

**REPORT ON THE CONSERVATION STATUS OF
HACKELIA CRONQUISTII IN IDAHO**

by

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**REPORT ON THE CONSERVATION STATUS OF
HACKELIA CRONQUISTII IN IDAHO**

Taxon Name: *Hackelia cronquistii* J.L. Gentry

Common Name: Cronquist's stickseed

Family: Boraginaceae

States Where Taxon Occurs: U.S.A.; Idaho, Oregon

Current Federal Status: Species of Concern

Recommended Federal Status: Species of Concern

Author of Report: Robert K. Moseley

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Date of Most Recent Revision: January 1, 1986 (for Oregon)

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SUMMARY

Hackelia cronquistii (Cronquist's stickseed) was discovered in Idaho by Mary Trail in 1993, on her family's property near Payette. Previously, this species was known only from a small area around Vale, Oregon. Further inventories by Trail in 1993 located several additional populations on slopes facing the Snake River valley between Weiser and Payette. Additional inventories in suitable habitat in southern Washington County and northern Payette County between 1993 and 1996 did not locate any new populations. Currently 14 small populations are known from Idaho. While considerably more common in Oregon, it is confined to a small geographic area. Cronquist's stickseed should remain a federal Species of Concern. Detailed discussions on the taxonomy, distribution, abundance, habitat requirements, conservation status, and recommendations to federal and state agencies are included in this report.

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I. Species Information.

1. Classification and nomenclature.

A. Species.

1. Scientific name.

a. **Binomial:** *Hackelia cronquistii* J.L. Gentry

b. **Full bibliographic citation:** Gentry, J.L. 1972. Madrono 21:490.

c. **Type specimen:** Cronquist 8184. Sandy sagebrush slopes 11 miles southwest of Vale, Oregon, T19S R43E, S23, elevation 2500 feet, May 4, 1959 (NY).

2. **Pertinent synonym(s):** *Hackelia patens* (Nutt.) I.M. Johnston var. *semiglabrata* Cronq.

3. **Common name(s):** Cronquist's stickseed, Malheur forget-me-not

4. **Taxon codes:** PDBOR0G080 (Natural Heritage and Conservation Data Center Network and The Nature Conservancy).

5. **Size of genus:** A genus of about 45 species, widespread in North and South America and Eurasia, but most abundant and diversified in the western United States (Cronquist 1984).

B. Family classification.

1. **Family name:** Boraginaceae

2. **Pertinent family synonyms:** None

3. **Common name(s) for family:** Borage Family

C. Major plant group: Dicotyledonea

D. History of knowledge of taxon in Idaho: Until 1993, *Hackelia cronquistii* was thought to be endemic to Oregon. During the spring of that year, Mary Trail, a fruit farmer near Payette, noticed a conspicuously-flowered species growing on her land that she had never seen before. She made inquiries to Pat Packard, Lynda Smithman and Jean Findley who identified it as the rare species, *Hackelia cronquistii*. Further inventories by Trail in 1993 located several additional populations (Smithman 1993).

E. Comments on current alternative taxonomic treatment(s): None.

2. Present legal or other formal status

A. International: None.

B. National.

1. Present designation or proposed legal protection or regulation: *Hackelia cronquistii* is currently recognized as a Species of Concern by the Snake River Basin Field Office of the U.S. Fish and Wildlife Service. Species of Concern are those where available information supports tracking the status and threats to species because of one or more of the following factors:

- A. Negative population trends have been documented;
- B. Habitat is declining or threats to the habitat are known;
- C. Subpopulations or closely related taxa have been documented to be declining;
- D. Habitats for life phases outside of Idaho (*i.e.*, migratory habitat) are known to be threatened;
- E. Competition or genetic implications from introduction/stocking of exotic species;
- F. Identified as a species of concern by agencies or professional societies;
- G. In combination with any of the other criteria, information is needed on status or threats to the species.

2. Other current formal status recommendation: The Natural Heritage and Conservation Data Center network and The Nature Conservancy rank *Hackelia cronquistii* G2, a rank that indicates that the taxon is imperiled because of rarity or because other factors demonstrably make it vulnerable to extinction (Conservation Data Center 1994).

The Oregon BLM treats *Hackelia cronquistii* as a Sensitive or Special Status species.

3. Review of past status: *Hackelia cronquistii* was treated as a category 1 candidate (U.S. Fish and Wildlife Service 1980 1983; 1985; 1990; 1993). Later, it was removed from candidate status (U.S. Fish and Wildlife Service 1996).

C. State.

1. Idaho.

a. Present designation or proposed legal protection or regulation: None.

b. Other current formal status recommendation: The Conservation Data Center state rank (S) equals S1 (Conservation Data Center 1994).

The Idaho Native Plant Society includes *Hackelia cronquistii* on its list of globally rare species in Idaho (Idaho Native Plant Society 1996).

c. Review of past status: None.

3. Description.

A. General nontechnical description: A perennial herb ranging from about 6 inches to 2 feet tall with 3/8- to 5/8- inch diameter showy, silvery-blue forget-me-not flowers. Stems are branching with hairy, elliptic-lance shaped leaves. Fruit composed of four units called nutlets, each less than 3/16 inch, with uneven projections. The dorsal side, with no obvious projections, is warty with stiff,

coarse hairs (Yamamoto *et al.* 1986).

B. Technical Description: Perennial 2-6.5 dm tall; stems from a taproot and compactly branched caudex, erect, glabrous below the middle, sparsely antrorse-strigose above. Leaves hirsute to subappressed-hirsute or strigose, sometimes hispidulous, basal lobes usually persistent, 6-14(-21) cm long, 5-20(-35) mm wide, narrowly elliptic or lance-elliptic, long petiolate, acute; cauline leaves strongly ascending, 2.5-11(-14.5) cm long, 2-8(-13) mm wide, narrowly elliptic to narrowly oblong or sometimes lanceolate, mostly sessile, narrowly acute, progressively smaller upward, the bracts generally small and inconspicuous in the inflorescence. Pedicels 8-14 mm long in fruit. Calyx lobes 1.7-2.8 mm long, oblong-lanceolate to lanceolate, subappressed-hirsute-hispid. Corolla limb white-tinged with blue, 8-15 mm wide; tube 2-2.2 mm long, shorter than to slightly exceeding the calyx lobes. Fornices with appendages papillate to papillate-puberulent, broad as long, the protuberance about 2 times as long as broad. Anthers 0.7-1.1 mm long. Nutlets (2.5-)3-3.5 mm long, lanceolate to lance-ovate; dorsal surface strongly verrucose-hispidulous, the intramarginal prickles 4-14, much shorter than the marginal ones, (0.2-)0.5-1.2 mm long; marginal prickles generally distinct at their bases, (1.5-)2-3.5(-4) mm long, 4-6 on each side, generally a long and short prickle alternating (Yamamoto *et al.* 1986).

C. Local field characters: *Hackelia cronquistii* very much resembles *H. patens* var. *patens*, but differing sharply in the vestiture of the stem, which is glabrous below the middle and antrorsely strigose above. Also, the fornices of the corolla are merely papillate or papillate-puberulent. The nearest known stations of *H. patens* are in Blaine and Twin Falls counties, Idaho, some 200 km to the east of the range of *H. cronquistii* (Cronquist 1984).

Other species in the borage family growing in the vicinity of *H. cronquistii* include *Lappula redowskii*, *Cryptantha circumscissa*, and *C. fendleri*. None can be mistaken for *Hackelia cronquistii* (Yamamoto *et al.* 1986).

Leaves of *Penstemon acuminatus* resemble juvenile and non-flowering forms of *H. cronquistii*, both appearing as clumps of lance-elliptic, long-petioled leaves. However, *Penstemon acuminatus* leaves have a softer pubescence and are more succulent with reddish veins due to anthocyanin concentrations (Yamamoto *et al.* 1986).

D. Identifying characteristics of material which is in interstate or international commerce or trade: No interstate or international trade is known. See above section for differences with a related species.

E. Photographs and/or line drawings: Line drawings appear in Meinke (1982) and Cronquist (1984), both reproduced in Appendix 1. Photographic slides of the habit and habitat of *Hackelia cronquistii* occur in the slide collection of the Conservation Data Center, several of which are reproduced in Appendix 4.

4. Significance.

A. Natural: None known.

B. Human: None known.

5. Geographical distribution.

A. Geographical range: The known range of *Hackelia cronquistii* includes an area approximately 30 x 30 miles in Malheur County, Oregon, and Payette and Washington counties, Idaho. The range is centered on Vale, Oregon, extending from approximately 12 miles southwest of Vale to six miles northeast of Payette, Idaho.

B. Precise occurrences in Idaho.

1. Populations currently or recently known extant: *Hackelia cronquistii* is known from one metapopulation(?) consisting of 14 populations, arranged in a linear manner for 3.5 miles along the sandy slopes bordering the Snake River valley. The populations are centered on the Payette County - Washington County line (Figure 1). For convenience, these populations have been lumped into four occurrences in the CDC data base, records for which appear in Appendix 2.

2. Populations known or assumed extirpated: None.

3. Historically known populations where current status not known: None.

4. Locations not yet investigated believed likely to support additional natural populations: Much of the area around the known populations in Idaho is private land and has not been surveyed as thoroughly as public lands (see Section III.17.C, Fieldwork). Therefore, there is a possibility that additional populations will be discovered, probably nearby known populations.

5. Reports having ambiguous or incomplete locality information: None.

6. Locations known or suspected to be erroneous reports: None.

6. General environment and habitat description.

A. Concise statement of general environment: In Idaho, *Hackelia cronquistii* occurs on steep, north-facing hillsides consisting of deep lacustrine sands. The sites occur in the shrub-steppe zone and have high vegetative cover. This is similar to that described for Oregon by Yamamoto *et al.* (1986).

B. Physical characteristics.

1. Climate.

a. Koppen climate classification: Populations of *Hackelia cronquistii* lie in an area classified as Koppen's unit BSk: semiarid climate or steppe climate (Trewartha and Horn 1980).

Figure 1. Distribution of *Hackelia cronquistii* in Idaho (portion of the 1951 Weiser South and 1952 Weiser Cove 7.5' USGS topographic quadrangles).

b. Regional macroclimate: The following general description of the regional macroclimate is modified from Yamamoto *et al.* (1986) and Noe (1991). The average monthly maximum temperature reaches its highest point during the month of July, a month which also marks the beginning of a pronounced dry season. About 15% of the total annual precipitation falls during the period from July through October. Two periods of peak precipitation occur, one in January and the other in May. The winter precipitation peak is greatest with more than 38% of the mean annual precipitation falling between December and February.

Precipitation and temperature data from the Vale Weather Station, which lies at the center of the distribution of *Hackelia cronquistii*, reflect well the climate of the area:

Precipitation (inches):

Average January	1.29
Average July	0.23
Average Annual	9.63

Temperature (°F):

Average January	28.7
Average July	80.2
Average Annual	71.5

c. Local microclimate: Specific microclimate is unknown. North-facing slopes tend to receive less sun and retain more moisture than south-facing slopes (Yamamoto *et al.* 1986).

2. Air and water quality requirements: Unknown.

3. Physiographic provinces: The entire distribution of *Hackelia cronquistii* is encompassed by Omernik and Gallant's (1986) Snake River Basin/High Desert Ecoregion. Following Bailey's Ecoregional classification, all occurrences lie within the Owyhee Uplands Section (342C) of the Intermountain Semi-desert Province (McNab and Avers 1994).

Occurrences of *Hackelia cronquistii* in Idaho fall within the Malheur-Boise-King Hill Section of the Columbia-Intermountain Geomorphic Province (Ross and Savage 1967; Wellner and Johnson 1974). Following the Idaho Floristic Regions of Ertter and Moseley (1992), Idaho populations occur in the Boise/Payette Unit of the Lower Snake River Plain Division.

4. Physiographic and topographic characteristics: *Hackelia cronquistii* occurs on steep, north-facing slopes that are about 300 feet high. Populations occur on all slope positions, from lower to upper. It does not occur on ridgecrests and only rarely on the alluvial toe slope. Elevations in Idaho range from 2200 to 2600 feet.

5. Edaphic factors: The substrate of all *Hackelia cronquistii* populations in Idaho is deep, lacustrine sands that are fairly well-drained, although its north-slope habitat is clearly moister than south slopes.

6. Dependence of this taxon on natural disturbance: The shrub-steppe habitat of *Hackelia cronquistii* evolved with periodic fire. During the last century, however, the composition and

structure of these communities has changed markedly as a result of overgrazing by livestock, subsequent weed invasions, and dramatically increased fire frequencies. All this has had deleterious effects on rare plant species in the vicinity of *H. cronquistii* (e.g., Rosentreter 1994; Moseley 1994; 1995; Mancuso 1995). It is not known to what degree this has affected *H. cronquistii* populations in Idaho.

7. Other unusual physical features: None

C. Biological characteristics.

1. Vegetation physiognomy and community structure: Populations occur in shrub-steppe vegetation consisting of widely scattered shrubs (mostly *Purshia tridentata* and *Chrysothamnus nauseosus*) reaching 4 feet tall with an understory with a nearly complete cover of grasses (mostly *Festuca idahoensis*) and forbs.

2. Regional vegetation type: Populations of *Hackelia cronquistii* lie in the shrub-steppe zone, dominated mostly by *Artemisia tridentata* with an understory of bunchgrasses and a diversity of forbs. In Idaho, the north-facing habitat of *H. cronquistii* has been classified as the *Artemisia tridentata* ssp. *xericensis*/*Festuca idahoensis* habitat type. Adjacent south-facing slopes are the *Purshia tridentata*/*Stipa comata* habitat type (Hironaka *et al.* 1983).

3. Frequently associated species:

Native Species: *Chrysothamnus nauseosus*, *Artemisia tridentata* ssp. *xericensis*, *Purshia tridentata*, *Festuca idahoensis*, *Poa secunda*, *Balsamorhiza sagittata*, *Crepis acuminata*, *Montia perfoliata*, *Achillea millefolium*, *Arabis* sp., *Phlox longifolia*, *Erysimum asperum*, *Lupinus argenteus*, *Elymus cinereus*, *Eriophyllum lanatum*, *Chrysothamnus viscidiflorus*.

Alien Species: *Bromus tectorum*.

4. Dominance and frequency: Plants can range from widely scattered to nearly dominant in small, localized areas.

5. Successional phenomena: There is a low cover of shrubs, in general, and a near absence of *Artemisia tridentata*, in particular, in the habitat of *Hackelia cronquistii* in Idaho. This may be a result of past fires that destroyed the shrub layer.

6. Dependence on dynamic biotic features: None known.

7. Other endangered species: *Astragalus mulfordiae* occurs on south slopes adjacent to *Hackelia cronquistii* populations and *Allium aaseae* occurs in similar habitats within two miles. Both are listed as Species of Concern by the Snake River Basin Field Office of the U.S. Fish and Wildlife Service.

7. Population biology.

A. General summary: Fourteen populations are known from Idaho, arranged in a linear manner along a 3.5-mile long slope facing the Snake River valley. The populations are generally small, mostly less than 2 acres in size.

B. Demography.

1. Known populations: Because all populations are on private land with limited access, only the size and area of four populations are known in detail. The rest were mapped while conducting a binocular survey from Hill Road during peak flowering. These four populations occur on and around the Trail's Sand Hill Site at the southern end of its known distribution in Idaho. Population sizes of these populations range from 250 individuals to over 700.

2. Demographic details: Demographic details for each occurrence in Idaho appear in Appendix 2.

C. Phenology.

1. Patterns: Flowering peaks sometime during May, the exact date depending largely on spring climatic patterns. The phenology of known populations should be monitored to determine the best time in May to conduct surveys (which should always be conducted during peak flowering).

2. Relation to climate and microclimate: Mary Trail reports that the *Hackelia cronquistii* populations in Idaho did not appear to bloom as profusely in 1996 as they did in 1993 (personnel communication, 1996). 1993 had an extraordinarily wet, cool spring.

D. Reproductive ecology.

1. Type of reproduction: *Hackelia cronquistii* reproduces only by seed.

2. Pollination.

a. Mechanisms: Probably insect and self pollinated. Research on borages shows that the receptive surface on the stigma is on the underside of a closely interlocking cell system. These cells split apart at the time of pollination to allow pollination access to the receptive surface (Yamamoto *et al.* 1986).

b. Specific known pollinators: Unknown.

c. Other suspected pollinators: Bees and flies are known pollinators of other *Hackelia* (Yamamoto *et al.* 1986).

d. Vulnerability of pollinators: Unknown, but insects are vulnerable to insecticides.

3. Seed dispersal.

a. General mechanisms: The surface of the nutlets are composed of prickles that allow for

adhesion to coats and passing animals and the clothing (especially wool socks) of humans. Gravity is also a dispersal mechanism (Yamamoto *et al.* 1986).

b. Specific agents: Mostly mammals.

c. Vulnerability of dispersal agents and mechanisms: Unknown.

d. Dispersal patterns: Specific details unknown.

4. Seed biology.

a. Amount and variation of seed production: Unknown.

b. Seed viability and longevity: Unknown, but borages in general have high seed viability in the early part of the reproductive season, then drop near the end. Seeds probably do not survive past the first year because they are consumed by insects and/or broken down by fungi and bacteria (Yamamoto *et al.* 1986).

c. Dormancy requirements: Unknown, but there is probably no dormancy requirements (Yamamoto *et al.* 1986).

d. Germination requirements: Unknown, but it is thought that if the seeds in the wild do not germinate within the first year, they never will. It has been observed in *Hackelia* that an inhibitor contained in the seed coat must be removed and the seed coat broken before germination proceeds. Water and bacteria may be involved in this process (Yamamoto *et al.* 1986).

e. Percent germination: Unknown.

5. Seedling ecology: This species apparently germinates in the fall and appears to need long periods of cool moist conditions to become established. Because it occurs in an area of low rainfall and fast-draining soils, seedlings probably must root quickly in order to survive (Yamamoto *et al.* 1986).

6. Survival and nature of mortality of plants: Unknown.

7. Overall assessment of reproductive success: Flower production appeared to be good in May 1996. The age class structure (as inferred from plant size) of the populations appeared well distributed indicating that it is reproducing successfully.

8. Population ecology.

A. General summary: Little is known about the population ecology of *Hackelia cronquistii* in Idaho. Oregon populations appeared stable a decade ago (Yamamoto *et al.* 1986).

B. Positive and neutral interactions: None known.

C. Negative interactions.

1. Herbivores, parasites and diseases: Unknown in Idaho.

2. Evidence of competition.

a. Intraspecific: Unknown.

b. Interspecific: Little is known. There is nearly complete ground cover of native herbaceous species in the habitat occupied by *Hackelia cronquistii* in Idaho. *Bromus tectorum* was the only exotic species observed, and it occurred in very low cover.

3. Toxic and allelopathic interactions with other organisms: Unknown.

D. Hybridization.

1. Naturally occurring: *Hackelia cronquistii* is not known to hybridize naturally. It is geographically isolated from its closest relative, *H. patens*. No intermediates or morphological overlap exists between the two species. It was noticed that one population in Oregon had pubescence that approached *H. patens* (Yamamoto *et al.* 1986).

2. Artificially induced: No attempts have been made with *Hackelia cronquistii* to cross pollinate interspecifically. In general, this genus is hard to cross pollinate and hard to grow (Yamamoto *et al.* 1986).

3. Potential in cultivation: Unknown.

E. Other factors of population ecology: None.

9. Current land ownership and management responsibility.

A. General nature of ownership: All populations in Idaho are on private land.

B. Specific landowners: Several private landowners.

C. Management responsibility: Private.

D. Easements, conservation restrictions, special designations, etc.: One site is being protected voluntarily. The Trail family owns and manage a 73-acre section of hillside above their fruit farm, near the southern end of the distribution of *Hackelia cronquistii* in Idaho (occurrence 001, Appendix

2). The area has not been intentionally grazed for many years and is currently fenced to exclude grazing. The ecological condition of the *Artemisia tridentata* ssp. *xericensis*/*Festuca idahoensis* and *Purshia tridentata*/*Stipa comata* communities occurring on the parcel is good and, in addition to two populations of *Hackelia cronquistii*, also supports a large population of *Astragalus mulfordiae*. The Trail's are aware of the significance of their parcel and are voluntarily protecting the habitat and rare plant populations. This parcel, dubbed Trail's Sand Hill, is considered by the CDC to be an important site for the maintenance of biological diversity in Idaho. It is on the "scorecard" of important Conservation Sites in the state. A conservation site record for Trail's Sand Hill from our data base is included in Appendix 3.

10. Management practices and experience.

A. Habitat management.

1. Review of past management and land-use experiences.

a. This taxon: The Vale District of the Bureau of Land Management has had considerable experience in the last decade in the management of the habitat of *Hackelia cronquistii* and have prepared a habitat management plan. They should be consulted when preparing habitat management regimes in Idaho.

b. Related taxa: N/A

c. Other ecologically similar taxa: N/A

2. Performance under changed conditions: Unknown in Idaho.

3. Current management policies and actions: Unknown, but some populations are grazed, some appear to be ungrazed, but the gentler portions of the slopes are being subdivided for residential development, and two populations are being voluntarily protected from inappropriate human disturbances.

4. Future land use(s): Possible subdivision and development of some populations.

B. Cultivation.

1. Controlled propagation techniques: None known.

2. Ease of transplanting: Unknown.

3. Pertinent horticultural knowledge: None known.

4. Status and location of presently cultivated material.

a. Specimen plants: None known.

b. Stored seed/propagule banks: Seeds from an Oregon population are being stored in the

long-term facility at the Berry Botanic Garden, Portland.

11. Evidence of threats to survival.

A. Present or threatened destruction, modification, or curtailment of habitat or range.

1. Past threats: Livestock grazing has taken place throughout the range of *Hackelia cronquistii* in Idaho, for over a century. The effect of past grazing practices on habitat and population viability is unknown, but early overgrazing was responsible for degradation of shrub-steppe habitats and subsequent invasion of fire-prone exotic weeds. Some habitat was probably destroyed in the past by road construction, irrigation ditch construction, residential development, and conversion for agricultural purposes.

2. Existing threats: Grazing continues on many of the populations and new residential development is taking place in the vicinity of occurrence 004. The long-term effects of these actions on habitat and population viability is unknown.

3. Potential threats: See above.

B. Overutilization for commercial, sporting, scientific, or educational use.

1. Past threats: None known.

2. Existing threats: Minimal to no existing threats.

3. Potential threats: Minimal to no potential threats.

C. Disease, predation, or grazing.

1. Past threats: None known.

2. Existing threats: See Past and Existing Threats.

3. Potential threats: See Past and Existing Threats.

D. Inadequacy of existing regulatory mechanisms.

1. Past threats: Virtually no regulations exist for private land use of rangeland.

2. Existing threats: Virtually no regulations exist for private land use of rangeland.

3. Potential threats: Virtually no regulations exist for private land use of rangeland.

E. Other natural or manmade factors.

1. Past threats: None.

2. Existing threats: None.

3. Potential threats: None.

II. Assessment and Recommendations.

12. General assessment of vigor, trends, and status in Idaho: In 1996, *Hackelia cronquistii* plants appeared healthy and robust and the populations appeared to contain a wide variety of age classes, indicating a healthy population. It was only discovered in Idaho in 1993, and no monitoring program has been established, so there is no evidence of expansion or contraction of any of the populations. All populations are on private land and most have been surveyed only with binoculars from the road, so habitat conditions are only generally known. One section of hillside, containing two populations, is being voluntarily protected. Remaining habitat is vulnerable to inappropriate human disturbances.

13. Recommendations for listing, status change, and/or conservation actions.

A. Recommendations to the U.S. Fish and Wildlife Service: Maintain as a Species of Concern in Idaho.

B. Recommendations to other U.S. Federal Agencies.

1. Bureau of Land Management: The known populations of *Hackelia cronquistii* in Idaho are within two miles of BLM land in Sand Hollow. Much of this habitat is highly degraded and some had been searched for *Hackelia* in 1995 and 1996. Nevertheless, it could occur on BLM land in the Cascade Resource Area and should be added to the BLM Special Status Species list for Idaho.

C. Other status recommendations.

1. Municipalities): No recommendations.

2. Counties: No recommendations.

3. State(s) (Idaho):

a. Idaho Conservation Data Center: I plan on keeping the Idaho state Heritage/CDC network rank at S1 due its limited geographic distribution and habitat that is vulnerable to disturbance.

b. Idaho Native Plant Society: The Idaho Native Plant Society should maintain *Hackelia cronquistii* on its list of globally rare species in Idaho.

4. Other Nations: No recommendations.

5. International Trade, etc.: No recommendations.

14. Recommended critical habitat: No critical habitat is recommended at this time. A Habitat Conservation Assessment that includes the entire range of *Hackelia cronquistii* is the appropriate method of identifying critical habitat. Trail's Sand Hill should be considered as a potential site during

this process.

15. Conservation/recovery recommendations.

A. General conservation recommendations.

1. Recommendations regarding present or anticipated activities: None.

2. Areas recommended for protection: Trail's Sand Hill is currently being protected voluntarily.

3. Habitat management recommendations: Because no populations except the two on Trail's Sand Hill were visited, no specific management recommendations are being made now. The habitat management plan prepared by the Vale BLM District should be consulted for general management guidelines.

High quality habitat can be maintained at Trail's Sand Hill by:

1. Limit further destruction of habitat on the hillside.
2. To limit the spread of weeds into natural habitats, do not graze livestock on the site and try to control all fires.
3. With the help of the Idaho Native Plant Society, CDC, BLM, and other knowledgeable individuals, establish a simple monitoring program to assess trends in habitat quality, as well as population levels of *Hackelia cronquistii* and *Astragalus mulfordiae*.

4. Publicity sensitivity: None.

5. Other recommendations: None.

B. Monitoring activities and further research recommendations: Monitoring programs for *Hackelia cronquistii* and *Astragalus mulfordiae* would be appropriate on Trail's Sand Hill. Methods should follow those used by the Vale BLM in Oregon.

16. Interested parties:

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III. Information Sources.

17. Sources of information.

A. Publications.

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2. Other pertinent publications.

a. Technical:

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b. Popular: None.

B. Herbaria consulted: Herbarium specimens of *Hackelia cronquistii* from Idaho are listed in the appropriate field on the occurrence records in Appendix 2, where herbarium acronyms follow Holmgren et al. (1990). No collections are known prior to Mary Trail's discovery in 1993.

C. Fieldwork: Below is a summary of the fieldwork conducted since 1993 for *Hackelia cronquistii* in Idaho.

Slopes above Hill Road, including Trail's Sand Hill - Mary Trail, Lynda Smithman, and Pat Packard, May 1993; Mary Trail and Bob Moseley, May 1996.

Sagebrush Hill - Lynda Smithman, May 1993; Bob Moseley, May 1996.

Rebecca Sand Hill - Lynda Smithman, May 1993; Ann DeBolt, May 1995.

BLM land on the north side of Sand Hollow - An DeBolt, May 1995.

Cherry Gulch-Cove Creek area - Ann DeBolt, Jack LaRocco, Bob Moseley, May 1996

D. Knowledgeable individuals:

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Portland, OR 97214

E. Other information sources: None known.

18. Summary of material on file: Color slides, field forms, maps, and most published and unpublished references pertaining to *Hackelia cronquistii* in Idaho are on file at the Idaho Conservation Data Center office.

IV. Authorship.

19. Initial authorship:

Robert K. Moseley
Conservation Data Center
Idaho Department of Fish and Game
P.O. Box 25
Boise, ID 83707

20. Maintenance of status report: The Idaho Conservation Data Center will maintain current information for Idaho and update the status report as needed.

V. New information.

21. Record of revisions: Not really applicable. Sue Vrilakis, Jimmy Kagan, and Elaine Joyal prepared a status survey report for Oregon in 1986, which is now out of date.

Appendix 1

Line drawings of *Hackelia cronquistii* from Meinke (1982) and Cronquist (1984)

Appendix 2

Idaho Conservation Data Center records for *Hackelia cronquistii* in Idaho

Appendix 3

Conservation Site Basic Record for Trail's Sand Hill

Idaho Conservation Data Center
Site Record

TRAIL'S SAND HILL
16

LOCATION

Ecoregion Section: OWYHEE UPLANDS SECTION (342C)
Watershed: 17050115004
County: Payette

USGS Quad:	WEISER COVE	4411627
	WEISER SOUTH	4411628

LAT:
LONG:

Legal Description (township/range, section, meridian, note)

Directions:

SITE DESIGN

Designer: Moseley, R. K.
Date: 96-05-12
Design Justification:

The east boundary is the top of the slope which coincides with the fence line of the OX Ranch. The southern boundary also coincides with the OX fence line. The northern boundary coincides with the property line of another owner. The western boundary runs along the uphill side of the orchard perimeter road.

Site Comments:

John and Mary Trail are aware of the presence of 2 rare plant species and the high quality habitat and are voluntarily protecting the natural values of the site.

Biological and Physical Characteristics

Size. Primary and Secondary Acres: 73.00

Primary Acres: 73.00

Elevation. Minimum: 2300

Maximum: 2600

Site Description:

The site is comprised of generally west-facing bluffs that front the Snake River. The hillside is steep (ca 25-40 degrees) and composed of deep lacustrine sands. The upper end is a flat ridgeline and the lower portion is orchards and irrigated pasture typical of this portion of the Snake River valley. W-trending spur ridges dissect the bluff creating northerly and southerly slopes. The southerly slopes are covered by a *Purshia tridentata/Stipa comata* community and have extensive populations of *Astragalus mulfordiae*. The northerly-facing slopes are covered with a *Artemisia tridentata* ssp. *xericensis/Festuca idahoensis* community and some contain populations of *Hackelia cronquistii*.

Element Occurrences (element/size):

<i>PURSHIA TRIDENTATA/STIPA COMATA</i>	55 AC
<i>ARTEMISIA TRIDENTATA</i> SSP. <i>XERICENSIS/FESTUCA IDAHOENSIS</i>	18 AC
<i>HACKELIA CRONQUISTII</i>	+ AC
<i>ASTRAGALUS MULFORDIAE</i>	5 AC

Biodiversity Significance (B1)

The site has been in ungrazed condition for ca 20 years and contains bitterbrush-grass communities in good to excellent condition. The site also contains an extensive population of *Astragalus mulfordiae* and one of the few known Idaho populations of *Hackelia cronquistii*.

Other Values (V3)

The area is mule deer winter range.

PROTECTION AND STEWARDSHIP

Designation: VOLUNTARY

Protection Urgency (P4)

The site is being voluntarily protected by the Trails.

Management Needs:

There are no major or urgent management needs.

Management Urgency (M4)

There are no major or urgent management needs.

Current Landuse:

Onsite: The Trail Family grows apples and raises cattle on an irrigated pasture. Trail and neighbors remove sand from three locations on the hillside along the orchard perimeter road, but Trail regulates the quantity of removal to prevent damage to plant populations. The area on top of the hillside is heavily grazed. There is a road through the east side of the site. Fence lines border the site on the east and south. Orchards and residential development are nearby.

Offsite: The site is posted for trespassing. Three active sand pits occur at the lower end of the site.

Exotic Species Comments:

Bromus tectorum is common throughout the site, especially on southerly slopes. No other aggressive exotic species were seen.

REFERENCES

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RECORD MAINTENANCE

Lead Responsibility: USIDHP
Edition Date: 96-05-29 Edition Author: R. K. Moseley

Appendix 4

Slides of the habit and habitat of *Hackelia cronquistii* in Idaho

Slide 1. Close-up of *Hackelia cronquistii* inflorescence showing flowers and immature fruits.

Slide 2. Whole plant showing cluster of leaves and stems with open inflorescence.

Slide 3. Close-up of habitat showing *Hackelia* plants on a well-vegetated hillside.

Slide 4. View looking downslope with *Hackelia cronquistii* plants in middle ground.

Slide 5. Overview of Trail's Sand Hill site - *Hackelia cronquistii* habitat is in center of photo.