

Conservation Agreement
For
Calochortus coxii (Crinite Mariposa Lily)



U.S. Department of the Interior
Bureau of Land Management
Roseburg District

U.S. Department of the Interior
Fish and Wildlife Service
Roseburg Field Office

January 2004

Conservation Agreement for *Calochortus coxii* (Crinite Mariposa Lily)

This conservation agreement is directed at providing protection and enhancement of crinite mariposa lily (*Calochortus coxii* M. R. Godfrey & F. T. Callahan) (*C. coxii*) and its habitat on lands managed by the Roseburg District, Bureau of Land Management (BLM), Roseburg, Oregon.

Extensive surveys were conducted under contract by the Bureau of Land Management (BLM) between 1988 and 1992 (Fredricks 1989, Kagan 1993). The BLM has been monitoring population trends since 1993. A status review was completed for the U.S. Fish & Wildlife Service (FWS) in 1992 (Fredricks *et al.* 1992). Based on this information, *C. coxii* is considered a Species of Concern by the FWS and has been designated as a Bureau Sensitive Species by the BLM and an endangered species by the State of Oregon. *C. coxii* is listed as Endangered by the State of Oregon and is ranked as a G1S1 (Globally and State Imperiled) species by the Oregon Natural Heritage Program.

The purpose of this conservation agreement is to identify and schedule management actions that will remove or limit threats to *C. coxii* and provide for its long-term survival. The signatories understand that implementation of this conservation agreement is intended to reduce or eliminate existing threats to *C. coxii*, however, the conservation agreement shall not preclude any person or agency from listing or recommending the listing of *C. coxii* under the ESA.

The life of this agreement will be ten years, following signatures, after which time the status of *C. coxii* along with the objectives and methods included in the strategy will be re-evaluated.

I. SPECIES INVOLVED

Calochortus coxii (Crinite mariposa lily)

C. coxii is a member of the lily family (Liliaceae). The taxon was described by Ray Godfrey and Frank Callahan (1988). It is a perennial bulb-forming species that lies dormant from August to January, begins above-ground growth in late January, blooms from May to July, fruits in July, and senesces in August and September. Its leaves are flat and narrow, slightly-curved, grass-like blades. The hairy flower petals are white with a yellow band above a magenta to violet base. The yellow anthers make a distinctive contrast to the petals.

II. INVOLVED PARTIES

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III. AUTHORITY

Authority for the involved parties to enter into this voluntary conservation agreement is derived from the:

1. Endangered Species Act (ESA) of 1973, as amended
2. Fish and Wildlife Act of 1956, as amended
3. Fish and Wildlife Coordination Act, as amended
4. Federal Land Policy and Management Act of 1976

IV. DISTRIBUTION AND HABITAT OF THE SPECIES

The distribution and habitat of *C. coxii* have been well defined. *C. coxii* is a narrow endemic species occurring exclusively in Douglas County, Oregon, in the South Umpqua River drainage (Appendix A). The distribution of *C. coxii* is restricted to 24 separate occurrences running northeast to southwest along a ten-mile serpentine ridge system between Myrtle Creek and Riddle, Oregon, and transected by Interstate 5.

C. coxii habitat consists of forest, shrub, and meadow communities on serpentine soils. It is primarily found in the transition zone between coniferous forests and grass-shrub meadows (Fredricks 1993). The most vigorous sites occur in open forest and meadows. *C. coxii* typically occurs in relatively intact and undisturbed plant communities (Fredricks 1993).

The occurrences of *C. coxii* have been arbitrarily divided into three clusters, although they are all part of one large metapopulation. The northern cluster occurs east of Interstate 5 and supports four occurrences. The central and southern clusters border the Interstate 5 corridor on the west side. The central cluster supports 11 occurrences and the southern cluster supports nine occurrences.

1. Northern Cluster. This cluster is composed of four occurrences and extends about four miles along a ridge east of Interstate 5. These occurrences support large concentrations of plants. Occurrences labeled Bilger 1 and 4 are separated by about 2000 feet of marginal to unsuitable habitat for *C. coxii*. Occurrences 1 and 2 are relatively close and may have been continuous at some time in the past. Likewise, occurrences 3 and 4 are relatively close and may have also been

continuous at some time in the past. The total population of the northern cluster (Appendix B) has been estimated as high as 9.5 million plants based on BLM monitoring data (Holmes 1999). Public land represents approximately 44 percent of the total occupied habitat and supports an estimated 5.6 million plants.

A. Bilger 1 and 2.

These are the most northeasterly occurrences of *C. coxii*. These occurrences are located on approximately 201 acres. Habitat consists of open woodland and serpentine grassland. Approximately 38 percent of the habitat is located on public land. The aspects range from northeast to southeast and elevation ranges between 1500 to 2400 feet. Bilger 1 has been impacted by quarry development, road construction, logging and aerial herbicide application on private land.

B. Bilger 3 and 4

These two occurrences occupy a total of 169 acres. Habitat consists of open Jeffrey pine/incense cedar (*Pinus jeffreyi/Calocedrus decurrens*) woodland and serpentine grassland. Approximately 83 percent of the habitat is on public land. The occurrences extend from a point southwest of the summit which is labeled Myrtle Creek on the U.S. Geological Survey 7.5 minute quadrangle map and continue approximately two miles northeast. Habitat on private land in the Bilger 4 occurrence has been selectively logged, resulting in open canopy conditions.

2. Central Cluster. This cluster supports 11 occurrences distributed over approximately 3 miles of habitat west of Interstate 5. The total population for the central cluster has been estimated at 1826 based on surveys conducted between 1988 and 1992 (Fredricks 1989, Kagan 1993), although five of the 11 occurrences have no estimates documented (Appendix B). Public land represents approximately 13 percent of the total occupied habitat.

A. Boomer Hill Occurrence

This 21 acre occurrence is located entirely on private land on lower slopes above Interstate 5 and the South Umpqua River. Habitat consists of a combination of open woodland and serpentine grassland. The number of plants has been estimated at 400. The site has been grazed by cattle and selectively logged.

B. Myrtle Creek Occurrences

These seven small to moderately sized occurrences are located on middle to upper slopes and ridge-tops and total 185 acres. Only a small portion of these occurrences (16 percent) are located on public land. The total number of plants has been estimated at 1406, although the population sizes of three of the occurrences have not been documented. Aspect varies from southeast to northeast but is primarily northeast to north. Elevation

ranges from 600 feet to 2100 feet. The occurrences have been grazed by cattle and selectively logged. Yellow starthistle (*Centaurea solstitialis*), a noxious weed, has spread up slope from Interstate 5 and could jeopardize the viability of these occurrences.

C. Sheep Hill Occurrences

These two occurrences are located on mid to upper slopes and total 51 acres. Sheep Hill 1 (5 acres) occurs entirely on public land and Sheep Hill 2 (46 acres) occurs entirely on private land. Total number of plants for Sheep Hill 1 has never been documented and the site has not been relocated since its discovery. The population of Sheep Hill 2 has been estimated at 20. Aspect varies between northeast and northwest and elevation ranges from 1700 to 2400 feet. Sheep Hill 1 has been logged. Sheep Hill 2 has been grazed by cattle and yellow starthistle is present.

D. Weaver Occurrence

This occurrence is located on a mid-slope and totals five acres. It is privately owned and the number of plants has never been documented. Aspect varies from north to northwest and elevation ranges between 1600 and 1700 feet. The site has been selectively logged and grazed by cattle.

3. Southern Cluster. This cluster supports nine occurrences distributed over approximately 2 miles of habitat west of Interstate 5 and approximately 3.5 miles southwest of the town of Myrtle Creek, Oregon. Population size has been estimated to be over 1.7 million based primarily on BLM monitoring studies at Langell Ridge (Holmes 1999). Public land represents approximately 55 percent of the total occupied habitat.

A. Baker Flat Occurrence

The Baker Flat occurrence is very small and located mid-slope on private land. It has an east aspect and its elevation is 1700 feet. Only two plants were documented in 1992 when the site was first discovered. The site has never been revisited and its status is unknown. It is located in an area that has been open to cattle grazing.

B. Mt. Rambler Occurrence

The Mt. Rambler occurrence is also small, encompassing approximately one acre in size, and located mid-slope on public land. It has a northwest aspect and ranges between 1400 and 1600 feet in elevation. Population estimates have ranged as high as 100 plants. The occurrence is located in open forest that has not been subject to logging, grazing or other disturbances since it was documented in 1993.

C. Red Ridge Occurrences

These occurrences consisting of one large and five smaller areas are located on approximately 66 acres of private and public land. Approximately 45 percent of the acreage is on public land. The habitat varies from open serpentine grassland and shrub land to Jeffrey pine savanna. Highest densities of plants are found on the north facing aspects along the ridges which extend east from Mt. Rambler. Elevation ranges between 900 and 1800 feet. Population estimates have been documented only for the largest occurrence on Mt. Rambler (Red Ridge 1). The size of this occurrence has been documented at 1000 plants. Recent logging and road construction on private land has occurred in all of the Red Ridge occurrences.

D. Langell Ridge Occurrence

This occurrence is located on approximately 143 acres of which 60 percent is public land. This is a fairly stable and continuous occurrence of over 1.7 million plants. The habitat is primarily open Jeffrey pine. Plants occur in low densities with infrequent and isolated dense patches. This site includes the ridge and north slope. The elevation ranges between 900 and 1900 feet. Logging has occurred within the occurrence on private land. Ecological succession is producing closed canopy forest in portions of the habitat on public land.

V. PROBLEMS FACING THE SPECIES

Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

Succession and Fire Exclusion. *C. coxii* occurs in areas with a very high natural fire frequency, due to hot, dry summers and abundance of lightning strikes. In addition, it is quite possible that the native (pre-European settlement) people used prescribed fires to maintain a more open habitat. Effects of fire exclusion over the last 80 years have allowed the encroachment of woody early-successional plant species, thus drastically altering much of the *C. coxii* habitat. The majority of the sites for this species occur in open, conifer woodlands. Reintroduction of natural or prescribed fires into its habitat is likely to be difficult because of the increase in rural housing developments, adjacent commercial timber stands, and the potential difficulty of fire control in the rugged terrain. However, without some reintroduction of fire, the species is expected to continue to decline (Kagan 1993).

Noxious Weed Invasion. Noxious weeds have been observed adjacent to and within *C. coxii* habitat. Yellow starthistle has been documented in the Myrtle Creek Beacon and Sheep Hill occurrences. Rush skeleton weed (*Chondrilla juncea*) has been documented near the Langell Ridge, Bilger Ridge, and Myrtle Creek Beacon occurrences. Other noxious weed species occurring in or near *C. coxii* are medusa-head (*Taeniatherum caput-medusa*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), and Italian thistle (*Carduus pycnocephalus*). Additional non-native species of concern are hedgehog dogtail grass (*Cynosurus echinatus*), cheatgrass (*Bromus tectorum*), and Malta

starthistle (*Centaurea melitensis*). Unrestrained expansion as well as unmitigated treatment of noxious weeds could adversely impact the species.

Logging. Populations have been impacted by logging practices which have resulted in major soil disturbances and the replanting of dense closed canopy forests. At the Bilger 4 occurrence, selective logging with little soil disturbance has served to increase habitat available for this species by reducing the effect of recent fire suppression which is changing the nature of many of the occurrences of *C. coxii* (Kagan 1993).

Grazing. Much of the habitat shows evidence of past or present livestock grazing by cattle and/or sheep. Evidence suggests that livestock grazing may place occurrences of *C. coxii* at risk. Studies have shown that individual plants are adversely affected by the removal of leaves by grazing (Fredricks *et al.* 1992). Evidence indicates removal of leaves results in depletion of carbohydrate reserves and results in reduction in size and reproduction in the years following grazing. Like many bulbous perennials, *C. coxii* is apparently very slow growing, so re-establishment may take decades and stabilization of the population structure may be slow (Fredricks *et al.* 1992). Plants have been observed to be restricted to ungrazed habitat at three separate locations (Kagan 1993).

Mining. All of the sites for *C. coxii* occur on serpentine soils. Though no mining has been observed at any of the populations, serpentine soils are noted for their mineral potential. The Hanna Nickel Mine occurs less than three miles from the Langell Ridge occurrence, clearly showing that extractable quantities of minerals occur in the vicinity. Mining has become a serious threat for other serpentine endemic species and is considered a threat for *C. coxii* as well.

Road Construction. Road construction impacts *C. coxii* occurrences by removing occupied habitat. Road construction is a much greater threat to smaller plant occurrences than larger ones. Road construction can seriously disrupt or destroy small occurrences, especially along ridges.

Road construction can also provide a conduit for the spread of noxious weeds. Road building equipment and vehicles using the roads may introduce noxious weed seed.

Recreation and Off-Highway Vehicle (OHV) Use. OHV use can destroy *C. coxii* plants and degrade their habitat. Impacts from OHV use include crushing of plants, increased soil compaction, increased soil erosion, and introduction of noxious weed species.

Overutilization for Commercial, Sporting, Scientific or Educational Purposes

Bulb Collecting. It has been well documented that bulbs of *Calochortus* have been extensively collected in the past. In the late 1800's one individual was reported to have collected over a quarter of a million *Calochortus* bulbs in one year (Fredricks 1989).

Disease or Predation

Disease. There are no known diseases of concern affecting *C. coxii*.

Herbivory. Native wildlife and insect predation of the buds, flowers, and capsules causes significant impact on seed production. Grazing by black-tailed deer and rabbits or other herbivores may result in near total loss of capsules from certain areas. Monitoring studies (Fredricks 1989, Holmes 1991 & 1992) have shown that as many as 83 percent of the plants that have produced buds have been grazed before they produced capsules and disseminated seeds.

Inadequacy of Existing Federal Regulations

Mining Regulations and the State and Federal ESA. *C. coxii* is listed as endangered by the State of Oregon and a Bureau Sensitive species by the BLM. Even though the federal ESA does not apply to Bureau Sensitive species, existing policy and regulations provide adequate authority to protect the species by the respective governments with two exceptions. First, mining regulations (43 CFR 3809) could permit mining exploration and mining development that could significantly impact *C. coxii* and its habitat. Secondly, neither the state or federal endangered species acts nor Bureau policy provides protection on private land.

VI. CONSERVATION ACTIONS THAT WILL BE CARRIED OUT

Management Objective

The objective of the management actions proposed in this conservation agreement are to remove or minimize the threats facing *C. coxii* so as to preclude the need to federally list it as threatened or endangered. The effectiveness of the management actions will be monitored. The monitoring plan will be reviewed annually by BLM and FWS and adjusted as needed to meet management objectives.

Monitoring

Monitoring Objective: To detect a significant change in population, subpopulation, occurrence numbers, or habitat between sampling periods.

A monitoring plan for *C. coxii* will be designed within one year of the signing date of this agreement to evaluate effectiveness of the management actions as well as demographic trends. The plan will determine the degree or conditions of demographic or suitable habitat declines necessary to trigger a change in management actions for *C. coxii*. Serious declines in habitat quality or demographics from the established baseline (in plant numbers and area occupied) at sites identified as critical populations will trigger management actions if the cause of the decline is obvious. Management actions will include those activities that are most suitable to reduce

threats to the populations or habitat and stop the respective decline. If the cause or causes of the decline is not obvious, it will trigger intensive studies to determine the cause of the decline.

Management Actions

The Bureau of Land Management shall:

- Pursue voluntary protection by adjacent land owners through cooperative agreements or the Oregon Register of Natural Heritage Resources which is managed by the Oregon Natural Heritage Information Center.
- Investigate the natural fire return interval for *C. coxii* habitat areas. Prescribe burn habitat on public land on a frequency that approximates the natural fire return interval and/or thin or girdle trees to produce gaps in forest habitat.
- Restore meadow habitat with native bunchgrasses or other native species, as appropriate.
- Inventory and control invasive and noxious weeds using integrated pest management (manual, mechanical, biological and chemical control methods).
- Exclude livestock inside habitat boundaries on BLM land to remove grazing impacts.
- Monitor plants on public land to determine population trend and effects of management treatments.
- Notify FWS when mining applications, notices of intent, or plans of operation indicate mining activity within *C. coxii* habitat.
- Collect seed for storage at the Berry Botanic Garden Cryogenic Seed Bank, as needed.
- Report on monitoring results and the implementation of conservation activities to FWS Field Office in Roseburg, Oregon by the end of each calendar year.
- Maintain an implementation schedule for all of the proposed management actions (see Appendix C).

The U.S. Fish & Wildlife Service shall:

- Forward all new information on *C. coxii* to the South River Field Manager of the Roseburg BLM.
- Refer all inquiries on management activities to the Field Manager of the South River Field Office.

- Participate in monitoring, site habitat evaluation, and monitoring design.
- Review monitoring data and conservation activities in cooperation with the BLM and recommend changes in the status of *C. coxii*, as appropriate.
- Cooperate in cost sharing conservation actions identified in this agreement as funding permits.

The Agencies shall:

- Identify quantifiable performance measures to monitor agreement compliance and effectiveness.


VII. FUNDING AND IMPLEMENTATION OF CONSERVATION MEASURES

At the time of the signing of this conservation agreement the Roseburg District of the BLM has already dedicated funds for a portion of the management actions and expect that funding will continue. Monitoring efforts have occurred in the past and are expected to continue to be funded in the future. Funds required for the implementation of these conservation measures may come directly from the funding of staff positions which are expected to remain at or above current levels for both the BLM and the FWS. Both agencies are committed to seeking funding to implement this conservation agreement each year.

VIII. DURATION OF AGREEMENT

The duration of this conservation agreement is for ten years following the date of the last signature. At the end of ten years, the involved parties identified in Section II will review the agreement and determine if it should be renewed, modified, or terminated. If some portion of this agreement cannot be carried out or if cancellation is desired, the party requesting such action will notify the other party within one month of the changed circumstances.


IX. SIGNATURES



 E. Dwight Fielder
 Field Manager
 South River Field Office, Roseburg District BLM



 Date



 Craig Tuss
 Field Supervisor
 U.S. Fish & Wildlife Service, Roseburg Field Office

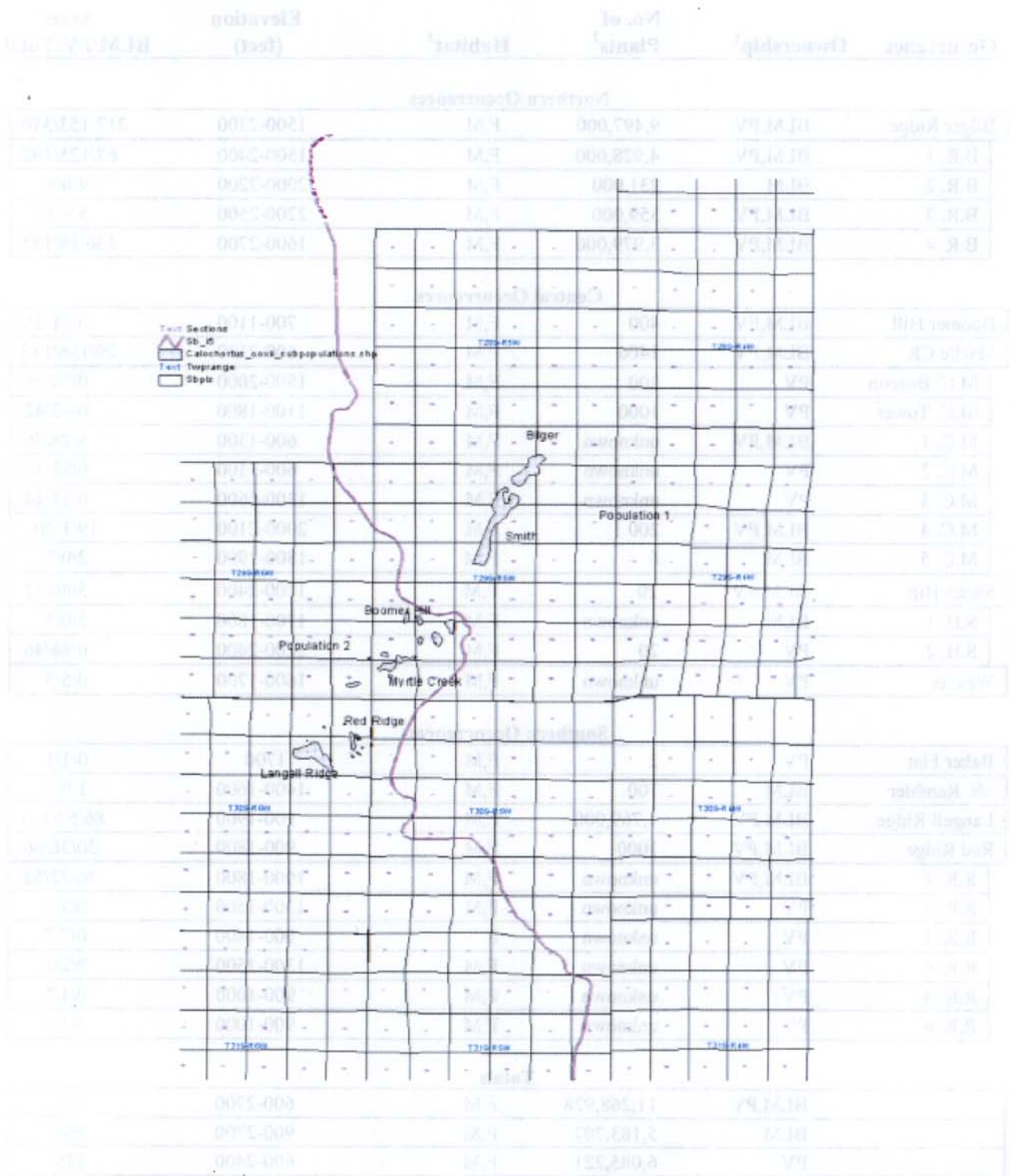


 Date

X. ATTACHMENTS

- Appendix A *Calochortus coxii* Occurrence Map
- Appendix B Population Data Summary
- Appendix C Implementation Schedule
- Appendix D References

Appendix A *Calochortus coxii* Occurrence Map



Occurrence data for *Calochortus coxii* were derived from the 10' x 10' grid. The map shows the distribution of *Calochortus coxii* in the Sierra Nevada mountains. The map is based on data from the 1993 California Rare Plant Inventory Project. The map is based on data from the 1993 California Rare Plant Inventory Project. The map is based on data from the 1993 California Rare Plant Inventory Project.

APPENDIX B
Population Data Summary

Occurrence	Ownership ¹	No. of Plants ²	Habitat ³	Elevation (feet)	Acres BLM/PV/Total
Northern Occurrences					
Bilger Ridge	BLM,PV	9,497,000	F,M	1500-2700	217/153/370
B.R. 1	BLM,PV	4,928,000	F,M	1500-2400	67/125/192
B.R. 2	BLM	231,000	F,M	2000-2200	9/0/9
B.R. 3	BLM,PV	359,000	F,M	2200-2500	5/9/14
B.R. 4	BLM,PV	3,979,000	F,M	1600-2700	136/19/155
Central Occurrences					
Boomer Hill	BLM,PV	400	F,M	700-1100	0/21/21
Myrtle CR	BLM,PV	1406	F,M	600-2100	29/156/185
M.C. Beacon	PV	200	F,M	1800-2000	0/59/59
M.C. Tower	PV	1000	F,M	1100-1800	0/42/42
M.C. 1	BLM,PV	unknown	F,M	600-1300	8/28/36
M.C. 2	PV	unknown	F,M	600-1100	0/12/12
M.C. 3	PV	unknown	F,M	1300-1600	0/14/14
M.C. 4	BLM,PV	200	F,M	2000-2100	19/1/20
M.C. 5	BLM	6	F,M	1800-1900	2/0/2
Sheep Hill	BLM,PV	20	F,M	1700-2400	5/46/51
S.H. 1	BLM	unknown	F,M	1700-1800	5/0/5
S.H. 2	PV	20	F,M	2200-2400	0/46/46
Weaver	PV	unknown	F,M	1600-1700	0/5/5
Southern Occurrences					
Baker Flat	PV	2	F,M	1700	0/1/1
Mt. Rambler	BLM	100	F,M	1400-1600	1/0/1
Langell Ridge	BLM,PV	1,769,000	F,M	900-1900	86/57/143
Red Ridge	BLM,PV	1000	F,M	900-1800	30/36/66
R.R. 1	BLM,PV	unknown	F,M	1000-1800	30/22/52
R.R. 2	PV	unknown	F,M	1300-1500	0/3/3
R.R. 3	PV	unknown	F	900-1400	0/7/7
R.R. 4	PV	unknown	F,M	1300-1500	0/2/2
R.R. 5	PV	unknown	F,M	900-1000	0/1/1
R.R. 6	PV	unknown	F,M	900-1000	0/1/1
Totals					
	BLM,PV	11,268,928	F,M	600-2700	843
	BLM	5,183,707	F,M	900-2700	368
	PV	6,085,221	F,M	600-2400	475

¹Ownership: BLM=Bureau of Land Management, PV=Private

²Numbers of plants: Bilger and Langell Ridge derived from BLM monitoring data. Boomer, Myrtle Cr, and Red Ridge derived from 1993 Challenge Cost Share Inventory Project

³Habitat: F=Forest, M=Meadows

Appendix C
Implementation Schedule

Management Action	Occurrence ¹	Begin Date	End Date	Frequency
Seed Collection	A, B, C, D, E	2003	2013	As Needed
Prescribe Burn	A, B, E	2003	2013	10-20 Year
Meadow Restoration	A, B, C	2003	2013	10 Year
Thinning	A, B, E	2003	2013	10 Year
Noxious Weeds	A, B, C, D, E	2003	2013	Annual
Threat and Habitat Monitoring	A, B, E	2003	2013	Annual
Management Treatment Monitoring	A, B, C, D, E	2003	2013	Annual
Demographic Monitoring	A, B, E	2005	2013	5-10 Year

¹Occurrence

- A = Bilger Ridge 1, 2
- B = Bilger Ridge 3, 4
- C = Myrtle Creek 1, 4, 5 & Sheep Hill 1
- D = Red Ridge 1 & Mt. Rambler
- E = Langell Ridge

Appendix D
References

- Fredricks, N.A. 1989. *Calochortus coxii*. Preliminary Status Report and Summary of Field Studies. Prepared for the Oregon Department of Agriculture and the Roseburg District BLM.
- Fredricks, N.A. K. Kuykendall and R.J. Meinke. 1992. Status Report for *Calochortus Coxii*. Unpublished report prepared for the U.S. Fish and Wildlife Service. Oregon Department of Agriculture, Salem, Oregon.
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