Verification of Rare Plants Reported to Occur in the Thielsen Wilderness Area, Umpqua National Forest, Oregon

Report to the Interagency Special Status/Sensitive Species Program
FY2005 Inventory & Conservation Planning Project

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August 2005

Executive Summary
A database review of herbarium specimens indicated that there were two US Forest Service (USFS) sensitive species in the Mt. Thielsen Wilderness area. Neither lesser blackscale sedge (*Carex atrosquama*) nor horizontal woody rockcress (*Arabis suffrutescens* var. *horizontalis*) had been otherwise documented to occur on the Umpqua National Forest. An inventory of the current and former trail to the summit was conducted. It was determined that different nerve sedge (*Carex epapillosa*) had been misidentified as rare lesser blackscale sedge and Lemmon's rockcress (*Arabis lemmonii*) had been misidentified as the rare horizontal woody rockcress. Different nerve sedge is on the Oregon Natural Heritage Information Center's review list but not the USFS sensitive species list while Lemmon's rockcress has no official status.

Another species of sedge that is a USFS sensitive species, spikenard sedge (*Carex nardina*), is tentatively identified from near the summit of Mt. Thielsen. This population would also represent a significant range extension from the nearest known sites in the Blue Mountains of Northeast Oregon.

Acknowledgements
We wish to thank the staff at the Douglas County Museum for allowing us to review their collections. We thank Diana Wageman for preparing the plant lists from our notes. We also thank Kelli Van Norman, Interagency Inventory Coordinator, and Rob Huff, Interagency Conservation Planning Coordinator, for providing financial assistance to conduct this inventory.

Introduction

A review of herbarium records indicated that two species of plants (*Carex atrosquama* and *Arabis suffrutescens* var. *horizontalis*) that are currently being tracked as US Forest Service sensitive species occur at high elevations in the Mt. Thielsen Wilderness Area. Neither of these species were otherwise known to occur on the Forest.

The Oregon Natural Heritage Information Center's (ONHIC) database indicated that an herbarium specimen of *Carex atrosquama* was collected at "MT THIELSEN, 5 MI FROM TRAILHEAD AT DIAMOND LAKE VIA MT THIELSEN TRAIL" on 8 August 1976. This information was evidently compiled by the Carex Working Group. The database does not cite a specimen. However, V.L. Crosby #882 was collected on that date with the same label information. The sedge she collected was originally labeled as *C. atrata* var. *erecta* when deposited at Oregon State University (OSC) but was later determined to be *C. epapillosa* (= *C. heteroneura* var. *epapillosa*). *Carex epapillosa* is similar to *C. atrosquama* and both are in sect. RACEMOSAE.

Carex atrosquama is reported to occur in subalpine and alpine meadows throughout the western United States and Canada from Colorado and Utah to Alaska (Murray 2002). The only other reported locations in Oregon are in the Blue Mountains in Harney and Wallowa counties. This is a Forest Service Sensitive Species and is ranked as S1/G4?, indicating that it is rare in Oregon but more common or stable elsewhere. *Carex epapillosa* also occurs in "moist subalpine and alpine meadows" (Murray 2002) throughout the western States. It is also reported to occur in the Blue Mountains as well as the Cascades of Southwest Oregon. It is on ONHIC's review list (List 3) but not on the USFS Sensitive Species list.

The Douglas County Museum has two specimens identified as *Arabis suffrutescens* var. *horizontalis* from Mt. Thielsen and Hershberger Mountain (on the Rogue-Umpqua Divide). This rare taxon is otherwise only known from nearby Crater Lake National Park. It was collected at Mt. Thielsen by Richard Sommer on 10 August 1997 and deposited in the Douglas County Museum's herbarium. Review of the herbarium specimens revealed that the Hershberger Mountain specimen appears to be in error while the Mt. Thielsen specimen was initially determined to be inconclusive. The species at Hershberger is determined to be *A. holboellii* var. *holboelii*.

Study Site

At 2799 m (9182 ft), Mt. Thielsen is the highest point on the Umpqua National Forest. It rises conspicuously along the crest of the Cascade Mountains of southwest Oregon to an apiculate peak. For this reason, it is sometimes known as the "lightning rod of the Cascades". It lies within the 22,245 ha (55,100 ac) Mt. Thielsen Wilderness Area, part of which is included within the Winema National Forest. An eight kilometer (five mi) trail up the west flank of Mt. Thielsen begins at the 1,700 m (5,600 ft) trailhead east of Diamond Lake. The lower trail winds through dry forested stands of *Pinus contorta*, *Tsuga mertensiana*, *Abies magnifica*, and *Pinus monticola*. The trail intersects the Pacific Crest Trail at 2,200 m (7,200 ft) where *T. mertensiana* recedes into a narrow band of *Pinus albicaulis* along the ridge that falls away sharply into open scree fields. The

upper slopes and summit are steep, treeless and rocky with persistent snow only on the north face.

Methods

On 8 August 2005, the authors ascended the Mt. Thielsen trail. Specimens of herbaceous and subshrub species above timberline that were abundant and healthy enough were collected. Photographs were taken of most species. Specimens were pressed, either in situ using a portable plant press or stored in plastic bags for pressing immediately afterwards. Specimens were all given tentative identifications by the two senior authors. A wide variety of floras were consulted including: Abrams (1923-1960), Hermann (1970), Hickman (1993), Hitchcock and Cronquist (1973) Hitchcock et al. (1955-1969), Hurd et al. (1998), Johnson (1964), Mastrogiuseppe (2002), Murray (2002), and Peck (1961). Noteworthy collections are to be sent to the Oregon State University herbarium (OSC) for verification and accession into their permanent collection. The balance of the specimens will remain in the Umpqua National Forest herbarium.

Results and Discussion

A total of 79 species of vascular plants were identified within the study area. Forty-four collections were made of 38 species. Four collections were made of three species of *Arabis* and seven collections were made of seven species of *Carex*. Two other common species of *Carex* were observed but not collected. See Appendices 1 and 2 for a complete list of plants species collected or observed.

<u>The genus *Arabis* on Mt. Thielsen</u>

Three species of *Arabis* were identified. *Arabis platysperma* is a common, although never abundant, species of high elevations on the Umpqua National Forest. It was first encountered on this trip below timberline in open, predominately *Tsuga mertensiana* forest and increased on the open slopes at and just above timberline. *Arabis lemmonii* and *A. lyallii* were also both quickly evident on the open slopes and ridges above timberline (Figure 1). The latter species, like *A. platysperma*, did not extend very much above timberline. *Arabis lemmonii*, on the other hand, was fairly common almost to the summit although, like most species of the genus, plants were sparsely distributed. This species occurred predominately in scree when first encountered but towards the summit it occurred in crevices and shelves in vertical rock faces (Figure 2).

Arabis platysperma has wide, sharply erect siliques that easily distinguish it from *A. suffrutescens* var. *horizontalis*. The varietal epithet of *A. suffrutescens* is based on its widely spreading siliques. *Arabis lyalli* also has erect siliques, however *A. lemmonii* has spreading siliques and is generally similar to *A. suffrutescens* var. *horizontalis* (Table 1).

Although the specimen at the Douglas County Museum herbarium had some siliques that were wider than 2 mm (although < 3 mm), all of the fruits measured in the field were 2 mm across or less. The siliques on the herbarium sheet may have been artificially flattened in the process of pressing and mounting. The other diagnostic feature of the collections regards the pubescence of the stems and basal leaves. The specimens have

dendritic hairs that extend the length of the stem into the inflorescence and is densely canescent on the lower stem and basal leaves. Both the characters of the siliques and the pubescence on the foliage are consistent with *A. lemmonii* rather than *A. suffrutescens* var. *horizontalis*.

There were some differences observed within the population. When growing in the rock crevices at higher elevations, the stems of *A. lemmonii* tended to be less stiffly erect than those below. The specimen collected from the rocks also had distinctly longer basal leaves (up to 4.2 cm vs. up to 2.2 cm). These leaves also had a much longer, tapered petiole and were distributed along the lower 3.5 cm of the stem. These differences are attributed to the nature of the substrate which the plants were growing out of and don't appear to have any taxonomic significance.

Table 1. Conspectus of characters distinguishing *Arabis lemmonii* var. *lemmonii* from *Arabis suffrutescens* var. *horizontalis*.

	Pubescence	**Silique width**	**Silique orientation**
A. lemmonii var. *lemmonii*	Usually densely hairy w/ small dendritic hairs	< 3 mm	Somewhat ascending to spreading or slightly reflexed
A. suffrutescens var. *horizontalis*	Glabrous above, stellate pubescence below	3-6 mm	Horizontally spreading

Figure 1. *Arabis lemmonii* on the left, with glaucous foliage and spreading siliques, growing with the shorter statured *A lyallii* on the right, with dark green foliage and ascending siliques

Figure 2. *Arabis lemmonii* growing from the crevice in a nearly vertical rock face near the summit of Mt. Thielsen.

Figure 3. The seep spring habitat for *Carex epapillosa*. Diamond Lake and Mt. Bailey are in the background.

The genus *Carex* on Mt. Thielsen

Nine *Carex* species were identified. Six of the species occurred primarily in dry areas. *Carex inops* and *C. rossii* occurred along the lower trail in canopy gaps in the *Pinus contorta-Tsuga mertensiana* stands. *Carex halliana* was observed only sparingly near timberline. *Carex breweri* was abundant in the scree slopes and along the rocky ridges above timberline. *Carex nardina* and *C. preslii* were observed only in rock crevices and shelves near the summit. However, the summit was achieved without observation of the putative *C. atrosquama*.

All three of the authors had previously climbed Mt. Thielsen, although the previous ascent for two of us had been in the early to mid 1980s. It was recalled that the trail had previously been located to the south of its present location so we descended down the path of the old trail still in search of *C. atrosquama*. A narrow, mossy, seep spring along the base of a narrow volcanic dike was quickly observed (Figure 3). This seep was dominated by *C. epapillosa* (Figure 4) along with *C. nigricans* and an unusually stout forma of *C. luzulina*. The common moss of springs, *Philonotis fontana*, formed a nearly continuous carpet below the sedges. *Arnica mollis, Ligusticum grayi*, *Mimulus tilingii*, and *Phleum alpinum* were interspersed with the sedges. Tufts of the purple-flowered *Mimulus lewisii* and *Epilobium glaberrimum* ssp. *fastigiatum* lined the edge of the spring. At the base of the spring was *Phyllodoce glanduliflora* and what appeared to be *P. intermedia*. The later is a cross between the white-flowered *P. glanduliflora* and the purple-flowered *P. emptriformis*, which was just upslope of the spring. The flowers on all of these were well faded.

The sedge in question is undoubtedly *Carex epapillosa* rather than *C. atrosquama* (Table 2). The culms are smooth in the upper part of the stem. The leaves are up to 8 mm wide although the ligule is not wider than long as reported for the species. There were five to six spikelets per plant on the specimens examined. The lateral spikelets, however, were only erect to slightly spreading and not at all pendent. The perigynia fit *C. epapillosa* in all respects (Figure 5) being nearly orbicular (3.3-4.0 x 2.7-2.9 mm). The pistillate scales are also consistent with *C. epapillosa*.

Table 2. Conspectus of characters distinguishing *Carex atrosquama* from *C. epapillosa*

	Culms	**Leaves**	**Inflorescence**	**Pistillate scales**	**Perigynia**
C. atrosquama	Rough-angled above	1.5-3.5 mm wide; ligule as long as wide	Spikelets 3-4, lowest lateral spikelets erect, not spreading or pendent	Black, broadly ovate	Narrowly elliptic-obovoid, 3.25 x 1.75 mm, granular-roughened above, inflated
C. epapillosa	Nearly smooth above	3.5-7 mm wide; ligule much wider than long	Spikelets 3-8, lowest spikelets spreading or pendent	Dark red, elliptic-ovate	Oval or oval-orbicular, 3.5-4.5 x 1.75-3.25 mm, strongly flattened

Figure 4. *Carex epapillosa*

Figure 5. Close-up of the perigynia and pistillate scales of *Carex epapillosa.*

The tentatively identified *Carex nardina* is a significant range extension of a Forest Service sensitive species that was neither known nor suspected from the Umpqua National Forest. This is a principally boreal species that extends south in the Rocky Mountains to Nevada, Utah and Colorado. It has been reported in Oregon only from Grant and Wallowa counties in the Blue Mountains. This cespitose species was collected from a crevice in a nearly vertical rock face and on a small, north-facing shelf just below the summit. It has a single androgynous spike with glabrous perigynia with mostly two stigmas (Figures 6-8).

Although the sedges are an extremely large and complex group there are relatively few species with only a solitary spike terminating the culm as is the case with this taxon. Unfortunately there is quite a bit of variability amongst high elevation taxa. *Carex nardina* is the sole North American member of section NARDINAE, which closely resembles sect. FILIFOLIAE and sect. CAPITULIGERAE. David Murray (2002) states that "[m]uch has been written about variation in *Carex nardina* but little has been resolved." Some authors have treated *C. nardina* as a strictly Scandinavian species with North American material referable as *C. hepburnii*.

The population on Mt. Thielsen does not entirely fit the description of *C. nardina* but other similar species are notably less consistent in key characters. A conspectus of characters for *C. nardina* and the three closest species is presented in Table 3. *Carex filifolia* and *C. elynoides* have three stigmas and are generally pubescent on the distal portion of the perigynia. *Carex capitata* should have an ovate perigynia, aphyllopodic leaves, and culms that are red-purple at the base. The Thielsen collection is consistent with *C. nardina* in having two, and occasionally three, stigmas. The perigynia is generally elliptic-shaped and glabrous with a serrulate margin at the base of the beak and along the upper ¼ of the perigynia. The stems are densely clustered with the old leaf bases persistent.

The Thielsen population deviates slightly from the descriptions of *C. nardina* in the narrow width of the perigynia (1-1.3 mm vs. 1.4-2.0 mm). Our population also exhibits a longer beak than is described or illustrated for the species. The pistillate scales are generally consistent with *C. nardina* but are unusual in having a ciliate apex. Among similar species only *C. filifolia* is sometimes reported to have an erose apex. Investigation of other peaks in the Southern Cascade Range for this taxon is warranted to determine if there are additional populations and whether the characters are stable between populations.

Figure 6. *Carex nardina*

Figures 7 and 8. The solitary, androgynous spike of *Carex nardina* is represented in the photograph on the left. Four perigynia are exhibited in the photograph on the right.

Table 3. Conspectus of characters distinguishing *Carex nardina* from similar high-elevation species with a solitary, androgynous spike.

	Leaves	**Culms**	**Perigynia pubescence**	**Perigynia shape**	**Perigynia size (mm)**	**Pistillate Scales**	**Stigmas**
C. nardina	Phyllopodic, densely tufted, old lf bases persistent	Yellow-brown at base	Glabrous, margins of beak distinctly serrulate	Obovate or elliptic	3.0-5.0 x 1.4-2.0	Brown, distal margins broadly hyaline, ovate as wide and as long as or slightly shorter than peri	2 (3)
C. filifolia	Densely tufted, old lf bases persistent	Brown at base	Pubescent to hirsute, at least towards beak	Obovate to orbiculate	1.9-4.8 x 1.3-2.0	Pale red-brown with white or gold margins, broadly obovate, 2.3-4.5 (-6.5) x 1.7-4 mm, shorter or longer than peri, apex obtuse to short-awned	3
C. elynoides	Densely tufted, old lf bases persistent	Brown at base	Glabrous or sparsely hirsute at base of beak	Obovate (or elliptic)	2.5-4.4 x 1.2-2.0	Pale red-brown or golden brown with white or gold margins, broadly obovate, 2-4 (-4.7) x 1.7-3.3 mm excluding awns, apex obtuse or awned	3
C. capitata	Aphyllopodic, not densely tufted	Red-purple at base	Glabrous, smooth or obscurely serrulate near beak	Narrowly or broadly ovate	2.0-4.0 x 1.5-1.8	Ovate, as long as or much shorter than the peri, margins narrowly or broadly hyaline	2

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Appendix 1. List of all vascular plants encountered within the Mt Thielsen Wilderness Area, 8 August 2005**.** H = Helliwell, et al.; Y = York, et al.

	Coll. Num.
Abies magnifica Andr. Murray [*A. magnifica* Andr. Murray var. *shastensis* Lemmon]	
Agrostis humilis Vasey	Y 2892
Allotropa virgata Torrey & Gray ex Gray	
Anemone occidentalis S. Watson	
Arabis lemmonii S. Watson var. *lemmonii*	Y 2872, 2876
Arabis lyallii S. Watson	Y 2866
Arabis platysperma Gray	H 3752
Arctostaphylos nevadensis Gray	
Arenaria pumicola Coville & Leib.	
Arnica mollis Hooker	Y 2874
Carex inops Bailey	H 3749
Carex breweri Boott	H 3754
Carex epapillosa Mackenzie [*C. heteroneura* Boott var. *epapillosa* Mackenzie]	Y 2888
Carex halliana Bailey	
Carex luzulina Olney	Y 2890
Carex nardina Fries	Y 2881
Carex nigracans C.A. Mey.	Y 2891
Carex preslii Steud.	Y 2880
Carex rossii Boott	
Castilleja spp.	
Chimaphila umbellata (L.) W. Bart.	
Claytonia megarhiza (Gray) Parry ex S. Watson	
Cystopteris fragilis (L.) Bernh.	Y2867
Dicentra formosa (Haw.) Walp.	
Draba lonchocarpa Rydb. var. *lonchocarpa* Rydb.	Y 2879
Elymus elymoides (Raf.) Swezey	
Chamerion angustifolium (L.) Holub ssp. *angustifolium* [*Epilobium angustifolium* L.]	
Epilobium clavatum Trel.	Y 2873
Epilobium glaberrimum Barbey ssp. *fastigiatum* (Nutt.) Hoch & Raven	Y 2887
Erigeron acris L. ssp. *debilis* (Gray) Piper	Y 2882
Erigeron compositus Pursh	
Eriogonum marifolium Torrey & Gray	H 3758
Eriogonum pyrolifolium Hooker var. *caryphaeum* Torrey & Gray	Y 2869
Eriogonum umbellatum Torrey var. *hausknechtii* (Dammer) M.E. Jones [*Eriogonum umbellatum* Torrey var. *polyanthum*]	H 3757
Heuchera sp.	
Hieracium albiflorum Hooker	
Holodiscus discolor (Pursh) Maxim.	
Hulsea nana Gray	Y 2870
Monotropa hypopithys L. [*Hypopitys monotropa* Crantz]	
Ipomopsis congesta (Hook.) V. Grant ssp. *montana* (A. Nels. & Kennedy) V. Grant	Y 2871
Juncus mertensianus Bong.	Y 2885
Juncus parryi Engelm.	H 3751
Kelloggia galioides Torrey	Y 2878
Ligusticum grayi Coult. & Rose	H 3762, Y 2868
Lomatium martindalei (Coult. & Rose) Coult. & Rose	
Luetkea pectinata (Pursh) Kuntz	
Luzula hitchcockii Hamet-Ahti	H 3750
Microseris sp.	
Mimulus lewisii Pursh	

Mimulus tilingii Regel	
Minuartia rubella (Wahlenb.) Hiem.	Y 2883
Oxyria digyna (L.) Hill	
Penstemon davidsonii Greene	
Penstemon procerus Dougl. ex Graham var. *brachyanthus* (A. Nels.) Cronq.	
Penstemon rupicola (Piper) T.J. Howell	
Phacelia hastata Dougl. ex Lehm. var. *compacta* (Brand) Cronq.	
Phleum alpinum L.	
Phyllodoce empetriformis (Sm.) D. Don	
Phyllodoce glanduliflora (Hooker) Coville	H 3763, Y 2886
Phyllodoce intermedia (Hooker) Rydb.	
Pinus albicaulis Engelm.	
Pinus contorta Loudon	
Pinus monticola Dougl.	
Poa cusickii Vasey ssp. *epilis* (Scribn.) W.A. Weber	H 3760
Poa secunda Presl ssp. *secunda* Presl	H 3761, Y 2889
Polemonium pulcherrimum Hooker	H 3756, Y 2875
Polygonum newberryi Small	H 3753
Potentilla gladulosa Lindl. ssp. *reflexa* Greene (Keck)	H 3759
Pyrola chlorantha Sw.	
Orthilia secunda (L.) House [*Pyrola secunda* L.]	
Raillardella argentea (Gray) Gray	
Sagina saginoides (L.) Karst.	Y 2893
Saxifraga tolmiei Torrey & Gray	Y 2865
Silene suksdorfii B.L. Robins.	H 3755, Y 2877
Cistanthe umbellata (Torr.) Hershkovitz var. *umbellata* [*Spraguea umbellata* Torrey]	
Achnatherum occidentale (Thurb. ex S. Wats.) Barkworth ssp. *occidentale* [*Stipa occidentalis* Thurb. ex S. Wats.]	
Trisetum spicatum (L.) Richter	
Tsuga mertensiana (Bong.) Carriere	
Vaccinium scoparium Leib. ex Coville	
Veronica wormskjoldii Roemer & J.A. Schultes	Y 2884

Appendix 2. Partial list of bryophytes encountered within the Mt Thielsen Wilderness Area, 8 August 2005.

Mosses
Grimmia sp.
Orthotrichum laevigatum Zett.
Philonotis fontana (Hedw.) Brid. var. *fontana*
Pohlia sp.
Pohlia wahlenbergii (Web. & Mohr) Andrews
Polytrichum sp.
Schistidium rivulare (Brid.) Podp. var. *rivulare* [*Schistidium alpicola* (Hedw.) Limpr.]
Liverworts
Aspiromitus punctatus L.
Marchantia polymorpha L.