

***Surveys for Rare Species of Bryophytes and Lichens on High Coastal  
Peaks in Oregon***

David Kofranek Botany, LLC  
davekofranek@gmail.com  
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## PROJECT SUMMARY

“These basalt flows, which reached the coast, rank among the longest on earth. They surged 300 miles from eastern Oregon and Washington. The dark brown rocks of Saddle Mountain are not native to the Coast Range. Like similar rocks on Onion Peak and other basaltic northern coastal mountains, they are eastside interlopers, bareheaded, dryland immigrants peering over the shoulders of the tree-shrouded, rain-sodden Coast Range”

-Bishop, Ellen Morris. *In Search Of Ancient Oregon A Geological And Natural History*. 2003. Timber Press Inc.

## BACKGROUND

In the extreme northwest corner of the state, Saddle Mountain, Curry County (Oregon State Natural Area), rises to 3,287 ft. just 11 miles from the ocean. This unique combination of physical characteristics matches those of cold maritime conditions of Southeast Alaska. Consequently, about a dozen species of rare bryophytes and lichens reside on Saddle Mt. and adjacent Onion Peak but nowhere else in Oregon or farther south. This location represents the southern range limit of the populations of those species establishing it as one of Oregon’s hot spots. It has been studied almost as long ago as a half century (Chambers, 1973).

During a routine non-vascular plant survey preceding a timber sale in the Siuslaw Field Office (F.O.) of Northwest Oregon District BLM, *Bryoria bicolor* (G4, S2, ORBIC2, ORSEN) was found. This species is not well known outside of Saddle Mt. Finding it prompted the question, “How far do species from Alaska or Saddle Mt. trickle south along the chain of high coastal peaks?”

This study was proposed to systematically search coastal peaks  $\geq 2,500$  ft. in elevation and  $\leq 25$  miles from the Pacific Ocean. These parameters would potentially reveal locations that match the temperatures and humidity of Southeast Alaska, Saddle Mt., and species that live there.

**Below: target species mostly known only from Saddle Mt. Clatsop Co. Species found in study area in bold.**

MOSSES
<i>Encalypta brevipes</i>
<i>Iwatsukiella leucotricha</i>
<i>Rhytidium rugosum</i>
LICHENS
<b><i>Bryoria bicolor</i></b>
<b><i>Bryoria tenuis</i></b>
<i>Sticta arctica</i>

LIVERWORTS
<i>Barbilophozia barbata</i>
<i>Herbertus aduncus</i> ssp. <i>aduncus</i>
<i>Herbertus dicranus</i>
<i>Plagiochila semidecurrens</i> var. <i>semidecurrens</i>
<i>Radula brunnea</i>
<i>Radula obtusiloba</i> ssp. <i>polyclada</i>
<i>Tritomaria quinquedentata</i>

## RESULTS

Fieldwork was from May through August 2019. A total of 38 species were found that are considered rare, uncommon, or not usually encountered in coastal areas. There is a noticeable north-south gradient in terms of the presence of target species. Mt. Hebo has the most notable

species because of its fairly northern location, habitats, and rock faces. Tillamook F.O. is more north, but most surveyed sites lacked extreme topography and features. According to the results, Marys Peak F.O. is the southern limit of northern target species. Gold Beach Ranger District (R.D.) has many notable species but they are montane to subalpine not necessarily north coastal.

Below: species in bold are rare and/or listed. Species not in bold are noteworthy being uncommon, previously listed, or not usually encountered in coastal areas. (x) = found just out of survey area.

	Hebo R.D.	Marys Pk F.O.	Gold Beach R.D.	Siuslaw F.O.	Tillamook F.O.	Powers R.D.
MOSSES						
<b>Bucklandiella brevipes</b>	X					
<b>Bucklandiella macounii</b> <b>ssp. alpina</b>		X	X			
<b>Codriophorus fascicularis</b>	X	X				
<b>Codriophorus ryszardii</b>	X	X			X	
<b>Cynodontium jeneri</b>	X					
<b>Dicranum bonjeanii</b>	X					
<i>Didymdon nicholsonii</i>			X			
<b>Grimmia longirostris</b>			X			
<i>Hedwigia stellata</i>						X
<b>Pohlia bolanderi</b>			X			
<i>Pseudoleskeella</i> <i>serpentinensis</i>			X			
<b>Racomitrium lanuginosum</b>	X	X				
<b>Scouleria siskiyouensis</b>			X			
<b>Sphagnum contortum</b>	X					
<b>Tetraplodon mnioides</b>	X	X		X		
LIVERWORTS						
<b>Barbilophozia floerkei</b>	X					
<b>Marsupella sprucei</b>		X	X			
<b>Scapania scandica</b>	X	X				
LICHENS						
<b>Bryoria bicolor</b>	X	X		X	X	
<b>Bryoria tenuis</b>	X				X	
<i>Cladonia ecmocyna</i> ssp. <i>occidentalis</i>			X			
<i>Cladonia verticillata</i>	X					
<i>Coelocaulon aculeatum</i>			X			
<i>Ephebe lanata</i>			X			
<i>Hypogymnia duplicata</i>		X				
<i>Melanelia hepatizon</i>			X			
<i>Montanelia panniformis</i>			X			
<i>Parmeliella parvula</i>	X			X		
<b>Pilophorus nigricaulis</b>	X	X				

	Hebo R.D.	Marys Pk F.O.	Gold Beach R.D.	Siuslaw F.O.	Tillamook F.O.	Powers R.D.
<i>Pseudocyphellaria mallota</i>	X	(X)		X		
<i>Scytinium platynum</i>			X			X
<i>Sulcaria spiralifera</i> (chemotype 1)	X					
<i>Sticta weigellii</i>		X				
<i>Usnea longissima</i>	X	X			X	
<i>Xanthoparmelia mougeotii</i>	X					

### SIGNIFICANT SPECIES

Of the suite of 13 species mostly restricted to Saddle Mt., two were found: *Bryoria bicolor* and *B. tenuis*. The latter is only the second record for the state after the first record some decades ago.

The notable species are predominantly from subalpine habitats of interior mountains. This appears to be a floristic pattern that the range of upper elevation species of interior mountains tapers in the south to the coast. The coast provides these species cool summer temperatures and regular fog, conditions that are not present in the interior mountains at those same latitudes.

### HABITAT

Within the parameters of elevation and distance from the ocean, habitats were sought based on coming closest to Southeast Alaskan or Saddle Mt. conditions. This entailed seeking out harsh settings at exposed upper elevations that are perennially damp, cool, and with a northern aspect.

In the southern part of the study area, in the Rouge River-Siskiyou National Forest (N.F.), it became immediately apparent that proximity to the ocean is more influential than elevation. The benefits of the proximity to the ocean are dependent on the fog belt. In the north the fog belt widens. The influence of fog was observed at multiple scales. At the landscape level it ranged from physical features directly intercepting the humidity to slightly drier nearby features in their fog shadow. Similarly, species composition in some cases changes from windward to leeward sides.

Being at least partly north facing is a requirement.

Rock features in these situations often have the most interesting species. Big prominent rock surfaces exposed to prevailing fog or winter storms are the best (i.e., Mt. Hebo, Rocky Pt., Signal Buttes).

Likewise, areas with heightened edge effect where tree stands are exposed to the north also have interesting species. Favorable exposure is produced by a number of factors such as being along the upslope side of a road with a younger shorter stand on the downhill side of the road. Additionally having snags, hardwood gaps, or other breaks on the downslope side increasing exposure to the optimally older trees upslope is advantageous.

The shape of the feature directly exposed to fog could be another factor affecting the distribution of these species. Pinnacle-shaped formations are more exposed to severe conditions (colder temps) during winter storms but are prone to drying out faster or for longer periods in other seasons. Conversely, mound-shaped rock features could be more moderated in temperature and moisture.

### INDICATOR / ASSOCIATED SPECIES

The following species are useful in the field during similar surveying by alerting one to “Slow down, getting close”. They are in order of strength of correlation with suitable habitat:

*Loxosporopsis corallifera*

*Ptilidium californicum*

*Ulotia megalospora*

*Douinia ovata*

*Platismatia stenophylla* (not necessarily an indicator species, but often prevalent where conditions are suitable).

### RECOMMENDATIONS

Many other intriguing peaks remain to be surveyed.

Disappointingly but not surprisingly, young forests were found on top of sites that looked to have great potential. Grindstone Mt., Tillamook F.O., is one of these in having a dramatic pinnacle summit with some exposed rock but the forest is too young and it was the sight of a former fire lookout. Both of these are inherently disrupting processes: harvesting and construction. If managed differently this peak can still fulfill its floristic potential. These coastal peaks have been impacted by fire, logging, and fire lookouts. Now logging, communication towers, quarrying, fire, and climate change threaten them.

This study has made it evident that high coastal mountains support species out of their usual ranges and habitats. These populations at the fringes of their ranges or physiological tolerances contribute unique diversity to these areas and genes to their species. In light of this, coastal mountains in Oregon above 2,500 ft., especially ridges and summits, should be treated as special habitats.

The Roman Nose area, Siuslaw F.O., is currently in the process of becoming an ACEC, Roman Ridge PACEC, because of these special land features, conditions, habitats, and species.

The cultivation of trees in specific areas to promote the establishment of rare epiphytic species could be an easy practice. A simple example would be to spare some scattered conifers around the edges of the meadows on Mt. Hebo the next time cutting is planned. Features in place for hundreds of years accumulate more than common species.

In settings where rock faces or trees in the habitat described above are threatened by encroachment of trees, then consideration of cutting them should be taken. If rocky features or large tree boles have notable species on them and young trees are in the way of their direct exposure to fog, then the young trees could be removed or topped to maintain the situation that is already established. An analogy would be of a homeowner keeping the vegetation low in front of their large window view of the ocean.

### MISCELLANEOUS

The report for Siuslaw F.O. (2015) is included in its original form to better complete the representation of these habitats throughout the Coast Range.

### ACKNOWLEDGMENTS

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- I am grateful to the following federal botanists for supporting the project, providing maps, and in some cases guiding me to study areas:

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Ian Grinter, Tillamook Field Office, Northwest Oregon District BLM

Matt Smith & Ken Hiser, Hebo Ranger District, Siuslaw N.F.

MT HEBO RANGER DISTRICT  
SIUSLAW NATIONAL FOREST, TILLAMOOK & YAMHILL COUNTIES

**Mt. Hebo Special Interest Area Survey Area**

**July 8-14, 2019**

3,200 ft. elevation

11 miles from the ocean.

The Mt. Hebo Special Interest Area was surveyed for rare species of bryophytes and lichens. The following is a written description of the study site, habitats, and species. There is also a spreadsheet that further details waypoint coordinates, collection numbers etc. The survey targeted northern species that reach their southern limit along the high peaks of the Oregon Coast. There were five habitats surveyed. They are in order of richness: cliffs, fen, meadows, forest, and the old radar site. These are described and discussed below. A total of 154 species were recorded: 62 mosses, 18 liverworts, and 74 lichens. Of those, 19 species (12%) were found to be either State Listed with the Oregon Biodiversity Information Center (ORBIC), rare, or noteworthy.

State Listed species found that were on the target list:

*Bucklandiella brevipes* moss

*Codriophorus ryszardii* moss

*Cynodontium jenneri* moss

*Tetraplodon mnioides* moss

*Bryoria bicolor* lichen

*Pilophorus nigricaulis* lichen

*Pseudocyphellaria mallota* lichen

Rare species but not State Listed:

*Codriophorus fascicularis* moss

*Racomitrium lanuginosum* moss

*Sphagnum contortum* moss

*Barbilophozia floerkei* liverwort

*Scapania scandica* liverwort

*Bryoria tenuis* lichen

Noteworthy species:

*Bucklandiella occidentalis* s.s. moss

*Dicranum bonjeanii* moss

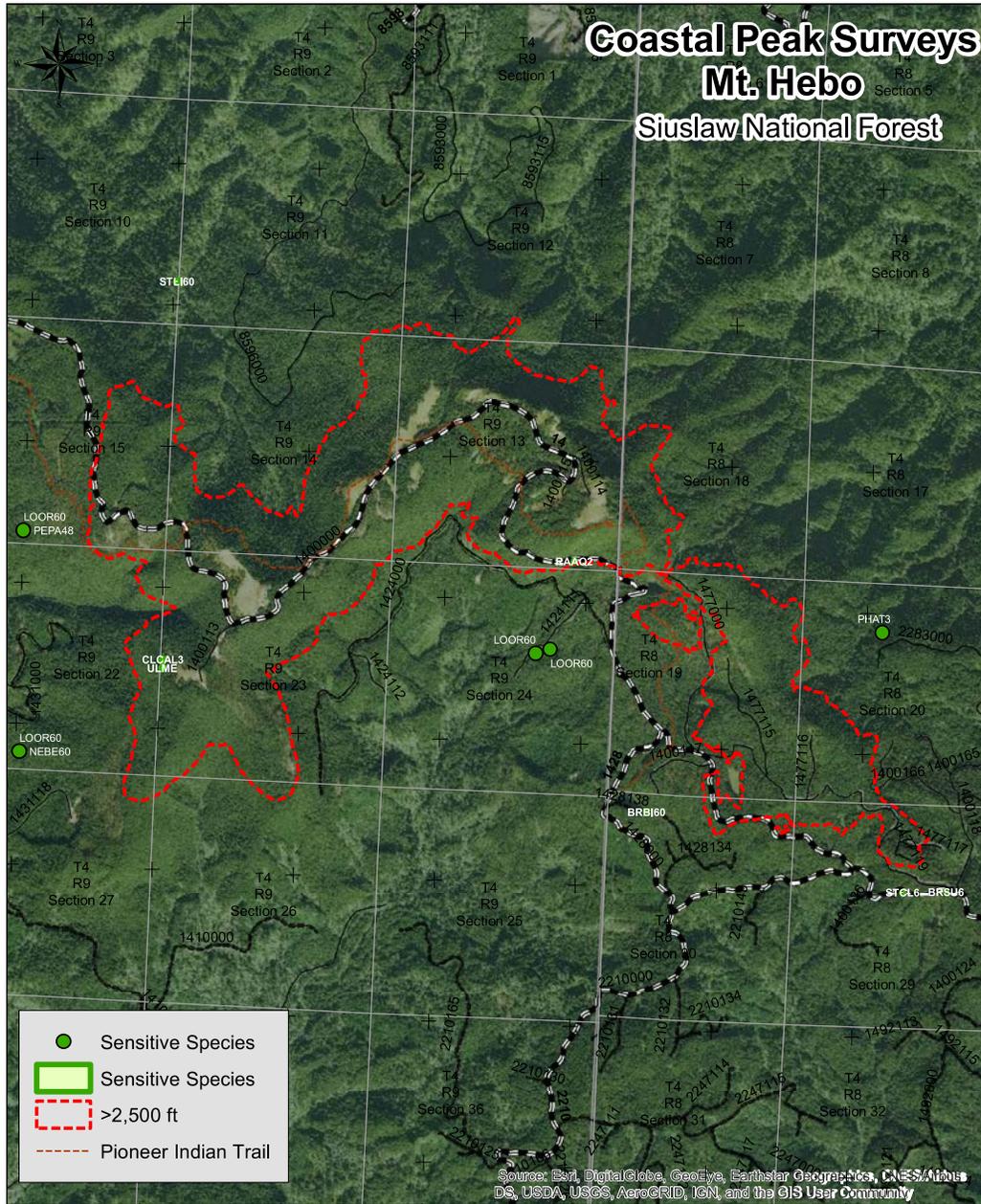
*Cladonia verticillata* lichen

*Sulcaria spiralifera* (syn. *Bryoria pseudocapillaris*) lichen

*Usnea longissima* lichen

*Xanthoparmelia mougeotii* lichen

Below: map of the study area: Mt. Hebo Special Interest Area.





Below: species list for all bryophytes and lichens encountered in the study area during the survey.

Mt. Hebo Species List	<i>Orthotrichum lyellii</i>
<b>MOSESSES</b>	<i>Plagiomnium insigne</i>
<i>Andreaea rupestris</i>	<i>Pleurozium schreberi</i>
<i>Antitrichia curtipendula</i>	<i>Pogonatum urnigerum</i>
<i>Aulacomnium androgynum</i>	<i>Pohlia cruda</i>
<i>Aulacomnium palustre</i>	<i>Pohlia nutans</i>
<i>Bartramia pomiformis</i>	<i>Polytrichastrum alpinum</i>
<i>Brachythecium albicans</i>	<i>Polytrichum commune</i>
<i>Bryum argenteum</i>	<i>Polytrichum juniperinum</i>
<i>Buckiella undulata</i>	<i>Polytrichum piliferum</i>
<i>Bucklandiella affine</i>	<i>Pseudotaxaphyllum elegans</i>
<b><i>Bucklandiella brevipes</i></b>	<i>Pterigynandrum filiforme</i>
<b><i>Bucklandiella occidentalis s.s.</i></b>	<i>Ptychostomum pseudotriquetrum</i>
<i>Ceratodon purpureus</i>	<b><i>Racomitrium lanuginosum</i></b>
<i>Claopodium bolanderi</i>	<i>Rhizomnium glabrescens</i>
<i>Codriophorus acicularis</i>	<i>Rhytidiadelphus loreus</i>
<b><i>Codriophorus fascicularis</i></b>	<i>Rhytidiadelphus triquetrus</i>
<b><i>Codriophorus ryszardii</i></b>	<i>Rhytidiopsis robusta</i>
<i>Codriophorus varius</i>	<i>Sarmentypnum exannulatum</i>
<b><i>Cynodontium jenneri</i></b>	<i>Schistidium papillosum</i>
<i>Dicranella varia</i>	<b><i>Sphagnum contortum</i></b>
<i>Dicranoweisia cirrata</i>	<b><i>Tetraplodon mnioides</i></b>
<b><i>Dicranum bonjeanii</i></b>	<i>Ulota megalospora</i>
<i>Dicranum tauricum</i>	<i>Ulota obtusiuscula</i>
<i>Funaria hygrometrica</i>	
<i>Grimmia ramondii</i>	<b>LIVERWORTS</b>
<i>Grimmia torquata</i>	<b><i>Barbilophozia floerkei</i></b>
<i>Grimmia trichophylla</i>	<i>Calypogeia azurea</i>
<i>Homalothecium megaptilum</i>	<i>Cephalozia bicuspidata</i>
<i>Homalothecium nuttallii</i>	<i>Cephaloziella divaricata</i>
<i>Hylocomium splendens</i>	<i>Cephaloziella sp.</i>
<i>Hypnum circinale</i>	<i>Diplophyllum albicans</i>
<i>Hypnum dieckei</i>	<i>Douinia ovata</i>
<i>Hypnum subimponens</i>	<i>Frullania nisquallensis</i>
<i>Imbricarium muehlenbeckii</i>	<i>Lophozia sudetica</i>
<i>Isothecium stoloniferum</i>	<i>Marsupella emarginata</i>
<i>Kindbergia oregana</i>	<i>Marsupella sphacelata</i>
<i>Kindbergia praelonga</i>	<i>Nardia scalaris</i>
<i>Leucolepis acanthoneura</i>	<i>Ptilidium californicum</i>
<i>Neckera douglasii</i>	<i>Radula bolanderi</i>
<i>Niphotrichum elongatum</i>	<i>Scapania americana</i>

<i>Scapania bolanderi</i>
<b><i>Scapania scandica</i></b>
<i>Scapania umbrosa</i>
LICHENS
<i>Alectoria imshaugii</i>
<i>Alectoria sarmentosa</i>
<i>Bryoria americana</i>
<b><i>Bryoria bicolor</i></b>
<i>Bryoria glabra</i>
<b><i>Bryoria tenuis</i></b>
<i>Cladonia bellidiflora</i>
<i>Cladonia carneola</i>
<i>Cladonia coniocraea</i>
<i>Cladonia furcata</i>
<i>Cladonia pyxidata</i>
<i>Cladonia squamosa</i> var. <i>squamosa</i>
<i>Cladonia transcendens</i>
<b><i>Cladonia verticillata</i></b>
<i>Fuscopannaria leucostictoides</i>
<i>Hypogymnia inactiva</i>
<b><i>Hypogymnia</i> sp. 1</b>
<i>Hypogymnia enteromorpha/apinnata</i>
<i>Hypogymnia physodes</i>
<i>Hypogymnia</i> sp. 2
<i>Hypogymnia tubulosa</i>
<i>Hypotrachyna sinuosa</i>
<i>Lapraria</i> sp.
<i>Lecidea tessellata</i>
<i>Letharia vulpina</i>
<i>Lobaria anomala</i>
<i>Lobaria anthraspis</i>
<i>Loxosporopsis corralifera</i>
<i>Massalongia carnosa</i>
<i>Melanohalea exasperatula</i>
<i>Melanohalea subelegantula</i>
<i>Menegazzia subsimilis</i>
<i>Mycoblastus affinis</i>
<i>Nephroma helveticum</i>
<i>Nephromopsis chlorophylla</i>
<i>Nephromopsis orbata</i>

<i>Parmelia hygrophila</i>
<i>Parmelia saxatilis</i>
<i>Parmelia sulcata</i>
<i>Parmeliopsis ambigua</i>
<i>Parmeliopsis hyperopta</i>
<i>Peltigera britannica</i>
<i>Peltigera collina</i>
<i>Peltigera membranacea</i>
<i>Peltigera neopolydactyla</i>
<i>Peltigera pacifica</i>
<i>Pertusaria</i> sp.
<i>Physcia alnophila</i>
<i>Pilophorus acicularis</i>
<i>Pilophorus clavatus</i>
<b><i>Pilophorus nigricaulis</i></b>
<i>Placopsis</i> sp.
<i>Placynthiella icmalea</i>
<i>Platismatia glauca</i>
<i>Platismatia herrii</i>
<i>Platismatia stenophylla</i>
<i>Polychidium contortum</i>
<i>Pseudocyphellaria citrina</i>
<b><i>Pseudocyphellaria mallota</i></b>
<i>Psoroma hypnorum</i>
<i>Rhizocarpon geographicum</i>
<i>Scytinium palmatum</i>
<i>Scytinium pulvinata</i>
<i>Sphaerophorus venerabilis</i>
<i>Stereocaulon sterile</i>
<i>Stereocaulon tomentosum</i>
<i>Sticta fulginosa</i>
<b><i>Sulcaria spiralifera</i></b> ( <i>Bryoria pseudocapillaris</i> )
<i>Umbilicaria polyphylla</i>
<i>Usnea filipendula</i>
<i>Usnea flavocardia</i>
<i>Usnea</i> cf. <i>fragilescens</i> grp.
<i>Usnea longissima</i>
<i>Xanthoparmelia mmougeotii</i>
<i>Xanthoria candelaria</i>

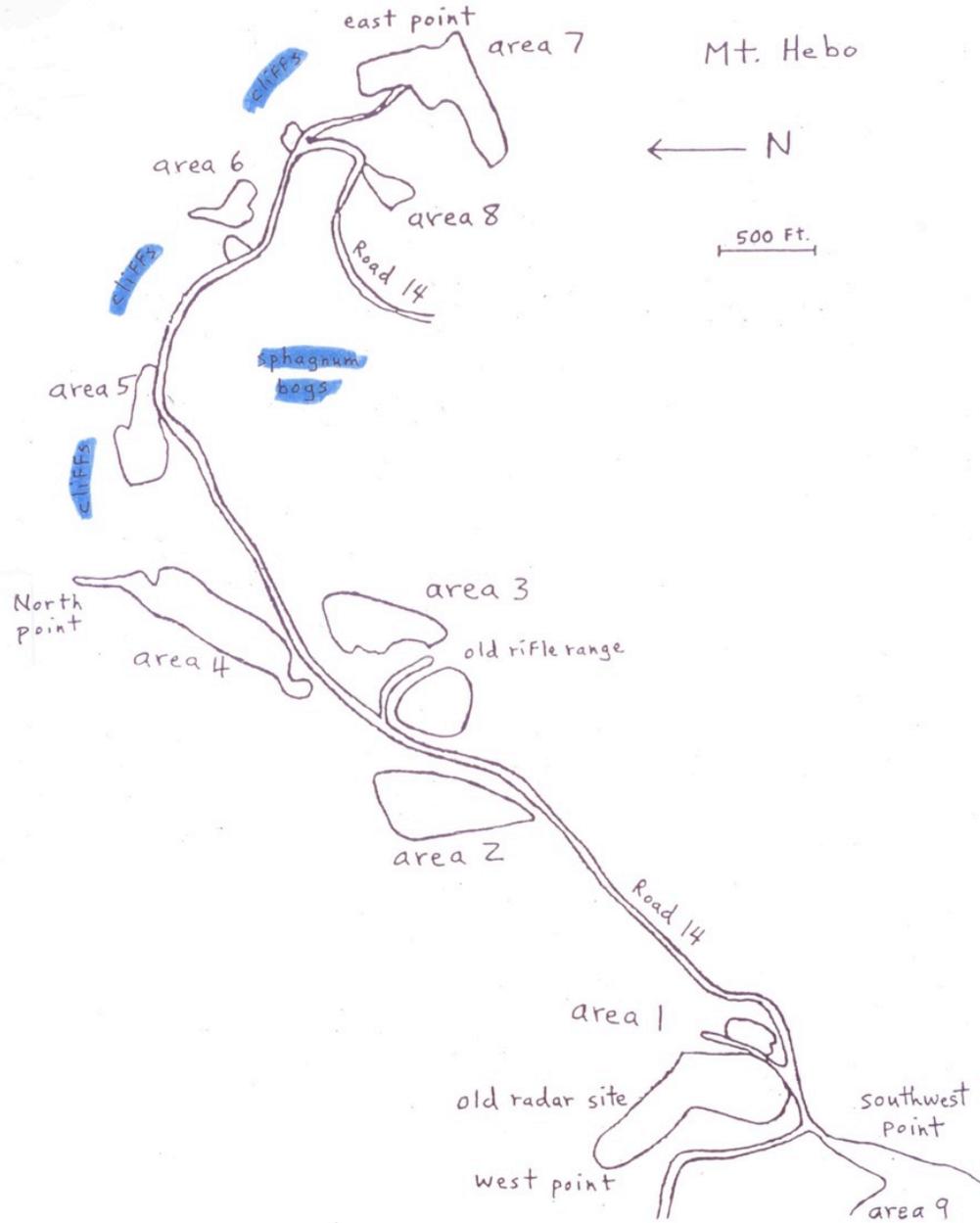
## Cliffs

The cliff habitat at Mt. Hebo is the richest because it takes the brunt of weather systems. It is exposed, north facing, maritime, and high elevation relative to the coast. This cumulative situation is comparable to that of southeast Alaska, and where the target species are most likely to occur on Mt. Hebo. There are other species on Mt. Hebo that barely occur west of the Cascades. These populations are outliers because high land features are scarce along the coast.

One example of this is the lichen, *Cladonia verticillata* that was split to accommodate a rare coastal species, *C. concinna*. With Mt. Hebo being a unique feature along the coast and having some pristine habitats one would expect the latter species to be present. Instead the former species is present because of the montane conditions and is likely even more rare than *C. concinna* on the coast. The remarkable presence of *C. verticillata* on Mt. Hebo is further supported by McCune & Geiser (2009) describing its habitat as “Exposed habitats at all elevations, except near the coast.”

Cliffs are present along the north side of the mountain. They are vertical to sub-vertical exposed faces, up to 30m high. The cliffs are often associated with meadows that are mapped and numbered by the Mt. Hebo Ranger District as “areas” one through nine. The cliffs near meadow Area 6 are the richest.

Below: map of meadow Areas 1-9. Provided by Mt. Hebo R.D., Siuslaw N.F.



**Below: notable species of Area 6 cliffs.**

<b>MOSSES</b>
<i>Andreaea rupestris</i>
<i>Bartramia pomiformis</i>
<i>Brachythecium albicans</i>
<i>Bryum argenteum</i>
<i>Bucklandiella affine</i> (most abundant)
<b><i>Bucklandiella occidentalis</i> s.s.</b>
<b><i>Codriophorus fascicularis</i></b>
<b><i>Cynodontium jenneri</i></b>
<i>Grimmia trichophylla</i>
<i>Isothecium stoloniferum</i>
<i>Niphotrichum elongatum</i>
<i>Pohlia cruda</i>
<i>Pterigynandrum filiforme</i>
<b>LIVERWORTS</b>
<b><i>Barbilophozia floerkei</i></b>
<i>Cephaloziella divaricata</i>
<i>Douinia ovata</i>
<i>Marsupella emarginata</i>
<i>Nardia scalaris</i>
<b><i>Scapania scandica</i></b>

<b>LICHENS</b>
<i>Bryoria glabra</i>
<i>Nephromopsis orbata</i>
<i>Cladonia bellidiflora</i>
<i>Cladonia carneola</i>
<i>Cladonia verticillata</i>
<i>Massalongia carnosa</i>
<i>Melanohalea exasperatula</i>
<i>Peltigera collina</i>
<b><i>Pilophorus nigricaulis</i></b>
<i>Placynthiella icmalea</i>
<i>Polychidium contortum</i>
<i>Psoroma hypnorum</i>
<i>Scytinium pulvinata</i>
<i>Stereocaulon sterile</i>
<i>Stereocaulon tomentosum</i>
<i>Umbilicaria polyphylla</i>
<i>Usnea</i> sp.
<i>Xanthoria candelaria</i>

*Codriophorus fascicularis* (syn. *Racomitrium fascicularis*) is not State Listed but it should be. According to Bednarek-Ochyra, (2006) and herbarium records, *C. fascicularis* is known from only two places in Oregon: Mt. Hebo and Mt. Hood. There is potentially a third location from the Cascades well south of Mt. Hood but that collection, Holmberg #3277 (OSC), should be verified as it appears to not have been.

On Mt. Hebo *C. fascicularis* is linearly scattered along the cliff between meadow Areas 5 & 6 (waypoints 217-221 & 243). There are a few palm-sized patches of *C. fascicularis* at each waypoint totaling about 20. There is likely more in inaccessible areas of the cliffs. Those found are on the edge of the bluff between a meadow with *Gaultheria shallon*, *Pteridium aquilinum*, *Rubus parviflorus*, and surrounded by mid seral *Pseudotsuga menziesii*. The aspect ranges from 330° - 40° and slope from 40% to sub-vertical. Associated species include *Amelanchier alnifolia*, *Penstemon*, *Castilleja*, *Andreaea rupestris*, *Stereocaulon sterile*.

*C. fascicularis* grows on bare rock while the closely associated *Niphotrichum elongatum* and *Selaginella wallacei* often form loose wefts in similar micro habitats. It appears that *C. fascicularis* has an antagonistic relationship with *S. wallacei* and *N. elongatum* by eventually being overgrown by them, but in turn reclaiming bare rock when their loose wefts are occasionally dislodged by weathering.

Additional *C. fascicularis* was found about a quarter mile away from the main population. A trace amount of it was on a clay and gravel roadbed of Rd #14000114 (waypoint 236).

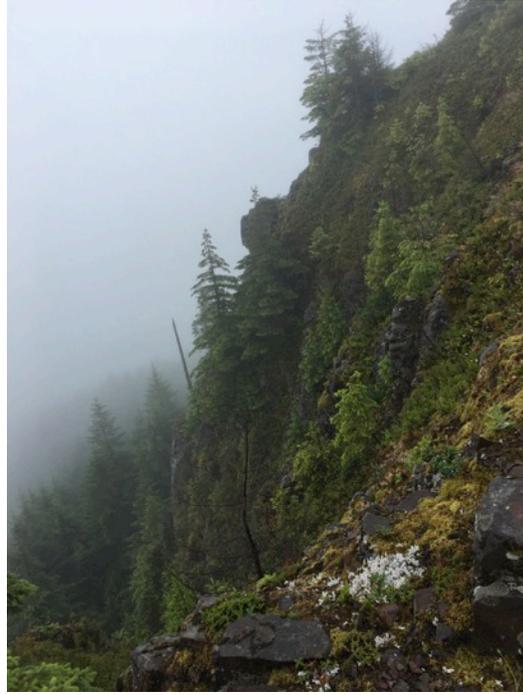


Above: *Codriophorus fascicularis* (waypoint 217).



Above: *Codriophorus fascicularis* habitats. Left: waypoint 217. Right: waypoint 221.

*Scapania scandica* is not State Listed but it should be as there are few records of it. It is on soil in a rock crevice (waypoint 221).



Above left: habitat of *C. fascicularis* and *S. scandica* (waypoint 221). Above right: different view of same location. White lichen, *Stereocaulon sterile*, in foreground (taken from waypoint 195).

*Cynodontium jenneri* (G5, S1, ORBIC 3) is a Strategic Species that warrants Sensitive Species status. Known from Saddle Mt. it is one of the specific target species of this study. Although not abundant on Mt. Hebo, its presence on coastal cliff habitat is to be expected. It is a non-descript, narrow and curly-leaved acrocarpous species detected only once (waypoint 227).



*Cynodontium jenneri* habitat near Area 6 (waypoint 227, 228).

*Barbilophozia floerkei* this liverwort is not State Listed but it should be. There are only two known locations in Oregon: Mt. Hebo and Willamette N.F. (Kofranek 869). It can be recognized by its three-lobed leaves on erect unbranched stems growing in caespitose tufts on rock. There are common species (e.g. *B. hatcheri*) similar to *B. floerkei* that need to be distinguished microscopically.

*B. floerkei* was found on the shoulder of the cliff edge at 30° aspect and 84% slope within a seasonally dry rock garden of *Racomitrium lanuginosum*, *Niphotrichum elongatum*, *Polytrichum*

*piliferum*, *Dicranum howellii*, *Stereocaulon tomentosum*, *Rhizocarpon geographicum*, *Selaginella wallacei*, *Amelanchier alnifolia*, *Castilleja*, *Cryptogamma crispa*, and sparse grasses.



Above left: *Barbilophozia floerkei* habitat with *B. floerkei* in lower left of photo in shade. Above right: close up of the bronze colored *B. floerkei*. (waypoint 216).

*Pilophorus nigricaulis*, the State Listed lichen (G3G4, S2, ORBIC List 3, OR-SEN), was observed near waypoint 226 on exposed rock of the cliff edge.

The most abundant species of bryophyte or lichen on the cliffs is the moss, *Bucklandiella (Racomitrium) affine*, often subsumed under *B. heterosticha*.

An interesting habitat is the stunted shrubs on the edge of the cliffs. These are usually low, very densely branched *Amelanchier alnifolia* loaded with epiphytes. The pleurocarpous moss, *Antitrichia curtispindula*, forms carpets at the bases of the shrubs because it receives enough cool air movement and precipitation. Otherwise it typically receives these conditions by carpeting upper limbs of old growth *Pseudostuga menziesii*. The bases of these shrubs were searched for locally rare northern lichens such as *Lobaria linita* and *Nephroma arcticum*, but only the common *Peltigera britannica* was found. It is interesting to note that *P. britannica* was nestled within the moss carpet at the base of the shrub just as *N. arcticum* does in Alaska. Besides the same erect growth form in the same ecological niche it additionally shares along with *L. linita* the same light green color and large size.

By spreading the stiff *Amelanchier alnifolia* canopy apart more epiphytes were searched for. However, no rare species were found despite this unique, old, and undisturbed feature. Epiphytic lichens include: *Polychidium contortum* (indicative of high humidity), *Massalongia carnosa* (“... rare as an epiphyte... in old-growth forests”) (McCune and Geiser 2009), *Platismatia stenophylla*, *Hypogymnia* spp.



Above: examples of *Amelanchier alnifolia* and associated bryophytes and lichens. Above right: with *Peltigera britannica* “mimicking” *Nephroma articum* (waypoint 228).



Above: the perhaps uncommon lichen, *Xanthoparmelia mougeotii*, was observed on rock (near waypoint 224).

The cliff associated with the Area 7 meadow was also searched. This cliff covers less area than the cliffs near Areas 5 or 6 and is more sheltered from nearby trees. *Bucklandiella (Racomitrium) occidentalis sensu stricto* was found here. It is a species most expected at mid elevations of the Cascade Mts. Because of Mt. Hebo’s cool moist conditions at a relatively high elevation its presence here may be anticipated but it is probably very scarce throughout the rest of coastal Oregon. In our region *B. obesa* has long been mistaken for this species. Since *B. obesa* is ubiquitous across western Oregon, and its inclusion on numerous species lists and in collections are under the erroneous identity, it is uncertain how common or uncommon *B. occidentalis s.s.* truly is.

The previously State Listed (Christy and Wagner 1996) liverwort, *Douinia ovata*, is also here and occurs fairly consistently throughout the study area, but is not common outside of it. *Bryoria glabra* is a brown, pendulous fruticose lichen common to north coastal areas (McCune and Geiser 2009).



Above: Cliff associated with Area 7 meadow (waypoint 230) where *Bucklandiella occidentalis*, *Scytinium pulvinatum* (aka *Leptogium lichenoides*), *Douinia ovata* (waypoint 231), *Bryoria glabra* are present (waypoint 232).

### Fen

There is an 11-acre wetland referred to as “*Sphagnum* bogs” on the meadow Areas map (waypoint 199) that better qualifies as a moderately rich fen. Its topography is a 50-75 m wide wet, shallow swale with broad, low-angled opposing slopes and slow-moving water draining as a small stream with a few 2-3 m<sup>2</sup> pools along the way. The open water is lined with *Sphagnum* as well as *Carex*, Cyperaceae spp., short graminoids, stunted *Lysichiton americanum*, *Veratrum californicum*, and *Gaultheria shallon*.

Upslope from the swale bottom the terrain steps up a meter where the deeper and better draining soil is thickly vegetated with *Gaultheria shallon*, *Pteridium aquilinum*, *Vaccinium membranaceum*, *Menziesia ferruginea*. In this area there are patches of old peat (waypoint 208), still recognizable as *Sphagnum*, suggesting that this fen was once a much broader area than it is today. It is shrinking, becoming increasingly forested. As for now, the *Picea sitchensis* and *Pseudotsuga menziesii* are sparsely scattered throughout the wetland.

These trees are probably much older than their pole-size suggest. Some are stunted and chlorotic (waypoint 206) partly from shallow saturated soil over bedrock, which is the impervious layer that has created the fen conditions. The known ability of *Sphagnum* to exchange cations, ultimately lowering pH, may play out here with Na<sup>+</sup>, K<sup>+</sup>, and Mg<sup>2+</sup> in particular because these ions are more abundant in coastal areas (McQueen 1990). Mg<sup>2+</sup> is an essential nutrient for plants as a component of the chlorophyll molecule. Therefore if Mg<sup>2+</sup> cations are drawn from the environment, incorporated into *Sphagnum*, and unavailable to other plants then this deficiency would account for the yellow leaves on some of the conifers from the breakdown of their chlorophyll. Typical appearing trees that are larger and healthier are due to deeper pockets of soil and their further distance from *Sphagnum*.

About two dozen coniferous snags of class 2-4 decay stages are present. Both trees and snags are laden with epiphytes. Coarse woody debris is present but mostly concealed by overgrown vegetation, especially *G. shallon*.

The streamlet (class 4-5) that drains this wetland shortly exits to the southwest by a severely down-cut exposed portion of the basalt bluff. This stream has additionally back-cut enough leaving two open rock slabs on either side of the stream. These glades have particularly erodible sides and are dominated by Grimmaceae species of moss.

Overall, these characteristics give a hint of a southeast Alaskan muskeg: a place composed of scrub forest, fens, pools, streams, and exposed rock in a cool, wet, coastal climate (Pojar and Mackinnon 1994).



**Above: fen habitat looking southwest (waypoint 200).**



**Above: fen habitat looking northeast (waypoint 201).**



Above left: shallow pool, < 1m deep, with underlying bedrock visible. Above right: chlorotic *Picea sitchensis* at northern extent of *Sphagnum* (waypoint 206).

*Sphagnum contortum* is apparently rare in Oregon but is not State Listed. According to herbaria records (CNABH) there is only one other record for the state that has not been annotated recently (Christy #1710 (BING) from the Three Sisters Wilderness).

*Sphagnum contortum* is the only species present here. Many species of *Sphagna* are specific to wetland type, microtopography, and pH to such a degree that they can be used as indicators in these regards. *S. contortum* is reported as being a species of moderate-rich fens (Vitt 2014) and minerotrophic mires (FNA 2007). It forms “carpets” of emergent shoots with incomplete coverage or “lawns” of level and complete coverage higher up from water (Vitt 2014). *S. contortum* occurs in situations with a pH between 5-7 (Vitt 2014). Because it is intolerant of shade (FNA 2007) it is usually encountered as bronze or orange plants due to exposure to solar radiation. However, small areas that were slightly shaded had plants thoroughly green.



Above: *Sphagnum contortum* of two color variations (waypoint 200 & 201).



Above left: close up of *Sphagnum contortum* (waypoint 200). Above right: *Nardia scalaris* with *S. contortum* (waypoint 201).

Other prominent bryophytes of this habitat also have a dark or golden bronze color from solar radiation. These include the leafy liverwort, *Nardia scalaris*, an uncommon species of cool wet conditions (Wagner 2016) and is often maroon at this fen. It is similar to the ubiquitous *Jungermannia* but has underleaves, a feature not necessarily visible in the field. With the presence of *Sphagnum*, one would expect another similar liverwort, *Mylia anomala*, but it was not found. Stranded on logs over water is *Marsupella sphacelata*, an alpine/subalpine species that is nearly black at this fen. Pleurocarpous mosses with falcate leaves are *Hypnum dieckei* and a trace amount of the strict wetland species, *Sarmentypnum* (*Warnstorfia*) *exannulatum*. *H. dieckei* is a widespread species of various habitats but always in seasonally wet situations. Here it occupies the hollows along the streamlets partially shaded by *Gaultheria shallon* (waypoint 207) where it is green. On logs above vegetation it is bronze or gold in color.



Above left: maroon *Nardia scalaris*, orange *S. contortum*, green *Polytrichum commune* (waypoint 201). Above right: golden *Hypnum dieckei*, maroon *Marsupella sphacelata*, and submerged *Sphagnum contortum* (waypoint 201).

About 100+ m from the core of the *Sphagnum* area of the wetland, faint tributaries were followed as the forest transitions to mostly closed conditions with less understory. The ground in these upper reaches (waypoints 203-205) has very slight swales too moist for most things except forest floor bryophytes and mountain beaver (*Aplodontia rufa*) burrows. The *Picea sitchensis*, *Thuja plicata*, *Tsuga heterophylla* are  $\leq 2'$  diameter-at-breast-height (DBH). Snags are mixed with these trees with the remarkable feature being the copious amounts of epiphytes on them both.

*Bryoria bicolor*, the State Listed lichen (G4, S2, ORBIC List 2, OR-SEN), is widespread throughout the greater area of the wetland occurring on twigs of conifers. It was recorded from waypoints 200, 201, 204 but is much more prevalent than that.



Above: *Bryoria bicolor* with two-tone black and olive thallus with third order perpendicular branching (waypoint 200).

*Bryoria tenuis* is much more rare than *B. bicolor*, though is not State Listed. There is only one record for Oregon, from Saddle Mt. (Pike #3763, det. Brodo 1975), the archetype habitat for this study. Current work (Myllys et al.) on *Bryoria* has revealed that this may be a complex of species to be split up (McCune pers. com. 2019). Nevertheless specimens as those collected at Mt. Hebo are rare south of British Columbia. Kofranek #8820 from Mt. Hebo is “distinctly bicolorous (=basal part black and apical parts pale brown) and scarcely branched thallus. It also has some short lateral branches (spinules) and is “esorediate” (Myllys pers. com. 2020). It is P+R but otherwise negative.



Above: *Bryoria tenuis* (waypoint 2019).

*Usnea longissima*, the formerly State Listed lichen, is patchy but abundant where present. This species only grows in cool, moist conditions and is an indicator of good air quality.

By far the most abundant epiphyte in terms of biomass is the common pleurocarpous moss, *Antitrichia curtipendula*. Here it forms deep cushions on limbs. It is a species of oceanic climates (FNA 2014) of high humidity and precipitation (Norris and Shevock 2004) and "... cool moist coniferous forests with fog penetration and cold air drainage" (Christy and Wagner 1996). The exceptionally thick growth of this epiphyte is another example of the similarity of this area to points northward such as the Hoh Rainforest of Washington or Tongass National Forest, Alaska. Another extraordinary example of these wet conditions is the moss, *Kindbergia praelongia*, a terrestrial species in places prone to ponding that was seen here growing epiphytically.



Above: exceptionally thick growths of *Antitrichia curtipendula* (waypoint 203).



Above left: exceptionally thick growths of *Antitrichia curtipendula* (waypoint 203). Above right: *Usnea longissima*. (waypoint 203).

There were several rare species that were expected at the wetland, but did not turn up. The reflective moss, *Schistostega pennata*, was intensely searched for on tipped-up root masses and in damp, shaded hollows of streamlets. The liverwort *Kurzia sylvatica* is found in coastal wetlands and perhaps could have occupied this fen when it was larger. *Herbertus aduncus* and *H. dicranus* were searched for throughout the fen area, especially as epiphytes on snags. The parmelioid lichen, *Hypotrachyna riparia*, was expected because of the exceedingly wet conditions, but

perhaps it is too high of elevation and too cool. There are several rare coastal species of *Usnea* and considering the unique and pristine conditions of this habitat, it is surprising that the diversity of *Usnea* here is low. There is a conspicuous absence of cyanolichens that cannot be easily explained except that it could be due to the relative young age of the forest or a mineral deficiency (phosphorus).

As described above, the fen drains through a notch in the bedrock between two basalt glades. These are exposed to the southwest and are covered with two rare species of the Racomitrioidae.

***Racomitrium lanuginosum*** is rare but not State Listed. This northern species is in fair quantities on the north outcrop and nearly completely covers the southern. In Oregon, outside of a trace amount at the Cascade crest, I have seen this species only here and at Marys Peak F.O. (Rocky Point), also part of this study. It is easily recognized in the field by the leaf's coarsely dentate hyaline and decurrent hairpoints.



Above left: *Racomitrium lanuginosum* in middle foreground and widespread in background (waypoint 247). Above right: *Racomitrium lanuginosum* (waypoint 212).

***Bucklandiella brevipes*** (syn. *Racomitrium brevipes*) (GNR, SNR, ORBIC List 2) also shares these two rock outcrops in much less quantity but still relatively abundant amounts.

**Notable fen species (“*Sphagnum* bogs”)**

MOSSES
<i>Aulacomnium palustre</i>
<b><i>Bucklandiella brevipes</i></b>
<i>Grimmia ramondii</i>
<i>Hypnum dieckei</i>
<i>Imbricarium muehlenbeckii</i>
<i>Isoetecium stoloniferum</i>
<i>Pleurozium schreberi</i>
<i>Pohlia nutans</i>
<b><i>Racomitrium lanuginosum</i></b>
<i>Niphotrichum elongatum</i>
<i>Sarmentypnum exannulatum</i>
<b><i>Sphagnum contortum</i></b>

LIVERWORTS
<i>Cephalozia bicuspidata</i>
<i>Cephalozia divaricata</i>
<i>Lophozia sudetica</i>
<i>Marsupella sphacelata</i>
<i>Nardia scalaris</i>
<i>Scapania americana</i>
LICHENS
<i>Alectoria sarmentosa</i>
<b><i>Bryoria bicolor</i></b>
<b><i>Bryoria tenuis</i></b>

<i>Cladonia squamosa</i> var. <i>squamosa</i>
<i>Cladonia transcendens</i>
<i>Hypogymnia</i> sp.

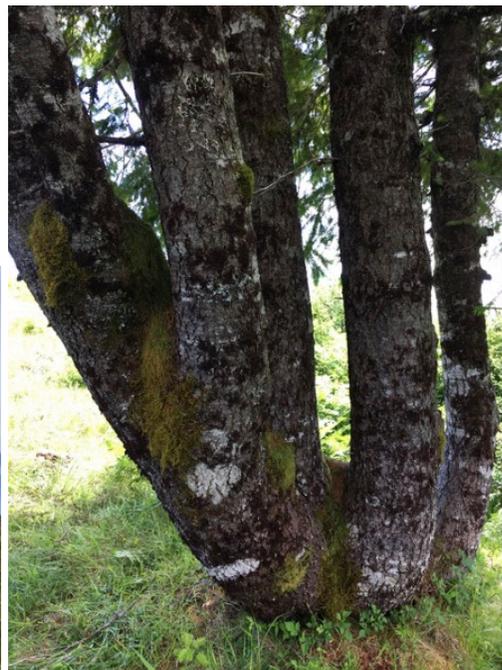
<i>Menegazzia subsimilis</i>
<i>Mycoblastus affinis</i>
<i>Usnea longissima</i>

### Meadows

There are nine meadow Areas managed by the Hebo R.D. for the State Listed Oregon silverspot butterfly. During the surveys on Mt. Hebo, meadow maintenance (weed whacking) was actively occurring. The ground of the meadows themselves is mostly devoid of bryophytes and lichens because the vascular plants have choked them out. Not even the occasional bare soil exposed by gophers supported any bryophytes or lichens. The State Listed moss, *Entosthodon fascicularis*, can be found in that situation but was not seen. Many of the rare or interesting lichen species present are along the ecotones of meadows and forest edges. Particularly the larger trees were sought out because they are older and therefore have had more time to acquire greater epiphytic diversity. Theoretically, given enough time even rare species that have proportionally less airborne spores and/or fragments will eventually land in these suitable situations.

*Bryoria bicolor*, the State Listed lichen (G4, S2, ORBIC List 2, OR-STR), was found in two meadows.

At Area 7 (waypoint 233) *B. bicolor* was on an isolated multi-stemmed *Pseudotsuga menziesii* slightly interior of the meadow from the nearby forest edge. Associated species included *Polychidium contortum* (microfruticose cyanolichen of highly humid conditions), *Nephroma helveticum*, *Douinia ovata*, and abundant *Frullania nisquallensis*. The target moss species, *Iwatsukiella leucotricha*, was highly suspected on this tree but only its look-alike was seen, *Ulota megalospora*, a cool montane species. The conditions seem to be right for *I. leucotricha* here and since the tree is not that old perhaps only more time is needed acquire more rare epiphytes.



Above: *Bryoria bicolor* at Area 7 (waypoint 233).

At Area 9 (waypoint 179), the “southwest point”, *B. bicolor* was found on an old *Vaccinium parvifolium*. The 5 ac. meadow is surrounded by what appears as an early seral *P. menziesii* but could be mid seral trees somewhat stunted by prevailing winds and storms. The lush meadow has grasses, *Pteridium aquilinum*, *Rubus parviflorus*, *Galium oreganum*, *Lupinus*, *Maianthemum dilatatum*, and *Sisyrinchium*. The meadow slopes 35% at 345°.

The *V. parvifolium* is 2m x 2m, compact, and densely branched by browsing of deer and elk. *B. bicolor* is on the leeward side of the shrub with more than a dozen other species of epiphytes. The habitat is dense and protective enough that a white-crowned sparrow was nesting in it. This shrub is similar to the *P. menziesii* in Area 7 by directly receiving precipitation and fog-sweeping patterns. In other cases *B. bicolor* is found in mid and upper conifer canopies to receive these conditions, but here a shrub in the right microclimate gets the same effect. There are a few other *V. parvifolium* in the immediate area, but they do not have *B. bicolor*. They are neither as large nor as densely branched. Apparently those features are needed to prolong moisture retention, provide more shade, and stay cooler.



Above: *Bryoria bicolor* habitat at Area 9 (waypoint 179), the “southwest point”.



Above: *Bryoria bicolor* at Area 9 (waypoint 179), the “southwest point”.

The forest edges and scattered trees and shrubs within the meadow complex were explored but no other rare species were found. However, some cyanolichens were seen, *Lobaria* (syn. *Pseudocyphellaria*) *anomala* and *Pseudocyphellaria citrina* (syn. *P. crocata*). Farther downslope (waypoint 197) the introduced European tree species, *Picea abies*, was seen with a mutant habit and cones 20 cm (8”) long, much longer than *P. sitchensis* cones.

At meadow Area 4 (waypoint 188) *Bryoria americana* was found on an isolated, 2' DBH, *P. sitchensis*. This brownish horsehair lichen was a coastal subspecies of *B. trichodes*, but was recently elevated to species level (Myllys et al. 2011).



Above left: meadow Area 4 from “north point” (waypoint 190) looking southwest to *Bryoria americana* red dot in middle distance (waypoint 188), *B. glabra* on snag, and *Dicranum bonjeanii* in far distance. Above right: *Bryoria americana* (waypoint 188).

Also in meadow Area 4 is the moss *Dicranum bonjeanii*. It is a species of wet sites found here occupying a discrete depression in the meadow that is likely wet most of the year from rain and snowmelt. According to CNABH there are only 23 records for the state. Most are over 100 years old and misapplying that name. Only several are believable records from the state, especially Norris’s from Tillamook Co., on wet soil of stabilized dune system at Sand Lake.

*Diphasiastrum sitchense* (syn. *Lycopodium sitchense*) was found in meadow Area 5 (waypoint 194) as patches as large as a few square meters each. It is a species of montane to alpine meadows and rocky places (Wagner, W.H. and Beitel 1997, Hitchcock and Cronquist 1976). Occasionally the meadow trimming shaves it but overall the management probably benefits it by preventing it from getting out competed.



Above: *Diphasiastrum sitchense* in meadow Area 5 (waypoint 194).

## Forest

Other than rock, old growth trees would be another stable substrate that could accumulate locally rare northerly species. Unfortunately most of the trees scattered near the cliffs and surrounding the associated meadows are early to mid seral. It is ecologically advisable to let trees in these rare microclimates mature so that some year they may support rare species of epiphytes, as they once must have in earlier times. This would further enrich the Mt. Hebo Special Interest Area.

Much of the forest on top of Mt. Hebo is early to mid seral *Pseudotsuga menziesii* with some mature stands of *Abies procera*. There is not much understory or mid story, especially hardwoods such as *Acer macrophyllum*. Overall this makes for low diversity of bryophytes and lichens. The four rare species found in forest habitat were close to edges of roads and trails not far from breaks in the canopy.

*Pseudocyphellaria mallota*, the state listed lichen (G4, S3, ORBIC List 2), was found twice about 193m apart.

The first site (waypoint 234) is on *Picea sitchensis* on the side of Rd. #14000114 near meadow Area 7. The *P. sitchensis* is 3'-4' DBH, forked about 8' up with large, live limbs emerging as low as one foot off the ground (wolf tree) and are loaded with epiphytes. It's mostly in the open and incompletely surrounded by early seral *Pseudotsuga menziesii* alternating with *Amelanchier alnifolia*, *Gaultheria shallon*, and *Pteridium aquilinum*. Unfortunately the twig that one thallus of *P. mallota* was on broke off in my hand during inspection. That specimen, Kofranek #8850, will be submitted to OSC (Oregon State Herbarium). A second thallus was found on the same wolf tree and was not collected.



Above: *Pseudocyphellaria mallota* on *Picea sitchensis* on side of Rd. #14000114 (waypoint 234).



Above: *Pseudocyphellaria mallota* on *Picea sitchensis* (waypoint 234).



Above: *Pseudocyphellaria mallota* DK coll. #8850 (waypoint 234). Upper left: note hyaline hairs on upper surface. Upper right: note faint yellow dots (pseudocyphellae) on lower surface.

The second site (waypoint 237) is off of the same road under a closed canopy in a dense stand of mid seral *Pseudotsuga menziesii* near a small meadow on a broad level ridge crest of the Hebo plateau. The *P. menziesii* that it is on is 1' DBH in a small cluster of similar statured *P. menziesii*. Other epiphytes are well represented here and are responding to the weather that sweeps over the cliff edge 40m away. There are at least seven small thalli of *Pseudocyphellaria mallota* clustered on a *P. menziesii* bole.



Above: forest habitat of *Pseudocyphellaria mallota* (waypoint 237).



Above: seven thalli of *Pseudocyphellaria mallota* (waypoint 237).

*Tetraplodon mnioides*, the State Listed dung moss (G5, S3, ORBIC List 3), is present 130m from the above *Pseudocyphellaria mallota* site. It is in a gap of the forest canopy associated with the cliff between meadow Areas 6 and 7 (waypoint 213). There are three clumps in close proximity to each other ranging in sizes 8cm<sup>2</sup>, 5cm<sup>2</sup>, and 3cm<sup>2</sup>. These were visited by at least two different species of flies. The site is in an opening 15m x 5m in area, on a small rocky point, with partially shaded, mesic conditions, exposed to the NE (60°), on a small, rocky, earthen berm in an otherwise level area, at an ecotone of meadow and mid seral *Pseudotsuga menziesii* forest with

*Amelanchier alnifolia*, and *Vaccinium parvifolium*, *Pteridium aquilinum*, *Gaultheria shallon*, *Cornus canadensis*, *Sorbus*, *Montia parvifolia*, grass, *Hypochaeris radiata*, *Polytrichum juniperum*, *Niphotrichum elongatum*, *Bucklandiella affine*, and *Cladonia*.



Above: *Tetraplodon mnioides* habitat (waypoint 213).



Above: *Tetraplodon mnioides* (waypoint 213).

*Sulcaria spiralifera* is a pale, pendulous, fruticose lichen that used to be listed for the state but is still uncommon. It is one of a few similar hypermaritime fruticose lichens. The species pair, *Bryoria spiralifera* and *B. pseudocapillaris*, were found to be conspecific (Myllys et al. 2014) differing only chemically. Furthermore they were synonymized and moved to the genus *Sulcaria*. Now they can be referred to as *S. spiralifera* chemotype 1 (syn. *B. pseudocapillaris*) and *S. spiralifera* chemotype 2 (syn. *B. spiralifera*). The specimen found at Mt. Hebo is *S. spiralifera* chemotype 1 (syn. *B. pseudocapillaris*).

*Sulcaria spiralifera* (waypoint 241) is on the southwest side of Rd. #14000114 under a closed canopy of a dense stand of mid seral *Pseudotsuga menziesii* of a broad level ridge crest of the Hebo plateau. It is partially shaded but somewhat exposed to the northeast. *S. spiralifera* was found on the bole of a 2' DBH *Pseudotsuga menziesii* with *Maianthemum dilatatum*, *Gaultheria shallon*, and *Pteridium aquilinum* below.

*Codriophorus ryszardii* (syn. *Racomitrium ryszardii*, misapplied as *Rhacomitrium aquaticum*), the State Listed moss (G4, G5, S2, ORBIC List 3, OR-STR), was found on a trail cut along a central portion of the Pioneer Indian Trail (waypoint 184). It is on basalt with *Tsuga heterophylla* roots wrapped around it. The surrounding forest is single age mid to late seral *Pseudotsuga menziesii* without midstory, or understories other than some *Vaccinium parvifolium*, and minimal ground cover other than some *Polystichum munitum*. It is on an 84% sloping trail cut at 70° aspect in mostly shaded and mesic conditions. Associated species are *Pseudotaxaphyllum elegans*, *Marsupella emarginata*, *Buckiella undulata*, and *Peltigera britannica*.



Above: *Codriophorus ryszardii* on a trail cut along a central portion of the Pioneer Indian Trail (waypoint 184).

### Old Radar Site

The final habitat is the location of the old radar station. It is included here not because it is a rich habitat, but because it is the place where visitors usually stop at first, is a good place to get oriented, and in early July is probably Tillamook County's largest wild strawberry patch.

This site has a couple of sprawling gravelly, weedy, landings surrounded by early seral *Pseudotsuga menziesii* that are too young to have accrued many epiphytes yet. Species seen here include *Bucklandiella affine* (the most abundant moss on cliffs and rocky areas), *Schistidium papillosum*, *Nardia scalaris* (trace amounts responding to moisture providing snow loads), *Cephaloziella divaricata*, *Stereocaulon tomentosum*, and *Cladonia squamosa*.



Above: old radar site (waypoints 174-177).

MARYS PEAK FIELD OFFICE,  
 NORTHWEST OREGON DISTRICT BLM, BENTON & LINCOLN COUNTIES

Below: species of bryophytes and lichens of study areas within Marys Peak F.O.

	Grass Mt.	Rocky Pt.	Saddle Bag Mt.	Near Rd #7-9-16.	Prairie Pk.
MOSESSES					
<i>Andreaea rupestris</i>					
<i>Antitrichia curtipendula</i>	X	X			
<i>Atrichum selwynii</i>	X				
<i>Bartramia pomiformis</i>		X			
<i>Brachythecium albicans</i>	X				
<i>Buckiella undulatum</i>	X	X			
<i>Bucklandiella heterosticha</i>		X			
<b><i>Bucklandiella macounii</i> <i>ssp. alpina</i></b>					X
<i>Bucklandiella obesa</i>	X				
<i>Bucklandiella occidentalis</i>					
<i>Buxbaumia piperi</i>			X		
<i>Ceratodon purpureus</i>	X				
<i>Claopodium bolanderi</i>	X				
<i>Codriophorus acicularis</i>		X			X
<b><i>Codriophorus fascicularis</i></b>				X	
<b><i>Codriophorus ryszardii</i></b>		X		X	
<i>Codriophorus varius</i>	X				
<i>Dicranella heteromalla</i>	X				
<i>Dicranum fuscescens</i>	X	X			
<i>Dicranum howellii</i>		X			
<i>Didymodon insulanus</i>	X				
<i>Dicranoweisia cirrata</i>		X			
<i>Ditrichum heterophyllum</i>		X			
<i>Grimmia montana</i>	X				
<i>Grimmia ramondii</i>		X			
<i>Grimmia torquata</i>	X	X			
<i>Grimmia trichophylla</i>	X				
<i>Heterocladium macounii</i>		X			
<i>Homalothecium megaptilum</i>	X				
<i>Hylocomnium splendens</i>		X			
<i>Hypnum circinale</i>	X	X			
<i>Imbricbryum miniatum</i>	X				
<i>Isothecium stoloniferum</i>	X	X			
<i>Kindbergia oregana</i>	X	X			
<i>Neckera douglasii</i>	X				

	Grass Mt.	Rocky Pt.	Saddle Bag Mt.	Near Rd #7-9-16.	Prairie Pk.
<i>Niphotrichum elongatum</i>					
<i>Oligotrichum aligerum</i>		X			
<i>Orthotrichum lyellii</i>	X	X			
<i>Orthotrichum rupestre</i>	X				
<i>Philonotis capillaris</i>		X			
<i>Plagiomnium insigne</i>	X				
<i>Plagiomnium venustum</i>	X				
<i>Pogonatum urnigerum</i>	X	X			
<i>Polystichum piliferum</i>		X			
<i>Polytrichastrum alpinum</i>					
<i>Polytrichum juniperinum</i>	X	X			
<i>Polytrichum piliferum</i>	X	X			
<i>Pseudotaxiphyllum elegans</i>	X	X			
<i>Pterigynandrum filiforme</i>		X			
<i>Ptychomitrium gardneri</i>	X				
<b><i>Racomitrium lanuginosum</i></b>		X			
<i>Rhytidiadelphus loreus</i>	X	X			
<i>Rhytidiadelphus triquetrus</i>	X	X			
<i>Rhytidiopsis robusta</i>	X				
<i>Schistidium papillosum</i>					
<i>Schistidium sp.</i>	X				
<b><i>Tetraplodon mnioides</i></b>	X			X	
<i>Ulota megalospora</i>	X	X			
<i>Ulota obtusiuscula</i>		X			
LIVERWORTS					
<i>Blepharostoma trichophylla</i>			X		
<i>Cephalozia bicuspidata</i>			X		
<i>Cephaloziella divaricata</i>		X			
<i>Diplophyllum albicans</i>	X	X			
<i>Diplophyllum taxifolium</i>		X			
<i>Douinia ovata</i>	X	X			
<i>Frullania nisqualensis</i>	X	X			
<i>Gymnomitrium obtusifolium</i>		X			
<i>Gyrothya underwoodiana</i>		X			
<i>Lophozia sudetica</i>		X			
<i>Lophozia ventricosa</i>			X		
<i>Marsupella emarginata</i>		X			
<b><i>Marsupella sprucei</i></b>	X				
<i>Metzgeria conjugata</i>					X

	Grass Mt.	Rocky Pt.	Saddle Bag Mt.	Near Rd #7-9-16.	Prairie Pk.
<i>Porella navicularis</i>	X				
<i>Ptilidium californicum</i>		1			
<i>Radula bolanderi</i>	X				
<i>Riccardia sp.</i>			X		
<i>Scapania americana</i>					
<i>Scapania bolanderi</i>		X			
<b><i>Scapania scandica</i></b>		X			
<i>Scapania umbrosa</i>			X		
<i>Solenostoma rubrum</i>	X	X			
LICHENS					
<i>Alectoria imshaugii</i>	X				
<i>Alectoria sarmentosa</i>			X		
<i>Alectoria sarmentosa/vancouverensis</i>	X				
<b><i>Bryoria bicolor</i></b>		X	X		
<i>Bryoria capillaris</i>	X				
<i>Bryoria glabra</i>	X				
<i>Bryoria subcana</i>	X				
<i>Cladonia chlorophaea</i>	X				
<i>Cladonia coniocraea</i>	X				
<i>Cladonia fimbriata</i>		X			
<i>Cladonia furcata</i>	X	X			
<i>Cladonia pyxidata</i>		X	X		
<i>Cladonia sp.</i>	X				
<i>Cladonia squamosa</i>					
<i>Cladonia transcendens</i>		X			
<i>Evernia prunastri</i>	X	X			
<i>Fuscopannaria pacifica</i>	X				
<b><i>Hypogymnia duplicata</i></b>		X			
<i>Hypogymnia enteromorpha</i>	X				
<i>Hypogymnia hultenii</i>		X			
<i>Hypogymnia inactiva</i>	X	X			
<i>Hypogymnia physodes</i>		X			
<i>Hypogymnia tubulosa</i>	X	X			
<i>Hypotrachyna sinuosa</i>	X	X			
<i>Lobaria anomala</i>	X				
<i>Lobaria anthraspis</i>	X				
<i>Lobaria oregana</i>	X				X
<i>Lobaria pulmonaria</i>	X				

	Grass Mt.	Rocky Pt.	Saddle Bag Mt.	Near Rd #7-9-16.	Prairie Pk.
<i>Loxosporopsis corallifera</i>		X			
<i>Massalongia carnosa</i>	X	X			
<i>Menagezzia subsimilis</i>	X	X			
<i>Nephroma laevigata</i>	X				
<i>Nephroma parile</i>					X
<i>Nephromopsis chlorophylla</i>	X				
<i>Nephromopsis orbata</i>	X				
<i>Nodobryoria oregana</i>	X				
<i>Parmelia pseudosulcata</i>	X				
<i>Parmelia sulcata</i>		X			
<i>Peltigera britannica</i>		X			
<i>Peltigera membranacea</i>	X	X			
<i>Peltigera neopolydactyla</i>	X				
<i>Pilophorus acicularis</i>	X	X			
<i>Pilophorus clavatus</i>		X	X		
<b><i>Pilophorus nigricaulis</i></b>		X			
<i>Platismatia glauca</i>	X				
<i>Platismatia herrei</i>	X				
<i>Platismatia lacunosa</i>	X	X			
<i>Platismatia stenophylla</i>	X				
<i>Polychidium contortum</i>	X				
<i>Polychidium musicola</i>	X				
<i>Pseudocyphellaria citrina</i>	X				
<b><i>Pseudocyphellaria mallota</i></b>	(X)				
<i>Psoroma hypnorum</i>		X			
<i>Ramalina farinacea</i>	X	X			
<i>Rhizocarpon geographicum</i>	X				
<i>Scytinium pulvinatum</i>					
<i>Sphaeroporus tuckermanii</i>	X				
<i>Sphaeroporus venerabilis</i>	X				
<i>Stereocaulon intermedium</i>		X			
<i>Stereocaulon sterile</i>		X			X
<i>Sticta fuliginosa</i>	X				
<b><i>Sticta weigellii</i></b>					X
<i>Usnea filipendula</i>	X				
<i>Usnea longissima</i>	X				X

**Saddle Bag Mt. Research National Area (RNA) Survey Area**

**July 25, 2019**

3,400 ft. in elevation  
11 miles from the ocean

State Listed species found that were on the target list:

*Bryoria bicolor* lichen  
*Codriophorus ryszardii* moss

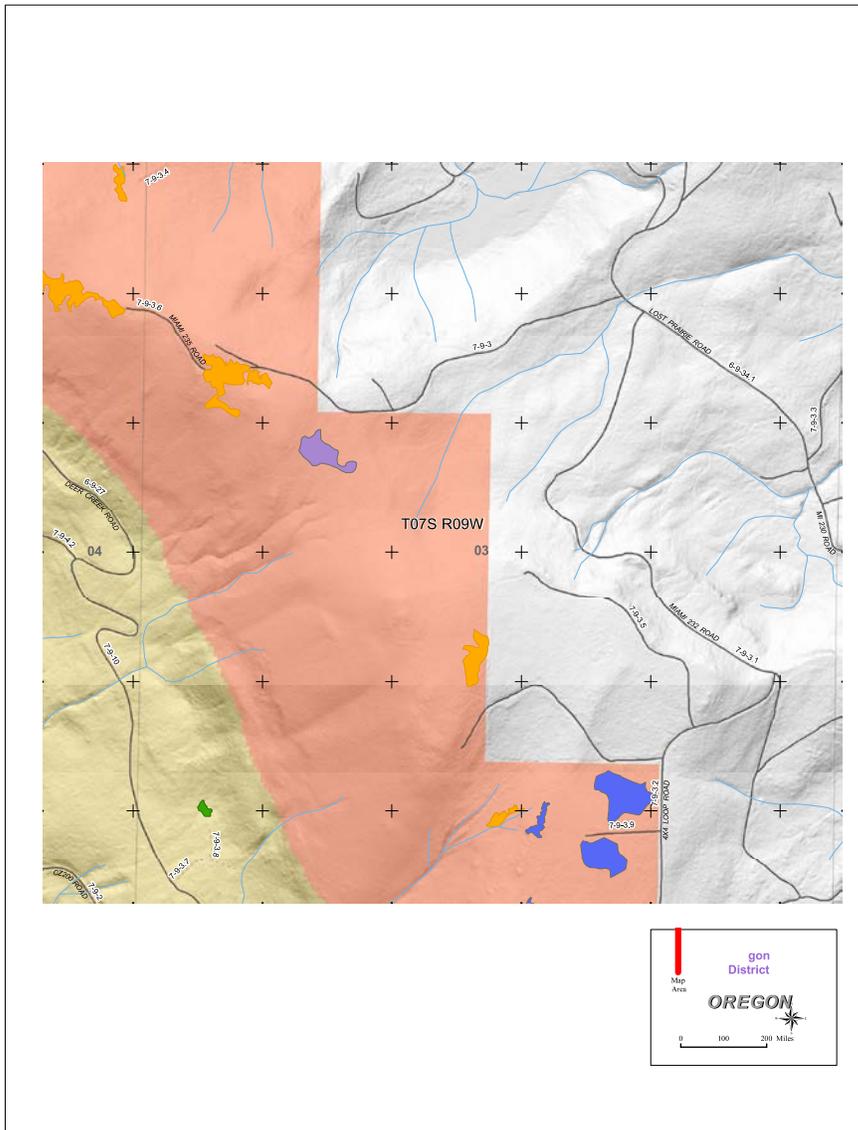
Rare species but not State Listed:

none

Noteworthy species:

none

**Below: map of Saddle Bag Mt. RNA study area.**



This area is known for its forest of 120 year-old *Abies amabilis*.

*Bryoria bicolor*, the State Listed lichen (G4, S2, ORBIC List 2, OR-STR), was found at the summit (waypoint 309) and three other nearby locations (waypoints 310-312).

The site has sustained some tree mortality as wind throws. There are also broken off branches and tree crowns. This has left a 25m<sup>2</sup> opening in the late seral *Abies amabilis*, *Tsuga heterophylla* forest with a dozen class 1-2 coniferous snags of the same stature. Mid and understories are absent except sparse *T. heterophylla* saplings. The groundcover is *Claytonia siberica*. Coarse woody debris is abundant. There is a 75% canopy cover, 250° aspect, and minimal slope on the summit. With 20+ thalli seen, *B. bicolor* is commonly scattered on the woody debris and snags described above. There is doubtless more in the canopies of the living trees and perhaps snags in the vicinity. The area is rich with other epiphytes such as *Platismatia norvegica*, *P. glauca*, *P. stenophylla*, *Nephroma helveticum*, *Sticta fuliginosa*, *Hypogymnia enteromorpha*, *H. inactiva*, and *Ulota megalospora*.



Above: summit of Saddle Bag Mt. with *Bryoria bicolor* (waypoint 309).



Above: close-up of *Bryoria bicolor* from Saddle Bag Mt. (waypoint 309).

*Codriophorus ryszardii* (syn. *Racomitrium ryszardii*, misapplied as *Rhacomitrium aquaticum*), the State Listed moss (G4, G5, S2, ORBIC List 3, OR-STR), is present on a small boulder 30m down the north-facing slope (waypoint 310) from the summit. It's under an 80% canopy cover of the forest type described above, without an understory, with *Oxalis oregana* as groundcover, and associated with *Pilophorus clavatus*.

*Bryoria bicolor*, the State Listed lichen (G4, S2, ORBIC List 2, OR-STR), is also present here (waypoint 310) on snags as well as at waypoints 311, 312.



Above left: habitat of *Codriophorus ryszardii* and *Bryoria bicolor*. Looking up towards summit of Saddle Bag Mt. (waypoint 310). Above right: *C. ryszardii* on rock in foreground (waypoint 310).

### Rocky Point Survey Area

3,000 ft. in elevation  
11 miles from the ocean

July 27, 28, 2019

State Listed species found that were on the target list:

*Bryoria bicolor* lichen  
*Codriophorus ryszardii* moss  
*Pilophorus nigricaulis* lichen

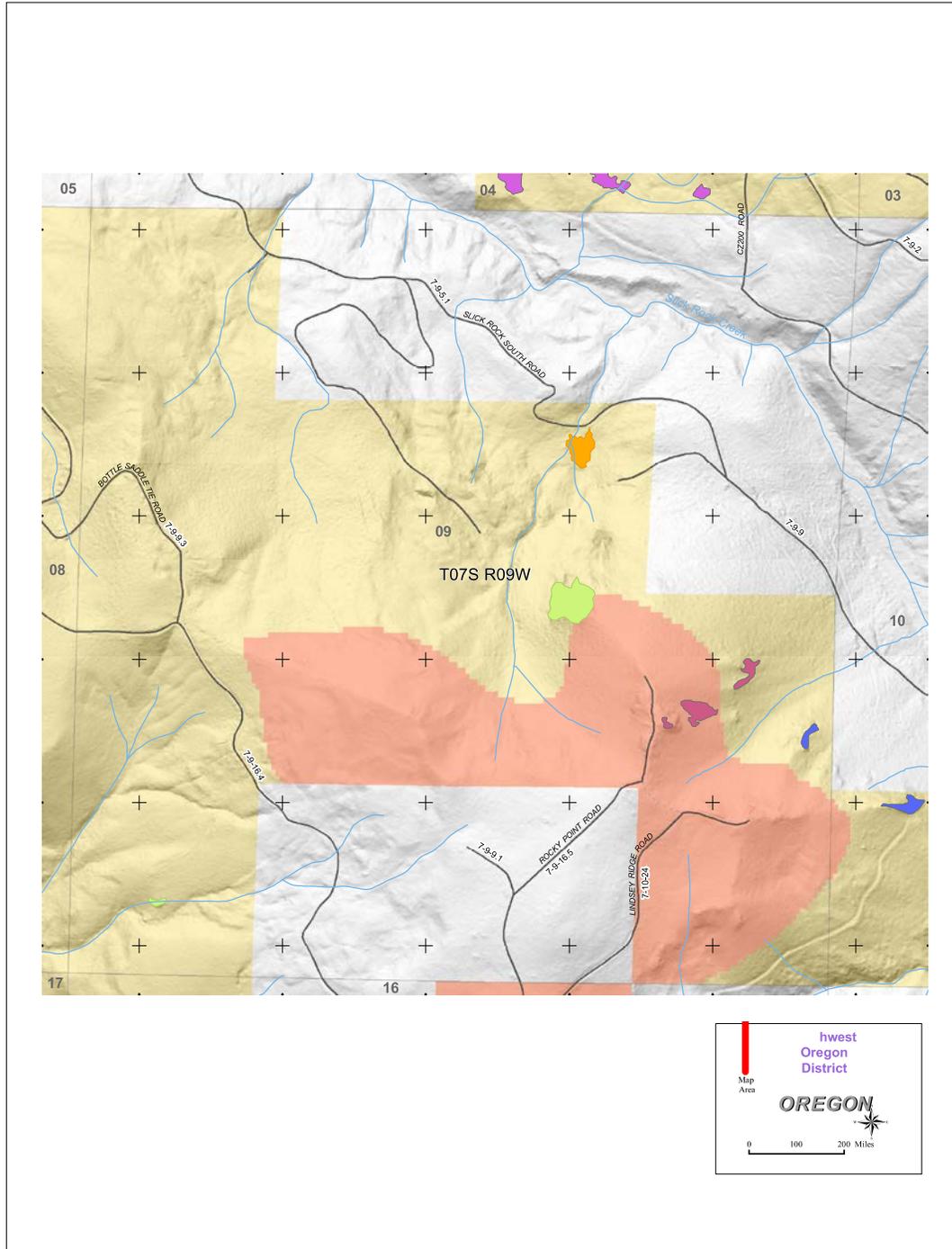
Rare species but not State Listed:

*Racomitrium lanuginosum* moss  
*Scapania scandica* liverwort

Noteworthy species:

*Hypogymnia duplicata* lichen

Below: map of Rocky Point study area.



Within a small area and a few rich habitats there are five rare species present here. This mountain has a well-defined north-south ridge crest of exposed rock a little wider than the road carved onto it. The ridge is about 200m long and dramatically drops precipitously off on all sides. The top is exposure and experiences renewed disturbances by human visitors and vehicles.

The east side of the ridge is the most interesting area. A large basalt outcrop acts as a buttress and is capped with a 20m x 15m 20% sloping slab at 65° (waypoint 333). This top, denoted as “Rock Garden” habitat on the map, has only 5-10% canopy cover of *Pseudotsuga menziesii* and *Tsuga heterophylla* while its undulating surfaces are covered with mostly *Selaginella wallacei*, *Racomitrium lanuginosum*, *Bucklandiella heterosticha* and minor amounts of *Dicranum howellii*, *Andreaea rupestris*, *Stereocaulon intermedium*, *Massalongia carnososa*, and *Cephaloziella divaricata*. The trees and snags surrounding this slab have especially thick quantities of epiphytes.



Above: rock slab on top of outcrop as “Rock Garden” habitat on map (Waypoint 333).

*Racomitrium lanuginosum* is rare but not State Listed. It is present at the above location in good quantities.



Above left: habitat of *Racomitrium lanuginosum*. Above right: close up of *R. lanuginosum* (waypoint 333).

*Bryoria bicolor*, the State Listed lichen (G4, S2, ORBIC List 2, OR-STR), is present at two locations at Rocky Pt. within 20m from one another. They are just within the forest margin around the rock slab described above. Most of the population (waypoint 341) is on a couple of *Tsuga heterophylla*, 18” and 12” DBH in a three-meter cluster with three other pole sized trees. The understory is fairly open with sparse *Vaccinium parvifolium* and high coverage of low growing *Gaultheria shallon* and minor amounts of *Berberis nervosa*. Also in the area are six < 1m<sup>3</sup> boulders covered with *Antitrichia curtipendula*, *Isothecium stoloniferum*, and *Peltigera britannica*. The physical characteristics are 150° aspect with predominant exposure at 100°, 10% slope, 80% canopy cover.

There are about 30 thalli of *B. bicolor* between the two larger trees. They are on their lower boles, between 320°-20°, about eye level, not much higher. One tree has large lower limbs but *B. bicolor* was not seen on those branches or limbs. The trees are covered with many epiphytic species: *Loxosporopsis corallifera*, *Isothecium stoloniferum* (pendulous form), *Hypnum circinatum*, *Frullania nisqualensis*, *Douinia ovata*, *Sphaerophorus venerabilis*, *Hypogymnia duplicata*, *H. inactiva*, *H. enteromorpha*, and *Platismatia glauca*.



Above: habitat of *Bryoria bicolor* on the two larger trees (waypoint 341).

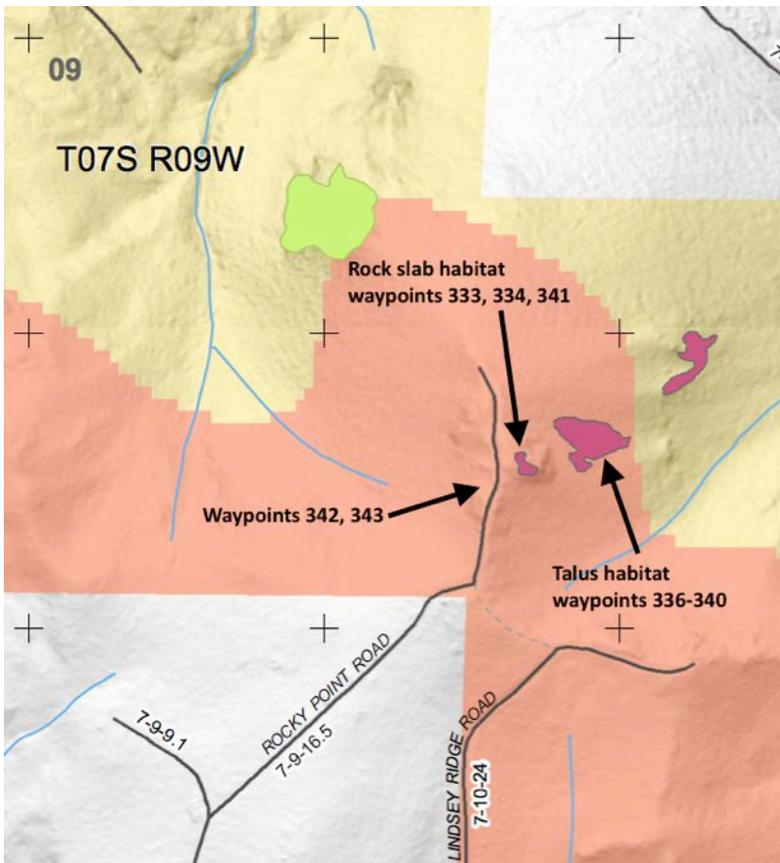


Above left: silhouette of distinctive morphology of *Bryoria bicolor* (waypoint 341). Above right: luxuriant growth form of the coralloid crustose species, *Loxosporopsis corallifera* (waypoint 341).

A little more of the subpopulation is on a 2' DBH *Pseudotsuga menziesii* wolf tree (waypoint 334).



Above: *Bryoria bicolor* on center tree. (waypoint 334).



Above: detail of Rocky Point map with notable habitats.

Working one's way down and around the side of the rock outcrop/buttness, the cliff is covered with bryophytes. However, given the shaded conditions of the situation, little more than ubiquitous species of forest floor bryophytes are present such as *Isothecium stoloniferum*, *Kinbergia oregana*, *Bucklandiella heterophylla*, et al.



Above: looking up shaded cliff face (waypoint 335) towards waypoints 333, 334, 341 out of view on top.

At the base of the cliff is a talus field (waypoints 336-340) about 50m x 30m, mostly open with less than ten trees in the talus field or encroaching from the sides. They are *Tsuga heterophylla* of pole (early seral) to sapling sizes. The talus field is at 70° aspect, 90% slope, < 30% canopy cover. Most of the talus field is cobble-sized rock, but there are some boulders that are  $\leq 0.5\text{m}^3$ . The talus field is surrounded by *Acer circinatum*, *Thuja plicata*, and *Pseudotsuga menziesii*. There is a scarce amount of vascular plants throughout the talus field, except for *Selaginella wallacei*, *Cryptogamma crista* and *Penstemon* sp. Likewise coarse woody debris is low with only sporadic logs of class 4 decays stage with *Cladonia transcendens*.



Above: looking up and downslope in talus field (waypoints 336-340).

*Pilophorus nigricaulis*, the State Listed lichen (G3G4, S2, ORBIC List 3, OR-SEN) is abundant across whole talus field except where encroached by trees. There are many variably aged thalli and phenotypes of *P. nigricaulis* here. Additionally, *P. acicularis* and *P. clavatus* are also here, which makes for a good place to compare and contrast the three species and observe their variation.

Other species present are: *Racomitrium lanuginosum*, *Bucklandiella occidentalis*, *B. heterosticha*, *Grimmia ramondii*, *Schistidium papillosum*, *Andreaea rupestris*, *Heterocladium macounii*, *Stereocaulon intermedium*.



Above left: talus field habitat (waypoint 336). Above right: *P. nigricaulis* close up (waypoint 336).

*Scapania scandica* (waypoint 332) is not State Listed but it should be as there are few records of it. This liverwort was found on the east facing ridge crest just north of the buttress area on a very steep slope of coastal scrub with high amounts of late decay stage coarse woody debris. Associated species are *S. americana*, *Lophozia sudetica*, *Diplophyllum cf. taxifolium*, *Cephaloziella divaricata*, *Cladonia squamosa*, *C. pyxidata*, *Psoroma hypnorum*, and *Polytrichum juniperum*.

On the west side of the Rocky Point ridge crest is another talus field created during road construction when rocky debris was shoved over the side some decades ago. The resultant talus has since healed in naturally but the warm western exposure prohibits any target species, except at the ecotone with the forest margin and further interior where there is an apparent cold sink.

*Codriophorus ryszardii* (syn. *Racomitrium ryszardii*, misapplied as *Rhacomitrium aquaticum*), the State Listed moss (G4, G5, S2, ORBIC List 3, OR-STR), was found at two locations (waypoints 342, 343) just below the west side of the ridge crest in a 97% closed canopied early to mid seral *Abies procera* forest without understory, minimal ground cover (some *Oxalis oregana*), abundant coarse woody debris, 84% slope, 280° aspect. *C. ryszardii* is on cobble sized rocks with associated species: *Kindbergia oregana*, *Pseudotaxiphyllum elegans*, *Bucklandiella heterophylla*, *Pilophorus clavatus*.



Above left: habitat of *Codriophorus rysardii* on small rock. Above right: close up of *C. rysardii* (waypoint 342).



Above: west side of Rocky Pt. ridge crest with talus field where conditions are too warm for target species (waypoint 343).

**Near Rd. #7-9-16 Survey Area**

**July 28, 2019**

3,000 ft. in elevation  
11 miles from the ocean

State Listed species found that were on the target list:

*Codriophorus ryszardii* moss

*Tetraplodon mnioides* moss

Rare species but not State Listed:

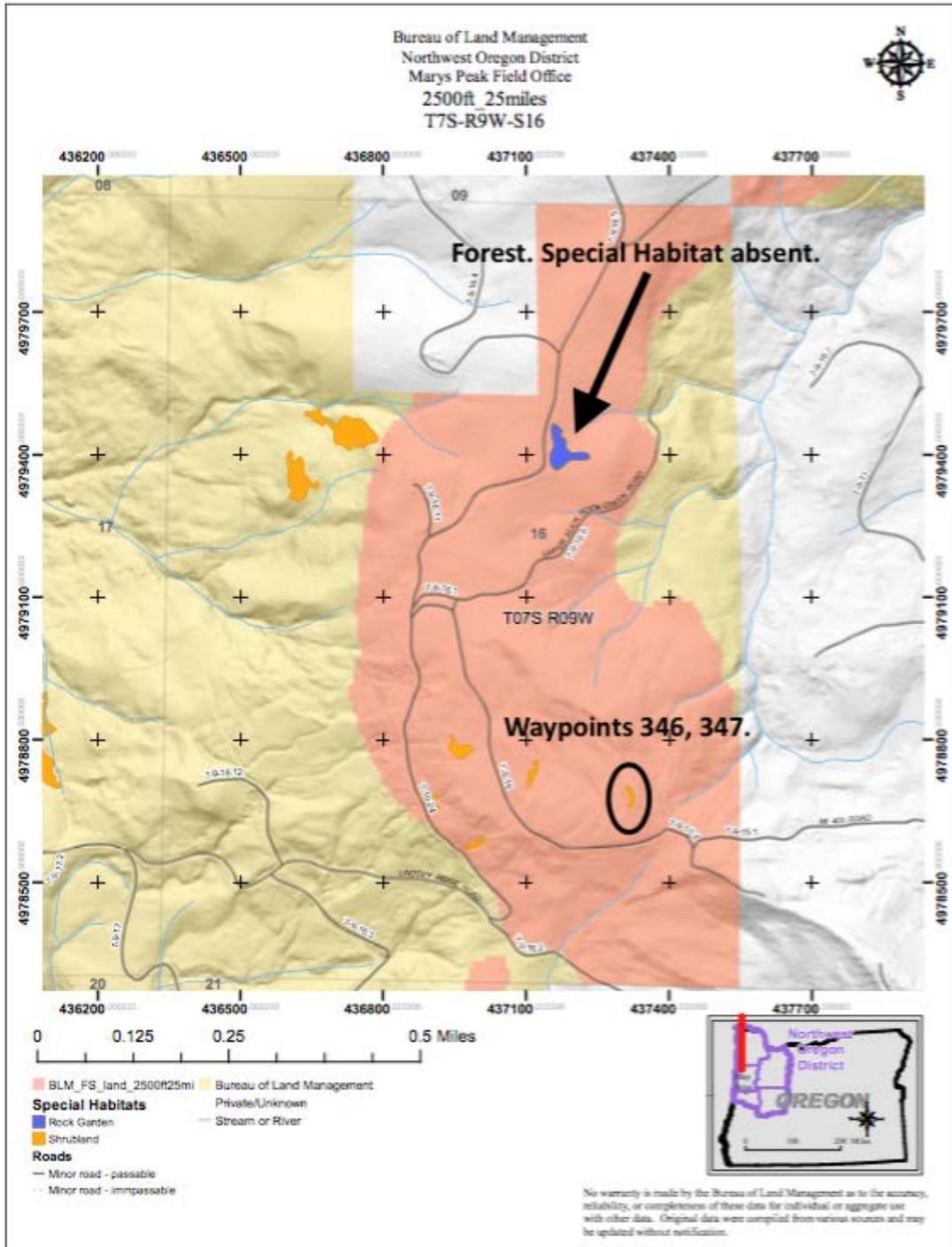
*Codriophorus fascicularis* moss

Noteworthy species:

none

A mile south of Rocky Point on a hilltop is an opening near Rd. #7-9-16 where three rare species were found in a small area (waypoints 346, 347). The map denotes it as the Special Habitat, shrubland. It is a short linear break in the forest appearing as an overgrown road with regenerating conifers. These saplings represent the "shrubland." It could be naturally formed because it is encircled by an old even aged stand.

Below: map of Near Rd. #7-9-16 study area.



The surrounding forest is a closed, dense stand of mid seral mixed conifers of *Abies amabilis*, *Tsuga heterophylla*, and *Pseudotsuga menziesii*. The mid story is absent, the understory has low *Vaccinium parvifolium*, and the ground layer is sparse with *Lycopodium clavatum*, *Viola sempervivans*, conifer seedlings, and bare gravelly soil. This landform has a 200° aspect, 2% slope, and 65% canopy cover.

*Codriophorus fascicularis* (syn. *Racomitrium fascicularis*) is not State Listed but it should be. *Codriophorus ryszardii* (syn. *Racomitrium ryszardii*, misapplied as *Rhacomitrium aquaticum*), the State Listed moss (G4, G5, S2, ORBIC List 3, OR-STR). Both of these species are on cobble size rocks close to each other along the forest margin.



Above left: *Codriophorus fascicularis* habitat (waypoint 346). Above right close-up of *C. fascicularis* (waypoint 346).



Above left: habitat of *Codriophorus fascicularis* in background, *C. ryszardii* in foreground (waypoint 346). Above right close-up of *C. ryszardii* (waypoint 346).

*Tetraplodon mnioides*, the State Listed dung moss (G5, S3, ORBIC List 3), is present on several pieces of coyote scat scattered across 15+m area at various stages of senescence, the youngest photographed. Associated species include *Bucklandiella heterosticha*, *Cladonia* sp., and the rare *Buxbaumia aphylla* is suspected.



Above: typical habitat of *Tetraplodon mnioides* (waypoint 346).



Above left: habitat of *Tetraplodon mnioides*. Above right: close-up of *T. mnioides* (waypoint 346).

**Grass Mt. RNA Survey Area**

3,645 ft. in elevation  
20 miles from the ocean

**July 30, 31, August 1, 2019**

State Listed species found that were on the target list:

*Marsupella sprucei* liverwort

*Tetraplodon mnioides* moss

Rare species but not State Listed:

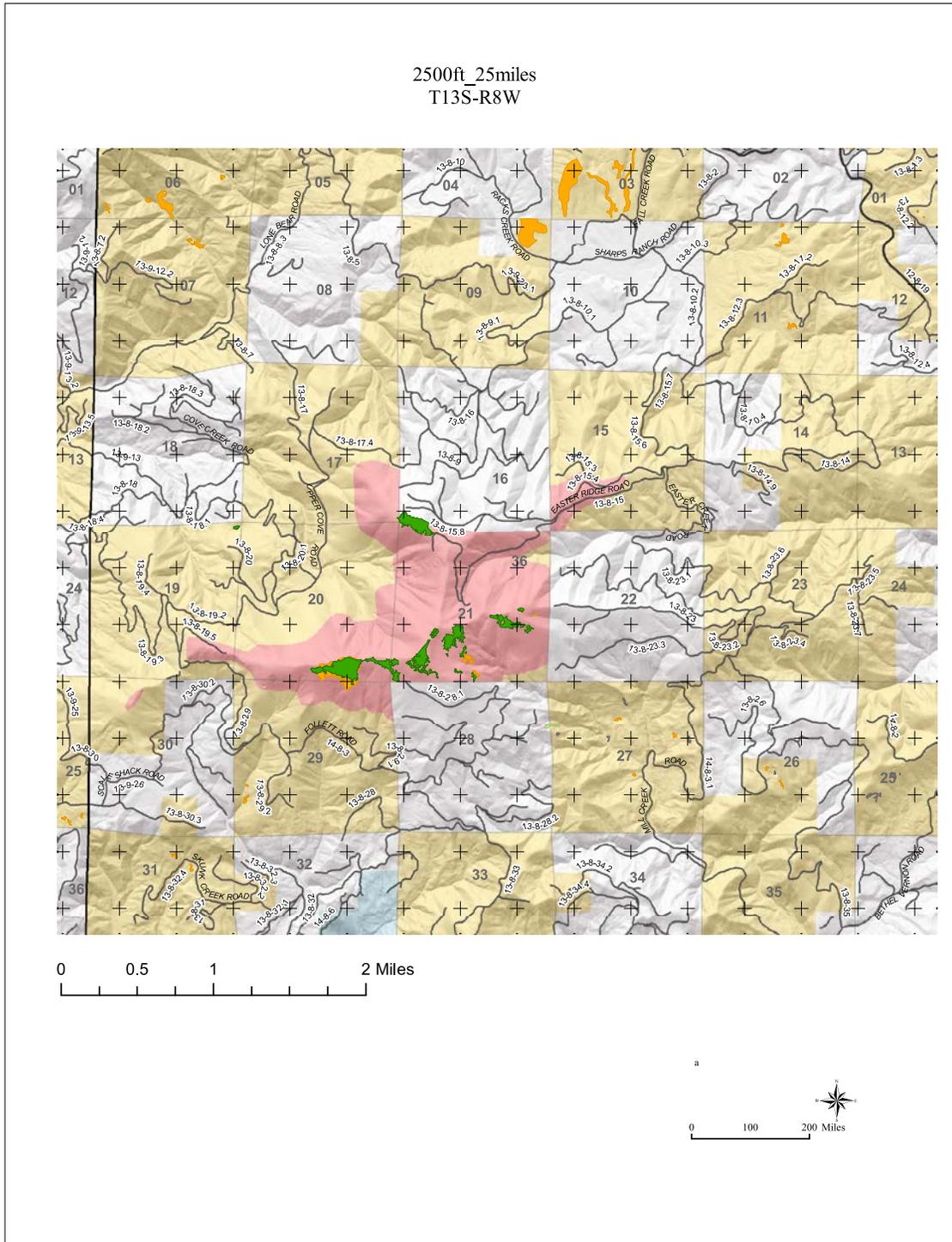
none

Noteworthy species:

none

This mountain was surveyed for three days because of its good potential habitats and relative ease of access. It extends across six sections of public land, has a couple of major east-west ridge crests that are connected by a north-south ridge crest, and along some of the southern aspects of the ridges are a series of extensive meadows. Additionally there are old growth *Abies amabilis* at 6'+ DBH and at least one area with rock formations. It is surprising that given the broad area, promising features, and conditions that only two State Listed species were found. This may be attributed to it being so far southeast and that many features are south facing.

Below: map of Grass Mountain RNA study area.



*Marsupella sprucei* (G3, G5, S1, ORBIC List 3), a minute leafy liverwort, was found lightly scattered on sandstone rocks (waypoints 348, 351-353) along overgrown Rd. #13-8-15. This species is often locally common when present. It's a pioneer species restricted to sandstone in cool damp conditions.

It is on numerous small cobble-sized sandstone rocks in middle of the partially overgrown road scattered across a 3m x 3m area. The rocks originate from an old eroding road cut. Associated species growing in the road are *Anaphalis margaritacea*, *Rubus ursinus*, *Viola sempervirens*, *Vaccinium parvifolium*, *Lupinus* sp. The overall aspect of the hill slope is 80°, the aspect of the road is 175°, the slope of the roadbed is 5%, it is partially shaded under a 70% canopy along the linear opening of the road. The surrounding forest is a closed mixed to mature seral coniferous stand of *Pseudotsuga menziesii*, *Tsuga heterophylla*, and *Abies amabilis*. The understory is mostly absent but where present has *Rhododendron macrophyllum* and young trees. The ground layer is also nearly absent.



Above left: habitat of *Marsupella sprucei* on partially overgrown lower road cut. Above right: close-up of typical *M. sprucei* appearing as maroon or brown fuzz on rock (waypoint 351).



Above right: close-up of damp green form of *M. sprucei* (waypoint 351).



Above left: habitat of *Marsupella sprucei* on rocks of fire ring. Gate along Rd. #13-8-15 to Grass Mt. RNA in background. Above right: close-up of *M. sprucei* on rocks of fire ring. (waypoint 348).

*Tetraplodon mnioides*, the State Listed dung moss (G5, S3, ORBIC List 3), is also scattered along Rd. #13-8-15 (waypoints 354, 380, 385). It is in mostly open conditions, on gravelly clay soil with a moderately thick layer of *Tsuga heterophylla* needles from the adjacent seedlings, saplings, and pole size trees. Other associated species are *Hypochaeris radicata*, *Anaphalis margaritacea*, *Lotus sp.*, *Niphotrichum elongatum*. The slope of the road is 8%, the aspect of the road is 130°, the aspect of the overall hill slope is 180°, the canopy cover is 65%, and the moisture regime is mesic. The surrounding forest is a closed mixed to mature seral coniferous stand of *Pseudotsuga menziesii*, *Tsuga heterophylla*, and *Abies amabilis*. The understory is mostly absent but where present has *Rhododendron macrophyllum* and young trees. The ground layer is also nearly absent.



Above left: habitat (Rd. #13-8-15) of *Tetraplodon mnioides* in middle foreground. Above right: close-up of *T. mnioides* (waypoint 354).

Various other areas that did not have State Listed species but are noteworthy are the meadow and rock formations in the northwest of Grass Mt. (waypoint 355). The conditions here are too warm for the target species of this study. On the backside (north facing) of the ridge under an *Abies* canopy cover is the State Listed lichen, *Pseudocyphellaria mallota*, however it is on private land at that point (waypoint 357).



**Above: northwest most meadow, south facing with rock formations (waypoint 355).**



**Above: northwest most meadow, south facing with rock formation (waypoint 355).**

There is a complex of south facing meadows along the south of Grass Mt. that are lined with old trees. Herbaceous plants choke out any non-vascular plants in the meadows; rare epiphytes and rock formations are absent. The meadows can vary from place to place. For example, the southwest most meadow is covered with *Rubus ursinus* and riddled with mountain beaver (*Aplodontia rufa*) burrows. Other meadows have less ground disturbance and are covered with *Carex* sp., or grasses.



Above left: the southwest most meadow (waypoint 363). Above right: the adjacent meadow to the east (waypoint 370).



Above left: the southeast most meadow (waypoint 382). Above right: meadow near summit.

Along the ridge proper at the upper end of these meadows is interesting habitat in terms of large old growth contorted trees and shrubs with abundant epiphytes. A pair of these open grown *Abies amabilis* with large, living lower limbs are “wolf trees” but could be better described as “elephant trees”. These uniquely formed trees are tagged (waypoint 374).

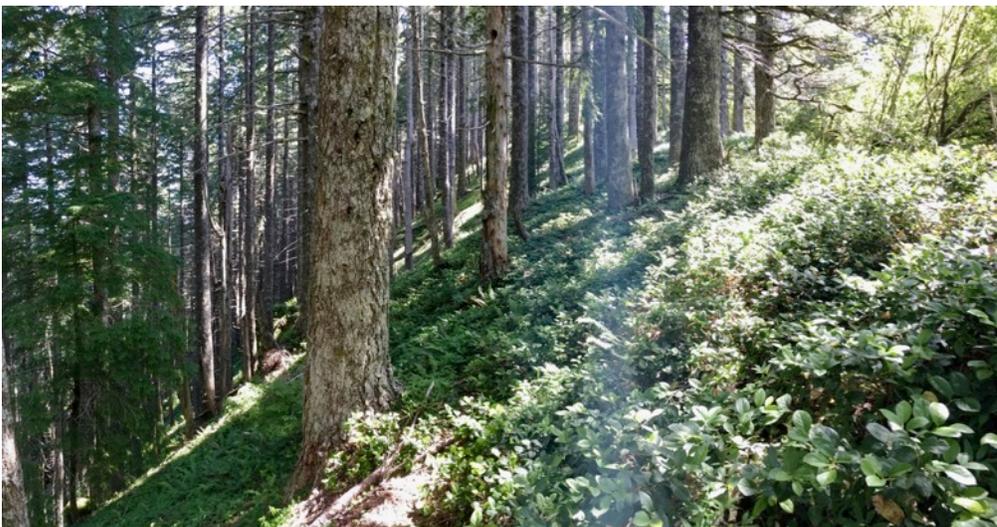


Above: “elephant trees” (waypoint 374).



Above left: “elephant trees” (waypoint 374). Above right: tag on “elephant tree” (waypoint 374).

In places where the meadows extend up to the ridge crest a barrier of thick shrubs is present which are rich with epiphytes including cyanolichens.



Above: example of narrow east-west ridge crest with thick shrubs with epiphytes in top right corner (waypoint 362).



Above: example of narrow east-west ridge crest with thick shrubs with epiphytes on left (waypoint 362).

Some of the forest is a gallery forest of mature seral *Abies amabilis* and *A. procera*, without mid or understories, and ground layer composed of just *Maianthemum stellatum*.



Above: gallery forest habitat at e: 446477 n: 4919229 NAD 83.

Along Rd. #13-8-15 is a sapling of *Abies amabilis* that appears to have a mutated “albino” branch (waypoint 350). This rare phenomenon can only exist in coastal areas with high humidity, fog and low temperatures. Similarly, mature specimens of discolored *A. procera* were also found but it is unclear whether it is partial albinism or chlorosis (waypoint 383).



Above left: “albino” branch *Abies amabilis* (waypoint 350). Above right: possible partial albinism or chlorosis of mature specimens of *A. procera* (waypoint 383).

### Prairie Peak Survey Area

3,000 ft. in elevation  
24 miles from the ocean

August 2, 2019

State Listed species found that were on the target list:

*Sticta weigeli* lichen

Rare species but not State Listed:

*Bucklandiella macounii* ssp. *alpina* moss

Noteworthy species:

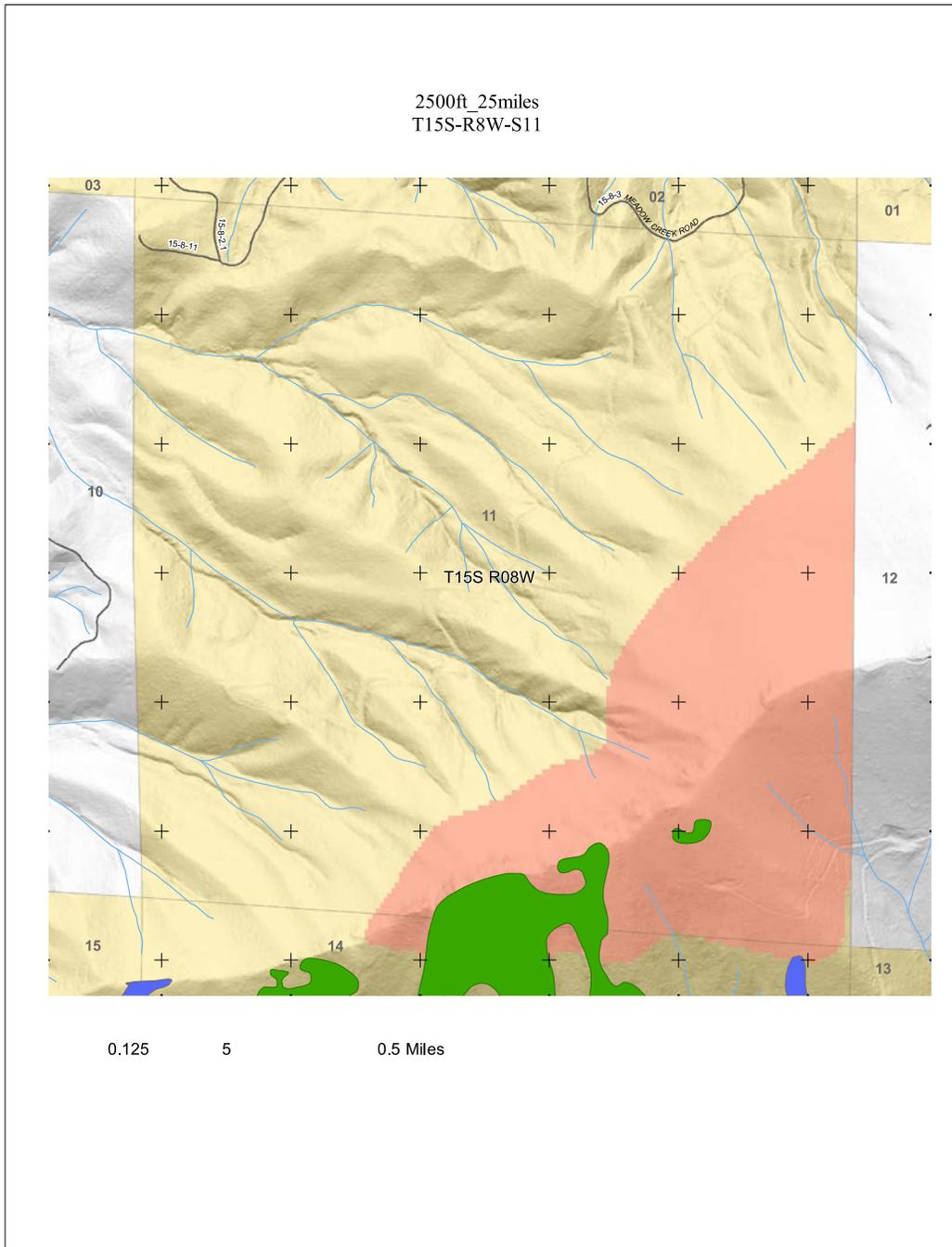
*Metzgeria conjugata* liverwort

*Nephroma parile* lichen

*Usnea longissima* lichen

This mountain is a long well defined east-west ridge with a complex of extensive meadows on the south facing side.

Below: map of Prairie Peak study area.



*Bucklandiella macounii* ssp. *alpina* is not State Listed but perhaps should be. According to herbaria records there are less than 10 sites for the state and not all of those are believable. It was found growing in rock garden conditions with *B. heterosticha* (waypoint 396).



Above: habitat of *Bucklandiella macounii* ssp. *alpina* (waypoint 396).

*Sticta weigelii* (G5, S3, ORBIC List 4), usually an epiphyte, was found on rock along the ridge (waypoint 394).



Above: habitat of *Sticta weigelii* (waypoint 394).



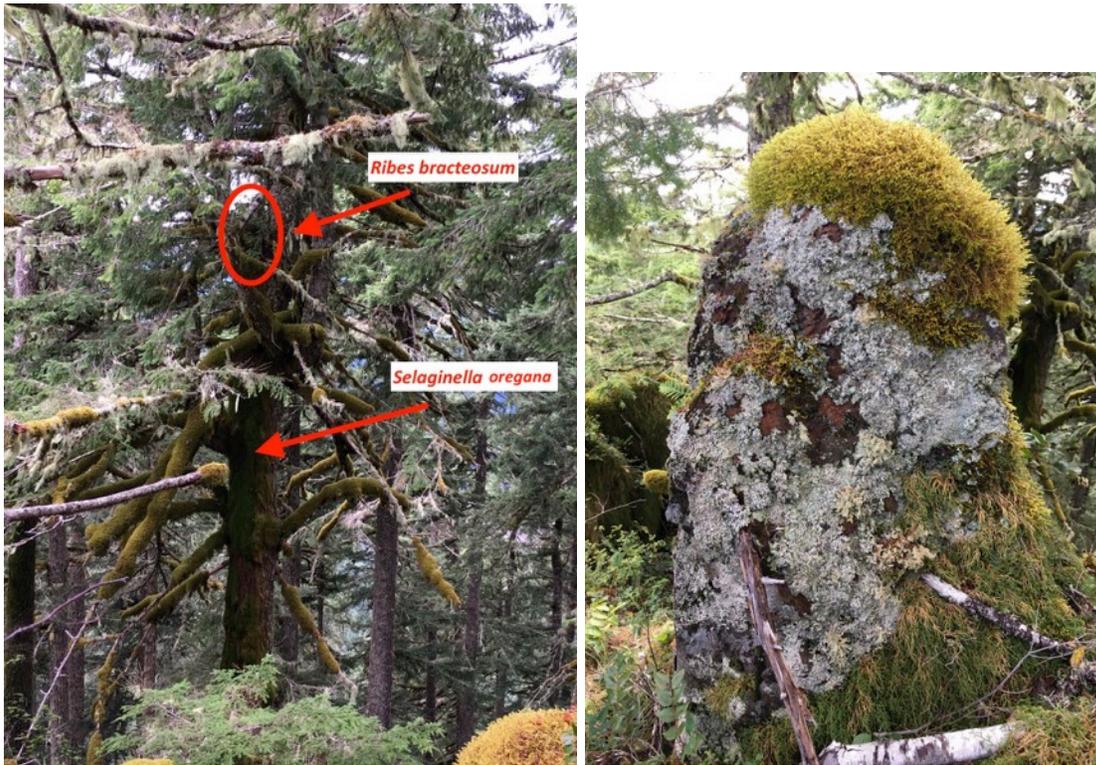
Above left: dark thallus of *Sticta weigelii* (waypoint 394). Above right: close-up of *Sticta weigelii* (waypoint 394).

Prairie Pk. was surveyed from the lower ridge up to 2,920 ft. even though it continues up to 3,220 ft. and ultimately up to 3,400 ft. on private property. Future surveys should focus on the remaining altitude of the ridge.

The lower part of the ridge is forested with mature to late seral *Tsuga heterophylla*-*Pseudotsuga menziesii* with an understory of *Acer circinatum* and *Holodiscus discolor* when present. The ground layer has *Gaultheria shallon* and *Polystichum munitum*. The ridge itself is often a narrow

rocky spine with boulders and bedrock rounded from erosion. These can form 10m cliffs in places and because of the full shade are covered with *Selaginella oregana*, *Antitrichia curtispindula*, and *Isoetecium stoloniferum*.

Farther up the ridge the tree composition changes to *Pseudotsuga menziesii*-*Abies procera*, which are at 2'-4' DBH and storm-beaten: broken, contorted, topped, with reiterating crowns, and includes "wolf" trees. Evidently, the cool, moisture-laden winds are regular enough to support a high quantity of epiphytes: *Lobaria oregana*, *Usnea longissima*, *Antitrichia curtispindula*, and pendulous forms of *Isoetecium stoloniferum*. *Selaginella oregana* covers one particular bole from the base to 40' up. This same tree has a vascular epiphyte, a moisture-loving shrub, *Ribes bracteosum* (!) (waypoint 388). Farther downslope *P. menziesii* and *T. heterophylla* get as large as 5' DBH (waypoint 387, 397).



Above left: example of old tree supporting many epiphytes including shrub, *Ribes bracteosum* and *Selaginella oregana* (waypoint 388). Above right: example of rounded rock feature of ridge with many species.



Above left: 4'+ DBH *T. heterophylla* and *P. menziesii* on north facing slope below ridge (waypoint 397). Above right: example of old trees with thick growths of epiphytes along rocky spine (waypoint 388).



Above right and left: examples of old trees with thick growths of epiphytes along rocky spine (waypoint 388).



**Above left and right: examples of cliffs along rocky spine (waypoints 395, 397).**



**Above: large rock outcrop supporting many woody plants along the rocky ridge.**

The meadows of the upper south facing slopes probably exist due to thin soil over bedrock. In some places this is more obvious than others with it being rocky enough to be considered rock garden habitat. An example of this is a 1-2 ac. area not on the map (waypoint 388).



Above: meadow with patches of *Q. garryana* (waypoint 391).

The meadows are lined with *Pseudotsuga menziesii* and there are some copses of stunted *Quercus garryana*, possibly *Q. g. var. semota*. These are dense thickets with abundant amounts of epiphytes.



Above: interior view of *Q. garryana* (cf. var. *semota*) copse with abundant epiphytes (waypoint 390).

Other noteworthy species includes the thalloid liverwort, *Metzgeria conjugata*, which is rarely found this far from the coast. It is in a crevice of a shaded rock formation (waypoint 387). Large rock slabs receiving sheet drainage from late snow melt and run off have the typically aquatic moss, *Codriophorus acicularis*. The lichen, *Nephroma parile*, is present here. It is a species much more common on the east side of the Cascades but is responding to the extensive rock formations. The old growth conifer associated lichen, *Lobaria oregana*, is on rock and *Q. garryana*. *Usnea longissima* is scattered patchy along the ridge. These species including *Bucklandiella macounii* ssp. *alpina*, which is a montane-alpine species, represent a wide range of climate and habitat preferences that have converged here atop Prairie Pk. It bespeaks of the ecological value of this

mountain that it can support species from the low elevation coast, alpine, riparian, and east side Cascade continental habitats.

In the rocky portions of the meadows the diversity of non-vascular plants is low being too warm and dry to support much more than moss species in the Grimmiaceae. These include *Bucklandiella heterosticha*, *Niphotrichum elongatum*, as well as *Polytrichum piliferum*.

GOLD BEACH RANGER DISTRICT  
ROGUE RIVER-SISKIYOU NATIONAL FOREST, CURRY COUNTY

**Signal Buttes Survey Area**

**June 1-3, 5, 2019**

3,500 ft. elevation  
7 miles from ocean

State Listed species found that were on the target list:  
*Scytinium platynum* (syn. *Leptogium platynum*)

Rare species but not State Listed:  
*Grimmia longirostris* moss  
*Bucklandiella macounii* ssp. *alpina* moss

Noteworthy species:  
*Cladonia ecmocyna* ssp. *occidentalis* lichen  
*Coelocaulon aculeatum* lichen  
*Didymodon nicholsonii* moss  
*Ephebe lanata* lichen  
*Melanelia hepatizon* lichen  
*Montanelia panniformis* lichen  
*Pseudephebe pubescens* lichen  
*Pseudoleskeella serpentiniensis* moss  
*Scouleria siskiyouensis* moss

During the first day of surveying at Signal Buttes it soon became apparent that proximity to ocean was more important than elevation in terms of habitats approximating those of more northerly latitudes. Explorations for other areas similar to Signal Buttes such as Quosatana and Chismore Buttes did not come close to the characteristics that Signal Buttes has. Therefore most of the survey efforts were focused there.

Signal Buttes is a broad, almost two square mile, isodiametric land feature with relatively low sloping sides, topped with level expanses, and many rocky promontories emergent from the top canopy. The summit is a pair of these about 30m apart joined by a shallow gravelly saddle once occupied by a fire lookout. From here there are views of other neighboring rock outcrops, plant communities, and features of the greater area: Saddle Mt., Quosatana Butte, Collier Butte, Bald Mt., Humbug Mt., Cape Blanco, and the mouth of the Rogue River.

Signal Buttes has an eclectic assemblage of habitats:

1. *Pinus jeffreyi* savannah.
2. An almost impenetrable coastal scrub of *Lithocarpus densiflorus* (2-3m tall), *Quercus vaccinifolia*, and *Arctostaphylos columbiana*.
3. Uplands have a somewhat subalpine character with conical and stout *Pseudotsuga menziesii* and *Pinus attenuata*. These are associated with glades of exposed slabs of bedrock surrounded by *Juniperus communis*, *Arctostaphylos uva-ursi*, *Castilleja* sp., and grasses. The resultant mosaic is edaphic in origin.
4. Typical closed-canopy *Pseudotsuga menziesii* forest. At Signal Buttes it is late to mature seral with the mid-story of *Quercus chrysolepis* and understory of *Gaultheria shallon* and *Holodiscus discolor*. This is the least prevalent habitat type. A small stream with boulders and aquatic bryophytes is present (waypoint 62).

**Below: bryophytes and lichens of Signal Buttes, Gold Beach Ranger District.**

MOSSES	LICHENS
<i>Amphidium mougeotii</i>	<i>Cetraria merrillii</i>
<i>Andreaea rothii</i>	<i>Cetraria orbata</i>
<i>Antitrichia curtispindula</i>	<i>Cladonia bellidiflora</i>
<i>Bucklandiella heterosticha</i>	<i>Cladonia carneola</i>
<i>Bucklandiella macounii ssp. alpina</i>	<i>Cladonia ecmocyna ssp. occidentalis.</i>
<i>Bucklandiella obesa</i>	<i>Cladonia furcata</i>
<i>Bucklandiella pacifica</i>	<i>Cladonia squamosa</i>
<i>Codriophorus varius</i>	<i>Coelocaulon aculeatum</i>
<i>Denroalsia abietina</i>	<i>Ephebe lanata</i>
<i>Dicranum fuscescens</i>	<i>Hypogymnia imshaugii</i>
<i>Dicranum fuscescens</i>	<i>Hypogymnia enteromorpha grp.</i>
<i>Dicranum howellii</i>	<i>Hypogymnia inactiva</i>
<i>Didymodon nicholsonii</i>	<i>Hypogymnia physodes</i>
<i>Encalypta ciliata</i>	<i>Hypogymnia tubulosa</i>
<i>Fissidens bryoides s.l.</i>	<i>Hypogymnia wilfiana</i>
<i>Grimmia longirostris</i>	<i>Lobaria anthrapsis</i>
<i>Grimmia montana</i>	<i>Lobaria scrobiculata</i>
<i>Grimmia ramondii</i>	<i>Melanelia hepatizon</i>
<i>Grimmia torquata</i>	<i>Montanelia panniformis</i>
<i>Homalothecium cf. aeneum</i>	<i>Mycoblastus affinis</i>
<i>Homalothecium megaptilum</i>	<i>Mycoblastus sanguinarius</i>
<i>Hypnum circinale</i>	<i>Nephroma laevigatum</i>
<i>Imbricium sp</i>	<i>Parmelia pseudosulcata</i>
<i>Isothecium stoloniferum</i>	<i>Parmelia saxatilis</i>
<i>Kindbergia oregana</i>	<i>Parmeliopsis hyperopta</i>
<i>Kindbergia praelonga</i>	<i>Peltigera britannica</i>
<i>Neckera douglasii</i>	<i>Placopsis lambii</i>
<i>Orthotrichum lyellii</i>	<i>Platismatia glauca</i>
<i>Orthotrichum rupestre</i>	<i>Platismatia herrii</i>
<i>Poltrichastrum alpinum</i>	<i>Platismatia stenophylla</i>
<i>Polytrichum juniperinum</i>	<i>Polychidium musicola</i>
<i>Polytrichum piliferum</i>	<i>Pseudephebe pubescens</i>
<i>Pseudoleskeella serpentinensis</i>	<i>Psoroma hypnoides</i>
<i>Pseudotaxaphyllum elegans</i>	<i>Scytinium pulvinatum</i>
<i>Rhytidiadelphus triquetrus</i>	<i>Sphaerophorus venerabilis</i>
<i>Scleropodium obtusifolium</i>	<i>Stereocaulon sterile</i>
<i>Scleropodium touretii</i>	<i>Umbilicaria polyphylla</i>
<i>Scouleria siskiyouensis</i>	<i>Usnea filipendula</i>
<i>Ulota megalospora</i>	<i>Vulpicida canadensis</i>
<i>Ulota obtusiuscula</i>	

LIVERWORTS
<i>Cephaloziella divaricata</i>
<i>Douinia ovata</i>
<i>Frullania nisquallensis</i>
<i>Gymnomitrium obtusum</i>
<i>Porella cordeana</i>
<i>Porella navicularis</i>
<i>Radula bolanderi</i>
<i>Scapania americana</i>
<i>Scapania undulata</i>

Particularly interesting are the rocky promontories such as the summit (waypoints 47, 60, 61, 73-76). Their west facing slopes that directly intercept fog and other precipitation often have a scrub community of stunted shrubs with many epiphytic lichens: *Platismatia stenophylla*, *Hypogymnia* spp., *Parmelia pseudosulcata*, *Sphaerophorus venerabilis*, and the moss *Antitrichia curtipendula*. Usually an epiphyte of an upper conifer canopy, here *A. curtipendula* receives enough cool moist airflow to persist at the bases of the shrubs.

Noteworthy species that are here because of the perennially cool moist conditions are:

*Montanelia panniformis*

*Melanelia hepatizon*

*Ephebe lanata*

*Cladonia ecmocyna* ssp. *occidentalis*

*Cladonia bellidiflora* Atypical, thamnolic acid chemotype superficially resembling *C. borealis*.

*Grimmia montana*

*Amphidium mougeotii*



Above: Signal Buttes summit, looking south (waypoint 047).



Above: *Melanelia hepaticum* (waypoint 74).

There is an equally interesting rock outcrop that is mound-shaped and the size of a mansion. (waypoints 49-54). Noteworthy species here are:

*Coelocaulon aculeatum*

*Ephebe lanata*

*Pseudephebe pubescens*

*Cetraria merrillii*

*Grimmia ramondii*

*Andreaea rothii*

*Bucklandiella heterosticha* The most prevalent moss on this outcrop. It is in small channels irrigated by adjacent sheet drainage.



Above: rock outcrop, excellent habitat (waypoints 49-54).



Above: rock outcrop, close up of substrates etc. (waypoints 49-54).



Above: *Coelocaulon aculeatum* (waypoint 51).



Above: pinnacle-shaped rock outcrop with *Bucklandiella macounii* ssp. *alpina*, *Andreaea rothii* (waypoint 043).

This warmer and dryer southern end of the study area provided visible evidence of the benefits of the proximity to the coast, specifically being within the fog belt. On warm sunny days the fog belt was visible over the shoreline that would from time to time blow several miles inland and engulf

the coastal slope. In northern parts of the study area, where fog is potentially wider spread, this would have been less obvious and taken longer to discover that closer to the shoreline is better. The fog's cooling moisture directly affecting the plant communities was distinctly observable here.

The unsuccessful searches for target species were replaced with a trend of many unexpected species: those responding to cold (snowy?) winters and cool moist summers. These are the same conditions found in alpine-subalpine habitats from moderate to high elevations. The species are more common in the Cascades and northwards (FNA 2007, McCune and Geiser 2009).

*Melanelia hepatizon*, a lichen of the arctic-alpine.

*Cladonia ecmocyna* ssp. *occidentalis*, a lichen of subalpine forests, more common E. Cascades.

*Coelocaulon aculeatum*, a lichen mostly known from the alpine or subalpine.

*Grimmia longirostris*, a moss rare along coast, more common in the Rocky Mts. and north.

*Bucklandiella macounii* ssp. *alpina*, a moss of late snowmelt areas at mid to high elevations.

Additional uncommon lichens:

*Montanelia panniformis*

*Ephebe lanata*

Seemingly out of place lichens:

*Cetraria merrillii*, "... is not found on the coast" (McCune & Geiser 2009).

*Vulpicida canadensis*

Another unexpected pattern is the relatively high number of ground-dwelling fruticose lichens. The usually highly branching growth form of fruticose species increases its fog-harvesting ability (Stanton 2013). This enables these montane species, growing within the fog belt, to exist in an area where it is otherwise hot and dry during the summers. The following species were growing on rock or duff over rock:

*Coelocaulon aculeatum*

*Ephebe lanata*

*Pseudephebe pubescens*

*Polychidium musicola*

*Cladonia bellidiflora*

*C. ecmocyna* ssp. *occidentalis*

*C. spp.*

*Sphaerophorus venerabilis*

Similarly, along fog swept ridges of Signal Buttes, trees and shrubs are draped with high amounts of pendulous epiphytes such as *Usnea filipendula*, *Isothecium stoloniferum*, *Neckera douglasii*, *Antitrichia curtispindula*, *Orthotrichum lyellii*, and *Porella navicularis*.



Above left: fog sweeping over west face of Signal Buttes summit (waypoint 075). Above right: abundant pendulous epiphytes of same habitat (waypoint 075).

Below are the factors in order of importance that are believed to potentiate northerly and/or montane species:

1. Proximity to ocean
2. Elevation
3. Fog belt
4. Topographic position
  - West facing slope/rock face
  - Gradual rise vs. drastic rise
  - Windward vs. leeward sides of physical features
5. Canopy cover
6. Proximity to river corridor (i.e., Rogue River)

*Didymodon nicholsonii* is apparently a locally common moss responding to the unique geology of southwest Oregon. Reported to be on quartzite (FNA 2007) I've also seen it on serpentine and other rock types other than ubiquitous basalt.



Above left: habitat of *Didymodon nicholsonii*. Above right: *D. nicholsonii* (waypoint 79).

*Grimmia longirostris* is growing on ultramafic rock. It is a species rare along coast, more common in the Rocky Mts. and north.



Above left: habitat of *Grimmia longirostris* (waypoint 045).

**Saddle Mt., Curry Co., Survey Area**

**May 31, 2019**

4,400 ft. elevation  
16 miles from ocean

State Listed species found that were on the target list:

*Pohlia bolanderi*

Rare species but not State Listed:

none

Noteworthy species:

*Didymodon nicholsonii* moss

Saddle Mt. is a rounded peak with its southern half burned but not recently. Now it has charred snags sparsely to moderately scattered across. Below them is a 1-2m tall coastal scrub of *Quercus vaccinifolia*, *Arctostaphylos columbiana*, and *Lithocarpus densiflorus*. This is interspersed with patches of bare gravel. After the snow melts from this mountain the open conditions approach xeric.

There is an outcrop complex in the unburned northern half of exposed weathered granite. On the leeward side of it is a stand of mid to late seral mixed conifers of *Picea brewiana*, *Pseudotsuga menziesii*, *Pinus jeffreyi*, *Chamaecyparis lawsoniana*, *Pinus monticola*, and *Abies* sp. The bryophytes and lichens are richest at the base of the tall north facing rock outcrop shaded by conifers where it is cooler and moister.



Above: Saddle Mt. with rock outcrops obscured by distant live trees. A dark maroon patch of *Didymodon brachyphyllus* in foreground on serpentine or greenstone gravel (waypoint 35).

*Pohlia bolanderi* was found on the shoulder of the summit in a crevice of a sloping rock outcrop in partially to mostly shaded conditions at 50° aspect and sub vertical slope. *P. bolanderi* is uncommon in the Cascades and other mountains, and not expected near the coast. The closest record for it on the coast is from Olympic National Park, but otherwise it is regarded as an alpine/subalpine species.

**Below: bryophytes and lichens of Saddle Mt., Curry Co. Gold Beach Ranger District.**

MOSSES	<i>Pseudoleskeala stenophylla</i>
<i>Andreaea rothii</i>	<i>Rosulabryum</i> sp.
<i>Andreaea</i> sp.	<i>Schistidium</i> sp.
<i>Bartramia pomiformis</i>	<i>Scleropodium touretii</i>
<i>Didymodon brachyphyllus</i>	
<i>Didymodon nicholsonii</i>	LIVERWORTS
<i>Grimmia montana</i>	<i>Cephaloziella divaricata</i>
<i>Grimmia ramondii</i>	
<i>Grimmia torquata</i>	LICHENS
<i>Isothecium stoloniferum</i>	<i>Psoroma hypnoides</i>
<i>Meiotrichum lyallii</i>	<i>Rhizocarpon geographicum</i>
<b><i>Pohlia bolanderi</i></b>	<i>Stereocaulon sterile</i>
<i>Polytrichum piliferum</i>	<i>Umbilicaria polyphylla.</i>
<i>Pseudoleskeala patens</i>	

## Quosatana Butte Survey Area

3,370 ft. elevation  
10 miles from ocean

June 4, 2019

State Listed species found that were on the target list:

*Marsupella sprucei* liverwort

Rare species but not State Listed:

*Bucklandiella macouni* spp. *alpina* moss

Noteworthy species:

*Pyrola dentata* vascular plant

Overall it appears that Quosatana Butte does not get enough fog-laden wind. Evidently it receives snowpack because of the presence of subalpine/alpine moss species *Bucklandiella macouni* spp. *alpina* (waypoint 67) and *Andreaea rothii*. Additionally there are numerous prostrate forms of woody plants. Quosatana Butte could be in a subtle “rain/fog shadow.” To the west it is apparent how the massive Signal Buttes and its rocky points could intercept much of the humid air.

*Marsupella sprucei* (waypoint 70) was found associated with the cyanobacterial crustose lichen, *Pyrenopsis furfurea* s.l. on cobble size rock in a partially exposed situation surrounded by scrub community. There is only one record south of here, Shasta Co., California (Hong 1982).

Quosatana Butte has large rock buttresses with cliff faces. Above those, on the peak, is a complex of rock outcrops with remarkable naturally formed corridor-like pathways interconnecting them. There is evidence of an old trail taking advantage of these. The ground layer is scree and patches of dense shrubbery are intermixed. The rock type here is particularly unusual. The surrounding forest is sparsely scattered or clumped early to mid with some late seral *Pseudotsuga menziesii*, *Pinus attenuata*, some being stout. The scrub community in between has shrub form *Quercus chrysolepis*, *Lithocarpus densiflorus*, *Arctostaphylos columbiana*, and *Xerophyllum tenax*. The west end of the peak is not good habitat because the forest is closed canopied and too young. Overall the butte has patchy but rich diversity and relatively high biomass of bryophytes and lichens.



Above: Quosatana Butte in middle distance seen from Signal Buttes.



Above: rock butresses of upper Quosatana Butte.



Above left: habitat of *Marsupella sprucei* (waypoint 70). Above right: unusual stout procumbent *P. menziesii*.



Above: uncommon *Pyrola dentata* in forest opening at mid slope of Quosatana Butte (waypoint 65).

The lower slopes of Quosatana butte have widespread forest type that is early to mid seral *Pseudotsuga menziesii* and *Pinus attenuata*. The midstory has *Lithocarpus densiflorus* with an understory of *Rhododendron macrophyllum* and *Gaultheria shallon*. Within this habitat, at mid slope, is a large serpentine rock outcrop (waypoint 71). It is too sheltered from prevailing maritime influence to meet the favorable conditions of this study. Some species here are: *Grimmia torquata*, *Anacolia menziesii*, *Gymnomitrium obtusifolium*, *Douinia ovata*, *Scapania americana*.



Above: too sheltered and shaded rock outcrop (waypoint 71).

### Chismore Butte Survey Area

2,600 ft. elevation  
6 miles from ocean

June 11, 2019

State Listed species found that were on the target list:  
none

Rare species but not State Listed:  
none

Noteworthy species:  
none

Chismore Butte has a very limited area influenced by maritime conditions. This setting is a linear break in the forest created by the road cut near the end of Rd. #3402188. Down slope from this location the forest is early seral while on the uphill side of the road the *Pseudotsuga menziesii* forest is older and trees larger. This situation exposes mature to late seral boles directly to fog and other precipitation. This difference in relief is analogous to an emergent rock outcrop above the

surrounding closed canopy. An example of this is also at Tillamook F.O. Rd. #3-6-29.1 (waypoint 264).

There are only a few trees remaining that are beneficially exposed at this edge habitat after a relatively recent cut. Here it is level terrain with a northwest aspect and partially shaded. The boles are covered with mostly crustose lichens including an indicator species of maritime conditions, *Loxosporopsis corallifera*. Other species are *Ochrolechia oregonensis*, *Japewia tornoensis*, *Lepra amara* (syn. *Pertusaria amara*), *Mycoblastus sanguinarius*, and *Nodobryoria oregana*.



Above left: epiphytes responding to maritime edge effect. Above right: sub-fruticose *Loxosporopsis corallifera* (waypoint 106).

An individual of *Lithocarpus densiflorus* at this same location had pendulous forms of *Dendroalsia abietina*, *Isothecium stoloniferum*, and *Neckera douglasii*. Pendulous growth forms occur in frequently fog swept habitats (Stanton 2013).

On the summit of Chismore Butte (waypoint 105), just 30m interior of the forest, there is no evidence of fog sweeping maritime influence, the boles being bare of epiphytes.



Above: interior forest at summit with boles lacking epiphytes, fog intercepted at edge (waypoint 105).

The forest of Chismore Butte is closed canopied, mixed-aged with late seral *Pseudotsuga menziesii* and sparse *Pinus attenuata*. The mid story has mature *Lithocarpus densiflorus* and the

understory is almost absent with some *Rhododendron macrophyllum* and young *L. densiflorus*. The ground layer is mostly fine and coarse woody debris and sparsely scattered *Chimaphila menziesii*, *Goodyera oblongifolia*, *Listera* sp, *Corallorhiza mertensiana*, *C. maculata*, cf. *Pityopus fimbriata*, *Allotropa virgata*, and *Xerophyllum tenax*. The moisture regime is mesic. Some *Pseudotsuga menziesii* boles have, aside from *Lobaria oregana*, the typical assemblage of epiphytes: *Platismatia glauca*, *P. herrei*, *Hypogymnia enteromorpha* s.l., *H. inactiva*, *Cetraria orbata*, *Sphaerophorus venerabilis*, *S. tuckermanii*, *Hypnum circinale*, and *Frullania nisqualensis*.

Along Road #188 on Chismore Butte is the uncommon lichen, *Scytinium platynum* (syn. *Leptogium platynum*), growing on duff over gravel. Also present is weedy moss *Campylopus introflexus*. The noxious weed, *Brachypodium sylvaticum*, is also along the road.

### Jacoby and Collier Buttes Survey Area

May 31, 2019

4,000 ft. & 4,200 ft. elevation

15 miles from ocean

State Listed species found that were on the target list:

none

Rare species but not State Listed:

none

Noteworthy species:

none

Adjacent buttes, Jacoby and Collier, were accessed but not surveyed after seeing that they had been burned, were too far inland, and too exposed appearing hot and dry. Nearby Saddle Mt. was surveyed instead.



Above left: Jacoby Butte (waypoint 41). Above right: Collier Butte (waypoint 34).



**Above left: habitat between Jacoby and Collier Buttes with *Didymodon nicholsonii* (waypoint 41). Above right: *D. nicholsonii* (waypoint 41).**

POWERS RANGER DISTRICT  
ROGUE RIVER-SISKIYOU NATIONAL FOREST, CURRY COUNTY

**Bald Mt. Survey Area**

**June 8, 14, 15, 2019**

3,000 ft. elevation  
3 miles from ocean

State Listed species found that were on the target list:  
*Scytinium platynum* (syn. *Leptogium platynum*)

Rare species but not State Listed: none

Noteworthy species:  
*Hedwigia stellata*

At 3,000 ft. high and just three miles from the ocean, Bald Mt. was anticipated to be a hot spot. However no target species were found presumably because the south-facing slope is enough to offset the previous two assets.

Bald Mt. has three main ridges that join to form the summit. The longest is an east-west ridge with a series of meadows across its broad south facing slope. Shallow underlain bedrock (ultramafic, serpentine) inhibits some encroachment of conifers as well as prescribed burns and girdling of select trees together maintain the meadow habitat. In response to gravelly soils and prescribed burns the following pioneer species are present, some of them weeds: *Pteridium aquilinum*, *Cynosurus echinatus*, *Hypochaeris radicata*, *Rumex acetosella*, and *Eriogonum* sp. Rock outcrops are low relief.

The surrounding forest is mid to late *Pseudotsuga menziesii* with a midstory of *Lithocarpus densiflorus* and understory of *Gaultheria shallon*, *Rhododendron macrophyllum*, and *Polystichum munitum*.



**Above: habitats of Bald Mt. (waypoint 100).**



Above: various views and characteristics of meadows.

*Scytinium platynum* is growing on seeping sections of shaded road cuts of Rd. #020 (waypoints 25 & 26). Many other species are growing on the extensive rocky road that is miles long, but all are common species.



Above: habitat of *Scytinium platynum* on seeping road cut (waypoint 125).



Above: *Scytinium platynum* (waypoint 125).

The liverwort, *Ptilidium californicum*, was found scattered throughout the study area. It is an indicator species that conditions are at least approaching those needed by northern target species. It usually grows on conifer bases  $\geq 3,000'$  in the Cascade Mts. and seldom occurs in coastal areas. The multi-lobed ciliate leaves of the brownish plants give an unmistakable fuzzy appearance of this species with a hand lens.



Above left: *Ptilidium californicum* (waypoint 97).

Where meadows extend up to the east-west ridge crest there is an ecotone with unusual features such as dead or living wolf trees. Unfortunately some of the large boles of other trees here are singed from prescribed burns and therefore lack any epiphytes.

Some of the ridge crest is very narrow and susceptible to the frequent and multidirectional wind currents throughout the year. There was a steady north breeze during the time of the survey. At the narrow sections of the ridge associated with rock outcrops the ground is covered with *Selaginella oregana*. A species normally draping *Acer macrophyllum* as an epiphyte, here it is receiving enough cool moist air passage that it can survive on the ground. This is analogous to the epiphytic moss, *Antitrichia curtispindula*, that was also seen on the ground and bases of wind-stunted shrubs at Signal Buttes and Mt. Hebo.

**Below: bryophytes and lichens of Bald Mt.**

<b>MOSESSES</b>
<i>Antitrichia curtispindula</i>
<i>Buckiella undulatum</i>
<i>Bucklandiella heterosticha</i>
<i>Bucklandiella obesa</i>
<i>Ceratodon purpureus</i>
<i>Claopodium bolanderi</i>
<i>Claopodium whippleanum</i>
<i>Codriophorus acicularis</i>
<i>Codriophorus varius</i>
<i>Dendroalsia abietina</i>
<i>Dichodontium pellucidum</i>
<i>Dicranella ambiguum</i>
<i>Dicranoweisia cirrata</i>

<i>Dicranum fuscescens</i>
<i>Dicranum howellii</i>
<i>Dicranum tauricum</i>
<i>Didymodon insulanus</i>
<i>Fissidens bryoides</i>
<i>Grimmia trichophylla</i>
<i>Grimmia montana</i>
<i>Homalothecium megaptilum</i>
<i>Hedwigia stellata</i>
<i>Hypnum circinale</i>
<i>Hypnum subimponens</i>
<i>Imbribryum miniatum</i>
<i>Isothecium stoloniferum</i>
<i>Kindbergia oregana</i>

<i>Kindbergia praelonga</i>
<i>Neckera douglasii</i>
<i>Niphotrichum elongatum</i>
<i>Orthotrichum consimile</i>
<i>Orthotrichum lyellii</i>
<i>Philonotis fontana</i>
<i>Polytrichastrum alpinum</i>
<i>Polytrichum juniperinum</i>
<i>Polytrichum piliferum</i>
<i>Pseudotaxiphyllum elegans</i>
<i>Rhizomnium glabrescens</i>
<i>Scleropodium touretii</i> var. <i>colpophyllum</i>
<i>Ulota megalospora</i>
<i>Ulota obtusiuscula</i>
<b>LIVERWORTS</b>
<i>Cephaloziella divaricata</i>
<i>Douinia ovata</i>
<i>Frullania nisquallensis</i>
<i>Marsupella emarginata</i>
<i>Porella navicularis</i>
<i>Ptilidium californicum</i>
<i>Radula bolanderi</i>
<i>Scapania americana</i>
<i>Scapania undulata</i>
<i>Solenostoma rubrum</i> ( <i>Jungermannia</i> )
<b>LICHENS</b>
<i>Alectoria vancouverensis/sarmentosa</i>

<i>Cetraria chlorophylla</i>
<i>Cetraria orbata</i>
<i>Cladonia furcata</i>
<i>Hypogymnia enteromorpha</i> group
<i>Hypogymnia inactiva</i>
<i>Hypogymnia tubulosa</i>
<i>Lobaria oregana</i>
<i>Lobaria scrobiculata</i>
<i>Mycoblastus sanguinarius</i>
<i>Parmelia pseudosulcata</i>
<i>Parmotrema arnoldii</i>
<i>Peltigera aphthosa/britannica</i>
<i>Peltigera membranacea</i>
<i>Peltigera neopolydactyla</i>
<i>Pilophorus acicularis</i>
<i>Placopsis lambii</i>
<i>Platismatia glauca</i>
<i>Platismatia herrei</i>
<i>Platismatia stenophylla</i>
<i>Ramalina farinacea</i>
<i>Scytinium pulvinatum</i>
<i>Scytinium platynum</i>
<i>Sphaerophorus venerabilis</i>
<i>Stereocaulon sterile</i>
<i>Usnea filipendula</i> group
<i>Usnea tufted</i> sp.



Above left: *Selaginella oregana* on ground (waypoint 96). Above right: wolf tree snag (waypoint 99).

## Mount Butler Survey Area

2,900 ft. elevation

11 miles from ocean

June 12, 2019

State Listed species found that were on the target list:

none

Rare species but not State Listed:

none

Noteworthy species:

none

Only a few noteworthy species were found on Mt. Butler. *Loxosporopsis corallifera* is a relatively common lichen species indicating that conditions are getting close to those needed by target species. However, this is as close as conditions came. By comparison, the liverwort indicator species, *Ptilidium californicum*, was not seen.

*Parmotrema arnoldii* is a common lichen on the coastal strip. Its presence was encouraging but not as important as *L. corallifera*.

*Buckiella undulata* is a forest floor moss of cool humid sites at mostly low elevations. It's presence here is the only location for these surveys in either Powers or Gold Beach Ranger Districts.

The negative results at this survey area are attributed to the south facing aspect and too long of distance from the ocean. Exposed areas of rock have *Niphotrichum elongatum*, a thermophilous species that can tolerate seasonal hot and dry conditions. Conversely, the presence of *Selaginella oregana* on sheltered rock surfaces attests to cool humid conditions in those microsites.

Perhaps better conditions and species occur on the north and/or east facing cliff bases. These situations can sometimes be overgrown with ubiquitous forest floor species of bryophytes and lichens. Where they are not, they still would be out of the way of the direct influence of any fog that could reach there. At best more montane species would be expected.

Mt. Butler appears as one great monolith of ancient seafloor conglomerate rock. Its highly erodible nature has formed a diversity of craggy features such as knife-edge ridges < 1m wide, spires, notches, slots, fluted ridges, and cliff faces.

The forest type of the lower slopes has old growth *Pseudotsuga menziesii* and *Tsuga heterophylla* 5'-6' DBH. It's suspected that trees upslope are the same age but smaller because of harsher growing conditions such as thinner soil. There is an abundant amount of *Quercus chrysolepis* in the mid-story and *Vaccinium ovatum* and *Rhododendron macrophyllum* make up the understory.



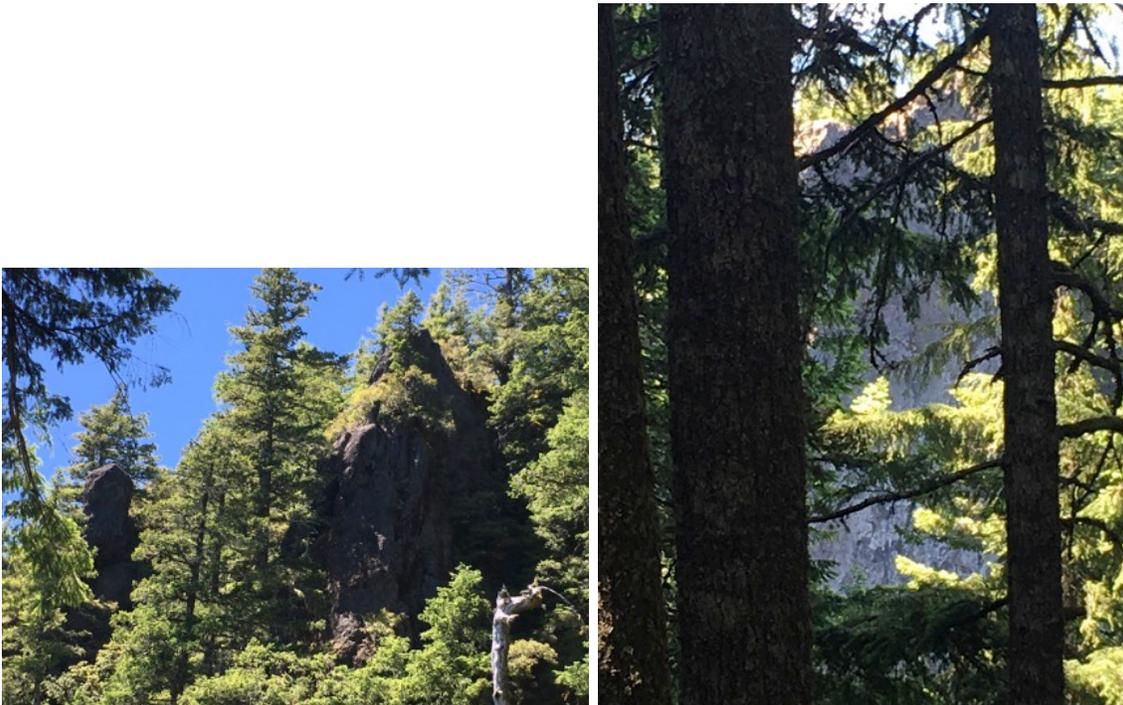
**Above: Mt. Butler's extensive rocky features are visible from a distance.**



**Above: expansive rock faces.**



Above: segments of the knife-edge ridge crest (waypoint 109).



Above left: rock spires. Above right: distant view of backside/north face of Mt. Butler as bare sheer cliff face 200' (?) tall, obscured but almost filling entirety of space between trees.

## Panther Mt. Survey Area

3,200 ft. elevation  
9 miles from ocean

June 13, 2019

State Listed species found that were on the target list:  
none

Rare species but not State Listed:  
none

Noteworthy species:  
*Hypogymnia oceanica* lichen

The overall richest area of Panther Mt. is on a ridge crest receiving cool, humid breezes (waypoints 113, 114). Here there are indicator and associated species: *Loxosporopsis corallifera*, *Ptilidium californicum*, *Hypogymnia oceanica*, *Douinia ovata* (waypoint 114). This good habitat is along an east-west ridge crest with breezes from north and/or northwest. The forest is early to mid seral *Pseudotsuga menziesii*. The young age of the trees may be a reason why target or unexpected species are absent.



Above: good ridge crest habitat (waypoint 114).

Of the above species only *Ptilidium californicum* was seen outside of the ridge crest. It is sparsely scattered throughout the survey area, never abundant. If *P. californicum* was more abundant here the thinning that has been done could have opened up mid and understories and dried them out too much.

The southern half of the survey area is better habitat than the northern half, which has been cut relatively recently and now is young forest. The thinned southern half has good late and some mature seral *Pseudotsuga menziesii* and *Tsuga heterophylla*. However these older trees are not where climate conditions are right for target species.

*P. menziesii* is the dominant species in the top canopy but *T. heterophylla* is present throughout the top, mid, and under stories. Other species include *Quercus chrysolepis*, *Lithocarpus densiflorus*, *Rhododendron macrophyllum*, and *Gaultheria shallon*. The *G. shallon* is thick in places having released following the thinning. Coarse woody debris is common of all sizes and decay stages including snags.

## Grassy Knob Wilderness Survey Area

2,400 ft. elevation  
5 miles from ocean

June 7, 2019

State Listed species found that were on the target list:  
none

Rare species but not State Listed:  
none

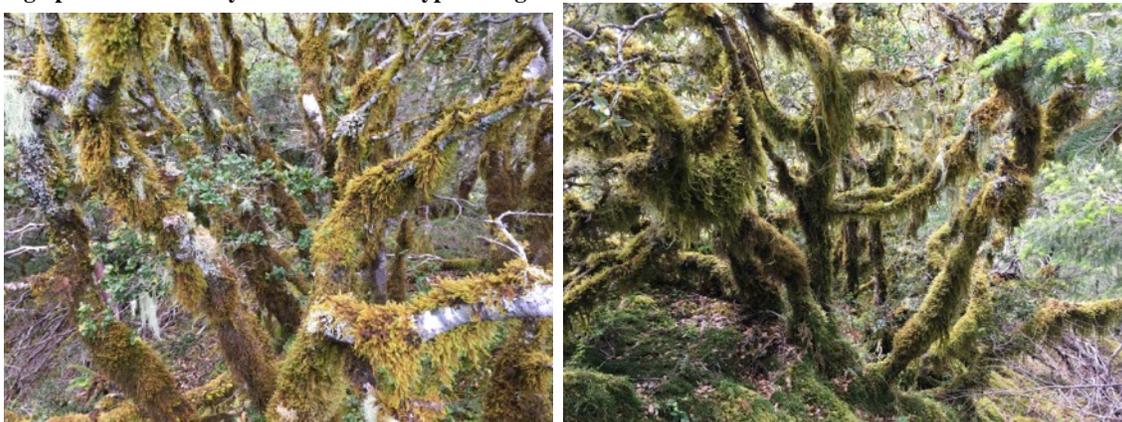
Noteworthy species:  
none

Grassy Knob was accessed knowing it was a little short of the 2,500 ft. elevation parameter but because of its close proximity to the ocean and its natural quality being in a designated wilderness. However, it proved to be too densely forested without any significant breaks in the canopy or forest.

The summit was once the site of a fire lookout. It's surrounded by early to mid seral *Pseudotsuga menziesii*. Farther east along the fog swept ridge *Quercus chrysolepis* is festooned with epiphytes reminiscent of a cloud forest. Associated species *Ulotia megalospora* and *Douinia ovata* are present but significant species beyond them did not materialize.



Above left: summit of Grassy Knob, site of historic fire lookout (waypoint 84). Above right: Anvil Mt., another high point with densely forested habitat typical of greater area.



Above: thick growths of epiphytes on wind-stunted *Quercus chrysolepis* (waypoint 86).

**Millbury Mt. Survey Area**

2,700 ft. elevation

8 miles from ocean

**June 10, 2019**

State Listed species found that were on the target list:

none

Rare species but not State Listed:

none

Noteworthy species:

none

Millbury Mt. does not have the habitat for target species. It has an even-aged early seral stand of *Pseudotsuga menziesii* with a thick understory of *Lithocarpus densiflorus*. Evidently it has been thinned and those piles burned relatively recently. The trees are too young to have accumulated many epiphytes of even common species. There are no significant physical features such as rock outcrops.



**Above: Millbury Mt. (waypoint 102)**

SIUSLAW FIELD OFFICE,  
NORTHWEST OREGON DISTRICT BLM, DOUGLAS COUNTY

**Roman Ridge PACEC Study Area**

**May 27, 2015 & May 23, 2016**

2,820 ft. in elevation  
21 miles from the ocean

State Listed species found that were on the target list:

*Bryoria bicolor* lichen  
*Pseudocyphellaria mallota* lichen  
*Tetraplodon mnioides* moss

Rare species but not State Listed: none

Noteworthy species:

*Lobaria oregana* (cyanomorph) lichen  
*Parmeliella parvula* lichen  
*Usnea longissima* lichen

This unit has four types of valuable habitats which include the ridge crest, balds (two) on the north facing side of the ridge, abandoned quarries, and the upper south facing slope just below the ridge crest.

**The Ridge**

This main feature of this unit is an east-west oriented knife-edge ridge cresting at 2,820 ft. that appears to be a volcanic dike. This relatively high elevation, only 21 air miles from the ocean, provides a situation that is uncommon in the Pacific Northwest. Unique conditions occur here for a suite of unusual species. The physical, ecological, and botanical value of this habitat is somewhat comparable to Saddle Mt. in Clatsop Co., which is 3,291 ft. high, and just 12 miles from the ocean. Saddle Mountain has several species of bryophytes and lichens that after decades of exploration and survey and manage surveys, have not turned up anywhere else in Oregon. In this regard, Saddle Mountain is arguably the hottest lichen and bryophyte spot in Oregon. The similarity of this unit to Saddle Mountain and the limited number of similar sites makes it worthy of intense scrutiny and possibly designated as an ACEC or RNA. This could be done in conjunction with neighboring Roman Nose Mt. (Coos Bay BLM).

First appearances of the plant community atop the ridge simultaneously resemble a windswept tropical cloud forest and a headland of southeast Alaska. Various aged *P. menziesii*, some with large, live lower limbs, are all probably older than they appear. Some individuals are contorted from snow burial and the bark of others differs from the usual furrowed texture to exfoliating plate-like character presumably from weathering. Underneath them is a thick stiff tangle of wind-stunted shrubs (*Amelanchier*, *Rhododendron macrophyllum*, *Vaccinium parvifolium*, *Gaultheria shallon* and *Holodiscus discolor*) with abundant epiphytes much lower to the ground than is typical due adequate air movement, moisture, and/or light. In places the ground layer is dominated by *Xerophyllum tenax*.

The entire length of the ridge is a cyanolichen pocket. There are some of the largest specimens of certain species that I've seen (*Sticta fuliginosa* et al.). Also abundant are *Lobaria oregana*, *L. scrobiculata*, *L. pulmonaria*, *Pseudocyphellaria crocata*, and *Sticta limbata*.

Pendulous species of *Usnea* and *Bryoria* are also prolific. The listed species, *Bryoria bicolor*, occupies conifers along this ridge as well as *B. pseudofuscescens*, *Hypogymnia enteromorpha* grp., *Platismatia glauca*, *Sphaerophorus venerabilis*, *Parmelia sulcata*, cf. *Parmeliella parvula* *Fuscopannaria pacifica*, *Ochrolechia oregonensis*, *O. upsaliensis*, *Mycoblastus sanguinarius*, and *Loxosporopsis corallifera*, which is luxuriant on tree boles. *Peltigera britannica* is common on the ground layer.

The neighboring section to the west is under private ownership that is actively quarrying that end of this unique ridge. There, the ridge has been leveled to a gravel yard reaching within 100 meters from the western end of the *B. bicolor* site. In a small patch of forest still remaining on the ridge crest on the private property side is more *B. bicolor* but its days must be numbered.



Roman Ridge with private quarry at left. *B. bicolor* in the upper most trees.

*Antitrichia curtispindula* is an abundant bryophyte on the ridge. Having originated from the crowns of conifers some have landed on the understory and are thriving as broad wefts on wind stunted *Amelanchier* low off the ground. The previously listed and seldom encountered liverwort, *Douinia ovata*, is on tree boles as is *Ptilidium californicum*, which according to Wagner's Guide to Liverworts of Oregon, occurs at "...3000' and higher in the Coast Range and Cascade Mountains." This species is at 2,800' and given that peaks of this elevation or higher in the Coast Range are very limited, so must this species. Conversely the ubiquitous liverwort, *Frullania nisqualensis*, is extra abundant in this habitat as large conspicuous purple maroon patches on boles and branches. The moss, *Ulota megalospora*, which does not extend down to lower elevations, is present here too. It is a similar and associated species of the listed moss, *Iwatsukiella leucotricha*, but that species was not found. *Hylocomium splendens* occupies the ground layer as patches.

### The Balds

There are two balds just below the ridge crest. The west bald is larger than the east bald, and both are north facing.

The west bald is an elongated sloping meadow paralleling the ridge east-west. The thin vernal moist soil over rock prevents any woody plants from encroaching. Graminoids and forbs are dominant and include *Allium* sp. The surrounding conifers, stunted shrubs, and the few naturally occurring boulders are especially rich with lichens.



**The west bald (looking northeast)**

The smaller eastern bald is similarly a thinly vegetated flat sloping slab of bedrock. Woody plants are limited to the upper slope; graminoids and forbs are present as well as abundant bryophytes. Thick mats of *Pleurozium schreberi* carpet the ground of the lower slope of the bald much like tundra. *Polytrichum piliferum* and *Polytrichastrum alpinum* are never as thick but present throughout. Finally the last dominant bryophyte of the bald is *Racomitrium aciculare* (usually in large creeks) where it is evidently receiving adequate runoff from the seeping subsurface. Co-occurring with them appears to be three forms of *Cladonia furcata*. Surrounding the bald are trees, snags, and shrubs that are loaded with epiphytes.



**The upper slope of the east bald.**

### Abandoned Quarries

Down slope from the balds are two abandoned quarries that are well healed over. Their rock walls are shaded and some are seeping but all are cool due to the northern aspect. Artificial talus here, both shaded and exposed, supports two species of *Umbilicaria* (*U. torrefacta*, *U. polyrhiza*), a genus uncommon in the coast range. The lichen and bryophyte communities are very rich here. The listed dung moss, *Tetraplodon mnioides*, is present in a small shaded area of the quarry (e: 441689 4862858 and at e: 441693 n: 4862851 NAD 83). At about 1 dm<sup>2</sup> and densely fruiting, it is the largest patch of Splachnaceae I've seen in the lower 48.



*Tetraplodon mnioides*



North facing rocky habitat (abandoned quarry?)



North facing rocky habitat with *Pseudocyphellaria mallota* in the tree on the right.

Below the eastern bald is another rocky area, presumably a quarry. On a level area within this habitat are a few *Pseudotsuga menziesii* encroaching from the forest margin. Two of these 12" dbh trees are loaded with cyanolichens including the largest examples of *Pseudocyphellaria mallota* that I've seen. Also present here are the "uncommon" cyanomorph of *Lobaria oregana*, *Usnea longissima*, *Polychidium contortum* and more than one species of each of the following genera: *Pseudocyphellaria*, *Lobaria*, *Nephroma*, *Sticta*.

The map depicts a short road at this location but it is not obvious. The lower end of the sloping bedrock of the bald abruptly ends as rocky wall a few meters in height. This and the boulders covering the ground at its base are covered with bryophytes. Species of the Grimmiaceae: *Racomitrium varium*, *R. affine*, *R. elongatum*, *Grimmia leibergii*, *Schistidium papillosum*. In various cavities and shelves of the rocky habitat are *Grimmia torquata*, *Rosulabryum capillare*, *Syntrichia princeps*, *Neckera menziesii*, *Peltigera britannica*, *P. cf. praetextata*, *Stereocaulon tomentosum*, *Placopsis lambii*. The liverworts, *Barbilophozia hatcheri* (common in the PNW but seldom encountered in this district), and *Lophozia cf. ventricosa* are also in this habitat.

### The South Side of Ridge

The rock on the south facing side of the ridge crest is a naturally occurring steep basalt wall. This rock wall habitat is contiguous along the length of the ridge. It is taller, steeper, and since trees are limited to the base of this long rocky band, more exposed. To the west it is more exposed and less colonized by bryophytes. Where shaded, it is mostly covered with *Isothecium stoloniferum* and forest floor species. Towards the east the tall wall is dominated by some of the same species of Grimmiaceae as are on the north side but are regularly mixed with *Leptogium lichenoides*. On a mostly bare vertical face of a boulder is the gelatinous crustose species of lichen, *Phylliscum demangeonii*, which is reportedly common along the west coast but apparently not common in this district. This side of the ridge is less diverse but more extensive than the north facing side. A species of *Erysimum* with yellowish orange flowers is in this habitat.



*Phylliscum demangeonii*

### **The Surrounding Forest**

This unit ranges in elevation from 2,100 to 2,820 ft. The lower slopes of this unit are mid to late seral *Pseudotsuga menziesii* with a high amount of *Tsuga heterophylla*. The understory is variable from nearly absent to thick with *Acer circinatum*, *Rhododendron macrophyllum*, *Corylus cornuta*. Upper slopes have more *Holodiscus discolor*, *Rosa*, *Amelanchier*, and *Toxicodendron diversiloba*.

TILLAMOOK FIELD OFFICE,  
NORTHWEST OREGON DISTRICT BLM, TILLAMOOK COUNTY

State Listed species found that were on the target list:

*Codriophorus ryszardii* moss

*Bryoria bicolor* lichen

Rare species but not State Listed:

*Bryoria tenuis* lichen

Noteworthy species:

*Hypogymnia duplicata* lichen

*Usnea longissima* lichen

**Bald Mt. Survey Area**

**July 17-20, 2019**

3,100 ft. in elevation

24 miles from the ocean

Bald Mt. was the richest area surveyed in the Tillamook F.O. because of its various habitats. Its lack of significant rocky situations was its only drawback.

The best habitats on the mountain are areas with heightened edge effect where stands, usually the older the better, are exposed to the north. Favorable exposure is produced by a number of factors, such as being along the upslope side of a road with a younger shorter stand on the downhill side of the road. Additionally, having snags, hardwood gaps, or other breaks on the downslope side increasing exposure to the optimally older trees upslope. East-west oriented roads that are linear exposure to the north, channel weather along them from the direction of the ocean. Well-developed examples of this have upslope conifers with large boles and remnant lower limbs covered with a diversity of species including those that require both the exposure and the benefit of the latent humidity that being closer to the forest floor provides.

This habitat is analogous to open outcrops or cliff faces found on Saddle Mt. or Mt. Hebo. Furthermore, since these conditions don't require a large physical feature of the landscape such as a cliff or rock outcrop, they can be created and managed indefinitely into the future.

The best location of this habitat is along Rd. #3-6-29.1 (waypoints 263-268) where weather from the northwest to northerly aspects (290°-340°) pass over an early to mid seral stand of *Pseudotsuga menziesii* on its downslope side and strikes the taller mature to late seral stand on the upslope side. Within this habitat there are scattered older trees just interior from the road edge proper. One of these is a 4' DBH *P. menziesii* (waypoint 264) with:

*Bryoria bicolor*, the State Listed lichen (G4, S2, ORBIC List 2, OR-STR), was found on the lower bole of the large tree. A total of five thalli were seen.

*Hypogymnia duplicata*, the previously listed lichen, is present on the same tree bole as *B. bicolor*.





Above: edge habitat of *Bryoria bicolor* and *Hypogymnia duplicata* along Rd. #3-6-29.1 (waypoint 264). Above right: just interior of forest edge with phorophyte (waypoint 264).



Above: Phorophyte of *Bryoria bicolor* and *Hypogymnia duplicata* (waypoint 264).



Above left: *Bryoria bicolor* (waypoint 264). Above right: *Hypogymnia duplicata* (waypoint 264).



Above: from left to right *Hypogymnia duplicata* P+R, *H. enteromorpha* P+Y pendulous form, *H. inactiva* P-.

Other noteworthy species of bryophytes and lichens present that are indicative of montane or cool, moist habitats are *Ulota megalospora*, *Douinia ovata*, *Bryoria subcana*, *Platismatia norvegica*, *Usnea longissima*, and *Loxosporopsis corallifera*.

The associated vascular plants here are: *Tsuga heterophylla*, *Abies procera*, *Acer circinatum*, *Vaccinium membranaceum*, *Polystichum munitum*, *Maianthemum stellatum*, *Achlys triphylla*, *Clintonia uniflora*, *Vancouveria hexandra*. Other common epiphytes here are *Dicranum fuscescens*, *Hypnum circinale*, *Scapania bolanderi*, *Antitrichia curtispindula*, *Hypogymnia inactiva*, *Nodobryoria oregana*, *Sphaerophorus venerabilis*, and *Rhytidiadelphus triquetrus* (on ground).

*Bryoria tenuis* (waypoint 268) is much more rare than *B. bicolor* but is not State Listed. It is in much the same conditions as *B. bicolor*: on a 3' DBH *P. menziesii*, at 290°, 10% slope, 85% canopy cover with many other epiphytes.

The second location of *Bryoria bicolor* in this habitat is along Rd. #3-6-31.2 (waypoint 286) in mixed mid seral *Pseudotsuga menziesii*-*Tsuga heterophylla* with *Alnus rubra* and some *Abies procera*. *B. bicolor* is on an 18" DBH *P. menziesii* on top of short 80% sloping embankment of the southeast side of the road at 310° aspect, receiving prevailing weather along road "channel" through forest from the west southwest (240°) direction, overall slope of hillside is 40%, and canopy cover is 75%. The midstory is composed of younger *P. menziesii*-*T. heterophylla*, the understory is sparse with few *Acer circinatum*, *Vaccinium parvifolium*, and *Rosa* sp. The ground layer has *Polystichum munitum*, *Oxalis oregana*, *Maianthemum stellatum*, and *Kindbergia oregana*. *B. bicolor* is also at 240° on the bole with *Hypnum circinale*, *Frullania nisquallensis*, *Sphaerophorus venerabilis*, *Platismatia stenophylla*, *Hypogymnia* (syn. *Cavernularia*) *hultenii*, and *H. enteromorpha* grp. *B. bicolor* is cryptic and very localized not being on adjacent trees.



Above left: habitat & phorophyte of *Bryoria bicolor*, Rd. #3-6-31.2 Above right: *B. bicolor* close up. (waypoint 286).

*Codriophorus rysardii* (syn. *Racomitrium rysardii*, misapplied as *Rhacomitrium aquaticum*), the State Listed moss (G4, G5, S2, ORBIC List 3), was also found here on a rock along the road cut.

About 150m away (waypoint 287) are very similar conditions where *B. bicolor* is absent but predicted to be present in 5-10 years. The *Pseudotsuga menziesii* boles in this area have a few but promising species (*Loxosporopsis corallifera*, *Platismatia lacunosa*) and little coverage, but will get better with time as the boles age and accumulate more epiphytes. Maintaining this exposure by removing or topping the young trees on the opposite side could be considered.



Above: Predicted phorophyte of *Bryoria bicolor*, Rd. #3-6-31.2 (waypoint 287).

The third location of *Bryoria bicolor* in this habitat is at the end of decommissioned Rd. #3-6-30.4 (waypoint 298). There are two thalli on a *Pseudotsuga menziesii* bole at 290° below breast height. This road is on the north side, just below a broad east-west ridge crest, under a 60% canopy cover of a late seral *P. menziesii* forest without midstory and minimal understory of saplings of *P. menziesii* and *T. heterophylla* with *Rosa* sp., *Achlys triphylla*, *Oxalis oregana*, *Festuca occidentalis* *Polystichum munitum*, and *Bromus vulgaris*. It is at an ecotone of this previously thinned forest and a weedy opening of the dead end road with cobble size gravel with *Cirsium* sp., *Leucanthemum vulgare*, and *Hypochaeris radicata*. It is mostly exposed at 300° on a 10% slope.



Above left: *Bryoria bicolor* habitat & specific phorophyte. Above right: *Bryoria bicolor* close up (waypoint 298).

*Codriophorus ryszardii* was found a second time (waypoint 289) on a small boulder in a closed-canopied forest of variably aged *P. menziesii* and *T. heterophylla* without a midstory or understory and with minimal ground cover of *Oxalis oregana* and *Achlys triphylla*. Coarse woody debris and duff is abundant. It is on a highpoint along a broad east-west ridge crest on a 10% slope and 340° aspect.



Above left: *Codriophorus ryszardii* on small boulder in foreground. Above right: close up (waypoint 289).



Above left: *Codriophorus ryszardii* on small boulder. Above right: close up with small amount of *Bucklandiella occidentalis* s.s. mixed in lower left of photo (waypoint 289).

There is a 0.1 ac. wetland along paved Bald Mtn. Access Rd #4-7-27 (waypoints 282-284). The stream draining this area is broad, slow, partially shaded in places, exposed to the northeast, and has a 3m<sup>2</sup> pool along it. It is vegetated with *Alnus rubra*, *Thuja plicata*, *Pseudotsuga menziesii*, *Rubus spectabilis*, *Lysichiton americanus*, *Scirpus microcarpa*, and other graminoids.

The bryophytes and lichens are high in diversity and biomass. Formerly listed lichens, *Platismatia lacunosa* and *Usnea longissima* are present here as is the common *Bryoria pseudofuscescens* on a *T. plicata* snag. Only a small amount of the common lichen, *Hypotrachyna sinuosa*, is present here. The State Listed species, *H. revoluta* and *H. riparia*, were not seen, likewise for *Schistostega pennata*. This intriguing habitat extends up and down stream and would be worthwhile to survey more at some other time.



**Above: wetland at waypoints 282-284.**



The first area surveyed was a mature to late seral *Tsuga heterophylla* grove (waypoint 249) with occasional old growth *Pseudotsuga menziesii* without crowns. The top canopy is closed and conditions below are very shaded. There is no understory except for patches of *T. heterophylla*. Ground layer vegetation is absent but duff is abundant. Coarse woody debris is also abundant including many 15m tall snags of class 4 decay stage.

Despite the older and relatively undisturbed forest, target species are absent due to the lack of edge effect, exposure, and/or rock. Noteworthy species present here include are *Ptilidium californicum* and *Lobaria oregana*, an old growth associate.



*Tsuga heterophylla* grove with occasional old growth *Pseudotsuga menziesii* (waypoint 249).

The ridge crest of Dovre Pk. is fog swept and forested with early to mid seral *Pseudotsuga menziesii* except for a gap in a cold pocket where the boles of trees are rich with epiphytes. The epiphytic montane moss, *Ulota megalospora*, is present here and perhaps with a little more time rare lichens will be too. This is an old landing (waypoint 255) where the ground is coarse gravel covered with the moss, *Nipotrichum elongatum*. It is ideal conditions for the State Listed dung mosses, *Tetraplodon mnioides*, *Tayloria serrata* that may have occupied this ridge in the past.



Above: Dovre Pk. ridge crest. Good habitat potentially for rare epiphytes and dung mosses (waypoints 255).

The second significant area searched was the Tillamook Special Habitat, meadow (waypoint 253). This 0.1 ac. wet meadow is the headwaters of a stream. Surface water originates as a seep draining at 20% slope and 60° aspect. The surrounding forest is dense mature to late seral *T. heterophylla*. The meadow has a few pole-sized *Alnus rubra* (probably more numerous in past years), *Rubus leucodermis*, *Oplopanax horridus*, *Oxalis oregana*, *Hydrophyllum tenuipes*, *Stachys cooleyae*, and *Circaea alpina*.

Situations as this with an opening in the forest that is cool and humid usually are rich with cyanolichens including rare species. They occur on the lower branches and twigs of conifers around the margin of meadows and wetlands etc. However, these are absent here because there is *T. heterophylla* and *Thuja plicata* instead of *P. menziesii*. Noteworthy lichens are *Usnea longissima* and *Lobaria oregana*. Fresh scat on a log was found that could support dung moss species. The lower end of a large log was searched for the State listed moss, *Tetraphis geniculata* but only *T. pellucida* was seen. The uncommon lichen, *Cladonia norvegica*, was also suspected on the same log but was not present. The formerly listed moss, *Schistostega pennata*, was searched for here, but is often restricted to exposed root masses of a tip up mounds as a substrate, something not currently there.



Above: potentially good, wet meadow habitat for rare epiphytes, dung mosses, and *Schistostega* (waypoint 253).

### Grindstone Mt. Survey Area

July 22, 2019

3,000 ft. in elevation

15 miles from the ocean

The summit of this mountain (waypoint 303) is a 1 ac. meadow and the site of a historic fire lookout, with the remains of a concrete foundation that has a robust population of the common moss, *Schistidium frigidum*. This occupies a short north-south ridge crest with some patches of thin soil over rock. It is weedy with *Leucanthemum vulgare*, *Hypericum perforatum*, *Hypochaeris radicata*, and has *Rubus ursinus*, and the moss *Niphotrichum elongatum*. The meadow is surrounded by early to mid seral *Pseudotsuga menziesii* and *Abies procera* mixed with a few slightly older individuals. The trees on this otherwise extreme coastal feature are too young to support anything of interest yet. Rocky habitats are all south facing therefore seasonally too warm to have target species.

The northwest side of the summit is steep (120% slope) and fully shaded. On a *P. menziesii* base in this habitat (waypoint 304) is an almost unrecognizable depauperate form of *cf. Chiloscypus*

*profundus* (syn. *Lophocolea heterophylla*), a liverwort common on logs. Along the road cut of Rd. #2-8-34 the State Listed moss, *Buxbaumia aphylla* was searched for but instead the uncommon moss, *Pohlia camptotrachel* (waypoint 305) was present. There are a couple of larger conifers that have cyanolichens on them: *Polychidium contortum*, *Nephroma helveticum*, *Sticta limbata*, *S. fuliginosa*, *Lobaria anomala*.



**Above left: Grindstone Mt., left peak. Above right: Grindstone Mt. summit (waypoint 303).**

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