

CONSERVATION ASSESSMENT

FOR

MIMULUS CLIVICOLA (bank monkeyflower)

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## INTRODUCTION

The National Forest Management Act of 1976 and Forest Service policy require that Forest Service land be managed to maintain populations of all existing native animal and plant species at or above the minimum viable population level (USDA Forest Service 1991). A minimum viable population consists of the number of individuals, adequately distributed throughout their range, necessary to perpetuate the existence of the species in natural, genetically stable, self-sustaining populations.

The Forest Service, along with other Federal and State agencies, has recognized the need for special planning considerations in order to protect the flora and fauna on the lands in public ownership. Species recognized by the Forest Service as needing such considerations are those that (1) are designated under the Endangered Species Act as endangered or threatened, (2) are under consideration for such designation, or (3) appear on a regional Forest Service Sensitive Species<sup>1</sup> list.

Mimulus clivicola Greenman (bank monkeyflower) is a regional endemic<sup>2</sup> of the interior Pacific Northwest. The species is documented from northern Idaho, west-central Idaho, and extreme northeastern Oregon. Presently, Mimulus clivicola is listed as a Sensitive Species in U.S. Forest Service Regions 1, 4 and 6, and is designated as a Category 3c<sup>3</sup> candidate by the USDI Fish and Wildlife Service (1991).

The objective of this Conservation Strategy is to outline a plan for the management of Mimulus clivicola throughout its range, which occurs in two states, five National Forests, and three Forest Service Regions. The guide is designed to coordinate management of Mimulus clivicola between the various Forests and Regions and to ensure the species' survival through time.

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<sup>1</sup> Sensitive Plant Species - a plant species, or recognized subspecies or variety, for which the Regional Forester has determined there is a concern for population viability, within a state, as evidenced by significant current or predicted downward trend in populations or habitat (USDA Forest Service 1991).

<sup>2</sup> A species confined naturally to a certain limited area or restricted locality. In this instance, confined to narrow river canyons in northern Idaho and extreme northeastern Oregon.

<sup>3</sup> Category 3c - former candidate taxa that have proven to be more widespread or abundant than previously believed, or are not subject to identifiable threats (USDI Fish and Wildlife Service 1991).

This guide is divided into two major sections. The first summarizes the most recent biological information about Mimulus clivicola. The second section identifies the procedures needed to conserve and enhance the species. This guide will be updated periodically as new information is obtained.

Most of the information presented here has been compiled from previous reports on Mimulus clivicola, including Lorain and Moseley (1989 and 1990) and Lorain (1991). Detailed information regarding mapped locations, demographic data, survey methods, and areas surveyed are documented in these reports and will not be presented here.

## BIOLOGICAL INFORMATION

### Nomenclature and Description:

Scientific Name: Mimulus clivicola Greenm.  
Common Name: bank monkeyflower  
Family: Scophulariaceae (Figwort family)  
Synonymy: Eunanus clivicola Heller  
Type Specimen: "Idaho, slopes near the foot of  
Weissner's Peak, Kootenai County"  
Sandberg, MacDougal, and Heller  
8 July 1892

Mimulus clivicola is a diminutive, generally single-stemmed annual. Mature plants possess large (1-2 cm long), showy, pink flowers that bloom from late May or early June through mid-July (approx. 6 weeks). The leaves are opposite and mostly elliptic in shape. Sticky, glandular hairs cover the entire plant and produce a distinct musky odor when the herbage is rubbed between the fingers.

The following technical description of Mimulus clivicola is adapted from Cronquist (1959) and Greenman (1899):

Low herbaceous annual, 2 to 15 cm tall, strongly glandular pubescent throughout; stems simple (mostly) or branched from near base; leaves oblanceolate to elliptic, mostly 0.5-3 cm long and 2-12 mm wide, scarcely 3-nerved, obtuse or merely acutish, entire or more commonly with scattered small teeth towards apex; flowers axillary, short-pedicellate initially, pedicel later elongating 3-7 mm; calyx 5.5-8 mm long at anthesis, about equally 5-toothed, teeth sharp, 1-2 mm long; corolla pale purple or pink, often marked with yellow spots at the throat, 1.2-2 cm along, evidently bilabiate and funnelform, pubescent in the throat, the lobes bearing a few scattered hairs on upper or inner surface, persistent for some time after withering; capsule lance-linear, curved, exserted and slightly overtopping the persistent calyx, dehiscent; placenta splitting to the base at maturity, the halves adherent to their respective valves.

Illustrations of Mimulus clivicola from Cronquist (1959) are found in Appendix A.

Although essentially allopatric from other Mimulus that might prove confusing, Mimulus clivicola and closely related Mimulus nanus are known to co-occur at one site in Oregon. Moreover, the ranges and habitats of these two taxa overlap in the southern portions of the distribution of Mimulus clivicola. A list of key characters of these two taxa is provided here to aid in identification.

Mimulus clivicola -

- generally pale pink flowers
- pedicels 2+ mm long in flower, enlongating to 3-7 mm in fruit
- fruit capsule narrow, curved and exserted beyond calyx
- evident, long glandular pubescence (hairs) with strong musky smell

Mimulus nanus -

- deep purple/pink (magenta) flowers
- pedicels lacking or very short (1-3 mm)
- fruit capsule ovate and obtuse
- pubescence (hairs) quite short and less aromatic

Background Information:

Mimulus clivicola was first collected by Sandberg, MacDougal, and Heller on 8 July 1892 from "Idaho, slopes near the foot of Weissner's Peak, Kootenai County." The taxon was formally described by Greenman (1899).

Since its description, little attention has been given to this diminutive annual and few collections were made over the next 80 years. The species was considered to be an extremely rare regional endemic known only from a few sites in northern Idaho and adjacent Washington, and far northeastern Oregon. Formal surveys for Mimulus clivicola in Idaho were initiated in the late 1980's by the Forest Service through contracts to the Idaho Natural Heritage Program (Caicco 1987a, 1987b). The results documented five extant, ten historical, and four possibly extirpated populations. All extant populations consisted of fewer than 100 individuals in 1987 and 1988. Threats to this taxon appeared to be competition from native and exotic weeds, road construction and maintenance, prior inundation by Dworshak Reservoir, and recreational disturbance (Caicco 1987a, 1987b, 1988).

During the 1989 and 1990 field seasons, field surveys for Mimulus clivicola were conducted on the Nez Perce, Clearwater, Idaho Panhandle, and Payette National Forests in Idaho and the Wallowa-Whitman National Forest in Oregon by the Idaho Natural Heritage Program (Lorain and Moseley 1989, 1990). These investigations revealed the presence of many more populations (additional 56) of this species than were previously known. Field surveys conducted by Forest Service Botanists during 1991 and 1992 have added additional populations (12). Some 74 population sites are now documented for Mimulus clivicola in Idaho, from portions of the St. Joe, North Fork Clearwater, Selway, Lochsa, and South Fork Clearwater River canyons, the Elk Creek Falls vicinity, Carrill Peak, and the Bear-Cuprum area of west-central Idaho (Idaho Conservation Data Center 1992). In Oregon, a total of 15 extant

sites are documented for Mimulus clivicola, mostly restricted to the North Pine Creek vicinity (Oregon Natural Heritage Data Base 1992). For more detailed information on exact site locations, areas surveyed and full demographic information see Lorain and Moseley (1989 and 1990) and the Idaho Conservation Data Center data base.

Despite the number of new populations and flowering individuals located between 1989 and 1992, Mimulus clivicola is a limited regional endemic with a very restricted and specific set of habitat requirements. The majority of the recently documented sites consist of fewer than 200 flowering individuals and many of the known populations occur within areas where human habitat-altering activities are taking place. In addition, virtually all of the known populations of Mimulus clivicola occur on land administered by the U.S. Forest Service.

#### Endangerment and Listing Status:

The present status of Mimulus clivicola according to concerned federal, state and private agencies is as follows:

USFWS: Category 3c (former candidate taxa that have proven to be more widespread or abundant than previously believed, or are not subject to identifiable threats (USDI Fish and Wildlife Service 1991)).

USFS: Sensitive in Regions 1, 4 and 6 (those species identified by a Regional Forester for which population viability is a concern, as evidenced by: a) significant current or predicted downward trends in population numbers or density, and/or b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (USDA Forest Service 1991)).

States: Idaho: State Rank S2 (imperiled because of rarity or because of other factors demonstrably making it very vulnerable to extinction (Moseley and Groves 1992)).

Oregon: List 1 - Taxa Endangered Throughout Range (taxa that are threatened with extinction or presumed to be extinct throughout their entire range (Oregon Natural Heritage Data Base 1989)).

Washington: Monitor (taxa of potential concern, but for which no status is assigned at this time) Group 1 (taxa in need of further field work before a status can be assigned (Washington Natural Heritage Program 1990)).



### Geographical Distribution:

Mimulus clivicola is a regional endemic of the interior Pacific Northwest. Floras describe this species as ranging from northern Idaho and adjacent Washington, southward to the southern end of the Snake River Canyon (Pine Creek, Union Co. [presently Baker Co.], Oregon)(Cronquist 1959).

Field surveys conducted from 1989 to 1992 document this taxon in Idaho from portions of the St. Joe, North Fork Clearwater, South Fork Clearwater, Selway, and Lochsa River canyons, the Elk Creek Falls vicinity, Carrill Peak, and the Bear-Cuprum area (Lorain and Moseley 1989, 1990; Simpson 1991, 1992; Blake 1992)(see Appendix B). Additional populations are known from northeastern Oregon in the North Pine Creek and Eagle Creek vicinities of the Wallowa-Whitman National Forest (Lorain and Moseley 1990, Kagan 1989, Meinke 1989, Brooks 1992). The majority (78/89) of documented extant sites for Mimulus clivicola are on lands administered by the Forest Service. These sites occur in three different Forest Service Regions and five different National Forests: the Idaho Panhandle, Clearwater, and Nez Perce National Forests (Region 1), the Payette National Forest (Region 4), and the Wallowa-Whitman National Forest (Region 6). In addition, two populations occurs on lands managed by the Bureau of Land Management (Coeur d'Alene District), nine sites occur on privately-owned land, and ten sites are either extirpated, historical or misidentified.

The Washington Natural Heritage Program's Illustrated Guide (Washington Natural Heritage Program 1981) indicates four historical locations for Mimulus clivicola, and lists its status as possibly extirpated. After reviewing the data, the species was reclassified to "Monitor," indicating that further field work is needed before a status can be assigned (Washington Natural Heritage Program 1990). Despite the fact that most of the floras of the Pacific Northwest describe this species as occurring in Washington, only one actual documented record for the state has been located: a single collection by George Vasey in 1889 from "Washington"; such a location is too vague to relocate with certainty (Thompson 1989). No recent surveys for Mimulus clivicola have been conducted in Washington and there currently appears to be no suitable habitat for the species in the state.

### Habitat Description:

Northern Idaho: Mimulus clivicola occurs within a narrow set of environmental conditions. Populations are almost exclusively found on southern aspects (south, southwest, and southeast) with steep slopes (generally > 60%). Elevations ranged between 1600 and 4100 feet, with the majority located below 3600 feet. Plants are typically found growing in open pockets of moist, exposed mineral soil created by natural or human-caused disturbances (i.e., tops of roadcuts or in areas of big game animal activity). Soils are relatively deep and loose and are primarily derived from decomposed schist or gneiss. A combination of steep slopes and the loose nature of the decomposed granitics cause a highly erosive soil condition.

One of the most important factors favoring this annual species appears to be the availability of spring moisture. All populations located in 1989 and 1990 were found in moist microhabitats such as seepages caused by perched water tables, areas where water channels following rain, or moist pockets created by elk tracks. These areas tend to dry out later in the summer, but retain enough moisture in the spring for seed germination and seedling establishment. When spring moisture is insufficient, numbers of observed individuals is very low or non-existent (Lorain personal observation 1990, 1991; Blake 1992). The largest and most vigorous populations were located on slopes 50-400 feet above river levels.

The habitats are comprised of open stands of Pinus ponderosa, Pseudotsuga menziesii and occasional Abies grandis dominated by a grass or shrub understory. The corresponding habitat types are Pseudotsuga menziesii/Festuca idahoensis (Douglas-fir/Idaho fescue), Pseudotsuga menziesii/Physocarpus malvaceus (Douglas-fir/ninebark), and Abies grandis/Physocarpus malvaceus (grand fir/ninebark)(Cooper et al. 1987). It is important, however, to note that although these habitat types are relatively xeric, they occur within a regional macroclimate that supports the Thuja plicata series habitat types.

Other species commonly found growing with Mimulus clivicola include Collomia linearis, Clarkia pulchella, Sedum lanceolatum, Pteridium aquilinum, Collinisa parviflora, Achillea millefolium, Agropyron spicatum, and Triodanis perfoliata. Two of the associated species, Clarkia pulchella and Collomia linearis, proved to be excellent indicators for identifying potential habitat. Not only were these species very consistent associates, but they were also easily distinguished from a distance. Additionally, two noxious weeds, Centaurea maculosa (spotted knapweed) and Hypericum perforatum (St. John's-wort or goat weed), were also commonly found as associated species.

West-central Idaho: Habitat for populations located in the Bear-Cuprum vicinity differed from those in northern Idaho. Dissimilarities were apparent in elevation, soil type, and associated plant communities. The Bear-Cuprum populations occurred at considerably higher elevations than the northern Idaho sites. Most populations ranged between 4200 and 5600 feet, with a single site extending to 7100 feet. Soils varied from moderately deep to thin, and were principally derived from basalt parent material.

Most of these populations occupied habitat conditions that were quite dry, namely within the Artemisia rigida/Poa secunda (stiff sagebrush/Sandberg's bluegrass) habitat type (Tisdale 1986). Associated species commonly encountered in this habitat type included two additional rare plants, Castilleja oresbia and Allium tolmiei var. persimile, along with Allium acuminatum, Lomatium dissectum, and Clarkia pulchella.

Several additional populations were found in situations similar to northern Idaho, in that they occurred in small openings in forest communities and/or near roadcuts. Habitat types included Pseudotsuga menziesii/Symphoricarpos oreophilus (Douglas-fir/mountain snowberry), and Pseudotsuga menziesii/Physocarpus malvaceus (Douglas-fir/ninebark) with scattered ponderosa pine trees. Associated plants included Carex geyeri, Collinsia parviflora, Antennaria luzuloides, Collomia linearis, Potentilla glandulosa, Paeonia brownii, Amelanchier alnifolia, Spiraea betulifolia, and Penstemon payettensis.

Northeastern Oregon: The Oregon populations of Mimulus clivicola exhibited a close similarity to the Bear-Cuprum populations. This was expected due to the close proximity of the two areas. Similarities existed in elevations, soil types, habitat, and certain associated species. Elevations ranged from a low of 2500 feet to as much as 5500 feet, with most populations occurring above 3500 feet. Soils were shallow, highly oxidized, quite gravelly, and derived from basaltic parent material. These soils were also reddish-colored with clay to clay loam surface horizons (Johnson and Simons 1987).

Preferred habitats were once again open sites with exposed mineral soils and moisture. More specifically, these sites included scabby openings that keyed to Cusick's camas seepage plant community type (Camassia cusickii - CACU)(Johnson and Simons 1987). This unique plant association occurs as small isolated communities within a well-defined zone on the Wallowa-Whitman National Forest, principally in the North Pine Creek vicinity. The Cusick's camas community type tends to occur beneath basalt rims where seepage water persists into early summer. As seepage duration and elevation decrease, these communities change from continuous, dense patches to smaller patches or separated

individuals within a bunchgrass type (Johnson and Simons 1987). The latter situation is most typical of sites that support Mimulus clivicola.

Species often found growing with Mimulus clivicola in Oregon included Camassia cusickii, Allium acuminatum, Calochortus eurycarpus, Sedum stenopetalum, Collomia linearis, Bromus tectorum, Collinsia parviflora, Achillea millefolium, Agropyron spicatum, Eriogonum heracleoides, and Perideridia bolanderi. Additionally, Mimulus clivicola was often found growing sympatrically with other annual Mimulus species such as Mimulus nanus, M. breweri, M. floribundus, and M. guttatus (annual form). Of all the associated species, Camassia cusickii proved to be the best indicator for identifying potential habitat of in Oregon. Not only was this species a very consistent associate, but it was also easily distinguished from a distance. Camassia cusickii, however, is far more abundant in the Pine Creek vicinity than Mimulus clivicola.

#### Population and Reproductive Biology:

Very little is known about the population or reproductive biology of Mimulus clivicola.

Mimulus clivicola is an annual. As with many annuals, this species reproduces solely by seed and exhibits erratic population fluctuations in flowering individuals in relation to annual weather conditions. Presumably, annual species have evolved to handle wide fluctuations in climatic conditions. Seeds generally remain viable as a seedbank in the soil until favorable conditions allow for germination. The number of individuals observed in recent years have been the flowering members of the population, with an unknown number of individuals remaining in the soil as seeds. While it appears that high spring precipitation results in good seed germination and flowering in Mimulus clivicola, this may mean very little in relation to the long-term viability of the species. To gain a better understanding of the population biology of this species it is essential that more information is gathered concerning the role of the seedbank and seed viability.

Successful seed germination studies conducted on seed collected from along the Lochsa River in northern Idaho, have been carried out by the Department of Biological Sciences at the University of Montana (Pavek and Mitchell-Olds 1990). Seeds apparently require three weeks of stratification (moist, cool conditions of 100% humidity at approx. 40° C) to germinate. Once this requirement is met, plants begin to emerge in 12 days and virtually all the plants have emerged by day 19. Percent germination appears to be quite high, through no actual values were obtained. The first flower buds develop at approx. five weeks, just after the second pair of leaves, and when the plants are only 0.5 inches tall.

### Threats:

Natural Threats: Natural threats to Mimulus clivicola are posed by the process of natural succession and large-scale erosion. It appears that Mimulus clivicola is adapted to disturbed exposed mineral soils. While a certain amount of natural erosion is necessary to maintain bare soil, large-scale erosion could eliminate populations. Moreover, as natural succession progresses, causing soil stabilization and shading, the species could be eliminated from an area.

Human-caused Threats: The most significant man-caused threat to Mimulus clivicola is the cumulative effects of reduced habitat. Many populations are very small in size and number of individuals and most known populations occur within areas where human habitat-altering activities are taking place. A road or rock quarry built directly over a population would not only eliminate the existing plants, but also the seedbank of the populations.

Direct timber harvesting poses little threat to Mimulus clivicola because this species occurs in non-timbered or very open stands with poor soils that are unsuitable for intensive logging. Indirect activities, such as road building and the subsequent invasion of highly competitive weeds (knapweed, goatweed, and/or cheatgrass), can threaten populations, as do the chemical sprays used to control these exotic weeds (Caicco 1987a).

One of the largest and most viable populations of Mimulus clivicola encountered thus far occurs along Canyon Creek (Lochsa River). Although a nearby mine does not presently seem to be active, a possible threat exists should further mining development take place.

Recreationists pose a potential threat to those population located near trails or existing roads. In addition, trampling by grazing sheep and/or cattle at on the Wallowa-Whitman National Forest poses a threat to several populations in northeastern Oregon.

It is important to note, however, that while certain management activities may harm existing individuals, they can help to disperse seed and create habitat for future populations. To a certain extent this taxon appears to tolerate and potentially benefit from some disturbance. For example, numerous populations have been documented along the tops of roadcuts or in other areas where activities have exposed mineral soils.

### Monitoring Methods and Findings:

During the 1989 field season, permanent monitoring plots were established to monitor the trends in Mimulus clivicola

populations. Four permanent Ecodata (USDA Forest Service 1987) plots were established within healthy populations, each within a different river drainage. Plots were set up at Elk Creek Falls, and one each along the North Fork Clearwater, Lochsa, and Selway Rivers (see Appendix D). Red-painted rebar was placed at the center of each circular tenth-acre plot. Complete ecodata (USDA Forest Service 1987) information was collected in addition to making counts of all Mimulus clivicola plants that fell within a 2-meter wide belt transect, which ran in a due N-S direction from the center of the circle. All observed individuals were counted, including seedlings (see Lorain and Moseley 1989).

These transects were revisited and recounted in 1990 and 1991. The following table indicates the number of flowering individuals counted for each year. The data clearly exhibit the wide variations often observed in annual species. Extreme caution is needed in reaching any "conclusions" from these numbers due to the natural annual fluctuations in the number of observed individuals.

Table 1. Comparison of counted Mimulus clivicola plants over a 3-year period at four permanent monitoring plots.

Plot sites	Year		
	1989	1990	1991
•Elk Creek Falls	789	574	27
•Skull Creek (N. Fk Clearwater R)	557	74	217
•Lost Irishman Mine (Lochsa River)	1143	388	1293
•20-Mile Bar (Selway River)	241	16	105

## CONSERVATION STRATEGY

### Management Objectives:

The purpose of this plan is to establish management direction for land areas supporting Mimulus clivicola populations on National Forest lands throughout the species range. The objectives are to coordinate management between the various National Forests and provide long-term protection for Mimulus clivicola while minimizing conflicts with other resource values and land management activities.

As stated in the introduction, the Forest Service is required to manage and maintain populations of native species at or above the minimum viable population level. To maintain this level, protected populations must be self-sustaining, genetically stable, and adequately distributed throughout the species range. In order to attain this goal, the following management objectives are proposed for Mimulus clivicola:

- 1) Inform Forest Service personnel of bank monkeyflower populations on their Districts and monitor the cumulative effects of habitat loss.
- 2) Complete inventory surveys in areas not yet examined, to delineate the overall distribution of Mimulus clivicola throughout its range.
- 3) Classify known populations into three protection categories, based on population size and distribution.
- 4) Permanently protect and monitor key populations throughout the range of the taxon.
- 5) Maintain cooperation between the USFS Regions and Forests, the Idaho Conservation Data Center, the Oregon Natural Heritage Data Base, the Coeur d'Alene District BLM and the U.S. Fish and Wildlife Service.

### Discussion and Implementation:

- 1) Inform Forest Service Personnel - Monitor Cumulative Effects.

Land managers and field personnel working on National Forests and Ranger Districts supporting known populations of Mimulus clivicola should be informed of the occurrence and location of the species in their area. IT IS ESPECIALLY IMPORTANT THAT ANY SITES DESIGNATED FOR SPECIAL PERMANENT PROTECTION BE CLOSELY MONITORED.

These sites are specifically selected to maintain larger, key populations and genetic variability throughout the species' range. In addition, should suitable habitat or populations be located outside the known distribution, inventory surveys should be conducted. New sites will likely need to be designated for protection as a result.

To identify potential habitat for Mimulus clivicola, National Forests can run a query on their computers which combines detailed habitat information for Mimulus clivicola with existing forest delineations (i.e., habitat types, timber stands, and soil types). Since each Forest and Region may have a slightly different method of obtaining and storing these data, the method used should best reflect the needs of each Forest.

Possible sightings of Mimulus clivicola should be documented by specimens (if the size of the population warrants collecting), and should include both flowers and roots. Suggested collection guidelines are: 1) population size should exceed 50 individuals, and 2) collection ratio should not exceed 1:10 individuals. Specimens should be sent to the Forest Botanist/Ecologist, University of Idaho Herbarium or Washington State University Herbarium for verification of their identity. Collections from Oregon may also be sent to Oregon State University. Confirmed sightings of Mimulus clivicola should be submitted to the Forest Supervisor's Office and the state Natural Heritage Program for entry into their permanent data base on sensitive species.

Our present knowledge of Mimulus clivicola indicates that ongoing management activities, while possibly affecting certain populations or individuals, will not cause the species' extinction. The most significant human-caused threat to Mimulus clivicola is the cumulative effects of reduced habitat. The Forest Service should, therefore, monitor the cumulative effects of activities within the species' range and in particular the loss of any existing populations. These data should be forwarded to the Forest Botanists for permanent recording and appropriate coordination.

## 2) Delineate Overall Species Distribution

Only recently have a number of new locations for Mimulus clivicola been documented from the Payette National Forest, Coeur d'Alene National Forest (Idaho Panhandle National Forests), and portions of the Nez Perce National Forest. Many areas of suitable habitat on these Forests have not yet been surveyed and additional inventory surveys should be conducted to delineate fully the species distribution in these regions. National Forests should allocate the appropriate funds for such activities.



Two populations on the Nez Perce National Forest represent considerable range extensions for Mimulus clivicola in Idaho. One site was discovered near the town of Dixie on the Red River Ranger District several miles north of the Salmon River, and another was found on Wild Horse Ridge in the Hells Canyon National Recreation Area. No intervening sites are yet known. In addition, the sites documented from along the South Fork Clearwater River in 1990 were surveyed quite late in the season. Consequently, it is quite likely that additional populations were missed. The South Fork Clearwater River should be surveyed more completely, especially those areas further upslope above the river.

On the Coeur d'Alene National Forest a recent northern range extension was also discovered near Carrill Peak on the Fernan Ranger District, just east of Lake Coeur d'Alene. This area should also be surveyed more completely.

Potential habitat on the Wallowa-Whitman National Forest exists throughout much of the Pine District and in the southern portion of the Hell's Canyon National Recreation Area. Further surveys are needed in these areas as well.

Should sizable new populations and numbers of new sites be located in any or all of these sites, a reevaluation of the species status and conservation strategy would be warranted.

### 3) Classify Populations into Protection Categories

A successful management strategy that has been used elsewhere is to classify populations into three protection categories. These classifications are based on the size of each populations, habitat condition, distribution, and proximity to other Special Management Areas. Categories are described as follows:

Protection Category 1 - Key populations, throughout the range of Mimulus clivicola, that will be permanently protected. Ideally this category would include the largest (>500 individuals), most vigorous populations that occur in relatively undisturbed habitats and where existing and/or future monitoring is considered important. Special consideration for this category should also include disjunct or peripheral populations that represent the known geographic distribution and may represent important genetic variability. Any suitable populations that may fall within existing special designation areas (e.g., Elk Creek Falls Recreation Area and Aquarius RNA), should be seriously considered.

Protection Category 2 - Populations, usually of moderate

size (200-500 individuals), that are managed within a multiple-use framework, with at least some special considerations given to their maintenance. This category would include populations that have been naturally and/or artificially disturbed in the past and may provide important information concerning the effects of disturbance.

Protection Category 3 - Populations, usually the smallest, that could be sacrificed if necessary, if there is some assurance that the best populations are being protected. These populations are considered "marginal," since they include sites supporting less than 200 individuals that exhibit low density, and/or occur on non-pristine sites.

As mentioned previously, Mimulus clivicola is an annual and can exhibit wide yearly fluctuations in the numbers of observed individuals within a population. These numbers of observed plants may not correctly represent the true population size, which also includes the seed bank. To insure proper category designation of newly discovered sites 1) a detailed assessment of existing and surrounding habitat is essential, and 2) if possible, repeated annual visits to populations should be conducted.

Specific areas that are recommended for each of these protection categories for all the National Forests throughout the range of Mimulus clivicola are presented in Appendices D, E and F. Population recommendations are based on data collected by the author in addition to personal contacts with Forest Service Botanists including: Jill Blake (Idaho Panhandle National Forest), Alma Hanson (Payette National Forest), Mike Simpson (former botanist, Payette National Forest), Paula Brooks and Martin Stein (Wallowa-Whitman National Forest), and Angela Sondenaa and Leonard Lake (Nez Perce National Forest).

#### 4) Permanently Protect and Monitor Key Populations

Once all populations have been prioritized by protection categories, those populations designated as Protection Category 1 should be provided permanent protection (see Appendix D). Each protected population should be analyzed to determine any site-specific threats and permanent monitoring should be established.

Recommended management guidelines for Protection Category 1 sites include:

- seasonal grazing restrictions - restrict grazing or fence populations in June and July to insure that plants are not trampled prior to seed set.
- ORV restrictions - ban ORV use in areas where known or suspected populations occur. Most populations occur on

steep slopes with highly erosive soils not suitable for ORV use.

- herbicide spraying - prohibit herbicide spraying from roadside areas that support populations.
- timber buffers - retain an intact forest buffer of a minimum width of 100 feet from population margins.
- road construction/maintenance - prohibit and road construction/maintenance from these sites.
- prescribed fire - ban from protection site.

From a management standpoint, identifying suitable protected sites in already existing special designation areas would be most expeditious. Such sites are generally exempted from management activities that might prove detrimental to the existing population.

#### 5) Maintain Interagency Cooperation

Mimulus clivicola populations are presently documented from five different National Forests and three different Forest Service Regions: the Idaho Panhandle, Clearwater, and Nez Perce National Forests (Region 1), the Payette National Forest (Region 4), and the Wallowa-Whitman National Forest (Region 6). Two sites have also been located on lands managed by the Bureau of Land Management, Coeur d'Alene District. To insure the flow of pertinent information about this species between these various Regions, Forests and Agencies, coordination and cooperation is essential.

Cooperative agreements should also include the U.S. Fish and Wildlife Service, Bureau of Land Management (Coeur d'Alene District), Idaho Conservation Data Center, Oregon Natural Heritage Data Base, and the Washington Natural Heritage Program. These Heritage and Conservation programs have been designated by 200 federal agencies as permanent data storage centers for rare, threatened and endangered plants, animals and ecosystems in their respective states.

Agency cooperation has been initially established in the writing of this Conservation Strategy. Prior to completion this report was reviewed by all three Regional Botanists (Region 1, 4 and 6). Additional technical review was provided by Bob Parenti (U.S. Fish and Wildlife Service, Boise, Idaho), Bob Meinke (Botanist/ Plant Conservation Program, Oregon Dept. of Agriculture, Salem, Oregon), Jill Blake (Forest Botanist, Idaho Panhandle National Forest, Idaho), Alma Hanson (Forest Botanist, Nez Perce National Forest, Idaho), Paula Brooks (Forest Botanist, Wallowa-Whitman National

Forest, Oregon), Karl Urban (Forest Botanist, Umatilla National Forest, Oregon), Angela Sondenaa and Leonard Lake (Nez Perce National Forest, Idaho), Dan Davis (Forest Biologist, Clearwater National Forest, Idaho) and Lewis Brown and Craig Johnson (Bureau of Land Management, Coeur d'Alene District).

Since the vast majority of all known populations of Mimulus clivicola occur on lands managed by the Forest Service, it is recommended that each Forest Botanist act as the coordinator for their Forest. They will need to:

- 1) maintain permanent and accessible records pertaining to Mimulus clivicola on their Forest,
- 2) monitor sites designated for permanent protection and insure that monitoring plots are established and reread at each site,
- 3) coordinate data exchange within their Forest, to their Region and between other Forests by
  - a) periodically (every 2-3 years) summarizing monitoring results and updating population numbers across their Forest,
  - b) documenting impacts and dispersing information to all participating Agencies.

Forest Botanists will also need to insure that District personnel (especially seasonal botanists and biologists) are informed of:

- 1) how to identify Mimulus clivicola,
- 2) how to identify potentially suitable habitat,
- 3) how to document new populations,
- 4) where known Mimulus clivicola sites and permanently protected populations are located.

#### Further Research and Monitoring Needs:

##### Field Surveys:

Many areas of suitable habitat on lands managed by the Forest Service have not yet been surveyed and additional inventory surveys should be conducted to delineate fully the species distribution in these regions (see Management Objective 2). National Forests should allocate the appropriate funds for such activities.

##### Monitoring:

1. Given the relatively high number of populations of bank monkeyflower discovered in recent years, detailed and expensive demographic monitoring does not seem warranted at this time. However, monitoring should be continued at the plots established in 1989 and expanded to include each of the

permanently protected sites (see Appendix C). This monitoring will be used to attain baseline data concerning the amount of annual population fluctuation of observed individuals and help to assure that these sites are being protected. Counts should continue to be taken from these permanent plots on an annual basis for at least five and preferably ten years.

2. Since Mimulus clivicola population levels appear to be strongly influenced by climate and available moisture, annual monitoring studies should be compared and correlated with annual climate patterns. The amount and effect of big game wintering and migration patterns towards creating exposed mineral soils can also be compared with the numbers of flowering individuals within populations.

3. To gain an understanding of the population biology and long-term viability of Mimulus clivicola, information concerning the role of the seedbank and seed viability is essential. The number of individuals observed in the last few years have been the flowering members of the population, with an unknown number of individuals remaining in the soil as seeds.

#### Action Plan:

The following activities are recommended for accomplishment within the years indicated. The responsible lead personnel recommended to perform the task is identified in bold letters after each activity.

#### Year One

1. Conduct identification training sessions and inform Forest Service personnel of known populations on their Forest/Districts. (Forest Botanist)
2. Run annual computer queries for those areas on the Forest/District where management activities are scheduled and coincide with potential Mimulus clivicola habitat. Conduct clearance surveys in these areas and monitor the cumulative effects of habitat loss. (District or Forest Botanist)
2. Continue inventory surveys for new populations and potential suitable habitat. Areas of particular focus should include the Payette, Nez Perce, Coeur d'Alene, and Wallowa-Whitman National Forests. (Field Botanists or contractors)
3. Implement interagency cooperation to insure the flow of pertinent information about this species (Regional

Botanists)

4. Continue monitoring counts at the four permanent monitoring plots established in 1989 and begin establishing transects at the Protection Category 1 sites. (Forest Botanist)

Year Two

1. Continue implementing monitoring plan and revise, if necessary, to include newly located populations.
2. Continue inventory and clearance surveys.
3. Complete establishment of permanent monitoring at all Protection Category 1 sites.
4. Establish an interagency technical working group to include USFS Regions 1, 4 and 6, all five National Forests, U.S. Fish and Wildlife Service, Idaho Conservation Data Center, Oregon Natural Heritage Data Base and the Bureau of Land Management, Coeur d'Alene District. This group should periodically review the status of the species and assess the effectiveness of this conservation strategy. (Regional Botanists)

Year Three-Four: same as year two

1. Continue inventory and clearance surveys.
2. Continue permanent monitoring program and revise as necessary.
3. Initiate study of seed viability/longevity and role of seedbank in population dynamics. (Regional Botanists or University contractors)

Year Five

1. Compile results of the monitoring program. (Forest Botanists)
2. Update and revise Conservation Strategy as appropriate (via a meeting of the technical working group).

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Appendix A

Line drawings of Mimulus clivicola  
(from Cronquist 1959)

Appendix B

Map of overall distribution of  
Mimulus clivicola

## Appendix C

### Permanent Monitoring Plot Data

1. Diagram of Ecodata Plot set-up.
2. Location of plots established in Idaho in 1989 (see data under Protection Category 1).

Appendix D

Recommended Sites for  
Priority Protection Category 1  
(by Forest with mapped locations)

PROTECTION CATEGORY 1

CLEARWATER NATIONAL FOREST

(EO# refers to the Idaho Conservation Data Center occurrence number)

ELK CREEK FALLS (EO# 002) - This site falls within the Elk Creek Falls Recreation Area, which is part of the St. Joe National Forest, but administered by the Clearwater National Forest. This population is also quite large, consisting of several thousand individuals (1989 observation). Due to its recreation value, human disturbance will likely occur in portions of the population. In 1989, a number of Mimulus clivicola plants were actually found growing in and directly beside a well-established trail. Fortunately, more remote areas within the region are well-protected and maintain substantial numbers of individuals.

\*\*NOTE: A permanent monitoring plot has been established at this site.

AQUARIUS RESEARCH NATURAL AREA (RNA) (EO# 009) - Six small populations of Mimulus clivicola are located along the North Fork Clearwater River within this RNA. Although these populations are small in actual number of flowering individuals, they are presently protected in the RNA and offer research opportunities.

SKULL CREEK (EO# 021) - This site consists of 4 populations, each of a moderate size (approx. 500 plants total), and all receive considerable disturbance from big game movements. Large game animals, principally elk and deer, make considerable use of this slope during the spring, and evidence indicates that they continue to use that area as an access to the North Fork Clearwater River as the year progresses. Monitoring of the effect of big game disturbance could be conducted at this site.

\*\*NOTE: A permanent monitoring plot has been established at this site at population 1 (just west of Skull Creek).

CANYON CREEK - LOST IRISHMAN MINE (EO# 028) - This site occurs along a tributary to the Lochsa River and is easily the largest population of Mimulus clivicola discovered thus far. An apparently healthy population where natural erosion appears to be responsible for maintaining the exposed mineral soils. The exact site is quite near an established Research Natural Area (Lochsa RNA) and directly above an old mine shaft.

\*\*NOTE: A permanent monitoring plot has been established at this site.

BOULDER CREEK (EO# 36) - Some 101-1000 plants are documented from this population in scattered clumps along a trail cutbank. Considerable acres of potential habitat are in the same vicinity and the site is located some 12 miles upriver from the nearest known population. Plants appear to be competing with two aggressive weeds (spotted knapweed and goatweed). Monitoring for both weed competition and trail disturbance is feasible and recommended.

PROTECTION CATEGORY 1

IDAHO PANHANDLE NATIONAL FORESTS

HAMMOND CREEK (EO# 041) - Although this is not a particularly large population (100-500 individuals) it is the best of the three known populations that occur along the North Fork St. Joe River. The area is relatively undisturbed except for natural erosion.

CARRILL PEAK (EO# 069) - This site not only represents a large and extensive population (2000-5000 plants), but is also the most northern extension known for the species. The population is apparently safe from disturbance at this time. Plants at this location are quite robust and several were discovered in a recently burned area in ash. Monitoring the effect of burning disturbance could be conducted at this site.

HERRICK NORTHEAST (EO# 071) - This site was surveyed in July 1991 by the Forest Botanist (Blake 1992) for a Biological Evaluation of the Black Sheep Resource Area and proposed timber harvest activities. Six subpopulations containing hundreds to thousands of individuals were located. Five of the subpopulations are in proposed timber harvest units. The effects analysis recommended that monitoring be established in two or three of the subpopulations to assess the effects of road construction and timber harvest. Plots were not established in 1992 due to excessively low germination (only 5 very small plants observed). The subpopulation located in section 34 is to be permanently protected as a control plot.



PROTECTION CATEGORY 1

NEZ PERCE NATIONAL FOREST

TWENTYMILE BAR (EO# 024) - This population is rather small in size, but a permanent monitoring plot has been established here and the plot site should be protected. Ten additional populations of Mimulus clivicola are documented along the Selway River corridor. Although most of these populations are small, they appear to be scattered in a more-or-less continuous pattern along the open, grassy, south-facing slopes above the river. Since this taxon occupies non-timbered or very open stands, unsuitable for intensive logging, direct timber harvest activities are unlikely. Additionally, the Selway River is designated as "Wild and Scenic," which promotes scenic values and discourages "development" and most management activities, thus providing a certain degree of protection.

\*\*NOTE: A permanent monitoring plot has been established at this population located on slopes just east of the 20-Mile Bar Campground.

SLIMS CAMPGROUND/MEADOW CREEK (EO# 037) - This appears to be the largest known population located within the Selway River drainage. Two smaller and one large population are estimated to support 1000-10,000 plants. Plants are well-distributed, vigorous, and quite common throughout the area. The site can be accessed from the Meadow Creek Road. There are not apparent threats to this population; however, extensive game trails cover the slope and some natural erosion is evident.

WILD HORSE RIDGE (EO# 068) - This population is located within the portion of Hell's Canyon National Recreation Area that is administered by the Nez Perce National Forest. The Wild Horse Ridge site is isolated from any other populations of Mimulus clivicola by some 30 miles and represents another peripheral population. An estimated 1000 individuals are found in this dry saddle and no apparent threats are present at this time.

RHETT CREEK (EO# 078) - This site is the southeasternmost extension of the known range of Mimulus clivicola and is located 20 miles from the next nearest site. Although the population consists of only some 500 plants, it is a peripheral population and could be of genetic importance. This population is found scattered along Rhett Creek Trail (#231) on the Red River Ranger District, some 3.5 miles southeast of Dixie. Plants at this site also occur at a rather high elevation (5200) for this Forest.

MOTHER LODE ROAD (EO# 080) - Although this population is not extremely large (some 100 plants), the habitat is quite good and it best represents the populations located within the South Fork Clearwater River canyon.

PROTECTION CATEGORY 1  
PAYETTE NATIONAL FOREST

NORTH OF BEAR GUARD STATION (EO# 061) - This population is easily accessed and consists of up to 1000 plants located just SW of a gravel pit. It appears that the population is not threatened at this time.

HUNTLEY GULCH (EO# 062) - Several scattered populations have been discovered within Huntley Gulch and it is recommended that at least one of these be protected (Simpson 1992). Most of the populations occur along a road and at least some portion of all the sites is found within a roadcut. Although this is not pristine habitat, the soils and habitat types in which these populations occur is different from other populations on the Payette National Forest. This site has an estimated 1000 plants growing in scattered, dense clusters.

BILL GULCH (EO# 067) - Although this population is quite remote and rather difficult to access, it is relatively safe from human disturbance except for potential timber harvest in the future. This population occurs along a crest in a shallow basin with open, flat areas. The soil is rather deep in comparison to most habitats and the slope is very slight.

\*\* NOTE - In August 1992 a large and intense fire swept through this area that may have damaged or eliminated this population (Hanson 1992). The site will need to be resurveyed to evaluate the extent of fire damage. Although flowering plants are past by August, if the fire penetrated through the soil profile, the seedbank may have been lost. Should this be the case, it is recommended that a nearby population (Steen Creek) be preserved in place of Bill Gulch. STEEN CREEK (EO# 066) - This population is quite remote and difficult to access, occurring on a small, open knob above Indian Creek. Soils at this site are very shallow and poorly developed. The population consists of over 1000 individuals and is associated with another rare plant, Castilleja oresbia.

CAMP CREEK (EO# 073) - This population occurs along the west side of Cuddy Mountain in slightly moist microhabitats within a very dry macrohabitat. Over 1000 plants are estimated to occur here growing on very thin soils on a very steep slope (80-100%). Although the site is partially within the proposed Grade-Dukes Timber Sale, it is likely not to be affected due to the lack of timber at the population site.

GRADE CREEK/DUKES CREEK DIVIDE (EO# 075) - This site consists of 6 populations (totalling several 1000 plants) scattered between 5520-7120 feet in elevation. This is by far the highest elevation known for Mimulus clivicola. The habitat is unusual (open ridgetop and areas just under trees) and plants are found on two different soil types. The site is not easily accessed and is partly within the proposed Grade-Dukes Timber Sale; however, the populations have been mapped and will likely not be affected.

## PROTECTION CATEGORY 1

### WALLOWA-WHITMAN NATIONAL FOREST

Since so few sites have been located in Oregon, it is likely that all of the sites will be followed and at least provided some protection (Stein 1992). However, these four sites appear to best represent the diversity of habitat and distribution within the Forest. The number in parentheses refers to the occurrence number given to that population by the Oregon Natural Heritage Data Base.

DRY/LONESOME CREEKS (EO #006) - This is definitely one of the largest populations discovered in Oregon thus far. The site is easily accessible and consists of an estimated 1000+ plants. Plants occur within a vernal moist, "meadow" opening surrounded by mixed coniferous forests. During the summer the site is very dry, but Camassia cusickii plants indicate considerable winter/spring moisture.

NORTH PINE CREEK (EO# 008) - This site is quite unique in that Mimulus clivicola and Mimulus nanus grow side by side. The site consists of several small vernal moist drainages and supports several hundred individuals. These soils are very dry and gravelly in the summer so Camassia cusickii is the best indicator of habitat. Most plants are found in scattered patches along the sides and upper reaches of the drainages. To reach this site requires a 1/2 mile walk NW over a ridge from spur road 774 then down into the drainages.

S OF PUDERBAUGH RIDGE (EO# 013) - This site is rather small, but it represents the northeasternmost location of Mimulus clivicola yet discovered in Oregon. Located beside the road to McGraw Lookout, it is a small population (100-250 plants) that occurs in very thin, gravelly, exposed soils. Sheep grazing has occurred in the vicinity in the past, but sheep were eliminated (re-routed) in the last two years due to vehicle concerns and the Mimulus clivicola population. This site was fenced in 1991 and the Forest avoided this population when the road was upgraded (widened and resurfaced) in 1992.

EAGLE FORKS CAMPGROUND (EO# 901) - This recently discovered (1992) site consists of four subpopulations and totals less than 50 observed plants. Despite the small population size, this site is located in an entirely different creek drainage from the other known sites and should be included for protection based on its distribution. The trail has not been completely surveyed and additional suitable habitat is located in this same vicinity. In a year of sufficient moisture, many more plants may be observed. Therefore, the site should be revisited and completely surveyed. The site also occurs along a creek trail and recreationists pose a potential threat to the subpopulations.

PROTECTION CATEGORY 1

COEUR D'ALENE DISTRICT BLM - COTTONWOOD RA

FARRENS CREEK/SOUTH FORK CLEARWATER RIVER (EO# 079) - This site is located along the South Fork Clearwater River within 1/2 mile of the Nez Perce National Forest boundary. At present, it is the only known location of Mimulus clivicola found on land managed by the BLM. Most of the other populations located along the South Fork Clearwater River are quite small and in rather disturbed habitats. This population, however, consists of some 1000 plants of good vigor and growing in excellent habitat with only natural disturbance (big game use and downslope soil movement).

Appendix E

Recommended Sites for  
Priority Protection Category 2  
(by Forest with mapped locations)

PROTECTION CATEGORY 2

CLEARWATER NATIONAL FOREST

LOST PETE CREEK (EO# 018) - This site, in the North Fork Clearwater River country, occurs along the Lost Pete Trail #268. Due to its proximity to a trail, the site could be monitored under a multiple-use scenario to determine the effects of human disturbance on the population.

IDAHO PANHANDLE NATIONAL FORESTS

ST. JOE WILD AND SCENIC RIVER CORRIDOR (EO#s 46-49) - Four small populations have been documented from scattered locations between Skookum Creek and Tin Can Flat Campground along the St. Joe River east of Avery. All of these populations are small (50-200 plants) and potentially threatened by road construction and/or maintenance. Some protection status is afforded these populations due to their occurrence within the St. Joe Wild and Scenic River corridor, however monitoring could be established to assess the effects of human disturbance.

HERRICK NORTHEAST (EO# 071) - (a full description of this site can be found under Protection Priority Category 1). Several populations at this site have been recommended for monitoring to determine the effects of road construction and timber harvesting on populations. One population, located in section 34, will be permanently protected as a control plot.

PROTECTION CATEGORY 2

NEZ PERCE NATIONAL FOREST

RACE CREEK CAMPGROUND (EO# 004)- Some 500 flowering plants were found scattered throughout approximately 1 acre at this location. The majority of the population occurs 50 to 100 feet above the Selway River Road in areas of eroded soils. This population receives considerable big game activity and could be monitored for this disturbance.

MEADOW CREEK CAMPGROUND (EO# 053) - 101-300 observed plants in 1990 on small crests along the top of a roadcut with natural erosion taking place. Threats are posed by road maintenance and herbicide spraying. These activities could be monitored at this site.

PAYETTE NATIONAL FOREST

UPPER HUNTLEY GULCH (EO# 065) - This population consists of 500-1000 plants that are partially within a roadcut and scattered in the "shoulder" above the roadcut. Plants are threatened by road alterations, increased competition from Bromus tectorum (cheatgrass) and possibly a proposed nearby timber harvest. This site offers the opportunity to monitor and assess the impact of any of these management activities on the species.

PROTECTION CATEGORY 2

WALLOWA-WHITMAN NATIONAL FOREST

NORTH PINE CREEK (EO# 009) - This site consists of at least three populations scattered along an old road. At present the site is undisturbed except for the old road and an old nearby clearcut unit. However, if the road is proposed for reworking in the future, most of these populations would be impacted and such activity could be monitored.

LONESOME CREEK (EO# 015) - This site consists of 100-300 scattered plants located in deer trails and within a small camas meadow above a road. Monitoring the effects of seasonal moisture and deer activity could easily be carried out at this location.

PROTECTION CATEGORY 2

COEUR D'ALENE DISTRICT BLM - COTTONWOOD RA

FIVE MILE CREEK (EO# 81) - Several small subpopulations (30-40 plants each) are located in scattered patches within this creek drainage on BLM and private lands. Despite the small population size, this site should be included for protection based on its distribution and elevation. The subpopulations are located a fair distance from other known sites and are quite low in elevation (1240-1300 feet). This site has received past disturbance from livestock grazing, as is evidenced by several weedy species including cheatgrass, however, overall site quality is fair. Timber harvest is quite likely in the future, but buffer zones for the creekbottom would encompass the known subpopulations. Monitoring for competition from weedy species and impact from future timber harvest are recommended.



Appendix F

Recommended Sites for  
Priority Protection Category 3

PROTECTION CATEGORY 3

Most of the other populations, occurring within the range of the species fall into Protection Category 3. These sites include "marginal" populations, that exhibit low density or occur in non-pristine habitats. Populations within this category could be sacrificed, if necessary, PROVIDED the best populations are assured protection. The following pages provide an abridged listing of site name, occurrence number (EO#), and legal description by Forest and BLM District for these extant sites.

CLEARWATER NATIONAL FOREST

Site Name	EO#	Legal Description	# plants/comments
Canyon WC West	016		<225/small area
Canyon WC East	017		<300/small area
N Fk Clearwater R	019		roadcuts
Upper Twin Creek E	020		101-300/roadcuts
Quartz Creek	022		disturbed roadcut
Burnt Creek	023		101-200/sm area
Washington Creek	029		11-50/small area
Siwash Creek	030		11-50/small area
Isabella Landing E	031		11-50/roadcuts
Deadman Creek	034		50-100/scattered
Johnny Butte W	038		150/trail cut
NE Fuzzy Creek	070		<50/small area
Tick/Knife Edge CG	072		300/3 subpops

IDAHO PANHANDLE NATIONAL FORESTS

Site Name	EO#	Legal Description	# plants/comments
Stetson Creek	040		<200/scattered
Tunnel 4	042		<100/scattered
Blackjack Creek	076		small pop.
Boulder Creek	077		small pop.

NEZ PERCE NATIONAL FOREST

Site Name	EO#	Legal Description	#plants/comments
Gedney Creek W	007		101-200
Cache Creek E	008		2
Johnson Creek	014		200/disturbed
Hamby Fork	015		200
Rock Island West	025		<200/along road
O'Hara Creek	026		12/gravel quarry

NEZ PERCE NATIONAL FOREST (continued)

Site Name	EO#	Legal Description	#plants/comments
Roar Creek	027		51-100/along road
Glover Campground	032		11-50/small area
Meadow Creek	035		11-50/small area
Cougar Creek East	055		51-100/roadcut
Dutch Oven Cr. S	056		11-50/roadcut
Fall Creek West	057		11-50/roadcut
Nelson Creek	058		101-250/disturbed
Fisher Mine East	059		51-100/scattered
Wickiup Creek	060		1-10/disturbed

PAYETTE NATIONAL FOREST

Site Name	EO#	Legal Description	# plants/comments
SE of Cuprum	063		37 / roadcut
E Brownlee Creek	074		scattered pop.

WALLOWA-WHITMAN NATIONAL FOREST

Site Name	EO#	Legal Description	# plants/comments
Lake Fork CG	002		200-250/sm area
Dry Creek	007		ca.100/small area
Puderbaugh Ridge	010		50+/scattered
Grouse Flat	011		<10/along road
Duck Creek	012		51-100/roadcut
Lonesome Creek	014		11-50/small area
Above Dry Creek	016		51-100/scattered
Fish Creek	900		200+/below road