Beatty Creek Research Natural Area

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Beatty Rocks as viewed from Cow Creek Road. Photo by Susan Carter.

Tucked away on the north slope of Cow Creek Canyon approximately 10 miles southwest of Myrtle Creek in Douglas County, Beatty Creek Research Natural Area (RNA) preserves a prime example of serpentine pine savanna at the north end of the Klamath Mountains Ecoregion (Allan and others 2001). Here, under the open canopy of scraggly Jeffrey pine (Pinus jeffreyi), several rare plants make their home: wayside aster (Eucephalus vialis), Bolander’s onion (Allium bolanderi var. mirabile), Douglas monkey flower (Mimulus douglasii), and California sandwort (Minuartia californica). In addition, Beatty Creek RNA is a fungus lover’s paradise, as revealed by recent inventories of its rich nonvascular and fungal community: 75 lichen species, 62 bryophyte species, and 198 mushroom and truffle species (Stone 1997, Wagner 1997, Trappe 1999). [These lists are available online at http://www.npsoregon.org/lists/plantlists/beatty_creek.htm] The rare moss, Pseudoleskeella serpentinensis, inhabits serpentine rock outcrops.

Beatty Creek is one of ten Areas of Critical Environmental Concern (ACEC) managed by the Bureau of Land Management (BLM) Roseburg District. It was first established as an RNA in 1983 to protect representative serpentine plant communities identified in the Oregon Natural Heritage Plan (Oregon Natural Heritage Advisory Council 1998). Beatty Creek was designated an ACEC/RNA in 1995 (BLM 1995). Although the RNA originally encompassed only 173 acres, the BLM Roseburg District Resource Management Plan provided for its expansion within the Beatty Creek watershed by purchase or land exchange (BLM 1995). Twenty acres were purchased from Silver Butte Timber Company in 2002 and approximately 657 acres were added in 2003 through direct exchange with Roseburg Resources Company. The BLM currently manages approximately 850 acres as the Beatty Creek ACEC/RNA. The RNA now encompasses the entire lower portion of the Beatty Creek watershed, a small perennial stream which drains into Cow Creek, a tributary of the South Umpqua River. In addition, the 280 acres lying adjacent to the new north boundary of the RNA have been withdrawn from active forest management by the BLM due to fragile soils.

Grassland, chaparral, and forest associations are all represented, including the riparian forest along Beatty Creek. The riparian
association includes Port Orford cedar (Cupressus lawsoniana) in the overstory and California laurel (Umbellularia californica) in the understory. Both of these species occur here at the eastern edge of their range in Oregon. Populations of seven special status species occur within the RNA and there is potential habitat for the serpentine endemic, crinite mariposa lily (Calochortus coxii), on the recently acquired addition to the RNA.

Climate

The climate is characterized by hot, dry summers and cool, wet winters. From late fall through spring, unstable low-pressure air masses carry frequent storms from the Pacific Ocean. During summer, stable high-pressure air masses bring clear skies and frequent temperature inversions. Precipitation averages about 40 inches per year, with 70% occurring from November to March. Average daily temperatures are 40°F in January and 65°F in July. Summer maximum temperatures reduce relative humidity to 40 to 45%, and occasionally to 15 to 20%. Evapo-transpiration at this time far exceeds the available soil moisture, leading to plant moisture stress, especially on south- and west-facing exposures.

Geology and Soils

Beatty Creek RNA lies within the northern portion of the Klamath Mountains Ecoregion, a region whose complex geology of folded, faulted, intruded, metamorphosed rock contains the highest concentration of serpentine bedrock in North America (Kruckeberg 1984). Serpentine rock is the metamorphosed remains of magnesium-rich igneous rock, commonly peridotite. A band of serpentine ranging from one to three miles wide crosses southern Douglas County near Cow Creek as it extends northeasterly to Little River (Ramp 1972). Most of the Beatty Creek RNA is underlain by this serpentine bedrock, except at the mouth of the creek, where marine siltstone, sandstone, and conglomerate bedrock forms exposed rock outcrops visible from the Cow Creek Road. The flora and soils of the marine conglomerate differ from the flora and soils of the serpentine intrusives in the rest of the RNA. The two main soil types derive from the two types of parent bedrock. Dubakella-Pearsoll soil associations derive from the weathering of serpentine and peridotite ultramafic bedrock. These shallow (20 to 40 inches), reddish-brown, gravelly, rocky soils are xeric, and generally occur on steep or very steep slopes. The Josephine-Speaker soil complex derives from the marine conglomerate. These soils are brown, well-drained, very gravelly loams. The Josephine-Speaker soil association supports mesic forest and oak-madrone forest (NRCS 1995).

Human Use

With the exception of a spur road which the BLM blocked off and a few old mining prospect pits, there is little evidence of past disturbance in the original RNA. However, approximately 80 acres of the new acquisition area was logged by the previous land owner. A network of skid trails is still apparent. Just north of the Central Oregon and Pacific railroad right-of-way, which was constructed in 1882, parts of a livestock fence remain, indicating that grazing may have occurred there at one time.

Although there is no direct evidence of Native American use in the RNA, early inhabitants may have burned the area to reduce brush to aid in the hunting of game animals and to ready tarweed plants for harvest (Riddle 1953).

Plant Communities/Ecology

Jeffrey pine savanna covers most of the RNA, with a small amount of late-successional Douglas fir forest, oak-madrone woodland, and rock outcrops (marine conglomerate) near the southern boundary. Jeffrey pine savanna occurs primarily on upland soils derived from serpentine parent material. In addition to Jeffrey pine, you will encounter incense cedar (Calocedrus decurrens), Pacific madrone
Buckbrush (Ceanothus cuneatus) is the most common shrub in serpentine Jeffrey pine savannas. Photo by Russ Holmes.
at the Hanna Nickel Mine, approximately two and a half miles northeast of Beatty Creek RNA. Compounding the unfavorable mineral composition, these soils are highly erodible, and have low moisture availability, resulting in a harsh environment for plants. As a result, serpentine habitats have led to a specialized native flora, a high level of endemism, and a relative lack of invasion by non-native plants.

Although Jeffery pine is common on non-serpentine soils in the Sierra Nevada Mountains, in the Klamath Mountains it is largely restricted to serpentine sites (Coleman and Kruckeberg 1999). Serpentine endemics of the Beatty Creek RNA include scorpion weed (Phacelia capitata), lax stonecrop (Sedum laxum ssp. laxum), common eriophyllum (Eriophyllum lanatum), and small flowered willow herb (Epilobium minutum) (Coleman and Kruckeberg 1999, White 1971, as cited in Franklin and Dyrness 1988). Other species that are good indicators of serpentine, but may also occur on non-serpentine include podfern (Aspidotis densa), Port Orford cedar, California laurel, bigseed biscuitroot (Lomatium macrocarpum), buckbrush, and canyon live oak (Coleman and Kruckeberg 1999, Whittaker 1960 as cited in Franklin and Dyrness 1988).

Special Status Plant Species

Special status plant species include wayside aster, the moss *Pseudoleskeella serpentinensis*, Bolander’s onion, Douglas monkey flower, and California sandwort. Wayside aster, a State Threatened and BLM Sensitive species (Oregon Natural Heritage Plan (ONHP) List 1), grows along Beatty Creek and some of its seasonal tributaries in the transition zone between the riparian forest and the upland grassland. The population is somewhat continuous throughout the drainage and forms one of the larger populations in the species’ range. Most of the population (over 60%) grows in the recently acquired parcels in the watershed. Wayside aster is a tall perennial with one to several stems. The simple, dull green leaves clasp the stem, and the rayless flower heads are grouped at the end of the stems. There are no other aster species in the area.

Six populations of *Pseudoleskeella serpentinensis*, a BLM Assessment species (ONHP List 2), are known to occur on the serpentine rock outcrops. *Pseudoleskeella serpentinensis* forms reddish mats on the rocks. Its tiny leaves grow on filamentous stems. Bolander’s onion is found scattered in openings on east-facing serpentine slopes. Bolander’s onion has 10-20 red-purple flowers in a head at the top of the long peduncle. The other onion known from the area, narrowleaf onion, has about 10-50 white to pink spreading flowers in the inflorescence.

Douglas monkey flower is found in serpentine openings of the shrub and Jeffrey pine associations as well as among mosses and short annuals on the conglomerate ledges at the mouth of Beatty Creek. Douglas monkey flower is a small compact annual with dark pink or maroon flowers. The upper petals look like mouse ears and the lower petals barely protrude from the lower lip. Other monkey flowers in the area are found in wetter habitats and have yellow flowers.

California sandwort grows on nearly bare soils on open slopes or ridges in the Jeffrey pine and shrub associations. California sandwort is a small plant with five-petaled flowers. It can be distinguished from the more common Douglas sandwort (*Minuartia douglasii*) by its smaller leaves. California sandwort has small, somewhat oblong leaves while Douglas sandwort has long, thread-like leaves that become curly. Bolander’s onion, Douglas monkey flower, and California sandwort are BLM Tracking species (ONHP List 4).

The recently acquired lands support populations of spring phacelia (*Phacelia verna*) (BLM Tracking and ONHP List 4), and
California sword fern (*Polystichum californicum*) (BLM Assessment and ONHP List 2). Both spring phacelia and California sword fern occur on the marine conglomerate outcrops. Spring phacelia is restricted to shallow moss cover over bedrock where there is very little grass and forb cover. Spring phacelia is a small annual with ovate leaves and flowers coiled in a fiddle neck. The common scorpion weed (*P. capitata*) is a perennial with long, narrow leaves and flowers densely clustered in a head. California sword fern occurs on rock bluffs with virtually no associated vegetation.

Serpentine areas in the acquired parcel are potential habitat for crinum mariposa lily, an endemic species restricted to serpentine sites in Douglas County (State Endangered and Bureau Sensitive species [ONHP List 1]). Although not yet found at Beatty Creek, it has been identified in the Lower Cow Creek watershed, less than five miles from the acquisition parcel in areas of similar soils and plant associations.

**Range Extension**

The Port Orford cedar that forms a common component of the riparian habitat along Beatty Creek is noteworthy because it is free of the introduced root disease fungus *Phytophthora lateralis* (Casavan, pers. comm.). This population along the eastern edge of the species’ range in Oregon occurs in relatively dry serpentine habitat, which differs significantly from typical habits closer to the center of the species’ range. The Beatty Creek population may contain highly desirable genotypes resistant to the root disease.

**Visiting Beatty Creek RNA**

Take exit 103 from Interstate 5, and drive west on Highway 39 toward Riddle, Oregon. After following the Cow Creek Road (Highway 39) for about 8 miles, there is an unmarked pullout along the road with parking for about two vehicles. The RNA lies just north of Cow Creek Road. Visitors can either walk up Beatty Creek (beware of poison oak) or scramble around and over the rock outcrops visible from Cow Creek Road. No other public roads or trails access the area.

**Acknowledgments**

K. Casavan provided information on Port Orford cedar and *Phytophthora lateralis*. The vascular plant list was developed by BLM staff and P. Zika. D. Stone inventoried the lichens; D. Wagner, the bryophytes; and J. Trappe, the mushrooms and truffles. The bryophyte and fungi lists were reviewed by Dave Wagner and Dan Luoma.

**References**


**Vascular Plant Species List**

Nomenclature follows the Oregon Flora Project checklist. Names of taxa native to Oregon are printed in italic *Garamond*, alien taxa are in italic *Gill Sans*, a sans-serif type.

**FERNS AND THEIR ALLIES**

*DENNSTAEDTIACEAE* (Bracken Family)

*Pteridium aquilinum* (L.) Kuhn (western brackenfern)

*Drynopteridaceae* (Wood Fern Family)

*Cryptopteris fragilis* (L.) Bernh. (brittle bladder fern)

*Drynopteris arguta* (Kaulf.) Maxon (coastal shield fern)

*Polystichum imbricans* (D.C. Eaton) D.H. Wagner sp. *imbricans* (narrowleaf swordfern)
PRIMULACEAE (Primrose Family)
Dodecatheon hendersonii A. Gray (Henderson’s shooting star)
Trientalis latifolia Hook. (broadleaf starflower)

RANUNCULACEAE (Buttercup Family)
Aquilegia formosa Fisch. ex DC (red columbine)
Delphinium menziesii DC. (Menzies’ larkspur)
Delphinium purpureum Nutt. (western buttercup)
Delphinium occidentale D. Don (little buttercup)

RHAMNACEAE (Buckthorn Family)
Ceanothus cuneatus (Hook.) Nutt. ex Torr. & A. Gray (buckbrush)
Rhamnus purshiana DC. (casca)

ROSACEAE (Rose Family)
Amelanchier alnifolia (Nutt.) Nutt. ex M. Roem. (western serviceberry)
Aphanes occidentalis (Nutt.) Rydb. (western lady’s mantle)
Craepeus monogynus Jacq. (English hawthorne)
Fragaria vesca (L.) Link (wood strawberry)
Holodiscus discolor (Pursh) Maxim. (creambush oceanspray)
Oemleria cerasiformis (Douglas ex Lindl.) Oakes ssp. (sweetbriar)
Rubus ursinus (L.) Oakes (salmonberry)
Rubus parviflorus (Nutt.) Nutt. ex Torr. & A. Gray ex Hook. & Arn. (sweetbriar)
Rubus spectabilis (L.) Oakes (narrowleaf onion)
Rubus leucodermis (Nutt.) Nutt. ex M. Roem. (black raspberry)
Rubus spectabilis Pursh (salmonberry)
Rubus occidentalis Cham. & Schltldl. (Pacific dewberry)

RUBIACEAE (Madder Family)
Galium aparine L. (stickywilly)
Galium parisiense L. (wall bedstraw)

SCROPHULARIACEAE (Figwort Family)
Castilleja attenuata (A. Gray) T.I. Chuang & Heckard (attenuate Indian paintbrush)
Castilleja praeornosa Fernald (frosted paintbrush)
Castilleja tenuis A. Gray (hairy owl clover)
Collinsia grandiflora Douglas ex Lindl. (large-flowered blue-eyed Mary)
Collinsia parviflora Douglas ex Lindl. (small-flowered blue-eyed Mary)
Collinsia rattanii A. Gray (Rattan collinsia)

Digitalis purpurea L. (foxglove)
Mimulus alpinoides Douglas ex Benth. (chickweed mimulus)
Mimulus douglasii (Benth.) A. Gray (Douglas monkey flower)
Mimulus guttatus DC. (yellow monkey flower)
Penstemon laetus A. Gray (gay penstemon)
Synthyris reniformis (Douglas ex Benth.) Benth. (snow-queen)
Thalictrum tenella (Benth.) A. Heller (lesser baby innocence)
Triphytium pusilla (Benth.) T.I. Chuang & Heckard (dwarf owl clover)
Veronica arvensis L. (wall or common speedwell)

VALERIANACEAE (Valerian Family)
Plectritis congesta (Lindl.) DC. (shortspur seablush)
Valerianella locusta (L.) Later. (European corn salad)

VIOLAECES (Violet Family)
Viola glabella Nutt ex Torr. & A. Gray (stream or pioneer violet)
Viola ballii A. Gray (Oregon violet)
Viola lobata Benth. ssp. integrifolia (S. Watson) R.J. Little (pine violet)

VISCACEAE (Mistletoe Family)
Arceuthobium campylopodum Engelm. (western dwarf mistletoe)

MONOCOTYLEDONS

CYPERACEAE (Sedge Family)
Carex deweyana Schwein. (Dewey’s sedge)
Carex mendocinensis Olney (Mendocino sedge)
Carex tumulicola Mack. (splitawn sedge)

IRIDACEAE (Iris Family)
Iris chrysophylla Howell (yellow leaf iris)
Iris tenax Douglas ex Lindl. (tough leaf iris)
Oxypodium douglasii (A. Dietr.) E.P. Bicknell var. douglasii (grass widows)
Sisyrinchium bellum S. Watson (narrowleaf blue-eyed grass)

JUNCACEAE (Rush Family)
Juncus bufonius L. (toad rush)
Juncus effusus L. (soft or common rush)

LILIACEAE (Lily Family)
Allium amplexicaule Torr. (narrowleaf onion)
Allium bolanderi S. Watson (Bolander’s onion)
Brodiaea elegans Hoover (elegant brodiaea)
Calochortus tolmiei Hook. & Arn. (Tolmie’s mariposa lily)
Camassia leichtlinii (Baker) S. Watson var. suksdorfii (Greenm.)

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Susan Carter is the District Botanist with the BLM in Roseburg, OR. Prior to coming to the Roseburg District in 2002, she was the Botanist for the BLM Bakersfield Field Office in California.