PRELIMINARY LIST OF MOSSES KOOTENAI NATIONAL FOREST

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INTRODUCTION

The Montana Natural Heritage Program and Kootenai National Forest (KNF), with funding provided by a challenge cost share agreement, contracted with Joe Elliott to collect and identify mosses from representative habitats on the KNF. The moss flora of Montana has recently been evaluated and included among the plant species of special concern by the Montana Natural Heritage Program and is proposed for the statewide vegetation classification. The moss flora of northwestern Montana has not been extensively studied although it is known to be diverse, with a relatively large number of species with Pacific-maritime floristic affinities. This study was conducted to help develop a foundation for evaluation of biodiversity and habitat indicator value of mosses.

This preliminary list of mosses for the KNF was assembled from the following sources: specimens at the University of Montana Herbarium (MONTU); Eversman and Sharp (1980); Reichel and Beckstrom (1994); Field notes of S. Flowers filed at the University of Colorado; Spribille (1996); Chadde and Shelly (1994); specimens provided by T. Spribille, Kara Hungate, Mike Lolley, J. Reichel, J. Vanderhorst, M. Arvidson, L. Sedler, and P. Lesica; and collections that we have made. Species denoted with an asterisk are new state records not previously reported for Montana.

This list is preliminary because it does not reflect intensive collecting throughout many habitats and geographic areas of the KNF. As future study results become available, this list will be updated and expanded. Several species identifications are tentative, awaiting verification by specialists in particular moss groups .

STUDY AREAS

We collected mosses from a variety of habitats, including: old-growth stands of western red cedar of western hemlock, wet meadows, mineral-rich fens, warm valleys, and riparian areas. Areas collected include: Bowen Creek fen (T31N,R26W,Sec.1); Cody Lake fen (T29N,R28W,Sec.6); Hawkins Pond fen, (T37N,R33W,Sec.18); Teepee Lake fen(T28N,R30W,Sec.25); Rainbow Lake fen (T33N,R31W,Sec.6); Rattlebone Fen (T34N,R25W,Sec. 26); Magnesia fen (T33N,R25W,Sec. 7); Dudley Slough (T34N,R26W,Sec. 14); and Pete Creek Meadows (T37N,R33W,Sec.24). Old-growth stands were surveyed as part of moonwort studies (a rare group of ferns) at: Zulu Creek (T34N,R31W,Sec.10); Kelsey Creek (T35N,R31W,Sec.29); Rock Creek (T26N,R32W,Sec.3 and 23), Cedar Creek (T31N, R32W, Sec. 34),Sutton Creek (T35,R28W,Sec.33); Alexander Mountain (T31N,R29W,Sec 19). Relatively dry and warm upland habitats were sampled in the Kootenai River vall
ey, near Kootenai Falls (T31N,R33W,Sec. 13). Toby Spribille made addtional collections from the Whitefish, Purcell, and Salish mountains as part of his habitat studies for the Forest Service.

METHODS

Habitats were searched, mosses were collected, dried in paper bags, and preserved for future identification. Taxonomic references used to identify specimens include: Lawton (1971). Taxonomic nomenclature generally follows Anderson et al (1990) and Anderson (1990). Specimens difficult to identify were sent to Dale Vitt at the University of Alberta, Edmonton; Bruce Allen, Missouri Botanical Garden; William Weber, University of Colorado; Arne Frisvoll, University of Trondheim, and Patricia Eckel, Buffalo Museum of Science, Buffalo, New York. Specimens of our collections are deposited at MONTU. Other collections identified in this report are

deposited at various herbaria including:: the Forest Service herbarium at Fortine, ALTA, COLO, MO, and MONTU. Survey forms for Montana Plant Species of Special Concern were filled out for taxa currently recognized or proposed for recognition as species of special concern. Data processing is in progress.

RESULTS

The Kootenai National Forest (KNF) has diverse forest and wetland communities that provide habitat for 202 known taxa of mosses, including new additions to the state flora and species of special concern. The moist, cool Pacific maritime climate, variability of geological parent material, and variation in precipitation due to localized " rain shadows" are factors contributing to diversity of both bryophytes and vascular plants. Some mosses with floristic affinities with the Pacific coastal region reach their eastern-most distributions in the KNF. Vitt et al (1988) show numerous bryophytes and lichens with Pacific coastal centers of distribution, extending inland to northwestern Montana. The maritime influence on Montana plant distribution has been discussed by McCune (1984).

The preliminary list of mosses is presented in Appendix A. New records for Montana are:

Hypnum callichroum: Soil over Rock, along Highway 2 Trail, south of Kootenai Falls (Elliott 2891) (verification pending).

Leucolepis acanthoneuron: Riparian cedar/hemlock forest near Cedar Creek Trailhead, four miles west of Libby; (Anderegg and Spribille 5020, Spribille and Elliott 3004).

Racomitrium brevipes: Thinly scattered over wind-swept subalpine knoll; Whitefish Range, north of Divide Creek and east of Mount Wam (Spribille 4126A).

Racomitrium pygmaeum: Thinly scattered over wind-swept subalpine knoll; Whitefish Range, north of Divide Creek and east of Mount Wam (Spribille 4127).

Sphagnum lindbergii: Purcell Fen at head of Drip Creek, Big Creek watershed (Spribille 5751, 5754, 5753 and 5740). (Verification pending confirmation by D. Vitt)

Sphagnum wulfianum: Hummocks in West Basin Fen, Purcell Mountains; circumboreal in North America; appears to be the only record in the western United States (Arvidson 431).

Splachnum sphaericum: Cattle dung in spruce swamp along Brown's Creek in Salish Mountains (Spribille 5625).

Splachnum vasculosum: Spribille collection (pending confirmation by D. Vitt)

Montana Species of Special Concern(Montana Natural Heritage Program 1996) that have been documented for the KNF are:

Aloina brevirostris: Known from several locations on the Fortine District; (Spribille and Triepke 4529, Hungate s.n.).

Brachythecium reflexum var. *reflexum*: Rare; known from one location in the Purcell Mountains (Lolley s.n.).

Brachythecium reflexum var. *pacificum*: Known from several locations in the Purcell Mountains (Lolley s.n.).

Catoscopium nigritum: Known from two locations on KNF, Magnesia Fen and a fen near Hidden Lake, Fortine District (Spribille 3908, 5313).

Dichodontium olympicum: Soil in subalpine; known from one collection in Ten Lakes Scenic Area (Spribille 4331).

Meesia longiseta: Known from one location at a calcareous fen near Trego (Spribille 5471).

Meesia triquetra; Known from Cody Lake, Bowen Fen, Dudley Slough, Wigwam River, Rattlebone Fen, and Purcell Fen at the head of Drip Creek, Big Creek watershed; (Elliott and Spribille collections).

Oligotrichum aligerum: Known from one location in Montana, on KNF, along trail to Leigh Lake in Cabinet Mountains (Elliott and Moore 1989).

Polytrichum lyallii: Fairly common on soil in whitebark pine and spruce-fir forests at higher elevations; (Spribille collections).

Scorpidium scorpioides: Known from Dudley Slough, Collins Fen, Hidden Lake Fen, Cody Lake Fen, and Rattlebone Fen; (Elliott and Spribille collections).

Sphagnum centrale: Known from Lydia Mountain Fen and Sutton Mountain Fen in the Salish Mountains; (Spribille collections).

Sphagnum compactum: Known in Montana from fen in Ravalli County and fen in the Canuck Creek drainage, Purcell Mountains (Arvidson 88).

Sphagnum girgensohnii: Known from Glacier National Park and on the KNF from an old-growth hemlock stand in the upper Libby Creek drainage, Cabinet Mountains (Elliott 1518).

Sphagnum magellanicum: Known on the KNF from Purcell Fen at the head of Drip Creek, in the Big Creek watershed (Spribille 5747, 5748,5753).

Trachybryum megaptilum: Locally common; Known from sites near Troy Ranger Station, Bull Lake area, Rock Creek drainage,(near Noxon) (Elliott collections) and one collection south of Eureka (K. Hungate collection).

Warnstorfia exannulata: Known on the KNF from Purcell Fen at head of Drip Creek, Big Creek drainage (Spribille 5755).

Recent collections of mosses in the KNF indicate that the following mosses should be added to the Montana Natural Heritage Program list of Species of Special Concern: *Hypnum callichroum* (if verified), *Leucolepis acanthoneuron*, *Racomitrium brevipes*, *Racomitrium pygmaeum*, *Sphagnum lindbergii* (if verified),*Sphagnum wulfianum*, *Splachnum sphaericum*, and *Splanchnum vasculosum* (if verified). *Brachythecium reflexum* var. *reflexum* appears to be rare; however *B. reflexum* var. *pacificum* appears to be more common. It may be appropriate to identify the variety *reflexum* as a sensitive taxon.

Buxbaumia aphylla is not listed as a sensitive species by the Montana Natural Heritage Program. Lawton (1970) indicates that it is present in Montana and recent collections by T. Spribille and me (see list of mosses in Appendix) have also documented its occurrence. This moss is probably more common than records indicate. It is relatively small and easily overlooked. Because it does not appear to be restricted to rare or unusual habitat, listing it as sensitive with the intent of trying to manage its conservation status, may not be warranted.

Polytrichum lyallii appears to be relatively common at higher elevations and its status as a Species of Special Concern does not appear warranted.

APPENDIX A

PRELIMINARY LIST OF MOSSES
FOR THE KNF

Aloina brevirostris (Hook.& Grev.)Kindb.

Soil on overturned tree bases; relatively frequent in Douglas-fir/pine grass habitat types on the Fortine District.

Amblystegium serpens (Hedw.) B.S.G.

Wet soil and rotten wood; common.

A. serpens var. *juratzkanum* (Schimp.) Rau and Herv.

Wet soil and rotten wood; common.

Amphidium lapponicum (Hedw.) Schimp.

Moist rock, in Cabinet Mountains near Snowshoe Mine (Flowers 10,266); infrequent, occurring in western and coastal mountains.

Anacolia menziesii (Turn.) Par.

Pacific maritime; rock and soil; Highway 2 Trail (Elliott 2884); common west of the Cascade Range.

Antitrichia californica Sull. *ex* Lesq.

Pacific maritime, on trees, logs, and rocks; Highway 2 Trail, south of Kootenai Falls (Elliott 2888).

A. curtipendula (Hedw.) Brid.

Pacific maritime, on trees, logs, and rocks; uncommon, at the margin of its range in Montana; Eversman and Sharp (1980) list it for Lincoln County.

Atrichum selwynii Aust.

Soil, often on overturned tree roots; common.

Aulacomnium androgynum (Hedw.) Schwaegr.

Very common on rotten wood.

A. palustre (Hedw.) Schwaegr.

Wet soil and humus in bogs and fens; common; dominant species in both rich and poor fens and other wetlands.

Barbula convoluta Hedw.

Common on disturbed soil in the Tobacco Valley; also known from a collection near Libby; small and often overlooked.

Bartramia pomiformis Hedw.

Soil and soil over rock; infrequent; sometimes called the "apple moss" because the round capsules resemble green apples; Highway 2 Trail, south of Kootenai Falls (Elliott 2896).

Brachythecium albicans (Hedw.) B.S.G.

Rocky, sandy soil and humus, often on relatively dry, disturbed sites; common.

B. collinum (Schleich. *ex* C. Mull.) B.S.G.

Soil and soil over rock; common.

B. erythrorrhizon Schimp. in B.S.G.

Wet humus, in many forest habitat types.

B. frigidum (C. Mull.) Besch.

Pacific maritime, often emergent from springs; common.

B. holzingeri (Grout)Grout

Common in spruce-fir forests.

B. hylotapetum B. Hig. & N. Hig.

Pacific maritime, soil, humus, and rotten wood often in association with *Rhytidiopsis robusta* under conifer forests; common throughout the KNF (Spribille 2486A).

B. leibergii Grout

Common in spruce-fir forests; numerous collections.

B. nelsonii Grout

Rare; wet hollows in marshes; Wigwam River bottom in marsh (Spribille and Arvidson 6016A).

B. reflexum var. *pacificum* Ren. & Card in Roll.

Known from several collections in the Basin Creek drainage, Purcell Mountains (Lolley s.n.).

B. reflexum var. *reflexum* (Starke *in* Web. & Mohr)B.S.G

Known from one collection in the Basin Creek drainage, Purcell Mountains (Lolley s.n.).

B. rivulare B.S.G.

Wet soil and rocks near streams, often emergent from water; common; variable species often confused with *B. frigidum* which occupies similar habitat.

B. salebrosum (Web. & Mohr) Schimp.

Rotting wood; widespread.

B. velutinum var. venustum (De Not.) Arc.

Rotten wood; northern Salish Mountains (Spribille 6349).

Bryoerythrophyllum recurvirostre (Hedw.) Chen

Soil and rock, often calcareous; relatively common.

Bryum argenteum Hedw.

Soil, rock, sidewalks, and walls; common; pioneer species at all elevations.

B. caespiticium Hedw.

Soil, often disturbed sites; common.

Bryum gemmiparum De Not.

Uncommon; along creeks and Montane, known from Wolverine Creek (Spribille s.n.).

Bryum pallescens Schleich. *ex* Schwaegr.

Wet soil in Pete Creek Meadows. Chadde collection, Intermountain Research Station Herbarium.

B. pseudotriquetrum (Hedw.) Gaertn.

Wet soil in fens and other wetlands, often calcareous.

Bryum weigelii Spreng. *in* Biehler

Damp soil and peat; Hawkins Pond northwest of Troy (Reichel *s.n.*).

Buxbaumia aphylla Hedw.

Bare, mineral soil in the northern Salish Mountains at Lydia Mountain and Sterling Creek (Spribille collections). Also known from a collection (Elliott 3006) at Mullan Pass in Lewis and Clark County, Montana; widespread, but uncommon throughout the northern United States.

B. piperi Best

Pacific maritime, rotting logs; infrequent; endemic to the Pacific Northwest; often associated with old growth cedar-hemlock forests; Leigh Creek (Elliott s.n.), and West Fork Rock Creek (Elliott 2874) in Cabinet Mountains.

B. viridis (DC.) Moug.& Nestl.

Infrequent on rotting wood; known from seven or eight locations Fortine and Eureka districts.

Calliergon cordifolium (Hedw.) Kindb.

Uncommon; nutrient-poor wetlands at edge of Rock Creek Meadows, under forest canopy, along Ramsey Creek,Cabinet Mountains (Elliott 1574, 1516).

C. giganteum (Schimp.) Kindb.

Circumboreal, very wet organic soil often submerged; common; similar to *C. cordifolium*, but usually growing on wetter sites.

C. stramineum (Brid.) Kindb.

Circumboreal; wet soil in poor fens; often intermixed with *Sphagnum*, fens in Salish and Purcell mountains (Spribille 5753).

C. hispidulum (Bridel) Mitten

Subalpine soils; Bluebird Trail in Whitefish Range (Spribille s.n.).

Campylium stellatum (Hedw.) C. Jens.

Circumboreal; common in rich calcareous fens in Fortine District (e.g., Bowen Creek Fen, Magnesia Fen, Cody Lake Fen, and Dudley Slough).

Catoscopium nigritum (Hedw.)Brid.

On wet soil in calcareous wetlands; Magnesia Fen and Hidden Lake (Spribille collections).

Ceratodon purpureus (Hedw.) Brid.

Soil, often disturbed sites; cosmopolitan; common.

Claopodium bolanderi Best

Pacific maritime, rock along Leigh Creek, Cabinet Mountains (Elliott *s.n.*), Cat Creek Trail (Spribille 3336), Dead Horse Creek (Spribille 4219).

Climacium dendroides (Hedw.) Web. & Mohr

Damp soil; common.

Coscinodon calyptratus (Hook.) C. Jens.

Western endemic on dry rock; common.

Conardia compacta (C. Mull.) H. Robinson

Wet soil and rotten bark on ground, in spruce swamps over limestone, also on calcareous soil at edge of wetlands in Chain-of-Lakes area south of Eureka.

Cratoneuron filicinum (Hedw.) Spruce

Common in calcareous springs throughout KNF.

Cynodontium strumiferum (Hedw.) Lindb.

Soil over rock; rare; low hills between Rattlebone Fen and Dickey Lake (Spribille 3614).

Desmatodon cernuus (Hub.)Bruch & Schimp. in B.S.G.

Rare; one record on damp calcareous soil, pond near Rock Lake, Fortine District (Spribille 5541).

Dichodontium olympicum Ren. & Card.

Soil in subalpine; rare.

D. pellucidum (Hedw.) Schimp.

Wet soil and rock; Bear Creek, east side of Cabinet Mountains (Elliott 1670), Swamp Creek, Salish Mountains, and Wigwam River..

Dicranella crispa (Hedw.)Schimper

On soil in Wigwam River drainage and Salish Mountains; probably more common than few records indicate.

D. grevilleana (Bridel)Schimper

Rare on bare soil in Whitefish Range at Stahl Creek (Spribille 5781).

D. palustris (Dicks.)Crundw. *ex* Warb.

Wet road side ditch, one mile south of Hawkins Pond (Elliott and Arvidson 2502); known from one other location in Montana in Glacier National Park (Hermann 1969).

D. schreberiana (Hedw.)Schimper

On wet limestone soil; known from Magnesia Creek and un-named creek near Stryker (Spribille s.n.).

Dicranoweisia crispula (Hedw.)Lindberg *ex* Milde

One of the most common dicranoid mosses on rock throughout the KNF.

Dicranum elongatum Schleich. *ex* Schwaeg.

Snowmelt basins in sub-alpine; Ten Lakes Scenic Area (Spribille 4303), Divide Creek (Spribille 4198).

D. fuscescens Sm.

Logs and stumps; common in spruce-fir forests.

D. pallidisetum (Bailey)R. Ireland

Common in moist, subalpine forests of Whitefish and Purcell ranges; also known from one collection in the Salish Mountains at Sterling Creek..

D. polysetum Sw.

Locally common in Douglas-fir forest, in drier habitats than other members of the genus; Tobacco Valley, Mud Creek, Dickey Lake, Sinclair Creek..

D. scoparium Hedw.

Soil, humus, and rotten wood; widespread.

D. spadiceum Zett.

Whitefish Range; Wolverine Basin (Spribille 6227).

D. tauricum Sapeh.

Rotten logs and tree bases; common from lowlands to subalpine (T.Spribille pers.comm.).

Didymodon rigidulus var. *gracilis* (Schleich. ex Hook. & Grav.) Zand.

Soil over rock; known from one location,Highway 2 Trail, one-half mile southwest of Kootenai Falls (Elliott 2887).

D. vinealis (Brid.)Zand.

Rare; wet rocks above Kootenai Falls (Flowers 10,252, Elliott *s.n.*).

Distichium capillaceum (Hedw.)Bruch & Schimp. *in* B.S.G.

Rock and soil, often on slopes; common.

Ditrichum flexicaule (Schwaegrichen)Hampe

Frequent over rock at lower elevations (T.Spribille pers.comm.).

D. pusillum (Hedw.) Hampe

Soil; rare; (Pierce 1528 MONTU).

Drepanocladus aduncus (Hedw.) Warnst.

Wet soil, sometimes semi-aquatic; common.

D. sendtneri (Schimp. *ex* H. Mull) Warnst.

Wet soil in rich calcareous fens; Dudley Slough (Lesica s.n.).

Dryptodon patens (Hedw.) Brid.

Pacific maritime, rock; common and widespread.

E. ciliata Hedw.

One collection from soil, south of Eureka (Lolley s.n.).

E. procera Bruch

Soil over rock; Highway 2 Trail, south of Kootenai Falls (Elliott 2890).

E. rhaptocarpa Schwaegr.

Soil over rock; west face of Mount Marston and Salish Mountains.

Eurhynchium oreganum (Sull.)Jaeg.

Pacific maritime, wet rotten wood, and humus; usually under old-growth cedar/hemlock in riparian areas; Sutton Creek (Elliott 2363), Zulu Creek (Elliott 2375, Cedar Creek, and Cabinet Mountains (Arvidson and Spribille 4717)..

E. pulchellum (Hedw.) Jenn

Tree bases and logs; common.

Fissidens grandifrons Bridel

Wet rocks in calcareous springs and streams.

Fissidens bryoides Hedw.

Locally common on soil of upturned tree bases, often with *Atrichum selwynii* (T. Spribille pers.comm.).

Fontinalis antipyretica Hedw.

Submerged in flowing streams; common.

Fontinalis hypnoides Hartm.

Flowing streams and ponds, often alkaline; floating loose in Murphy Lake (T. Spribille pers.comm.).

F. neomexicana Sull. & Lesq.

Endemic to the Pacific Northwest; most common *Fontinalis* in western Montana.

Funaria hygrometrica Hedw.

Cosmopolitan, disturbed soil; common. Frequent following fire, often with *Ceratodon purpureus*.

Grimmia anondon Bruch & Schimp. *in* B.S.G.

One collection from the headwaters of Meadow Creek, Salish Mountains (Spribille 3376).

G. donniana Sm.

Acidic rock; rare; west face of Mount Marston (Spribille 3671B).

G. montana B.S.G.

Rock; Eversman and Sharp (1980) report this species for Lincoln County.

G. pulvinata (Hedw.) Sm.

Only record for KNF is on an old stump, impregnated with calcareous dust along a county road. Normally, this moss would grow on rock or, sometimes, concrete.

G. tenerrima Ren. & Card.

Common in sub-alpine on rock.

Gymnostomum aeruginosum Sm.

Dripping calcareous rock in subalpine; Wolverine Creek (Spribille 4283).

Hamatocaulis vernicosus (Mitt.)Hedenas

Mineral-rich springs and calcareous waters; rare; Rattlebone Fen (Spribille 3581), Cody Lake Fen (Elliott 2792), Louis Lake (Spribille 3445)..

Helodium blandowii (Web. & Mohr.) Warnst.

Rich fens; Magnesia Fen, Bowen Creek Fen (Elliott 2534), Cody Lake Fen (Reichel *s.n.).*

Heterocladium dimorphum (Brid.) Schimp. *in* B.S.G.
Rock in spruce-fir forests in northern Salish Mountains.

Homalothecium fulgescens (Mitt. *ex* C. Mull.) Lawt.
Rotten wood near Eureka (Lolley s.n.).

H. nevadense (Lesq.) Ren. & Card.
Dry rock, western North America; common.

Hygroamblystegium tenax (Hedw.) Jenn.
Rocks in flowing water and seeps; Murphy Creek, near outlet of Murphy Lake (Spribille 3129).

Hygrohypnum cochlearifolium (Vent. *ex* DeNot) Broth.
Pacific maritime, wet places in mountains; rare, known from collection of W. Schofield (MONTU) along Leigh Lake Trail, Cabinet Mountains.

H. luridum (Hedw.) Jenn.
Streams and wet places; wet spray of Kootenai Falls (Elliott s.n.) and Stahl Creek, Whitefish Range..

H. ochraceum (Turn. *ex* Wils.) Loeske
Rocks in streams and springs; Divide Creek (Spribille 4204A).

Hylocomium splendens (Hedw.) B.S.G.
Soil and humus in coniferous boreal and montane forests; one of the most common forest mosses.

**Hypnum callichroum* Funck *ex* Brid.
Soil over rock; Highway 2 Trail, south of Kootenai Falls (Elliott 2891) (verification pending).

Hypnum lindbergii Mitt.
Wet soil; Cody Lake Fen (Reichel *s.n.*), frequent in shrub carrs in Fortine District.

H. pallescens (Hedw.) P. Beauv.
Rotten wood; Swamp Creek and Salish Mountains.

H. pratense (Rabenh.) W. Koch *ex* Spruce
Damp soil often in fens; Swamp Creek, Salish Mountains (Vanderhorst *s.n.*),

H. recurvatum (Lindb. & Arn.) Kindb.
One collection from the Purcell Mountains (Arvidson s.n.).

H. revolutum (Mott.)Lindb.

On rock and soil over rock; common.

Isopterygiopsis pulchella (Hedw.)Iwats.

Soil, trees, and rotten wood at high elevations; reported for Lincoln County by Eversman and Sharp (1980).

Isothecium myosuroides Brid.

On wood; rare; Highway 2 Trail (Elliott 2880).

Leptobryum pyriforme (Hedw.) Wils.

Cosmopolitan, soil and rotten wood; common.

Leptodictyum riparium (Hedw.) Warnst.

Wet soil in fens; rare; Fen south of Fish Lake near Stryker (Spribille 3173B).

**Leucolepis acanthoneuron* (Schwaegr.) Lindb.

Pacific-maritime; humus under canopy of cedar/hemlock; Cedar Creek Trailhead, 4 miles west of Libbey (Elliott/ Spribille collection).

Limprichtia cossonii (Schimp.)

Wet soil in calcareous fens; numerous locations on Fortine District.

L. revolvens (Sw.)Loeske

Rare; rich fens in Fortine and Eureka districts (T. Spribille pers.comm.) Specimens that I tentatively identified as *L. revolvens*, from Magnesia Fen need to be re-examined to determine if they are actually *L. cossonii.*

Meesia longiseta Hedw.

Rare; fen at confluence of Lime and Magnesia creeks; known in Montana from early collection in Glacier National Park.

Meesia triquetra (Richt.) Angstr.

Wet soil in Rattlebone Fen, Bowen Creek Fen, Wigwam River Fen, and Purcell Fen (Spribille and Elliott collections).

Meesia uliginosa Hedw.

Wet soil along Lime Creek, uncommon. Chadde collection at Intermountain Research Station Herbarium, Missoula, Montana..

Metaneckera menziesii (Hook. *ex* Drumm.) Steere.

Rock; common.

Mnium blyttii Bruch & Schimp. *in* B.S.G.
Calcareous soil and rock in Ten Lakes Scenic Area (Spribille).

Mnium spinulosum B.S.G.
Rotten wood and moist soil; common.

Mnium thomsonii Schimp.
Damp, shaded soil; Kelsey Creek and Pipe Creek (Vanderhorst *s.n.*).

Oligotrichum aligerum Mitt.
Pacific maritime, soil; rare; trail to Leigh Lake in Cabinet Mountains (Elliott and Moore 1989).

Oncophorus virens (Hedw.) Bridel
Soil, usually damp in subalpine; Wolverine Creek (Spribille 4289B).

O. wahlenbergii Bridel
Cabinet Mountains (Spribille and Arvidson 4730).

Orthotrichum anomalum Hedw.
Rock in subalpine; limestone ridge between Kopsi and Blue Sky creeks (Spribille 4243), Salish Mountains, and Sterling Creek 5289B).

O. laevigatum Zett.
Rock; unknown status; reported by Eversman and Sharp (1980) for Lincoln County.

O. obtusifolium Brid.
Trees, usually cottonwood; common throughout KNF.

O. rupestre Scheich. *ex* Schwaegr.
Noncalcareous rock; common.

O. speciosum Nees *ex* Sturm
Trees and sometimes rock; common.

Palustriella commutata (Brid.) Ochyra
Very wet soils; common.

Philonotis fontana (Hedw.) Brid.
Wet soil; common.

P. fontana var. *pumila* (Turn.)Brid.
Wet soil in fens.

Plagiomnium cuspidatum (Hedw.) T. Kop.

Damp, shaded soils; Houghton Creek (Elliott 2372), Forest Creek (Vanderhorst *s.n.*).

Plagiomnium drummondii (Bruch & Schimp.)T. Kopl.

Damp, shaded soil; Kelsey Creek (Elliott 2776).

P. ellipticum (Brid.) T. Kop.

Wet soils in base-rich fens; Bowen Creek Fen (Elliott 2345), Jumbo Lake (Vanderhorst *s.n.*).

P. insigne (Mitt.)T. Kop.

Pacific-maritime; Moist humus, under old-growth cedar/hemlock; Kelsey Creek, Alexander Mountain, and Sutton Creek (Elliott collections).

P. medium (B.S.G.) Kop.

Wet soil; most common *Plagiomnium* on KNF; Magnesia Fen (Elliott 2813), Berray Cedars, Alexander Creek, and Zulu Creek.

P. venustum (Mitt.) T. Kop.

Damp, shaded soils and humus Highway 2 Trail, south of Kootenai Falls (Elliott 2879).

Plagiothecium laetum Schimp. in B.S.G.

Common on rotten wood and tree boles in moist forest habitat types throughout the KNF.

Pleurozium schreberi (Brid.) Mitt.

Circumboreal, humus, and rotten logs; common in conifer forests.

Pogonatum urnigerum (Hedw.) Beauvois

Soils, often disturbed such as on road cuts at higher elevations.

Pohlia cruda (Hedw.)Lind.

Uncommon; soil over Rock along Highway 2 Trail southwest of Kootenai Falls (Elliott 2885), Wolf Creek drainage (Spribille collection).

P. longicolla (Hedw.) Lindb.

Soil; Teepee Lake fen (Elliott 2806).

P. nutans (Hedw.) Lindb.

Soil and rotten wood; common.

P. wahlenbergii (Web.& Mohr) Andrews

Emergent from seeps and springs, often calcareous; Highway 2 Trail (Elliott 2895).

Polytrichastrum alpinum (Hedw.)G.L. Sm.

Soil; along road to Snowshoe Mine in Cabinet Moutains (Elliott *s.n.*), Bear Creek old-growth, Cabinet Mountains (Elliott 1617).

Polytrichum juniperinum Hedw.

Soil; common.

P. longisetum Brid.

Soil; Rock Creek Meadows, talus below Saint Paul Peak (Elliott collections) and Purcell Summit (Spribille and Arvidson 5881).

P. lyallii (Mitt.) Kindb.

Common in subalpine forests.

P. piliferum Hedw.

Common on soil.

P. sexangulare Bridel

Soil, often wet, at high elevations; rare; ridge between Rainbow Lake and Ten Lakes Basin (Spribille 4301).

Pseudoleskea patens (Lindb.)Kindb.

Reported by Eversman and Sharp (1980) for Lincoln County.

Pseudoleskea radicosa (Mitt.) Mac. & Kindb.

Common moss growing on rocks.

Pterigynandrum filiforme Hedw.

Rock and wood; common.

Ptilium crista-castrensis (Hedw.) De Not.

Common on soil and humus under forest overstory.

**Racomitrium brevipes* Kindb.

Damp soil in subalpine; rare (Spribille 4162A)

R. ericoides (Web.*ex* Brid.) Brid.

Soil over rock; Highway 2 Trail (Elliott 2889).

R. canescens (Hedw.) Brid.

Rock and soil; common throughout KNF.

R. heterostichum (Hedw.) Brid.
Rock; Highway 2 Trail, south of Kootenai Falls (Elliott 2886); common throughout KNF.

R. lanuginosum (Hedw.) Brid.
Rock; Three Rivers District, Shannon Lake (Spribille 4619).

**R. pygmaeum* Frisv.
Damp soil in subalpine; rare; Divide Creek (Spribille 4127).

R. sudeticum (Funck) Bry. Eur.
Rock and soil over rock; subalpine; Wolverine Basin, ridge north of Divide Creek (Spribille collections).

Rhizomnium magnifolium (Horik.) T. Kop.
Damp, shaded soil; Chief Creek, southeast of Libby (Vanderhorst *s.n.*), Hemlock Creek, northwest of Libby (Vanderhorst *s.n.*).

R. nudum (Brit.& Williams)T.Kop.
Moist soil and humus; most common *Rhizomnium* on KNF.

R. pseudopunctatum (Bruch & Schimp.) T. Kop.
Moist, shaded soil; Forest Creek, northwest of Troy (Vanderhorst *s.n.*).

Rhydidiadelphus loreus (Hedw.) Warnst.
Moist, shaded soil; Cedar Creek , four miles west of Libby (Spribille and Elliott 3004).

R. squarrosus (Hedw.) Warnst.
Wet soil and wood; rare; upper Libby Creek, Cabinet Mountains Wilderness (Elliott 1530).

R. triquetrus (Hedw.) Warnst.
Humus and logs; common.

Rhytidiopsis robusta (Hook.) Broth.
Pacific maritime, soil, and humus; common; endemic to Pacific Northwest.

Rhytidium rugosum (Hedw.)Kindb.
Uncommon; dry, soil in open forest near Kootenai Falls; known from Flowers collection (10,246).

Roellia roellii (Borth. *ex* Roll.) Andr. *in* Crum
Pacific maritime, soil, and humus; common; may be associated with old-growth forests; Zulu Creek (Elliott 2785), Redtop Creek (Vanderhorst *s.n.*), and Forest Creek (Vanderhorst *s.n.*).

Scanionia uncinata (Hedw.) Loeske
Common on rotten wood and rock.

Schistidium agassizii Sull. & Lesq.
Rocks in splash zone of streams; Clarence Creek (Spribille 4249).

Schistidium apocarpum (Hedw.) B.&S. *in* B.S.G.
Rock; common.

S. tenerum (Zetterstedt) Nyholm
Rock; Bluebird Lake Trail (Spribille *s.n.*).

Scleropodium obtusifolium (Jaeq. & Sauerb.) Kindb. *ex* Mac. & Kindb.
Pacific maritime, wet rock often submerged; Purcell Mountains, North Fork Big Creek, Leigh Creek in Cabinet Mountains (Elliott *s.n.*).

Scorpidium scorpioides (Hedw.) Limpr.
Circumpolar, wet soil of rich fens; restricted to calcareous seeps and fens; Rattlebone Fen, Dudley Slough, Collins Fen, Hidden Lake Fen, and Cody Lake Fen (Elliott and Spribille collections)

Scouleria aquatica Hook.
Pacific maritime, wet rock, often submerged; Rock Creek, Edna Creek, Swamp Creek, Salish Mountains, Leigh Creek, Cabinet Mountains (Elliott *s.n.*).

Sphagnum angustifolium (C. Jens. *ex* Russ.) C. Jens.
Wet peat in bogs and fens; Purcell Fen (Spribille 5745), Purcell Summit Fen (Arvidson 354).

Sphagnum capillifolium (Ehrh.) Hedw.
Wet soil and peat; Purcell Fen (Spribille 5879), Purcell Summit Fen (Arvidson 354A).

S. centrale C. Jens.
Rare; fens in Salish Mountains (Spribille 5743, 5817)

S. compactum DC. *ex* Lam. & DC.
Rare; wet soil and peat; Purcell Mountains along the Idaho border, south of Canuck Pass (Arvidson 88).

S. girgensohnii Russ.
Rare; wet soil in old-growth hemlock stand in upper Libby Creek, Cabinet Mountains (Elliott 1518).

**S. lindbergii* Schimp. *in* Lindb.
Rare; Purcell Fen (Spribille 5750) (pending verification).

S. magellanicum Brid.
Fens; rare but locally abundant in Purcell Fen (Spribille 5747).

S. russowii Warnst.
Wet soil and peat; common and widespread.

S. squarrosum Crome
Wet soil; common; appears to be restricted to western Montana.

S. subsecundum Nees *ex* Sturm
Wet soil and peat; common.

S. teres (Schimp.) Aongstr. *ex* C. Hartm.
Wet soil; common.

S. warnstorfii Russ.
Wet soil and peat; common.

**S. wulfianum* Girg.
Known from one station in Montana, West Basin Fen in Purcell Mountains (Arvidson and Sedler 431).

**Splachnum sphaericum* Hedw.
Rare; on cattle dung in spruce swamp along Brown's Creek in Salish Mountains (Spribille 5625)

**S. vasculosum* Hedw.
(Pending verification)

Tetraphis pellucida Hedw.
Infrequent on rotten and soil.

Thuidium recognitum (Hedw.) Lindb.
Soil, rock, and rotten wood, usually calcareous; common; Homes Lake (Vanderhorst *s.n.*), Magnesia Creek (Vanderhorst *s.n.*.).

Timmia austriaca Hedw.
Moist, shaded soil; Sutton Creek (Elliott 2364).

T. megapolitana Hedw.
Common on soil under forest canopy.

Tomentypnum nitens (Hedw.) Loeske
Moist soil in fens; common; Bowen Fen, Cody Lake Fen, Magnesia Fen (Elliott collections).

Tortella fragilis (Hook. & Wils *in* Drumm) Limpr.
Soil and soil over rock; rare; known from two collections in Salish Mountains.

T. tortuosa (Hedw.) Limpr.

Soil and stone, usually calcareous; Cat Creek Trail, above Grave Creek (Spribille 3337), Wolverine Basin, and Stahl Creek (Spribille 6585).

Tortula mucronifolia Schwaegrichen

Soil and soil over rock. Sinclair Creek (Spribille 3143B), Murphy Lake, and Grave Creek (Spribille 5755).

T. ruralis (Hedw.) Gaertn.

Soil and soil over rock; common.

Trachybryum megaptilum (Sull.) Schof.

Pacific maritime, soil over rock; infrequent; edge of range in northwestern Montana; Rock Creek in Cabinet Mountains, Bull Lake, Troy Ranger Station, and south of Eureka.

Warnstorfia exannulata (Schimp. in B.S.G.)Loeske

Circumboreal, submerged, or emergent from high elevation Purcell Fen (Spribille 5755).

W. fluitans (Hedw.)Loeske

Submerged or emergent in wetlands. Wolverine Creek, subalpine swamp (Spribille 4273A), alder/spirea carr on east side of Bull Lake (Lesica *s.n.*), Rock Creek Meadows in Cabinet Mountains (Elliott 1538).

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