Tall Bugbane (*Cimicifuga elata*) Inventory in Douglas County, Oregon

Report to the Interagency Special Status/Sensitive Species Program
FY2010 Inventory & Conservation Planning Project

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Introduction

In 2004 Lee and Park published a new variety of *Cimicifuga elata* based on specimens from a single site at Grizzly Peak near Ashland, Oregon. This new variety they named *alpestris*. Unfortunately this new variety created more confusion than clarity resulting in further investigation by Kaye (2008) who decided that the new variety was supported although with qualification. The varieties appear to be distributed clinally with Douglas County being the zone of apparent introgression. Currently, the Oregon Natural Heritage Information Center (ORNHIC) has element occurrences at seven locations on the Umpqua National Forest. Of these, two sites represent the large and diffusely scattered Rogue-Umpqua Divide population while the others have either never been relocated or not revisited in the last fifteen years. Specimens from the Rogue-Umpqua Divide have been determined to fit var. *alpestris* while the habitat and population size at the other occurrences are more consistent with var. *elata*. One additional occurrence is known from the Umpqua also in habitat more similar to var. *elata*. Four additional sites occur in Douglas County on lands administered by the Roseburg District BLM. Two of these sites were revisited by Kaye (2008) with one site being determined to be var. *alpestris* and the other var. *elata*.

The purpose of this investigation was to revisit the remaining Douglas County population to determine which variety each site represents. A second objective was to better map the large population along the Rogue-Umpqua Divide to provide a more accurate assessment of the population size and distribution.

Methods and Study Area

Seven occurrences of *Cimicifuga elata* were identified to be revisited (Figure 1). All occurrences are in Douglas County. Five occurrences are on the Umpqua National Forest while the remaining two are on Roseburg District, Bureau of Land Management. Geographic locations were precisely mapped using a Trimble Juno GPS unit. Measurements were made of basal sheathing scales. This character was determined to be the most reliable indicator of taxonomic variety (Kaye 2008). Observations of pistil number, number of reproductive stems and habitat were also recorded.

Results

All of the occurrences were relocated with the exception of the Upper Myrtle Creek population (Table 1). This occurrence was reported to consist of 11-50 non-reproductive plants 60 m east of the road. We surveyed at least 150 m east of the road without locating any *Cimicifuga elata*. The previous survey was done on 3 May 2001, which is early for identifying this species, so it is possible that the site is a misidentification. The Irwin Rocks population was relocated and still consists of only two plants as was the case as of the last visit in 1999. In 1991 this site evidently consisted of 11-50 plants. The Cowbell Mountain site also consisted of only two plants, both non-reproductive. This population is down from 28 plants in 1999. The basal sheathing scales were buried in the duff at both sites and only one scale at each site was able to be located without risking damage to the plants. The scales were measured at 9 and 14 mm at the Cowbell and

Irwin Rocks sites respectively (Table 2). Because of the limited characters that were available for measurement, no taxonomic variety could be confidently ascribed to either occurrence.

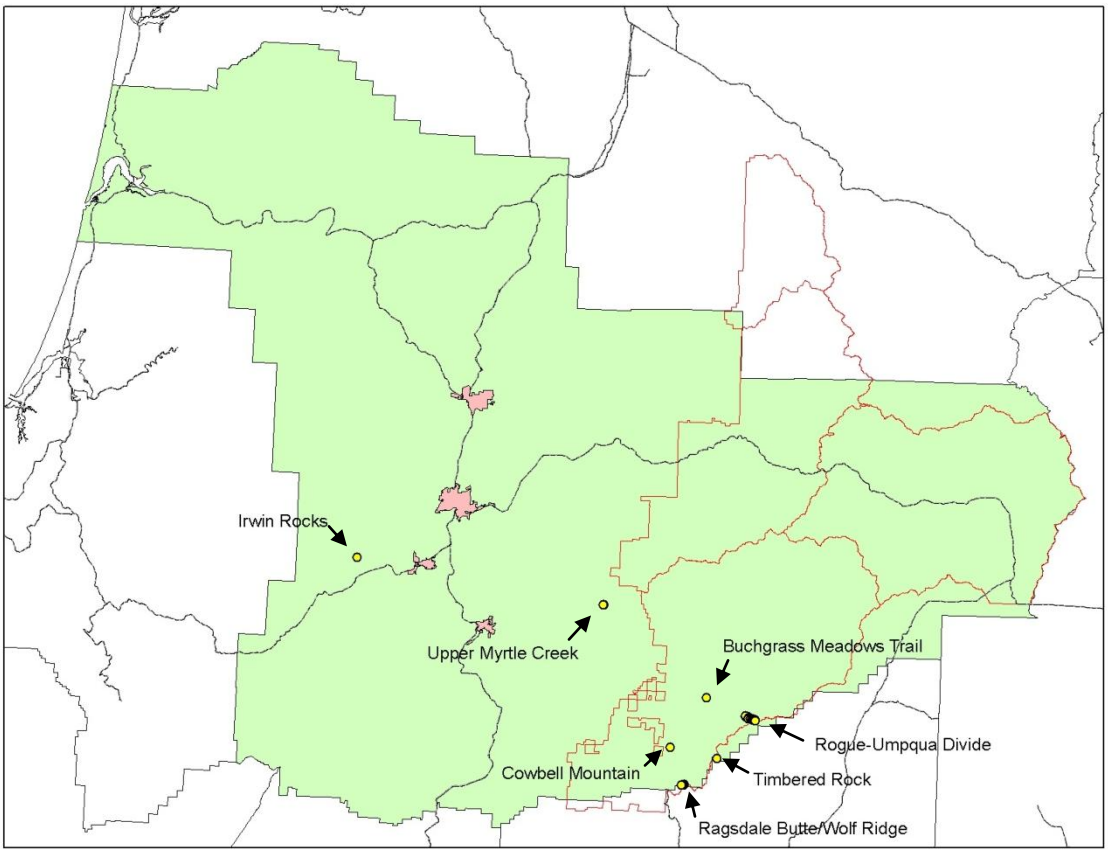

Figure 1. Occurrences of *Cimicifuga elata* in Douglas County visited.

The Timbered Rock, Ragsdale Butte/Wolf Ridge and Bunchgrass Meadows Trail occurrences were all relocated and determined to be consistent with var. *alpestris* (Table 2). The Timbered Rock population was reported to consist of 100 plants in 1999 and is now observed to be only about 30-40 plants. However these are large plants in close proximity with numerous reproductive stems making determination of numbers of genets impossible. No previous site report was available for the later two occurrences.

The Rogue-Umpqua Divide population had previously been identified as belonging to var. *alpestris* from herbarium specimens (Helliwell nos. 2666, 3234 and 3676) at the Oregon State University herbarium (OSC). Additional measurements in the field, as well as measurements from yet another collection from the population, corroborate this conclusion Table 2). This population is unique in that it is the only one to not be associated with an old clearcut or powerline corridor in the case of Timbered Rock occurrence. The boundary of this very large occurrence was mapped (Figure 2). Although there is a break between what is mapped as two subpopulations, there is no clear break in habitat and the close proximity suggests that ongoing genetic interchange is to be expected. The area where *C. elata* forms the dominant understory is noted (Figure 3).

Three populations were not revisited. The Bulldog Creek population comes from a 1992 hand-drawn map from Mildred Theile. Although the observer is typically reliable, several attempts to relocate this occurrence in the past have all proved futile. A small population along Beaver Creek from a 1994 site report is probably reliable, however this site is a long hike in to an area where it would difficult to find what only consisted of five plants 16 years ago. This site is worth revisiting but we simply ran out of time. A final site consisting of one "senescent" plant from the Cowboy Timber Sale area in 1991 was judged to be less reliable and was also not revisited.

Table 1. *Cimicifuga elata* site locations that were revisited in this study.

Site Name	**EO**	**Pop. Size**	**Elev. (ft)**	**Variety**	**Coll. No.**
Cowbell Mtn.	None	2	2560	undetermined	none
Bunchgrass Meadows Trail	None	12	3150	*alpestris*	none
Timbered Rock	226	30-40	4240	*alpestris*	3936
Ragsdale Butte/Wolf Ridge	179	70-90	4115	*alpestris*	3935
Irwin Rocks	75	2	1500	undetermined	none
Upper Myrtle Creek	None	0	1780		
Rogue-Umpqua Divide	58, 71	10-15,000	4115-5100	*alpestris*	3938

Table 2. Field measurements and observations from selected *Cimicifuga elata* plants.

Site Name	**Basal Scale Avg. (mm)**	**Basal Scale All (mm)**	**Reprod. Stems (No.)**	**Pistil (No.)**
Cowbell Mtn.	9.0	9	0	0
Bunchgrass Meadows Trail	21.5	16,17,22,31	1-3	-
Timbered Rock	24.7	18,19,22,23,26,40	many	2-4
Ragsdale Butte/Wolf Ridge	25.0	21,22,24,26,32	1-2 (4)	(1)2-3(4)
Irwin Rocks	14.0	14	2	1-4
Upper Myrtle Creek	-	-	-	-
Rogue-Umpqua Divide	27.5	10,22,22,23,25,25,26,26,30,31,34, 35,35,41	many	1-5

Discussion

All populations investigated were determined to be consistent with var. *alpestris* as revised by Kaye (2008). The exception is the two populations that only had two plants each. These two populations at Irwin Rocks and Cowbell Mountain were of relatively poor vigor, particularly the Cowbell populations that had no reproductive stems. The basal sheathing scales at both sites were buried, or partially buried, in the duff. Only a single sheath at each site could be unearthed without risking damage to the plants. Each had relatively short scales of 14 and 9 mm that would be consistent with var. *elata*. The habitat at the Cowbell site is also of more similar

elevation and habitat for var. *elata*. It consists of an overstory of *Pseudotsuga menziesii* and *Acer macropyllum* with *Polystichum munitum* in the understory at 2550 feet elevation. The Irwin Rocks habitat is within a relatively recent clearcut that appears to have been precommercially thinned within the last few years. At 1500 feet it is the lowest elevation site that was investigated. Although the traits are most consistent with var. *elata*, the character traits that were present are judged to be too limited for confident determination of variety.

It was observed that there may be a correlation with overall plant vigor, as evidenced by number and size of reproductive stems, with length of the basal sheathing stem (Figure 4). In addition to the short basal scales noted for the Cowbell and Irwin Rocks populations, relatively small sheaths were measured from relatively small plants with similarly few reproductive stems at other populations (Table 2). The two measurements of scales of 40 and 41 mm were from particularly robust, multi-stemmed plants. The scales in the middle range however seemed to come from either small or large plants so the relationship may not be consistent. This possible relationship was noted only after most sites had already been visited so no measurements were taken for further evaluation. Similarly, the large, vigorous plants tended to have more reproductive stems and were most likely to have some inflorescences with four or more pistils. As noted by Kaye (2008), pistil number was exceedingly variable even within the same inflorescence.

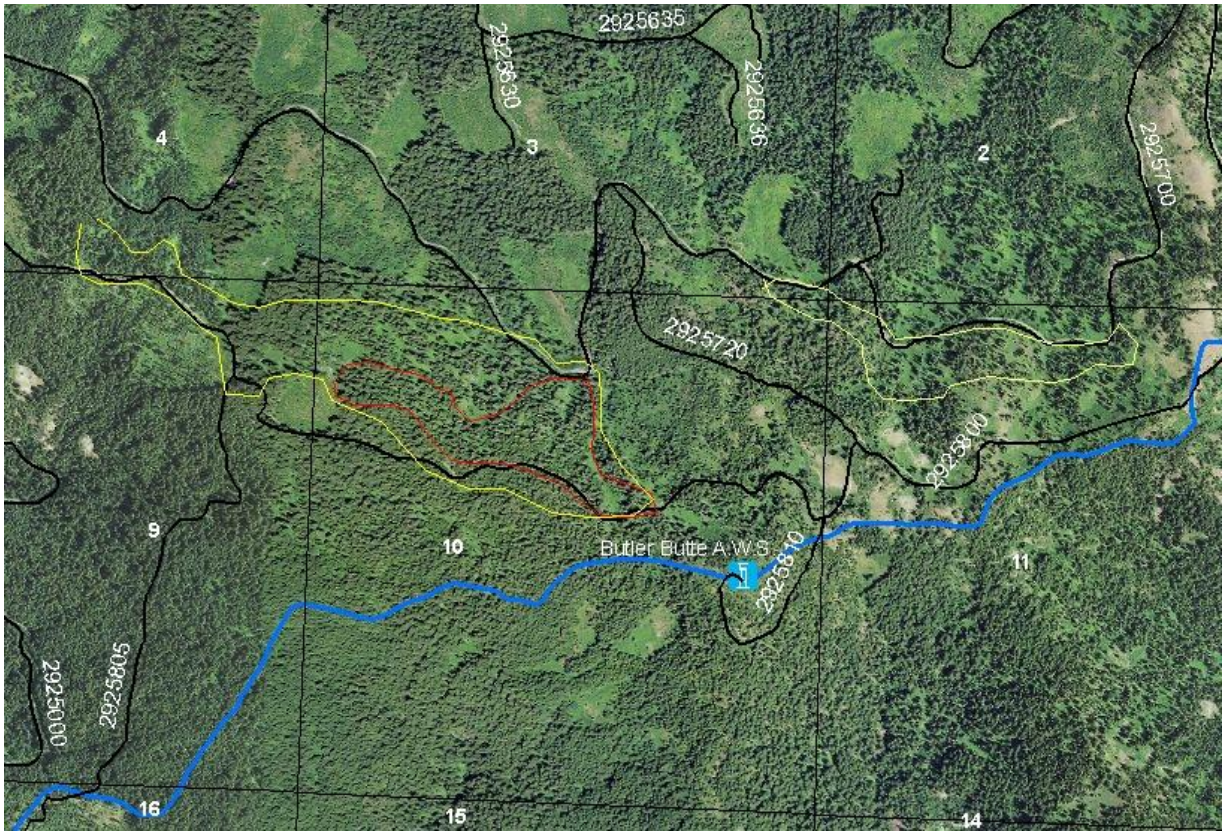

Figure 2. Extent of population of *Cimicifuga elata* along the Rogue-Umpqua Divide. The blue line indicates the boundary with the Rogue River National Forest to the south. The yellow line demarcates to the approximate perimeter of the two subpopulations. The red line represents the area where *C. elata* is the dominant understory species.

Figure 3. *Cimicifuga elata* at the Rogue-Umpqua Divide forms a nearly continuous understory canopy in large patches under an open canopy of old-growth *Pseudotsuga menziesii* and *Abies concolor*.

Figure 4. Comparison of a small basal sheathing scale from a slender, non-reproduction stem at Cowbell Mountain on the left with a relatively large scale from a stouter stem at the Rogue-Umpqua Divide on the right.

The habitat at the Rogue-Umpqua Divide is unique in being the only site that was not a clearcut or powerline corridor. It is also the highest elevation site although the lower elevation plants overlap those at Timbered Rock and Wolf Ridge, which also lie along the Umpqua and Rogue River basin divide. It is notable that there are no known occurrences on the Rogue River side of the divide. In fact all the visited populations except for Bunchgrass Meadows Trail are confined to northerly aspects. Even that population is on a west-facing lower slope of an otherwise north-facing drainage. Therefore, this species would not be anticipated to occur on the predominately south-facing Rogue River drainage, at least in the immediate vicinity. In the Grassy Range area of the Rogue-Umpqua Divide, *C. elata* disappeared when the aspect changed even where the slope was nearly flat.

The Rogue-Umpqua Divide area is dominated by old-growth *P. menziesii, Abies concolor* and *Thuja plicata*. Stands in this area have a generally open understory although there are dense thickets of *Acer circinatum* scattered throughout with some *A. glabrum* var. *douglasii*. Canopy gaps and small meadow openings are common. Small wetlands associated with the headwaters of Black Canyon Creek are scattered throughout. *Cimicifuga elata* forms the dominant understory throughout much of this area, particularly in an approximately 40 acre area northwest of Butler Butte (Figure 2). Elsewhere throughout the area its distribution is patchy within the canopy gaps and margins of the headwater wetland openings. *Actea rubra* and *Achyls triphylla* are closely associated with *C. elata* throughout this area.

Although fire scars are common on the largest *P. menziesii* and *T. plicata*, the decadent and dead patches of large *Abies concolor*, a relatively fire intolerant species, suggest a complicated fire history. Loss of habitat due to encroachment of conifers into the openings was assumed to be one of the principle threats to *C. elata* (USDI, USDA and USACE 1996) but this too seems to be more complicated than originally understood. Small conifers within monitoring transects for both *C. elata* and *Frasera umpquaensis* in this area, were observed to stagnate and die in the sapling stage suggesting that succession within the openings is either a very slow or highly episodic process. Monitoring of *C. elata* in this area from 1998-2006 demonstrated a relatively stable population (Unpublished data). Conversely, rapid loss of habitat due to conifer succession appears to be a significant process at the other populations.

The Cowbell Mountain population was reduced to two, non-reproductive plants growing in full shade in 2010, down from 28 in 1999 (Figure 5). Without canopy opening this population will not persist at this site. All other populations investigated as part of this study were confined to the margins of roads, a trail and a powerline corridor (Figure 6). Other than the powerline corridor population at Timbered Rock, these other populations are growing in dense plantations with the edge afforded by the road or trail providing the only apparent opening that is allowing for persistence of the populations. It is anticipated that these populations will also dwindle as the conifers in the plantations mature and shade the roadside. This is consistent with the findings of Kaye and Kirkland (1999) that found *C. elata* thriving in clearcuts but postulated that it may disappear with subsequent regrowth of conifers. The Irwin Rocks and Timbered Rock populations both have lower population sizes than were originally reported in 1991 and 1999 respectively. The Ragsdale Butte/Wolf Ridge and Bunchgrass Meadows Trail occurrences lacked site reports so there is no record of the historic population size or structure however, without either active management or a wildfire, both sites are anticipated to decline.

Figure 5. One of two remaining *Cimicifuga elata* plants remaining at the Cowbell Mountain site.

Figure 6. *Cimicifuga elata* growing along the edge of the powerline corridor at the Timbered Rock site.

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