

Summary of 1991 surveys
for Threatened, Endangered and Sensitive plants
in the
Hells Canyon National Recreation Area

by

Michael Mancuso and Robert K. Moseley

Idaho Conservation Data Center
Nongame/Endangered Wildlife Program

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Idaho Department of Fish and Game
600 South Walnut, P.O. Box 25
Boise, Idaho 83707
Jerry M. Conley, Director

Cooperative Challenge Cost-share Project
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INTRODUCTION

A botanical survey for Threatened, Endangered and Sensitive species was conducted within portions of the Hells Canyon National Recreational Area (NRA) May 20-24 and June 30-July 4, 1991, by personnel of the Idaho Department of Fish and Game's Conservation Data Center (formerly the Natural Heritage Program). Some adjacent Nez Perce National Forest, Bureau of Land Management and private lands were also searched to obtain a more comprehensive view of the extent and distribution patterns for several of the species. The survey was a cooperative Challenge Cost-share project between the Department and the Wallowa-Whitman National Forest.

The 1991 survey resulted in the collection of new and updated information for ten species of conservation concern that occur in the Hells Canyon National Recreation Area and/or adjacent lands. Survey results included the discovery of five populations of Mirabilis macfarlanei (Macfarlane's four-o'clock), two populations of Calochortus nitidus (broad-fruited mariposa), three populations of Penstemon elegantulus (lovely penstemon), one population of Mimulus clivicola (bank monkeyflower), two populations tentatively identified as Mimulus washingtonensis ssp. ampliatus (spacious monkeyflower), and one population of Rubus bartonianus (bartonberry) within the Hells Canyon NRA. Additionally, a number of previously documented Macfarlane's four-o'clock, broad-fruited mariposa and lovely penstemon populations within the NRA were revisited and considerable, updated information collected. Location and population data were also collected for several new and revisited Erigeron engelmannii var. davisii (Davis' fleabane), Allium tolmiei var. platyphyllum (Tolmie's onion) and Lomatium rollinsii (Rollin's desert-parsley) populations, three other noteworthy species encountered in the NRA during the survey. One population of Pediocactus simpsonii var. robustior (Simpson's hedgehog cactus), plus a number of extensive broad-fruited mariposa, lovely penstemon, Tolmie's onion and Davis' fleabane populations on adjacent National Forest, Bureau of Land Management and private lands were also discovered during this investigation.

A discussion for each species follows. A list of areas surveyed and maps showing the precise locations of all new and revisited populations follows the text. Conservation Data Center element occurrence records are also included for selected species. These records provide additional population, habitat and location details, among other things.

Mirabilis macfarlanei

Distribution

Mirabilis macfarlanei (Macfarlane's four-o'clock) is a federally listed Endangered species. Previous to the 1991 survey, two populations were known from the Hells Canyon NRA. These two populations were revisited and updated information collected in 1991. The 1991 survey also resulted in the discovery of five new populations within the NRA. Earlier survey work in 1988 failed to find any Macfarlane's four-o'clock away from the Lower Pittsburg Landing vicinity either (Moseley 1988). Most of the populations are small in size covering only a fraction of an acre. An exception is the population (011) which is approximately an acre in size and supports 1000 to 1500 plants, easily the most of any population in the area. Only a couple of other populations contain over 100 individuals and all other populations combined are estimated to support only 450 to 500 genets.

See Appendix 1 - Map 1 for precise population locations and Maps 2,3,4,5 for survey routes taken, and Appendix 3 for the Conservation Data Center element occurrence records for Mirabilis macfarlanei. These records provide additional population, habitat and location details, among other things.

Note: the number in parentheses associated with the name/location of a population refers to the occurrence number of this species in the Conservation Data Center's database. Only species that are in the data base will have these occurrence numbers.

Habitat

In Hells Canyon NRA, Macfarlane's four-o'clock was found at elevations between 1200 and 2700 feet in dry, mostly open, flat to vertical slopes. These lower to upper slopes are often unstable and includes virtually all aspects. The populations were associated with a number of different communities, including Festuca idahoensis-Agropyron spicatum, Rhus glabra/Agropyron spicatum, Glossopetalon nevadense/Agropyron spicatum, Agropyron spicatum-Poa secunda, Agropyron spicatum-Aristida longiseta and other Agropyron spicatum associations. Besides the species named above, common associates include Bromus tectorum, Sporobolus cryptandrus, Hypericum perforatum, Phlox colubrina, Astragalus cusickii, Erodium cicutarium, Celtis reticulata, Alyssum alyssoides, Sisymbrium altissimum, Opuntia polycantha and Asclepias cryptoceras (in population 011).

Threats

Most of the natural communities in the Pittsburg portion of Hells Canyon have been degraded by the invasion of weedy species, many of them annuals. Most of this degradation has been fostered by many years of intensive grazing pressures. B. Meinke recently established permanent monitoring plots within part of the West

Creek (006) population, both in and outside of an enclosure. Among other things, this should provide data on the effects of grazing.

Threats identified during the survey include resumed prospecting or mining near the "Mine Gulch" population (007), roadwork such as widening along Road #493 in the vicinity of the Kurry Creek population (010) and the general potential for livestock damage.

Penstemon elegantulus

Distribution

Two new populations of Penstemon elegantulus (lovely penstemon) were found in the Hells Canyon NRA during the 1991 field survey. One near the Kirkwood Creek Azimuth point (010) southeast of Triangle Mountain, the other near the upper reaches of Hiltzley Creek (009), west of the Table Lands. One population (005) previously documented on nearby Nez Perce National Forest lands in the vicinity of Grave Point was found to extend into the NRA. The previously known Table Lands (006) and Motthorn Saddle (007) populations were revisited and updated location and population information collected. The Motthorn Saddle population was found to be much more extensive than previously documented, extending at least as far north as Camp Howard Ridge. In addition, two populations on adjacent Nez Perce National Forest land (Center Ridge - 011; Johnson Ridge - 012) and two on nearby private ownership lands (Pilgrim Ridge - 013; Saddle Horse Ridge - 014) were discovered in 1991. See Appendix 1 - Maps 6,7,11,12,13,14,15 for precise population locations and Appendix 3 for the Conservation Data Center's element occurrence records. These records provide additional population, habitat and location details, among other things.

The 1991 survey slightly extended to the south the known distribution for lovely penstemon in Idaho. Within the state, it is now known from south of Cottonwood, to the northern portion of the Hells Canyon NRA, on slopes and ridges overlooking the Snake and Salmon Rivers.

Populations of lovely penstemon typically consisted of widely scattered, small clusters of plants with low density, over an extensive area. An exception being the small Kirkwood Creek Azimuth (010) population which apparently is quite localized. The five populations known to occur within the Hells Canyon NRA, support approximately 3700 plants, and this is likely a conservative estimate.

Habitat

Lovely penstemon was most often found on ridge crests and rocky

outcrops and openings in adjacent upper slopes on dry, shallow soil, relatively sparser vegetated sites within the Festuca idahoensis - Koeleria cristata and to a lesser extent the Festuca idahoensis - Agropyron spicatum habitat types (Tisdale 1986). On several occasions individual plants extended to near the edge of adjacent Pseudotsuga menziesii and Pinus ponderosa woodlands so that the plants were under partial shade. Plants were found between 4300 and 5550 feet elevation, on all aspects and from flat to 35% slopes. Common associates included Festuca idahoensis, Koeleria cristata, Agropyron spicatum, Bromus tectorum, Poa secunda, Danthonia unispicata, Balsamorhiza sagittata, B. incana, Erigeron engelmannii var. davisii, E. chrysopsidis, Achillea millifolium, Geum triflorum, Eriogonum heracleoides, Sedum stenopetalum, Lupinus spp. and Penstemon venustus. Soils were rocky and of volcanic origin, including basalt.

Threats

All populations are persisting in areas where varying amounts of livestock grazing continues to occur. The Motthorn Saddle population (007) is the largest and receives the lightest grazing impacts and has likely been only minimally impacted, if at all. Grave Point (005), Kirkwood Creek Azimuth (010), Table Lands (006) and Hiltsley Creek (009) populations all contain areas which have been heavily impacted by livestock grazing. The relative low density of plants seen in areas where these impacts appear heaviest hints that livestock grazing can be detrimental.

Lovely penstemon was fairly regularly observed along road cuts, although not within the NRA boundaries. As a result, road alterations and maintenance could destroy individuals in certain instances. Because recreational use where lovely penstemon is known to occur is minimal or absent, no conflicts are foreseen.

Additional Survey Work

Much of the suitable appearing habitat from the NRA's northern boundary south to Cow Creek Saddle was searched in 1991. Suitable-appearing ridgeline habitats to the south of Cow Creek Saddle begin to increase in elevation as one enters the Cold Spring Mountains and eventually the Seven Devils Mountains. Most of the area south of where the 1991 survey ended is higher in elevation than the 5550 feet upper limit found for lovely penstemon during the 1991 field survey. Surveying these areas would prove helpful in further delineating the abundance and range of the species in Idaho.

There is also a considerable amount of potential lovely penstemon habitat to the north of the NRA that has not been searched, the great majority of which is private land. Because some of the lovely penstemon plants were still in bud in the first week of July, 1991, it is recommend looking for lovely penstemon be delayed until the middle of July if surveys at higher elevations

to the south of Cow Creek Saddle are initiated. This recommendation should be balanced against the current year's weather patterns.

Comments on identification

A combination of floral and vegetative characters are used to distinguish Penstemon elegantulus from other Penstemon species. In all populations, floral characteristics and measurements fit well within the known range of variability for the species. However, all populations contained individuals with one or more vegetative characteristics falling outside the known range of variability for the species as described in Vascular Plants of the Pacific Northwest (Cronquist, 1959). This proved troublesome in trying to decide if the population in question was indeed P. elegantulus. Although some individuals (in some populations the majority of individuals) possessed one or more morphological features inconsistent with published information, at the population level identification is much less problematic because all populations contained individuals which met characteristics used to distinguish the species. It seems probable that when Cronquist wrote the key for lovely penstemon he did not have sufficient specimens at his disposal to reflect the full range of variability for the species.

The following is a list of morphological features showing some degree of discrepancy with that described in Vascular Plants of the Pacific Northwest for P. elegantulus.

- 1) some individuals exceeded 3 dm. in height.
- 2) some individuals with cauline leaves wider than 8 mm.
- 3) some individuals with all leaves entire.
- 4) some individuals with inflorescences that appeared to be more than "few-flowered".

Calochortus nitidus

Distribution

Two new populations of Calochortus nitidus (large-fruited mariposa) were found within the Hells Canyon NRA during the 1991 field survey - a small population (ca. 20 plants) approximately 0.75 mile south of Pittsburg Landing (092), and a larger population (ca. 1000 plants) in the upper Hiltzley Creek (090) area west of the Table Lands. In addition, three previously known populations within the NRA were revisited and updated population information collected. The Motthorn Saddle (084) and Table Lands

(032) populations were found to be more extensive than previously reported, while the Cow Creek Saddle population (020) appeared similar to earlier reports. Several new populations were discovered and others previously known revisited, on lands adjacent to the NRA. This included two previously reported populations we were unable to relocate. See Appendix 1 - Maps 6,8,11,13,14,15 for precise population locations and Appendix 3 for the Conservation Data Center's element occurrence records. These records provide additional population, habitat and location details, among other things.

The pattern of distribution within a population of broad-fruited mariposa typically varies from widely scattered individuals to pockets of loose to dense clusters of plants. Because the broad-fruited mariposa was not yet in flower (therefore harder to see) when the survey was made, it seems probable that our population estimates and perhaps even extent are in error in a conservative direction.

Continued survey work over the past several years has shown broad-fruited mariposa not to be as rare as once believed. Threats, and other questions of population dynamics concerning broad-fruited mariposa are currently being investigated via an ongoing monitoring project initiated by the Idaho Conservation Data Center and the Nez Perce NF. The Idaho Conservation Data Center will recommend changing the federal conservation status of Calochortus nitidus from C1 to C3C at the next Idaho Rare Plant Conference. The Conservation Data Center is also preparing a Species Management Guide for Forest Service lands in Idaho which will include Hells Canyon NRA populations.

Habitat

Calochortus nitidus was found on ridge crests and adjacent upper slopes in dry meadow sites within the Festuca idahoensis - Koeleria cristata and to a lesser extent the Festuca idahoensis - Agropyron spicatum habitat types (Tisdale 1986). It was found both on rocky sites containing relatively sparse vegetative cover and also mixed within the typical grassland vegetation. Like the lovely penstemon, it apparently does not extend into the most lush portions of adjacent meadow complexes. On several occasions individual plants extended to near the edge of adjacent Pseudotsuga menziesii and Pinus ponderosa woodlands so that the plants were under partial shade. Substrate material is of volcanic origin. Within the NRA, plants were found between approximately 4450 and 5300 feet elevation, on all aspects except east. Most typically it occurred on flat to gently sloped areas, but occasionally on slopes to 35%. Common associates included Festuca idahoensis, Koeleria cristata, Agropyron spicatum, Bromus tectorum, Poa secunda, Danthonia unispicata, Balsamorhiza sagittata, Brodiaea douglasii, Erigeron engelmannii var. davisii, Geum triflorum, Eriogonum heracleoides, Sedum stenopetalum,

Lupinus spp. and Penstemon elegantulus.

Threats

Intensive livestock grazing occurs in several areas where broad-fruited mariposa is found. The greatest impacts from grazing were found outside the NRA boundary, especially in the Grave Point area, including one population (021) that has possibly been extirpated, although the contribution of grazing towards this end is uncertain. Parcel to overgrazing is invasion by exotic species. Portions of the Hiltsley Creek (090) population within the NRA have been seriously invaded with annual weeds, especially cheatgrass. The precise effect of this on the population is not known, but it seemed apparent that broad-fruited mariposa was less abundant where the weeds were most prominent.

Mimulus clivicola

A single population of Mimulus clivicola (bank monkeyflower) was discovered in the Hells Canyon NRA during the 1991 survey. This represents the first documentation of this species within the NRA. Comprised of an estimated 1000 individuals, the population is located in the saddle-like area where Wild Horse Ridge abuts the north-south trending Snake/Salmon Rivers divide ridge. It was found in small, bare ground patches between large rocks within a Festuca idahoensis - Koeleria cristata (Tisdale 1986) community. Associates included Agropyron spicatum, Balsamorhiza sagittata, Phacelia heterophylla, Collinsia parviflora, Clarkia pulchella, and Erysimum sp. Similar habitats are scattered throughout the northern portion of the NRA and it seems likely additional populations occur in the area. See Appendix 1 - Map 9 for precise population location and Appendix 3 for the Conservation Data Center's element occurrence record. This record provides additional population, habitat and location details, among other things.

Cattle traverse the population, but do not seem to pose any threat to this occurrence. No other potential threats were observed in the area.

Mimulus washingtonensis ssp. ampliatus

Two populations of what we have tentatively identified as Mimulus washingtonensis ssp. ampliatus (spacious monkeyflower) were discovered in the Hells Canyon NRA during the 1991 survey. One population was found approximately 0.4 mile west of Grave Point and is estimated to contain 100 individuals, the other in upper Hiltsley Creek west of the Table Lands with an estimated 170 plants. See Appendix 1 - Maps 6,13 for precise locations of these occurrences.

Both populations were found on southwest-facing slopes in very small, seepy microsites where the soil remained moist longer into the growing season than adjacent grassland sites. Associated species were different between the two populations, but in both cases unlike those found in the adjacent grassland communities. Examples include Dodecatheon sp., Delphinium sp., Epilobium sp., Plagiobothrys sp., Navarretia sp. and Montia linearis.

The Grave Point population receives minimal impacts from livestock, probably because it is located near the edge of a steep, cliff-like drop in the terrain. The Hiltzley Creek population is trampled by cattle, but is evidently persisting. Because of its annual habit, such disturbance may not be a problem.

Allium tolmiei var. platyphyllum

Distribution

Within the Hells Canyon NRA, Allium tolmiei var. platyphyllum (Tolmie's onion) was found to be common along the ridge complex north from Pittsburg Saddle, becoming more common from the Big Canyon Saddle area to Camp Howard Ridge. This population is comprised of several thousand individuals, mostly as small clusters in relatively sparsely vegetated areas that are intermittent along the ridge. Two larger concentrations occur, one just north of Big Canyon Saddle, the other just below the Camp Howard triangulation point approximately 1.3 miles further north. Tolmie's onion was found to be even more abundant in two populations north of the NRA, at Pilgrim Ridge and Christmas Tree Gulch. Just north of the NRA along the ridge system tending northwest from upper Jones Creek another population was discovered. A small population was also discovered near Grave Point east of the NRA. The Cow Creek Saddle population (004) within the NRA was revisited and updated information collected. It is comprised of several hundred individuals. See Appendix 1 - Maps 9,14,15,16,17 for precise population locations.

Habitat

The Big Canyon Saddle population occurs in flat to very gently sloping ridge crest to upper slope openings within the Festuca idahoensis - Koeleria cristata habitat zone (Tisdale 1986). It is sympatric with Penstemon elegantulus and Erigeron engelmannii var. davisii in several places and Calochortus nitidus in at least one. It is found in stony soil derived from volcanics that usually have a clayey component. Elevation of the population varies from 5000 to 6000 feet. Although cattle trail through part of the population near the saddle, this is not perceived as a serious threat, as the

population appears vigorous.

The population at Cow Creek Saddle is associated with an Artemisia rigida scabland habitat at 5250 feet that is predominately flat with soil derived from basalt.

The populations found north of the NRA boundary occur in habitats similar to the Big Canyon Saddle population and appear vigorous even though livestock grazing can be locally heavy. It is expected additional populations of Tolmie's onion occur north of the NRA in areas not searched.

Conservation Status

Recent surveys have revealed Tolmie's onion to be fairly widespread and in some cases abundant in west-central Idaho. It is anticipated that this species will be dropped as a conservation concern in Idaho in the near future.

Rubus bartonianus

A single Rubus bartonianus (bartonberry) shrub was discovered in a mid-slope draw on the south side of Big Canyon Creek within the Hells Canyon NRA. Additional shrubs may occur in the area but were not located. It was found on a fairly steep, west-facing slope at an elevation of 2000 feet in soil derived from basalt. The bartonberry was associated with a riparian stringer community of Cornus stolonifera, Celtis reticulata and Rhus glabra. No evidence of disturbance or threats were observed.

Bartonberry is endemic to the Hells Canyon area of the Snake River where it can be locally common. The Big Canyon Creek discovery is especially noteworthy because it extends the range of the species in Idaho by approximately 13 miles north. See Appendix 1 - Map 16 for precise population location and Appendix 3 for the Conservation Data Center's element occurrence record. This record provides additional population, habitat and location details, among other things.

Erigeron engelmannii var. davisii

Distribution

Erigeron engelmannii var. davisii (Davis'fleabane) was found to be widespread and often abundant along nearly all the ridge systems surveyed both within and outside the NRA. The only ridge complex where it was not found was Center Ridge just east of the NRA boundary on Nez Perce NF and State lands. The soil parent material is different on Center Ridge than in surrounding places, and may

in part explain the absence of Davis' fleabane there.

Within the NRA, Davis' fleabane was particularly abundant along the ridge complex north from Pittsburg Saddle to Camp Howard Ridge, including Wild Horse Ridge. This large population contains well over 10,000 individuals. Vigorous populations were also discovered on some upper slopes west of Pittsburg Saddle in upper Kurry Creek, the Grave Point area, upper Hiltzley Creek, Kirkwood Creek Azimuth area, Cow Creek Saddle area and Phillips Ridge, all within the NRA. Additional populations were discovered on Bureau of Land Management land north of the NRA in the upper Jones Creek area, on private lands to the north at Pilgrim Ridge and Christmas Tree Gulch, and on National Forest lands east of Grave Point and on Johnson Ridge. Two populations were also found in the Bureau of Land Management's Lucile Cave ACEC on the Salmon River. Additional populations likely occur, especially to the north in areas not surveyed. See Appendix 1 - Maps 6,10,11,13,14,15,16,17 for precise population locations.

Habitat

Davis' fleabane occurs most commonly on rocky, ridgecrest openings within Festuca idahoensis - Koeleria cristata and Festuca idahoensis - Agropyron spicatum habitat types (Tisdale 1986). To a lesser extent it can be found on upper slopes either in relatively sparsely vegetated openings or even within the predominate grassland communities. On a few occasions it was observed growing beneath the canopy along the grassland-forest edge. Davis' fleabane occurs on all aspects, from flat to fairly steep slopes, and within the survey area from approximately 4000 to 6000 feet elevation. Common associates include Festuca idahoensis, Koeleria cristata, Poa secunda, P. bulbosa, Bromus tectorum, Balsamorhiza sagittata, B. incana, Lupinus spp., Penstemon elegantulus, P. venustus and Lomatium spp. Two cogenerics, Erigeron compositus and E. chrysopsidis are sometimes sympatric, but neither should be confused with Davis' fleabane.

Conservation Status

Davis' fleabane is persisting very well under current land use patterns in the NRA and no long-term threats were observed. Although livestock grazing is prevalent in some areas, it seems to be at most a minor threat. Davis' fleabane is currently a U.S. Forest Service Region 1 Sensitive Species and a Sensitive Species on the Idaho Native Plant Society state list. In light of discoveries made during the 1991 Hells Canyon survey, the conservation status for this species is being re-evaluated.

Pediocactus simpsonii var. robustior

A population of Pediocactus simpsonii var. robustior (Simpson's hedgehog cactus) was discovered along the ridge complex trending northwest from upper Jones Creek, just north of the Hells Canyon NRA on Bureau of Land Management and private land. It was common along the rocky crest and was sympatric with both Erigeron engelmannii var. davisii and Allium tolmiei var. platyphyllum. No populations were found within the NRA. See Appendix 1 - Maps 16,17 for precise population location.

Lomatium rollinsii

Lomatium rollinsii (Rollin's desert-parsley) was regularly encountered during the 1991 surveys, except along the highest ridges. Previous survey work done in the Hells Canyon area had documented the relative abundance and insulation from disturbance of Rollin's desert-parsley there. A Species Management Guide (Moseley 1988) recommended the species be dropped from the Region 1 and 6 Sensitive Species List. The 1991 survey work further verifies the abundance of Rollin's desert-parsley in the Hells Canyon NRA. Although new locations for this species are noted on field maps, in light of the documented abundance of this species, this information was deemed relatively trivial and is not included in this report.

Acknowledgment

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Appendix 1

Locations of, and survey routes for Threatened, Endangered and Sensitive plants in the Hells Canyon National Recreation Area and adjacent lands.

- Map 1. Distribution of Mirabilis macfarlanei in the Pittsburg Landing area, Hells Canyon NRA. Portion of Grave Point 7.5' USGS quadrangle.
- Map 2. Mirabilis macfarlanei survey route. Portion of Kernan Point NE 7.5' USGS quadrangle.
- Map 3. Mirabilis macfarlanei survey route. Portion of Grave Point 7.5' USGS quadrangle.
- Map 4. Mirabilis macfarlanei survey route. Portion of Grave Point 7.5' USGS quadrangle.
- Map 5. Mirabilis macfarlanei survey route. Portion of Kirkwood Creek 7.5 USGS quadrangle.
- Map 6. Grave Point populations for Calochortus nitidus (058, 059), Penstemon elegantulus (005), Mimulus washingtonensis ssp. ampliatus, and Erigeron engelmannii var. davisii. South of Pittsburg Saddle population for Calochortus nitidus (092). Portion of Grave Point 7.5' USGS quadrangle.
- Map 7. Penstemon elegantulus, Motthorn Saddle population (007). Portion of Grave Point 7.5' USGS quadrangle.

- Map 8. Calochortus nitidus, Motthorn Saddle population (084).
Portion of Grave Point 7.5' USGS quadrangle.
- Map 9. Big Canyon Saddle population for Allium tolmiei var. platyphyllum. Wild Horse Ridge population (068) for Mimulus clivicola. Portion of Grave Point 7.5' USGS quadrangle.
- Map 10. Erigeron engelmannii var. davisii. Portion of Grave Point 7.5' USGS quadrangle.
- Map 11. Joe Creek population for Calochortus nitidus (060). Grave Point populations (continued) for Penstemon elegantulus (005) and Erigeron engelmannii var. davisii. Portion of Slate Creek 7.5' USGS quadrangle.
- Map 12. Penstemon elegantulus, Center Ridge Saddle population (011). Portion of Lucile 7.5' USGS quadrangle.
- Map 13. Table Land populations for Calochortus nitidus (032), Penstemon elegantulus (006) and Erigeron engelmannii var. davisii. Hiltzley Creek populations for Calochortus nitidus (090), Penstemon elegantulus (009), Erigeron engelmannii and Mimulus washingtonensis ssp. ampliatum. Johnson Ridge populations for Calochortus nitidus (091), Penstemon elegantulus (012), and Erigeron engelmannii var. davisii. Portion of Kirkwood Creek 7.5' USGS quadrangle.
- Map 14. Kirkwood Creek Azimuth populations for Penstemon elegantulus (010) and Erigeron engelmannii var. davisii. Cow Creek Saddle populations for Calochortus nitidus (020) and Allium tolmiei var. platyphyllum (004). Phillips Ridge population for Erigeron engelmannii var. davisii. Portion of Kirkwood Creek 7.5' USGS quadrangle.
- Map 15. Pilgrim Ridge populations for Calochortus nitidus (094), Penstemon elegantulus (013), Allium tolmiei var. platyphyllum and Erigeron engelmannii var. davisii. Christmas Tree Gulch populations for Calochortus nitidus (093), Allium tolmiei var. platyphyllum and Erigeron engelmannii var. davisii. Saddle Horse Ridge population for Penstemon elegantulus (014). Portion of Joseph 7.5' USGS quadrangle.
- Map 16. Big Canyon Creek population for Rubus bartonianus. East part of upper Jones Creek populations for Allium tolmiei var. platyphyllum, Erigeron engelmannii var. davisii and Pediocactus simpsonii var. robustior. Portion of Kernan Point NE 7.5' USGS quadrangle.
- Map 17. West part of upper Jones Creek populations for Allium

tolmiei var. platyphyllum, Erigeron engelmannii var. davisii and Pediocactus simpsonii var. robustior.
Portion of Grave Point 7.5' USGS quadrangle.

Appendix 2

List of areas surveyed during the 1991 field investigation.

Areas surveyed within the Hells Canyon NRA - May 20 to May 24:

- 1) low terraces above the Snake River from north of the NRA boundary (T28N R2W S35) south to Kirby Creek, a distance of ca. 11 river miles.
- 2) lower Jones Creek and series of ridges and slopes north (to ca. 0.5 mile north of NRA boundary) of the creek.
- 3) lower, mid and upper-slopes between Jones and Big Canyon Creeks.
- 4) lower and mid-slopes south from Big Canyon Creek to Lower Pittsburg Landing with special emphasis in the West and Kurry Creek drainages.
- 5) lower Klopton Creek and mid-slopes between Klopton Creek and China Rapids.
- 6) Kirby Bar and lower Kirby Creek areas.

Areas surveyed within the Hells Canyon NRA - June 30 to July 4:

- 1) the north to south trending Snake/Salmon Rivers divide ridge from Camp Howard Ridge south to Grave Point, including the Big Canyon Saddle, Motthorn Saddle and Pittsburg Saddle areas.
- 2) Wild Horse Butte area.
- 3) west of Pittsburg Saddle (upper Kurry Creek), in the vicinity of USFS Road #493 as far as the SE corner of Section 23.
- 4) Table Lands and ridge complex to the west between upper Hiltsley and upper Corral Creeks.
- 5) USFS Road #420 from the Grave Point area south to the Cow Creek Saddle area.
- 6) USFS Road #2062 (off of #420) to Kirkwood Creek Azimuth point and nearby slopes.
- 7) Cow Creek Saddle south to below Wickiup Butte.

Areas surveyed on Nez Perce National Forest lands adjacent to Hells Canyon NRA - June 30 to July 4:

- 1) Grave Point Lookout and ridges to east and southeast, and Bull Springs.
- 2) Points along USFS Road #672 from Christie Creek south to Cow Creek Saddle including Center, Johnson and Phillips Ridges.

Areas surveyed to the north of Hells Canyon NRA on nearby Bureau of Land Management, State of Idaho and private ownership lands - June 30 - July 4:

- 1) Pilgrim Ridge.
- 2) Saddle Horse Ridge.

- 3) Portion of Camp Howard Ridge at the very head of Christmas Tree Gulch.
- 4) Points along the White Bird to Joseph road as far as Christmas Tree Gulch.

Appendix 3

Idaho Conservation Data Center
Element Occurrence Records

NOT INCLUDED IN THE CDC HOME PAGE VERSION OF THIS REPORT