



## **NATURAL HISTORY & ECOLOGY OF BOHEMIA ECOLOGICAL PRESERVE**

The following is a general overview of the Property's significant and unique natural, ecological, and habitat features.

### **Watershed**

The property contains portions of three canyons (with three creeks) that drain toward the southwest, into Dutch Bill Creek. The three-acre portion of the Property on the West side of Bohemian Highway includes an approximately 1,000 ft section of Dutch Bill Creek. Dutch Bill Creek in turn drains directly into the Russian River, approximately three miles north of the Property, where the Russian River flows westward about eight miles to the Pacific Ocean, near Jenner.

The Russian River is a Class I stream that supports populations of Russian River tule perch (*Hysterocarpus traski*), federally endangered coho salmon (*Oncorhynchus kisutch*) and federally threatened steelhead (*Salmo gairdneri*), which also run up Dutch Bill Creek. Because the Property lies within the Russian River watershed, it is subject to Federal regulations protecting these species and water quality, including the Clean Water Act and the Federal Endangered Species Act. All three creeks on the Property contain barriers to fish migration but are nevertheless important in supplying clean water to Dutch Bill Creek and the Russian River.

The northernmost creek is an unnamed creek on the 7.5-minute USGS Camp Meeker quad, known locally as Margaret's Creek. It starts on the Bohemian Grove property to the north and drains in a southwesterly direction, joining Dutch Bill Creek just west of the property's northern intersection with the Bohemian Highway. All of the slopes in the northwestern quarter of the property drain to this creek. The culvert under the Bohemian Highway creates a barrier to fish use of Margaret's Creek. The central creek on the property is called Duvoul Creek, which drains a larger sub watershed (approximately twice the size) than Margaret's Creek.

The canyons in the northeastern half of the property (as well as land on the Bohemian Grove property to the north) drain into this creek, which connects with Dutch Bill Creek in the approximate center of the property's western edge along the Bohemian Highway. Duvoul Creek contains a 25-foot waterfall that runs most of the year, presenting a natural barrier to fish migration up this creek.

Grub Creek lies in the southern portion of the property, and drains a small sub watershed, portions of which are off of the Property on the south and the east. An older reservoir just east of the Property captures and ponds Grub Creek, and its dam produces a barrier to fish migration. According to a site assessment, it had filled with sediment and was breached prior to 1999, but was more recently reported to have been re-excavated to provide open water storage in 2000. In 2003, site visits revealed that substantial ponding occurred, but the overflow at the north end of the earthen dam approximately 30 feet below the top of the dam. A concrete structure under the Bohemian Highway where Grub Creek joins the Dutch Bill Creek was considered another barrier to fish migration. In 2008 CDFG, NOAA, Sonoma County Fish & Wildlife Commission, and others completed a \$52,000 Culvert Retrofit Project. The project included retrofitting the culvert with baffles and roughening the channel to provide better access for steelhead and coho salmon to Grub Creek under Bohemian Highway.

## **Habitat Types**

The property contains diverse habitat types and ecological communities, including rare plant populations associated with the serpentine soils. Several botanical surveys have been performed on the Property; the most recent one was completed in 2003 as part of the NTMP.

### Hardwood-Conifer Forest

Forest dominated by Douglas fir and redwood, and also containing tanoak, madrone, California bay, and various species exist in the steep canyons in the north and northeastern quadrants of the Property. Redwoods are generally located on the northfacing slopes and along watercourses, while firs predominate on both south and northfacing middle and upper slopes. Much of the forest onsite has been subject to previous timber harvests and is currently in a "second-growth" condition. Some large remnant trees (greater than 24dbh) remain in the northern portion of the property. Understory vegetation includes huckleberry, redwood sorel, and a variety of ferns.

### Oak Woodlands & Savannah

Some of the south and west-facing slopes and ridgetops, including the Hut Hill Area and Top of the World contain mixtures of Oregon oaks, coast live oaks, black oaks, madrones, and California bays. Understory is composed of toyon, poison oak, and honeysuckle, as well as perennial grasses and forbs. In drier areas such as the ridgetops, the trees are widely spaced, forming a savannah with grasslands dominating between the trees.

### Riparian Woodland

The riparian woodlands onsite follow the course of the three creeks on the property, and contain a variable and structurally diverse community by white alder, big-leaf maple, willow, California bay, and occasionally Oregon ash, with some areas containing conifers such as redwoods and Douglas fir. Understory is composed of many species of ferns, sedges, spicebush, California hazel, coffeeberry, and western azalea.

### Serpentine Chaparral and Sargent Cypress Forest

Serpentine bedrock material underlies a significant portion of the property, resulting in low fertility, chemical imbalances (including the presence of heavy metals) and high erodibility. The serpentine chaparral community, which is located primarily on Henneke soils, is comprised of a diverse mix of shrubs such as Baker's Manzanita, Jepson's ceanothus, chamise, and coffeeberry, as well as Sargent's cypress. Serpentine reed grass and Tiburon tarplant are also found in scattered locations within this association.

### Serpentine Grasslands and Native Grasslands

There are several grasslands on the Property, including some that contain serpentine indicator species such as Tiburon tarplant, Pennell's birdsbeak, serpentine reed grass, Sonoma jewelflower, lessingias and Calycadenia. Perennial native grasses include rare red grass, western melica, and California fescue are present in the grassland's areas. In the northwest panhandle, blue bunchgrass is additionally present. Native grasslands, such as those found in the panhandle are not assigned a special status, but it is widely recognized by ecologists and botanists as an important habitat type. A large proportion of introduced Mediterranean grasses occur in the grasslands near Hut Hill and Top of the World (where serpentine soils are less present) including wild oats, bromes, and ryegrass.

### Wetlands

There are several seeps on the Property, including one at the north eastern portion of the Hut Hill Envelope and another along the road to the panhandle and near the old mine area at the southeast corner of the panhandle.

## **THREATENED, ENDANGERED, AND SENSITIVE SPECIES**

### Plants

The following are special-status and rare plant species that were identified on the Original Easement Property (where noted, the occurrences of the species were found within the Property boundaries):

1. Pennell's bird's-beak (*Cordylanthus tenuis* ssp. *capillaris*) is a federally-endangered species and listed as rare within California. It is associated with Baker's Manzanita on serpentine soils. CNPS identified the colonies on the Original Easement Property as representing approximately 40 percent of the total known population of this species. On the property, Pennell's bird's-beak is found near the Quarry Road entrance and along the road leading to the panhandle.

2. Baker's Manzanita (*Artostaphylos bakeri* ssp. *bakeri*) is a federal species of concern, ranked by the NDDDB as a G2 species, or having fewer than 20 viable element occurrences, less than 3,000 individuals, or occurring on less than 10,000 acres. It is found on Henneke and Montara soils in the upland forests (primarily Sargent Cypress Forest) and chaparral. The Original Easement Property has been identified as part of one of the best-known sites for this species. Large areas of Baker's Manzanita occur on the Property.
3. Crystal springs lessingia (*Lessingia arachnoidea*) is also a federal species of concern and ranked by the NDDDB as a G1 species, or having less than six viable element occurrences, less than 1,000 individuals, or occurring on fewer than 2,000 acres. This species is associated with Baker's Manzanita on Henneke soils.
4. Woolly-headed lessingia (*Lessingia hololeuca*) was identified as occurring "along access roads and in grasslands of serpentine soils."
5. Serpentine reed grass (*Calamagrostis ophiditis*) is endemic to four California counties in Chaparral and grassland. This species is recognized as rare by the CNPS and populations were identified south of the old mine site and along the road to the panhandle.
6. Sonoma jewelflower (*Stephananthus glandulosus* var. *sonomensis*) is known to only occur in five areas within Sonoma County. On the Original Easement Property, it is associated with Baker's Manzanita on Henneke and Montara soils.
7. Hayfield tarplant (*Hemizonia congetsa* ssp. *leucocephala*) is a rare annual forb known to occur in wet meadows in only three California counties. A single colony has been identified by CNPS on the Original Easement Property)
8. Tiburon tarplant (*Hemizonia multicaulis* ssp. *vernalis*) is an annual herb that is a CNPS list 1B species. This subspecies is known to occur in only three counties, on serpentine grasslands.
9. Narrow-leaved daisy (*Erigeron angustus*) is ranked by the NDDDB as a G2 species. It is known in serpentine areas in chaparral habitat in only three counties.
10. Long-bearded lichen (*Usnea longissima*) is a rare pendulous lichen associated with mature and late-seral forests.

### Heritage Trees

Several trees which qualify to be protected by the Sonoma County Tree Protection and Replacement Ordinance as Heritage Trees were identified on the Original Easement Property as part of the Original Baseline Report. These include a madrone that measures 12 feet in circumference at breast height, a Douglas fir that measures 19 feet, 9 inches

in circumference, seven oaks, a big-leaf maple, a redwood and a bay tree. Further research is needed to determine the location of these trees.

## Wildlife

The California Wildlife Habitat Relations Program (CWHR) within the California Department of Fish and Game (CDFG) identifies four distinct types of habitat associated with the vegetation found on the Property. These include conifer forest, chaparral, grasslands and oak woodlands. Wildlife species that use these types of habitat in Sonoma County are listed as an attachment to the Original Baseline Report. Some of the wildlife present or expected onsite fall within protected status categories by the California Department of Fish and Game (DFG) and or the U.S. Fish and Wildlife Service (USFWS), including threatened, endangered, and sensitive species, and species of concern. The Natural Diversity Database (NDDDB) identifies several wildlife species that impact the management of the Property.

Northern spotted owls, a species listed as threatened with extinction by the U.S. Fish and Wildlife Service, inhabit mature / old-growth conifer forest in California, Oregon, Washington and British Columbia. Three owl activity centers are known within 1.3 miles of the Bohemia Ranch, and two activity centers were identified, one on the eastern edge of the Property (within the forested portion of the Property) and one just south of the Property on the neighboring parcel. The Property contains hundreds of acres of roosting /foraging habitat for northern spotted owls. The size of a spotted owl territory in northern California is approximately 1/3-mile radius circle.

The red tree vole is a federal species of concern and is found in conifer forest where it feeds almost exclusively on Douglas-fir needles. It has been identified along Dutch Bill Creek at the south end of the Original Easement Property. The

Property also falls within the natural range of the marbled murrelet, which is listed as threatened with extinction by USFWS and endangered by CDFG. A seabird, marbled murrelets generally nest on large branches in the upper third of the canopy of mature / old-growth coniferous forest within 50 miles of marine habitat. Though the species has never been identified on the Property, nesting habitat likely exists there.

The Property also provides habitat for several California species of concern, which may or may not have actually been identified on the Property. Both the existing and potential species occupying habitat types found on the Bohemia Ranch are listed in the Original Baseline Report.