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Bryophytes and lichens from Malheur National Forest, Blue Mountains of eastern Oregon

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Abstract. We present a collections-based checklist for bryophyte and lichen species known or expected to occur within the boundaries of Malheur National Forest, an administrative unit spanning several climatic zones and vegetation types in the semi-arid Blue Mountains of eastern Oregon. A synthesis of survey, literature and herbarium records yielded 2 hornwort species, 51 liverworts, 219 mosses and 276 lichens. Notable bryophytes included: *Anoetangium aestivum*, *Bruchia bolanderi*, *Bryum calobryoides*, *Calliergonella lindbergii*, *Racomitrium depressum*, *Fontinalis hypnoides*, *Preissia quadrata* and *Schistidium cinclidodonteum*. Notable lichens included: *Lecanora pringlei*, *Peccania arizonica*, *Placidiopsis cinerascens*, *Schaereria dolodes* and 6 calicioid lichens. We also provide conservation notes and conclude with a brief synopsis of collecting history in the region.

Keywords. Biotic soil crusts, Blue Mountains ecoregion, Columbia River Basin, natural resource management, semi-arid shrub steppe.

INTRODUCTION

The Blue Mountains region of eastern Oregon exhibits a wealth of bryophyte and lichen species, due in part to a variety of available substrates, landcover types and climatic conditions. Distance from population centers has historically resulted in under-appreciation of diversity in the region. Progress in the Blue Mountains was also constrained by assumptions of a uniformly dry climate (which is not strictly true) and by presumptions that a rich non-vascular flora should require abundant or constant moisture (also not true) (Proctor et al. 2007). Without baseline biodiversity information and with a shortage of taxonomic experts, it was challenging for natural resource managers in eastern Oregon to effectively inventory bryophytes and lichens, and to manage their habitats.

Parts of Oregon located east of the Cascade Mountain range have received some attention from professional lichenologists (e.g., Ponzetti and McCune 2001; Miller et al. 2011; Root et al. 2011) and to a lesser degree bryologists (Duvall 1938; Hardman and McCune 2010), but many localities remain incompletely surveyed. Our goal was to address these sampling deficiencies through an extensive survey of bryophyte and lichen vegetation on the Malheur National Forest, an administrative unit of the USDA Forest Service's Pacific Northwest Region (Region 6). Our surveys, coupled with comprehensive searches of the literature and of herbaria, will provide a basis for future research on regional bryophyte and lichen floristics, while allowing managers to fulfill inventory and conservation goals.

METHODS

Study area

The Malheur National Forest ("MNF", hereafter) is located in the southern Blue Mountains of eastern Oregon (Fig. 1), primarily in Grant and Harney Counties, with an approximate geographical center near the town of Seneca (44.418°, -118.955°). It occupies over 691,600 hectares of National Forest System lands, including over 97,000 hectares of the Ochoco National Forest that

are administered by MNF managers. The MNF is situated about 200 km east of the Cascade Mountains, which are a major north–south geographical barrier that intercepts a large fraction of the prevailing southwesterly precipitation. Precipitation in the nearby town of John Day averages 340 mm annually, mostly falling as winter snow (data for 1950–2013 from Western Regional Climate Center; <http://www.wrcc.dri.edu/>). The area features a variety of landcover types including open rangelands and lithosolic scablands dominated by sagebrush (*Artemisia tridentata*, *A. rigida*) and native bunchgrasses (e.g., *Pseudoregneria spicata*, *Festuca idahoensis*, *Leymus cinereus*, *Poa secunda*). Such areas can be good habitat for biotic soil crust organisms when left relatively undisturbed (Root and McCune 2012a). Woodlands and forests in the area are dominated by *Abies lasiocarpa*, *Pinus albicaulis*, *Abies grandis*, *Larix occidentalis*, *Picea engelmannii*, *Pinus monticola*, *Pinus contorta*, *Pinus ponderosa*, *Juniperus occidentalis* and *Cercocarpus ledifolius* (in rough order of decreasing elevation). Local topography features basalt rimrock canyons (min. elev. ~550 m), wetlands and riparian areas, and four named mountain ranges including the previously glaciated Strawberry Mountains (max. elev. 2756 m). Riparian areas and wetlands are of particular interest for bryophytes and lichens because of greater moisture availability and the presence of locally uncommon substrates like hardwood trees and downed woody debris. Fens and spring habitats are regionally rare but are important because of well-developed humic layers and minerotrophic hydrology (i.e., ground-water fed).

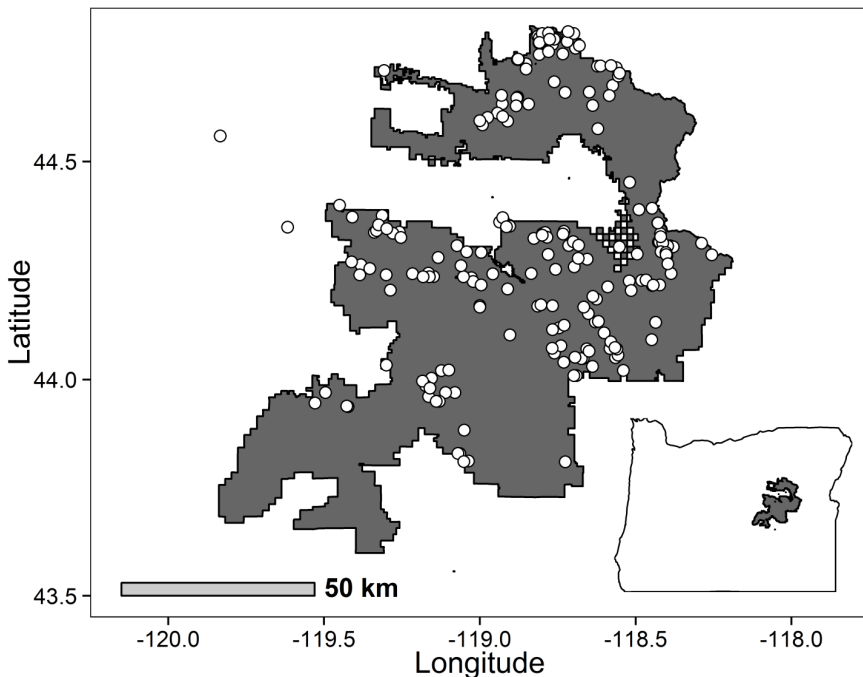


Figure 1. Map of study area (Malheur National Forest, dark polygon) and bryophyte/ lichen survey sites (white circles), including guided-intuitive and incidental searches.

Ecological patterns in the area have been subject to human-induced changes. A few areas have been heavily invaded by non-native, annual grasses (e.g., *Bromus tectorum*, *Ventenata dubia*, *Taeniatherum caput-medusae*), especially where intense fires or grazing pressures have disrupted historical disturbance patterns (Kerns et al. 2011). Fire suppression in the 20th century has also altered historical wildfire regimes (Heyerdahl et al. 2001), though recent management has become increasingly focused on the reduction of flammable fuels in the course of the USDA’s Collaborative Forest Landscape Restoration Program.

Field methods

We conducted guided-intuitive and incidental surveys for all bryophyte and lichen species encountered on MNF lands over a four year period (2010-2013), although management directives placed an emphasis on detecting rare species or species of conservation concern. These included surveys by USFS employees and contractors. Voucher specimens were deposited at OSC, the herbarium of MNF and the personal herbaria of individual collectors (see Results and Discussion).

Literature search

We conducted comprehensive searches of herbarium records and compiled reports from published and unpublished literature. For the herbarium searches, we first queried three web portals: the Consortium of North American Bryophyte Herbaria (CNABH; <http://bryophyteportal.org/portal>), the Consortium of North American Lichen Herbaria (CNALH; <http://lichenportal.org/portal>) and the Consortium of Pacific Northwest Herbaria (CPNWH; <http://www.pnwherbaria.org>) using combinations of “Grant County”, “Harney County” and “Oregon” as search strings, or else a bounding box whose coordinates enclosed Grant County. To capture records that had adequate locality descriptions but lacked geographic coordinates, we also filtered searches by names of collectors known to have collected in the vicinity. All records were manually inspected and verified to have occurred within or immediately adjacent to the boundaries of MNF. We compiled the survey, herbarium and literature reports into a list of all bryophyte and lichen taxa known to occur within MNF. Additionally, we include in a separate section those taxa which have been documented in the Blue Mountains region but have not yet been recorded in proximity to MNF. All reports were based on expert assessment of real material, though not all had an associated voucher specimen or collection number. Accepted names, authors and families followed the North American Lichen Checklist Version 19 (Esslinger 2014) for lichens and Missouri Botanical Garden’s Tropicos (<http://www.tropicos.org>) for bryophytes. We also assigned conservation status based on NatureServe Explorer (<http://explorer.natureserve.org>) and the Oregon Biodiversity Information Center (<http://orbic.pdx.edu>). All websites were accessed on 1 May 2014.

RESULTS AND DISCUSSION

We include the checklist as an Appendix below. Most taxa were documented by the authors during surveys in 2010-2013 (those in the checklist annotated *Smith* or *Rausch*); by other Forest Service workers (*Dewey*, *Yates*); or from contract work in 2010, 2011 and 2013 (*Stone*, *Hardman*, *Kofranek* and *Weiss*). Additional taxa were sourced from herbarium databases including CNALH reports (*Anderegg*, *Rosentreter*, *Ryan*, *Sharnoff*, *Tucker*), CNABH reports (*Lyford*, *Norris*, *Peck*, *Schofield*, *Weber*), CPNWH reports (*Wagner*), previous MNF herbarium vouchers (*Barker*), or from personal herbarium records (*McCune*). Although few intensive surveys have specifically targeted MNF or Grant and Harney Counties, several bryologists and lichenologists have historically been active in the region (Table 1). Collectively, this synopsis suggests that the Blue Mountains region of eastern Oregon has a far richer bryophyte and lichen flora than previously recognized.

Among this flora, we uncovered several rare taxa and taxa of management interest. These include the second Oregon report of the moss *Anoetangium aestivum*, as well as uncommon bryophytes like *Bruchia bolanderi*, *Bryum calobryoides*, *Calliargonella lindbergii*, *Racomitrium depressum*, *Fontinalis hypnoides*, *Preissia quadrata* and *Schistidium cinclidodonteum*. Rare or uncommon lichens included *Lecanora pringlei*, *Peccania arizonica*, *Placidiopsis cinerascens* and *Schaereria dolodes*. Although *Schaereria dolodes* has a conservation status of G4S1, it is relatively well distributed throughout the western United States (Schmull and Spribille 2005).

Other uncommon species included six calicioid lichens (“pin lichens”): *Calicium adequatum* (G3G4), *Calicium viride*, *Chaenotheca furfuracea* (G4G5), *Chaenothecopsis debilis*, a *Mycocalicium* species, and *Stenocybe pullatula*. High species richness of calicioid lichens elsewhere (i.e., west of the Cascades crest) may simply be evidence of sampling bias. Projections of undetected

Table 1. Synopsis of bryophyte and lichen collection history in the vicinity of Malheur National Forest, eastern Oregon. References include published and unpublished literature, while unpublished collectors were sourced from CNABH, CNALH and CPNWH.

<i>References</i>	<i>Target locality</i>	<i>Bryophytes</i>	<i>Lichens</i>
Clark & Rakestraw (1938)	Wallowa Mountains, Wallowa Co., OR	X	
DeBolt (2008)	Birch Creek, Malheur Co., OR	X	X
Dewey (2008)	Ochoco National Forest, Crook Co., OR	X	X
Dewey (2009)	Malheur National Forest, Grant Co., OR	X	X
Duvall (1938)	Wallowa Mountains, Wallowa Co., OR	X	
Hardman & McCune (2010)	Starkey Experimental Forest, OR	X	X
Link et al. (2000)	Hanford Reach Nat'l Monument, WA	X	X
Mayfield & Kjelson (1984)	Boardman RNA, Morrow Co., OR	X	X
McCune (1994)	Columbia River Basin, OR and WA		X
McCune et al. (2007)	Wallowa Mountains, Wallowa Co., OR		X
McCune & Rosentreter (2007)	Columbia River Basin, OR and WA		X
McIntosh (2003)	Hanford Reach Nat'l Monument, WA	X	X
Miller et al. (2011)	Lawrence Grassland, Wasco Co., OR		X
Pickett and Jones (1928)	Southeast WA and adjacent ID	X	
Ponzetti and McCune (2001)	Central OR, west of MNF	X	X
Root and McCune (2012a)	Central OR, west of MNF		X
Root and McCune (2012b)	Central OR, west of MNF		X
Root et al. (2011)	Central OR, west of MNF		X
Rosentreter (1995)	Columbia River Basin, OR and WA		X
Weiss (2014)	Malheur National Forest, Grant Co., OR	X	
Wood and Yates (2007)	Baker and Wallowa Counties, OR	X	X
<i>Unpublished collectors, year</i>	<i>Target locality</i>	<i>Bryophytes</i>	<i>Lichens</i>
D.E. Anderegg, 1972	Malheur National Forest, Grant Co., OR		X
J. Barker, 1998	Malheur National Forest, Grant Co., OR		X
J.H. Lyford, 1979	Umatilla National Forest, Grant Co., OR	X	
D.H. Norris & J. Peck, 1992, 1993	Crook and Grant Counties, OR	X	
B. McCune, 2011	Grant, Crook and Harney Counties, OR		X
J.H. Rausch, 2009, 2013	Malheur National Forest, Grant Co., OR	X	X
S. Riley, 2002	Malheur National Forest, Grant Co., OR		X
R. Rosentreter, 1977, 1990	Grant County, OR		X
B.D. Ryan, 1985	Grant County, OR		X
J. Shevock, 2008	Crook County, OR	X	
R.J. Smith, 2010-2013	Malheur National Forest, Grant Co., OR	X	X
W. Schofield, 1979	Malheur National Forest, Grant Co., OR	X	
W. Schofield, 2000	Umatilla National Forest, Grant Co., OR	X	
S. Sharnoff, 1990	Malheur National Forest, Grant Co., OR		X
D. Stone et al., 2010-2013	Malheur National Forest, Grant Co., OR	X	X
S.C. Tucker, 1975	Malheur National Forest, Grant Co., OR		X
W.A. Weber, 1945	Malheur National Forest, Grant Co., OR	X	
D.H. Wagner, 1978	Malheur National Forest, Grant Co., OR	X	
G. Yates, 2000	Malheur National Forest, Grant Co., OR	X	

pin lichen diversity on substrates east of the Cascades (Fig. 15 in Rikkinen 2003) highlight the need for increased sampling in the Blue Mountains region.

In conclusion, we integrated collection and literature reports to compile a checklist of bryophyte and lichen taxa, which will facilitate future studies of non-vascular vegetation in the Blue Mountains ecoregion. Pairing historical and contemporary reports promises much in the way of future discoveries for bryophytes and lichens in eastern Oregon.

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APPENDIX

Species and authorities in the checklist are followed by taxonomic family, voucher collection number (if available) and conservation status (if applicable, bold font), where "G" prefix denotes global conservation rank, "S" denotes Oregon state rank. While every attempt was made to collect or locate vouchers for every species, many were included based on reliable expert reports in the absence of a voucher, and so lack a voucher collection number in the checklist below. Taxa that are presently excluded but expected are listed at the end of the main checklist.

BRYOPHYTES (272 species)

PHYLUM ANTHOCEROTOPHYTA (2 hornwort species)

Anthoceros fusiformis Austin—Anthocerotaceae—*Smith 1163*—**G2G4**

Phaeoceros carolinianus (Michx.) Prosk.—Anthocerotaceae—*Smith 1324*

PHYLUM MARCHANTIOPHYTA (51 liverwort species)

Aneura pinguis (L.) Dumort.—Aneuraceae

Athalamia hyalina (Sommerf.) S. Hatt.—Cleveaceae—*Smith 1612*

Barbilophozia hatcheri (A. Evans) Loeske—Anastrophyllaceae—*Smith 1649*

- Blasia pusilla* L.—Blasiaceae—Smith 1615
Blepharostoma trichophyllum (L.) Dumort.—Pseudolepicoleaceae—Smith 888
Calypogeia fissa (L.) Raddi—Calypogeiaceae—Smith 869
Calypogeia integristipula Stephani—Calypogeiaceae—Wagner 2162, 2156
Calypogeia muelleriana (Schiffner) K. Müller—Calypogeiaceae—Smith 1098
Cephalozia connivens (Dicks.) Lindb.—Cephaloziaceae—Lyford 2398
Cephalozia lunulifolia (Dumort.) Dumort.—Cephaloziaceae—Smith 1300—G5
Cephalozia pleniceps (Austin) Lindb.—Cephaloziaceae—Smith 1139
Cephaloziella divaricata (Sm.) Warnst.—Cephaloziellaceae—Smith 1352
Cephaloziella hampeana (Nees) Schiffner ex Loeske—Cephaloziellaceae—Stone 8466.1—G5
Chiloscyphus coadunatus (Sw.) R.M. Schust. & J.J. Engel—Lophocoleaceae—Stone s.n.
Chiloscyphus pallescens (Ehrh. ex Hoffm.) Dumort.—Lophocoleaceae—Smith 1393
Chiloscyphus polyanthos (L.) Corda—Lophocoleaceae—Smith 849
Chiloscyphus profundus (Nees) J.J. Engel & R.M. Schust.—Lophocoleaceae—Stone s.n.
Conocephalum conicum (L.) Underw.—Conocephalaceae—Smith 892; Wagner 2177
Fossombronina longiseta Austin—Fossombroniaceae—Smith 840
Geocalyx graveolens (Schrad.) Nees—Geocalycaceae—Stone s.n.
Jungermannia atrovirens Dumort.—Jungermanniaceae—Smith 552
Jungermannia leiantha Grolle—Jungermanniaceae—Smith 1084; Wagner 2142
Lepidozia reptans (L.) Dumort.—Lepidoziaceae—Smith 1376
Lophocolea bidentata (L.) Dumort.—Lophocoleaceae—Smith 1146
Lophocolea heterophylla (Schrad.) Dumort.—Lophocoleaceae—Smith 865
Lophozia ascendens (Warnst.) R.M. Schust.—Jungermanniaceae—Smith 1356; Kofranek 6600
Lophozia heterocolpos (Thed.) M. Howe—Jungermanniaceae—Wagner 2173, 2175
Lophozia incisa (Schrad.) Dumort.—Jungermanniaceae—Smith 1316
Lophozia longiflora (Nees) Schiffner—Jungermanniaceae—Stone s.n.
Lophozia ventricosa (Dicks.) Dumort.—Jungermanniaceae—Smith 1133
Marchantia polymorpha L.—Marchantiaceae
Pellia endiviifolia (Dicks.) Dumort.—Pelliaceae—Smith 884
Pellia neesiana (Gottsche) Limpr.—Pelliaceae—Smith 887
Plagiochila porelloides (Torr. ex Nees) Lindenb.—Plagiochilaceae—Smith 1322
Porella cordaeana (Huebener) Moore—Porellaceae—Smith 1323
Preissia quadrata (Scop.) Nees—Marchantiaceae—Smith 1007—G5S2
Radula complanata (L.) Dumort.—Radulaceae—Smith 1377
Reboulia hemisphaerica (L.) Raddi—Aytoniaceae—Schofield-Lyford 73876
Riccardia latifrons (Lindb.) Lindb.—Aneuraceae—Smith 1210
Riccardia multifida (L.) Gray—Aneuraceae—Wagner 2154
Riccia beyrichiana Hampe ex Lehm.—Ricciaceae—Smith 847
Riccia cavernosa Hoffm.—Ricciaceae—Smith 906
Riccia glauca L.—Ricciaceae—Smith 740
Riccia sorocarpa Bisch.—Ricciaceae—Smith 792
Scapania bolanderi Austin—Scapaniaceae—Stone s.n.
Scapania irrigua (Nees) Nees—Scapaniaceae—Smith 797
Scapania scandica (Arnell & H. Buch) Macvicar—Scapaniaceae—Smith 896
Scapania umbrosa (Schrad.) Dumort.—Scapaniaceae—Smith 1143—G4G5
Scapania undulata (L.) Dumort.—Scapaniaceae—Smith 1342
Targionia hypophylla L.—Targioniaceae—Smith 1613
Tritomaria exsecta (Schmidel ex Schrad.) Schiffner ex Loeske—Jungermanniaceae—Stone s.n.

PHYLUM BRYOPHYTA (219 moss species)

Amblystegium juratzkanum Schimp.—Amblystegiaceae

- Amblystegium polygamum* Schimp.—Amblystegiaceae
Amblystegium serpens (Hedw.) Schimp.—Amblystegiaceae—Smith 1262
Amphidium californicum (Hampe ex Müll. Hal.) Broth.—Orthotrichaceae
Andreea rupestris Hedw.—Andreeaceae—Smith 1617
Anoetangium aestivum (Hedw.) Mitt.—Pottiaceae—Kofranek 6116—**G3G5S1**
Antitrichia californica Sull. ex Lesq.—Leucodontaceae—Smith 1333
Atrichum selwynii Austin—Polytrichaceae—Smith 1099—**G4**
Aulacomnium androgynum (Hedw.) Schwägr.—Aulacomniaceae—Smith 421
Aulacomnium palustre (Hedw.) Schwägr.—Aulacomniaceae—Smith 1138
Barbula convoluta Hedw.—Pottiaceae—Smith 631
Bartramia ithyphylla Brid.—Bartramiaceae—Smith 1301
Blindia acuta (Hedw.) Bruch & Schimp.—Seligeriaceae—Smith 1082
Brachytheciastrum collinum (Schleich. ex Müll.) Ignatov & Huttunen—Brachytheciaceae—Smith 789
Brachytheciastrum leibergii (Grout) Ignatov & Huttunen—Brachytheciaceae—Smith 478, 1106
Brachythecium albicans (Hedw.) Schimp.—Brachytheciaceae—Smith 827
Brachythecium asperrimum (Mitt. ex Müll. Hal.) Sull.—Brachytheciaceae—Smith 520
Brachythecium erythrorrhizon Schimp.—Brachytheciaceae
Brachythecium frigidum (Müll. Hal.) Besch.—Brachytheciaceae—Smith 433
Brachythecium hylotapetum B.L. Higinb. & N.L. Higinb.—Brachytheciaceae—Stone s.n.
Brachythecium rivulare Schimp.—Brachytheciaceae—Stone s.n.
Brachythecium salebrosum (Hoffm. ex F. Weber & D. Mohr) Schimp.—Brachytheciaceae—Smith 1107
Brachythecium velutinum (Hedw.) Schimp.—Brachytheciaceae—Stone s.n.
Bruchia bolanderi Lesq.—Bruchiaceae—Smith 1053—**G3S2**
Bryoerythrophyllum recurvirostrum (Hedw.) P.C. Chen—Pottiaceae—Smith 909
Bryum argenteum Hedw.—Bryaceae—Smith 1505
Bryum calobryoides J.R. Spence—Bryaceae—Smith 1095, 1216—**G3S2**
Buxbaumia aphylla Hedw.—Buxbaumiaceae—Kofranek 5417, 5481—**G4G5S3**
Buxbaumia viridis (DC.) Moug. & Nestl.—Buxbaumiaceae—Smith 1164; Wagner 2143—**G4G5**
Calliergonella cuspidata (Hedw.) Loeske—Hypnaceae—Smith 1232
Calliergonella lindbergii (Mitt.) Hedenäs—Hypnaceae—Smith 1209
Campyliadelphus stellatus (Hedw.) Kanda—Amblystegiaceae—Smith 1074—**G5SNR**
Campylium chrysophyllum (Brid.) Lange—Amblystegiaceae
Ceratodon conicus (Hampe) Lindb.—Ditrichaceae—Stone s.n.
Ceratodon purpureus (Hedw.) Brid.—Ditrichaceae—Smith 1371
Claopodium bolanderi Best—Thuidiaceae—Smith 1055
Claopodium crispifolium (Hook.) Renauld & Cardot—Thuidiaceae—Smith 1359
Conardia compacta (Müll. Hal.) H. Rob.—Amblystegiaceae
Coscinodon calyptratus (Drumm.) C.E.O. Jensen—Grimmiaceae
Cratoneuron filicinum (Hedw.) Spruce—Amblystegiaceae—Smith 398
Dichodontium pellucidum (Hedw.) Schimp.—Dicranaceae—Smith 1339
Dicranella heteromalla (Hedw.) Schimp.—Dicranaceae
Dicranoweisia cirrata (Hedw.) Lindb.—Dicranaceae—Smith 500
Dicranoweisia crispula (Hedw.) Milde—Dicranaceae—Smith 748
Dicranum fuscescens Turner—Dicranaceae
Dicranum howellii Hedw.—Dicranaceae—Smith 591
Dicranum pallidisetum (J.W. Bailey) Ireland—Dicranaceae—Stone s.n.
Dicranum tauricum Sapjegin—Dicranaceae—Smith 467
Didymodon australasiae (Hook. & Grev.) R.H. Zander—Pottiaceae—Smith 1516
Didymodon brachyphyllus (Sull.) R.H. Zander—Pottiaceae

- Didymodon fallax* (Hedw.) R.H. Zander—Pottiaceae
Didymodon rigidulus Hedw.—Pottiaceae—Smith 784
Didymodon vinealis (Brid.) R.H. Zander—Pottiaceae—Smith 1215
Distichium capillaceum (Hedw.) Bruch & Schimp.—Ditrichaceae—Smith 1001, 1429
Ditrichum montanum Leiberg—Ditrichaceae
Ditrichum pusillum (Hedw.) Hampe—Ditrichaceae—Smith 1173
Drepanocladus aduncus (Hedw.) Warnst.—Amblystegiaceae—Smith 844
Drepanocladus capillifolius (Warnst.) Warnst.—Amblystegiaceae
Drepanocladus longifolius (Wilson ex Mitt.) Broth. ex Paris—Amblystegiaceae
Drepanocladus polygamus (Schimp.) Hedenäs—Amblystegiaceae—Smith 1097
Dryptodon patens (Dicks. ex Hedw.) Brid.—Grimmiaceae
Encalypta ciliata Hedw.—Encalyptaceae
Encalypta rhapsocarpa Schwägr.—Encalyptaceae—Smith 1127
Encalypta vulgaris Hedw.—Encalyptaceae—Smith 1238
Epipterygium tozeri (Grev.) Lindb.—Bryaceae
Eurhynchiastrum pulchellum (Hedw.) Ignatov & Huttunen—Brachytheciaceae—Smith 1398
Fissidens bryoides Hedw.—Fissidentaceae—Smith 1116
Fissidens sublimbatus Grout—Fissidentaceae—Smith 783
Fissidens ventricosus Lesq.—Fissidentaceae
Fontinalis antipyretica Hedw.—Fontinalaceae
Fontinalis hypnoides Hartm.—Fontinalaceae—Smith 549
Fontinalis neomexicana Sull. & Lesq.—Fontinalaceae—Smith 1616
Funaria hygrometrica Hedw.—Funariaceae—Smith 462
Gemmabryum caespiticium (Hedw.) J.R. Spence—Bryaceae—Smith 1507
Gemmabryum violaceum (A.C. Crundwell & Nyholm) J.R. Spence—Bryaceae—Smith 1607
Grimmia affinis Hornsch.—Grimmiaceae
Grimmia alpestris (F. Weber & D. Mohr) Schleich.—Grimmiaceae—Smith 804
Grimmia caespiticia (Brid.) Jur.—Grimmiaceae
Grimmia hamulosa Lesq.—Grimmiaceae—Stone s.n.
Grimmia montana Bruch & Schimp.—Grimmiaceae
Grimmia ovalis (Hedw.) Lindb.—Grimmiaceae
Grimmia pulvinata (Hedw.) Sm.—Grimmiaceae
Grimmia ramondii (Lam. & DC.) Margad.—Grimmiaceae—Smith 786
Grimmia torquata Drumm.—Grimmiaceae
Hamatocaulis vernicosus (Mitt.) Hedenäs—Amblystegiaceae—Smith 907
Helodium blandowii (F. Weber & D. Mohr) Warnst.—Thuidiaceae—Smith 1315—G5S3
Herzogiella striatella (Brid.) Z. Iwats.—Hypnaceae—Smith 1113
Homalothecium aeneum (Mitt.) E. Lawton—Brachytheciaceae
Homalothecium nevadense (Lesq.) Renauld & Cardot—Brachytheciaceae—Smith 1366
Hygroamblystegium tenax (Hedw.) Jenn.—Amblystegiaceae
Hygroamblystegium varium (Hedw.) Mönk.—Amblystegiaceae—Smith 1334
Hygrohypnum bestii (Renauld & Bryhn) Holz.—Amblystegiaceae—Smith 628
Hygrohypnum cochlearifolium (Venturi) Broth.—Amblystegiaceae—Weiss 20133
Hygrohypnum luridum (Hedw.) Jenn.—Amblystegiaceae—Smith 1161
Hygrohypnum ochraceum (Turner ex Wilson) Loeske—Amblystegiaceae—Smith 1058
Hylocomium splendens (Hedw.) Schimp.—Hylocomiaceae—Smith 1365
Hypnum dieckei Renauld & Cardot—Hypnaceae—Smith 828
Hypnum pratense Koch ex Spruce—Hypnaceae—W.A. Weber 3109
Hypnum revolutum (Mitt.) Lindb.—Hypnaceae—Smith 1112
Imbribryum miniatum (Lesq.) J.R. Spence—Bryaceae—Smith 1239
Imbribryum muehlenbeckii (Bruch & Schimp.) N. Pedersen—Bryaceae—Smith 846

- Isopterygiopsis pulchella* (Hedw.) Z. Iwats.—Plagiotheciaceae—Smith 630
Isothecium myosuroides Brid.—Brachytheciaceae—Smith 1364
Isothecium spiculiferum (Mitt.) Macoun & Kindb.—Brachytheciaceae—Smith 1104
Kindbergia oregana (Sull.) Ochyra—Brachytheciaceae—Smith 1111
Kindbergia praelonga (Hedw.) Ochyra—Brachytheciaceae—Smith 1302
Leptobryum pyriforme (Hedw.) Wilson—Bryaceae—Smith 561
Leptodictyum humile (P. Beauv.) Ochyra—Amblystegiaceae—W.A. Weber 3120, 3124
Leptodictyum riparium (Hedw.) Warnst.—Amblystegiaceae—Smith 576
Leskea polycarpa Hedw.—Leskeaceae
Leucolepis acanthoneura (Schwägr.) S.O. Lindberg—Mniaceae—Smith 1370
Meesia triquetra (L. ex Jolycl.) Ångström—Meesiaceae—Smith 1062
Meesia uliginosa Hedw.—Meesiaceae—Smith 1335—**G4S3**
Meiotrichum lyallii (Mitt.) G.L. Merr.—Polytrichaceae—Schofield-Lyford 73884
Metaneckera menziesii (Drumm.) Steere—Neckeraceae—Smith 1368
Mnium ambiguum H. Müll.—Mniaceae—Smith 871
Mnium blyttii Bruch & Schimp.—Mniaceae—Dewey s.n.—**G5S1**
Mnium marginatum (Dicks. ex With.) P. Beauv.—Mniaceae—Smith 1259
Mnium spinulosum Bruch & Schimp.—Mniaceae—Smith 1399
Oncophorus virens (Hedw.) Brid.—Dicranaceae
Orthotrichum affine Schrad. ex Brid.—Orthotrichaceae—Smith 579
Orthotrichum alpestre Hornsch. ex B.S.G.—Orthotrichaceae
Orthotrichum cupulatum Hoffm. ex Brid.—Orthotrichaceae
Orthotrichum euryphyllum Venturi—Orthotrichaceae—Weiss 20127; Weiss 20130—**G3S1**
Orthotrichum holzingeri Renauld & Cardot—Orthotrichaceae—Weiss 20124, 20129; Smith 757, 1331—**G3S1**
Orthotrichum laevigatum J.E. Zetterst.—Orthotrichaceae—Smith 494
Orthotrichum macounii Austin—Orthotrichaceae
Orthotrichum pallens Bruch ex Brid.—Orthotrichaceae—Weiss 20139—**G5**
Orthotrichum pallens var. *johnseniae* Vitt—Orthotrichaceae—Weiss 20131
Orthotrichum rupestre Schleich. ex Schwägr.—Orthotrichaceae—Smith 471
Orthotrichum speciosum Nees—Orthotrichaceae
Palustriella falcata (Brid.) Hedenäs—Amblystegiaceae—Smith 1075
Philonotis americana Dism.—Bartramiaceae—Norris 81200
Philonotis capillaris Lindb.—Bartramiaceae—Stone s.n.
Philonotis fontana (Hedw.) Brid.—Bartramiaceae—Smith 900
Physcomitrium pyriforme (Hedw.) Hampe—Funariaceae—Smith 426
Plagiomnium ellipticum (Brid.) T.J. Kop.—Mniaceae—Smith 442
Plagiomnium medium (Bruch & Schimp.) T.J. Kop.—Mniaceae—Smith 1102
Plagiothecium denticulatum (Hedw.) Schimp.—Plagiotheciaceae—Smith 1362
Plagiothecium laetum Schimp.—Plagiotheciaceae
Platydictya jungermannioides (Brid.) H.A. Crum—Amblystegiaceae—Smith 533
Pleurozium schreberi (Willd. ex Brid.) Mitt.—Hylocomiaceae—Smith 1401
Pohlia cruda (Hedw.) S.O. Lindberg—Bryaceae—Smith 423
Pohlia nutans (Hedw.) S.O. Lindberg—Bryaceae—Smith 1094
Pohlia prolifera (Kindb.) S.O. Lindberg ex Arnell—Bryaceae
Pohlia wahlenbergii (F. Weber & D. Mohr) A.L. Andrews—Bryaceae—Smith 524
Polytrichastrum alpinum (Hedw.) G.L. Sm.—Polytrichaceae—Smith 1337
Polytrichum commune Hedw.—Polytrichaceae—Smith 400
Polytrichum juniperinum Hedw.—Polytrichaceae—Smith 582
Polytrichum piliferum Hedw.—Polytrichaceae—Smith 1655
Polytrichum strictum Menzies ex Brid.—Polytrichaceae—Stone s.n.—**G4S1**

- Porothamnium bigelovii* (Sull.) M. Fleisch.—Neckeraceae—Smith 1369
Pseudoleskea incurvata (Hedw.) Loeske—Leskeaceae—Smith 751
Pseudoleskea patens (Lindb.) Kindb.—Leskeaceae—Smith 894
Pseudoleskea radicata (Mitt.) Macoun & Kindb.—Leskeaceae—Smith 755
Pseudoleskea saviana (De Not.) Latzel—Leskeaceae—Smith 1131
Pseudoleskea stenophylla Renauld & Cardot—Leskeaceae
Pseudoleskeella tectorum (A. Braun ex Brid.) Broth.—Leskeaceae—Weiss 20096, 20097—**G5S2**
Pterigynandrum filiforme Hedw.—Pterigynandraceae—Smith 1396
Ptychostomum amblyodon (Müll. Hal.) C. Y. Wang & J.-C. Zhao—Bryaceae—Schofield-Lyford 73949—**G5**
Ptychostomum creberrimum (Taylor) J.R. Spence & H.P. Ramsay—Bryaceae
Ptychostomum pallescens (Schleich. ex Schwägr.) J.R. Spence—Bryaceae—Smith 574
Ptychostomum pseudotriquetrum (Hedw.) J.R. Spence & H.P. Ramsay ex Holyoak & N. Pedersen—Bryaceae—Smith 407
Ptychostomum weigeli (Spreng.) J.R. Spence—Bryaceae—Smith 548
Racomitrium affine (Schleich. ex F. Weber & D. Mohr) Lindb.—Grimmiaceae—Smith 1123
Racomitrium brevipes Kindb.—Grimmiaceae—Schofield-Lyford 74027—**S3**
Racomitrium depressum Lesq.—Grimmiaceae—Smith 1218—**G2S1**
Racomitrium elongatum Ehrh. ex Frisvoll—Grimmiaceae—Smith 1358
Racomitrium heterostichum (Hedw.) Brid.—Grimmiaceae—Smith 811
Racomitrium obesum Frisvoll—Grimmiaceae—Stone s.n.
Racomitrium occidentale (Renauld & Cardot) Renauld & Cardot—Grimmiaceae—Lyford 2464
Rhizomnium glabrescens (Kindb.) T.J. Kop.—Mniaceae—Smith 525
Rhizomnium magnifolium (Horik.) T.J. Kop.—Mniaceae—Smith 898
Rhizomnium pseudopunctatum (Bruch & Schimp.) T.J. Kop.—Mniaceae—Smith 824
Rhytidiadelphus triquetrus (Hedw.) Warnst.—Hylocomiaceae—Smith 1114
Rhytidiopsis robusta (Hook.) Broth.—Hylocomiaceae—Smith 903
Roellia roellii (Broth.) A.L. Andrews ex H.A. Crum—Bryaceae—Smith 583
Rosulabryum capillare (Hedw.) J.R. Spence—Bryaceae—Smith 1625
Sanionia uncinata (Hedw.) Loeske—Amblystegiaceae—Smith 553
Schistidium agassizii Sull. & Lesq.—Grimmiaceae
Schistidium apocarpum (Hedw.) Bruch & Schimp.—Grimmiaceae—Smith 1498
Schistidium atrichum (Müll. Hal. & Kindb.) W.A. Weber—Grimmiaceae
Schistidium cinclidodonteum (Müll. Hal.) B. Bremer—Grimmiaceae—Stone 8393.1; Weiss 20128; Kofranek 6105A—**G2G3S2**
Schistidium dupretii (Thér.) W.A. Weber—Grimmiaceae
Schistidium flaccidum (De Not.) Ochyra—Grimmiaceae—Hardman 6001
Schistidium frigidum H.H. Blom—Grimmiaceae
Schistidium heterophyllum (Kindb.) T.T. McIntosh—Grimmiaceae—Hardman 6002, 6003; Kofranek 6119; Stone 8417.29—**G3G4S3**
Schistidium occidentale (E. Lawton) S.P. Churchill—Grimmiaceae—Smith 1063
Schistidium rivulare (Brid.) Podp.—Grimmiaceae—Smith 1219
Schistidium strictum (Turner) Loeske ex Martensson—Grimmiaceae
Schistidium tenerum (J.E. Zetterst.) Nyholm—Grimmiaceae—Weiss 20140; Kofranek 5461, 6154—**G5S2**
Scleropodium cespitans (Müll. Hal.) L.F. Koch—Brachytheciaceae
Scleropodium obtusifolium (Mitt.) Kindb.—Brachytheciaceae—Smith 1264
Scleropodium touretii (Brid.) L.F. Koch—Brachytheciaceae—Smith 769
Scouleria aquatica Hook.—Grimmiaceae—Smith 1292
Sphagnum capillifolium (Ehrh.) Hedw.—Sphagnaceae—Hardman s.n.
Sphagnum subnitens Russow & Warnst.—Sphagnaceae—Smith 895

- Sphagnum teres* (Schimp.) Ångström—Sphagnaceae—Smith 853
Stegonia latifolia (Schwägr.) Venturi ex Broth.—Pottiaceae
Syntrichia bartramii (Steere) R.H. Zander—Pottiaceae
Syntrichia norvegica F. Weber—Pottiaceae—Smith 1527
Syntrichia papillosissima (Copp.) Loeske—Pottiaceae—Smith 1518
Syntrichia ruralis (Hedw.) F. Weber & D. Mohr—Pottiaceae—Smith 1514
Tetraphis pellucida Hedw.—Tetraphidaceae—Smith 1317
Timmia austriaca Hedw.—Timmiaceae—Smith 1110
Timmia norvegica J.E. Zetterst.—Timmiaceae
Timmiella crassinervis (Hampe) L.F. Koch—Pottiaceae
Tomentypnum nitens (Hedw.) Loeske—Brachytheciaceae—Smith 1255—**G5S3**
Tortula acaulon (With.) R.H. Zander—Pottiaceae—Smith 791
Tortula hoppeana (Schultz) Ochyra—Pottiaceae—Smith 1237
Tortula leucostoma (R. Br.) Hook. & Grev.—Pottiaceae—Smith 1229
Tortula mucronifolia Schwägr.—Pottiaceae—Kofranek 6148—**G5S2**
Tortula muralis Hedw.—Pottiaceae—Stone s.n.
Tortula obtusifolia (Schwägr.) Mathieu—Pottiaceae
Tortula subulata Hedw.—Pottiaceae
Trichodon cylindricus (Hedw.) Schimp.—Ditrichaceae—Smith 1057—**G4G5**
Warnstorfia exannulata (Schimp.) Loeske—Amblystegiaceae
Warnstorfia fluitans (Hedw.) Loeske—Amblystegiaceae
Weissia controversa Hedw.—Pottiaceae

LICHENS (276 species)

- Acarospora schleicheri* (Ach.) A. Massal.—Acarosporaceae
Acarospora strigata (Nyl.) Jatta—Acarosporaceae
Alectoria imshaugii Brodo & D. Hawksw.—Parmeliaceae—Barker s.n.
Alectoria sarmentosa (Ach.) Ach.—Parmeliaceae—Barker s.n.
Allantoparmelia alpicola (Th. Fr.) Essl.—Parmeliaceae—Smith 1635
Amandinea punctata (Hoffm.) Coppins & Scheid.—Physciaceae—Smith 1227
Arthonia glebosa Tuck.—Arthoniaceae—Smith 1511
Arthonia patellulata Nyl.—Arthoniaceae—Tucker 14576
Aspicilia cinerea (L.) Körber—Megasperaceae—B.D. Ryan 13910
Aspicilia contorta (Hoffm.) Krempelh.—Megasperaceae
Aspicilia intermutans (Nyl.) Arnold—Megasperaceae—McCune 31205b
Aspicilia phaea Owe-Larss. & A. Nordin—Megasperaceae—McCune 31205a
Athallia holocarpa (Hoffm.) Arup, Frödén & Søchting—Teloschistaceae—Tucker 14578, 14579
Bellemeria alpina (Sommerf.) Clauzade & Cl. Roux—Lecideaceae—Tucker 14573
Brodoa oroarctica (Krog) Goward—Parmeliaceae—Smith 1646—**G5**
Bryobilimbia hypnorum (Lib.) Fryday, Printzen & S. Ekman—Lecideaceae—Smith 1304
Bryoria capillaris (Ach.) Brodo & D. Hawksw.—Parmeliaceae—Barker s.n.
Bryoria fremontii (Tuck.) Brodo & D. Hawksw.—Parmeliaceae—Smith 507
Bryoria fuscescens (Gyel.) Brodo & D. Hawksw.—Parmeliaceae—Smith 1347
Bryoria lanestris (Ach.) Brodo & D. Hawksw.—Parmeliaceae—Dewey s.n.
Bryoria simplicior (Vain.) Brodo & D. Hawksw.—Parmeliaceae
Bryoria tortuosa (G. Merr.) Brodo & D. Hawksw.—Parmeliaceae
Bryoria trichodes subsp. *trichodes* (Michaux) Brodo & D. Hawksw.—Parmeliaceae—Tucker 14574
Buellia disciformis (Fr.) Mudd—Physciaceae—Tucker 14602
Buellia triseptata A. Nordin—Physciaceae—Tucker 14577
Calicium adequatum Nyl.—Physciaceae—**G3G4**—Stone s.n.
Calicium viride Pers.—Physciaceae—Stone s.n.

- Caloplaca castellana* (Rasanen) Poelt—Teloschistaceae—*Stone s.n.*
Caloplaca cladodes (Tuck.) Zahlbr.—Teloschistaceae—*Stone s.n.*
Caloplaca epithallina Lynge—Teloschistaceae—*Smith 1657*
Caloplaca jungermanniae (Vahl) Th. Fr.—Teloschistaceae
Caloplaca saxicola (Hoffm.) Nordin—Teloschistaceae—*Smith 1628*
Caloplaca stillucidiorum (Vahl) Lynge—Teloschistaceae—*Smith 1642*
Caloplaca tirolensis Zahlbr.—Teloschistaceae—*Smith 1453*
Caloplaca tominii Savicz—Teloschistaceae
Candelaria pacifica M. Westb. & Arup—Candelariaceae—*Smith 1656*
Candelariella rosulans (Müll. Arg.) Zahlbr.—Candelariaceae—*Smith 460*
Candelariella vitellina (Hoffm.) Müll. Arg.—Candelariaceae
Catapyrenium daedaleum (Krempelh.) Stein—Verrucariaceae—*Stone s.n.*
Catapyrenium squamellum (Nyl.) J.W. Thomson—Verrucariaceae—*Stone s.n.*
Chaenotheca furfuracea (L.) Tibell—Coniocybaceae—*Smith 1297—G4G5*
Chaenothecopsis debilis (Turner & Borrer ex Sm.) Tibell—Mycocaliciaceae—*Smith 1391*
Cladonia bellidiflora (Ach.) Schaerer—Cladoniaceae
Cladonia cariosa (Ach.) Spreng.—Cladoniaceae—*Smith 1267*
Cladonia carneola (Fr.) Fr.—Cladoniaceae—*Barker s.n.*
Cladonia cenotea (Ach.) Schaerer—Cladoniaceae
Cladonia chlorophaea (Flörke ex Sommerf.) Spreng.—Cladoniaceae—*Smith 479*
Cladonia coniocraea (Flörke) Spreng.—Cladoniaceae—*Barker s.n.*
Cladonia fimbriata (L.) Fr.—Cladoniaceae—*Tucker 14584*
Cladonia macrophyllodes Nyl.—Cladoniaceae—*Barker s.n.*
Cladonia ochrochlora Flörke—Cladoniaceae—*Barker s.n.*
Cladonia pocillum (Ach.) Grognot—Cladoniaceae—*Stone s.n.*
Cladonia pyxidata (L.) Hoffm.—Cladoniaceae
Cladonia subulata (L.) F.H. Wigg.—Cladoniaceae—*Barker s.n.*
Cladonia sulphurina (Michx.) Fr.—Cladoniaceae—*Barker s.n.*
Cladonia transcendens (Vain.) Vain.—Cladoniaceae—*D.E. Anderegg 875*
Cladonia umbricola Tønsberg & Ahti—Cladoniaceae—*Barker s.n.*
Cladonia verruculosa (Vain.) Ahti—Cladoniaceae—*Barker s.n.—G4*
Collema tenax (Sw.) Ach.—Collemataceae—*Smith 1523*
Collema tenax var. *expansum* Degel.—Collemataceae—*Smith 1697*
Cyphelium inquinans (Sm.) Trevis.—Physciaceae—*Smith 1328—G3G4*
Cyphelium pinicola Tibell—Physciaceae—*Smith 1698*
Dermatocarpon cf. *'bachmannii'* ined.—Verrucariaceae—*Smith 1245*
Dermatocarpon meiohyllizum Vainio—Verrucariaceae—**G3G5**
Dermatocarpon miniatum (L.) W. Mann—Verrucariaceae—*Smith 1409*
Dermatocarpon miniatum var. *complicatum* (Lightf.) Th. Fr.—Verrucariaceae—*Smith 1412*
Dermatocarpon reticulatum H. Magn.—Verrucariaceae—*Smith 1480*
Dermatocarpon rivulorum (Arnold) Dalla Torre & Sarnth.—Verrucariaceae
Dimelaena oreina (Ach.) Norman—Physciaceae
Diploschistes muscorum (Scop.) R. Sant.—Graphidaceae—*Smith 1277*
Diplotomma alboatrum (Hoffm.) Flotow—Physciaceae—*Tucker 14608*
Diplotomma penichrum (Tuck.) Szat.—Physciaceae—*Rausch 1205*
Endocarpon pulvinatum Th. Fr.—Verrucariaceae—*Stone s.n.*
Esslingeriana idahoensis (Essl.) Hale & M.J. Lai—Parmeliaceae—*Barker s.n.*
Evernia prunastri (L.) Ach.—Parmeliaceae—*Smith 1385*
Fuscopannaria mediterranea (Tav.) P.M. Jørg.—Pannariaceae—*Stone s.n.*
Fuscopannaria praetermissa (Nyl.) P.M. Jørg.—Pannariaceae—*Stone s.n.*
Heppia lutosa (Ach.) Nyl.—Heppiaceae—*Smith 1419*

- Hypogymnia imshaugii* Krog—Parmeliaceae—Smith 527
Hypogymnia metaphysodes (Asah.) Rass.—Parmeliaceae
Hypogymnia occidentalis L. Pike—Parmeliaceae
Hypogymnia tubulosa (Schaerer) Hav.—Parmeliaceae—Smith 1388
Japewia tornoensis (Nyl.) Tønsberg—Ramalinaceae—McCune 31214
Kaernefeltia merrillii (Du Rietz) A. Thell & Goward—Parmeliaceae—Smith 543
Lecanora (sp. 4) ined. (Šliwa and Wetmore 2000)—Lecanoraceae—McCune 31195
Lecanora albellula Nyl.—Lecanoraceae—Tucker 14589, 14590, 14591A, 14619
Lecanora carpinea (L.) Vain.—Lecanoraceae—McCune 31193
Lecanora epanora (Ach.) Ach.—Lecanoraceae—Stone s.n.
Lecanora epibryon (Ach.) Ach.—Lecanoraceae—Smith 1648
Lecanora flowersiana H. Magn.—Lecanoraceae—Stone s.n.
Lecanora garovaglii (Körb.) Zahlbr.—Lecanoraceae—Smith 1481
Lecanora hagenii (Ach.) Ach.—Lecanoraceae—Tucker 14591B
Lecanora hypopta (Ach.) Vainio—Lecanoraceae—Tucker 14604
Lecanora impudens Degel.—Lecanoraceae—Tucker 14622
Lecanora laxa (Šliwa & Wetmore) Printzen—Lecanoraceae—Smith 1651
Lecanora muralis (Schreb.) Rabenh.—Lecanoraceae—Smith 1447
Lecanora pacifica Tuck.—Lecanoraceae—Tucker 14592A, 14593
Lecanora phaedrophthalma Poelt—Lecanoraceae—B.D. Ryan 13912
Lecanora polytropa (Ehrh. ex Hoffm.) Rabenh.—Lecanoraceae—Tucker 14594
Lecanora pringlei (Tuck.) Lamb—Lecanoraceae—McCune 31169—G3
Lecanora pseudomellea B.D. Ryan—Lecanoraceae—McCune 31170
Lecanora reagens Norman—Lecanoraceae—Stone s.n.
Lecidea atrobrunnea (Raymond ex Lam. & DC.) Schaerer—Lecideaceae—Tucker 14596
Lecidea nylanderi (Anzi) Th. Fr.—Lecideaceae—Tucker 14609
Lecidea protabacina Nyl.—Lecideaceae—McCune 31172a
Lecidea tessellata Flörke—Lecideaceae—Smith 485
Lecidea truckeei Herre—Lecideaceae—McCune 31172b
Lecidella carpathica Körb.—Lecanoraceae—McCune 31208
Lecidella euphorea (Flörke) Hertel—Lecanoraceae—Tucker 14601B
Lecidella stigmathea (Ach.) Hertel & Leuckert—Lecanoraceae—McCune 31204
Lecidella wulfenii (Hepp) Körb.—Lecanoraceae—Smith 1295
Lepraria neglecta (Nyl.) Erichsen—Stereocaulaceae—Stone s.n.
Lepraria rigidula (de Lesd.) Tønsberg—Stereocaulaceae—Stone s.n.
Leptochidium albociliatum (Desmaz.) M. Choisy—Massalungiaceae—Smith 1269
Leptogium intermedium (Arnold) Arnold—Collemataceae—Stone s.n.
Leptogium lichenoides (L.) Zahlbr.—Collemataceae—Smith 1483
Leptogium nanum Herre—Collemataceae—Stone s.n.
Leptogium pulvinatum (Hoffm.) Cromb.—Collemataceae—McCune 31203
Leptogium rivale Tuck.—Collemataceae—Stone s.n.
Leptogium saturninum (Dicks.) Nyl.—Collemataceae—Stone s.n.—G5
Leptogium subaridum P.M. Jørg. & Goward—Collemataceae—Stone s.n.
Leptogium tacomae P.M. Jørg. & Tønsberg—Collemataceae—Stone s.n.
Leptogium tenuissimum (Dicks.) Körb.—Collemataceae—Stone s.n.
Letharia columbiana (Nutt.) J.W. Thomson—Parmeliaceae—Smith 511
Letharia vulpina (L.) Hue—Parmeliaceae—Smith s.n.
Lichenomphalia sp. Redhead, Lutzoni, Moncalvo & Vilgalys—Hygrophoraceae—Smith 812
Lobothallia alphoplaca (Wahlenb.) Hafellner—Megasporaceae—Smith 1610
Massalungia carnosae (Dicks.) Körb.—Massalungiaceae—Stone s.n.
Megaspora verrucosa (Ach.) Hafellner & V. Wirth—Megasporaceae—Smith 1478

- Melanelia fuliginosa* (Fr. ex Duby) Essl.—Parmeliaceae—*Stone s.n.*
Melanelia subargentifera (Nyl.) Essl.—Parmeliaceae
Melanelia subaurifera (Nyl.) Essl.—Parmeliaceae
Melanohalea elegantula (Zahlbr.) O. Blanco et al.—Parmeliaceae
Melanohalea exasperatula (Nyl.) O. Blanco et al.—Parmeliaceae
Melanohalea infumata (Nyl.) O. Blanco et al.—Parmeliaceae
Melanohalea multispora (A. Schneider) O. Blanco et al.—Parmeliaceae—*McCune 31188*
Melanohalea subelegantula (Essl.) O. Blanco et al.—Parmeliaceae
Melanohalea subolivacea (Nyl.) O. Blanco et al.—Parmeliaceae—*Smith 1515*
Melanohalea subolivacea (papillate morph) (Nyl.) O. Blanco et al.—Parmeliaceae—*McCune 31176*
Multiclavula corynoides (Peck) R. Petersen—Clavariaceae—*Sharnoff 667*
Mycocalicium sp. Vainio—Mycocaliciaceae—*Stone s.n.*
Myriospora smaragdula (Wahlenb. ex Ach.) K. Knudsen & L. Arcadia—Acarosporaceae—*Tucker 14573*
Nephroma helveticum Ach.—Nephromataceae—*Smith 1387*
Nephroma parile (Ach.) Ach.—Nephromataceae—*Smith 1383*
Nodobryoria abbreviata (Müll. Arg.) Common & Brodo—Parmeliaceae—*Smith 543*
Nodobryoria oregana (Tuck.) Common & Brodo—Parmeliaceae
Ochrolechia androgyna (Hoffm.) Arnold—Ochrolechiaceae—*McCune 31217*
Ochrolechia upsaliensis (L.) A. Massal.—Ochrolechiaceae—*Smith 1415*
Parmelia barrenoae Divakar, M. C. Molina & A. Crespo—Parmeliaceae—*McCune 31187*
Parmelia hygrophila Goward & Ahti—Parmeliaceae—*Smith 516*
Parmelia saxatilis (L.) Ach.—Parmeliaceae
Parmelia sulcata Taylor—Parmeliaceae—*Smith 1336*
Parmeliopsis ambigua (Wulfen) Nyl.—Parmeliaceae—*Smith 737*
Parmeliopsis hyperopta (Ach.) Arnold—Parmeliaceae
Peccania arizonica (Tuck.) Herre—Lichinaceae—*Stone s.n.*
Peltigera aphthosa (L.) Willd.—Peltigeraceae
Peltigera britannica (Gyel.) Holt.-Hartw. & Tonsb.—Peltigeraceae
Peltigera canina (L.) Willd.—Peltigeraceae—*Smith 1636*
Peltigera collina (Ach.) Schrad.—Peltigeraceae—*Smith 1285*
Peltigera degenii Gyel.—Peltigeraceae
Peltigera didactyla (With.) J.R. Laundon—Peltigeraceae—*Smith 1608*
Peltigera extenuata (Vain.) Lojka—Peltigeraceae—*Smith 572*
Peltigera kristinssonii Vitik.—Peltigeraceae—*Smith 587*
Peltigera leucophlebia (Nyl.) Gyel.—Peltigeraceae—*Smith 1346*
Peltigera malacea (Ach.) Funck—Peltigeraceae—*Smith 1621*
Peltigera membranacea (Ach.) Nyl.—Peltigeraceae—*Smith 1344*
Peltigera neopolydactyla (Gyel.) Gyel.—Peltigeraceae—*Smith 1618*
Peltigera ponjensis Gyel.—Peltigeraceae—*Smith 1345*
Peltigera praetextata (Flörke ex Sommerf.) Zopf—Peltigeraceae
Peltigera rufescens (Weiss) Humb.—Peltigeraceae—*Smith 1330*
Peltigera venosa (L.) Hoffm.—Peltigeraceae
Pertusaria saximontana Wetmore—Pertusariaceae—*McCune 31219*
Pertusaria subambigens Dibben—Pertusariaceae—*Smith 1402*
Phaeophyscia decolor (Kashiw.) Essl.—Physciaceae—*Smith 509*
Phaeophyscia orbicularis (Neck.) Moberg—Physciaceae—*Barker s.n.*
Phaeophyscia sciastra (Ach.) Moberg—Physciaceae—*Smith 1630*
Phaeorrhiza nimbosea (Fr.) H. Mayrh. & Poelt—Physciaceae—*Smith 1637*
Phaeorrhiza sareptana (Tomin) H. Mayrh. & Poelt—Physciaceae—*Smith 1596*
Physcia adscendens (Fr.) H. Olivier—Physciaceae

- Physcia aipolia* (Ehrh. ex Humb.) Furnr.—Physciaceae—McCune 31191
Physcia biziana (A. Massal.) Zahlbr.—Physciaceae—Smith 1611
Physcia caesia (Hoffm.) Furnr.—Physciaceae—Smith 1524
Physcia cf. 'occidentalis' ined.—Physciaceae—Stone s.n.
Physcia dimidiata (Arnold) Nyl.—Physciaceae—Smith 1666
Physcia dubia (Hoffm.) Lettau—Physciaceae
Physcia phaea (Tuck.) J.W. Thomson—Physciaceae—Stone s.n.
Physcia stellaris (L.) Nyl.—Physciaceae—Barker s.n.
Physcia tenella (Scop.) DC.—Physciaceae—Smith 1355
Physconia enteroxantha (Nyl.) Poelt—Physciaceae—Smith 1474
Physconia fallax Essl.—Physciaceae
Physconia isidiigera (Zahlbr.) Essl.—Physciaceae—Smith s.n.
Physconia muscigena (Ach.) Poelt—Physciaceae—Smith s.n.
Physconia perisidiosa (Erichsen) Moberg—Physciaceae—Smith 1281
Placidopsis cinerascens (Nyl.) Breuss—Verrucariaceae—McCune 31199
Placidium lachneum (Ach.) B. de Lesd.—Verrucariaceae
Placidium rufescens (Ach.) Breuss—Verrucariaceae
Placidium squamulosum (Ach.) Breuss—Verrucariaceae—Smith 1294
Placynthiella icmalea (Ach.) Coppins & P. James—Trapeliaceae—Smith 1603
Placynthiella oligotropha (J.R. Laundon) Coppins & P. James—Trapeliaceae—Stone s.n.
Placynthiella uliginosa (Schrad.) Coppins & P. James—Trapeliaceae
Platismatia glauca (L.) W.L. Culb. & C.F. Culb.—Parmeliaceae—Smith 1384
Platismatia herrei (Imshaug) W.L. Culb. & C.F. Culb.—Parmeliaceae—Barker s.n.
Platismatia stenophylla (Tuck.) W.L. Culb. & C.F. Culb.—Parmeliaceae—Barker s.n.
Pleopsidium flavum (Bellardi) Körb.—Acarosporaceae—Smith 1289
Polychidium muscicola (Sw.) A. Gray—Placynthiaceae—Smith 1231
Polysporina simplex (Davies) Vezda—Acarosporaceae—Smith 1350
Protopannaria pezizoides (Weber) P.M. Jørg. & S. Ekman—Pannariaceae—Smith 1462
Protoparmelia ochrococca (Nyl.) P.M. Jørg., Rambold & Hertel—Parmeliaceae—McCune 31216
Pseudephebe minuscula (Nyl. ex Arnold) Brodo & D. Hawksw.—Parmeliaceae—Smith 742
Pseudephebe pubescens (L.) M. Choisy—Parmeliaceae—Smith 1658
Pseudocyphellaria anomala Brodo & Ahti—Lobariaceae—Smith 1389
Psora cerebriformis W.A. Weber—Psoraceae—Smith 1522
Psora globifera (Ach.) A. Massal.—Psoraceae—Smith 1513
Psora montana Timdal—Psoraceae—Smith 1489
Psora nipponica (Zahlbr.) Gotth. Schneid.—Psoraceae—Smith 1265
Psora tuckermanii R. Anderson ex Timdal—Psoraceae
Psoroma hypnorum (Vahl) A. Gray—Pannariaceae—Smith 1390
Ramalina farinacea (L.) Ach.—Ramalinaceae—Smith 1382
Rhizocarpon geographicum (L.) DC.—Rhizocarpaceae—Smith 1600
Rhizoplaca chrysoleuca (Sm.) Zopf—Lecanoraceae—Smith s.n.
Rhizoplaca melanophthalma (DC.) Leuckert & Poelt—Lecanoraceae—Smith 529
Rinodina archaea (Ach.) Arnold—Physciaceae—McCune 31180; Tucker 14618
Rinodina milvina (Wahlenb.) Th. Fr.—Physciaceae—McCune 31211
Rinodina mniaraea (Ach.) Körb.—Physciaceae—Stone s.n.
Rinodina olivaceobrunnea C.W. Dodge & Baker—Physciaceae—Smith 1647
Rinodina parasitica H. Mayrh. & Poelt—Physciaceae—McCune 31197
Rinodina terristris Tomin—Physciaceae—Stone s.n.
Sagedia mastrucata (Wahlenb.) A. Nordin, S. Savić & Tibell—Megasperaceae—Smith 1500
Schaereria dolodes (Nyl. ex Hasse) Schmult & T. Sprib.—Schaereriaceae—McCune 31215—G4S1
Staurothele areolata (Ach.) Lettau—Verrucariaceae—Stone s.n.

- Stenocybe pullatula* (Ach.) Stein—Mycocaliciaceae—*Stone s.n.*
Stereocaulon tomentosum Fr.—Stereocaulaceae—*Smith 1145*
Tephromela atra (Huds.) Hafellner—Mycoblastaceae—*Smith 1602*
Tetramelas terricolus (A. Nordin) Kalb—Physciaceae—*Smith 1525*
Thelomma ocellatum (Körb.) Tibell—Physciaceae—*Smith 1696*
Toninia ruginosa (Tuck.) Herre—Ramalinaceae—*Smith 1597*
Toninia sedifolia (Scop.) Timdal—Ramalinaceae—*Smith 1494*
Trapeliopsis flexuosa (Fr.) Coppins & P. James—Trapeliaceae—*Tucker 14623A*
Trapeliopsis glaucopholis (Nyl. ex Hasse) Printzen & McCune—Trapeliaceae—*Smith 1461*—

G3G4, Washington state S1

- Trapeliopsis granulosa* (Hoffm.) Lumbsch—Trapeliaceae—*Tucker 14595*
Trapeliopsis viridescens (Schrader) Coppins & P. James—Trapeliaceae—*Tucker 14600*
Tuckermannopsis chlorophylla (Willd.) Hale—Parmeliaceae—*Smith 1623*
Tuckermannopsis orbata (Nyl.) M.J. Lai—Parmeliaceae
Tuckermannopsis playtphylla (Tuck.) Hale—Parmeliaceae—*Smith 1348*
Umbilicaria americana Poelt & T. Nash—Umbilicariaceae—*Smith 1643*
Umbilicaria angulata Tuck.—Umbilicariaceae—*Stone s.n.*—**G4**
Umbilicaria hyperborea (Ach.) Hoffm.—Umbilicariaceae—*Smith 1404*
Umbilicaria phaea Tuck.—Umbilicariaceae—*Smith 1526*
Umbilicaria polaris (Schol.) Zahlbr.—Umbilicariaceae—*McCune 31174; Smith 1634*
Umbilicaria torrefacta (Lightf.) Schrad.—Umbilicariaceae—*Smith 1653*
Umbilicaria vellea (L.) Ach.—Umbilicariaceae—*Smith 1629*
Umbilicaria virginis Schaerer—Umbilicariaceae—*Smith 1659*
Usnea filipendula Stirt.—Parmeliaceae—*Barker s.n.*
Usnea lapponica Vain.—Parmeliaceae—*McCune 31189*
Usnea scabrata Nyl.—Parmeliaceae—*Smith 526*
Vahlia californica (Tuck.) P.M. Jørg.—Pannariaceae—*McCune 31206*
Variolaria ophthalmiza Nyl.—Pertusariaceae—*Tucker 14614*
Verrucaria aethiobola Wahlenb.—Verrucariaceae—*Stone s.n.*
Vulpicida canadensis (Rasanen) J.-E. Mattsson & M.J. Lai—Parmeliaceae—*Smith 464*
Xanthomendoza fallax (Hepp ex Arn.) Søchting, Kärnefelt & S. Kondr.—Teloschistaceae
Xanthomendoza fulva (Hoffm.) Søchting, Kärnefelt & S. Kondr.—Teloschistaceae—*Smith 1622*
Xanthomendoza galericulata L. Lindblom—Teloschistaceae
Xanthomendoza hasseana (Räsänen) Søchting, Kärnefelt & S. Kondr.—Teloschistaceae
Xanthomendoza mendozae (Räsänen) Kondratyuk & Kärnefelt—Teloschistaceae—*Smith 795*
Xanthomendoza montana (L. Lindblom) Søchting, Kärnefelt & S. Kondr.—Teloschistaceae—*Smith 440*
Xanthomendoza oregana (Gyel.) Søchting, Kärnefelt & S. Kondr.—Teloschistaceae
Xanthoparmelia coloradoensis (Gyel.) Hale—Parmeliaceae—*Stone s.n.*
Xanthoparmelia loxodes (Nyl.) O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch—
 Parmeliaceae—*Smith 1303*
Xanthoparmelia mexicana (Gyel.) Hale—Parmeliaceae—*Smith 1491*
Xanthoparmelia plittii (Gyel.) Hale—Parmeliaceae—*B.D. Ryan 13911*
Xanthoparmelia subhosseana (Essl.) Crespo, O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch—
 Parmeliaceae—*Stone s.n.*
Xanthoparmelia verruculifera (Nyl.) Crespo, O. Blanco, A. Crespo, Elix, D. Hawksw. & Lumbsch—
 Parmeliaceae—*Stone s.n.*
Xanthoparmelia wyomingica (Gyel.) Hale—Parmeliaceae—*Smith 1446*
Xanthoria candelaria (L.) Th. Fr.—Teloschistaceae—*Smith 1293*
Xanthoria elegans (Link) Th. Fr.—Teloschistaceae—*Smith 1609*
Xanthoria sorediata (Vain.) Poelt—Teloschistaceae—*Smith 1633*

Bryophytes not yet found but known from nearby:

- Aloina bifrons* (De Not.) Delgad.—Pottiaceae—**G3S1**—Mayfield and Kjelman (1984)
Anacolia menziesii (Turner) Paris—Bartramiaceae—CNABH
Barbilophozia lycopodioides (Wallr.) Loeske—Anastrophyllaceae—**G5S1**—CNABH
Brachythecium reflexum (Starke) Schimp.—Brachytheciaceae—CNABH
Bryoerythrophyllum columbianum (F.J. Herm. & E. Lawton) R.H. Zander—Pottiaceae—**G3G4S2**—
 CNABH
Bucklandiella sudetica (Funck) Bednarek-Ochyra & Ochyra—Grimmiaceae—CNABH
Calliergon giganteum (Schimp.) Kindb.—Amblystegiaceae—CNABH
Calliergon richardsonii (Mitt.) Kindb.—Amblystegiaceae—**G4S1**—Dewey (2008)
Crumia latifolia (Kindb.) W.B. Schofield—Pottiaceae—CNABH
Dicranella palustris (Dickson) E. F. Warburg—Dicranaceae—CPNWH
Didymodon vinealis var. *luridus* (Hornsch.) R.H. Zander—Pottiaceae—McIntosh (1989)
Encalypta intermedia Jur.—Encalyptaceae—**G4**—CNABH
Encalypta procera Bruch—Encalyptaceae—CNABH
Grimmia anodon Bruch & Schimp.—Grimmiaceae—CNABH
Grimmia laevigata (Brid.) Brid.—Grimmiaceae—CNABH
Grimmia muehlenbeckii Schimp.—Grimmiaceae—CNABH
Grimmia ungeri Jur.—Grimmiaceae—CNABH
Hedwigia stellata Hedenäs—Hedwigiaceae—**G4**—CNABH
Marsupella sp. Dumort.—Gymnomitriaceae—*Stone s.n.*
Mnium thomsonii Schimp.—Mniaceae—CNABH
Oncophorus wahlenbergii Brid.—Dicranaceae—CPNWH
Orthotrichum pellucidum Lindb.—Orthotrichaceae—**G3G5S1**—CNABH
Philonotis muhlenbergii (Schwägr.) Brid.—Bartramiaceae—CNABH
Polytrichastrum formosum (Hedw.) G.L. Sm.—Polytrichaceae—CNABH
Pseudocrossidium revolutum (Brid.) R.H. Zander—Pottiaceae—Mayfield and Kjelman (1984)
Pterygoneurum ovatum (Hedw.) Dixon—Pottiaceae—Ponzetti and McCune (2001); also CNABH
Sphagnum warnstorffii Russow—Sphagnaceae—CNABH
Straminergon stramineum (Dicks. ex Brid.) Hedenäs—Amblystegiaceae—CNABH
Syntrichia caninervis Mitt.—Pottiaceae—CNABH
Syntrichia princeps (De Not.) Mitt.—Pottiaceae—CNABH
Tortella fragilis (Hook. & Wilson) Limpr.—Pottiaceae—**G5S1**—CNABH
Tortula brevipes (Lesq.) Broth.—Pottiaceae—Mayfield and Kjelman (1984)
Tripterocladium leucocladulum (Müll. Hal.) A. Jaeger—Lembophyllaceae—CNABH

Lichens not yet found but known from nearby:

- Aspicilia reptans* (Looman) Wetmore—Megasporaceae—CNALH
Biatora rufidula (Graewe.) S. Ekman & Printzen—Ramalinaceae—McCune
Biatora subduplex (Nyl.) Printzen—Ramalinaceae—McCune
Buellia erubescens Arnold—Physciaceae—McCune
Buellia griseovirens (Turner & Borrer ex Sm.) Almb.—Physciaceae—McCune
Calicium parvum Tibell—Physciaceae—CNALH
Calogaya biatorina (A. Massal.) Arup, Frödén & Søchting—Teloschistaceae—McCune
Caloplaca arenaria (Pers.) Müll. Arg.—Teloschistaceae—McCune
Chaenotheca ferruginea (Turner & Borrer) Mig.—Coniocybaceae—CNALH
Circinaria hispida (Mereschk.) A. Nordin, Savić & Tibell—Megasporaceae—CNALH
Circinaria rogeri (Sohrabi) Sohrabi—Megasporaceae—CNALH
Diploschistes scruposus (Schreb.) Norman—Graphidaceae—Mayfield and Kjelman (1984)
Ephebe lanata (L.) Vain.—Lichinaceae—CNALH

- Fuscopannaria cyanolepra* (Tuck.) P. M. Jørg.—Pannariaceae—CNALH
Hypogymnia wilfiana Goward, T. Sprib. & Ahti—Parmeliaceae—McCune
Lecanora cenisia Ach.—Lecanoraceae—CNALH
Lecanora circumborealis Brodo & Vitik.—Lecanoraceae—McCune
Lecanora confusa Almb.—Lecanoraceae—McCune
Lecanora expallens Ach.—Lecanoraceae—McCune
Lecanora laatokkaensis (Rasanen) Poelt—Lecanoraceae—CNALH
Lecanora mughicola Nyl.—Lecanoraceae—McCune
Lecanora rupicola (L.) Zahlbr.—Lecanoraceae—McCune
Lecanora semitensis Tuck.—Lecanoraceae—CNALH
Lecanora sierrae B.D. Ryan & T. Nash—Lecanoraceae—McCune
Lecidea lithophila (Ach.) Ach.—Lecideaceae—CNALH
Lecidea sphaerella Hedl.—Lecideaceae—McCune
Ochrolechia gowardii Brodo—Ochrolechiaceae—McCune
Physconia detersa (Nyl.) Poelt—Physciaceae—CNALH
Pleopsidium chlorophanum (Wahlenb.) Zopf—Acarosporaceae—CNALH
Rinodina capensis Hampe—Physciaceae—McCune
Rinodina disjuncta Sheard & Tønsberg—Physciaceae—McCune
Rinodina obnascens (Nyl.) Oliv.—Physciaceae—McCune
Rinodina orculata Poelt & M. Steiner—Physciaceae—McCune
Texosporium sancti-jacobi (Tuck.) Nád. —Physciaceae—**G3S1**—CNALH
Thelenella muscorum var. *octospora* (Nyl.) Coppins & Fryday—Thelenellaceae—**G4G5S2**—
 CNALH