *Festuca idahoensis*-*Koeleria nidita* plant association. The largest populations, however, occur on the Wallowa Lake terminal and lateral moraines in various aspects, and in an unusual habitat dominated by *Artemisa ludoviciana* and *Festuca idahoensis*.

Range Description

Regional endemic restricted to remnants of the Poulouse Prairie grasslands of eastern Washington, northeastern Oregon, northern Idaho, and western Montana (barely extending into British Columbia, Canada).

Thelypodium howellii* ssp. *spectabilis

Habitat Description

Occurs in moist, alkaline valley bottoms, dominated by basin wildrye, alkali-grasses (*Distichlis stricta*, *Puccinella lemmonii*, *Poa juncifolia*), and black greasewood. Sites are usually in alluvial outwash areas, near streams or rivers, with seasonal moisture.

Range Description

Endemic to the northeastern corner of Oregon, occurring in the Baker-Powder River valley in Baker and Union Counties (Fish and Wildlife Service 1999).

APPENDIX D (continued)

Candidate Plants for listing

Artemisia campestris var. *wormskioldii*

Habitat Description

Rocky, sandy and cobbly shoreline and banks of rivers.

Range Description

The taxon is restricted to the Columbia Basin Province in Washington and historically Oregon. Only 2 EOs are known, separated by about 200 river miles. Reports of this variety from Canada, California, and Greenland (Kartesz, pre-1997 datasets) are erroneous; in the August, 1997, review draft of his revised distribution data, Kartesz accepts only the Oregon and Washington reports for this plant.

*Botrychium lineare***

Habitat Comments: Wagner and Wagner (1994) stated that it is difficult to describe a typical habitat for this species because the known sites are so different. It has been found mostly at higher elevations (about 1500-3000 m) in mountains, but specific habitats have ranged from a meadow dominated by knee-high grass, shaded woods and woodlands, grassy horizontal ledges on a north-facing limestone cliff, and a flat upland section of a river valley. Possibly a colonizer of disturbed, early seral habitats (USFWS 2003).

Range: *B. lineare* is currently known from 12 widely disjunct sites in Colorado, Idaho, Oregon, Montana, Nevada, and Washington, with historic collections from California, Quebec, and possibly New Brunswick. Limited monitoring and survey efforts continue to locate some new populations (USFWS 2003).

*Calochortus persistens***

Habitat Comments: Rocky, open areas within coniferous forests. 1000-1500 m elevation.

Range: Endemic to the Siskiyou Mountains of northern California and southwest Oregon.

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