

**Report on the Conservation Status of  
Mertensia bella (Oregon bluebells) in Idaho**

by

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## I- Species information

### 1. Classification and nomenclature

#### A. Species

##### 1. Scientific name

- a. **Binomial:** *Mertensia bella* Piper
- b. **Full bibliographic citation:** C.V. Piper. 1918. New Plants of the Pacific Northwest. Proceedings of the Biological Society of Washington 31:75-78.
- c. **Type specimen:** M.E. Peck (5811) Horse Pasture Mt., 10 miles southwest of McKenzie Bridge, Lane Co., Oregon.

##### 2. Pertinent synonym(s): *Mertensia siskiyouensis* (Williams 1937)

##### 3. Common name: Oregon bluebells

##### 4. Size of genus: The genus *Mertensia* contains 35-40 species native to extratropical Eurasia and North America (Cronquist 1959). Williams (1937) recognized 24 species in North America, most of them in the western United States. The highest concentration of *Mertensia* species occurs in the western half of Colorado, with a second, smaller concentration in northern Idaho and adjacent Montana, Wyoming, Washington, and Oregon. Oregon bluebells is a distinctive species apparently without close relatives (Cronquist 1959).

#### B. Family classification

1. **Family name:** Boraginaceae
2. **Pertinent family synonyms:** None
3. **Common name for family:** Borage

#### C. History of knowledge of taxon: The type specimen for *Mertensia bella* was collected in the Cascade Mountains, in Lane County, Oregon by Peck in 1914 (Lorain 1988). The first collections from Montana were made in the Bitterroot Mountains by Marie Mooar in 1968. It was first collected in Idaho by J.H. Christ in 1941, "11 miles east of the town of Elk River " (J.H. Christ 12126 (ID)). When the first Idaho Watch List was compiled in 1981, it was noted that Oregon bluebells "Occurs locally along roadsides, cut-over areas, and in forests. It is more common in Southwestern Oregon" (Steele 1981).

**D. Alternative taxonomic treatments:** None.

**2. Present legal or other formal status**

**A. National:**

- 1. US Fish and Wildlife Service:** none.
- 2. US Forest Service:** Oregon bluebells is currently a Forest Service Sensitive Species in Region 1 (USDA Forest Service 1988).
- 3. Other current formal status recommendations:** Oregon bluebells is considered "not rare and apparently secure, but with cause for long-term concern" (global rank = G4) by the Idaho Conservation Data Center (Moseley and Groves 1992).

**B. State**

**1. Idaho**

**a. Current formal status recommendations:** Oregon bluebells is considered "rare or uncommon but not imperiled in Idaho" (S3) by the Idaho Conservation Data Center.

**b. Review of past status:** Oregon bluebells was placed on the first State Watch List in 1981 (Steele 1981).

- 2. Montana:** Oregon bluebells is listed as "critically imperiled" (S1 = 5 or fewer occurrences) and is known from a total of three locations (Roe 1991).
- 3. Oregon:** Oregon bluebells has been recommended for the State Review List (more information is needed before status can be determined) of the Oregon Natural Heritage Program (Zika pers. comm.).
- 4. California:** Oregon bluebells is ranked "List 3" (more information needed) by the California Native Plant Society. It was first recognized as a rare plant in California in 1992. Herbarium or field surveys have not yet been done.

**3. Description**

- A. General nontechnical description:** Oregon bluebells has a single stem, from 4-16 inches in height, arising from a round to oblong corm. The lowermost leaves are reduced in size, and sheath the base of the stem. The upper leaves are thin and ovate, and from 1-3 inches in length. These leaves are stalked, the stalks becoming progressively shorter upwards along the stem, and the blade has distinctive lateral venation. Tiny (6-10 mm) blue, bell-shaped flowers are borne

in an open, delicate inflorescence. Unlike other members of the genus, this species does not have a long, constricted tube near the base of the bell. Instead, the lower two-thirds of the petals are fused to form a flared bell-shaped corolla, 0.3-0.4 inch long (adapted from Roe 1991).

- B. Technical description:** Stems solitary from a shallow, ellipsoid-globose corm or cormose root 0.5-2 cm thick, slender and weak, 1-7 dm tall, openly branched above in larger plants; leaves thin, evidently veined, glabrous or strigulose, not very numerous, the lowermost reduced to a scarious sheath, the upper with mostly ovate, acute, basally rounded blade 3-8 cm long and 1-5 cm wide, borne on progressively shorter petioles, or the upper sessile and often opposite; inflorescence mostly rather open; calyx 2-3 mm long, strigulose, cleft to near the base; corolla 6-10 mm long, campanulate, flaring from near the base, not sharply divided into a tube and limb, the fornicies scarcely developed, the rounded lobes 2-3 mm long; filaments slender, attached about 1 mm from the base of the corolla, a little longer than the 1 mm anthers; style surpassing the anthers, but not exerted (Cronquist 1959).
- C. Local field characters:** Oregon bluebells is a diminutive, single-stemmed perennial. The stem terminates in a diffuse, branched inflorescence. Pedicels bearing the bell-shaped flowers are extremely slender and arching. Oregon bluebells often occurs with tall bluebells (*Mertensia paniculata*), but differs in several distinctive characters. Tall bluebells is taller (2-15 dm), has stems that arise from a caudex or stout rhizome rather than a corm, and has flowers that are divided into a distinct limb and tube rather than flaring from the base. Tall bluebells has an inflorescence that is somewhat one-sided rather than spreading.
- D. Photos and line drawings:** see Appendix A for a line drawing and Appendix E for slides.

#### 4. Geographical distribution

- A. Global distribution:** Oregon bluebells occurs in three apparently disjunct ranges in the Pacific Northwest including parts of four states (Appendix B, Map 1). Several hypotheses have been proposed to explain this unusual, scattered distribution. Coastal disjunct plant species are common in northern Idaho, but for most the main range is clearly in the Cascade Mountains. Daubenmire saw the inland ranges of these species as relict populations of a once widespread mesic temperate Miocene flora (Daubenmire 1952). However, some evidence points to a post-Pleistocene migration inland by various routes. One such route is formed by the chain of mountain ranges that still loosely links the Siskiyou Mountains with the northern Rockies. This route has been used to explain the distribution of Oregon bluebells and several other coastal disjuncts (Lorain 1988). It is presently unclear whether Oregon bluebells is more abundant in its coastal or inland ranges.

Roe (1991) suggested that Oregon bluebells may be an introduced species in Montana, based on its association with logging areas and its colonizing ability. Oregon bluebells was recorded in Idaho as early as 1941, and it is highly improbable that such a rare species could have been introduced here at that time.

## **B. Distribution by state**

- 1. Montana:** Oregon bluebells is known from only three locations, all on the southwest edge of Missoula County adjacent to Idaho (Bitterroot Mountains; Map B8).
- 2. Oregon:** Oregon bluebells is known from Lane, Linn (west-central Cascades), Jackson, and Josephine (Siskiyou Mountains) counties where it is locally common (Zika, pers. comm.).
- 3. Idaho:** Oregon bluebells is known from the Clearwater Mountains in central Idaho County (Map B2) and at one site on the Montana/Idaho border near Montana's sites (Map B8).
- 4. California:** Oregon bluebells occurs in the far northwest part of the State in the Klamath Range near the California/Oregon border (Roxanne Bittman, Pers. comm.). Precise locations and range are not known.

**C. Precise occurrences in Idaho:** Oregon bluebells is relatively common in two distinct areas centered on mountain ridges to the north and south of the Middle Fork Clearwater River (Map B2). To the north, it ranges from Walde Mountain north to Mex Mountain. The southern range is centered around Lookout Butte, from there following ridges to the north, south to O'Hara Saddle and from O'Hara Saddle several miles east and west (Map B6). Within these ranges Oregon bluebells is fairly predictable in a specific type of habitat described below. There is one apparently isolated occurrence (015) separate from the Lookout Butte range but on the same ridge system separating Middle Fork and South Fork drainages (Map B7). Because the habitat associated with Oregon bluebells is patchy but common, it became prohibitive to number each population (see Appendix B for precise locations).

Oregon bluebells also occurs in a third disjunct range along the Idaho/Montana border in the Bitterroot Mountains. Three Montana sites and one Idaho site (004) are known from this range (Map B8). The Idaho population was not revisited in 1992 .

**D. Historical sites:** Breakfast Creek, 11 miles east of Elk River, Idaho (010), collected by J.H. Christ in 1941 (12126 ID). This location has not been revisited. Land ownership in the vicinity is a combination of State and Potlach Corp. holdings.

- E. Unverified/undocumented reports:** Fish Creek (002) and Camp Moosehorn (007) sites in the Walde Mountain range, and Brown's Spring Ck. (011) in the Lookout Butte range were not surveyed in 1992. A record for Sneakfoot Meadows Research Natural Area (003) near the Idaho/Montana border could not be verified during the 1992 survey and was dropped for lack of documentation.

## 5. Habitat:

- A. General habitat description:** In Idaho, Oregon bluebells occurs within the grand fir (*Abies grandis*) zone, between 4,000 and 6,000 ft, where it occupies forest openings, Sitka alder (*Alnus sinuata*) glades, clearcuts, and older roadcuts, primarily on moist, shady north aspects. It occurs on sites with seasonally high moisture due to late snow pack or drainage patterns. Oregon bluebells is not a species of wet meadows although it has been recorded on "streamsides" (004). It can occur on any amount of slope from steep roadcuts to flat ridgetops and in broad, shallow depressions.

Habitat types associated with Oregon bluebells include grand fir/wild ginger (*Abies grandis*/*Asarum caudatum*), western redcedar/wild ginger (*Thuja plicata*/*A. caudatum*), western redcedar/lady fern (*T. plicata*/*Athyrium filix-femina*), and Sitka alder/miner's lettuce (*Alnus sinuata*/*Montia cordifolia*). Within these types, Oregon bluebells is a species of disturbed sites, natural and man-made forest openings, and alder glades. The upper limit of Oregon bluebells seems to coincide with the lower limits of the subalpine fir (*Abies lasiocarpa*) zone.

Oregon bluebells is highly associated with Sitka alder. Sitka alder forms dense stands on a variety of sites including avalanche chutes and streambanks, however, Oregon bluebells is specifically associated with the Sitka alder/miner's lettuce habitat type occupying swales and seasonally moist sites. These sites are characterized by deep, dark-colored "umbric" soils of low nutrient status and low pH (Cooper *et al.* 1987). Within its limited range, Oregon bluebells is very predictable wherever roads intersect alder glades on north aspects. Plants on the roadcut are shaded by overhanging alder above.

Much of the Idaho range of Oregon bluebells occurs in the grand fir mosaic ecosystem described by Ferguson (1991). In the grand fir mosaic, forest types dominated by grand fir form a mosaic with openings of alder, bracken fern (*Pteridium aquilinum*), or tall forbs. Successional tree species are Engelmann spruce (*Picea engelmannii*) and Douglas fir (*Pseudotsuga menzeisii*). Elevations range from 4,200 to 6,000 ft—roughly the range of Oregon bluebells. There are problems with forest regeneration in this zone probably due to dominance of bracken fern and western coneflower (*Rudbeckia occidentalis*) and to pocket gopher activity (Ferguson 1991). At one of Ferguson's (1991) monitoring sites, Oregon bluebells is scattered throughout a clearcut that is severely disturbed by pocket gophers. Oregon bluebells sites in Montana are also difficult to restock

(Roe 1991).

- B. Soils:** Where Oregon bluebells occurs in the Clearwater Mountains, surface soils have formed from volcanic ash or a mixture of ash and loess (Sommer 1991). Surface textures are silt-loam to silt. Except where they have been removed by erosion, these surface layers overlie older soils formed from granite and metasediments. These older layers are coarser in texture and have lower water and nutrient holding capacities than those above.

Soils of bracken and alder glades have a thick, dark-colored surface horizon resulting from rapid incorporation of organic matter. These soils are low in fertility and pH and are not conducive to conifer establishment. There is a low diversity of vegetation on these sites. However, Sommer (1991) observed that "when topsoil is removed as in roads, skid trails, or log landings, forest community species, including trees, often establish at high densities". Oregon bluebells often grows on such sites in exposed mineral soil.

- C. Associated species:** Oregon bluebells is strongly associated with Sitka alder glades common in the grand fir zone of the Clearwater Mountains. It does not grow in the heavily shaded understory, but occurs sparsely along the margins of the stand and is most abundant on roadcuts and other disturbed sites. These alder glades usually have a uniform low-forb layer of miner's lettuce (*Montia cordifolia*). In open alder stands characteristic of cut-over areas, Oregon bluebells occurs in grass/forb openings where ground cover is not high, at least in early spring. These sites usually include bracken fern but the bracken is not yet part of the herbaceous canopy when Oregon bluebells flowers. The association between Oregon bluebells and Sitka alder may be due to a soil moisture regime or other soil properties conducive to both species.

The species associated with Oregon bluebells vary depending on the type of site. However, the following species occurred with Oregon bluebells with approximately 80-100% constancy:

Sitka alder	( <i>Alnus sinuata</i> )
miner's lettuce	( <i>Montia cordifolia</i> )
yellow violet	( <i>Viola glabella</i> )
avalanche lily	( <i>Erythronium grandiflorum</i> )

In addition to the above, the following species are highly constant with Oregon bluebells in bare soil on steep roadcuts:

Engelman spruce seedlings	( <i>Picea engelmannii</i> )
lady fern	( <i>Athyrium filix-femina</i> )
sweet cicely	( <i>Actaea rubra</i> )
wild ginger	( <i>Asarum caudatum</i> )
red columbine	( <i>Aquilegia formosa</i> )
woodrush	( <i>Luzula</i> sp.)
tall bluebells	( <i>Mertensia paniculata</i> )
Jacob's ladder	( <i>Polemonium pulcherrimum</i> )
strawberry	( <i>Fragaria vesca</i> )

and in clearcuts or alder glades:

elderberry	( <i>Sambucus racemosa</i> )
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Other species that were recorded on disturbed sites were:

evergreen kittentails	( <i>Syntheris platycarpa</i> )
veratrum	( <i>Veratrum viride</i> )
miter's wort	( <i>Mitella</i> sp.)
meadowrue	( <i>Thalictrum occidentale</i> )
waterleaf	( <i>Hydrophyllum capitatum</i> )
valerian	( <i>Valeriana sitchensis</i> )

Oregon bluebells was occasionally observed in forest understory, in grand fir/wild ginger habitat types with the following species:

Rocky Mountain maple	( <i>Acer glabrum</i> )
red alder	( <i>Alnus rubra</i> )
current	( <i>Ribes</i> sp.)
snowberry	( <i>Symphoricarpos albus</i> )
thimbleberry	( <i>Rubus parviflorus</i> )
twinflower	( <i>Linnaea borealis</i> )

Utah honeysuckle	( <i>Lonicera utahensis</i> )
coneflower	( <i>Rudbeckia occidentalis</i> )
foamflower	( <i>Tiarella trifoliata</i> )
Piper's anemone	( <i>Anemone piperi</i> )
northern bedstraw	( <i>Galium triflorum</i> )
false Solomon's seal	( <i>Smilacina stellata</i> )
wild ginger	( <i>Asarum caudatum</i> )
trillium	( <i>Trillium ovatum</i> )

Most of these are moist-site rather than wet-site species. In three separate sites in Montana, Oregon bluebells is associated with mountain boykinia (*Boykinia major*) which is considered a good habitat indicator (Roe 1991). While mountain boykinia is common in the Lookout Butte range of Oregon bluebells it was never recorded growing with Oregon bluebells. Mountain boykinia often grew nearby on microsites that were notably wetter.

- D. Other rare species:** Evergreen kittentails is an Idaho endemic and an indicator species for the grand fir mosaic (Ferguson 1991). It occurs with Oregon bluebells on roadcuts. Evergreen kittentails is the only other rare plant known from the Lookout Butte range. In the Walde mountain range, Oregon bluebells has a distribution very similar to that of Daubenmire's dasynotus (*Dasynotus daubenmirei*) although the two occupy somewhat different habitats and were not recorded growing together.

## 6. Population Biology

- A. Phenology:** Flowering has been recorded as early as May 5 and as late as August 1, with most collections made from mid-June to mid-July (ICDC). In 1992 flowering began in May and was finished before the end of June. The fact that flowering also began in May 1991, in a very cold spring, indicates that phenology of Oregon bluebells is not directly temperature dependent. Because Oregon bluebells grows in shaded sites, often in depressions that hold late snow, emergence may immediately follow snow melt as suggested by Roe (1991), allowing plants to set fruit before being shaded out by tall forbs and bracken fern. Plants deteriorate rapidly after flowering making it virtually impossible to survey for Oregon bluebells when not in flower.
- B. Population size and condition:** Because of the number of populations and their small size, populations were grouped for entry into the ICDC database.
- 1. Lookout Butte range:** Oregon bluebells is most abundant in this range. I recorded 29 separate occurrences in 1992, most less than 10 square yards in size and with 50-100 individuals. Plants were very abundant in the moist, bare mineral soil of roadcuts becoming sparse in adjoining alder or conifer stands in scattered small groups. Sometimes Oregon bluebells occurred only at the road. Population size varied from one plant to several thousand.

Occurrence of Oregon bluebells is very predictable in this range wherever roadcuts intersect alder glades on north aspects. In cut-over areas it is usually sparse in microsites except at Radcliff Ridge East (013, Map B6) where it is quite abundant throughout an old cutting unit. At another location a dense population of several thousand plants grow in the partially open understory of mature grand fir, in a slight depression (ca 0.1 ac) that is probably wet in spring. Some plants also grow at the roadside.

2. **Walde Mountain range:** Oregon bluebells is less frequent and less abundant in this range probably due to scarcity of suitable habitat. It still occurs predictably in the same types of habitats as in the Lookout Butte range. In 1992 I observed four populations of less than 500 individuals on roadcuts to the north of Walde Mountain (005, 018; Maps B3 and B4). Another population of more than 500-1000 individuals (016; Map B4) occupied a low-lying area within a mature western redcedar forest, where it was associated with lady fern and not with Sitka alder. Two large roadside populations (1000-2000 individuals) extended into adjoining alder glades on the flank of Mex Mountain (017; Map B3). Oregon bluebells has also been found growing in alder swales in a clear-cut north of Walde Mountain (018; Map B3). I found no evidence of damage to any populations.

C. **Reproductive Biology:** Oregon bluebells reproduces by seed. Nothing is known about seed dispersal or viability; no pollinators were observed.

D. **Biological interactions**

1. **Competition:** Oregon bluebells is a colonizer that proliferates on disturbed soils where competition is low, probably moving out as ground cover or canopy cover increases. This is most evident at Hamby Saddle (001) where it grows densely on a berm created at the edge of a parking area. Although it thrives in partial shade at edges of alder glades it does not appear to tolerate the deep shade of dense stands. On sites with dense forb cover, early growth may enable Oregon bluebells to set seed before being shaded out. Plants were often observed growing up through a thin layer of bracken fern residue. When Oregon bluebells was flowering bracken fern was just beginning to bolt.

2. **Herbivory:** none observed.

7. **Land ownership**

- A. Clearwater National Forest, Lochsa Ranger District:  
Fish Creek (002)  
Walde Mountain NNW (005)

Camp Moosehorn	(007)
Walde Mountain	(008)
Walde Mountain North	(016)
Canyon Meadows SW	(018)
Mex Mountain	(017)

- B. Clearwater National Forest, Pierce Ranger District:
  - Walde Mountain NNW (in part) (005)
  
- C. Clearwater National Forest, Powell Ranger District:
  - Elk Meadows Road (004)
  
- D. Nez Perce National Forest, Selway Ranger District:
  - Hamby Saddle (001)
  - Lookout Butte SW (009)
  - Upper Lodge Creek (012)
  - Brown's Spring (011)
  - Radcliff Ridge East (013)
  - Upper Goddard Creek (014)
  - Upper Wart Creek (015)
  
- E. Nez Perce National Forest, Clearwater Ranger District:
  - Upper Newsome Ck. (in part) (006)
  
- F. Nez Perce NF, Elk City Ranger District:
  - Upper Newsome Ck. (in part) (006)
  
- 8. **Land use:** Logging is ongoing throughout the Idaho range of Oregon bluebells with approximately 40% of the area in various stages of regeneration after logging. Clearcutting is the dominant method used because trees are large and susceptible to wind throw. Upper Newsome Creek RNA encompasses at least four populations of Oregon bluebells (Map B6). O'Hara Creek RNA on the Selway Ranger District also appears to contain habitat.

## II. Assessment and management recommendations

- 1. **Threats to currently known populations:** A comparison of ICDC (Idaho Conservation Data Center) records with sites observed in spring of 1992 does not give any indication of a downward trend in abundance of this species. Although its small range makes its susceptible to extinction, no threats to populations or to habitat have been identified. However, a single, documented, historical record (1941) lies well outside the currently known range of the species, possibly indicating that the range has shrunk during historical time.

- A. Grazing:** Oregon bluebells was found growing vigorously along the road to Brown's spring near Lookout Butte, although the road had recently been used for trailing cattle. Plants were fairly restricted to the roadcut and escaped trampling. Cattle use in early spring would be highly detrimental to Oregon bluebells populations due to trampling of wet soils.
- B. Mining:** no threats known
- C. Timber harvesting:** Oregon bluebells occurs in clearcuts without dense shrub layers. It is likely that such stands contained Oregon bluebells, in association with alder glades, prior to logging. The age of the clearcut does not seem to have a bearing on the presence of Oregon bluebells, and plants were found both on sites that were burned and sites that were mechanically treated following harvest. However, any treatment that alters the hydrology of a site would likely be detrimental. Oregon bluebells populations in clearcuts will probably decrease as succession proceeds.

Oregon bluebells appears to be part of the climax vegetation that also has the ability to colonize disturbed soils where suitable moisture conditions exist. However, it has seldom been found as isolated populations away from clearcuts or roadside populations. Probably the best example of a site removed from logging operations is Mex Mountain (017) where Oregon bluebells occurs in a Sitka alder/miner's lettuce habitat type, with bracken fern, within an undisturbed western redcedar forest. A 4-wheel drive road cuts across the alder stand, creating a moist, north-facing roadcut that is densely populated with Oregon bluebells.

Because of Oregon bluebells' association with edge habitat, it is likely logging and road building have served to increase population numbers and sizes. Oregon bluebells can occur in clear-cuts where there is not a dense shrub cover, including units that were burned following logging. Dense, roadcut populations represent a seed source that increases the probability of plants spreading into nearby, available habitat including undisturbed vegetation.

## 2. Recommendations

- Oregon bluebells should remain on the Region 1 Sensitive species list because of its global rarity. Factors determining its habitat and distribution are still not clearly understood. Although logging may not be detrimental, the Forest Service should continue to record its presence and abundance and to observe responses of populations to canopy removal, burning, and succession in clearcuts.
- Biological evaluations of proposed timber sales should note the presence and condition of any Oregon bluebells populations present. This could help clarify

the role of Oregon bluebells in climax vegetation as well as documenting the response of populations to logging.

- Monitoring plots should be established in Oregon bluebells populations both within, and outside of, proposed timber sale areas. These will allow us to more accurately assess the affects of logging and to observe changes in populations as succession proceeds. Monitoring plots could also help determine the effects of various post-harvest treatments on Oregon bluebells populations.
- Proximity of Oregon bluebells populations to roadsides makes them susceptible to road maintenance activities. Weed control and road maintenance crews should be made aware of the locations of Oregon bluebells sites.

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