REPORT ON THE CONSERVATION STATUS OF *CYMOPTERUS DOUGLASSII*

by

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REPORT ON THE CONSERVATION STATUS OF
CYMOPTERUS DOUGLASSII

Taxon Name:	*Cymopterus douglassii* R.L. Hartman & Constance
Common Name:	Douglass' wave-wing
Family:	Apiaceae
States Where Taxon Occurs:	U.S.A.; Idaho
Current Federal Status:	Category 2 Candidate
Recommended Federal Status:	Category 3c Candidate
Author of Report:	Robert K. Moseley
Original Date of Report:	May 20, 1995
Date of Most Recent Revision:	N/A
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SUMMARY

Cymopterus douglassii is endemic to carbonate substrates in the central Lost River Range and central Lemhi Range. Ten occurrences are known and all but one occur in the Lost River Range, Custer County, centered around Borah Peak. One disjunct occurrence is on Sheep Mountain in the Lemhi Range, Lemhi County, ca. 30 miles northwest of those in the Lost River Range. After 20 years of intensive floristic exploration of east-central Idaho, *Cymopterus douglassii* remains a narrowly-distributed endemic. However, all ten populations are large, both in area and especially in population number. There appear to be no demographic bottlenecks. All populations are on public land managed by the U.S. Forest, all are isolated from anthropogenic disturbance, and there are no apparent threats to population and species viability. Three populations are in designated Research Natural Areas, one is in a proposed Research Natural Area, and one is in a proposed Special Interest Botanical Area. I recommend that *Cymopterus douglassii* be downgraded from a category 2 candidate to a category 3c (more common than previously thought), indicating that it is no longer an active candidate for listing.

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I. Species Information.

1. Classification and nomenclature.

A. Species.

1. Scientific name.

a. Binomial: *Cymopterus douglassii* R.L. Hartman & Constance

b. Full bibliographic citation: Hartman, R.L., and L. Constance. 1985. Two new species of *Cymopterus* (Umbelliferae) from western North America. Brittonia 37:88-95.

c. Type specimen: Idaho. Custer Co.: E slope Lost River Range, just N of Horseheaven Pass, T11N R23E S33, elevation ca. 2743 m, 1 August 1981, *R.L. Hartman 13782* (Holotype: RM; Isotypes: BRY, GH, ID, NY, TEX, UC, UTC, WS).

2. Pertinent synonym(s): None.

3. Common name(s): The most commonly used common name is Douglass' wavewing (or wave-wing), after Douglass Henderson, Curator of the University of Idaho Herbarium, for whom the taxon was named. Alternatively, Borah Peak wave-wing may also be an appropriate common name because its distribution is centered around this massif, the tallest summit in Idaho. Other common names that have been used include Henderson's spring-parsley and Douglass' biscuitroot and Douglas (*sic*) biscuitroot.

4. Taxon codes: PDAPI0U1D0 (Natural Heritage and Conservation Data Center Network and The Nature Conservancy).

5. Size of genus: About 50 species endemic to western North America (Constance 1993).

B. Family classification.

1. Family name: Apiaceae

2. Pertinent family synonyms: Umbelliferae

3. Common name(s) for family: Carrot

C. Major plant group: Dicotyledonea

D. History of knowledge of taxon: R.J. Davis was apparently the first to collect the species in 1940, on the east side of Borah Peak, probably at the head of Rock Creek. C.L. Hitchcock collected it at the same place in 1944 and 1954. All these collections were originally identified as *Cymopterus nivalis*, which is how it was treated by Mathias and Constance (1944-45) in their continent-wide treatment of the Umbelliferae, and later in *Vascular Plants of the Pacific Northwest* (Cronquist 1961) and *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1973). Our knowledge of its distribution expanded greatly during the 1970's, as a result of the exploration of the flora of east-central Idaho and rare plant surveys of the Challis National Forest conducted by Doug Henderson and students from the University of Idaho. Initially they thought it was the wider-ranging *C. nivalis* (Henderson 1977; 1981; Brunsfeld 1981; Henderson et al. 1979; 1980), which was itself being considered for federal listing at the time. By 1981, Ron Hartman, University of Wyoming, and Lincoln Constance, University of California, recognized that all east-central Idaho material that had been identified as *C. nivalis* was actually a new species. They formally published the new name in 1985 (Hartman and Constance 1985). Between 1982 and 1985, the taxon was identified as *Cymopterus* sp. nov. (yellow flowers), to distinguish it from what was thought to be another new species with white flowers (Henderson 1982; 1983a; 1983b).

The distribution of *Cymopterus douglassii* was largely elucidated by Doug Henderson and students by about 1980. I expanded its known distribution only sightly in 1994. With the exception of one population, *Cymopterus douglassii* is restricted to ridges and cirques in the central Lost River Range, all within ca. 8 miles of Borah Peak . One population is disjunct in the Lemhi Range, on and around Sheep Mountain, ca. 30 miles northeast of Borah Peak.

E. Comments on current alternative taxonomic treatment(s): None, but see discussion above regarding early taxonomic confusion.

2. Present legal or other formal status

A. International: None.

B. National.

1. Present designation of proposed legal protection or regulation: *Cymopterus douglassii* is currently recognized as a category 2 candidate for listing under the Endangered Species Act (U.S. Fish and Wildlife Service 1993).

2. Other current formal status recommendation: The Natural Heritage and Conservation Data Center network and The Nature Conservancy rank *Cymopterus douglassii* G2, a rank that includes taxa that are globally imperiled because of rarity or because of other factors demonstrably making it vulnerable to extinction (Conservation Data Center 1994).

The U.S. Forest Service, Intermountain Region, recognizes *Cymopterus douglassii* as a sensitive species on the Challis and Salmon National Forests (USDA Forest Service

1994).

3. Review of past status: Originally recognized as *Cymopterus nivalis*, it was on the original Smithsonian list as Endangered (Henderson 1977) and later treated as a category 2 candidate (U.S. Fish and Wildlife Service 1980). Once it was recognized as being different from *C. nivalis*, *Cymopterus* sp. nov./ined. (Custer, Lemhi Cos.) was treated as a category 1 candidate (U.S. Fish and Wildlife Service 1983) and then category 2 (U.S. Fish and Wildlife Service 1985). As *Cymopterus douglassii,* it appeared in the 1990 Notice of Review as a category 2 candidate (U.S. Fish and wildlife Service 1990).

In his review of the taxon for the Rare and Endangered Plants Technical Committee of the Idaho Natural Areas Council, Doug Henderson (1983b) recommended federal Threatened status, due to its limited distribution and small number of plants.

C. State.

1. Idaho.

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

b. Other current formal status recommendation: Because *Cymopterus douglassii* is endemic to Idaho, the Conservation Data Center state rank (S) equals the global (G) rank (see above; Conservation Data Center 1994).

In anticipation of the recommendations of this status survey, the Idaho Native Plant Society moved *Cymopterus douglassii* from its list of current and recommended Federal Candidate Species to the state Sensitive list (Idaho Native Plant Society 1995). The Sensitive list includes those taxa with small populations or localized distributions within Idaho that presently do not meet the criteria for classification as state Priority 1 or 2, but whose populations and habitats may be jeopardized without active management or removal of threats (Idaho Native Plant Society 1995).

c. Review of past status: None.

3. Description.

A. General nontechnical description: A member of the parsley family, *Cymopterus douglassii* grows low and tufted (4-15 cm tall) with a straight to curved, 6-20 cm long taproot. The crown has few to several branches arising 1-3 cm below the ground, which are enveloped by marcescent, papery leaf sheaths. The leaves are oblong, 2-5 cm long, green to grayish-green, and once-pinnate with entire leaflets or few to many unequally bilobed to pinnately 3-7 lobed or twice-pinnate (especially below). The leaflets are in 3-5 opposite, elliptic, distinct pairs which are crowded and greatly overlapping. The inflorescence consists of subcompact, compound umbels, 3-8 mm in diameter. The flower stalk is 4-13 cm long and exceeds the leaves. The 5-12 bractlets are entire, about

equalling the flower length, and thinly white margined. The flowers are yellow (fading pale) and the carpophore is bilobed (Spahr et al. 1991).

B. Technical Description: Low, tufted, herbaceous perennial 4-15 cm tall, acualescent or essentially so, not markedly aromatic unless crushed, with a straight to curved primary root 6-20 cm long, 2-6 mm in diam at the summit, the crown mostly with few to several branches arising 1-3 cm below the ground, the branches enveloped above by marcescent, papery leaf sheaths (occasionally a few petioles as well) which often double the apparent diam; leaves petiolate, subcoriaceous, oblong in outline, 2-5 cm long, 0.4-1.5 cm wide, once-pinnate with leaflets entire or few to many unequally bilobed to pinnately 3-5 (7) lobed, or twice-pinnate (especially below), green to grayish-green, glabrous or minutely scaberulous on margins; petiole subterete in cross section (when fresh), glabrous, 0.5-3 cm long, expanded at base into a relatively broad, scarious sheath; blade (0.8) 1.5-2 (4) cm long; lobes or leaflets narrowly to broadly elliptic or sometimes lanceolate; leaflets in 3-5 opposite, distinct pairs, not decurrent on the rachis or petiole, the apices mostly mucronulate. Inflorescence of subcompact, compound umbels 3-8 mm in diam; peduncle terminal, erect or nearly so, 4-13 cm long, exceeding the leaves, glabrous; involucre wanting; rays 3-6, 2-5 mm long, flattened, spreading, sometimes scariously winged; umbellets andromonoecious, of several pedicellate staminate and 1-5 (or more) subsessile perfect flowers; involucres dimidiate, the branchlets 5-12, linear-lanceolate to obovate, entire and acute or few-toothed apically, 1.5-3 mm long and about equalling the flowers, connate for up to 1/3 their length, sometimes thinly white-margined; pedicels 0.5-1.5 mm long. Flowers yellow (fading to pale yellow or white); sepals ovate to lanceolate, 0.4-0.7 mm long, subequal, not enlarging in fruit; petals 1.6-2 mm long, obovate below with a narrow, inflexed, plicate apex of nearly equal length; anthers yellow, 0.5-0.6 mm long; filaments 0.9-1.1 mm long; styles filiform, terete, 1-1.5 mm long, spreading, not elongating in fruit; stylopodium none; disc present; ovary glabrous; carpophore present, bipartate, persistent. Fruit subterete, broadly ovoid, not constricted at commissure, 3-4 mm long, (1.7) 2-2.5 (3) mm broad, glabrous, dull to somewhat lustrous, light brown, the dorsal rib and pair of intermediate ribs low and rounded but prominent, corky, unwinged, the lateral pair narrowly winged, about as broad as the intervals; oil tubes small, flattened, reddish-brown, 3-5 in the intervals, 6-10 on the concave commissural face; seeds slightly compressed dorsally in cross section, the face plane. Chromosome number, n = 11 (Hartman and Constance 1985).

C. Local field characters: Leaves once-pinnate but the leaflets only lobed or some of the terminal ones entire, strongly bluish-grey in color (glaucous), flowers yellow (Henderson et al. 1979).

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

E. Photographs and/or line drawings: The best line drawing of *Cymopterus douglassii* appears in Hartman and Constance (1985), which has been reproduced in Spahr et al. (1991), USDA Forest Service (no date), Moseley (1989), and Appendix 1. Interestingly, the nice illustration provided for *Cymopterus nivalis* in an illustrated guide to rare plants of

Nevada (Mozingo and Williams 1980) was drawn from Idaho plants (which are actually *Cymopterus douglassii)* on the assumption at the time that these were conspecific (Hartman and Constance 1985). Photographs of this species and its habitat appear in USDA Forest Service (no date). The slide collection of the Conservation Data Center contains images of *Cymopterus douglassii*, two of which are reproduced in Appendix 4.

4. Significance.

A. Natural: None known.

B. Human: None known.

5. Geographical distribution.

A. Geographical range: *Cymopterus douglassii* is endemic to carbonate substrates in the central Lost River Range and central Lemhi Range (Figure 1). Ten occurrences are known and all but one occur in the Lost River Range, Custer County, centered around Borah Peak. One disjunct occurrence is on Sheep Mountain in the Lemhi Range, Lemhi County, ca. 30 miles northwest of those in the Lost River Range.

B. Precise occurrences in Idaho.

1. Populations currently or recently known extant: The Conservation Data Center data base contains ten occurrences of *Cymopterus douglassii*. All of these are known to be extant based on field observations made in 1994. Occurrence records for the ten populations appear in Appendix 2, each one being identified by a three digit code (i.e., 005, 009). Among other things, each record contains information on the county of occurrence, site name, narrative of the location, date of initial discovery, date of most recent observation, pertinent USGS quads, township, range and section, and latitude and longitude. Maps of individual occurrences appear in Appendix 3.

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: Relatively thorough floristic inventories have been conducted throughout the subalpine and alpine zone of east-central Idaho over the last 20 years. There may be, however, remote ridges or basins in the Lost River Range where new localized populations may be discovered.

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

Figure 1. Distribution of *Cymopterus douglassii.*

6. Locations known or suspected to be erroneous reports: Henderson (1983a) refers to *Cymopterus douglassii* occurring in the Scott Peak area of the Beaverhead Mountains, based on a Wellner collection. This must have been a misidentification, because its distribution no longer is considered to include the Scott Peak area (see Hartman and Constance 1985).

C. Biogeographical and phylogenetic history: Largely unknown. Hartman and Constance (1985) had difficulty placing *Cymopterus douglassii* in the proper genus. Originally they considered placing it in the genus *Oreoxis* because of features of the carpophore. However, its inclusion in this genus would have necessitated a considerable expansion in the circumscription of this otherwise homogenous taxon.

6. General environment and habitat description.

A. Concise statement of general environment: *Cymopterus douglassii* is restricted to carbonate substrates. It can occur on all aspects, from flat, exposed fellfields on ridgelines to relatively stabilized pockets on steep scree slopes. It occurs both in the alpine zone and, more often, in open coniferous woodlands of the subalpine zone, between 9000-10,900 feet (2743-3312 m), although one population occurs in the montane forest zone at 8000 feet (2440 m).

B. Physical characteristics.

1. Climate.

a. Koppen climate classification: Populations of *Cymopterus douglassii* lie in an area classified as Koppen's undifferentiated highlands (H) unit. Its distribution probably falls into a D (microthermal) climate, which includes cold-snowy forests with an average temperature of the coldest month below -3^{o} C and the average temperature of the warmest month above 10^{o} C. The average temperature of the warmest month in this unit roughly coincides with upper timberline (Trewartha and Horn 1980).

b. Regional macroclimate: The climate of east-central Idaho is transitional between two contrasting climatic regimes. To the north and west, influence of the Pacific maritime climate is most marked, with a pronounced summer drought, while to the south and east, the climate is continental in character, with proportionally more summer precipitation (Ross and Savage, 1967). There are no climatic records from the study area, however, Knoll (1973) estimates that the mean annual precipitation for the alpine portion of the Lemhi Range is 750 mm.

c. Local microclimate: *Cymopterus douglassii* typically occurs on ridges and in cirque basins where there is usually moderate amounts of snow deposition, creating a moderate microclimate. Portions of some populations, however, occur on windswept ridges exposed to winter winds, and are relatively xeric.

2. Air and water quality requirements: Unknown.

3. Physiographic provinces: All occurrences of *Cymopterus douglassii* occur within the East-central Idaho Section of the Northern Rocky Mountain Geomorphic Province (Ross and Savage 1967; Wellner and Johnson 1974). Its distribution is encompassed by Omernik and Gallant's (1986) Northern Rockies Ecoregion and the Beaverhead Mountains Section of the Middle Rocky Mountain Steppe-Coniferous Forest-Alpine Meadows Province (M332E) of Bailey's ecoregions (McNab and Avers 1994).

4. Physiographic and topographic characteristics: East-central Idaho has traditionally been placed within the Northern Rocky Mountain physiographic province, but has strong physiographic affinities with the Basin and Range province because of its isolated, roughly parallel mountain ranges separated by broad, semi-arid valleys. Elevations range from 4800 feet at Howe, located along the northern edge of the Snake River Plain, to 12,665 feet on the summit of Borah Peak in the Lost River Range.

Within this area, *Cymopterus douglassii* occurs on ridges, slopes and on moraines, colluvium, and outwash found in adjacent cirques. It occurs on all aspects and virtually all slope declivities (flat to greater than 70%). It is most commonly found at elevations between 9000-10,500 feet but has been found occurring as high as 10,865 feet on Sheep Mountain (001) and, at the other extreme, the Cedar Creek-Lower Valley (008) population occurs between 8000-8400 feet.

5. Edaphic factors: *Cymopterus douglassii* occurs exclusively on Paleozoic carbonate substrates, either limestone or mostly dolomite (Ross 1947; 1961). Microedaphic attributes of *Cymopterus douglassii*'s habitat are best characterized as loose and gravelly, with no soil development. Whether occurring on ridges or on steep scree slopes, gravelly to rocky soil is the norm, consisting of frost-shattered fragments of the carbonate substrate.

6. Dependence of this taxon on natural disturbance: *Cymopterus douglassii* is probably a poor competitor. It occurs only in sparsely vegetated areas that have considerable amounts of bare ground. These sites are constantly subject to disturbance of the soil surface, either by wind erosion, water erosion, frost-heaving, and most commonly downslope movement.

7. Other unusual physical features: None known.

C. Biological characteristics.

1. Vegetation physiognomy and community structure: *Cymopterus douglassii* was included in Steve Urbanczyk's analysis of vegetation patterns in Sheep Mountain Research Natural Area (001) in the Lemhi Range (Urbanczyk 1993; Urbanczyk and Henderson 1994). He found that it was a minor, but consistent component, of the alpine *Carex rupestris* community, it was the highest elevation plant collected, and was restricted to dolomite. The *Carex rupestris* community occupied the highest, driest, and most exposed sites in his study area. It was sparsely vegetated (35%), with most of the area being exposed mineral soil. *Carex rupestris* does not occur in the Lost

River Range.

The vegetation containing *Cymopterus douglassii* in the Lost River Range has been characterized as alpine tundra (actually fellfield is a better term), talus (including scree), and spike-fescue (*Leucopoa kingii*) grasslands by Brunsfeld (1981) and Moseley (1985). The fellfield and scree communities are similar in physiognomy and cover to the *Carex rupestris* community described from the Lemhi Range. The spike-fescue grasslands have a higher cover than the other two, but there is still considerable bare ground and soil surface instability from frost-heaving and downslope movement. *Cymopterus douglassii* was included in my analysis of spike-fescue grasslands (Moseley 1985). It occurred in one plot at one of the Mahogany Creek Research Natural Area populations (occurrence 004). Ordination of the species and the plots with indirect gradient analysis showed that they both occurred at the unstable end of the substrate stability gradient (Moseley 1985). These alpine and subalpine sites are largely devoid of trees or, if present, are widely scattered individuals or krummholz.

The Cedar Creek-Lower Valley (008) population occurs in a considerably different from the rest. It occurs in the lower montane zone in the *Pseudotsuga menziesii/Cercocarpus ledifolius* habitat type (Steele et al. 1981). This habitat is best characterized as a *Pseudotsuga menziesii-Pinus flexilis* woodland with *Cercocarpus ledifolius* occurring in the tree interspaces. *Symphoricarpos oreophilus* and numerous herbaceous species, including *Cymopterus douglassii*, occur in the openings in the woodland.

2. Regional vegetation type: As in other mountainous areas of North America, the vegetation of east-central Idaho varies according to climatic gradients generally associated with changing altitude. The intermontane basins, not under intensive management, support natural communities of sagebrush-grass and salt desert shrub vegetation. From these basin the mountains rise abruptly creating elevational gradients of up to 5250 feet over a relatively short distance. Sagebrush-grass communities are the primary non-forest cover on the mountain slopes and occur up to ca. 9850 feet. Coniferous forest communities form mosaics with sagebrush-grass vegetation and begin at ca. 7200 feet (2200 m). *Cercocarpus ledifolius* occurs as extensive stands on mountain slopes with shallow soils and rock outcrops, particularly on carbonate substrates. Above 9500 feet alpine plant communities occur in mosaics along complex environmental gradients (Moseley 1985).

3. Frequently associated species:

Alpine and Subalpine: *Potentilla ovina, P. fruticosa, P. diversifolia, Ribes hendersonii, R. montigenum, Phlox pulvinata, P. muscoides, Erigeron radicatus, Linum perenne, Cymopterus bipinnatus, C. ibapensis, Haplopappus acaulis, H. suffruticosus, Trisetum spicatum, Calamagrostis purpurascens, Draba oligosperma, Carex rupestris, Pinus albicaulis, P. flexilis, Juniperus communis, Achillea millefolium., Astragalus kentrophyta, A. terminalis, A. aboriginum, Townsendia montana, T. parryi, Campanula rotundifolia, Arenaria obtusifolia, A. rubella, A. nuttallii, Polemonium viscosum, Lesquerella occidentalis, Zigadenus*

elegans, Eritrichium nanum, Castilleja covilleana, Hymenoxys grandiflora, Oxytropis besseyi, O. sericea, Lloydia serotina, Calamagrostis purpurascens, Carex rupestris, C. elynoides, Poa secunda, P. alpina, P. cusickii, Sedum lanceolatum, Artemisia frigida, Erigeron compositus, Senecio canus, S. werneriaefolius, S. fremontii, Anemone multifida, Salix nivalis, Epilobium alpinum, Leucopoa kingii, Delphinium glaucescens, Synthyris pinnatifida, Picea engelmannii, Abies lasiocarpa, Solidago multiradiata, Agoseris glauca, Eriogonum ovalifolium.

Montane (Cedar Creek-Lower Valley): *Pseudotsuga menziesii, Pinus flexilis, Cercocarpus ledifolius, Symphoricarpos oreophilus, Shepherdia canadensis, Arctostaphylos uva-ursi, Agropyron spicatum, Astragalus miser, A. kentrophyta, Phlox pulvinata, Bupleurum americanum, Trisetum spicatum, Senecio canus.*

4. Dominance and frequency: *Cymopterus douglassii* contributes relatively low vegetative cover to all communities in which it occurs. It may constitute, however, one of the more prominent species in the community because there are relatively few species, all having low cover (see Moseley 1985; Urbanczyk 1993).

5. Successional phenomena: This is not applicable to most populations, as the habitats are maintained in and open state by physical processes. The Cedar Creek-Lower Valley (008) occurrence, on the other hand, is on a north slope that has a relatively high canopy closure of *Pseudotsuga menziesii, Pinus flexilis,* and *Cercocarpus ledifolius*. *Cymopterus douglassii* is restricted to small openings in this forest. It is probable that, without fire to maintain an open woodland, this population has decreased since the advent of modern fire suppression by the Forest Service.

6. Dependence on dynamic biotic features: See above discussion..

7. Other endangered species: *Cymopterus douglassii* is sympatric with *Cymopterus ibapensis* at one of the populations in Mahogany Creek Research Natural Area (002), and at the two populations around Cayuse Canyon (Cayuse-Mahogany Divide 005 and West Side Cayuse Canyon 006). It also occurs near populations of several rare arctic-alpine disjunct plants in Rock Creek Cirque (010) (Moseley 1992) and Merriam Lake Basin Research Natural Area (007) (Wellner 1991a). These species include *Parnassia kotzebuei, Saxifraga cernua, S. adscendens, Salix farriae, Gentianella tenella, Gentianella propinqua,* and *Erigeron humilis* (Conservation Data Center 1994).

7. Population biology.

A. General summary: All populations are relatively large in area and number, appear to have well distributed age class structures, and have no (few?) threats to their viability.

B. Demography.

1. Known populations: Ten populations of *Cymopterus douglassii* are known extant; none are known to be extirpated. All populations are relatively large in number; I estimate that over 75,000 individuals occur at these ten sites. The populations occupy a total area of ca. 837 acres. The age class structure appears to be well distributed among immature and mature (reproductive) individuals; no seedlings were observed. See below for details for each population.

2. Demographic details:

001 Sheep Mountain Proposed Research Natural Area
Estimated number of individuals: >10,000
Area of population: 155 acres

002 Mahogany Creek Research Natural Area
Estimated number of individuals: "thousands"
Area of population: 30 acres

003 Horseheaven Pass North
Estimated number of individuals: "several thousand"
Area of population: 33 acres

004 Mahogany Creek Research Natural Area
Estimated number of individuals: "many thousands"
Area of population: 50 acres

005 Cayuse - Mahogany Divide
Estimated number of individuals: "1,000's"
Area of population: 15 acres

006 West Side of Cayuse Canyon
Estimated number of individuals: "many 10,000'"
Area of population: 275 acres

007 Merriam Lake Basin Research Natural Area
Estimated number of individuals: "many 1,000's"
Area of population: 145 acres

008 Cedar Creek - Lower Valley
Estimated number of individuals: "thousands"
Area of population: 10 acres

009 Cedar Creek - Upper Basin
Estimated number of individuals: "many 10,000's"
Area of population: 115 acres

010 Rock Creek Cirque
Estimated number of individuals: "many thousands"

Area of population: 9 acres

C. Phenology.

1. Patterns: *Cymopterus douglassii* flowers from mid-June through late; fruiting late July through August (Hartman and Constance 1985).

2. Relation to climate and microclimate: During extremely dry summers, such as in 1994, few viable fruits appear to be produced in any of the populations.

D. Reproductive ecology.

1. Type of reproduction: *Cymopterus douglassii* reproduces only by seed.

2. Pollination.

a. Mechanisms: Unknown.

b. Specific known pollinators: Unknown.

c. Other suspected pollinators: None known.

d. Vulnerability of pollinators: Unknown.

3. Seed dispersal.

a. General mechanisms: Unknown, but probably gravity and possibly wind and water are important.

b. Specific agents: Unknown, but probably gravity is the most important.

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.

c. Dormancy requirements: Unknown.

d. Germination requirements: Unknown.

e. Percent germination: Unknown.

5. Seedling ecology: No data.

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

7. Overall assessment of reproductive success: No data.

8. Population ecology.

A. General summary: Little is known regarding the population ecology of *Cymopterus douglassii.*

B. Positive and neutral interactions: None known.

C. Negative interactions.

1. Herbivores, predators, pests, parasites and diseases: None observed.

2. Evidence of competition.

a. Intraspecific: Largely unknown. Population densities are generally low, and intraspecific competition is probably minimal, although there may be some density dependent mortality in seedlings.

b. Interspecific: Largely unknown. Plant density in communities supporting *Cymopterus douglassii* is generally low, but I'm unsure whether this is due to interspecific competition for resources or not.

3. Toxic and allelopathic interactions with other organisms: None known.

D. Hybridization.

1. Naturally occurring: None known.

2. Artificially induced: Unknown.

3. Potential in cultivation: Unknown.

E. Other factors of population ecology: None known.

9. Current land ownership and management responsibility.

A. General nature of ownership: All populations are entirely on public land managed by the U.S. Forest Service. The Challis National Forest manages all populations in the Lost River Range and shares responsibility for management of the Sheep Mountain population in the Lemhi Range with the Salmon National Forest. Field investigations by Moseley (1989) found that the Sheep Mountain population does not extend south onto the Targhee

National Forest.

B. Specific landowners: See above.

C. Management responsibility:

001 Sheep Mountain Proposed Research Natural Area
Salmon NF, Leadore Ranger District (east side of Lemhi crest.)
Challis NF, Lost River Ranger District (west side of Lemhi crest)

002 Mahogany Creek Research Natural Area
Challis NF, Challis Ranger District

003 Horseheaven Pass North
Challis NF, Challis Ranger District

004 Mahogany Creek Research Natural Area
Challis NF, Challis Ranger District

005 Cayuse - Mahogany Divide
Challis NF, Challis Ranger District

006 West Side of Cayuse Canyon
Challis NF, Challis Ranger District

007 Merriam Lake Basin Research Natural Area
Challis NF, Challis Ranger District

008 Cedar Creek - Lower Valley
Challis NF, Lost River Ranger District

009 Cedar Creek - Upper Basin
Challis NF, Lost River Ranger District

010 Rock Creek Cirque
Challis NF, Lost River Ranger District

D. Easements, conservation restrictions, special designations, etc.: Three populations occur in two Research Natural Areas, one occurs in a proposed Research Natural Area, and another occurs in a proposed Special Interest Botanical Area, as follows:

001 Sheep Mountain Proposed Research Natural Area - this site is proposed as a Research Natural Area (Hilty and Moseley 1991) in both the Salmon NF, Challis NF, and Targhee NF Forest Plans.

002 and 004 Mahogany Creek Research Natural Area - was designated as a

Research Natural Area by the Chief of the Forest Service in 1991 (Wellner 1991b).

007 Merriam Lake Basin Research Natural Area - was designated as a Research Natural Area by the Chief of the Forest Service in 1991 (Wellner 1991a).

010 Rock Creek Cirque - was proposed as a Special Interest Botanical Area in 1992 (Moseley 1992).

10. Management practices and experience.

A. Habitat management.

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

a. This taxon: None known.

b. Related taxa: Not known.

c. Other ecologically similar taxa: N/A

2. Performance under changed conditions: Unknown.

3. Current management policies and actions: Current management policy on all populations is pretty *laissez faire.* Three populations are in Research Natural Areas and two others are proposed for special designation. Some dispersed recreational use occurs in and around some of the populations. The Sheep Mountain area is riddled with mining claims, but most (all?) are not on the limestone portion, which is the only part containing *Cymopterus douglassii.*

4. Future land use(s): Same as above.

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: None known.

11. Evidence of threats to survival.

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

1. Past threats: The Rock Creek (010) population has persisted since the 1940's and most of the others have persisted since the mid-1970's.

2. Existing threats: Virtually none. There is apparently no livestock grazing of any population and wild ungulate herbivory appears minimal. There are no trails near or through any population. Only one 4WD road approaches the edge of one population (Horseheaven Pass North 003) with no impact to the population. There are apparently no mining threats (but see discussion above about Sheep Mountain). Three populations are in established Research Natural Areas and two others are in proposed special designations.

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 in Idaho.

3. Potential threats: Minimal to no potential threats foreseen in Idaho.

C. Disease, predation, or grazing.

1. Past threats: None known.

2. Existing threats: See Past Threats.

3. Potential threats: See Past Threats.

D. Inadequacy of existing regulatory mechanisms.

1. Past threats: None.

2. Existing threats: None.

3. Potential threats: None.

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: After 20 years of intensive floristic exploration of the carbonate substrates of east-central Idaho, *Cymopterus douglassii* remains a narrowly-distributed endemic. However, all ten populations are large in both area and especially population number. There appear to be no demographic bottlenecks. All the populations are relatively isolated from anthropogenic disturbance and there are no apparent threats. Three populations are in designated Research Natural Areas, one in a proposed Research Natural Area, and one in a proposed Special Interest Botanical Area.

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

A. Recommendations to the U.S. Fish and Wildlife Service: Change *Cymopterus douglassii* from a category 2 candidate to a category 3c candidate.

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

1. U.S. Forest Service: *Cymopterus douglassii* remains globally rare and should be maintained on the Intermountain Region Sensitive Species List for the Challis and Salmon National Forests.

C. Other status recommendations.

1. Municipalities): No recommendations.

2. Counties: No recommendations.

3. State(s) (Idaho):

a. Conservation Data Center: Because there are only ten populations, I plan to keep *Cymopterus douglassii* at the G2 global rank.

b. Idaho Native Plant Society: In anticipation of the category 3c recommendation, the Idaho Native Plant Society already moved *Cymopterus douglassii* from its list of species requiring federal action (candidates) to its Sensitive List at the 1995 Idaho Rare Plant Conference (Idaho Native Plant Society 1995).

4. Other Nations: No recommendations.

5. International Trade, etc.: No recommendations.

14. Recommended critical habitat: None recommended.

15. Conservation/recovery recommendations.

A. General conservation recommendations.

1. Recommendations regarding present or anticipated activities: None.

2. Areas recommended for protection: Three populations are already in specially designated areas to protect natural communities and populations. I recommend that the Forest Service move forward and formally designate the Sheep Mountain Research Natural Area, which is currently identified in their Forest Plans, and the Rock Creek Cirque Special Interest Botanical Area.

3. Habitat management recommendations: None.

4. Publicity sensitivity: None.

5. Other recommendations: None.

B. Monitoring activities and further research recommendations: None.

16. Interested parties:

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Salmon, ID 83467

Conservation Data Center
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Boise, ID 83707

Idaho Native Plant Society
P.O. Box 9451
Boise, ID 83707

Director
University of Idaho Herbarium
Department of Biological Sciences
University of Idaho
Moscow, ID 83844

Chief Botanist
The Nature Conservancy
1815 N Lynn St.
Arlington, VA 22209

III. Information Sources.

17. Sources of information.

A. Publications.

1. References cited in report:

Brunsfeld, S.J. 1981. Alpine flora of east-central Idaho. M.S. thesis. University of Idaho, Moscow, ID. 205 p.

Caicco, S.L. 1983. Alpine vegetation of the Copper Basin area, south-central Idaho. M.S. Thesis. University of Idaho, Moscow, ID. 99 p.

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Cronquist, A. 1961. *Cymopterus* . Pages 525-530 *In*: Vascular Plants of the Pacific Northwest - Part 3, by C.L. Hitchcock, A. Cronquist, M. Ownbey, and J.W. Thompson, University Washington Press, Seattle, WA.

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Hitchcock, C.L., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle, WA. 730 p.

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2. Other pertinent publications.

a. Technical:

Atwood, D. 1986. Status report - *Cymopterus douglassii*. Unpublished report on file at USDA Forest Service, Intermountain Region, Ogden, UT.

Henderson, D.M. 1985. Checklist of the vascular plants of the Mt. Borah region. Unpublished report on file at the University of Idaho Herbarium, University of Idaho, Moscow, ID.

b. Popular: None.

B. Herbaria consulted: All regional and many national herbaria have been consulted several times over the years regarding specimens of Idaho's rare flora (see Moseley 1990). Herbarium specimens of *Cymopterus douglassii* are listed below, indexed by

occurrence number (see also Appendix 2). Herbarium acronyms follow Holmgren et al. (1990).

001 Sheep Mountain Proposed Research Natural Area
Henderson 3334 (ID, RM)
Brunsfeld 348 (ID)

002 Mahogany Creek Research Natural Area
Henderson 4582 (ID)
Henderson 4682 (ID, UC)

003 Horseheaven Pass North
Hartman 13782 (ID, BRY, GH, NY, TEX, UC, US, UTC, WS)
Hartman 14025 (ID, BRY, COLO, F, GH, NY, RM, UC, US, WS)
Henderson 4463 (ID)
Henderson 4464 (ID)
Henderson 4953 (ID)

004 Mahogany Creek Research Natural Area
Henderson 4908 (ID, UC)

005 Cayuse - Mahogany Divide
Moseley 34 (ID)

006 West Side of Cayuse Canyon
Moseley 56 (ID)

007 Merriam Lake Basin Research Natural Area
Brunsfeld 183 (ID, UC)
Brunsfeld 187 (ID)
Henderson 4695 (ID, UC)
Wellner 1490 (ID)

008 Cedar Creek - Lower Valley
None

009 Cedar Creek - Upper Basin
None

010 Rock Creek Cirque
Hitchcock and Muhlick 10958 (RM, WTU, UC, DS, CAS)
Hitchcock 20411 (WTU)
Davis 2018 (IDS, UC)

C. Fieldwork: As mentioned previously, Doug Henderson and students have spent considerable time during the last 22 years conducting floristic and ecological inventories of all the ranges in east-central Idaho containing carbonate substrates (e.g., Brunsfeld 1981;

Caicco 1983; Moseley 1985; Urbanczyk 1993). Specific rare plant surveys of this area include Henderson et al. (1979); Henderson (1982; 1983a); and Moseley (1989). I visited all *Cymopterus douglassii* populations in 1994, and conducted *de novo* searches in the Lemhis, between Sheep Mountain and Meadow Lake, and in the Lost River Range on the periphery of its known distribution, where I discovered two new populations.

D. Knowledgeable individuals:

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Lincoln Constance
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Berkeley, CA 94720

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 *Cymopterus douglassii* are on file at the Idaho Conservation Data Center office.

IV. Authorship.

19. Initial authorship:

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

V. New information.

21. Record of revisions: Not applicable.

Appendix 1

Line drawing of *Cymopterus douglassii* (from Hartman and Constance 1985).

Appendix 2

Conservation Data Center records for the ten occurrences of *Cymopterus douglassii*.

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 001

Survey Site Name: SHEEP MOUNTAIN PROPOSED RESEARCH NATURAL AREA

County: Lemhi

USGS quadrangle: GILMORE

Location: Crest of Lemhi Range, Sheep Mountain vicinity.

Survey Date: 1994-08-02
Last Observed: 1994-08-02
First Observed: 1976

EORANK: A

Population Data: 1989: Several thousand plants, 80% in fruit, 20% in flower. 1994: Many thousands, possibly >10,000 in fruit. Excellent age class (size class) distribution. Area surveyed by Bob Moseley, Idaho CDC.

Habitat Description: Limestone; all aspects; flat ridgeline to relatively steep scree slope; mostly *Carex rupestris* community. With *Oxytropis besseyi, Lloydia serotina, Calamagrostis purpurascens, Arenaria obtusiloba, Zigadenus elegans, Phlox pulvinata,* and *Hymenoxys grandiflora.*

Minimum Elevation: 9880 feet Maximum Elevation: 10865 feet
Size: 155 ACRES

Ownership Comments: Salmon NF, Leadore RD, and Challis NF, Lost River RD.

Comments:Limestone habitats to the north and south have been thoroughly surveyed for Cymopterus douglassii between 1976 and 1994.

Protection Comments: Occurs within Sheep Mountain proposed RNA.

Specimens: Henderson 3334 (ID, RM); Brunsfeld 348 (ID).

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 002

Survey Site Name: MAHOGANY CREEK RESEARCH NATURAL AREA

County: Custer

USGS quadrangle: BORAH PEAK

Location:
Mahogany Creek, Lost River
Range.

Survey Date: 1994-08-18
Last Observed: 1994-08-18
First Observed: 1978-07-17

EORANK: A
EORANK Comments:

Population Data:
1978: Locally abundant; flowers yellow. Observation by D. Henderson, University of Idaho. 1994: Thousands of plants past flowering. Moderate density. Apparently no fruits developed this year. Area surveyed by Bob Moseley, Idaho CDC.

Habitat Description:
Limestone substrate, gravelly flats and slopes on moraines and glaciated bedrock ridges. Predominantly E slope. Subalpine basin; open subalpine woodland and grassland. Associated with *Pinus albicaulis, Pinus flexilis, Anemone multifida, Juniperus communis, Senecio canus, Draba oligosperma, Achillea millefolium, Leucopoa kingii, Townsendia parryi,* and *Cymopterus ibapensis.*

Minimum Elevation: 9200 feet
Maximum Elevation: 9400 feet
Size: 30 ACRES

Ownership Comments: Challis NF, Challis RD.

Protection Comments: Within Mahogany Creek RNA.

Specimens: Henderson 4582 (ID); Henderson 4682 (ID, UC).

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 003

Survey Site Name: HORSEHEAVEN PASS NORTH

County: Custer

USGS quadrangle: BORAH PEAK
BURNT CREEK

Location:
N of Horseheaven Pass; E slope Lost River Range.

Survey Date: 1994-08-15
Last Observed: 1994-08-15
First Observed: 1978

EORANK: B
EORANK Comments:

Population Data:
1978: Plants locally abundant; flowers yellow. 1994: Several thousand plants in dense population of all size (age?) classes. Apparently no fruits developed this year. Area surveyed by Bob Moseley, Idaho CDC.

Habitat Description:
Barren windswept ridge; all aspects; limestone/dolomite substrate; gravelly subalpine grassland; associated with *Poa secunda, Phlox muscoides, Draba oligosperma, Artemisia frigida, Erigeron compositus, Carex elynoides*, and *Oxytropis sericea.*

Minimum Elevation: 9000 feet
Maximum Elevation: 9315 feet
Size: 33 ACRES

Ownership Comments: Challis NF, Challis RD.

Comments: Suitable appearing habitat <1000 ft below EO does not have Cymopterus.
Specimens: Hartman 13782 (ID, BRY, GH, NY, TEX, UC, US, UTC, WS, RM); Hartman 14025 (ID, BRY, COLO, F, GH, NY, RM, UC, US, WS); Henderson 4953 (ID); Henderson 4464 (ID); Henderson 4463 (ID).

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 004

Survey Site Name: MAHOGANY CREEK RESEARCH NATURAL AREA

County: Custer

USGS quadrangle: BORAH PEAK

Location:
Crest of Lost River Range, N of Borah Peak

Survey Date: 1994-08-18
Last Observed: 1994-08-18
First Observed: 1978-08-03

EORANK: A
EORANK Comments:

Population Data:
1978: Locally abundant, flowers yellow. Observation by D. Henderson, University of Idaho. 1994: Many thousands of plants past flowering. Mostly high density; many size (age?) classes represented. Apparently no fruits developed this year. Area surveyed by Bob Moseley, Idaho CDC.

Habitat Description:
Steep slopes, gentle ridgeline grasslands, and exposed, windswept fellfields. Limestone. Generally unstable gravelly substrate with low vegetative cover. Associated with *Festuca ovina, Poa secunda, Eritrichium nanum, Phlox pulvinata, Arenaria rubella, Potentilla ovina, Trisetum spicatum, Synthyris pinnatifida.*

Minimum Elevation: 9400 feet Maximum Elevation: 10000 feet
Size: 50 ACRES

Ownership Comments: Challis NF, along border of Challis RD and Lost River RD.

Protection Comments: Mostly within Mahogany Creek RNA.

Specimens: Henderson 4908 (ID).

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 005

Survey Site Name: CAYUSE - MAHOGANY DIVIDE

County: Custer

USGS quadrangle: BORAH PEAK

Location:
Ridge between Mahogany Creek and Cayuse Canyon, Lost River Range.

Survey Date: 1994-08-18
Last Observed: 1994-08-18
First Observed: 1983-07-06

EORANK: B
EORANK Comments: Somewhat limited in size, but otherwise in excellent condition.

Population Data:
1983: Common. 1994: Locally abundant along ridgeline. 1000's of plants past flower. All size (age?) classes represented. Apparently did not develop fruit this year. Area surveyed by Bob Moseley, Idaho CDC.

Habitat Description:
Gravelly carbonate substrate along ridgeline. Scree. Eastern exposure and inclined at ca 20-40 degrees. *Potentilla ovina* community with *Astragalus kentrophyta, Phlox pulvinata, Oxytropis sericea, Senecio canus, Lloydia serotina, Poa secunda,* and *Polemonium viscosum.*

Minimum Elevation: 9800 feet
Maximum Elevation: 10400 feet
Size: 15 ACRES

Ownership Comments: Challis NF, Challis RD.

Specimens: Moseley 34 (ID).

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 006

Survey Site Name: WEST SIDE OF CAYUSE CANYON

County: Custer

USGS quadrangle: BORAH PEAK

Location:
W and SW of Horseheaven
Pass;Lost River Range.

Survey Date: 1994-08-15
Last Observed: 1994-08-15
First Observed: 1983-07-07

EORANK: A
EORANK Comments: Extensive, dense, occupying several habitats, and undisturbed.

Population Data:
1983: Common. 1994: Many 10,000's of plants, mostly fairly dense. All size (age?) classes represented. No fruits developed this year, only dried flowers remain on inflorescence. Area surveyed by Bob Moseley, Idaho CDC.

Habitat Description:
All aspects on windswept ridgelines, moderately unstable talus on up to 70% slopes, and on grass dominated moraines in cirque. Associates include *Leucopoa kingii, Oxytropis sericea, Astragalus kentrophyta, Astragalus aboriginum, Poa cusickii,* and *Senecio canus.*

Minimum Elevation: 9240 feet Maximum Elevation: 10500 feet
Size: 275 ACRES

Ownership Comments: Challis NF, Challis RD.

Specimens: Moseley 56 (ID).

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 007

Survey Site Name: MERRIAM LAKE BASIN RESEARCH NATURAL AREA

County: Custer

USGS quadrangle: ELKHORN CREEK

Location:
Lost River Range, Merriam Lake basin.

Survey Date: 1994-08-16
Last Observed: 1994-08-16
First Observed: 1976

EORANK: A
EORANK Comments: Protected, extensive.

Population Data:
1978: Locally abundant; flowers yellow. 1994: Many 1000's of plants observed. Past flower and apparently no fruits this year. Observation by Bob Moseley, Idaho CDC.

Habitat Description: Glaciated bedrock ridges, benches, and on recent moraines near headwall. Flat to gently sloping gravelly substrates. Found only on carbonate substrate, not on quartzite in south part of basin. All aspects, although predominantly south. Associated with *Festuca ovina, Erigeron radicatus, Potentilla fruticosus, Lloydia serotina, Poa secunda, Erigeron compositus*, and *Haplopappus acaulis.*

Minimum Elevation: 9800 feet Maximum Elevation: 10400 feet
Size: 145 ACRES

Ownership Comments: Challis NF, Challis RD.

Protection Comments: Occurs mostly within Merriam Lake Basin RNA.

Specimens: Brunsfeld 183, 187 (ID, UC); Henderson 4695 (ID); Wellner 1490 (ID).

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 008

Survey Site Name: CEDAR CREEK - LOWER VALLEY

County: Custer

USGS quadrangle: ELKHORN CREEK

Location:
Lower Cedar Creek, Lost River Range.

Survey Date: 1994-08-19
Last Observed: 1994-08-19
First Observed: 1994-08-19

EORANK: A

Population Data:
1994: An estimated thousands of vegetative genets past flowering. No fruits developed this year. Population is moderately dense and vigorous. Observation on a cursory survey of the area by Bob Moseley, Idaho CDC.

Habitat Description: Occurs in *Pseudotsuga menziesii-Pinus flexilis* woodland with open to relatively dense canopy cover. 45 degree, N-facing slope with gravelly, carbonate substrate, primarily colluvial, although possibly some morainal material. Associates include *Cercocarpus ledifolius, Bupleurum americanum, Symphoricarpos oreophilus, Agropyron spicatum, Phlox pulvinata*, and *Shepherdia canadensis*. Overall site quality is excellent.

Minimum Elevation: 8000 feet Maximum Elevation: 8400 feet
Size: 10 ACRES

Ownership Comments: Challis NF, Lost River RD.

Comments: Exact limits of population are unknown (BM).

Protection Comments: Population is well isolated from disturbance.

Specimens:

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 009

Survey Site Name: CEDAR CREEK - UPPER BASIN

County: Custer

USGS quadrangle: ELKHORN CREEK

Location:
Upper Cedar Creek, Lost River Range.

Survey Date: 1994-08-19
Last Observed: 1994-08-19
First Observed: 1994-08-19

EORANK: A
EORANK Comments:

Population Data:
1994: Many 10,000's of vegetative genets past flowering. Apparently no fruits developed this year. All age classes represented. Population assessed as having excellent vigor, mostly high density. Area thoroughly surveyed by Bob Moseley, Idaho CDC.

Habitat Description:
Most of area is *Picea engelmannii-Abies lasiocarpa* woodland with sparse understory on very gravelly colluvium and outwash. Associates include *Juniperus communis, Ribes montigenum, Solidago multiradiata, Astragalus terminalis*, and *A. kentrophyta.* Overall site quality is excellent.

Minimum Elevation: 9280 feet Maximum Elevation: 9840 feet
Size: 115 ACRES

Ownership Comments: Challis NF, Lost River RD.

Protection Comments: No disturbance, not even much wild ungulate use in basin. Access to upper basin is difficult and strenuous.

Specimens:

CYMOPTERUS DOUGLASSII
DOUGLASS' WAVEWING
Occurrence Number: 010

Survey Site Name: ROCK CREEK CIRQUE

County: Custer

USGS quadrangle: BORAH PEAK

Location:
Rock Creek Cirque, Lost
River Range.

Survey Date: 1994-10-01
Last Observed: 1994-10-01
First Observed: 1940-06-17

EORANK: A
EORANK Comments: Moderately big, undisturbed population.

Population Data:
1987: Common; in two populations. Observation by Bob Moseley,
Idaho CDC. 1994: Many thousands of plants in the two populations.
Observation by Bob Moseley Idaho CDC.

Habitat Description:
Level, gravelly areas with much frost heaving.

Minimum Elevation: 9100 feet
Maximum Elevation: 9900 feet
Size: 9 ACRES

Ownership Comments: Challis NF, Lost River RD.

Protection Comments: Partially within Rock Creek Cirque proposed Special Interest
Botanical Area.

Specimens: C. L. Hitchcock and C. V. Muhlick 10958 (RM, WTU, UC, DS, CAS) -
originally identified as C. nivalis, annotated by L. Constance 1979-1980 and by R. Hartman 1985.

C. L. Hitchcock 20411 (WTU) - collected 8/11/54. Specimen
identified as C. nivalis (unknown if it has been annotated).
Davis 2018 (IDS, UC).

Appendix 3

Maps showing the location of *Cymopterus douglassii* populations.

Map 1. Eastern portion of Horseheaven North 003. Portion of the 1967 Burnt Creek USGS 7.5' quad.

Map 2. Western portion of Horseheaven North 003, West Side of Cayuse Canyon 006, and Cayuse-Mahogany Divide 005. Portion of the 1967 Borah Peak USGS 7.5' quad.

Map 3. Two Mahogany Creek Research Natural Area occurrences (002 &004) and Rock Creek Cirque 010 occurrence. Portion of the 1967 Borah Peak USGS 7.5' quad.

Map 4. Merriam Lake Basin Research Natural Area 007. Portion of the 1967 Elkhorn Creek USGS 7.5' quad.

Map 5. Cedar Creek - Lower Valley 008 and Cedar Creek - Upper Basin 009. Portion of the 1967 Elkhorn Creek USGS 7.5' quad.

Map 6. Sheep Mountain Proposed Research Natural Area 001. Portion of the 1987 Gilmore USGS 7.5' quad, provisional edition.

Appendix 4

Slides of the habit and habitat of *Cymopterus douglassii*.

Slide 1. Close-up of plant.

Slide 2. Habitat on Sheep Mountain 001 in *Carex rupestris* community.