

CONTINUED FIELD INVESTIGATIONS OF
MIMULUS CLIVICOLA (BANK MONKEYFLOWER)

by

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ABSTRACT

A second year field survey of Mimulus clivicola (bank monkeyflower) was conducted on the St. Joe, Nez Perce, Payette, and Wallowa-Whitman National Forests during the summer of 1990 by the Idaho Department of Fish and Game's Natural Heritage Program. The investigation was a cooperative Challenge Cost Share project between the Department and the Clearwater and Payette National Forests.

Bank monkeyflower, a Region 1 Sensitive Species and a Category 2 candidate species, is a regional endemic to west-central Idaho and northeastern Oregon. Following two years of intensive field surveys, bank monkeyflower is now documented in Idaho from portions of the St. Joe, North Fork Clearwater, South Fork Clearwater, Selway, and Lochsa River canyons, the Elk Creek Falls vicinity, and the Bear-Cuprum area. Additional populations are documented from northeastern Oregon in the North Pine Creek vicinity of the Wallowa-Whitman National Forest. The majority of documented sites for bank monkeyflower are on lands administered by the Forest Service, within the Clearwater, Nez Perce, St. Joe, Payette, and Wallowa-Whitman National Forests.

The first year concentrated on the Clearwater National Forest, while this investigation concentrated on extended and delineating the overall distribution of bank monkeyflower. The areas of focus included the St. Joe River drainage, the South Fork Clearwater River, the eastern Payette National Forest, and the North Pine Creek vicinity of northeastern Oregon. As of 1989 bank monkeyflower was known from 56 populations at 29 sites in Idaho (Lorain and Moseley 1989). This report documents 30 new sites (15 from the St. Joe River, 8 from the South Fork Clearwater River, and 7 from the Bear-Cuprum area) for Idaho. In Oregon, bank monkeyflower was known from six extant and four historical sites. One historical site was apparently misidentified and one extant site is now believed to be extirpated. In addition, six new sites are documented from the Wallowa-Whitman National Forest in northeastern Oregon.

Results of second year counts of the permanent Ecodata monitoring plots is also presented and several recommendations are made relative to the long-term conservation of bank monkeyflower on lands administered by the Forest Service.

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INTRODUCTION

The National Forest Management Act of 1976 (16 U.S.C. 1600. Planning Regulations Section 219.19, Fish and Wildlife Resource) 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 1984). 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 Species¹ list.

Mimulus clivicola (bank monkeyflower) is a regional endemic² to the interior Pacific Northwest. This species is listed presently as a Region 1 Sensitive Species and is a Category 2 Candidate Species³ (USFWS 1990).

Investigations of bank monkeyflower were first launched in 1987 and 1988 by the Idaho Natural Heritage Program (Caicco 1987a, 1987b, 1988). In 1989 an intensive inventory survey was conducted

¹ 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 1984, 1988).

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

³ Candidate Species - "those plant and animal species that, in the opinion of the Fish and Wildlife Service, may become endangered or threatened". Three types of candidate species exist, C1, C2 and 3C. Category 2 - "taxa for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the immediate preparation of rules" (USDI Fish and Wildlife Service 1990).

on the Clearwater and Nez Perce National Forests and a Species Management Guide for bank monkeyflower was initiated. Gaps in essential information, particularly the distribution and status of locations in northeastern Oregon and additional areas of Idaho, were identified. This investigation attempts to fill in the gaps by delineating the overall distribution and outlining the status of bank monkeyflower in the interior Pacific Northwest. During the 1990 field season surveys for bank monkeyflower were conducted on the Nez Perce, St. Joe, Payette, and Wallowa-Whitman National Forests by the Idaho Department of Fish and Game's Natural Heritage Program through the Cooperative Challenge Cost Share Program.

Additional individuals consulted on this project were Steve Caicco (formerly with the Idaho Natural Heritage Program), Jimmy Kagan (Oregon Natural Heritage Program), Dr. Bob Meinke (Oregon Dept. of Agriculture), John Gamon (Washington Natural Heritage Program), Dr. David Thompson (Research Botanist, Rancho Santa Ana Botanic Garden, Calif.), and Paula Brooks and Martin Stein (Botanists, Wallowa-Whitman National Forest).

The primary objectives of this second year investigation were as follows:

- 1) Locate and survey for potential habitats and new populations of Mimulus clivicola on the Nez Perce, St. Joe, Payette, and Wallowa-Whitman National Forests.
- 2) Attempt to delineate the overall distribution of bank monkeyflower within the interior Pacific Northwest.
- 3) Acquire population data and characterize habitat conditions for known populations.
- 4) Remeasure existing long-term monitoring plots established in 1989.
- 5) Assess population numbers and threats to existing populations and make management recommendations to the forests based on these assessments.

Mimulus clivicola Greenm.

CURRENT STATUS USFS Region 1 Sensitive Species
 USFWS Category 2 Candidate Species

TAXONOMY

Family: Scrophulariaceae (Figwort)

Common Name: bank monkeyflower

Citation: Greenman, J.M. 1899. Northwestern plants, chiefly
 from Oregon. Erythea 7(11):115-120.

Synonymy: Eunanus clivicola Heller (Muhlenbergia 1(4):60, 1904)

Technical Description: See Lorain and Moseley (1989)

Nontechnical Description: See Lorain and Moseley (1989)

Distinguishing Features and Similar Species: See Lorain and Moseley (1989). A special note should be made concerning the use of smell in identifying bank monkeyflower, especially for non-flowering individuals. Bank monkeyflower exhibits a very distinct musky, sweet smell when the herbage is rubbed. This character was identified during the 1989 field season and proved exceptionally useful for this investigation. No mention of this trait is presented in Cronquist (1959), however, it is extremely consistent and should be used when conducting field investigations, especially when bank monkeyflower is found with other annual Mimulus species and/or in the non-flowering phase.

Oregon populations of bank monkeyflower were commonly found growing sympatrically with several other species of annual Mimulus. Four species, Mimulus nanus (dwarf purple monkeyflower), M. guttatus (annual form), M. floribundus, and M. breweri, were discovered. Of these, only dwarf purple monkeyflower could be readily confused with bank monkeyflower. Mimulus guttatus and M. floribundus are similar in overall size, but both have yellow flowers. Mimulus breweri is also a small, pink-flowered annual, but can easily be distinguished from bank monkeyflower based on flower size. Bank monkeyflower supports rather large (1-2 cm), funnel-form corollas, while M. breweri has rather inconspicuous, small, slender flowers.

Superficially bank monkeyflower and dwarf purple monkeyflower look similar and it would appear that a number of collectors have confused these two taxa. Both species have large, rather showy flowers and branched to unbranched growth habits. The basic differences are in flower color, pedicel length, and pubescence. Mimulus nanus has deep magenta flowers on 1-3 mm long pedicels and very few hairs on the herbage. In contrast, Mimulus clivicola has distinctly pink flowers, 3-7 mm long pedicels (in fruit), and the

herbage is covered with a rather dense, sticky, glandular pubescence. As mentioned previously, these glandular hairs produce a definite musky, sweet smell when the herbage is rubbed, which I never identified in dwarf purple monkeyflower.

DISTRIBUTION

Range: Bank monkeyflower 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., Oregon) (Cronquist 1959).

Prior to the 1989 field season, ten historical, five extant, and four possibly extirpated populations of Mimulus clivicola were known in Idaho. The Oregon Natural Heritage Program documented six extant and four historical sites in northeastern Oregon (Kagan 1989, Meinke 1989)(see Appendix III). Information from the Washington Natural Heritage Program (Washington Natural Heritage Program 1981) indicated four historical locations for Mimulus clivicola and listed its status as possibly extirpated. However, only one documented record for the state is confirmed; a 1889 collection by George Vasey from simply "Washington" (Thompson 1989).

Information from the 1989 field season revealed the presence of many more populations of bank monkeyflower (Lorain and Moseley 1989). A total of 56 populations from 29 sites were documented from the Clearwater and Nez Perce National Forests of Idaho. Populations were located in the North Fork Clearwater, Lochsa, and Selway River drainages. During that same year, a single location of bank monkeyflower was found along the St. Joe River within one mile of the St. Joe National Forest boundary. Since funding did not allow for an intensive survey at that time, it was recommended that a status inventory of the St. Joe River drainage be conducted. Additionally, some sites were not revisited during 1989, since they were far outside our area of concentration. One such site that we were unable to revisit that year was a historical collection by T. Lommasson in 1923 from Squaw Flat on the Payette National Forest.

In the spring of 1990, surveys for bank monkeyflower were again conducted in Idaho, this time focusing on the St. Joe River (Benewah and Shoshone Counties), South Fork Clearwater River (Idaho County), and Squaw Flat vicinity (Adams County). Surveys were also conducted in northeastern Oregon, mainly in the North Pine Creek vicinity. Results of the 1990 field season included the location of 30 new sites for bank monkeyflower in Idaho, 15 from the St. Joe River drainage, 8 from the South Fork Clearwater River, and 7 from the Bear-Cuprum area (see Appendix II). Bank monkeyflower is now documented from 86 populations at 59 sites in

Idaho. In addition, six new sites have been added to the previously known locations from northeastern Oregon on the Wallowa-Whitman National Forest (see Appendix II and III). One of the Oregon sites is believed to be extirpated and another was apparently misidentified (Stein 1990). A total of 14 sites are currently documented for bank monkeyflower in Oregon.

Our present information indicates that the overall distribution of bank monkeyflower in the interior Pacific Northwest includes the St. Joe, North Fork Clearwater, Lochsa, Selway, and South Fork Clearwater Rivers, the Elk Creek Falls vicinity, and Bear-Cuprum area in Idaho and the North Pine Creek drainage in northeastern Oregon (see Appendix I). As of 1990, no extant locations are known from any portion of Washington state. The Washington Natural Heritage Program (Washington Natural Heritage Program 1990) now lists the Mimulus clivicola as Monitor, Group 1 - taxa in need of further field work before a status can be assigned.

ST. JOE RIVER DRAINAGE
(St. Joe National Forest)

Surveys in the St. Joe River drainage focused on the south-facing slopes along the north side of the river from St. Maries to Red Ives. Suitable habitat and 13 new bank monkeyflower populations were located from Ahrs Gulch (ca. 10 miles E of St. Maries) to Tin Can Creek (ca. 10 miles E of Avery). Three additional populations were found along the lower North Fork St. Joe River (to ca. 6.5 miles N of Avery). Seven of these new sites fall on lands administered by the St. Joe National Forest. The remaining eight sites are located on private land, principally on land owned and operated by the Potlatch Corporation.

Extensive road construction along the St. Joe River hindered access in many areas with potentially suitable habitat, however, it was possible to delimit the extent of the distribution within the drainage (see Appendix II).

SOUTH FORK CLEARWATER RIVER DRAINAGE
(Nez Perce National Forest)

Due to a shortened flowering season, the plants along the South Fork Clearwater River were well past flowering by the time a survey was conducted in the area. Bank monkeyflower is difficult to locate once past flowerings and only a few sites were discovered. Surveys of this region focused on the south-facing slopes along the north side of the river where abundant amounts of suitable habitat occur. Eight new populations of bank monkeyflower were documented from McAllister Picnic Area to just south of Elk City above Red River along the Mother Lode Road (see Appendix II). All of these sites occur on lands administered by the Nez Perce National Forest.

It is quite likely that some populations of bank monkeyflower were missed during this survey of the South Fork Clearwater River drainage. Fortunately, several individuals from the local Ranger Districts are knowledgeable about the species and will undoubtedly locate additional populations in subsequent years.

NORTHEASTERN OREGON
(Wallowa-Whitman National Forest)

As mentioned previously, prior to 1990 bank monkeyflower was documented from six extant and four historical sites in northeastern Oregon (Kagan 1989, Meinke 1989)(see Appendix III). All but two of these sites are located in the North Pine Creek vicinity in the southeastern portion of the Wallowa-Whitman National Forest. Inventories for additional populations in Oregon focused on this same region, which apparently possess unique climatic and edaphic characteristics (Johnson and Simons 1987). Suitable habitat and six new bank monkeyflower populations were located from Little Elk Creek, along the lower portion of North Pine Creek, to McGraw Lookout (see Appendix II). All of these new sites were located on lands administered by the Wallowa-Whitman National Forest and all but one occurred within the Hells Canyon National Recreation Area.

Surveys were also conducted in the Gumboot Creek area where there appears to be ample suitable habitat, but no bank monkeyflower plants were found. Surveys along the Imnaha River were also fruitless, however, the geology and habitat of this region appeared to be inappropriate for bank monkeyflower.

In addition, one of the two populations documented from outside the North Pine Creek drainage, from the Wenaha River area (Umatilla National Forest), was determined to be a misidentification (Stein 1990). The second population, from Buford Creek just south of the Oregon/Washington border (BLM Vale District), was not relocated. The habitat at this site appeared to be far too dry (distinctly an Agropyron habitat) to support bank monkeyflower, however, Mimulus nanus was seen.

COUNCIL AREA
(Payette National Forest)

Surveys for bank monkeyflower on the Payette National Forest began in 1990, resulting from the discovery of a 1923 herbarium specimen recently annotated as Mimulus clivicola by David Thompson (Research Botanist, Rancho Santa Ana Botanic Garden, CA). Information provided on the herbarium label is as follows:

T. Lommasson 117; Idaho County; Weiser National Forest; Squaw Flat, elevation 6700 ft.; south slope, moist loam. 20 July 1923.

Although this collection is considerably farther south than other Idaho locations, it is similar in latitude to the Oregon populations. Several questions arise, however, concerning this site and collection. First, the old Weiser National Forest (now the eastern half of the Payette National Forest) does not extend north into Idaho County, as indicated on the herbarium label. Because of this, we assumed that Lommasson was referring to the Squaw Flat in Adams County, approximately 10 miles east-northeast of Council in the West Mountains. Secondly, the elevation was given as 6700 feet, some 1200 feet above other known populations, and it was collected in late July, well after plants have dried up at most other sites. Nevertheless, we began our survey in the Squaw Flat area, but found no bank monkeyflower or suitable-appearing habitat. For these reasons, we believe the location and site information on the Lommasson collection is probably erroneous.

At the time we were surveying the Squaw Flat area, however, botanists from the Payette National Forest discovered a population of bank monkeyflower in the Cuprum area, approximately 31 miles northwest of Squaw Flat. With this hard evidence, we then shifted our effort from the West Mountains to the Bear-Cuprum area. Although we were running out of time for easy identification of monkeyflower population at this point, Payette National Forest (Simpson 1990) and Heritage Program botanists were able to locate seven small populations, all on the divide between the Indian Creek and Bear Creek drainages. The populations ranged in size from 37 to a few hundred individuals and covered from a few square yards up to about 2.5 acres.

Habitat and Associated Species: Previously documented Mimulus clivicola populations occur within a narrow set of environmental conditions and are typically found growing in open pockets of moist, exposed mineral soil created by erosion or big game animal activity (Lorain and Moseley 1989). Exposed mineral soils can come about by natural or human-caused disturbances (ie. tops of roadcuts). It also appears that early spring moisture is essential. All known populations occur in moist microhabitats such as seepages caused by perched water tables or areas where water channels following rain. Although these areas dry out later in the summer, they provide a moist substrate in the spring for seed germination and flowering. Sites are almost exclusively found on southern aspects (south, southeast, and southwest) with steep slopes (generally > 60%).

Species often found growing with bank monkeyflower in northern Idaho included Collomia linearis, Clarkia pulchella, Collinsia parviflora, Achillea millefolium, Bromus tectorum, Sedum sp., Agropyron spicatum, and Tridonis perfoliata.

Bear-Cuprum populations: The newly located 1990 Idaho

populations conformed to the same general habitat scenario as the previous Idaho locations, except for the Bear-Cuprum sites. Dissimilarities with regard to these populations were apparent in elevations, soil type, and associated plant communities. The Bear-Cuprum populations occurred at considerably higher elevations than the northern Idaho sites, ranging between 4200 and 5400 feet. Northern Idaho populations tend to occur on soils that are relatively deep and loose, highly erosive, and primarily derived from decomposed granitics (schist or gneiss). Soils supporting these west-central Idaho populations ranged from moderately deep to thin, but were derived from basalt parent material.

Most of these populations occupied habitat conditions that were much dryer than previously encountered, namely within the Artemisia rigida/Poa secunda (stiff sagebrush/Sandburg'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 (Cooper et al. 1987). Associated plants included Balsamorhiza sagittata, Eriogonum heracleoides, Collinsia parviflora, Antennaria luzuloides, Galium aperine, Collomia linearis, Potentilla glandulosa, Spiraea betulifolia, and Penstemon payettensis.

Oregon populations: The Oregon populations of bank monkeyflower exhibited a close similarity to the Bear-Cuprum populations. This is 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. Cusick's camas community 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 later situation is most typical of sites that support bank monkeyflower (see Appendix V for photos of habitat).

Species often found growing with bank monkeyflower 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, bank monkeyflower was often found growing sympatically with other annual Mimulus species such as Mimulus nanus, M. breweri, M. floribundus, and M. guttatus. Of all the associated species, Camassia cusickii proved to be the best indicator for identifying potential habitat of bank monkeyflower 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 bank monkeyflower.

Permanent Monitoring Plots: In order to monitor the trends in bank monkeyflower populations, four permanent monitoring plots were established during the 1989 field season (Lorain and Moseley 1989). Each of these plots was revisited during the 1990 field season and counts were made for all individuals, including seedlings, that fell within a 2-meter wide belt transect set-up within a circular ecodata plot (USDA Forest Service 1987, Lorain and Moseley 1989). Ecodata information and counts of bank monkeyflower for 1989 and 1990 are presented in Table 1.

Numbers of individuals were significantly lower during the 1990 field season, compared to the 1989 counts (Table 1). Such results are not unexpected with an annual species. Seasonal climatic conditions commonly cause drastic fluctuations in the size and extend of the observed members of an annual species. Possible reasons for the 1990 reduction could be the atypical weather pattern experienced during the spring of 1990. Unseasonably warm and dry weather dominated late April and May, followed by very heavy rains in June, then quick drying again in July. Although counts for each plot were made at the same time as last year, principally in late June and early July, many of the individuals were already dried up and dead in 1990. The difference in phenology indicated a earlier season and possibly many fewer surviving plants, particularly since there was a lack of early spring moisture.

Table 1. Comparison of counted Mimulus clivicola plants over a 2-year period at four permanent monitoring plots.

	Year		Decrease
Plot sites	1989	1990	(%)
•Elk Creek Falls	789	574	27%
•Skull Creek (N. Fk Clearwater R)	557	74	87%
•Lost Irishman Mine (Lochsa River)	1143	388	66%
•20-Mile Bar (Selway River)	241	16	93%

STATUS

Ownership: The majority of the known *Mimulus clivicola* populations occur on lands administered by the National Forest Service in Regions 1, 4 and 6. Most of the species distribution falls in Region 1 on the Clearwater, Nez Perce, and St. Joe National Forests. Within Region 4, seven populations are known, all from the Payette National Forest, Council Ranger District in Adams County. In Region 6, bank monkeyflower is only found in the far northeastern portion of Oregon on the Wallowa-Whitman National Forest. All but one of the Oregon populations fall within the Hells Canyon National Recreation Area. Additionally, eight populations of bank monkeyflower were noted on private land along the lower portions of the St. Joe River, principally on land owned and operated by the Potlatch Corporation.

Threats: Several factors which continue to play a role in threatening and/or eliminating populations of bank monkeyflower are presented in Lorain and Moseley (1989). This list includes road building and maintenance, invasion of exotic weeds, recreational disturbances, extensive erosion, and chemical control of exotic weeds. In addition, Payette National Forest and Oregon populations are subject to damage by grazing. The communities that support bank monkeyflower in Oregon are frequently grazed and can undergo soil damage if grazing occurs when the soils are saturated with moisture (generally before mid-July)!

Recent information indicates, however, that bank monkeyflower is tolerant of certain management actions and moderate disturbance. This conclusion is based on the fact that much of the habitat with areas of exposed mineral soil and bank monkeyflower populations are disturbed, naturally or unnaturally. For example, a number of populations discovered in the last two years were found growing

along the tops of older roadcut or beside trails. While large-scale activities can destroy entire populations and extensive habitat, smaller, well-planned activities could actually enhance or expand potential habitat.

Management Implications: It appears that current land-use and management of habitat containing Mimulus clivicola on land administered by the Forest Service does not conflict with the species long-term viability. Future management activities, particularly road construction, improvement and/or maintenance, should be assessed with regard to their impact and cumulative effect on the conservation status of bank monkeyflower. Management decisions should be made based on the Species Management Guide for bank monkeyflower (Lorain, in preparation) in the Northern Region.

ASSESSMENT AND RECOMMENDATIONS

Summary: Mimulus clivicola is a regional endemic to west-central Idaho and northeastern Oregon. During the 1990 field season, 30 new sites of bank monkeyflower were documented in Idaho for a total of 86 populations at 59 sites. In Oregon, the species is now documented from 14 sites in the Wallowa-Whitman National Forest (see Appendix II and III). Our present information indicates that the overall distribution of bank monkeyflower in the interior Pacific Northwest includes the St. Joe, North Fork Clearwater, Lochsa, Selway, and South Fork Clearwater Rivers, the Elk Creek Falls vicinity, the Bear-Cuprum area in Idaho and the North Pine Creek drainage in northeastern Oregon (see Appendix I). No extant locations are known from Washington.

Virtually all of the known populations of Mimulus clivicola occur on land administered by the Forest Service. Although many of these appear not to conflict with current land-use and management, all cover small areas and many populations are presently grazed, or occur along roadsides, proposed road building projects, and proposed timber sale areas. These small populations are highly susceptible to extirpation from these disturbances.

As reported in Lorain and Moseley (1989), very little is known about the autecology of this species. In particular, we are lacking in information about the seedbank and seed viability. For this reason continued monitoring is essential to assess correctly the proper status for this taxon.

Recommendations to the U.S. Fish and Wildlife Service: Bank monkeyflower is currently a Category 2 candidate (USDI Fish and Wildlife Service 1990). Category 2 species are "taxa for which information now in possession of the Service indicates that proposing to list them as endangered or threatened species is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to

support the immediate preparation of rules" (USDI Fish and Wildlife Service 1990). This report provides additional information regarding the distribution, ecology, and conservation status of bank monkeyflower in northern Idaho.

Our investigations indicate that bank monkeyflower is more abundant and widespread in west-central Idaho and northeastern Oregon than previously thought. While it is clear from our data that the isolated loss of a single population will not place the species in jeopardy of extinction, the cumulative effect of all development activities need to be assessed in this light. We therefore recommend that Mimulus clivicola be maintained as a Category 2 candidate. When conservation strategies outlined in the Species Management Guides for Forest Service Regions 1 (Lorain, in preparation) and Region 4 are implemented, then the Service may want to reconsider this classification.

Recommendations to the Regional Foresters:

Region 1: As stated above, our investigations reveal that bank monkeyflower is more abundant and widespread than previously thought. However, when comparing 1987 and 1988 data with our 1989 and 1990 data, it is quite apparent that we still know very little about the autecology and population dynamics of this species. Moreover, virtually all of the known sites for bank monkeyflower are located on lands administered by the Forest Service where habitat-altering activities are taking place.

While it is clear from our data that the isolated loss of a single population will not place the species in jeopardy of extinction, the cumulative effect of all development activities need to be assessed in this light. We therefore recommend that Mimulus clivicola be maintained as a Region 1 Sensitive Species for the Clearwater and Nez Perce National Forests and be added to the Idaho Panhandle National Forest list. In addition, the permanent Ecodata plots should continue to be monitored on an annual basis to assess the population dynamics of this species.

Informed management decisions should be made based on the Species Management Guide for bank monkeyflower (Lorain, in preparation) in the Northern Region.

Region 4: The presence of extant populations of bank monkeyflower were confirmed this year on the Payette National Forest. Because it is a Category 2 candidate (USDI Fish and Wildlife Service 1990), it should automatically be considered a Sensitive Species in Region 4, for the Payette National Forest. Many of the recommendations outlined above to the Regional Forester, Region 1, apply to Region 4 as well.

Region 1 currently is preparing a Species Management Guide for bank monkeyflower on the St. Joe, Clearwater, and Nez Perce

National Forests. A similar document should also be prepared for populations on the Payette National Forest. The Management Guide should address the collection of further biological data such as the role of the seed bank in population dynamics, seed dispersal mechanisms, effect of big game wintering patterns, climatic variability on population dynamics, and the effect of exotic weeds on population levels. The guide also discusses a long-term monitoring and protection strategy for bank monkeyflower. Once the protective actions are implemented, as outlined in the Species Management Guide, it is likely that the species could be reclassified as a Category 3c candidate by the U.S. Fish and Wildlife Service.

Recommendations to the Clearwater National Forest: During the 1989 field season, numerous populations of bank monkeyflower were found along the North Fork Clearwater River and a few along the Lochsa River. During that same year permanent monitoring plots were established in four drainages with known bank monkeyflower populations (Lorain and Moseley 1989).

Surveys conducted in 1990 concentrated on unexplored areas outside the Clearwater National Forest. Based on our current knowledge, it appears that bank monkeyflower is more abundant and widespread than previously thought. However, for the reasons listed above and the fact that many of the known populations fall within the Clearwater National Forest, the species should be maintained on the Sensitive Species list for the Clearwater National Forest.

Management decisions should be based on the Species Management Guide for bank monkeyflower (Lorain, in preparation). Until a conservation strategy is implemented, as outlined in the Management Guide, clearance surveys should be conducted for any projects in suitable habitat along the North Fork Clearwater and Lochsa Rivers and their tributaries, that may support Mimulus clivicola populations.

Recommendations to the Nez Perce National Forest: In 1989 populations of bank monkeyflower were found along the upper, south-facing slopes of the Selway River from just south of Lowell to the Selway-Bitterroot Wilderness border (Lorain and Moseley 1989). During the 1990 field season, inventory surveys were conducted along the South Fork Clearwater River, following the location of bank monkeyflower there by Forest Service employees. This survey resulted in eight new populations of bank monkeyflower, occurring from McAllister Picnic Area to just south of Elk City (see Appendix II).

It is recommended that Mimulus clivicola be maintained on the Sensitive Species list for the Nez Perce National Forest and be managed as specified in the Species Management Guide for bank monkeyflower (Lorain, in preparation). Clearance surveys should be conducted for any projects in suitable habitat along the Selway River and tributaries that may support bank monkeyflower populations.

Recommendations to the Idaho Panhandle National Forests: During the 1990 field season a survey for bank monkeyflower was conducted along the St. Joe River. Suitable habitat and 12 new bank monkeyflower populations were located from Ahrs Gulch to just west of Tin Can Creek with an additional three populations located along the lower North Fork St. Joe River (see Appendix II). Seven of these new sites occur on lands administered by the St. Joe National Forest. Although extensive road construction along the river hindered access in many areas with potentially suitable habitat, it was possible to delimit the extent of the distribution within the drainage.

It is recommended that Mimulus clivicola be added to the Sensitive Species list for the Idaho Panhandle National Forest and be managed as specified in the Species Management Guide for bank monkeyflower (Lorain, in preparation). Clearance surveys should be conducted for any projects in suitable habitat along the St. Joe River and tributaries that may support bank monkeyflower populations.

Recommendations to the Payette Forest: We were unable to relocate a historical population of bank monkeyflower in the West Mountains. For reasons discussed earlier in this report, we believe that the location information associated with this herbarium specimen is erroneous. Heritage Program and Payette National Forest botanists did, however, locate seven populations of bank monkeyflower in the Bear-Cuprum area, all on the Council Ranger District. These populations are small, consisting of 37 to a few hundred individuals and covering small areas. All populations are also in close proximity to ongoing management disturbances, such as road maintenance operations and grazing allotments, or within proposed timber sales areas.

Management decisions should be based on the Species Management Guide for bank monkeyflower, similar to what is being prepared in Region 1. Until a conservation strategy outlined in the Management Guide is implemented, clearance surveys should be conducted for any projects in the Bear-Cuprum area, and other suitable-appearing habitats on the Council Ranger District that may support Mimulus clivicola populations.

REFERENCES CITED

- Caicco, S.L. 1987a. Field investigations of selected sensitive plant species on the Nez Perce National Forest. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 42 p plus appendixes.
- Caicco, S.L. 1987b. Field investigations of selected sensitive plant species on the Clearwater National Forest. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 21 p plus appendixes.
- Caicco, S.L. 1988. Field investigations of selected sensitive plant species on the Clearwater National Forest. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 21 p plus appendixes.
- Cooper, S.V., K.E. Neiman, R. Steele, and D.W. Roberts. 1987. Forest habitat types of northern Idaho; a second approximation. USDA Forest Service, Intermountain Research Station General Technical Report INT-236. Ogden, UT. 135p.
- Cronquist, A. 1959. Mimulus. Pages 337-350 In: Vascular Plants of the Pacific Northwest, Part 4, by C.L. Hitchcock, A. Cronquist, M. Ownbey and J.W. Thompson. University of Washington Press, Seattle.
- Gamon, John. 1989. Personal communication. Washington Natural Heritage Program, Olympia, WA.
- Greenman, J.M. 1899. Northwestern plants, chiefly from Oregon. Erythea 7(11):115-120.
- Kagan, Jimmy. 1989. Personal communication. Oregon Natural Heritage Data Base, Portland, OR.
- Heller, A.A. 1904. Western species, new and old II. Muhlenbergia 1(4):47-60.
- Johnson C.G. Jr., and S.A. Simon. 1987. Plant associations of the Wallowa-Snake Province (Wallowa-Whitman National Forest). USDA Forest Service, Pacific Northwest Region, R6-ECOL-TP-255A-86. 400 p.
- Lorain, C.C. In preparation. Species management guide for Mimulus clivicola (bank monkeyflower) on the Clearwater and Nez Perce National Forests.

- Lorain, C.C. and R.K. Moseley. 1989. Field investigation of Mimulus clivicola (bank monkeyflower), a Region 1 Sensitive Species, on the Cleawater and Nez Perce National Forests. Idaho Natural Heritage Program, Idaho Department of Fish and Game, Boise, ID. 15 p plus appendixes.
- Meinke, Robert. 1989. Personal communication. Botanist, Oregon State Department of Agriculture, Salem, OR.
- Simpson, M. 1990. Roadless E.I.S.: T.E.S. clearance - Steen Creek. Unpublished report for the Payette National Forest; on file at the Idaho Natural Heritage Program, Dept. of Fish and Game, Boise.
- Stein, M. 1990. Personal communication. Botanist, Hells Canyon National Recreation Area, Wallowa-Whitman National Forest, Enterprise, OR.
- Tisdale, E.W. 1986. Canyon grasslands and associated shrublands of west-central Idaho and adjacent areas. Bulletin Number 40. Forest, Wildlife and Range Experiment Station, Univ. of Idaho, Moscow. 42 p.
- Thompson, David M. 1989. Personal communication. Research Botanist, Rancho Santa Ana Botanic Garden, Claremont, CA.
- USDA Forest Service. 1984. Threatened, endangered and sensitive plants and animals. Forest Service Manual. Chapter 2670. Washington D.C.
- USDA Forest Service. 1987. Ecosystem classification handbook FSH 12/87 R-1, Chapter 4 - Ecodata sampling methods. Regional Office, Northern Region, Missoula, MT.
- USDA Forest Service. 1988. Sensitive plant field guide. In house publication, Northern Region. Missoula, MT.
- USDI Fish and Wildlife Service. 1990. Endangered and threatened wildlife and plants: Review of plant taxa for listing as endangered and threatened species: Notice of review. Federal Register. 50(17):6184-6229 (21 Feb. 1990).
- Washington Natural Heritage Program. 1981. An illustrated guide to the endangered, threatened and sensitive vascular plants of Washington. Dept. of Natural Resources, Olympia, WA. 328 p.
- Washington Natural Heritage Program. 1990. Endangered, threatened and sensitive vascular plants of Washington. Department of Natural Resources, Olympia, WA. 52p.

APPENDIX I

Maps of precise occurrences of
Mimulus clivicola

Map A. Map of overall distribution of Mimulus clivicola
in Idaho and Oregon.

Non-Forest Service Property
along lower St. Joe River

Map B. Portion of St. Joe Baldy 7.5' quadrangle
Map C. Portion of St. Joe 7.5' quadrangle
Map D. Portion of St. Joe 7.5' quadrangle
Map E. Portion of Calder 15' quadrangle
Map F. Portion of Marble Creek 7.5' quadrangle
Map G. Portion of Marble Creek 7.5' quadrangle
Map H. Portion of Marble Mountain 7.5' quadrangle
Map I. Portion of Hoyt Mountain 7.5' quadrangle

St. Joe National Forest

Map J. Portion of Wallace 15' quadrangle
Map K. Portion of Three Sisters 7.5' quadrangle
Map L. Portion of Three Sisters 7.5' quadrangle

Nez Perce National Forest

Map M. Portion of Hungry Ridge 7.5' quadrangle
Map N. Portion of Hungry Ridge 7.5' quadrangle
Map O. Portion of Huddleson Bluff 7.5' quadrangle
Map P. Portion of Golden 7.5' quadrangle
Map Q. Portion of Center Star Mountain 7.5' quadrangle
Map R. Portion of Elk City 7.5' quadrangle

Wallowa-Whitman National Forest

Map S. Portion of Homestead NE 7.5' quadrangle
Map T. Portion of Homestead SE 7.5' quadrangle
Map U. Portion of Homestead SW 7.5' quadrangle
Map V. Portion of Copperfield NW 7.5' quadrangle

Payette National Forest

Map W. Portion of Cuprum 15' quadrangle
Map X. Portion of Homestead 15' quadrangle

APPENDIX II

Demographic data for 36 new Mimulus clivicola
sites in Idaho (30) and Oregon (6).

(plus one - previously known and documented population - *)

Categories follow those on the Idaho Natural Heritage Program's Special Plant Survey Form. The categories breakdown as follows:

<u>Pop. Size</u>	-	actual #	<u>Pop. Area</u>	-	1yd ²
		estimated #			1-5 yds ²
		1-10			5-10 yds ²
		11-50			10-100 yds ²
		51-100			100 yds ² - 2 ac
		101-1000			2 ac+
		1001-10,000			actual area
		10K+			(if known)

ST. JOE RIVER DRAINAGE: (plus one previously documented site - *)

1. Ahrs Gulch East
 - a. Location:
 - b. Area: 1-5 yd²
 - c. Number of plants: 51-100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

2. Reeds Gulch West
 - a. Location:
 - b. Area: 1-5 yds²
 - c. Number of plants: 2 pops approx. 600 feet apart and totaling 51-100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

3. Fitzgerald Creek West
 - a. Location:
 - b. Area: 1-5 yds²
 - c. Number of plants: 11-50 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

4. Charlie Creek
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 11-50 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

5. Herrick North
 - a. Location:
 - b. Area: 1-5 yds²
 - c. Number of plants: ca. 100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

- * 6. Black Prince Creek/Rechard Site
 - a. Location:
 - b. Area: scattered within 2 acres
 - c. Number of plants: 101-1000 plants in 1989, less than 50 seen in 1990
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: decrease in number of flowering individuals from previous year

- 7. Marble Creek RR
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: ca. 500 plants in 1990
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence

- 8. St. Joe - 2nd Bridge
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: 101-1000 plants in 1990
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence

- 9. Slate Creek South
 - a. Location:
 - b. Area: 2 acres +
 - c. Number of plants: 101-500 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

- 10. Stetson Creek
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: 100-200 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

- 11. Hammond Creek
 - a. Location:
 - b. Area: 2 acres +
 - c. Number of plants: 101-500 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

- 12. Tunnel 4
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: 51-100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

13. Skookum Creek
 - a. Location:
 - b. Area: 10-100 yd²
 - c. Number of plants: 11-50 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
14. Coyote Creek
 - a. Location:
 - b. Area: 10-100 yd²
 - c. Number of plants: ca 100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
15. Bird Creek
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: 2 pops ca 1/4 mile apart, each with 101-200 plants in 1990
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence
16. Tin Can Campground West
 - a. Location:
 - b. Area: 1-5 yds²
 - c. Number of plants: 11-50 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

SOUTH FORK CLEARWATER RIVER DRAINAGE

17. Nelson Creek
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 101-250 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
18. Meadow Creek Camp
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: 101-300 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
19. Fisher Mine East
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: 51-100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

20. Wickiup Creek
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: 1-10 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

21. Cougar Creek East
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 51-100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

22. Fall Creek West
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: 11-15 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

23. Dutch Oven Creek South
 - a. Location:
 - b. Area: 10-100 yds²
 - c. Number of plants: 11-50 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

24. Mother Lode Road
 - a. Location:
 - b. Area: 10-100 yd²
 - c. Number of plants: 51-100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

NORTHEASTERN OREGON (1990 New Sites)

25. Road 490 - Gravel Pit
 - a. Location:
 - b. Area: 1-5 yds²
 - c. Number of plants: 101-250 plants in 1990
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence

26. Road 490 - 1 mile
 - a. Location:
 - b. Area: 2 acres +
 - c. Number of plants: 51-100 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

27. Lonesome Creek draw
 - a. Location:
 - b. Area: 1-5 yds²
 - c. Number of plants: 11-50 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence
28. Lonesome Creek NW
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: 101-300 plants in 1990
 - d. Density: Moderate (in places)
 - e. Evidence of expansion/contraction: No evidence
29. Doe Creek South
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: 51-100 plants in 1990
 - d. Density: Moderate
 - e. Evidence of expansion/contraction: No evidence
30. Road 3990 - Sandbank
 - a. Location:
 - b. Area: 5-10 yds²
 - c. Number of plants: 1-10 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: No evidence

PAYETTE NATIONAL FOREST

31. Steen Creek
 - a. Location:
 - b. Area: ca. 2.5 acres
 - c. Number of plants: several hundred plants in 1990
 - d. Density: Unknown
 - e. Evidence of expansion/contraction: No evidence;
within a proposed timber sale area.
32. Bill Gulch
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: several hundred plants in 1990
 - d. Density: Unknown
 - e. Evidence of expansion/contraction: No evidence;
within a proposed timber sale area.
33. Huntley Gulch
 - a. Location:
 - b. Area: ca. 2.5 acres
 - c. Number of plants: several hundred plants in 1990
 - d. Density: Variable; low to high
 - e. Evidence of expansion/contraction: Road has
destroyed part of population; population is
adjacent to proposed timber sale area.

34. Southeast of Cuprum
 - a. Location:
 - b. Area: 1-5 yds²
 - c. Number of plants: 37 plants in 1990
 - d. Density: Low
 - e. Evidence of expansion/contraction: Road has destroyed part of population.

35. North of Huntley Gulch
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: ca. 300 plants in 1990
 - d. Density: Medium
 - e. Evidence of expansion/contraction: Unknown, although population is near a FS logging road and is in an area that is grazed by cattle and has been logged in the past.

36. Upper Huntley Gulch
 - a. Location:
 - b. Area: 100 yds² - 2 acres
 - c. Number of plants: ca. 400 plants in 1990
 - d. Density: Medium
 - e. Evidence of expansion/contraction: Road has destroyed part of population; area is grazed by cattle and is part of proposed timber sale area. Increased competition from exotic seeds also poses threat.

37. North of Bear Guard Station
 - a. Location:
 - b. Area: 10 - 100 yds²
 - c. Number of plants: ca. 250 plants in 1990
 - d. Density: Dense
 - e. Evidence of expansion/contraction: Road may have destroyed part of population.

APPENDIX III

Map and demographic data for 10 previously known populations of Mimulus clivicola in Oregon.

NOTE: population #.001 - believed to be extirpated
population #.004 - apparently misidentified

APPENDIX IV

Slides of Mimulus clivicola and its habitat.