

THE STATUS AND DISTRIBUTION OF
CUSICK'S FALSE YARROW (*CHAENACTIS CUSICKII*)
IN IDAHO

by

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ABSTRACT

Cusick's false yarrow (*Chaenactis cusickii*) is a narrow endemic, restricted to clay outcrops in Malheur County, Oregon, and adjacent portions of northwestern Owyhee and Canyon counties, Idaho. It is BLM Sensitive Species in Idaho, as well as a Category 2 candidate for listing as Endangered or Threatened under the Endangered Species Act. The Category 2 classification includes those species for which preliminary information indicates that listing is possibly warranted, but for which further biological research and field study are needed to support a proposed rule-making for listing. To rectify this paucity of information on the distribution, abundance, and conservation status of Cusick's false yarrow in Idaho, the Boise District BLM and the Idaho Department of Fish and Game's Conservation Data Center entered into a cooperative project to conduct field inventories in 1994.

During May and June, 1994, I conducted a field survey of nearly all suitable clay outcrops within the range of Cusick's false yarrow in Idaho. Nine occurrences have been documented in Idaho, six are known to be extant, one extirpated, and the disposition of two historical collections remains to be determined. All extant populations appeared to be within mining claims, although none were active in 1994. All populations also occur on land that is open to cattle grazing, although their impact on the barren clay substrates that is Cusick's false yarrow habitat is negligible. In addition to elucidating the conservation status of Cusick's false yarrow, I also clarified the Idaho distribution and abundance of two other rare species occurring on clay outcrops in the area, *Mentzelia mollis* (smooth stickleaf) and *Phacelia lutea* var. *calva* (Malheur yellow phacelia).

Included is a status survey summarizing the status of our knowledge of Cusick's false yarrow in Idaho, including information on taxonomy, habitat, distribution, conservation status, and management and conservation recommendations. Sections containing line drawings, distribution maps, maps of areas searched, and slides of its habit and habitat are appended to the end of the report.

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INTRODUCTION

Cusick's false yarrow (*Chaenactis cusickii*) is a narrow endemic species, restricted to clay outcrops in Malheur County, Oregon, and adjacent portions of northwestern Owyhee and Canyon counties, Idaho. It has been recognized to be of conservation concern in Idaho since the early 1980's (Packard and Grimes 1981) and as a BLM Sensitive Species in Idaho for a number of years (Rosentreter 1980; 1986; DeBolt and Rosentreter 1988; Conservation Data Center 1994). It was recently added to the list of federal candidates for possible listing consideration as Endangered or Threatened under the Endangered Species Act (U.S. Fish and Wildlife Service 1993). It is considered a Category 2 candidate, indicating that according to information now in the possession of the Fish and Wildlife Service, proposing to list Cusick's false yarrow as Endangered or Threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support proposed rules. Further biological research and field study may be needed to ascertain its conservation status (Conservation Data Center 1994).

To rectify this paucity of information on the distribution, abundance, and conservation status of Cusick's false yarrow in Idaho, the Boise District BLM and the Idaho Department of Fish and Game's Conservation Data Center entered into a cooperative project to conduct field inventories in 1994. The primary objectives of this cooperative investigation are as follows:

- 1) Survey and delineate known populations of Cusick's false yarrow in Idaho, and search suitable habitat for additional populations.
- 2) Characterize habitat conditions for the populations.
- 3) Assess population data on and threats to the Idaho populations and make management recommendations to the Boise District BLM based on these assessments.

RESULTS

During May and June, 1994, I conducted a field survey of nearly all suitable clay outcrops within the range of Cusick's false yarrow in Idaho. In addition to elucidating the conservation status of Cusick's false yarrow, I also clarified the Idaho distribution and abundance of two other rare species occurring on clay outcrops in the area, *Mentzelia mollis* and *Phacelia lutea* var. *calva*.

Following is the status of our knowledge of Cusick's false yarrow in Idaho, including information on taxonomy, habitat, distribution, conservation status, and management and conservation recommendations. Sections containing line drawings, distribution maps, maps of areas searched, and slides of its habit and habitat are appended to the end of the report.

***Chaenactis cusickii* A. Gray**

TAXONOMY

Full bibliographic citation: Synopsis of the Flora of North America. Edition 2. 1(2):452. 1886.

Type specimen: Oregon, Malheur County, "sandy hills of the Malheur River," Cusick 1237 (holotype GH).

Pertinent synonym(s): None.

Common name: Cusick's false yarrow, morning brides.

Size of genus: About two dozen species, native to western North America (Cronquist 1994).

Family name: Asteraceae, Compositae.

Common name for family: Aster, Sunflower.

History of knowledge of taxon in Idaho: Harold Tucker of the College of Idaho first collected Cusick's false yarrow in Idaho in the late 1930's; in 1937, along Squaw Creek on the north slope of the Owyhee Mountains, and in 1938, at Greenleaf in Canyon County and near Marsing in Owyhee County. It was next collected in the state in 1978, by Roger Rosentreter where he encountered it at the mouth of Jump Creek Canyon. Conservation attention was focused on it when Pat Packard and Jim Grimes (1981) reviewed its status for the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council. Several collections and population discoveries were made in the 1980's, and the full extent of its distribution in the state was elucidated in 1993 and 1994.

Alternative taxonomic treatments: None.

LEGAL OR OTHER FORMAL STATUS

National:

U.S. Fish and Wildlife Service: Cusick's false yarrow is a category 2 candidate for listing under the Endangered Species Act (U.S. Fish and Wildlife Service 1993). The category 2 status indicates that according to information now in the possession of the Fish and Wildlife Service proposing to list Cusick's false yarrow as Endangered or Threatened is possibly appropriate, but for which conclusive data on biological vulnerability and threat are not currently available to support proposed rules. Further biological research and field study may be needed to ascertain the status of it in this category (Conservation Data Center 1994).

Bureau of Land Management: Cusick's false yarrow is currently an Idaho BLM Sensitive Species (Conservation Data Center 1994).

Other current formal status recommendations: Because it is narrowly distributed, Cusick's false yarrow is given a global rank of G2 by the Biodiversity Information Network - the International Association of Natural Heritage Programs and Conservation Data Centers (Conservation Data Center 1994).

State:

Idaho:

Idaho Native Plant Society: Because Cusick's false yarrow is a federal candidate, the Idaho Native Plant Society does not assign a state priority rank to it (Idaho Native Plant Society 1994).

Conservation Data Center: Because of its very limited distribution in Idaho, it is given a state conservation rank of S1 by the Biodiversity Information Network (Conservation Data Center 1994).

Review of past status: In their review of this taxon for the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Packard and Grimes (1981) proposed that it be placed on the Federal Watch List.

Oregon:

Department of Agriculture Plant Conservation Biology Program: Cusick's false yarrow is a candidate for listing as Threatened or Endangered under the Oregon Endangered Species Act (Oregon Natural Heritage Program 1993).

Natural Heritage Program: Cusick's false yarrow is on the Heritage Program List 1, which includes taxa that are endangered and threatened throughout their range or which are presumed extinct (Oregon Natural Heritage Program 1993).

DESCRIPTION

General nontechnical description: A small to medium-sized annual plant up to about 6 inches tall. When small, the stem is unbranched and terminated by one flowering head. When larger, the stems are branched, each one also terminated by one head. The herbage and stems are more or less succulent, dark green, and mostly glabrous, although occasionally they are thinly and unevenly covered with woolly pubescence. The leaves are mostly narrow, strap-shaped, and entire or occasionally with a few small lobes. The head consists of a few, white disc flowers. Showy ray flowers are absent.

Technical description: Annual up to about 1 (1.5) dm tall, simple when small, freely branched when well developed, rather thinly and unevenly arachnoid-puberulent when young, later more or less glabrate; leaves subsucculent (as also the stems), entire or occasionally with a few irregular teeth or small lobes, linear or oblanceolate, mostly 1-4 cm long and 2-5 mm wide; heads terminating the branches; involucre 7-9 mm high, of (8)13(21) green or somewhat anthocyanic, subherbaceous, linear-oblong bracts, commonly shortly surpassed by one or more closely subtending leaves; corollas mostly 4-6 mm long; anthers evidently exerted; pappus-scales mostly 10-14, shorter than the white or faintly anthocyanic corolla,

unequal, often ragged or lacerate or fringed along the margins; 2n=12 (Cronquist 1994).

Local field characters: As Cronquist (1994) states, "a distinctive local species, not to be confused with anything else." It is the only *Chaenactis* and one of the few composites that occur on barren clay outcrops in northwestern Owyhee County. Three other *Chaenactis* species are known from southwestern Idaho and can be separated by the following key (adapted from Cronquist 1994):

1. Pappus-scales mostly 6-10, sometimes unequal and more or less biseriate, but not with a well defined outer series much shorter than the inner.
 2. Leaves 1-3 times pinnatifid; plants biennial or perennial *Chaenactis douglasii*
 2. Leaves entire or occasionally with a few irregular teeth or small lobes; annual
..... *C. cusickii*
1. Pappus-scales fewer, generally either 4, or 4 + 4 with the outer series much shorter than the inner; annual or winter annual.
 3. Pappus biseriate, of 4 long inner scales mostly 3-8 mm long and 4 shorter outer ones
..... *C. macrantha*
 3. Pappus uniseriate, of 4 short to elongate scales *C. stevioides*

Photos and line drawings: Reproductions of line drawings of Cusick's false yarrow appear in Cronquist (1994), DeBolt and Rosentreter (1988), and Appendix 1. The Conservation Data Center has an extensive collection of slides of the habit and habitat of Cusick's false yarrow, some of which appear in Appendix 5.

DISTRIBUTION

Global distribution: Cusick's false yarrow is endemic to extreme northwestern Owyhee and (formerly) Canyon counties, Idaho, and adjacent Malheur County, Oregon.

Idaho distribution: Nine occurrences have been documented from Idaho, six known to be extant, one known to be extirpated, and two historical collections that have not been relocated. Aside from the extirpated site in Canyon County, Cusick's false yarrow occurs in two distinct areas of northwestern Owyhee County: (1) lowlands between the northern edge of the Owyhee Mountains and the Snake River, at elevations ranging from 2200 to 2700 feet; and (2) at higher elevations in the Succor Creek and Squaw Creek drainages, along the western slope of the Owyhee Mountains, at elevations ranging from 4100 to 4300 feet. See Appendix 2 for maps of the Idaho distribution of Cusick's false yarrow.

Extant occurrences in Idaho: (the three digit code preceding the occurrence is the reference number used by the Conservation Data Center and others for that occurrence; further data are provided in the Occurrence Records that appear in Appendix 3; see Appendix 2 for precise locations of extant occurrences).

Northern, lowland populations:

- 001 Jump Creek - This population covers approximately three acres, west of the mouth of Jump Creek Canyon. It was first observed in 1978 and revisited during my 1994 survey.
- 006 Rattlesnake Butte South - Located approximately six miles south of Homedale, west of Jump Creek, along the northeastern slope of the Owyhee Mountains. It was first discovered in 1989. I did not visit the site in 1994 due to access problems, but observed from a distance that the habitat did not appear to be altered.
- 008 Rats Nest Gulch - Two small populations are known from the vicinity of the lower reaches of Opalene Gulch and Rats Nest Gulch, east of Highway 95 along the base of the Owyhee Mountains. One of the populations was discovered in 1993, the other in 1994.

Southern, highland populations:

- 002 Sands Basin Road - In the McBride Creek drainage, approximately 1.4 miles north of the old Rocks Stage Station site. This population was first observed in 1981, and revisited in 1994.
- 005 McBride Creek - Located east of McBride Creek, approximately one mile north of where Highway 95 crosses the creek. This population was first observed in 1986 and revisited in 1994.
- 009 Dead Horse Ridge - This population occurs north of Dead Horse Creek and west of Highway 95 in the McBride Creek drainage. It was discovered in 1994.

Extirpated sites: One site is known to be extirpated in Idaho.

- 007 Greenleaf - Collected by Tucker in 1938, no suitable habitat remains in the vicinity of Greenleaf in 1994. It has been totally converted to residential, industrial, and agricultural uses.

Historical sites: Two Idaho sites are known from old herbarium collections. I regard these as historical observations, with the implied intent that they may be rediscovered.

- 003 Marsing Job Corps Center - Collected by Tucker in both 1938 and again in 1952, location information for these collections is given as "about 4 miles S of Marsing" presumably near the present-day Marsing Job Corps Center along Highway 78. I checked this area in 1994 and was unable to relocate this population. The area has a much sandier substrate than all other populations I visited, as evidenced by the presence of *Stipa comata* and *Oryzopsis hymenoides*. The population is part of the northern, lowland group

of populations.

- 004 Squaw Creek/Blackstock Ranch - This population was collected by Tucker in 1937. The location information "Squaw Creek above Blackstock Ranch, Owyhee Mountains," is sufficiently vague to be difficult to relocate. It is mapped in Shares Basin, above private land along Squaw Creek, T1S, R4W, section 6. It is part of the southern, highland group of populations.

Unverified/undocumented reports: DeBolt and Rosentreter (1988) list a "known location" of Cusick's false yarrow from Shares Basin (T1S, R4W, section 6) as well as Tucker's site above the Blackstock Ranch. It's unknown what the source of the Shares Basin location is (Ann DeBolt, Boise BLM, personal communication, 1994), but it is highly likely that it is the same as occurrence 004.

Synopsis of past and needed inventories: Tucker's early collections represent a general botanical exploration of southwestern Idaho. Roger Rosentreter began the first coarse-level rare plant surveys in the Boise BLM District in 1978, where he, and later Ann DeBolt, discovered several populations as part of general rare plant surveys. Smithman's (1989) survey for *Mentzelia mollis* included habitat for Cusick's false yarrow, but failed to discover any new sites.

My survey in 1994, was the first systematic field inventory for the species in Idaho (Appendix 4). My search area was divided into two portions, the northern lowland portion, which included the distribution of the Poison Creek Formation, from the Oregon border at Graveyard Point, southeast along the foothills of the Owyhee Mountains to the mouth of Reynolds Creek. Every outcrop of clay was search in this area. The second area was the southern, highland portion of its range, which included Little Squaw Creek and the upper Succor Creek drainage, including Dead Horse Creek, McBride Creek, and Dry Creek. Similar to the lowland portion of the study area, I checked every outcrop of Succor Creek Formation clay in the area. See Appendix 4 for maps of the inventory area.

Little remains to be done as far as field inventories for Cusick's false yarrow in Idaho. The Squaw Creek/Blackstock Ranch 004 historical occurrence needs to be confirmed; I did not search the Shares Basin area for it in 1994. There is a Judith Glad collection of *Mentzelia mollis* along upper Succor Creek, above Succor Creek Reservoir, that I was not able to visit. This may represent some uninventoried clay outcrops, although no populations of Cusick's false yarrow are known south of McBride Creek.

HABITAT

General habitat description: In Idaho, Cusick's false yarrow is restricted to outcrops of Poison Creek Formation and Succor Creek Formation clay that has a very sparse cover of vegetation. The communities are undescribed and consist of less than 10 vascular species and an occasional cover of lichens on the soil. The clays have high shrink-swell capacity, creating a chronically-disturbed soil surface on which few plants are able to establish.

Geology and Soils: Extant sites of Cusick's false yarrow are underlain by two formations of Miocene age (Ekren et al. 1981). The three northern, lowland occurrences are all underlain by the Poison Creek Formation, consisting of gray, buff, and white lacustrine and stream silt, sand, and clay, mostly tuffaceous and, in the places where Cusick's false yarrow occurs, much altered to montmorillonite. To the south, the

highland occurrences occur on the Succor Creek Formation, consisting of an altered and vitric nonwelded tuff.

Associated species: *Amsinkia tessellata*, *Camissonia claviformis*, *Cleomella macbrideana*, *Phacelia lutea lutea*, *Phacelia lutea calva*, *Mentzelia mollis*, and *Chenopodium* sp. are the only species that were observed to be directly associated with Cusick's false yarrow on the clay outcrops. The habitat is surrounded by shrub-steppe vegetation dominated by *Atriplex confertifolia*, *Artemisia spinescens*, *Artemisia tridentata vaseyana*, and/or *Artemisia arbuscula*.

Other rare species: Cusick's false yarrow is sympatric with two other rare species at the three highland sites. At McBride Creek (005) and Dead Horse Ridge (009) it is associated with *Phacelia lutea* var. *calva* and *Mentzelia mollis*, while only the *Phacelia* occurs at the Sands Basin Road (002) population. *Mentzelia mollis* is a federal candidate that is restricted to the Succor Creek drainage and adjacent areas of Malheur County, Oregon, and Owyhee County, Idaho, similar to Cusick's false yarrow (Smithman 1989). Similarly, *Phacelia lutea* var. *calva* is restricted to the Succor Creek drainage in Oregon and Idaho, as well as a disjunct population in northwestern Humboldt County, Nevada (Cronquist 1984). The lowland populations of Cusick's false yarrow, north of the Owyhee Mountain crest are associated exclusively with another variety, *Phacelia lutea* var. *lutea*. Several other rare species occur in adjacent habitats within the range of Cusick's false yarrow in Idaho, including *Eriogonum salicornioides* and *Astragalus sterilis*.

Because I searched virtually every clay outcrop of Poison Creek Formation and Succor Creek Formation clays within Idaho for Cusick's false yarrow (see Appendix 4 for maps of areas searched), I also elucidated the distribution of the other two rare taxa in the state that are also restricted to this substrate, *Mentzelia mollis* and *Phacelia lutea* var. *calva*. I discovered the first lowland population of *Mentzelia mollis*, between the Owyhee Mountains and the Snake River. Previously, all known Idaho populations were in the highland area of upper Succor Creek, although lowland populations do occur in Oregon. I also discovered several new populations in the highland area of its distribution, as well as rectified the status of several historical collections. All told, I visited 13 of the 16 known occurrences in Idaho during 1994. Two others were last observed in 1989, and only one historical collection needs to be reevaluated, a 1974 Judith Glad collection from along Succor Creek above the reservoir. Little habitat remains to be surveyed in Idaho, and I doubt that many, if any, more sites will be discovered.

Prior to 1994, the Conservation Data Center had populations of *Phacelia lutea* var. *calva* from both the lowlands north of the Owyhee crest, as well as in the highlands to the south. During the course of this field work, I determined that all *Phacelia lutea* in the lowlands is var. *lutea* and all the populations in the highlands are var. *calva*. In Idaho, at least, the two *Phacelia lutea* taxa are allopatric. The type variety, var. *lutea* is common and relatively widespread and of no conservation concern in Idaho or Oregon. Variety *calva*, however, is more narrowly distributed and on the edge of its range in Idaho. Currently there are 13 known occurrences in Idaho, and in 1994, I visited all but one, a 1986 observation in the Dry Creek drainage.

POPULATION BIOLOGY

Phenology: Germination and growth probably begins sometime in April on average years, but may be as early as March in the lowland populations during years with warm, sunny spring weather. Again, depending on climatic conditions and the elevation of the population, flowering begins in late April or May and usually ends by early June, especially in the lowlands. The size of the plant and the number of flowers and fruits produced is highly dependent on precipitation levels during the spring.

Population size and condition: The known distribution of Cusick's false yarrow in Idaho consists of six extant occurrences, consisting of seven populations (two nearby populations are mapped at Rats Nest Gulch 008). The estimated area covered by these seven populations is approximately 20 acres, or an average of around three acres per population. The estimated number of above-ground individuals was around 5000 in 1994, but because it's an annual and we have no idea of the number of individuals in the seed bank, this attribute is not useful in assessing population quality. Population area and habitat quality are better attributes with which to assess the conservation status of populations. Below are estimates of population area and numbers of above-ground individuals observed recently. Later sections assess ownership patterns, land use, and threats to extant populations. The density of populations I visited in 1994, varied from widely scattered individuals to areas being locally dense, usually concentrated at the base of the clay slopes, in small, ephemeral drainage pathways. Further data are provided in the Occurrence Records that appear in Appendix 3.

Northern, lowland populations:

- 001 Jump Creek - This locally dense population covers approximately three acres, and in 1994 consisted of nearly 1000 above-ground individuals.
- 006 Rattlesnake Butte South - When first discovered in 1989, there were between 200-300 plants observed. I did not visit the site in 1994 due to access problems, but observed from a distance that the habitat did not appear to be altered. The site covers four acres.
- 008 Rats Nest Gulch - Two small populations are included at this occurrence. In total, they cover approximately 2.2 acres. Approximately 2500 individuals were observed at the two sites.

Southern, highland populations:

- 002 Sands Basin Road - This population contained approximately 500 plants in 1994. It covers less than one acre.
- 005 McBride Creek - This population contained approximately 400 plants in 1994. Suitable habitat covers approximately 10 acres, although the population covers less than that.
- 009 Dead Horse Ridge - This locally dense population, consisting of several hundred plants in 1994, covers one acre.

Reproductive Biology: Cusick's false yarrow reproduces by seed. Nothing is known about seed dispersal or viability; no pollinators were observed. Seed production varies widely between years as a result of varying spring weather patterns. This year was an average to slightly below normal spring, as far as rainfall goes, and many plants exhibited no or a very simple branching pattern and few flowering heads.

Biological Interactions: Unknown.

Competition: There is little to no interspecific competition on the barren clays, although some density-dependent, intraspecific competition may take place during years of high rainfall.

Herbivory: None observed.

Land ownership: All populations known to be extant are on public land managed by the Owyhee Resource Area of the Boise District BLM. The extirpated site was probably on private land and the two historical occurrences could be on either Boise District BLM or private.

Extant occurrences:

Northern, lowland populations:

- 001 Jump Creek - Boise District BLM, Owyhee Resource Area
- 006 Rattlesnake Butte South - Boise District BLM, Owyhee Resource Area
- 008 Rats Nest Gulch - Boise District BLM, Owyhee Resource Area

Southern, highland populations:

- 002 Sands Basin Road - Boise District BLM, Owyhee Resource Area
- 005 McBride Creek - Boise District BLM, Owyhee Resource Area
- 009 Dead Horse Ridge - Boise District BLM, Owyhee Resource Area

Extirpated occurrence:

- 007 Greenleaf - Probably private.

Historical occurrences:

- 003 Marsing Job Corps Center - Boise District BLM, Owyhee Resource Area, or private.
- 004 Squaw Creek/Blackstock Ranch - Boise District BLM, Owyhee Resource Area, or private.

Land use: Below are current land use and possible threats to each extant population.

Northern, lowland populations:

- 001 Jump Creek - Habitat has been disturbed in the past by mining activities, and is threatened by expansion of this operation. ORV use occurs nearby, but was not observed to be directly impacting population.
- 006 Rattlesnake Butte South - Habitat has been disturbed by trails and a road. Mining has occurred nearby and is a potential threat.
- 008 Rats Nest Gulch - A portion of the eastern population has been destroyed by bulldozers (for mining?) in the past, and mining may be a threat in future. The western population is heavily impacted by motorcycle use.

Southern, highland populations:

- 002 Sands Basin Road - Undisturbed, although close to the road and some cattle trailing takes place nearby.
- 005 McBride Creek - Undisturbed.
- 009 Dead Horse Ridge - Undisturbed.

ASSESSMENT AND MANAGEMENT RECOMMENDATIONS

Threats to known extant populations: All extant populations appeared to be within mining claims, although none were active in 1994. All populations also occur on land that is open to and actively grazed by cattle, although they don't negatively impact the habitat of Cusick's false yarrow because of low forage value. Occasional cattle trailing may take place across a population, but this impact is negligible. ORV use is impacting one site.

Recommendations:

- o Cusick's false yarrow remains a conservation concern in Idaho. It should remain as a species of special concern for the BLM in Idaho. It should also remain a federal candidate for listing in category 2. The distribution, abundance, and conservation status of Cusick's false yarrow in Oregon needs to be determined before the U.S. Fish and Wildlife Service can make a final decision on the appropriateness of listing as endangered or threatened under the Endangered Species Act.
- o Little field survey work remains to be done for the species in Idaho. The status of the historical Squaw Creek/Blackstock Ranch 004 population needs to be determined.

- o All six extant occurrences of Cusick's false yarrow in Idaho should be protected to the fullest degree by the BLM. None are protected now. Other than the threats from mining to all populations, the highland populations are largely undisturbed and have no obvious threats. The lowland populations have all been impacted in the past to some degree and the Rats Nest Gulch 006 population has substantial ongoing motorcycle disturbance that needs to be controlled.

- o A Habitat Conservation Assessment and Conservation Strategy are currently being developed by state and federal botanists for three federal candidates occurring on barren outcrops in northwestern Owyhee County, Idaho, *Chaenactis cusickii*, *Mentzelia mollis*, and *Astragalus sterilis*. The documents will lead to a formal, prelisting Conservation Agreement that will be implemented by the BLM to try and prevent listing of these species under the Endangered Species Act. The potential impacts of mining the habitat is probably the mostly difficult issue that must be addressed to assure the long-term survival of Cusick's false yarrow in Idaho. Because *Phacelia lutea* var. *calva* is virtually sympatric with *Mentzelia mollis* and/or Cusick's false yarrow in Idaho, the conservation of this species of limited distribution should also be addressed in the conservation assessment, strategy and agreement.

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Appendix 1

Line drawing of *Chaenactis cusickii* (from Cronquist 1994).

Appendix 2

Maps of the distribution of *Chaenactis cusickii* in Idaho.

Map 1. Distribution of *Chaenactis cusickii* in Idaho, and area of intensive surveys in 1994 (shaded).
Portion of a 1:500,000 map of Idaho.

Northern, lowland populations:

Map 2. Jump Creek 001. Portion of the 7.5' Jump Creek Canyon USGS quadrangle, 1989 provisional edition.

Map 3. Rattlesnake Butte South 006. Portion of the 1971 7.5' Homedale USGS quadrangle.

Map 4. Rats Nest Gulch 008. Portion of the 1971 7.5' Opalene Gulch USGS quadrangle.

Southern, highland populations:

Map 5. Sands Basin Road 002; McBride Creek 005; Dead Horse Ridge 009. Portion of the 7.5' Piute Butte USGS quadrangle, 1989 provisional edition.

Appendix 3

Occurrence records from the Conservation Data Center
for *Chaenactis cusickii* in Idaho.

NOT INCLUDED IN CDC HOME PAGE VERSION OF THIS REPORT

Note: the EORANK field refers to the relative conservation rank of that occurrence on a scale from A to D, with A being the best sites and D the worst.

Appendix 4

Maps of areas searched in western Owyhee County for *Chaenactis cusickii* (shaded). In addition, searches were

also conducted around the town of Greenleaf, Canyon County.

Northern lowland:

- Map 1. Graveyard Point (Oregon border), southeast along the Owyhee Front to Poison Creek; also the Greenleaf area. Portions of the 1:100,000-scale Boise (1978) and Vale (1975) BLM Surface Management Status maps.
- Map 2. Poison Creek, southeast along the Owyhee Front to Reynolds Creek. Portion of the 1988 Murphy 1:100,000-scale Idaho Transportation Department map.

Southern highland:

- Map 3. Upper part of Little Squaw Creek and Dead Horse Creek, south to Succor Creek Reservoir. Portion of the 1988 Murphy 1:100,000-scale Idaho Transportation Department map.

Appendix 5

Slides of *Chaenactis cusickii* and its habitat.

- Slide 1. Close-up of *Chaenactis cusickii*.
- Slide 2. Close-up of *Chaenactis cusickii* habitat. A single plant is below the top of the pencil.
- Slide 3. *Chaenactis cusickii* is the only vascular plant inhabiting this otherwise barren clay slope.
- Slide 4. Overview of *Chaenactis cusickii* habitat at Dead Horse Ridge 009. *Chaenactis cusickii* occurs at the base of the barren clay slopes in the center.