BOTANICAL RESOURCE ASSESSMENT FOR THE CONSERVATION FUND'S BIG RIVER AND SALMON CREEK PROPERTIES, MENDOCINO COUNTY, CA

Prepared for:

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Introduction

The purpose of this Botanical Resource Assessment is to bring the original 2008 Botanical Resource Assessment authored by Geri Hulse-Stephens up to date in terms of new species occurrences, taxonomic revisions, current status of rare as well as invasive species, pathogens (SOD), and lastly, current vegetation classification conventions. Where applicable, updated management recommendations for rare species are provided.

The original assessment summarized special status plants and communities, vegetation habitat types, gaps in surveys, and invasive plants and pathogens. Species lists for Big River and Salmon Creek Forest were compiled based on all available surveys at the time. Recommendations were made which largely stressed the need for more inventories since large un-surveyed areas existed in 2008. This gap in our understanding of species richness including the status of rare and endangered species would soon be narrowed as field surveys continued.

The preliminary inventory of vascular flora of the Big River property was represented in 2008 by at least 317 species in 203 genera and 68 families. The preliminary inventory of vascular flora of the Salmon Creek property was represented by at least 234 species in 159 genera and 62 families. Twelve special status plants and two special status communities were identified on the Properties. Eighty-eight invasive plants on Big River and 49 on Salmon Creek were identified throughout six distinct vegetation types. Lastly, 35 bryophytes and 12 lichens had been identified in 2008. Additional baseline surveys of both properties were recommended to better provide informed management decisions.

Over the past ten years a number of THP botanical surveys have been conducted throughout Big River and Salmon Creek Forest parcels providing a more accurate picture of species diversity. Notably, there have been substantial increases in the number of species documented i.e., 219 additions to the Big River Forest vascular plant flora, and 55 additions to the Salmon Creek flora since 2008 (Table 1). Due to increased survey efforts the bryophyte flora more than doubled, and lichens tripled in number. Current species list for vascular plants as well as bryophytes and lichens are provided at the end of this report in Appendices B, C, and D.

Table 1. Floristic Summary

	2008	2018
Big River (BR)		
total vascular species	317	538
families	68	89
exotics	88	156
rare	7	9
Salmon Creek (SC)		
total vascular species	234	290
families	62	70
exotics	49	72
rare	10	12
BR and SC bryophytes	35	88
BR and SC lichens	12	35

Vegetation of Big River and Salmon Creek Forests: an overview

The vegetation descriptions herein combine both physiognomic (relating to structure, i.e. pond, seep, river, forest etc.) and floristic elements (redwood forest, slough sedge swards). Alliances are floristic in nature and describe dominant or co-dominant species within homogeneous stands. They follow the National Vegetation Classification Hierarchy as applied to California vegetation (Sawyer et al. 2009).

Big River Forest

Conifer Forest

Within most stands, redwood (*Sequoia sempervirens*), Douglas fir (*Pseudotsuga menziesii*), and tanoak (*Notholithocarpus densiflorus*) occur in varying combination of dominance which determine the vegetation Alliance. Grand fir (*Abies grandis*) and western hemlock (*Tsuga heteropylla*) are occasionally encountered along with Pacific madrone (*Arbutus menziesii*), California bay (*Umbellularia californica*), and wax myrtle (*Morella californica*). The *Sequoia sempervirens* Forest Alliance is the primary vegetation type across the Big River Forest along with at least three associations including *Sequoia sempervirens-Notholithocarpus densiflorus, Sequoia sempervirens - Notholithocarpus densiflorus/Vaccinium ovatum,* and *Sequoia sempervirens-Pseudotsuga menziesii*. Stands primarily of Douglas fir and tanoak are placed in the *Pseudotsuga menziesii - Notholithocarpus densiflorus* Alliance of which many potential associations exist (Sawyer et al. 2009), depending on the scale at which vegetation units are mapped.

Common mid canopy taxa include: salal (*Gaultheria shallon*), Columbia manzanita (*Arctostaphylos columbiana*), Western raspberry (*Rubus leucodermis),* California blackberry (*R. ursinus*), thimble berry (*R. parviflorus*), honeysuckle (*Lonicera hispidula*), California coffeberry (*Frangula californica*), cascara (*F. purshiana*), blue blossom *(Ceanothus thysirflorus),* California rose-bay *(Rhododendron macrophyllum*), California huckleberry *(Vaccinium ovatum),* red huckleberry (*V. parvifolium*), poison oak *(Toxicodendron diversilobum),* and wood rose *(Rosa gymnocarpa*). Widespread forest understory ferns include sword fern (*Polystichum munitum*) and bracken fern (*Pteridium aquilinum* var. *pubescens*) while others such as giant chain fern (*Woodwardia fimbriata*), deer fern (*Struthiopteris spicant*), lady fern (*Athyrium filix-femina var. cyclosorum),* and five-finger fern (*Adiantum aleuticum*), are more common in and around seeps, gullies, and creek banks.

The composition of the herbaceous layer varies with aspect, available light, and litter depth. In fertile soils in more open canopy, modesty *(Whipplea modesta),* hawkweed (*Hieracium albiflorum*), star flower (*Lysimachia latifolia*), Douglas iris (*Iris douglasiana*), California harebell (*Asyneuma prenanthoides*), western trillium (*Trillium ovatum*), trail plant (*Adenocaulon bicolor*), evergreen violet (*Viola sempervirens*), redwood ivy (*Vancouveria planipetala*), yerba

buena (*Clinopodium douglasii*) are common. Low light tolerant species in dense canopy included spotted coralroot *(Corallorhiza maculata*), Hooker's fairybell (*Prosartes hookeri*), sweet scented bedstraw (*Galium triflorum*), fetid adders' tongue (*Scoliopus bigelovii*), and redwood sorrel (*Oxalis oregana*).

A variety of grasses and sedges occur across forest stands including the native species: western fescue *(F. occidentalis),* sweet grass *(Anthoxanthum occidentale),* Columbia brome *(Bromus vulgaris),* California oat grass (*Danthonia californica*), crinkle-awned fescue (*Festuca subuliflora*), blue wildrye (*Elymus glaucus*), Alaskan oniongrass (*Melica subulata*), Kellogg's bluegrass (*Poa kelloggii*), and slender hairgrass (*Deschampsia elongata*), as well as round-fruit sedge (*Carex globosa*), Harford's sedge (*C. harfordii*) and timber sedge (*C. hendersonii*). Common exotic grasses include: sweet vernal grass (*Anthoxanthum odoratum*), velvet grass (*Holcus lanatus*), and jubata grass (*Cortaderia jubata*).

Riparian

Along the main stem of Big River upland coniferous forest extends down to the channel including Douglas fir, redwood, and grand fir. Woody plants more or less confined to the riparian corridor include large leaf maple (*Acer macrophylla*), red alder (*Alnus rubra*), white alder (*A. rhombifolia*), Oregon ash (*Fraxinus latifolia*), western azalea (*Rhododendron occidentale*), California blackberry (*Rubus ursinus*), Sitka willow (*Salix sitchensis*), Scouler's willow (*S. scouleriana*), and Pacific bay (*Umbellularia californica*).

Common herbaceous perennial species include mugwort (*Artemesia douglasiana*), lady fern (*Athyrium filix-femina* var. *cylosorum*), torrent sedge (*Carex nudata*), Chilean wormseed (*Dysphania chilensis*), streamside orchid (*Epipactis gigantea*), common scouring rush (*Equisetum hymale*), giant scouring rush (*E. telmateia* subsp. *braunii*), white sweet clover (*Melilotus albus*), false waterpepper (*Persicaria hydropiperoides*), willow weed (*P. lapathifolium*), and panicled bulrush (*Scirpus microcarpus*). Common bryophytes include leafy liverworts – *Conocephalum conicum* and *Marchantia polymorpha*, and mosses – *Brachythecium frigidum, Kindbergia oregana, Rhizomnium glabrescens,* and *Porotrichum bigelovii* along shady banks, while *Scleropodium obtusifolium* is the most common seasonally submerged species of creek channels.

Upland seasonal drainages such as Peterson, Kidwell and Wheel gulches vary in vegetation with gradient and accumulated debris. Where gradients are steep and debris dense the plant community is less diverse with sword fern, giant chain fern (*Woodwardia fimbriata*), and hydrophytic mosses such as *Scleropodium obtusifolium,* which forms mats on boulders in streams and *Leucolepis acanthoneuron* which forms dense patches on moist soil along streams. Where the gradient is more gradual and some ponding occurs in the summer months, slough sedge (*Carex obnupta*) can form dense communities along with big-leaf sedge (*Carex*

amplifolia). Wild ginger (*Asarum caudatum*), lady fern (*Athyrium felix-femina*), and giant horsetail (*Equisetum telmateia* subsp. *braunii*).

Areas of off-channel bottomlands adjacent to the Big River mainstem consist of dense slough sedge (*Carex obnupta*) along with western raspberry (*Rubus leucodermis*), surrounded by redwood forest. Along the secondary tributary, Two Log Creek, California wax myrtle (*Morella californica*) is the dominant woody species along with thimble berry (*Rubus parviflorus*), western azalea (*Rhododendron occidentalis*), poison oak (*Toxicodendron diversilobum*), arroyo willow (*Salix lasiolepis*), and sitka willow (*S. sitchensis*). Other common species include elk clover (*Aralia californica*), lady fern (*Athyrium filix-femina* var. *cylosorum*), Boykinia (*Boykinia occidentalis*), torrent sedge (*Carex nudata*), Durango root (*Datisca glomerata*), giant horsetail (*E. telmateia* subsp. *braunii*), leopard lily (*Lilium pardalinum*), western sweet coltsfoot (*Petasites fridgidus* var. *palmatus*), and chain fern (*Woodwardia fimbriata*).

Springs and Seeps

Seeps associated with roadsides, upland springs, and gullies include a variety of ferns including five-finger fern (*Adiantum aleuticum*), lady fern (*Athyrium felix-femina* var. *cyclosorum*), deer fern (*Struthiopteris spicant*), bracken fern (*Pteridium aquilinum* var. *pubescens*), giant chain fern (*Woodwardia fimbriata*), and giant horsetail (*Equisetum telmateia* subsp. *braunii*); common herbaceous perennial species include elk clover (*Aralia californica*), wild ginger (*Asarum caudatum*), selfheal (*Prunella vulgaris* var. *lanceolata*), Bolander's rush (*Juncus bolanderi*), Pacific rush (*J. effusus* var. *pacificus*), spreading rush (*J. patens*), speedwell (*Veronica america*), willow herb (*Epilobium ciliatum*), and slender foot sedge (*Carex leptopoda*). Where water ponds for prolonged periods native Bolander's starwort (*Callitriche heterophylla* var. *bolanderi*) and exotic pennyroyal (*Mentha pulegium*) are common.

Ponds

N39.33349 W123.64805 - A deep excavated pond known as "Dry Lake" occurs at the top of the ridge above the East Branch Little N. Fork Big River. Adjacent to the pond a marshy area supports a dense stand of slough sedge (*Carex obnupta*), inflated sedge (C. *vesicaria)*, panicled bulrush (*Scirpus microcarpus),* lady fern (*Athyrium filix-femina* var. cyclosorum), and coast hedge nettle (*Stachys chamissonis).*

N39.33766, W123.66779 - A terrace pool app. 10x20m near the northwestern corner of the Big River Forest. The vegetation surrounding the pond includes Scouler's willow (*Salix scouleriana*), tan oak (*Notholithocarpus densiflorus*), and Douglas-fir (*Pseudotsuga menziesii*), under a larger redwood (*Sequoia sempervirens*) canopy. The shrub layer is comprised of California huckleberry (*Vaccinium ovatum*), creeping snowberry (*Symphoricarpos mollis*) and salal (*Gaultheria shallon*). Aquatic plants include Bolander's starwort (*Callitriche heterophylla*

var. bolanderi), the aquatic moss, *Fontinalis neomexicana*, and *Rhizomnium glabrescens*, a large-leafed moss of wet shady habitat.

Pond at N39.33766, W123.66779

Roadbeds and Clearings

Portions of main roads, skid trails, and other semi-natural forest openings provide a niche for species ordinarily uncommon underneath dense forest canopy. These areas often have high species diversity, as well as provide important habitat for rare species, such as the rare Monterey clover (*Trifolium trichocalyx*). Such disturbance related areas host a rich variety of both native and exotic herbaceous forbs and grasses. Native grasses include California brome (*Bromus carinatus* var. *carinatus*), Columbia brome (*B. vulgaris*), California oatgrass (*Danthonia californica*), slender hairgrass (*Deschampsia elongata*) and blue wildrye (*Elymus glaucus* subsp. *glaucus*). Exotic grasses include silver European hairgrass (*Aira caryophllea*), little quaking grass (*Briza minor*), soft chess (*Bromus hordeaceus*), sweet vernal grass (*Anthoxanthum ordoratum*), six-weeks fescue (*Festuca bromoides*), and hairy oatgrass (*Rytidosperma penicillatum*).

Common native herbaceous eudicots include modesty (*Whipplea modesta*), redwood sorrel (*Oxalis oregana*), star-flower (*Lysimachia latifolia*), hawkweed (*Hieracium albiflorum*), Douglas iris (*Iris douglasiana*), Spanish lotus (*Acmispon americanus*), deervetch (*A. parviflorus*), smooth hawksbeard (*Crepis capillaris),* little tarweed (*Madia exigua*), coast tarweed (*M. sativa*), self-heal (*Prunella vulgaris* var. *lanceolata*), woodland buttercup (*Ranunculus uncinatus),* small-headed clover (*Trifolium microcephalum*), thimble clover (*T. microdon*), variegated clover (*T. varigatum*), and tomcat clover (*T. willdenovii*). Exotics forbs include star cudweed (*Euchiton sphaericus),* hairy cat's ear (*Hypochaeris radicata*), tansy ragwort (*Senecio jacobaea*), coastal burnweed (*S. minimus*), shamrock clover (*Trifolium dubium*), clustered clover (*T. glomeratum*), nodding glover (*T. cernuum*), rose clover (*T. hirtum*), and subterranean clover (*T. subterraneum).*

Grassland

Small, mostly semi-natural openings of graminoids and forbs occur here and there; one such opening on the Picolotti THP below the main access road 23000 below gate B10 supports a diverse mix of native and exotic grasses including California oat grass, *Danthonia californica*, Mediterranean barley (*Hordeum marinum*), Italian ryegrass (*Festuca perennis*), common velvet grass (*Holcus lanatus*), soft chess (*Bromus hordeaceus*) and rip-gut brome (*B. diandrus*). Native blue wild rye (*Elymus glaucus* spp. *glaucus*) grows at the forest edge. At the toe of slope the grassland transitions into a sedge meadow dominated by native foothill sedge (*Carex tumulicola*).

Salmon Creek Forest

Conifer Forest

The *Sequoia sempervirens* Forest Alliance is the primary vegetation type along with two dominant associations including *Sequoia sempervirens-Notholithocarpus densiflorus* and *Sequoia sempervirens-Pseudotsuga menziesii* (Sawyer et al. 2009). Within most stands all three of the above species are common with occasional grand fir (*Abies grandis*), western hemlock (*Tsuga heterophylla*), Pacific madrone (*Arbutus menziesii*), California bay (*Umbellularia californica*), and wax myrtle (*Morella californica*). Patches of Mendocino pygmy cypress forest (*Hesperocyparis pygmaea*) with associated Bolander's beach pine (*Pinus contorta* subsp. *bolanderi*) occur on uplifted marine terraces south of Albion River Road. These are described more fully in the following rare plant descriptions.

Shrubs and semi-woody plants and ferns: Common mid canopy taxa observed during the surveys include: hazelnut (*Corylus cornuta* subsp. *californica*), salal (*Gaultheria shallon*), Columbia Manzanita (*Arctostaphylos columbiana*), Western raspberry (*Rubus leucodermis),* California blackberry (*R. ursinus*), thimble berry (*R. parviflorus*), California coffeberry (*Frangula californica*), cascara (*F. purshiana*), blue blossom *(Ceanothus thysirflorus),* California rose-bay *(Rhododendron macrophyllum*), California huckleberry *(Vaccinium ovatum),* red huckleberry (*V.*

parvifolium), poison oak *(Toxicodendron diversilobum),* and wood rose *(Rosa gymnocarpa*). Widespread forest understory ferns include sword fern (*Polystichum munitum*) and bracken fern (*Pteridium aquilinum* var. *pubescens*) while others such as giant chain fern (*Woodwardia fimbriata*), deer fern (*Struthiopteris spicant*), lady fern (*Athyrium filix-femina var. cyclosorum),* and five-finger fern (*Adiantum aleuticum*), are more common in and around seeps, gullies, and creek banks.

Herbaceous layer plants: The composition of the herbaceous layer varies with aspect, available light, and litter depth. In fertile soils in more open canopy, modesty *(Whipplea modesta),* hawkweed (*Hieracium albiflorum*), star flower (*Lysimachia latifolia*), honeysuckle (*Lonicera hispidula* var. *vacillans*), Douglas iris (*Iris douglasiana*), California harebell (*Asyneuma prenanthoides*), western trillium (*Trillium ovatum*), trail plant (*Adenocaulon bicolor*), evergreen violet (*Viola sempervirens*), redwood ivy (*Vancouveria planipetala*), yerba buena (*Clinopodium douglasii*) were common. Low light tolerant species in dense canopy included spotted coralroot *(Corallorhiza maculata*), Hooker's fairybell (*Prosartes hookeri*), sweet scented bedstraw (*Galium triflorum*), fetid adders tongue (*Scoliopus bigelovii*), and redwood sorrel (*Oxalis oregana*).

Under semi-open canopies a variety of native grasses and sedges occur that include, western fescue *(F. occidentalis),* sweet vernal grass *(Anthoxanthum occidentale),* Columbia brome *(Bromus vulgaris),* California oat grass (*Danthonia californica*), crinkle-awned fescue (*Festuca subuliflora*), blue wildrye (*Elymus glaucus*), Alaskan oniongrass (*Melica subulata*), Kellogg's bluegrass (*Poa kelloggii*), and slender hairgrass (*Deschampsia elongata*), as well as round-fruit sedge (*Carex globosa*), Harford's sedge (*C. harfordii*) and timber sedge (*C. hendersonii*).

Roadbed and Cleared Landings

The main roads along Big Salmon and Hazel Creeks along with numerous skid trails and other relatively flat clearings create forest openings that provide a niche for species ordinarily uncommon underneath dense forest canopy, and in some cases provide important habitat for rare species as well as wetland plants associated with roadside ditches. Such disturbance related areas host a rich variety of both native and exotic herbaceous forbs and grasses. Native grasses include California brome (*Bromus carinatus* var. *carinatus*), Columbia brome (*B. vulgaris*), California oatgrass (*Danthonia californica*), slender hairgrass (*Deschampsia elongata*) and blue wildrye (*Elymus glaucus* subsp. *glaucus*). Exotic grasses include silver European hairgrass (*Aira caryophllea*), little quaking grass (*Briza minor*), soft chess (*Bromus hordeaceus*), sweet vernal grass (*Anthoxanthum ordoratum*), six-weeks fescue (*Festuca bromoides*), and hairy oatgrass (*Rytidosperma penicillatum*).

Native forbs include Spanish lotus (*Acmispon americanus*), deervetch (*A. parviflorus*), *Crepis vesicaria,* little tarweed (*Madia exigua*), coast tarweed (M. sativa), cudweed (*Pseudognaphalium*

californicum), self-heal (*Prunella vulgaris* var. *lanceolata*), and woodland buttercup (*Ranunculus uncinatus).* Exotics forbs include star cudweed (*Euchiton sphaericus)*, hairy cat's ear (*Hypochaeris radicata*) and coastal burnweed (*Senecio minimus*). A high diversity of clover species occupies roadbeds and clearings. These include both exotics such as nodding glover (*T. cernuum*), shamrock clover (*Trifolium dubium*), clustered clover (*T. glomeratum*), and subterranean clover (*T. subterraneum),* as well as natives such as pinole clover (*T. bifidum*), the rare Santa Cruz clover (*T. buckwestiorum*), small-head clover (*T. microcephalum*), thimble clover (*T. microdon*), variegated clover (*T. varigatum*), and tomcat clover (*T. willdenovii*).

Riparian and Seep Wetland

The largest wetland features found on the Salmon Creek Forest includes the riparian areas along Big Salmon and Hazel Creeks. Additionally, seeps and springs are located within the deep cuts of numerous gullies that descend steep south and east facing slopes. In some places old haul roads have bisected some of these perennial springs keeping the road surface sufficiently wet and thus providing habitat for native wetland species.

Big Salmon Creek is densely shaded by redwood, tanoak, Douglas fir, and grand fir. Red alder (*Alnus rubra*) and willow (*Salix lasiandra, S. sitchensis, S. scouleriana)* are patchy along Big Salmon Creek especially. Other common trees and shrubs include California bay (*Umbellularia californica*), western burning bush (*Euonymus occidentalis),* California wax myrtle (*Morella californica*), hazelnut *(Corylus cornuta* subsp. *californica),* and western azalea *(Rhododendron occidentalis*).

Common ferns and herbaceous species include giant horsetail (*Equisetum telmateia* subsp. *braunii*), sword fern (*Polystichum munitum*), five finger fern (*Adiantum aleuticum*), giant chain fern (*Woodwardia fimbriata*), lady fern (*Athyrium felix-femina*), coltsfoot (*Petasites frigidus* var. *palmatus*), coast boykenia (*Boykenia occidentalis*), wild ginger (*Asarum caudatum*), stream violet (*Viola glabella*), candy flower (*Montia siberica*), lace flower (*Tiarella trifoliata* var. *unifoliata*), slender-foot sedge (*Carex leptopoda*), slough sedge (*C. obnupta*), and panicled bulrush (*Scirpus microcarpus*).

Bryophytes are a conspicuous component of the herbaceous understory along the edges of Big Salmon and Hazel creeks and add to the forest's native plant diversity while providing bank stability. Species occupying the wetter central portions of creek channels and gullies that can tolerate submergence for long periods include the liverworts *Conocephalum conicum* and *Marchantia polymorpha* along with several mosses such as *Porotrichum bigelovii, Fissidens grandifrons,* and *Scleropodium obtusifolium.* Off-channel species, occupying slightly higher terraces on moist ground include mosses such as *Fissidens crispus, Plagiomnium venustum, Rhizomnium glabrascens, Kindbergia oregana, Brachythecium frigidum,* and *Leucolepis acanthoneuron,* as well as the liverworts *Targionia hypophylla* and *Scapania bolanderi*.

CNPS Inventory of Rare and Endangered Plants - Changes from 2008-2018

Since 2008 yearly queries of the California Native Plant Society Inventory of Rare and Endangered Plants are made to determine which rare species are documented within USGS 7.5' minute quads around the state. A current list of potentially occurring rare species for both the Big River and Salmon Creek Forests is provided in App. A. The query incorporates 15 USGS quads that encompass both Big River and Salmon Creek Forests in addition to all adjacent quads. All CRPR (1A – 4) are included in quad based queries in Version 8 of the Inventory, an improvement when CRPR 4 species were only obtainable for county wide queries.

Over the past ten years many important changes have been made regarding the description and status of rare plant species in California. First, Version 8 of the Online Inventory was released in Dec. of 2010. Preparation of environmental documents for review under the California Environmental Quality Act (CEQA) often use the Online Inventory to help determine the potential for resource conflicts, and to develop project-specific lists of rare plants to target during botanical surveys. The Online Inventory is continually updated as the status of rare species changes, thus providing a timely resource for rare plant protection efforts, conservation planning, and management. Bryophytes (mosses, liverworts, and hornworts) and lichens are now included in the Inventory.

CNPS initially created five California Rare Plant Ranks (CRPR), formally "CNPS Lists", in an effort to categorize degrees of concern; however, in order to better define and categorize rarity in California's flora, the CNPS Rare Plant Program and Rare Plant Program Committee developed the new California Rare Plant Ranks (CRPR) 2A and CRPR 2B.

- CRPR 2A: Plants Presumed Extirpated in California, But Common Elsewhere

- CRPR 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere

Lastly, the 2nd edition of the Jepson Manual: Vascular Plants of California (Baldwin et al. 2012) was released reflecting significant taxonomic revisions and changes to nomenclature. These have been applied throughout the body of this report and to the species lists that follow.

BR and SC taxa that have undergone changes in rarity status since 2008

- White rein orchid (*Piperia candida*) has been upgraded from CRPR 4 to CRPR 1B.2.

- Oregon goldthread (*Coptis laciniata*), has been downgraded from CRPR 2B.2 to CRPR 4.2.

- The CNPS Rare Plant Program began including Lichens of Conservation Concern in the CNPS *Inventory* in 2014; subsequently Methuselah's beard lichen (*Usnea longissima*) was assigned to CRPR 4.2.

- The pygmy cypress was changed from (*Cupressus goveniana ssp. pigmaea)* to (*Hesperocyparis pigmaea*). Its CRPR 1B.2 ranking is unchanged.

- The leafy stemmed miterwort (*Mitellastra caulescens)* was changed from CRPR 4.3 to CRPR 4.2. The older name for this taxon was *Mitella caulescens*.

Timber Harvest Plan Review

Botanical surveys within Timber Harvest Plans provide the basis, to a large extent, of our current knowledge of species occurrences and distribution in Big River and Salmon Creek Forests. Table 2 provides a list of THPs from 1996 – 2018 that were consulted for both the 2008 and 2018 Botanical Resource Assessments. Geri Hulse-Stephens reviewed plans as far back as 1996 and several in 1997, 1998, 1999 in her 2008 report. In a conversation with Charles Martin, a CDF forester she learned that full botanical surveys were not required until the California Native Plant Society (CNPS) listings of rare, endangered and threatened species were adopted around 2001 by the California Department of Fish and Game (CDF&G).

Early botanical surveys were often focused on a small group of target species, namely those rare species with the potential to occur in a project area. Current botanical survey guidelines for THPs developed by CDFW and CNPS state that surveys be floristic in nature, that is, all species, rare or otherwise, are to be documented. This insures that a more comprehensive assessment of botanical resources is provided and that rare species beyond their known range are not missed. Floristic surveys are robust and can only be achieved by personnel with a good understanding of the local flora.

The current vascular species lists for Big River (App. B) and Salmon Creek (App. C), as well as a combined list for bryophytes and lichens (App. D) reflect additions and nomenclatural changes since 2008 from botanical surveys largely conducted by Kerry Heise, Geri Hulse-Stephens, and Zoya Akulova between 2008 – 2016, and Kerry Heise, Madison Thomson, and Lauren Fety from 2016 – 2018.

Sensitive Plant Communities

As in 2008, this assessment queried a current list of Sensitive Natural Communities. Similar to Alliance and Association subgroups which are floristically based, Natural Communities are also State and Globally ranked (CDFW 2018). RareFind 5 and Bios data viewer were used to query and examine CNDDB records for Natural Communities within USGS quads for TCF Big River and Salmon Creek parcels which included: Mendocino Pygmy Cypress Forest, Coastal Valley

and Freshwater Marsh, Northern Coastal Marsh, Sphagnum bog, Grand Fir Forest, Coastal Brackish Marsh, and Sphagnum Bog. Bulrush Salt Marsh was added to CNDDB after examining the Picolotti THP botanical survey report. Those Natural Communities considered sensitive (NatureServe ranks of 1-3) and that occurred within the Big River and Salmon Creek boundaries are shown below:

Salmon Creek Forest

Mendocino Pygmy Cypress Forest (G1 S1)

Areas of uplifted marine terraces and associated sandstone. Soils are acidic spodosols of the Blacklock soil series with cemented hardpans that are seasonally flooded (Sawyer et al. 2009). Regionally, stands occur from Pudding Creek to the Navarro River in Mendocino County, and scattered in Sonoma County. In the Salmon Creek Forest patches occur primarily between the Albion River Road and Little Salmon Creek.

Big River Forest

Bolboschoenus maritimus Herbaceous Alliance - Salt marsh bulrush marshes (G4 S3)

N39.30727, W123.65580: An unusual alkali spring/marsh system within the Big River floodplain just below Picolotti Crossing surrounded by redwood forest. The shallow pond is rimmed on the north and east with a dense mat of native salt grass (*Distichlis spicata*) and *Chenopodium chenopodioides,* and on the west and south sides by a monospecific stand of alkali bulrush (*Bolboschoenus maritimus* ssp. *paludosus*) and adjacent patches of slough sedge (*Carex obnupta*) and spikerush (*Eleocharis macrostachya*). Other species include Coville's rush *Juncus Covillei*), Nootka rose (*Rosa nutkana var. nutkana*), Italian ryegrass (*Festuca perennis)* and California meadow barley (*Hordeum brachyantherum* subsp. *californicum*).

Alkali marsh on Big River Forest with *Bolboschoenus maritimus* subsp. *paludosus.* Photo: K. Heise

Coastal and Valley Freshwater Marsh (G3 S2)

N39.29343, W123.67102: East end of the Big River Laguna lies just outside of the Big River Forest boundary below the confluence of Feldman Gulch and Laguna Creek. This unique fen is considered the state's largest floating mat of vegetation and is dominated by sphagnum moss (*Sphagnum* sp.), Labrador tea (*Rhododendron columbianum*), Cusick's sedge (*Carex cusickii*), and broadleaf cattail (*Typha latifolia*) (Leppig et al. 2018). Mapped in CNDDB as Coastal and Valley Freshwater Marsh but could also be described as a sphagnum bog.

Carex obnupta Herbaceous Alliance – Slough sedge swards (G4 S3)

Patches of slough sedge are common throughout Big River Forest where water accumulates in flats, or in low gradients seeps. Two larger, notable stands are presented here:

N39.30273, W123.61821: upper SW fork of Portuguese Gulch with dominant *Carex obnupta.* Other associated species include *C. leptopoda, C. amplifolia, Woodwardia fimbriata, Polystichum munitum, Equisetum telmateia, Athyrium felix-femina, Asarum caudatum, and Oenanthe sarmentosa.*

N39.31094, W123.66064: Slough sedge swards below main road 23000 and main stem Big River, between Peterson and Wheel Gulches. A long, narrow floodplain influenced meadow with slough sedge dominant along with sneezeweed (*Helenium puberulum),* Scouler's willow (*Salix scouleriana*) and redwood around the margins. Photo: K. Heise, 4/22/2010.

Table 2. Timber Harvest Plans either reviewed or surveyed between 1996 and 2018

Salmon Creek					
THP Name	**Map**	**Finds**	**Surveyor(s)**	**Ac**	**Date**
Saghart Gulch	Yes	CABO, HEPI, MICA	Shayne Green		Pre 2008
East Rumbler	Yes	No finds	Shayne Greene		Pre 2008
Pulllman	Yes	No finds	Shayne Greene/J. McIntosh	124	Pre 2008
Mezner	Yes	CABO, MICA, HEPI, CACA	Shayne Greene	166	Pre 2008
Upper Salmon Creek	Yes	CACA, MICA, CABO, VEFI	Shayne Greene/ Jim McIntosh		Pre 2008
Pullman	Yes	No finds	Shayne Greene	407	Pre 2008
Upper Hazel	Yes	COLA	Kerry Heise / Geri Hulse-Stephens		2015
West Hazel	Yes	COLA, PICA, TRBU	Kerry Heise		2017
Big River					
Berry Gulch	Yes	No finds	Shayne Greene	334	Pre 2008
Two Log	Yes	SIMA, CABO, PICA	Shayne Greene		Pre 2008
River Bends	Yes	No finds	M. Richmond/ K. Wear/ J. McIntosh		Pre 2008
Blind Gulch	Yes	CABO	K. Heise/G. Hulse-Stephens		2008
N. of Hwy 20	Yes	CABO	K. Heise/G. Hulse-Stephens		2008
Tunzi	Yes	No finds	K. Heise/G. Hulse-Stephens		2008
Wheel Gulch	Yes	SIMA, CABO	Z. Akulova, G. Hulse-Stephens		2009
Coombs Gulch	Yes	No finds	K. Heise/G. Hulse-Stephens/Z. Akulova		2009-2010
Kidwell	Yes	CABO	K. Heise/G. Hulse-Stephens		2009-2010
Little N. Fork	Yes	CABO, COLA	K. Heise/G. Hulse-Stephens		2010
Picolotii	Yes	CABO	K. Heise/G. Hulse-Stephens		2009-2010
Shaftsky	Yes	No finds	K. Heise/G. Hulse-Stephens		2010
EBLNF	Yes	COLA, CABO	K. Heise/G. Hulse-Stephens		2010-2012
Elephant Seal	Yes	No finds	K. Heise/G. Hulse-Stephens		2011
O	Yes	CABO	K. Heise/G. Hulse-Stephens		2011
Changeling	Yes	COLA	K. Heise/G. Hulse-Stephens, M. Thomson		2013
Docker Hill	Yes	TRBU	K. Heise/G. Hulse-Stephens		2016
Ironing Board	Yes	COLA, PICA	K. Heise/G. Hulse-Stephens		2016
Rabbit Ears	Yes	COLA	K. Heise/G. Hulse-Stephens, M. Thomson		2015-2016
Elf	Yes	CABO, TRTR	K. Heise/L. Fety		2017
Jarvis	Yes	CABO, PICA	K. Heise/L. Fety/M. Thomson		2018

Table 3. Rare taxa at Salmon Creek and Big River Forest. CRPR updated Nov. 2018

Scientific Name	**Common Name**	**CRPR S/G**	**Location and notes**
Calamagrostis bolanderi CABO	Bolander's reed grass	4.2 S4 G4	**Salmon Creek** and **Big River**. Found at many locations around the properties
Campanula californica CACA	Swamp harebell	1B.2 S3 G3	**Salmon Creek**. Bogs and fens, Meadows and seeps North Coast coniferous forest
Carex californica CARCA	California sedge	2B.3 S2 G5	**Salmon Creek.** Understory of Bolander's beach pine and pygmy cypress south of Albion River Road.
Coptis laciniata COLA	Oregon goldthread	4.2 S3 G4	**Salmon Creek** and **Big River** Meadows and seeps, forest stream banks
Hesperocyparis pigmaea HEPI	Pygmy cypress	1B.2 S1 G1	**Salmon Creek**. and **Big River**, Closed-cone forests. (podizol-like soil)
Lilium rubescens LIRU (no cnddb record)	Redwood lily	4.2 S3 G4	**Big River**. Broad leafed upland forests, North Coast coniferous forests, sometimes roadsides.
Mitellastra caulescens MICA	Leafy stemmed mitrewort	4.2 S4 G5	**Salmon Creek**. North Coast coniferous forest, mesic
Pinus contorta subsp. *bolanderi* PICOBO	Bolander's beach pine	1B.2 S2 G5	**Salmon Creek**. Closed cone coniferous forest (podizol-like soil)
Piperia candida PICA	White-flowered rein orchid	1B.2 S3 G3	**Big River** and **Salmon Creek**. Broadleaved upland forest, North Coast coniferous forest.
Pityopus californicus PITCA	California pinefoot	4.2 S4 G4	**Salmon Creek**. North Cost coniferous forests, mesic
Sidalcea malachroides SIMA	Maple-leaved checkerbloom	4.2 S3 G3	**Big River**. Two locations, Broadleafed upland forest
Trifolium buckwestiorum TRBU	Santa Cruz clover	1B.1 S2 G2	**Salmon Creek** and **Big River.** Along road margins at few locations.
Trifolium trichocalyx TRTR	Monterey clover	1B.1 S1 G1	**Big River**. One location above E. Branch Little N. Fork of Big R. Along roadside, n-facing slope, Douglas fir and redwood.
Veratrum fimbriatum VEFI	Fringed false hellebore	4.3 S3 G3	**Salmon Creek.** Riparian areas in low gradient streams, Closed-cone coniferous forests, North Coast coniferous forests
Usnea longissima USLO	Long bearded lichen	4.2 S4 G4	**Salmon Creek** and **Big River,** North Coast coniferous forests

RARE SPECIES OCCURRENCES

Maple-Leafed Checkerbloom (*Sidalcea malachroides)* Malvaceae CRPR 4.2 S3 G3

Known Range

The known range of the maple-leafed checkerbloom is restricted to sites from sea level to 720 m, near the coast, in Del Norte, Humboldt, Mendocino, Monterey, Santa Cruz and Sonoma counties and Oregon. "Threatened by logging and associated road usage, non-native plants, competition, low reproduction, road maintenance and development. Endangered in Oregon (CNPS 2018)." It has only been found in two locations at the western end of Big River Forest (Table 4).

Plant Description

A California endemic, maple-leafed checkerbloom is a perennial plant that grows from a woody base.

Stems: range between 1 to 4.5 feet tall and are bristly throughout.

Leaves: are grape-leaf-like, coarsely toothed with shallow lobes and evenly arranged on the stem.

Inflorescence: is a head-like unit of many flowers that are pistillate, staminate, bisexual or mixed.

Flowers: with petals are white and often tinged purple between 3/8 and 5/8 inches long with a notch in the tip of the petal.

Photo by Kerry Heise

Habitat

Edges of seasonally wet openings such as old log landings and dense thickets along roadsides with mixture of mostly native woody and herbaceous plants. Associated species include coyote brush (*Baccharis pilularis*), poison oak and blue blossom (*Ceanothus thyrsiflorus*), Pacific rush (*Juncus effusus*), spreading rush (*Juncus patens*), giant horsetail (*Equisetum telmateia*), Harford's sedge (*Carex harfordii*), Indian thistle (*Cirsium brevistylum*), Bolander's phacelia (*Phacelia bolanderi*), black-cap raspberry (*Rubus leucodermis*), California blackberry (*Rubus ursinus*), California canary grass (*Phalaris californica*), and Columbia brome (*Bromus vulgaris).*

Recommendations
Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, it will be transferred to a more appropriate rank by CNPS rare plant botanists. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA.

Given this, where possible a minimum buffer of 25 feet should be considered to avoid direct impact. New occurrences of the maple-leafed checkerbloom should be mapped and included into the TCF rare species databases as well as a CNDDB field form submitted.

Oregon goldthread (*Coptis laciniata*) Ranunculaceae CRPR 4.2 S3 G4

Known Range
The known range of Oregon goldthread extends between sea level and 1000 m, on moist riparian areas of the North Coast coniferous forest in Del Norte, Humboldt and Mendocino counties in California extending into Oregon and Washington where occurrences are more common. Distribution records for Mendocino County in the Consortium of California Herbaria indicate collections as far south as the Noyo River. According to Calflora there are 36 literature records for Mendocino County some dating back to 1899 and ranging from the coast to fifteen miles inland and as far south as Point Arena. The Point Arena occurrence is the most southern in its range. Occurrences within TCF parcels are along main branch and North Fork, Big River, as well as an upland site above East Branch N.F. (Table 4). In the Salmon Creek Forest is occurs along Little Salmon Creek and Hazel Creek (Table 5).

Plant Description
Oregon goldthread is an herbaceous perennial that grows from both rhizomes and stolons.
Stems: It reaches a height of approximately 10 inches.
Leaves: Plants have 3 to 8 leaves that grow from the base of the plant and are pinnately divided into three leaflets each of which has three lobes with coarsely toothed margins. The leaves are shiny and somewhat waxy in appearance.
Inflorescence: The flowering stem is shorter than the leaves during flowering, approximately 1/2 to 1 inch tall, and taller than the leaves in fruit.
Flowers: The sepals are up to 3/8 inch long, pale and linear; the petals are slightly shorter with an almost transparent linear petal with a thread-like base.
Fruit: is made up of several dry, papery, many-seeded, stalked pods that radiate horizontally from the terminal axis of the flower.

Habitat

Forms small to dense patches along river and creek corridors, although sometimes on shady N-facing slopes of Douglas-fir and redwood in deep duff on steep, rocky soils. Associated species include sword fern (*Polystichum munitum*), western trillium (*Trillium ovatum*), milk maids (*Cardamine californica*), redwood ivy (*Vancouveria planipetala*), western azalea (*Rhododendron occidentalis*), stream violet (*Viola glabella*), redwood sorrel (*Oxalis oregana*), and the mosses *Kindbergia oregana, Leucolepis ancanthoneuron* and *Porotrichum bigelovii*.

Recommendations

Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, it will be transferred to a more appropriate rank by CNPS rare plant botanists. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA.

This population of Oregon goldthread is part of the southern extension of the known range and thus should be considered locally rare. Locally rare plants are genetically adapted to tolerate conditions outside of the central range of the plant making them stronger and more broadly adapted to change. As a result, they are more likely to persist in the event of climate change and have the likelihood of supplanting less broadly adapted native species in the center of their range. This makes populations on the edge of their range of particular ecological significance (Lepig and White 2006). Observation suggests that it does not require or tolerate a disturbance regime.

Photo by Geri Hulse-Stephens

Given this, where possible a minimum buffer of 25 feet should be considered to avoid direct impact. New occurrences of Oregon goldthread should be mapped and included into the TCF rare species databases as well as a CNDDB field form submitted.

Bolander's reed grass (*Calamagrostis bolanderi)* Poaceae CRPR 4.2 S4 G4

Known Range

The known range of the Bolander's reed grass is restricted to sites from sea level to 500 m, near the coast, in Humboldt, Mendocino and Sonoma counties. It is a California endemic. According to the CNPS on-line inventory (8th edition), it is "Possibly threatened by vehicles, logging, development, and grazing." It is widespread across Big River, apparently less so on Salmon Creek forest.

Photo by Kerry Heise

Plant Description

Bolander's reed grass is a perennial grass that grows from slender rhizomes. The 1-flowered spikelets with long awn attached at lemma base is characteristic of *Calamagrostis*; its rhizomatous habit and open inflorescences are distinctive for *C. bolanderi*. It blooms in late summer to early fall.

Stems are erect reaching a height of 3 to 4.5 feet, generally with 4 nodes. Leaves are flat and nearly smooth with blades 3-10 mm wide, evenly distributed along stems. Inflorescence is a more or less open panicle, 10 to 25 cm long, with spreading branches, the lower ones as much as 8 cm long, all arranged in whorls. Spikelets have smooth glumes, 3-4 mm long, with short stiff hairs on the keels. Lemmas are ± equal to the glumes with short stiff hairs throughout. The anthers are 2/3s the size of the lemma. The awn is attached near the base of the lemma, sometimes abruptly bent and extends beyond the lemma about 2 mm. The hairs at the base of the floret are short (±1 mm) and tufted.

Habitat

Found in a variety of forest settings but mostly under semi-open stands of Douglas-fir, tanoak, redwood with some shade. Often grows along seasonal road margins as well as abandoned skid trails. Common associates include *Bromus vulgaris, Clinopodium douglasii, Galium triflorum, Juncus effusus var. pacificus, Lysimachia latifolia, Oxalis oregana, Polygala californica, Polystichum munitum, Pteridium aquilinum subsp. pubescens, Viola sempervirens,* and *Whipplea modesta.*

Recommendations

Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of

endangerment or rarity of a California Rare Plant Rank 4 plant change, it will be transferred to a more appropriate rank by CNPS rare plant botanists. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA.

It persists primarily in sites that have been thinned or graded suggesting some disturbance is required for establishment. No actions are required except to continue mapping new occurrences of Bolander's reedgrass as they are discovered and submission of CNDDB field forms.

Monterey clover (*Trifolium trichocalyx*) Fabaceae
CRPR 1B.1 FE CE S1 G1

Known Range

Previously unknown beyond the Monterey Peninsula (USFWS 2009) this state and federally listed endangered species has since been documented at 23 sites across the western portion of the Garcia River Forest 28 miles to the south of the Big River occurrence. Significant from both a biogeographic and conservation perspective, these Mendocino County populations extend the range of the species approximately 200 mi (322 km) north of the Monterey Peninsula.

Monterey clover occurs at two locations, within .25 mile of each other, on seasonal Road 21020 which contours along a north facing slope of the upper East Branch Little North Fork Big River watershed. The primary population is situated along 275 feet of road surface area at 702 feet elevation (N39.33518, W123.63643). Another much smaller population occurs a short distance to the east on the outboard margin of the road at 666 feet elevation (N39.33784, W123.63544) a short distance to the east. The area is included in the Elf THP (Table 4).

Photo by Kerry Heise

Description

Monterey clover is an herbaceous annual and is extremely variable in form (Baldwin et al. 2012).

Stems: Plants are prostrate and spreading, often compact and occasionally producing one or two long prostrate stems up to 50cm long that become decumbent when supported by adjacent plants.

Leaves: Plants have cauline leaves with 5-10 mm leaflets that are oblanceolate to obovate. Stipules are toothed or lobed.
Inflorescence: Flowers are arranged in head-like clusters of 1-20 flowers subtended by a small, deeply-cut, irregularly toothed involucre that can be smooth or hairy.
Flowers: Calyces are hairy, 6-7 mm long with lobes generally longer than the tubes. Calyx lobes are bristle-tipped and sometimes slightly forked. Flowers are contained within the calyx or sometimes extend just beyond the tips of the lobes. Corollas are pale pink to lavender.
Fruit: Fruits are cylindrical and 5-7 mm. long containing up to 6 seeds.

Habitat
The area is situated within a shady, mesic redwood and Douglas fir forest. Adjacent and upslope from the primary site is a seasonal seep with Pacific rush (*Juncus effusus)* and giant horsetail (*Equisetum telmateia* ssp. *braunii)*. Associate species on the running surface include two other clovers, little hop clover (*Trifolium dubium)* and white-topped clover (*T. varigatum),* as well as hairy cat's ear (*Hypocharis radicata),* miniature lotus (*Acmispon parviflora)* and *Gnaphalium purpureum*. Monocots include slender hair grass (*Deschampsia elongata),* California brome (*Bromus carinatus),* and common rush (*Juncus patens).* A suite of perennials co-occur with Monterey clover along the edges where cover is less dense. Here, associated perennials and biennials include California blackberry (*Rubus ursinus),* Black-cap raspberry (*Rubus leucodermis),* Douglas iris *(Iris douglasiana),* bull thistle *(Cirsium vulgare),* nut sedge *(Cyperus eragrostis),* and giant horsetail.

Recommendations
Monterey clover is highly resilient to some grading pressure and persists under regular disturbance. It is an extremely variable species in regards to yearly patterns of presence and abundance regardless of the level of disturbance. The following recommendations are developed following information gained from monitoring since 2011.

- Established permanent plot on Big River site should continue to be monitored a minimum of every 3 years.

- New *T. trichocalyx* occurrences should be documented as they are discovered and field forms sent to CNDDB as well as added to the TCF rare plant database.

- No grading restrictions other than following best management practices designed to minimize soil erosion during road maintenance activities.

- Schedules of grading activity should be maintained by TCF on a yearly basis so that more informed decisions can be made regarding optimal grading frequency to maintain population.

Santa Cruz clover (*Trifolium buckwestiorum*) Fabaceae CRPR 1B.1 S2 G2

Known Range

The known range of the *T. buckwestiorum* is restricted to Mendocino, Monterey, Santa Cruz and Sonoma counties showing a disjunct distribution pattern. Although it can dominate sites and become locally abundant in Mendocino County, it's distribution and habitat specificity is very narrow. Findings since the initial discovery in 2005 on the Garcia River Forest indicate it extends from the Buckeye Forest of northern Sonoma County northwards to Big River. It is most abundant and widespread on the Garcia River Forest.

Photo by Kerry Heise

At the northern end of its apparent range on Big River it occurs along the main road (22000) through Docker Hill THP paralleling Big River near the south end; where an estimated 500 – 750 plants occur along 50 meters of roadbed (Table 4). Only one site occurs at Salmon Creek above the road near the confluence of Little Salmon Creek and Hazel Creek consisting of two dense patches with up to 1,600 individuals (Table 5).

Description

Santa Cruz clover is an annual in the Pea Family (*Fabaceae*) that displays several growth habit phases. In more impoverished soils where moisture is limited to brief accumulations following spring storms the plant grows to about 2cm and develops sessile non-involucred heads of 1 or 2 flowers, followed by seed set before desiccation. If moisture availability is extended by cool temperatures, spring rains, or available ground water the plant gradually produces a well-developed involucre with conspicuous tooted lobes that subtend a head of a few to many flowers.

Stems: range from 2cm to more than 20cm. and are decumbent to ascending.
Leaves: occur along the stems and stipules have bristle-tipped teeth. Leaflets are .5 to 1.5 cm, round to elliptic and finely serrate.
Inflorescence: can range from a singular flower without an involucre to a head of flowers, 5 to many, nested in a bowl-shaped involucre that is irregularly toothed and cut.
Flowers: consist of a calyx tube 4-5mm, 10 veined with lobes smaller than the tube. Each lobe has 3 to 5 tiny lateral teeth ending in a 1-1.5 red bristle. The corolla is 6-7mm pale pink or white. *Seed*: 1 (2)

Habitat
At the Big River site, a shady section of roadway with pennyroyal (*Mentha pulegium*), English plantain (*Plantago lanceolatum*), little hop clover (*Trifolium dubium*), clustered clover (*T. glomeratum*), and white-topped clover (*T. variegatum*).

At the Salmon Creek site an opening dominated by exotic grasses adjacent to main road and surrounded by redwood and Douglas fir. Associated species include sweet vernal grass (*Anthoxanthum ordoratum*), velvet grass (*Holcus lanatus*), little hop clover (*Trifolium dubium*), variegated clover (*Trifolium variegatum),* common rush (*Juncus patens*), deervetch (*Acmispon parviflorus*), and hairy cat's ears (*Hypochaeris radicata*).

Recommendations
This is a disturbance adapted species and is very tolerant of grading and vehicular traffic associated with logging activities. In addition, regular grading appears to help distribute seed while reducing competition. In light of these findings we suggest that good road maintenance is beneficial to the long term viability of *T. buckwestiorum*. The following recommendations are provided for *T. buckwestiorum* across all sites on TCF parcels.

- No grading restrictions other than to follow best management practices designed to minimize soil erosion during road maintenance activities.
- New *T. buckwestiorum* occurrences should be documented as they are discovered and field forms sent to CNDDB as well as added to the TCF rare plant database.
- Schedules of grading activity should be maintained by TCF on a yearly basis so that more informed decisions can be made regarding rare plant management.

White-flowered Rein Orchid (*Piperia candida*) Orchidaceae **CRPR 1B.2 S3 G3**

Known Range
The known range of the white-flowered rein orchid in California extends from Santa Cruz and San Mateo counties northward into Sonoma, Mendocino, Humboldt, Trinity, Del Norte and Siskiyou counties. The range continues into Oregon and Washington

Description
P. candida is a perennial herb that reproduces primarily by underground tubers; production of seed is very rare. The white flowers are sparse to numerous, often on one side of the stem. The dorsal sepal has a green mid-vein. The white triangular shaped lip points downward. The spur is relatively short at only 2-3½ mm long. The flowers purportedly have a honey like fragrance. The basal leaves of mature *P. candida* typically emerge early following winter rains and wither by July or August when the plant produces a single flowering stem. Monitoring *P. candida* over the past decade has shown that individuals that flower in one year may not flower the next, and a

portion of the population may be completely dormant in any given year (Heise and Hulse-Stephens 2016).

Habitat

The white rein orchid can be found in coniferous and mixed evergreen forests primarily a short distance inland from the coast east to Hwy 101. At the Big River site several clusters of plants (up to 100 individuals) occur on west-facing slope in dense canopy of Doug fir, redwood, tanoak, and madrone. The understory is relatively open with blue huckleberry (*Vaccinium ovatum*), honeysuckle (*Lonicera hispidula*), sword fern (*Polystichum munitum*), and bracken fern (*Pteridium aquilinum* var. *pubescens*); common herbaceous species include star flower (*Lysimachia latifolia*), sweet scented bedstraw (*Galium triflorum),* yerba de selva (*Whipplea modesta*), spotted coral root (*Corallorhiza maculata*), and western fescue (*Festuca occidentalis).* Although these are typical associates within forest understories, roadside habitat, which is also quite common, can be quite exceptionally barren.

Photo by Kerry Heise

At the Salmon Creek site a single plant was found growing among light leaf litter and small woody debris under a semi-closed stand of redwood and grand fir. Associated species include *Whipplea modesta, Melica subulata, Toxicodendron diversilobum, Iris douglasiana, Sanicula crassicaulis, Vaccinium ovatum,* and a sparse cover of the moss *Kindbergia oregana*.

Recommendations

The distribution of *Piperia candida,* from observations on commercial timber lands in Mendocino County primarily along margins of skid trails and haul roads, suggests some level or pattern of disturbance is important in maintaining optimal habitat conditions. Local habitat conditions include partial to dense shade, thin soils with little to moderately deep leaf litter. Slash and other woody debris appear to limit establishment and success of *P. candida*. Accordingly, the following recommendations are presented:

1) A buffer (no harvest area) of at least 50 feet from all confirmed *P. candida* off-road occurrences should be maintained. All trees must be felled away from the circumscribed buffer. Any tractor work above such occurrences should avoid soil destabilization of the slope, additionally actions that could alter upslope hydrology should be avoided.

2) No grading restrictions for occurrences along permanent haul roads and skid trails, however, such occurrences should remain free of slash, woody debris, and cut logs.

3) New occurrences should be documented and CNDDB field forms submitted.

California sedge (*Carex californica*) Cyperaceae CRPR 2B.3 S2 G5

Known Range

From Outer Coast Ranges, Bay Area northward to Washington state. West of the Cascades in Oregon and Washington; disjunct in Idaho. California is southern end of its range. Although uncommon throughout its range it is not considered rare in Oregon and Washington. In Salmon Creek Forest one occurrence at south end of Albion Ridge, on south side of Albion Ridge road about 0.3 mile southeast of Middle Ridge road (Table 5).

Photo by Steve Matson

Habitat

In pygmy forest, meadows, swamps, and damp road banks in Mendocino County. Associated species include *Hesperocyparis pygmaea, Pinus contorta* subsp. *bolanderi, P. muricata, Sequoia sempervirens, Rhododendron macrophyllum, Vaccinium ovatum, Arctostaphylos nummularia* subsp. *mendocinoensis,* and *Gaultheria shallon.*

Other nearby locations where redwood and Bishop pine co-dominate in the tree layer with large shrub-dominated openings of *Arctostaphylos columbiana, Frangula californica, Gaultheria shallon, Morella californica, Rhododendron columbianum,* and *Vaccinium ovatum.* Herbaceous species include *Calamagrostis bolanderi, Luzula comosa var. elata,* and *Viola sempervirens.*

Description

A group 4 sedge (Stigmas 3; inflorescence bract sheath >= 6 mm) in the Jepson Manual. Plant rhizomatous, glabrous, 15-70cm tall, base of the plant reddish brown; the lower leaves reduced to bladeless sheaths. Inflorescence of spikelets >2, stigmas 3, fruit triangular. Perigynia strongly papillose, the scales reddish brown.

Recommendations

All of the plants constituting California Rare Plant Rank 2B meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA. Throughout its range in California the California sedge occurs primarily in pygmy cypress forest, itself a rare community type that supports other rare plant species such as the swamp harebell and Bolander's reedgrass. 50' buffers are the recommended distance to avoid impacting populations and the habitat they depend on.

Swamp harebell (*Campanula californica*) Campanulaceae CRPR IB.2 S3 G3

Known Range

A California endemic. Close to coast from Pt. Conception northwards to Oregon border. On the Salmon Creek Forest along Navarro Ridge; approx. 0.6 and 0.8 air mile southeast of Ketty Gulch, also pygmy woodland terrace between head of Little Salmon Creek and Big Salmon Creek.

Description

Perennial herb, hairs stiff, recurved, on stem angles, leaf margins, ovary ribs. *Stem*: clambering, 10--30 cm. *Leaf*: 10--20 mm, ovate, thin, crenate, petiole 0 or short. *Flower*: pedicel 1--20 mm; sepals spreading; corolla 8--15 mm, bell-shaped, pale blue, lobes reflexed; stamens 5 mm, base sparsely ciliate; ovary 2--3 mm, hemispheric, style +- 8 mm, white, distal 95% papillate. *Fruit*: spherical, weakly ribbed; pores basal (from Baldwin et al. 2012).

Habitat

Shady, moist to marshy areas, seeps, creek margins, roadside ditches, in redwood, redwood/Douglas fir, or pygmy cypress/Bishop pine forests. CNDDB record notes occurrence in the Salmon Creek Forest on flat marine terrace along with other rare species including *Veratrum fimbriatum* and *Calamagrostis bolanderi.* Forest type: redwood, Douglas-fir, bishop pine, pygmy cypress (not pygmy form) and plants surrounded by non-native grasses. Other sites nearby on moist ground under redwood/Bishop pine forest with *Carex obnupta, Rubus ursinus, Equisetum hymale, Lonicera hispidula, Stachys chamissonis, Struthiopteris spicant, Scirpus microcarpus.*

Recommendations

To ensure impacts such as uprooting and crushing of plants, soil compaction, and changes to local hydrology a 50 ft. buffer around swamp harebell occurrences is recommended. Swamp harebell is an obligate wetland species and thus very sensitive to changes in soil moisture and hydrology. Declines are evident in situations related to soil drying such as along roadsides subject to compaction, grading that has changed hydrology at the site scale, as well as seasonal drying related to periods of drought (Valentine et al. 2016). More directly, slash deposition heavy enough to obstruct light to the herbaceous layer, introduction and proliferation of invasive plants, and herbicide application are expected to have negative impacts (Sholars and Golec 2007). Marine conditions with more summer fog and cooler temperatures may ameliorate potential drying from thinning stands.

Fringed false hellebore (*Veratrum fimbriatum*) CRPR 4.3 S3 G3

Known Range
A California endemic species from coastal California, Sonoma and Mendocino County counties. Pygmy woodland terrace between head of Little Salmon Creek and Big Salmon Creek.

Photo by John Doyen

Description
A tall, coarse, perennial species, with leafy stems and thick rhizomes. *Leaf:* lanceolate; lower 20--50 cm, glabrous or sparsely hairy. *Inflorescence*: generally, 15--50 cm, tomentose; branches spreading; pedicels 6--12 mm. *Flower:* 6--10 mm; perianth parts diamond-shaped to ovate, white, glabrous, deeply fringed, glands 2, elliptic, yellow; stamens +- 1/2 perianth; ovary glabrous. *Fruit*: +- 8 mm, obovoid. *Seed:* +- 6 mm, +- margined (from Baldwin et al. 2012).

Habitat
Wet meadows of Coastal Scrub and North Coast coniferous forest, bogs and fens, meadows and seeps. CNDDB record notes occurrence in the Salmon Creek Forest on flat marine terrace of redwood, Douglas-fir, bishop pine, pygmy cypress, along with other rare species including *Campanula californica* and *Calamagrostis bolanderi.*

Recommendations
Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, it will be transferred to a more appropriate rank by CNPS rare plant botanists. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA.

Given this, where possible a minimum buffer of 25 feet should be considered to avoid direct impact. New occurrences of the fringed false hellebore should be mapped and included into the TCF rare species databases as well as a CNDDB field form submitted.

Pygmy cypress (*Hesperocyparis pygmaea*) Cupressaceae CRPR 1B.2 S1 G1

Known Range
California endemic. Southern North Coast Ranges (Mendocino, Sonoma counties). Distribution Outside California: reported from southwestern Oregon. In scattered areas at western end of Salmon Creek Forest, mostly on flat terraces south of Albion Ridge Road above Big Salmon Creek close to the Pacific Ocean.


Photo by Kerry Heise

Description
Habit: Shrub or tree, 1--2 m on sterile soil, 10--20(50) m on rich soil; with long whip-like ultimate shoot. *Stem:* bark fibrous, gray-brown; ultimate branches 0.9--1.1 mm diam, cylindric. *Leaf:* generally dark dull green, resin 0. *Seed Cone:* 12--27(35) mm, spheric to generally widely elliptic, tan aging gray; scales 6--10. Seed: 2.5--4.7(5.5) mm, not glaucous, dark red-brown to black, shiny or not; attachment scar inconspicuous. Elevation: 50--200(300) m. *Synonyms: Callitropsis pygmaea; Cupressus goveniana* subsp. *pygmaea; Cupressus pygmaea* (Baldwin et al. 2012).

Habitat
Confined to poorly drained, acidic, podzolic soils of uplifted marine terraces, where winter ponding frequently occurs. Here, trees are dwarfed, < 2m tall, and known as the Mendocino pygmy cypress woodland (Sawyer et al. 2009). The alliance intergrades with stands of redwood, Douglas-fir, and grand fir in deeper, richer soils. Pygmy cypress woodland is subdivided into Associations based on co-dominates with Bolander's beach pine (*Pinus contorta* subsp. *bolanderi*), Bishop pine (*P. muricata*), Western Labrador tea (*Rhododendron columbianum),* or *Arctostaphyllos nummularia*. Other associated species within the broader Alliance include *Vaccinium ovatum, Gaultheria shallon, Rhododendron macrophyllum,* and *Xerophyllum tenax.*

Recommendations
This rare species along with the rare vegetation type that supports it (Mendocino pygmy cypress woodland, S1 G1) is of high conservation value. The Alliance is severely fragmented due to residential development, road building, off road vehicles, and indirect impacts from historic logging activities. In addition, past surveys on the Salmon Creek Forest have documented other rare species within the vegetation type (*Carex californica, Calamagrostis bolanderi, Pinus contorta* subsp. *bolanderi*), therefore sufficient buffers around this feature should be established prior to future development plans.

Bolander's beach pine (*Pinus contorta* subsp. *bolanderi*) Pinaceae
CRPR 1B.2 S2 G5

Photo by Dieter Wilken

Known Range

Bioregional Distribution is the North Coast (NCo), specifically Mendocino County. In scattered areas at western end of Salmon Creek Forest, mostly on flat terraces south of Albion Ridge Road above Big Salmon Creek close to the Pacific Ocean.

Description

Stem: mature bark scaly, thin; trunk generally < 2 m tall. *Leaf*: 2 per bundle, 2.5--8.6 cm; sheath persistent. *Seed Cone:* asymmetric, generally not opening, on stem many years; scale tip knobs angled, prickle < 6 mm

Habitat

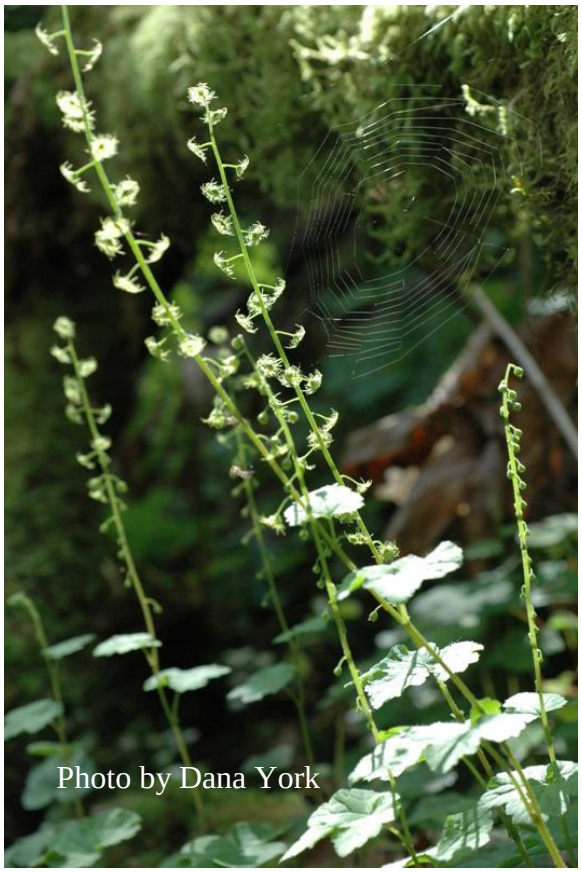
Confined to poorly drained, acidic, podzolic soils of uplifted marine terraces, where winter ponding frequently occurs. At such sites trees are dwarfed and known as the Mendocino pygmy cypress woodland Alliance. Two Associations are described in Sawyer et al. (2009) that include Bolander's beach pine as a sub or co-dominant: *Hesperocyparis pygmaea/Pinus contorta* subsp. *bolanderi/Pinus muricata* and *Hesperocyparis pygmaea/Pinus contorta* subsp. *bolanderi/Rhododendron columbianum.*

Recommendations

Similar to pygmy cypress as the two species occur together. This rare species along with the rare vegetation type that supports it (Mendocino pygmy cypress woodland, S1 G1) is of high conservation value. The Alliance is severely fragmented due to residential development, road building, and indirect impacts from historic logging activities, as well as threatened by off road vehicles. In addition, past surveys on the Salmon Creek Forest have documented other rare species within the vegetation type (*Carex californica, Calamagrostis bolanderi, Hesperocyparis pygmaea),* therefore sufficient buffers around this feature should be established prior to future development plans.

Leafy-stemmed mitrewort (*Mitellastra caulescens*) Saxifragaceae 4.2 S4 G5

Known Range and Habitat
From northwestern California, northwards to British Columbia; Montana. Largely a plant of shady moist mossy streambanks and terraces.



Description
Habit: Plant 1.5--4.5 dm; rhizome scaly; bulblets 0. Leaf: basal and 1--few cauline; petiole glabrous to +- hairy; blade 2--7 cm wide, +- round, lobes 3--7, teeth sharp. *Inflorescence*: blooming from tip to base; pedicel 2-8 mm. *Flower*: hypanthium 2.5--4 mm wide, saucer-shaped, +- fused to ovary; petals yellow-green, lobes 4--7, alternate, linear; stamens 5, alternate petals; filaments >> anthers, +- 2/3 calyx lobes; pistil 1, ovary > 1/2-inferior, chamber 1, placentas 2, parietal, styles 2, +- 0.2 mm, stigmas unlobed, headlike. *Fruit*: capsule, becoming widely dehiscent, forming splash cup. *Seed*: many, red-brown (to black), shiny.

Recommendations
Note: *Mitellastra caulescens* (previously *Mitella caulescens*) is easily mistaken for *Pectiantia ovalis* (previously *Mitella ovalis*) if care is not taken to determine presence of cauline leaves and direction of inflorescence blooming (tip to base in the former; base to tip in the latter).

Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, it will be transferred to a more appropriate rank by CNPS rare plant botanists. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA.

Where possible a minimum buffer of 25 feet should be considered to avoid direct impact. New occurrences of leafy-stemmed mitrewort should be mapped and included into the TCF rare species databases as well as a CNDDB field form submitted. Historic occurrences should be revisited to verify identity.

Redwood Lily (*Lilium rubescens*) Liliaceae CRPR 4.2 S3 G3

Known Range

California endemic. Northwestern California and Bay Area. Reported in Big River Forest, however no CNDDB record and no description of location available.

Description

Habit: Plant < 2 m, often glaucous; bulb +- erect-ovoid, scales unsegmented, longest 4--9 cm. *Leaf*: in 3--9 whorls, generally +- ascending, 3--13 cm, generally oblanceolate; margin generally wavy. *Inflorescence:* flowers 1--40, ascending to erect. *Flower*: funnel-shaped, fragrant; perianth parts 4.2--6.6 cm (inner wider, strongly oblanceolate), recurved in distal 33--50%, adaxially white, turning pink-purple, magenta spots minute, abaxially often +- red or +- purple; stamens held at same level as perianth, filaments +- parallel except distally, anthers 4--8 mm, pale yellow, pollen yellow; pistil 2.7--3.8 cm. *Fruit*: 2--3.7 cm, generally ribbed (Baldwin et al. 2012).

Photo by John Doyen

Habitat

Dry soils in chaparral, gaps in conifer forest, sometimes on serpentine.

Recommendations

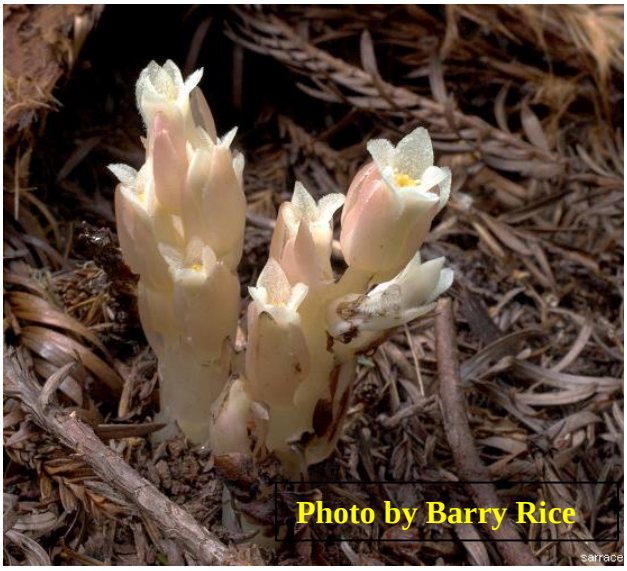
Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, it will be transferred to a more appropriate rank by CNPS rare plant botanists. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA.

Where possible a minimum buffer of 25 feet should be considered to avoid direct impact. New occurrences of redwood lily should be mapped and included into the TCF rare species databases as well as a CNDDB field form submitted.

California pinefoot (*Pityopus californicus*) Ericaceae CRPR 4.2 S4 G4,5

Known Range
Bioregional distribution: NCo, KR, NCoRO, s SNH, CCo, SnFrB; Distribution Outside California: north to Washington. Reported from Salmon Creek Forest but no CNDDB record or location description available.

Description
Pityopus californicus is the smallest of the mycotrophic wildflowers in the Heath family. It ranges in height from 1to 10 centimeters. The entire plant is a pale creamy white. The leaves are crowded and scale-like on the flower stalk (peduncle). The inflorescence is a raceme of 2 to 11 flowers at the tip of the stem. Upon emerging from the ground, the flowers are pendant. As the anthers and stigma mature, the flowers are spreading to all most perpendicular to the stem. In 1950, noted California botanist, J.T. Howell noted that the odor of the mature plants resembled over-ripe Brie cheese and would be attractive to some animals. The fruit is a capsule. As the capsule matures, the flowers become erect. Once ripened, seed is released through slits that open from the tip to the base of the capsules. The plant is not persistent after seed dispersal (from USDA Forest Service).



Habitat:
Mesic mixed upland hardwood forest or conifer forest.

Recommendations
Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, it will be transferred to a more appropriate rank by CNPS rare plant botanists. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA.

Where possible a minimum buffer of 25 feet should be considered to avoid direct impact. New occurrences of California pinefoot should be mapped and included into the TCF rare species databases as well as a CNDDB field form submitted.

Methuselah's beard lichen (*Usnea longissima*) Parmeliaceae CRPR 4.2 S4 G4

Known Range
Northwestern California (Sonoma County northward) to Alaska; Montana, upper Midwest and New England states. Scattered location in the North Coast ranges often along rivers and streams.

Photo by Hayley Ross

Description
A pendant lichen that hangs from tree branches. It is a light yellow-green lichen with a central cord and short branches coming off of the central cord. In all *Usnea* species, the central cord is like an elastic band surrounded by a hard fungal cortex. *Usnea longissima* can be from 6 inches long up to 20 feet long (from USDA Forest Service).

Habitat
Old growth and mature Douglas fir/redwood forest in California, also on hardwoods. One documented site at Big River Forest with *Usnea* on 8 *Pseudotsuga menziesii* trees (Table 4). One site on Salmon Creek (Table 5) on n-facing slope of redwood/Doug-fir, with *Usnea* on *Sequoia. sempervirens, Pseudotsuga menziesii, Abies grandis,* and hardwoods of various size and age classes.

Recommendations
Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, it will be transferred to a more appropriate rank by CNPS rare plant botanists. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA

Usnea longissima is now considered rare in the United States. Reasons for its rarity include pollution and loss of habitat. If possible, individual trees supporting Methuselah beard lichen should be protected. Additional discoveries should be documented and CNDDB records made.

Table 4. Rare plant occurrences on the Big River Forest, The Conservation Fund

SciName	ComName	Latitude	Longitude	THP
Calamagrostis bolanderi	Bolander's reedgrass	N39° 19.823'	W123° 39.167'	Kidwell
Calamagrostis bolanderi	Bolander's reedgrass	N39° 19.907'	W123° 39.166'	Kidwell
Calamagrostis bolanderi	Bolander's reedgrass	N39° 19.590'	W123° 38.399'	Kidwell
Calamagrostis bolanderi	Bolander's reedgrass	N39° 18.936'	W123° 38.636'	Picolotti
Calamagrostis bolanderi	Bolander's reedgrass	N39° 19.111'	W123° 39.338'	Picolotti
Calamagrostis bolanderi	Bolander's reedgrass	N39° 19.503'	W123° 39.916'	Picolotti
Calamagrostis bolanderi	Bolander's reedgrass	N39° 19.365'	W123° 39.350'	Picolotti
Calamagrostis bolanderi	Bolander's reedgrass	N39° 18.964'	W123° 39.281'	Picolotti
Calamagrostis bolanderi	Bolander's reedgrass	N39° 18.832'	W123° 39.175'	Picolotti
Calamagrostis bolanderi	Bolander's reedgrass	N39° 18.932'	W123° 37.602'	O
Calamagrostis bolanderi	Bolander's reedgrass	N39° 18.917'	W123° 37.604'	O
Calamagrostis bolanderi	Bolander's reedgrass	N39° 18.822'	W123° 37.734'	O
Calamagrostis bolanderi	Bolander's reedgrass	N39.33345	W123.64319	Elf
Calamagrostis bolanderi	Bolander's reedgrass	N39.33863	W123.63200	Elf
Calamagrostis bolanderi	Bolander's reedgrass	N39.33817	W123.63152	Elf
Calamagrostis bolanderi	Bolander's reedgrass	N39.34995	W123.60822	Jarvis
Calamagrostis bolanderi	Bolander's reedgrass	N39.34911	W123.60625	Jarvis
Calamagrostis bolanderi	Bolander's reedgrass	N39.34913	W123.60590	Jarvis
Coptis laciniata	Oregon goldthread	N39° 20.557'	W123° 40.294'	Little N. Fork
Coptis laciniata	Oregon goldthread	N39.34247	W123.67150	Little N. Fork
Coptis laciniata	Oregon goldthread	N39.33656	W123.65429	Little N. Fork
Coptis laciniata	Oregon goldthread	N39.34257	W123.67144	Changeling
Coptis laciniata	Oregon goldthread	N39.43373	W123.67295	Changeling
Coptis laciniata	Oregon goldthread	N39.31681	W123.62143	Ironing Board
Coptis laciniata	Oregon goldthread	N39.29369	W123.66854	Feldman Gulch
Hesperocyparis pigmaea	Pygmy cypress	N39.34626	W123.6663	Changeling
Lilium rubescens	Redwood lily	No CNDDB Records		?
Piperia candida	white-flowered rein orchid	N39.31719	W123.61218	Rabbit Ears
Piperia candida	white-flowered rein orchid	N39.31720	W123.61264	Rabbit Ears
Piperia candida	white-flowered rein orchid	N39.31649	W123.61296	Rabbit Ears
Piperia candida	white-flowered rein orchid	N39.31655	W123.61275	Rabbit Ears
Piperia candida	white-flowered rein orchid	N39.31661	W123.61270	Rabbit Ears
Piperia candida	white-flowered rein orchid	N39.31587	W123.61999	Ironing Board
Piperia candida	white-flowered rein orchid	N39.34234	W123.59496	Jarvis
Sidalcea malachroides	maple-leafed checkerbloom	N39° 19’ 02.8”	W123° 40’ 21.2"	Wheel Gulch
Sidalcea malachroides	maple-leafed checkerbloom	N39° 19’ 40.6”	W123° 40’ 28.6"	Wheel Gulch
Trifolium buckwestiorum	Santa Cruz clover	N39.30299	W123.58154	Docker Hill
Trifolium trichocalyx	Monterey clover	N39.33518	W123.63643	Elf
Trifolium trichocalyx	Monterey clover	N39.33784	W123.63544	Elf
Usnea longissima	Methusulah's beard lichen	N39.33230	W123.65257	S. of EBLNF

Table 5. Rare plant occurrences on the Salmon Creek Forest, The Conservation Fund

ScName	ComName	Latitude	Longitude	THP or Location
Calamagrostis bolanderi	Bolander's reedgrass	no cnddb		Mezner
Calamagrostis bolanderi	Bolander's reedgrass	39.19557	123.71041	south of Boyd Hill
Calamagrostis bolanderi	Bolander's reedgrass	39.20341	123.71227	Upper Salmon Cr.
Campanula californica	swamp harebell	39.19557	123.71041	south of Boyd Hill
Campanula californica	swamp harebell	39.20341	123.71227	Upper Salmon Cr.
Campanula californica	swamp harebell	39.20481	123.68481	Ketty Gulch
Campanula californica	swamp harebell	39.19247	123.68222	Navarro Ridge
Carex californica	California sedge	39.20492	123.70763	S. side Albion Ridge Road
Coptis laciniata	Oregon goldthread	39.22493	123.65810	Upper Hazel
Coptis laciniata	Oregon goldthread	39.22491	123.65765	Upper Hazel
Coptis laciniata	Oregon goldthread	39.19148	123.70093	West Hazel
Coptis laciniata	Oregon goldthread	39.19758	123.69662	West Hazel
Coptis laciniata	Oregon goldthread	39.20106	123.68467	West Hazel
Coptis laciniata	Oregon goldthread	39.20386	123.66873	West Hazel
Coptis laciniata	Oregon goldthread	39.20907	123.66768	West Hazel
Coptis laciniata	Oregon goldthread	39.21026	123.66734	West Hazel
Coptis laciniata	Oregon goldthread	39.21300	123.66760	West Hazel
Coptis laciniata	Oregon goldthread	39.22473	123.66302	West Hazel
Hesperocyparis pigmaea	Pygmy cypress	39.20492	123.70763	S. side Albion Ridge Road
Hesperocyparis pigmaea	Pygmy cypress	39.20341	123.71227	Upper Salmon Cr.
Hesperocyparis pigmaea	Pygmy cypress	39.19247	123.68222	Navarro Ridge
Mitellastra caulescens	leafy stemmed mitrewort	39.19279	123.69766	Saghart Gulch
Mitellastra caulescens	leafy stemmed mitrewort	no CNDDB		Mezner
Mitellastra caulescens	leafy stemmed mitrewort	no CNDDB		Upper Salmon Cr.
Pinus contorta subsp*. bolanderi*	Bolander's beach pine	39.20492	123.70763	S. side Albion Ridge Road
Piperia candida	white rein orchid	39.20627	123.66989	West Hazel
Pityopus californicus	California pinefoot	no CNDDB		?
Trifolium buckwestiorum	Santa Cruz clover	39.20627	123.66989	West Hazel
Usnea longissima	Methuseleh's beard lichen	39.19226	123.71829	Navarro Ridge Rd.
Veratrum fimbriatum	fringed false hellebore	39.20341	123.71227	Upper Salmon Cr.

INVASIVE PLANT OCCURENCES AND RECOMMENDATIONS

Between 2008 - 2018 Big River Forest gained 68 additional exotic species for a total of 156 while Salmon Creek Forest gained 23, for a total of 72 exotic species (Table 1). Of these, 23 are listed by California Invasive Plant Council (Cal-IPC), five of which are rated "High": jubata Grass (*Cortaderia jubata*), Scotch Broom (*Cytisus scoparius*), French Broom (*Genista monspessulana*), English Ivy (*Hedera helix*), and Himalayan blackberry (*Rubus ameniacus*), see Table 6 below. "High" Cal-IPC rated species have severe ecological impacts on physical processes, plant and animal communities and vegetation structure. Their biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Table 6. Exotic Plants with Cal-IPC Ratings of the Big River and Salmon Creek Properties. Note: List updated and revised in 2018. * new taxa added since 2008

Scientific name *new to list	Common name	Mixed Hardwood =MH Redwood/Doug-Fir =RD Grassland =G Riparian=R Roadcuts, Cliffs, Outcrops=RC Wet seep=WS S=scrub Road margins, disturbed ground= RM	Rating High=H Moderate =M Limited= L	Property Salmon Creek (SC Big River (BR) *new to site
**Agrostis stolonifera*	Creeping bent	G, WS	L	BR, SC
Anthoxanthum ordoratum	Sweet vernal grass	G, RC	L	SC, BR
Avena barbata	Wild oat	G, RC	M	SC, BR
Brassica rapa	Field mustard	G, RC	L	BR
Briza maxima	Rattlesnakegrass	G, RC	L	SC, BR
Bromus diandrus	Ripgut brome	MH, RD, G, RC	M	BR, *SC
Bromus hordeaceus	Soft brome	G	L	SC, BR
Carduus pycnocephalus	Italian thistle	MN, RD, G, RC, S	M	BR
**Centaurea melitensis*	tocalote	G, RC	M	BR
Cirsium arvense	Canada thistle	RD, R, G,	M	SC, BR
Cirsium vulgare	Bull thistle	R, WS	M	SC, BR
**Conium maculatum*	Poison hemlock	R	M	BR
**Cynosurus echinatus*	Hedgehog dogtail	G, RC, WS	M	SC, BR
Cortadaria jubata	Jubata grass	RD, RC	H	SC, BR
**Cytisus scoparius*	Scotch Broom	RD, RC	H	BR, SC
**Dactylis glomerata*	Orchard grass	WS	L	BR, SC
**Digitalis purpurea*	Foxglove	RD, WS	L	BR, SC
**Dipsacus fullonum*	Common teasel	G, WS	M	BR
**Dipsacus sativus*	Fuller's teasel	G, WS	M	BR
Erodium cicutarium	Redstem filaree	RC, G	L	BR
Festuca arundinacea	Tall fescue	G, *WS, *R	M	*BR, SC

Festuca myuros	Rattail fescue	RC, S	M	BR
**Festuca perennis*	Italian ryegrass	G, WS, R, MH	M	BR, SC
**Foeniculum vulgare*	Fennel	G, RC	M	BR
Genista monspessulana	French broom	MH, G, S	H	SC, BR
**Geranium dissectum*	Cutleaf geranium	G, WS	L	BR, SC
**Hedera helix*	English Ivy	RD, MH	H	BR
Holcus lanatus	velvet grass	G, WS	M	SC, BR
**Hordeum marinum*	Mediterranean barley	G, RC	M	BR
**Hypericum perforatum*	St. John's wort	MH, RD, G, S	L	BR
Hypochaeris glabra	Smooth cat's ear	MH, RC, S	L	BR
Hypochaeris radicata	Rough cat's ear	MH, RC, S	M	SC, BR
**Lythrum hyssopifolium*	Hyssop loosestrife	WS	M	BR, SC
Medicago polymorpha	California bur clover	RC, G	L	BR, *SC
Mentha pulegium	Penny royal	WS	M	SC, BR
Myosotis latifolia	forget-me-not	RD, R	L	BR
Parentucellia viscosa	Yellow glandweed,	G	L	BR
Phalaris aquatica	Harding grass	G	M	SC, BR
Plantago lanceolata	English plantain	RC, G	L	SC, BR
**Polypogon monspeliensis*	Rabbits foot grass	R, WS	L	BR, SC
Ranunculus repens	Creeping buttercup	RD, R	L	BR
**Rubus armeniacus*	Himalayan blackberry	R, WS	H	BR, SC
Rumex acetosella	Sheep sorrel	RD, G, R, WS	M	SC, BR
Rumex crispus	Curly dock	G, WS, R	L	BR, *SC
**Rytidosperma penicillatum*	Hairy oatgrass	G	L	BR, SC
Senecio glomeratus	Cutleaf burnweed	RD, S	M	BR, SC
Senecio jacobaea	Tansy ragwort	G, R	L	SC, BR
Silybum marianum	Blessed milkthistle	G, R	L	BR
**Stipa miliacea*	Smilo grass	R	L	BR
Torilis arvensis	Hedge parsley	MX, RD, RC	M	SC, BR
**Trifolium hirtum*	Rose clover	RM	L	BR, SC
**Verbascum thapsus*	Woolly mullein	G, RC	L	BR
**Vinca major*	periwinkle	R, WS	M	SC

High-these species have severe ecological impacts on physical processes, plant and animal communities and vegetation structure; Their biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate-these species have substantial and apparent but generally not severe_ ecological impacts on physical processes, plant and animal communities, and vegetation structures. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal through establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited- these species are invasive but their ecological impacts area minor on a statewide level or there was not enough information to justify a high score. Their reproductive biology and other attributes result tin low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but the species may be locally persistent and problematic.

The Big River - Salmon Creek Forest Invasive Plant Management Plan (BRSCFIPMP) was prepared by Geri Hulse-Stephens for The Conservation Fund in 2009. It states that the management goal for invasive plants is to reverse the spread of invasive species using mechanical means of control as the preferred method. The introduction and success of invasive species, especially jubata grass and French broom is an important factor influencing herbaceous composition on both the Big River and Salmon Creek Forests. Where adequate light and water combine with disturbed soils, infestations of both jubata grass and French broom have become established especially along open roads and at landings.

According to Blair et al, (2010) the impact of exotic species such and French broom and English ivy in the redwood forest understory is not fully known, but their spread in logging gaps may change hydrology, mycorrhizal composition, and interrupt regeneration of disturbance-dependent native species, possible leading to their extinction. Further, invasion of logging gaps by exotic species and the increase in exotic species richness in gaps of increasing size is likely due to increase in light availability.

French broom (*Genista monspessulana*) Control

French broom has been managed by hand and mechanical removal on portions of the Salmon Creek Forest but some mature and immature plants remain. The use of heavy equipment can cause significant disturbance that will bring about re-sprouting from the seed bank. Prior to timber harvest operations, mature plants should be removed by weed wrench or excavator, soil shaken loose from the roots and plants stacked for burning. Used in conjunction with hand removal of year-old plants an area can be left for one year after disturbance, before plants begin to flower, and returned to the following year for hand removal of all sprouts to reverse any infestation stimulated by soil disturbance.

Jubata grass (*Cortaderia jubata*) Control

Where flowering plants are disturbed the short-lived seed sprouts easily in loose soil. The BRSCFIPMP recommends that areas where flowering plants have been removed follow-up removal should take place within the next two years. Seedlings are easily removed by hand at 2 years of age and follow-up eradication efforts can be conducted accordingly. Plants would be excavated, as much soil shaken loose from them as possible and piled in an opening to decompose where they would not be disturbed. Root wads would be piled separately from slash piles. Some of the most difficult infestations to eliminate have been those where jubata grass was piled amongst slash and pushed down a hill. Excavated jubata grass plants have also been disposed of effectively by piling in deep shade.

BIG RIVER FOREST

The following are notable infestations, however, with the exception of English ivy, both French broom and jubata grass are widespread.

French broom (*Genista monspessulana*)

GEMO 1 - A large stand of French broom occurs along Road 24200, approaching Gate B7.
GEMO 2 - Three small occurrences of Scotch broom were observed on seasonal roads, Road 23885 and road 21100 on north and west-facing aspects at exposed sites.
GEMO 3 – Changeling THP, N39 20.705' W123 39.997'
GEMO 4 - N39 20.793' W123 40.218') Approximately 250 French broom plants about eight feet tall crowded by jubata grass over approximately 20 percent of the stand.
GEMO 5 - N39.31072, W123.58508 Both Scotch and French broom occur along the margins of the main road (#22000) above Two Log confluence for approximately 160 meters. This is a highly disturbed area adjacent to a prior patch of clear cut.
GEMO 6 – Elf THP, N39.34134, W123.62887 Interspersed along the ridge road at the northern boundary of the Elf THP. Densest infestations are at the eastern end of the road

English ivy (*Hedera helix*)

Covering an area of approximately 200 square feet adjacent to Road 21020 at N39 20.253', W123 37.601'

Jubata grass (*Cortaderia jubata*)

COJU 1 - N39 20.596 W123 39.795) A stand of jubata grass that grows on the slope above the road as high as 50 feet and extends along approximately 150 feet of the roadside
COJU 2 - N39.33392˚, W123.62505˚ Along Road 21100 at the north end of Ironing Board THP. The occurrence occupied the road shoulders and occasionally extended both above and below the road. The length of the infestation was approximately 100 meters.

SALMON CREEK FOREST

Jubata Grass (*Cortaderia jubata*)

COJU 1- 75-foot portion of old road where a stand of mature non-flowering plants were observed, located at N39 21.157 W123 64.075, elevation 779 feet.
COJU 2 - located on an approximate 200-foot stretch of unmaintained road and comprised of a stand of mature non-flowering plants, located at
N39 20.995 W123 64.153, elevation 891 feet.
COJU 3 - comprised of mass of mature, non-flowering plants in an area approximately 50 by 75 feet located at N3921.721 W123 65.347 elevation 984 feet.
COJU 4 - comprised of a stand of mid-aged to mature flowering plants, located at
N39 12.803 W 123 38.865.

GEMO 1 - The thick cover of broom covering approximately 30m of roadbed. N39.22575, W123.66708
GEMO 2 - was observed along the ridge top road, spreading in the vicinity of N3920.947 W123 64.465, elevation 976 feet.

Invasive Pathogens (Sudden Oak Death)
Outbreaks of Sudden Oak Death (SOD) caused by the pathogen *Phytopthora ramorum* have killed hundreds of thousands of native oak and tanoak trees in 15 coastal and near coastal counties in California since 1995 when it was first discovered. Intensive efforts to monitor the extent, pathology and control are underway by the California Oak Mortality Task Force and other research institutions. SOD BioBlitz's have been organized for the past several years and have greatly increased our knowledge of the extent and spread of SOD. Up to date materials related to research, treatment and diagnosis, management guidelines, and SOD education are available from the UC Berkeley Forest Pathology and Mycology Lab.
https://nature.berkeley.edu/garbelottowp/

As of 2018 no cure for Sudden Oak Death or other *P. ramorum*-associated diseases has been found, however a number of preventive measures that may protect plants are available (Swiecki 2013). A recent 2016 SOD BioBlitz to the western portion of Mendocino County mapped many infected bay trees just south of the Big River Forest, east of Comptche, although more coastal samples between the Navarro and Little Rivers were negative (SOD BioBlitz 2016).

Over the past few years forestry surveys on the Big River and Salmon Creek Properties have observed substantial tanoak mortality along both Big Salmon Creek and the mainstem of Big River (M. Thomson, Pers. Comm. Nov. 2018). In these situations SOD infected bay trees were present.

A list of regulated hosts and plants associated with Phytopthora ramorum is regularly updated and available on line at www.aphis.usda.gov/ppq/ispm/pramorum.

SOD hosts known to be on the TCF Properties are: (*added since 2008)
Acer macrophyllum, big leaf maple
Adiantum aleuticum, western maidenhair fern
Adiantum jordani, California maidenhair fern
**Aesculus californica*, California buckeye
Arbutus menziesii, madrone
Arctostaphylos manzanita, manzanita
Frangula californica (Rhamnus californica), California coffeeberry
Frangula purshiana (Rhamnus purshiana), cascara
**Heteromeles arbutifolia*, toyon

Lonicera hispidula, California honeysuckle
Maianthemum racemosum (Smilacina racemosa), false Solomon's seal
Notholithocarpus densiflorus, tan oak
Pseudotsuga menziesii var. menziesii and all nursery grown *P. menziesii*, Douglas-fir
**Quercus agrifolia*, coast live oak
**Quercus chrysolepis*, canyon live oak
**Quercus kelloggii*, black oak
**Quercus parvula* var. *shrevei* Shreve oak
Rhododendron macrophyllum, California rose bay
Rhododendron occidentale, western azalea
Rosa gymnocarpa, wood rose
Sequoia sempervirens, coast redwood
Lysimachia latifolia, western starflower
Umbellularia californica, California bay laurel
Vaccinium ovatum, evergreen huckleberry

References

Ackerman, J.D. and R. Morgan. 2002. In Flora of North America. Vol 6. Magnoliophyta: Liliidae: Liliales and Orchidales. Oxford University Press

APHIS. A List of Regulated Hosts and Plants associated with *Phytophthora ramorum.* www.aphis.usda.gov/ppq/ispm/pramorum

Baldwin, B.G., D.H. Goldman, D.J. Keil, R. Patterson, T.J. Rosatti, and D.H. Wilken, editors. 2012. The Jepson manual: vascular plants of California, second edition. University of California Press, Berkeley.

Bassard D.D, Randall, J.M., Hoshovsky, M.C. Invasive Plants of California's Wildlands. The University of California Press. 2000

Blair, B.C., Letourneau, D.K., and S.G. Bothwell. 2010. Disturbance, resources, and exotic plant invasion: gap size effects in a redwood forest. Madrono 57:11-19.

BRSCFIRMP. Big River/Salmon Creek Integrated Resource Management Plan. The Conservation Fund. 2009.

Brodo I.M., S.D. Sharnoff, and S. Sharnoff. 2001. Lichens of North America. Yale University Press.

CNDDB and CDFW. 2018. California Department of Fish and Wildlife and California Natural Diversity Database Changes to the CNDDB Special Vascular Plants, Bryophytes and Lichens List, July 2018.
Sensitive Plants and Animals: http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp
Sensitive Natural Communities:
https://www.wildlife.ca.gov/Data/VegCAMP/Natural-Communities

Cal-IPC. 2018. Plant Profiles for *Cortadaria jubata* and *Cytisus monspessulanus* www.cal-ipc.org

CNPS. California Native Plant Society, Rare Plant Program. 2018. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 16 October 2018].

CNPS (California Native Plant Society). 1996. *Policy on Invasive Exotic Plants.* California Native Plant Society, Sacramento, CA

Coleman, R.A. 1995. The wild orchids of California. Cornell University Press, Ithaca, New York. 201 pp.

Doyle W.T. and R.E. Stotler. 2006. Contributions toward a bryoflora of California III. Keys and Annotated Species Catalogue for Liverworts and Hornworts. Madrono 53: 89-197.

CDFW 2018. *California Natural Diversity Database (CNDDB),* Rare
Find 5, Bios Viewer, California Department of Fish and Wildlife, Sacramento, CA.

Sholars, T. and C. Golec, 2007. Rare Plants of the Redwood Forest and Forest Management Effects. Pp 185 191 In: Standiford, R.B.; Giusti, G.A.; Valachovic, Y.; Zielinkski, W.J., technical coordinators. Proceedings of the Redwood Region Forest Science Symposium. 2004 March 15-17; Rohnert Park, CA. Gen. Tech. Rep. PSW-GTR-194. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture.

Heise, K. and G. Hulse-Stephens. 2016a. Rare Plant Monitoring on the Garcia and Big River Forests, The Conservation Fund, Mendocino County: Santa Cruz clover (*Trifolium buckwestiorum*), Monterey clover (*Trifolium trichocalyx*), and white rein orchid (*Piperia candida*).

Jepson Flora Project (eds.) [2018] *Jepson eFlora*, http://ucjeps.berkeley.edu/IJM.html [accessed July 1, 2018].

Lepig G. and J.W. White. 2006. Conservation of peripheral plant populations in California. Madrono 53: 264-274.

Lepig G., M. van Hattem, and W. Maslach. 2018. North Coast Fens: Biodiversity hotspots of great botanical richness. Pages 14-20, *In* Fremontia Vol. 46 (2). November.

Rasmussen, H.N. 1995. Terrestrial orchids from seed to mycotrophic plant. University Press, Cambridge, Great Britain. 444 pp.

Norris D.H. and J.R. Shevock. 2004. Contributions toward a bryoflora of California: I. A Specimen-Based Catalogue of Mosses. Madrono 51(1): 1-131.

N:\Big_River-Salmon\2006\THPs\River Bends\Wildlife\Botany\RiverBendsText.doc *River Bends THP Preliminary Botanical Assessment 8-17-06* 9

Sawyer, J.O., T. Keeler-Wolf, and J. Evens. 2009. A Manual of California Vegetation. California Native Plant Society. 2nd Edition. Sacramento, CA.

SOD bioblitz. 2016. See: https://nature.berkeley.edu/garbelottowp/?page_id=2942

Swiecki, Tedmund J.; Bernhardt, Elizabeth A. 2013. A reference manual for managing sudden oak death in California. Gen. Tech. Rep. PSW-GTR-242. Albany, CA: U.S. Department of Agriculture, Forest Service, Pacific Southwest Research Station. 129 p.

Valentine, B., T. Nelson, C. Golec, T. Labanca, and S. Martinelli. 2016. The Response of Swamp Harebell (*Campanula californica*) to Timber Harvest: A Case Study. In Proceedings of the Coast Redwood Science Symposium, September 13-15, 2016, Eureka, California.

Appendix A: Query of rare taxa from 15 USGS quads which encompass Salmon Creek and Big River Forest parcels along with adjacent quads.

California Native Plant Society, Rare Plant Program. 2018. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 30 October 2018].

Note: Taxa in bold occur on the Salmon Creek and Big River Forests.

Scientific Name	Common Name	Family	CRPR	GRank	SRank	CESA	FESA	Bloom	Habitat
Abronia umbellata var. breviflora	pink sand-verbena	Nyctaginaceae	1B.1	G4G5T2	S2	None	None	Jun-Oct	Coastal dunes
Agrostis blasdalei	Blasdale's bent grass	Poaceae	1B.2	G2	S2	None	None	May-Jul	Coastal bluff scrub, Coastal dunes, Coastal prairie
Angelica lucida	sea-watch	Apiaceae	4.2	G5	S3	None	None	May-Sep	Coastal bluff scrub, Coastal dunes, Coastal scrub, Marshes and swamps (coastal salt)
Arctostaphylos nummularia ssp. mendocinoensis	pygmy manzanita	Ericaceae	1B.2	G3?T1	S1	None	None	Jan	Closed-cone coniferous forest (acidic sandy clay)
Astragalus agnicidus	Humboldt County milk-vetch	Fabaceae	1B.1	G2	S2	CE	None	Apr-Sep	Broadleafed upland forest, North Coast coniferous forest
Blennosperma nanum var. robustum	Point Reyes blennosperma	Asteraceae	1B.2	G4T2	S2	CR	None	Feb-Apr	Coastal prairie, Coastal scrub
Calamagrostis bolanderi	**Bolander's reed grass**	**Poaceae**	**4.2**	**G4**	**S4**	**None**	**None**	**May-Aug**	**Bogs and fens, Broadleafed upland forest, Closed-cone coniferous forest, Coastal scrub, Meadows and seeps (mesic), Marshes and swamps (freshwater), North Coast coniferous forest**

Calamagrostis crassiglumis	Thurber's reed grass	Poaceae	2B.1	G3Q	S2	None	None	May-Aug	Coastal scrub (mesic), Marshes and swamps (freshwater)
Calystegia purpurata ssp. saxicola	coastal bluff morning-glory	Convolvulaceae	1B.2	G4T2T3	S2S3	None	None	Apr-Sep	Coastal bluff scrub, Coastal dunes, Coastal scrub, North Coast coniferous forest
Campanula californica	**swamp harebell**	**Campanulaceae**	**1B.2**	**G3**	**S3**	**None**	**None**	**Jun-Oct**	**Bogs and fens, Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Marshes and swamps (freshwater), North Coast coniferous forest**
Carex californica	California sedge	Cyperaceae	2B.3	G5	S2	None	None	May-Aug	Bogs and fens, Closed-cone coniferous forest, Coastal prairie, Meadows and seeps, Marshes and swamps (margins)
Carex lenticularis var. limnophila	lagoon sedge	Cyperaceae	2B.2	G5T5	S1	None	None	Jun-Aug	Bogs and fens, Marshes and swamps, North Coast coniferous forest
Carex livida	livid sedge	Cyperaceae	2A	G5	SH	None	None	Jun	Bogs and fens
Carex lyngbyei	Lyngbye's sedge	Cyperaceae	2B.2	G5	S3	None	None	Apr-Aug	Marshes and swamps (brackish or freshwater)
Carex saliniformis	deceiving sedge	Cyperaceae	1B.2	G2	S2	None	None	Jun(Jul)	Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps (coastal salt)
Castilleja ambigua var. ambigua	johnny-nip	Orobanchaceae	4.2	G4T5	S4	None	None	Mar-Aug	Coastal bluff scrub, Coastal prairie, Coastal scrub, Marshes and swamps, Valley and foothill grassland, Vernal pools margins

Castilleja ambigua var. humboldtiensis	Humboldt Bay owl's-clover	Orobanchaceae	1B.2	G4T2	S2	None	None	Apr-Aug	Marshes and swamps (coastal salt)
Castilleja litoralis	Oregon coast paintbrush	Orobanchaceae	2B.2	G3	S3	None	None	Jun-Jul	Coastal bluff scrub, Coastal dunes, Coastal scrub
Castilleja mendocinensis	Mendocino Coast paintbrush	Orobanchaceae	1B.2	G2	S2	None	None	Apr-Aug	Coastal bluff scrub, Closed-cone coniferous forest, Coastal dunes, Coastal prairie, Coastal scrub
Ceanothus gloriosus var. exaltatus	glory brush	Rhamnaceae	4.3	G4T4	S4	None	None	Mar-Jun	Chaparral
Ceanothus gloriosus var. gloriosus	Point Reyes ceanothus	Rhamnaceae	4.3	G4T4	S4	None	None	Mar-May	Coastal bluff scrub, Closed-cone coniferous forest, Coastal dunes, Coastal scrub
Chorizanthe howellii	Howell's spineflower	Polygonaceae	1B.2	G1	S1	CT	FE	May-Jul	Coastal dunes, Coastal prairie, Coastal scrub
Chrysosplenium glechomifolium	Pacific golden saxifrage	Saxifragaceae	4.3	G5	S3	None	None	Feb-Jun	North Coast coniferous forest, Riparian forest
Clarkia amoena ssp. whitneyi	Whitney's farewell-to-spring	Onagraceae	1B.1	G5T1	S1	None	None	Jun-Aug	Coastal bluff scrub, Coastal scrub
Collinsia corymbosa	round-headed Chinese-houses	Plantaginaceae	1B.2	G1	S1	None	None	Apr-Jun	Coastal dunes
Coptis laciniata	**Oregon goldthread**	**Ranunculaceae**	**4.2**	**G4?**	**S3?**	**None**	**None**	**Mar-May**	**Meadows and seeps, North Coast coniferous forest (streambanks)**
Cornus canadensis	bunchberry	Cornaceae	2B.2	G5	S2	None	None	May-Jul	Bogs and fens, Meadows and seeps, North Coast coniferous forest
Cuscuta pacifica var. papillata	Mendocino dodder	Convolvulaceae	1B.2	G5T1	S1	None	None	Jul-Oct	Coastal dunes (interdune depressions)

Cypripedium montanum	mountain lady's-slipper	Orchidaceae	4.2	G4	S4	None	None	Mar-Aug	Broadleafed upland forest, Cismontane woodland, Lower montane coniferous forest, North Coast coniferous forest
Erigeron biolettii	streamside daisy	Asteraceae	3	G3?	S3?	None	None	Jun-Oct	Broadleafed upland forest, Cismontane woodland, North Coast coniferous forest
Erigeron supplex	supple daisy	Asteraceae	1B.2	G2	S2	None	None	May-Jul	Coastal bluff scrub, Coastal prairie
Erysimum concinnum	bluff wallflower	Brassicaceae	1B.2	G3	S2	None	None	Feb-Jul	Coastal bluff scrub, Coastal dunes, Coastal prairie
Erysimum menziesii	Menzies? wallflower	Brassicaceae	1B.1	G1	S1	CE	FE	Mar-Sep	Coastal dunes
Erythronium revolutum	coast fawn lily	Liliaceae	2B.2	G4G5	S3	None	None	Mar-Jul	Bogs and fens, Broadleafed upland forest, North Coast coniferous forest
Fissidens pauperculus	minute pocket moss	Fissidentaceae	1B.2	G3?	S2	None	None		North Coast coniferous forest (damp coastal soil)
Fritillaria roderickii	Roderick's fritillary	Liliaceae	1B.1	G1Q	S1	CE	None	Mar-May	Coastal bluff scrub, Coastal prairie, Valley and foothill grassland
Gilia capitata ssp. pacifica	Pacific gilia	Polemoniaceae	1B.2	G5T3	S2	None	None	Apr-Aug	Coastal bluff scrub, Chaparral (openings), Coastal prairie, Valley and foothill grassland
Gilia millefoliata	dark-eyed gilia	Polemoniaceae	1B.2	G2	S2	None	None	Apr-Jul	Coastal dunes
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	Asteraceae	1B.2	G5T2	S2	None	None	Apr-Nov	Valley and foothill grassland
Hesperevax sparsiflora var. brevifolia	short-leaved evax	Asteraceae	1B.2	G4T3	S2	None	None	Mar-Jun	Coastal bluff scrub (sandy), Coastal dunes, Coastal prairie

Hesperocyparis pygmaea	**pygmy cypress**	**Cupressaceae**	**1B.2**	**G1**	**S1**	**None**	**None**		**Closed-cone coniferous forest (usually podzol-like soil)**
Hesperolinon adenophyllum	glandular western flax	Linaceae	1B.2	G2G3	S2S3	None	None	May-Aug	Chaparral, Cismontane woodland, Valley and foothill grassland
Horkelia marinensis	Point Reyes horkelia	Rosaceae	1B.2	G2	S2	None	None	May-Sep	Coastal dunes, Coastal prairie, Coastal scrub
Hosackia gracilis	harlequin lotus	Fabaceae	4.2	G3G4	S3	None	None	Mar-Jul	Broadleafed upland forest, Coastal bluff scrub, Closed-cone coniferous forest, Cismontane woodland, Coastal prairie, Coastal scrub, Meadows and seeps, Marshes and swamps, North Coast coniferous forest, Valley and foothill grassland
Juncus supiniformis	hair-leaved rush	Juncaceae	2B.2	G5	S1	None	None	Apr-May	Bogs and fens, Marshes and swamps (freshwater)
Kopsiopsis hookeri	small groundcone	Orobanchaceae	2B.3	G4?	S1S2	None	None	Apr-Aug	North Coast coniferous forest
Lasthenia californica ssp. bakeri	Baker's goldfields	Asteraceae	1B.2	G3T1	S1	None	None	Apr-Oct	Closed-cone coniferous forest (openings), Coastal scrub, Meadows and seeps, Marshes and swamps
Lasthenia californica ssp. macrantha	perennial goldfields	Asteraceae	1B.2	G3T2	S2	None	None	Jan-Nov	Coastal bluff scrub, Coastal dunes, Coastal scrub
Lathyrus palustris	marsh pea	Fabaceae	2B.2	G5	S2	None	None	Mar-Aug	Bogs and fens, Coastal prairie, Coastal scrub, Lower montane coniferous forest, Marshes and swamps, North Coast coniferous forest

Lilium maritimum	coast lily	Liliaceae	1B.1	G2	S2	None	None	May-Aug	Broadleafed upland forest, Closed-cone coniferous forest, Coastal prairie, Coastal scrub, Marshes and swamps (freshwater), North Coast coniferous forest
Lilium rubescens	**redwood lily**	**Liliaceae**	**4.2**	**G3**	**S3**	**None**	**None**	**Apr-Aug**	**Broadleafed upland forest, Chaparral, Lower montane coniferous forest, North Coast coniferous forest, Upper montane coniferous forest**
Listera cordata	heart-leaved twayblade	Orchidaceae	4.2	G5	S4	None	None	Feb-Jul	Bogs and fens, Lower montane coniferous forest, North Coast coniferous forest
Lycopodium clavatum	running-pine	Lycopodiaceae	4.1	G5	S3	None	None	Jun-Aug	Lower montane coniferous forest (mesic), Marshes and swamps, North Coast coniferous forest (mesic)
Microseris borealis	northern microseris	Asteraceae	2B.1	G5	S1	None	None	Jun-Sep	Bogs and fens, Lower montane coniferous forest, Meadows and seeps
Mitellastra caulescens	**leafy-stemmed mitrewort**	**Saxifragaceae**	**4.2**	**G5**	**S4**	**None**	**None**	**Apr-Oct**	**Broadleafed upland forest, Lower montane coniferous forest, Meadows and seeps, North Coast coniferous forest**
Packera bolanderi var. bolanderi	seacoast ragwort	Asteraceae	2B.2	G4T4	S2S3	None	None	Apr-Aug	Coastal scrub, North Coast coniferous forest
Phacelia insularis var. continentis	North Coast phacelia	Hydrophyllaceae	1B.2	G2T2	S2	None	None	Mar-May	Coastal bluff scrub, Coastal dunes

Pinus contorta ssp. bolanderi	**Bolander's beach pine**	**Pinaceae**	**1B.2**	**G5T2**	**S2**	**None**	**None**		**Closed-cone coniferous forest (podzol-like soil)**
Piperia candida	**white-flowered rein orchid**	**Orchidaceae**	**1B.2**	**G3**	**S3**	**None**	**None**	**May-Sep**	**Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest**
Pityopus californicus	**California pinefoot**	**Ericaceae**	**4.2**	**G4G5**	**S4**	**None**	**None**	**May-Aug**	**Broadleafed upland forest, Lower montane coniferous forest, North Coast coniferous forest, Upper montane coniferous forest**
Pleuropogon hooverianus	North Coast semaphore grass	Poaceae	1B.1	G2	S2	CT	None	Apr-Jun	Broadleafed upland forest, Meadows and seeps, North Coast coniferous forest
Pleuropogon refractus	nodding semaphore grass	Poaceae	4.2	G4	S4	None	None	Apr-Aug	Lower montane coniferous forest, Meadows and seeps, North Coast coniferous forest, Riparian forest
Puccinellia pumila	dwarf alkali grass	Poaceae	2B.2	G4?	SH	None	None	Jul	Marshes and swamps (coastal salt)
Ramalina thrausta	angel's hair lichen	Ramalinaceae	2B.1	G5	S2?	None	None		North Coast coniferous forest
Rhynchospora alba	white beaked-rush	Cyperaceae	2B.2	G5	S2	None	None	Jun-Aug	Bogs and fens, Meadows and seeps, Marshes and swamps (freshwater)
Sanguisorba officinalis	great burnet	Rosaceae	2B.2	G5?	S2	None	None	Jul-Oct	Bogs and fens, Broadleafed upland forest, Meadows and seeps, Marshes and swamps, North Coast coniferous forest, Riparian forest
Sidalcea calycosa ssp. rhizomata	Point Reyes checkerbloom	Malvaceae	1B.2	G5T2	S2	None	None	Apr-Sep	Marshes and swamps (freshwater, near coast)

Sidalcea malachroides	**maple-leaved checkerbloom**	**Malvaceae**	**4.2**	**G3**	**S3**	**None**	**None**	**Apr-Aug**	**Broadleafed upland forest, Coastal prairie, Coastal scrub, North Coast coniferous forest, Riparian woodland**
Sidalcea malviflora ssp. patula	Siskiyou checkerbloom	Malvaceae	1B.2	G5T2	S2	None	None	May-Aug	Coastal bluff scrub, Coastal prairie, North Coast coniferous forest
Sidalcea malviflora ssp. purpurea	purple-stemmed checkerbloom	Malvaceae	1B.2	G5T1	S1	None	None	May-Jun	Broadleafed upland forest, Coastal prairie
Tiarella trifoliata var. trifoliata	trifoliate laceflower	Saxifragaceae	3.2	G5T5	S2S3	None	None	Jun-Aug	Lower montane coniferous forest, North Coast coniferous forest
Trifolium buckwestiorum	**Santa Cruz clover**	**Fabaceae**	**1B.1**	**G2**	**S2**	**None**	**None**	**Apr-Oct**	**Broadleafed upland forest, Cismontane woodland, Coastal prairie**
Trifolium trichocalyx	**Monterey clover**	**Fabaceae**	**1B.1**	**G1**	**S1**	**CE**	**FE**	**Apr-Jun**	**Closed-cone coniferous forest (sandy, openings, burned areas)**
Triquetrella californica	coastal triquetrella	Pottiaceae	1B.2	G2	S2	None	None		Coastal bluff scrub, Coastal scrub
Usnea longissima	**Methuselah's beard lichen**	**Parmeliaceae**	**4.2**	**G4**	**S4**	**None**	**None**		**Broadleafed upland forest, North Coast coniferous forest**
Veratrum fimbriatum	**fringed false-hellebore**	**Melanthiaceae**	**4.3**	**G3**	**S3**	**None**	**None**	**Jul-Sep**	**Bogs and fens, Coastal scrub, Meadows and seeps, North Coast coniferous forest**
Viburnum ellipticum	oval-leaved viburnum	Adoxaceae	2B.3	G4G5	S3?	None	None	May-Jun	Chaparral, Cismontane woodland, Lower montane coniferous forest
Viola palustris	alpine marsh violet	Violaceae	2B.2	G5	S1S2	None	None	Mar-Aug	Bogs and fens (coastal), Coastal scrub (mesic)

Vascular Plants of the Big River Forest, The Conservation Fund, Mendocino County, CA

Updated: Nov. 20, 2018

Nomenclature and taxonomy follow the Jepson Manual, Higher Plants of California, 2nd ed. 2012 and Jepson Flora Project (eds.) 2018. Jepson eFlora, http://ucjeps.berkeley.edu/eflora/, accessed on Oct. 1, 2018.

Total taxa = 541, Families = 89, Exotics = 158 (29%)

Rare species in Bold

Family	Scientific Name	Common Name	Exotic
LYCOPHYTES - Spike Mosses, Club Mosses, Quillworts			
Selaginellaceae - Spike-Moss family			
	Selaginella wallacei		
FERNS			
Athyriaceae - Lady Fern Family			
	Athyrium filix-femina var. cyclosorum	lady fern	
Azollaceae - Mosquito-fern Family			
	Azolla filiculoides	mosquito fern	
Blechnaceae -Deer Fern Family			
	Struthiopteris spicant (Blechnum s.)	deer fern	
	Woodwardia fimbriata	giant chain fern	
Cystopteridaceae - Fragile Fern Family			
	Cystopteris fragilis	fragile fern	
Dennstaedtiaceae - Bracken Fern Family			
	Pteridium aquilinum var. pubescens	bracken fern	
Dryopteridaceae -Wood Fern Family			
	Dryopteris arguta	wood fern	
	Dryopteris expansa	wood fern	
	Polystichum californicum	California sword fern	
	Polystichum imbricans ssp. imbricans		
	Polystichum munitum	western swordf fern	
Equisetaceae - Horsetail Family			
	Equisetum arvense	common horsetail	
	Equisetum hyemale ssp. affine	common scouring rush	
	Equisetum laevigatum	smooth scouring rush	
	Equisetum telmateia ssp. braunii	giant horsetail	
Polypodiaceae - Polypody Family			
	Polypodium calirhiza	nested polypody	
	Polypodium glycyrrhiza	licorice fern	
	Polypodium scouleri	leather leaf fern	
Pteridaceae - Brake Fern Family			
	Adiantum aleuticum	five-finger fern	
	Adiantum capillus-veneris	Venus' hair fern	

	Adiantum jordanii		
	Pentagramma triangularis ssp. *triangularis*	goldenback fern	
GYMNOSPERMS - Conifers			
Cupressaceae - Cypress Family			
	Cupressus lawsoniana	Port Orford cedar	
	Hesperocyparis macrocarpa	Monterey cypress	x
	Sequoia sempervirens	coast redwood	
Pinaceae - Pine Family			
	Abies grandis	grand fir	
	Pinus radiata	Monterey pine	x
	Pseudotsuga menziesii	Douglas fir	
	Tsuga heterophylla	western hemlock	
Taxaceae - Yew Family			
	Torreya californica	California nut-meg	
MAGNOLIIDS			
Aristolochiaceae - Pipevine Family			
	Asarum caudatum	wild-ginger	
Lauraceae - Laurel Family			
	Umbellularia californica	California bay	
EUDICOTS			
Adoxaceae - Muskroot Family			
	Sambucus nigra subsp. *caerulea (Sambucus mexicana)*	blue elderberry	
	Sambucus racemosa	red elderberry	
Anacardiaceae - Sumac Family			
	Toxicodendron diversilobum	poison oak	
Apiaceae - Carrot Family			
	Conium maculatum	poison hemlock	x
	Daucus carota		x
	Daucus pusillus	rattlesnake weed	
	Foeniculum vulgare	fennel	x
	Heracleum maximum (Heracleum lanatum)	cow parsnip	
	Lomatium macrocarpum		
	Oenanthe sarmentosa		
	Osmorhiza berteroi (O. chilensis)	sweet cicley	
	Perideridia kelloggii	yampah	
	Sanicula bipinnatifida	purple sanicle	
	Sanicula crassicaulis	gamble weed	
	Sanicula laciniata		
	Torilis arvensis	Japanese hedge parsley	x
	Torilis nodosa	knotted hedge parsley	x
	Yabea microcarpa	hedge parsley	
Araliaceae - Ginsing Family			

	Aralia californica	elk clover	
	Hedera helix	English ivy	x*
Asteraceae - Aster Family			
	Achillea millefolium	yarrow	
	Adenocaulon bicolor	trail plant, silver arrow	
	Agoseris grandiflora	grand mountain dandelion	
	Agoseris heterophylla		
	Anisocarpus madioides (Madia madioides)	woodland tarweed	
	Anaphalis margaritacea	pearly everlasting	
	Arnica discoidea		
	Artemisia douglasiana	mugwort	
	Artemisia suksdorfii	coastal mugwort	
	Baccharis glutinosa (B. douglasii)	marsh baccharis	
	Baccharis pilularis	Coyote Brush	
	Bellis perennis		x
	Carduus pycnocephalus	Italian thistle	x*
	Centaurea melitensis	Napa thistle, tocalote	x*
	Chrysanthemum segetum	corn chrysanthemum	x
	Cirsium arvense		x
	Cirsium brevistylum		
	Cirsium occidentale var. venustum	Venus thistle	
	Cirsium vulgare	bull thistle	x
	Crepis capillaris	smooth hawksbeard	x
	Erigeron canadensis (Conyza c.)	horseweed	x
	Erigeron foliosus var. *mendocinus*		
	Eriophyllum lanatum var. achilleoides	common wooly sunflower	
	Euchiton gimnocephalus (Gnaphalium collinum)	creeping cudweed	
	Euchiton sphaericus (Gnaphalium japonicum)		x
	Eurybia radulina (Aster radulinus)	broad-leafed aster	
	Gamochaeta ustulata (Gnaphalium purpureum)	featherweed	
	Helenium puberulum	rosilla, sneezeweed	
	Hemizonella minima (Madia minima)	small tarweed	
	Hieracium albiflorum	Hawkweed	
	Hypochaeris glabra	Smooth Cat's Ear	x
	Hypochaeris radicata	hairy cat's ear	x
	Lactuca saligna	willow lettuce	x
	Lactuca virosa	wild lettuce	x
	Leontodon saxatilis subsp. *saxatilis (L. taraxacoides)*	hairy hawkbit	x
	Leucanthemum vulgare	ox-eye daisy	x
	Logfia filaginoides (Filago californica)	California cottonrose	
	Logfia gallica (Filago gallica)	daggerleaf cottonrose	x
	Madia exigua	litter tarweed	

	Madia gracilis	gumweed, slender tarweed	
	Madia sativa	coast tarweed	
	Matricaria discoidea	pineapple weed	
	Micropus californicus	slender cottonweed	
	Petasites frigidus var. *palmatus*	coltsfoot	
	Pseudognaphalium californicum	California cudweed	
	Pseudognaphalium luteo-album	cudweed	x
	Pseudognaphalium ramosissimum	everlasting	
	Pseudognaphalium stramineum		
	Psilocarphus brevissimus var. brevissimus	dwarf woolly-heads	
	Senecio glomeratus (Erechitites g.)		x
	Senecio jacobaea	tansy ragwort	x
	Senecio minimus (Erechitites m.)	coastal burnweed	x
	Senecio vulgaris	common ragwort	x
	Silybum marianum	milk vetch	x
	Soliva sessilis		x
	Sonchus asper	prickly sow thistle	x
	Sonchus oleraceus	common sow thistle	x
	Symphyotrichum chilense (Aster chilensis)	American aster	
	Taraxacum officionale	California dandelion	x
	Tolpis barbata		x
	Xanthium strumarium	cocklebur	
Berberidaceae - Barberry Family			
	Achlys californica	vanilla leaf	
	Berberis nervosa	barberry	
	Vancouveria planipetala	redwood ivy	
Betulaceae - Birch Family			
	Alnus rhombifolia	white alder	
	Alnus rubra	red alder	
	Corylus cornuta subsp. californica	hazelnut	
Boraginaceae - Borage Family			
	Cryptantha torreyana	Torrey's cryptantha	
	Cynglossum grande	hound's tongue	
	Heliotropium curassavicum	salt heliotrope	
	Hydrophyllum tenuipes	Pacific waterleaf	
	Myosotis discolor	blue scorpion grass	x
	Myosotis latifolia	forget-me-not	
	Nemophila heterophylla		
	Nemophila parviflora		
	Nemophila pedunculata		
	Phacelia bolanderi		
	Plagiobothrys bracteatus		

	Romanzoffia californica		
Brassicaceae- Mustard Family			
	Barbarea orthoceras	winter cress	
	Brassica rapa	field mustard	
	Cardamine californica	milk maids	x
	Cardamine oligosperma		
	Hirschfeldia incana	short-pod mustard	x
	Raphanus raphanistrum	jointed charlock	x
	Rorippa curvisiliqua		
	Turritis glabra (Arabis g.)	tower mustard	
Campanulaceae - Bluebell Family			
	Asyneuma prenanthoides (Campanula p.)	California harebell	
	Heterocodon rariflorum		
Caprifoliaceae - Honeysuckle Family			
	Lonicera hispidula	honeysuckle	
	Symphoricarpos albus var. *laevigatus*	snowberry	
	Symphoricarpos mollis	creeping snowberry	
Caryophyllaceae - Pink Family			
	Cerastium arvense	field chickweed	
	Cerastium fontanum subsp. vulgare	common mouse-eared chickweed	x
	Cerastium glomeratum	mouse-ear chickweed	x
	Moenchia erecta	upright chickweed	x
	Petrorhagia dubia		x
	Polycarpon tretraphyllum	four-leaved allseed	x
	Sagina apetela	dwarf pearl-wort	
	Sagina decumbens subsp. occidentalis	pearlwort	
	Silene gallica	windmill Pink	x
	Silene laciniata subsp. californica	Indian Pink	
	Spergularia rubra	sand-spurrey	x
	Stellaria borealis subsp. sitchana	Sitka willow	
	Stellaria crispa		
	Stellaria longipes subsp. longipes	Goldie's starwort	
	Stellaria media	common chickweed	x
	Stellaria nitens	shining chick-weed	
Celastraceae - Staff Tree Family			
	Euonymus occidentalis var. *occidentalis*	western burning bush	
Chenopodiaceae - Goosefoot Family			
	Chenopodium chenopodioides		x
	Dysphania ambrosioides (Chenopodium a.)	Mexican tea	x
	Dysphania bothrys (Chenopodium b.)	Jerusalem oak	x
	Dysphania chilensis	Chilean worm seed	x

Convolvulaceae - Morning-Glory Family			
	Calystegia purpurata subsp. purpurata		
	Convolvulus arvense	common bindweed	x
Cornaceae - Dogwood Family			
	Cornus nuttallii	mountain dogwood	
	Cornus sericea subsp. *sericea*	western dogwood	
Crassulaceae - Stonecrop Family			
	Crassula connata	sand pygmy-weed	
	Crassula tillaea		
Datiscaceae - Datisca Family			
	Datisca glomerata	Durango Root	
Dipsacaceae - Teasel Family			
	Dipsacus fullonum	Fuller's teasel	x
	Dipsacus sativus	wild teasel	x
Ericaceae - Heath Family			
	Allotropa virgata	sugar stick	
	Arbutus menziesii	madrone	
	Arctostaphylos columbiana	Pacific manzanita	
	Arctostaphylos glandulosa subsp. glandulosa		
	Arctostaphylos manzanita subsp. glaucescens	common manzanita	
	Arctostaphylos manzanita subsp. manzanita	common manzanita	
	Chimaphila menziesii	little prince's pine	
	Chimaphila umbellata	pipsissewa	
	Gaultheria shallon	salal	
	Hemitomes congestum	gnome plant	
	Pyrola picta	white-veined wintergreen	
	Rhododendron macrophyllum	California rosebay	
	Rhododendron occidentale	western azalea	
	Vaccinium ovatum	California huckleberry	
	Vaccinium parvifolium	red huckleberry	
Euphorbiaceae - Spurge Family			
	Croton setigerus (Eremocarpus s.)	turkey mullein	
	Euphorbia crenulata	Chinese cups	x
Fabaceae - Pea Family			
	Acmispon americanus (Lotus purshianus)	Spanish lotus	
	Acmispon brachycarpus (Lotus humistratus)	deervetch	
	Acmispon glaber (Lotus scoparius)	California broom	
	Acmispon parviflorus (Lotus micranthus)	deervetch	
	Cytisus scoparius	Scotch broom	x
	Genista monspessulana	French Broom	x*
	Hosackia rosea (Lotus aboriginus)		
	Lathyrus angulatus		x

	Lathyrus jepsonii var californicus		
	Lathyrus polyphyllus		
	Lathyrus latifolius	perennial sweet pea	x
	Lathyrus sulphureus		
	Lathyrus torreyi		
	Lathyrus vestitus var. vestitus	hillside pea	
	Lotus angustissimus	slender lotus	x
	Lotus corniculatus	birdfoot trefoil	x
	Lotus tenuis		x
	Lupinus arboreus		
	Lupinus bicolor	miniature lupine	
	Lupinus rivularis		
	Medicago polymorpha	California burclover	x
	Melilotus albus	white sweetclover	x
	Trifolium barbigerum var barbigerum		
	Trifolium bifidum var bifidum	pinole clover	
	Trifolium bifidum var decipiens		
	Trifolium buckwestiorum	**Santa Cruz clover**	
	Trifolium campestre	hop cover	x
	Trifolium cernuum		
	Trifolium ciliolatum		
	Trifolium depauperatum	balloon clover	
	Trifolium dubium	little hop clover	x
	Trifolium glomeratum	clustered clover	x
	Trifolium gracilentum	pinpoint clover	
	Trifolium hirtum	rose clover	x
	Trifolium microcephalum	small head clover	
	Trifolium microdon	thimble clover	
	Trifolium oliganthum	few-flowered clover	
	Trifolium repens	white clover	x
	Trifolium striatum		x
	Trifolium subterraneum	subterranean Clover	x
	Trifolium trichocalyx	**Monterey clover**	
	Trifolium varigatum	varigated clover	
	Trifolium willdenovii	tomcat clover	
	Vicia americana	American vetch	
	Vicia gigantea		
	Vicia hirsuta		x
	Vicia lathyroides	spring pea vetch	x
	Vicia sativa ssp nigra	narrow-leaved vetch	x
	Vicia sativa ssp sativa	spring vetch	x
	Vicia tetrasperma		x

Fagaceae - Beech Family			
	Chrysolepis chrysophylla var. chrysophylla	chinquapin	
	Notholithocarpus densiflorus var. densiflorus	tan oak	
	Quercus chrysolepis	canyon live oak	
	Quercus kelloggii	black oak	
Gentianaceae - Gentian Family			
	Cicendia quadrangularis		
	Zeltnera venusta	California centaury	
Geraniaceae - Geranium Family			
	Erodium botrys	broadleaf filaree	x
	Erodium cicutarium	red-stemmed filaree	x
	Geranium dissectum	cut-leaf geranium	x
	Geranium molle	dove-foot geranium	x
Grossulariaceae - Gooseberry Family			
	Ribes menzisii	canyon gooseberry	
	Ribes sanguineum var. glutinosum	red-flowering currant	
Hypericaceae - St. John's Wort Family			
	Hypericum anagalloides	tinker's penny	
	Hypericum perforatum	Klamath weed	x*
Lamiaceae - Mint Family			
	Clinopodium douglasii (Satureja d.)	yerba buena	
	Melissa officinalis	bee balm	
	Mentha arvensis	field mint	x
	Mentha canadensis	American cornmint	
	Mentha pulegium	penny royal	x*
	Prunella vulgaris var. lanceolata	self-heal	
	Prunella vulgaris var. vulgaris		x
	Stachys ajugoides	hedge nettle	
	Stachys rigida subsp. *quercetorum*	hedge nettle	
	Stachys chamissonis	coast hedge nettle	
	Trichostema lanceolatum	vinegar weed	
Linaceae - Flax Family			
	Linum bienne	common flax	x
Lythraceae - Loosestrife Family	Loosestrife Family		
	Lythrum hyssopifolium	loosestrife	x
Malvaceae - Mallow Family			
	Sidalcea malachroides **CRPR 4.2**	**maple-leafed checkerbloom**	**x**
Montiaceae - Montia Family			
	Calandrinia menziesii	red maids	
	Claytonia parviflora subsp. parviflora	streamside spring beauty	

	Claytonia perfoliata subsp. mexicana		
	Claytonia perfoliata subsp. perfoliata	miner's lettuce	
	Claytonia rubra subsp. *rubra*	redstemmed spring beauty	
	Claytonia sibirica	candy flower	
	Montia siberica		
	Montia fontana	water chickweed	
Myricaceae- Wax Mytrle Family			
	Morella californica (Myrica california)	California wax myrtle	
Myrsinaceae - Myrsine Family			
	Lysimachia arvensis (Anagallis arvensis)	scarlet pimpernel	x
	Lysimachia latifolia (Trientalis latifolia)	star flower	
Nymphaeaceae - Waterlily Family			
	Nuphar polysepala (Nuphar lutea subsp. polysepala)	yellow pond lily	
Oleaceae - Olive Family			
	Fraxinus latifolia	Oregon ash	
Onagraceae - Evening Primrose Family			
	Epilobium brachycarpum		
	Epilobium ciliatum ssp. ciliatum	Northern willow herb	
	Epilobium densiflorum		
	Epilobium minutum		
Orobanchaceae - Broomrape Family			
	Parentucellia viscosa		x
	Pedicularis densiflora	Indian warrior	
	Triphysaria pusilla		
	Triphysaria versicolor ssp. versicolor		
Oxalidaceae- Oxalis Family			
	Oxalis oregana	redwood sorrel	
Papaveraceae - Poppy Family			
	Dicentra formosa	bleeding heart	
	Eschscholzia californica	California poppy	
Philadelphaceae - Mock Orange Family			
	Whipplea modesta	yerba de selva, modesty	
Phrymaceae - Lopseed Family			
	Mimulus aurantiacus	sticky monkey-flower	
	Mimulus cardinalis	scarlet monkey flower	
	Mimulus guttatus	common monkeyflower	
	Mimulus moschatus	musk monkeyflower	
	Mimulus pilosus	false monkeyflower	
Plantaginaceae - Plantain Family			
	Callitriche heterophylla var. bolanderi	Bolander's Water-Starwort	
	Callitriche marginata		
	Digitalis purpurea	foxglove	x

	Gratiola ebracteata	bractless hedge-hyssop	
	Plantago lanceolata	English plantain	x
	Plantago major	common plantain	x
	Plantago subnuda	naked plantain	
	Synthyris reniformis	snow queen	
	Veronica americana	American brooklime	
	Veronica anagallis-aquatica	water speedwell	x
	Veronica arvensis	common speedwell	x
	Veronica peregrina ssp. xalapensis	purslane speedwell	
	Veronica persica	Persian speedwell	x
	Veronica scutellata	marsh speedwell	
Polemoniaceae - Phlox Family			
	Collomia heterophylla	varied-leaf collomia	
	Leptosiphon bicolor (Linanthus b.)	bicolored linanthus	
	Navarretia squarrosa	skunkweed	
Polygalaceae - Milkwort Family			
	Polygala californica	California milkwort	
Polygonaceae - Buckwheat Family			
	Persicaria amphibia (Polygonum amphibium var. emersum)	water smartweed	
	Persicaria hydropiper (Polygonum hydropiper)	waterpepper	x
	Persicaria hydropiperoides (Polygonum hydropiperoides)	small false waterpepper	
	Persicaria lapathifolia (Polygonum lapathifolium)	willow weed	
	Persicaria punctata (Polygonum punctatum)	water smartweed	
	Polygonum aviculare subsp. *depressum*	common smartweed	x
	Rumex acetosella	sheep sorrel	x
	Rumex conglomeratus	clustered dock	x
	Rumex crispus	curly dock	x
	Rumex obtusifolius	bitter dock	x
	Rumex transitorius (R. salicifolius)	willow dock	
Ranunculaceae - Buttercup Family			
	Actaea rubra	red baneberry	
	Anemone deltoidia	windflower	
	Aquilegia formosa	columbine	
	Coptis laciniata	**goldthreads**	
	Delphinium nudicaule	red larkspur	
	Ranunculus californicus	California buttercup	
	Ranunculus hebecarpus		
	Ranunculus occidentalis	western buttercup	
	Ranunculus parviflorus		x
	Ranunculus repens	creeping buttercup	x
	Ranunculus uncinatus	woodland buttercup	
Resedaceae - Mignonette Family			

	Reseda luteola	Dyer's rocket	x
Rhamnaceae - Buckthorn Family			
	Ceanothus foliosus var. foliosus		
	Ceanothus thyrsiflorus		
	Ceanothus velutinus	tobacco brush	
	Frangula californica (Rhamnus californica)	California coffeeberry	
	Frangula purshiana (Rhamnus purshiana)	cascara	
Rosaceae - Rose Family			
	Aphanes occidentalis	western ladies mantle	
	Cotoneaster pannosa		x
	Drymocallis glandulosa var. glandulosa (Potentilla g.)	sticky cinquefoil	
	Fragaria vesca	woodstrawberry	
	Heteromeles arbutifolia	toyon	
	Holodiscus discolor	ocean spray	
	Horkelia californica var. *californica*		
	Horkelia californica var. *elata*		
	Malus pumila	apple	x
	Prunus domesticum	plum	x
	Pyrus communis	common pear	x
	Rosa gymnocarpa	wood rose	
	Rubus armeniacus (R. discolor)	Himalayan blackberry	x
	Rubus leucodermis	western raspberry	
	Rubus parviflorus	thimbleberry	
	Rubus ursinus	California blackberry	
Rubiaceae - Madder Family			
	Galium aparine	goose grass	x
	Galium californicum ssp. californicum	California bedstraw	
	Galium muricatum	Humboldt bedstraw	
	Galium parisiense	wall bedstraw	x
	Galium porrigens var. porrigens	climbing bedstraw	
	Galium triflorum	sweet-scented bedstraw	
	Sherardia arvensis	field madder	x
Salicaceae - Willow Family			
	Salix exigua var. hindsii	narrow-leaf willow	
	Salix laevigata	red willow	
	Salix lasiolepis	arroyo willow	
	Salix lasiandra	Pacific willow	
	Salix scouleriana	Scouler's willow	
	Salix sitchensis	Sitka willow	
Sapindaceae - Soapberry Family			
	Acer macrophyllum	big leaf maple	
	Aesculus californica	California buckeye	

Saxifragaceae - Saxifrage Family			
	Boykinia occidentalis		
	Heuchera micrantha	alum root	
	Pectiantia ovalis = Mitella ovalis	Bishop's cup	
	Saxifraga mertensiana	Merten's saxifrage	
	Tellima grandiflora	fringe cups	
	Tiarella trifoliata var. unifoliata	lace flower	
Scrophulariaceae - Figwort Family			
	Scrophularia californica	California figwort	
	Verbascum thapsus	woolly mullein	x
Solanaceae - Nightshade Family			
	Solanum americanum		
Urticaceae - Nettle Family			
	Urtica dioica subsp. gracilis	American stinging nettle	
Verbenaceae - Vervain Family			
	Verbena lasiostachys var. lasiostachys		
Violaceae - Violet Family			
	Viola glabella	stream violet	
	Viola ocellata	western heart's ease	
	Viola sempervirens	evergreen violet	
MONOCOTS			
Agavaceae - Century Plant Family			
	Chlorogalum pomeridianum	soaproot	
Alismataceae – Water Plantain Family			
	Alisma trivale (A. plantago-aquatica)	water plantain	
Alliaceae - Onion Family			
	Allium neopolitanum	Naple's garlic	x
	Allium unifolium		
Araceae - Arum Family			
	Lemna minuta		
	Lemna minor	duckweed	
Cyperaceae - Sedge Family			
	Bolboschoenus maritimus subsp. *paludosus*		
	Carex amplifolia	big-leaf sedge	
	Carex bolanderi	Bolander's sedge	
	Carex echinata subsp. *phyllomanica*	star sedge	
	Carex exsiccata (C. vesicaria var. major)	inflated sedge	
	Carex globosa	round-fruited sedge	
	Carex gynodynama	wonder-woman sedge	
	Carex harfordii	Harford's sedge	
	Carex hendersonii	timber sedge	
	Carex leptopoda	slender-foot sedge	

	Carex nudata	torrent sedge	
	Carex obnupta	slough sedge	
	Carex subfusca	rusty brome sedge	
	Carex tumulicola	foothill sedge	
	Carex vesicaria	inflated sedge	
	Cyperus eragrostis	nutsedge	
	Eleocharis macrostachya	spikerush	
	Isolepis carinata (Scirpus koilolepis)		
	Scirpus microcarpus	panicled bulrush	
Iridaceae - Iris Family			
	Iris douglasiana	Douglas Iris	
	Sisyrinchium bellum	blue-eyed grass	
Juncaceae - Rush Family			
	Juncus articulatus	jointed rush	
	Juncus bolanderi	Bolander's rush	
	Juncus bufonius var. bufonius	toad rush	
	Juncus bufonius var. occidentalis	dwarf toad rush	
	Juncus capitatus	dwarf rush	x
	Juncus covillei	Coville's rush	
	Juncus dubius	mariposa rush	
	Juncus effusus var. pacificus	Pacific rush	
	Juncus ensifolius	dagger rush	
	Juncus occidentalis	western rush	
	Juncus patens	common rush	
	Juncus phaeocephalus	brown-headed rush	
	Juncus tenuis	slender rush	
	Juncus xiphioides	iris leaved rush	
	Luzula comosa	wood rush	
	Luzula parviflora subsp. *parviflora*	woodrush	
Liliaceae - Lily Family			
	Calochortus tolmei	pussy ears	
	Clintonia andrewsiana	clintonia	
	Fritillaria affinis	checker lily	
	Lilium pardalinum	leopard lily	
	Lilium rubescens **CRPR 4.2**	**redwood lily**	
	Prosartes hookeri (Disporum hookeri)	Hooker's fairybell	
	Prosartes smithii (Disporum smithii)	Smith's fairybell	
	Scoliopus bigelovii	fetid adders tongue	
Melanthiaceae - False-Hellebore Family			
	Toxicoscordion fremontii (Zigadenus fremontii)	death camus	
	Trillium ovatum	western trillium	
	Xerophyllum tenax	bear-grass	

Orchidaceae - Orchid family			
	Calypso bulbosa	calypso orchid	
	Cephalanthera austiniae	phantom orchid	
	Corallorhiza maculata	spotted coralroot	
	Corallorhiza mertensiana	western coralroot	
	Corallorhiza striata	striped coralroot	
	Epipactis gigantea	streamside orchid	
	Goodyera oblongifolia	rattlesnake-plantain	
	Piperia candida	**white rein orchid**	
	Piperia elongata	wood rein orchid	
	Piperia transversa	flat spurred piperia	
Poaceae - Grass Family			
	Agrostis exarata		
	Agrostis gigantea	redtop	x
	Agrostis pallens	dune bent grass	
	Agrostis stolonifera	redtop	x*
	Aira caryophyllea	silver European hairgrass	x
	Aira praecox		x
	Alopecurus pratensis	meadow foxtail	x
	Anthoxanthum aristatum	annual vernal grass	x
	Anthoxanthum occidentale (Hierochloe occidentalis)	sweet grass	
	Anthoxanthum ordoratum	sweet vernal grass	x
	Avena barbata	slender wild oat	x
	Avena fatua	wild oats	x
	Briza maxima	big quaking grass	x
	Briza minor	little quaking grass	x
	Bromus arenarius	Australian chess	x
	Bromus carinatus var. carinatus	California brome	
	Bromus diandrus	ripgut brome	x
	Bromus hordeaceus	soft chess	x
	Bromus laevipes	woodland brome	
	Bromus sterilis	poverty brome	x
	Bromus tectorum	cheatgrass brome	x
	Bromus vulgaris		
	Calamagrostis bolanderi	**Bolander's Reedgrass**	
	Calamagrostis rubescens	pine grass	
	Cortaderia jubata	Jubata Grass	x*
	Cynodon dactylon	Bermuda grass	x
	Cynosurus cristatus	crested dogtail	x
	Cynosurus echinatus	hedgehog dogtail	x
	Dactylis glomerata	orchard grass	x
	Danthonia californica	California oatgrass	

	Deschampsia danthonioides	annual hairgrass	
	Deschampsia elongata	slender hairgrass	
	Distichlis spicata	salt grass	
	Echinochloa crus-galli	barnyard grass	x
	Elymus glaucus ssp. glaucus	blue wildrye	
	Elymus triticoides	beardless wildrye	
	Festuca arundinacea	tall Fescue	x
	Festuca bromoides	brome fescue	x
	Festuca californica	California Fescue	
	Festuca elmeri	Elmer's fescue	
	Festuca microstachys		
	Festuca myuros	sixs weeks rattail fescue	x
	Festuca occidentalis	western fescue	
	Festuca perennis (Lolium multiflorum, L. perenne)	Italian ryegrass	x
	Festuca rubra	red Fescue	
	Festuca subulata		
	Festuca subuliflora		
	Gastridium phleoides (G. ventricosum)	nit grass	x
	Glyceria elata	fowl mannagrass	
	Glyceria xoccidentalis	western mannagrass	
	Holcus lanatus	common velvet grass	x
	Hordeum brachyantherum ssp. brachyantherum	meadow barley	
	Hordeum jubatum subsp. jubatum	foxtail barley	x
	Hordeum marinum ssp. gussoneanum	Mediterranean barley	x
	Hordeum vulgare		x
	Melica harfordii		
	Melica subulata	Alaskan Oniongrass	
	Melica torreyana	Torrey's melic	
	Muhlenbergia mexicana	Mexican muhly	
	Paspalum dilatatum	dallis grass	x
	Phalaris aquatica	harding grass	x
	Phalaris californica	California canary grass	
	Poa annua	annual bluegrass	x
	Poa kellogii	Kellogg’s bluegrass	
	Poa nemoralis	wood bluegrass	x
	Poa pratensis	Kentucky bluegrass	x
	Poa secunda ssp. secunda	One-sided bluegrass	
	Poa trivialis	rough bluegrass	x
	Polypogon australis	Chilean beardgrass	x
	Polypogon interruptus	ditch beard grass	x
	Polypogon monspeliensis	annual beard grass	x
	Rytidosperma penicillatum (Danthonia pilosa)	hairy oatgrass	x

	Setaria viridis	setaria	x
	Stipa miliacea (Piptatherum miliaceum)	smilo grass	x
	Torreyochloa pallida var. paciflora	pale false mannagrass	
	Trisetum canescens	smooth trisetum	
Potamogetonaceae - Pondweed Family			
	Potamogeton natans	floating-leaved pond weed	
Ruscaceae - Buthcher's-Broom Family			
	Maianthemum racemosum (Smilacina racemosa)	branched false solomon's seal	
	Maianthemum stellatum (Smilacina stellata)	star false solomon's seal	
Themidaceae - Brodiaea Family			
	Brodiaea elegans subsp. elegans	harvest brodiaea	
	Dichelostemma capitatum ssp.capitatum	blue dicks	
	Dichelostemma ida-maia	fire cracker flower	
	Triteleia laxa	Ithuriel's spear	
Typhaceae - Cattail Family			
	Sparganium emersum	bur-reed	
	Typha latifolia	broad-leaf cattail	

Survey Dates (Since 2008) Note: in 2008 KLH and GHS surveyed N. Hwy 20, Blind Gulch, and Tunzi THPs.
GHS, Z. Akulova-Barlow (ZAB) 4/13, 4/13, 5/20, 5/29, 6/15, 6/16, 2009
(Wheel Gulch THP). GHS, ZAB 4/30, 5/20, 7/17, 2009. KLH, GHS 5/13, 6/21, 7/1, 2010 (Coombs Gulch THP). GHS, ZAB 7/1, 8/8, 8/13, 8/18, 2009. KLH, GHS 4/28, 5/20, 6/15, 2010 (Kidwell THP). KLH, GHS 5/18, 5/21, 7/23, 2010 (Little NF THP). GHS, ZAB 8/14, 8/18, 2009. GHS, ZAB, 8/14, 8/18, 2009. KLH, GHS 4/22, 4/27, 5/20, 5/21, 6/14, 6/15, 2010 (Picolotii THP). KLH, GHS, 5/13, 6/22, 6/24, 2010 (Shaftsky THP). KLH and GHS 4/22, 4/27, 4/28, 5/18. 5/20, 5/21, 6/14, 6/15, 7/23, 8/8, 8/13. 8/14, 8/18, 2010; 4/14, 5/27,6/6, 6/17, 2011; 4/20, 5/22, 6/7, 2012 (EBLNF THP) KLH and GHS 4/28/4/29. 5/2, 5/4, 5/5, 5/12 6/17, 6/29, 6/30, 7/11, 8/9, 8/17, 2011 (Elephant Seal and O THPs). KLH and GHS 4/23, 4/25, 5/21, 7/30, 2013 (Changeling THP). KLH and GHS 5/5, 5/6, 5/17, 5/27, 6/17, 6/21, 7/13, 7/15, 2016 (Docker Hill and Ironing Board THPs). KLH and GHS 5/4, 5/5, 5/12, 6/17, 6/29, 6/30, 2011; 4/25, 6/26, 6/27, 2012; 7/15, 8/18, 9/2, 9/3, 2015; 3/15, 3/29, 5/27, 6/17, 2016 (Rabbit Ears). KLH 4/9, 4/21, 5/1, 5/11, 5/26, 6/8, 7/12. 2017 (Rabbit Ears Amend.) KLH 4/15, 5/1, 5/8, 5/26, 6/6, 7/12, 8/15, 9/21, 2017 (Elf THP). KLH 5/9, 5/10, 5/30, 6/13, 2018 (Jarvis THP).

Appendix C: Vascular Plants of the Salmon Creek Forest, TCF, Mendocino County, CA

Nomenclature and taxonomy follow the Jepson Manual, Higher Plants of California, 2nd ed. 2012 and **Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/eflora/ accessed 10/8/2018.**

Zika, P., Wilson, B., and J. Kirschner. 2015. The Luzula comosa complex (Luzula Sect. Luzula, Juncaceae) in western N. America. Phylotaxa 192 (4): 201-229.

Surveys between 2008-2018 conducted by Kerry Heise and Geri Hulse-Stephens

Survey dates since 2008: March 12, 27, May 21, July 2 of 2015 (K. Heise and G. Hulse-Stephens); April 14, 20, May 5, 4, June 1, July 14, Aug 15, of 2017 (K. Heise)

Rare plants in bold

Total taxa = 289; Families = 70; Exotics = 72 (25%)

Family	*Scientific Name*	Common Name	Exotic
FERNS			
Athyriaceae - *Lady Fern Family*			
	Athyrium filix-femina	lady fern	
Blechnaceae -Deer Fern Family			
	Struthiopteris spicant (Blechnum s.)	deer fern	
	Woodwardia fimbriata	giant chain fern	
Dennstaedtiaceae - Bracken Fern Family			
	Pteridium aquilinum var. pubescens	bracken fern	
Dryopteridaceae -Wood Fern Family			
	Dryopteris expansa	wood fern	
	Polystichum munitum	western sword fern	
Equisetaceae - Horsetail Family			
	Equisetum hymale subsp. *affine*	common scouring rush	
	Equisetum telmateia subsp. *braunii*	giant horsetail	
Pteridaceae - Brake Fern Family			
	Adiantum aleuticum	five-finger fern	
	Pentagramma triangularis subsp. *triangularis*	goldenback fern	
Polypodiaceae - Polypody Family			
	Polypodium glycyrrhiza	licorice fern	
GYMNOSPERMS			
Cupressaceae - Cypress Family			
	Hesperocyparis pygmaea **CRPR 1B.2**	**pygmy cypress**	
	Sequoia sempervirens	coast redwood	
Pinaceae - Pine Family			
	Abies grandis	grand fir	
	***Pinus contorta* subsp. *bolanderi* CRPR 1B.2**	**Bolander's pine**	
	Pinus muricata	Bishop pine	

	Pseudotsuga menziesii	Douglas fir	
	Tsuga heterophylla	western hemlock	
Taxaceae - Yew Family			
	Torreya californica	California nutmeg	
MAGNOLIIDS			
Lauraceae - Laurel Family			
	Umbellularia californica	California bay	
EUDICOTS			
Adoxaceae - Muskroot Family			
	Sambucus nigra subsp. *caerulea (S. mexicana)*	blue elderberry	
	Sambucus racemosa	red elderberry	
Anacardiaceae - Sumac Family			
	Toxicodendron diversilobum	poison oak	
Apiaceae - Carrot Family			
	Angelica genuflexa		
	Daucus pusillus	rattlesnake weed	
	Oenanthe sarmentosa	ditch carrot	
	Osmorhiza berteroi	sweet cicley	
	Sanicula bipinnata	poison sanicle	
	Sanicula crassicaulis	gamble weed	
	Scandix pecten-veneris	Venus' needle	x
	Torilis arvensis	Japanese hedge parsley	x
	Torilis nodosus	knotted hedge-parsley	x
	Yabea microcarpa	hedge parsley	
Apocynaceae - Dogbane Family			
	Vinca major	greater periwinkle	x
Araliaceae - Ginseng Family			
	Aralia californica	elk clover	
Aristolochiaceae - Pipevine Family			
	Asarum caudatum	wild-ginger	
Asteraceae - Aster Family			
	Adenocaulon bicolor	trail plant	
	Anaphalis margaritacea	pearly everlasting	
	Anisocarpus madioides (Madia madioides)	woodland tarweed	
	Baccharis glutinosa (B. douglasii)	marsh baccharis	
	Baccharis pilularis	coyote brush	
	Bellis perennis	English daisy	x
	Cirsium arvense	Canada thistle	
	Cirsium vulgare	bull thistle	x
	Crepis vesicaria subsp. *taraxacifolia*		

	Erigeron canadensis	horseweed	
	Eriophyllum lanatum var. *arachnoideum*	common wooly sunflower	
	Euchiton sphaericus (Gnaphalium japonicum)	star cudweed	x
	Gamochaeta ustulata (Gnaphalium purpureum)		x
	Hieracium albiflorum	hawkweed	
	Hypochaeris radicata	hairy cat's ear	x
	Lasthenia minor	coastal gold fields	
	Leucanthemum vulgare	ox eye daisy	x
	Logfia gallica	daggerleaf cottonrose	x
	Madia exigua	small tarweed	
	Madia gracilis	gumweed	
	Madia sativa	coast tarweed	
	Petasites frigidus var. *palmatus*	coltsfoot	
	Pseudognaphalium luteoalbum		x
	Pseudognaphalium stramineum		
	Psilocarphus brevissimus var. *brevissimus*	dwarf woolyheads	
	Senecio glomeratus (Erechitites glomerata)	cut-leaf coast fireweed	x
	Senecio minimus (Erechtites minima)	fireweed	x
	Senecio jacobaea	tansy ragwort	x
	Senecio sylvaticus	woodland ragwort	x
	Sonchus asper	prickly sow thistle	x
	Sonchus oleraceus	common sow thistle	x
	Soliva sessilis		x
	Taraxacum officionale	California dandelion	x
Berberidaceae - Barberry Family			
	Achlys californica	vanilla leaf	
	Berberis aquifolium	barberry	
	Berberis nervosa	barberry	
	Vancouveria planipetala	redwood ivy	
Betulaceae - Birch Family			
	Alnus rubra	red alder	
	Corylus cornuta subsp. californica	hazelnut	
Boraginaceae - Borage Family			
	Cynglossum grande	hound's tongue	
	Nemophila parviflora	tiny flowered nemophila	
	Nemophila pedunculata		
	Myosotis discolor	changing forget-me-not	x
	Plagiobothrys sp.	popcorn flower	
Brassicaceae- Mustard Family			

	Cardamine californica	milk maids	
	Cardamine oligosperma		
	Nasturtium officionale (Rorippa nasturtium-aquaticum)	water cress	
Campanulaceae - Bluebell Family			
	Asyneuma prenanthoides (C. prenanthoides)	California harebell	
	***Campanula californica* CRPR 1B.2**	**swamp harebell**	
Caprifoliaceae - Honeysuckle Family			
	Lonicera hispidula var. *vacillans*	honeysuckle	
	Symphoricarpos mollis	creeping snowberry	
Caryophyllaceae - Pink Family			
	Cerastium glomeratum	mouse-ear chickweed	x
	Stellaria crispa		
	Stellaria media	common chickweed	x
	Stellaria nitens	shining chickweed	
Celastraceae - Staff-Tree Family			
	Euonymus occidentalis	western burning bush	
Convolvulaceae - Morning Glory Family			
	Calystegia purpurata subsp. *purpurata*		
Cucurbitaceae - Gourd Family			
	Marah oregana	coast manroot	
Ericaceae - Heath Family			
	Arbutus menziesii	madrone	
	Arctostaphylos canescens subsp. *canescens*	hoary manzanita	
	Arctostaphylos columbiana	Columbia manzanita	
	Arctostaphylos nummularia subsp. *nummularia*	shiny leaf manzanita	
	Chimaphila menziesii	little prince's pine	
	Gaultheria shallon	salal	
	***Pityopus californicus* CRPR 4.2**	**California pinefoot**	
	Pyrola picta	white-veined wintergreen	
	Rhododendron columbianum (Ledum glandulosum)	western Labrador tea	
	Rhododendron macrophyllum	California rose-bay	
	Rhododendron occidentale	western azalea	
	Vaccinium ovatum	California huckleberry	
	Vaccinium parvifolium	red huckleberry	
Fabaceae - Pea Family			
	Acmispon americanus (Lotus purshianus)	Spanish lotus	
	Acmispon parviflorus (Lotus micranthus)	deer vetch	

	Cytisus scoparius	Scotch broom	x*
	Genista monspessulana	French broom	x*
	Lathyrus latifolius	perennial sweet pea	x
	Lathyrus torreyi	redwood or Torrey's pea	
	Lathyrus vestitus	hillside pea	
	Lotus corniculatus	birdfoot trefoil	x
	Lupinus bicolor	minature lupine	
	Lupinus rivularis		
	Medicago polymorpha	bur clover	x
	Trifolium bifidum var. *bifidum*	pinole clover	
	Trifolium buckwestiorum **CRPR 1B.1**	**Santa Cruz clover**	
	Trifolium cernuum	nodding clover	x
	Trifolium dubium	shamrock clover	x
	Trifolium gracilentum	pinpoint clover	
	Trifolium hirtum	rose clover	x
	Trifolium microcephalum	small head clover	
	Trifolium microdon	thimble clover	
	Trifolium striatum	knotted clover	x
	Trifolium subterraneum	subterranean Clover	x
	Trifolium varigatum	varigated clover	
	Trifolium willdenovii	tomcat clover	
	Vicia hirsuta	hairy vetch	x
	Vicia sativa subsp. *sativa*	spring vetch	x
Fagaceae - Beech Family			
	Chrysolepis chrysophylla	chinquapin	
	Notholithocarpus densiflorus var. *densiflorus*	tan oak	
Gentianaceae - Gentian Family			
	Zeltnera venusta (Centarium v.)	California centaury	
Geraniaceae - Geranium Family			
	Geranium dissectum	cut-leaf geranium	x
	Geranium molle	dove foot	x
Grossulariaceae - Gooseberry Family			
	Ribes divaricatum var. *pubiflorum*	straggle bush	
Hypericaceae - St. John's Wort Family			
	Hypericum anagalloides	tinker's penny	
Lamiaceae - Mint Family			
	Clinopodium douglasii (Satureja d.)	yerba buena	
	Mentha pulegium	penny royal	x*
	Prunella vulgaris var. lanceolata	self-heal	
	Prunella vulgaris var. vulgaris	self-heal	x
	Stachys chamissonis	coast hedge nettle	

	*Stachys rigida*var. *rigida*	hedge nettle	
Linaceae - Flax Family			
	Linum bienne	common flax	x
Lythraceae - Loosestrife Famly			
	Lythrum hyssopifolia	hyssop loosestrife	x
Montiaceae - Montia Family			
	Claytonia perfoliata	miner's lettuce	
	Montia fontana	water chickweed	
	Montia siberica	candy flower	
Myricaceae- Wax Mytrle Family			
	Morella californica (Myrica california)	California wax myrtle	
Myrsinaceae - Myrsine Family			
	Lysimachia arvensis (Anagallis arvensis)	scarlet pimpernel	x
	Lysimachia latifolia (Trientalis latifolia)	star flower	
Onagraceae - Evening primrose Family			
	Epilobium ciliatum subsp. *ciliatum*	Northern willow herb	
Orobanchaceae - Broom rape Family			
	Triphysaria pusilla	dwarf owl's clover	
Oxalidaceae- Oxalis Family			
	Oxalis oregana	redwood sorrel	
	Oxalis pilosa	hairy wood-sorrel	
Papaveraceae - Poppy Family			
	Dicentra formosa	bleeding heart	
Philadelphaceae - Mock Orange Family			
	Whipplea modesta	modesty	
Phrymaceae - Lopseed Family			
	Mimulus aurantiacus	sticky monkey-flower	
	Mimulus moschatus	musk monkeyflower	
Plantaginaceae - Plantain Family			
	Callitriche heterophylla	water starwart	
	Callitriche marginata	winged water starwart	
	Digitalis purpurea	foxglove	x
	Plantago lanceolata	English plantain	x
	Plantago major	common plaintain	
	Synthyris reniformis	snow queen	
	Veronica americana	American brooklime	
Polemoniaceae - Phlox Family			
	Collomia heterophylla	variable leaf collomia	
	Leptosiphon minimus	tiny leptosiphon	
	Navarretia squarrosa	skunkweed	

Polygalaceae - Milkwort Family			
	Polygala californica	California milkwort	
Polygonaceae - Buckwheat Family			
	Rumex acetosella	sheep sorrel	x
	Rumex crispus	curly dock	x
Ranunculaceae - Buttercup Family			
	Actaea rubra	baneberry	
	Anemone grayi	Gray's anemone	
	Aquilegia formosa	columbine	
	Coptis laciniata **CRPR 4.2**	**Oregon goldthread**	
	Ranunculus californicus	California buttercup	
	Ranunculus uncinatus	hooked fruit buttercup	
Rhamnaceae - Buckthorn Family			
	Ceanothus thyrsiflorus	blue blossum	
	Frangula californica (Rhamnus californica)	California coffeeberry	
	Frangula purshiana (Rhamnus purshiana)	cascara	
Rosaceae - Rose Family			
	Aphanes occidentalis	western ladies mantle	
	Cotoneaster pannosa		x
	Drymocallis glandulosa var. *glandulosa*	sticky cinquefoil	
	Fragaria vesca	wood strawberry	
	Rosa gymnocarpa	wood rose	
	Rubus armeniacus (R. discolor)	Himalayan blackberry	x
	Rubus leucodermis	western raspberry	
	Rubus parviflorus	thimbleberry	
	Rubus spectabilis	salmon berry	
	Rubus ursinus	California blackberry	
Rubiaceae - Madder Family			
	Galium aparine	goose grass	x
	Galium muricatum	Humboldt bedstraw	
	Galium parisiense	wall bedstraw	x
	Galium triflorum	sweet-scented bedstraw	
	Sherardia arvensis	field madder	x
Salicaceae - Willow Family			
	Salix lasiandra var. *lasiandra (Salix lucida)*	Pacific willow	
	Salix scouleriana	Scouler's willow	
	Salix sitchensis	Sitka willow	
Sapindaceae - Soapberry Family			
	Acer macrophyllum	big leaf maple	
Saxifragaceae - Saxifrage Family			
	Boykinia occidentalis	boykinia	

	Heuchera micrantha	alum root	
	Mitellastra caulescens **CRPR 4.2**	leafy stemmed mitre-wort	
	Pectiantia ovalis (Mitella ovalis)	coastal mitrewort	
	Tellima grandiflora	fringe cups	
	Tiarella trifoliata var. unifoliata	lace flower	
	Tolmiea diplomenziesii	pig-a-back plant	
Scrophulariaceae - Figwort Family			
	Scrophularia californica	California figwort	
Solanaceae - Nightshade Family			
	Solanum americanum	small-flowered nightshade	
	Solanum xantii	chaparral nightshade	
Urticaceae - Nettle Family			
	Urtica dioica subsp. *gracilis*	American stinging nettle	
Violaceae - Violet Family			
	Viola glabella	stream violet	
	Viola sempervirens	evergreen violet	
MONOCOTS			
Cyperaceae - Sedge Family			
	Carex californica **CRPR 2B.3**	California sedge	
	Carex globosa	round-fruited sedge	
	Carex gynodynama	wonder woman sedge	
	Carex harfordii	Harford's sedge	
	Carex hendersonii	timber sedge	
	Carex leptopoda	slender-footed sedge	
	Carex obnupta	slough sedge	
	Carex rossii	Ross' sedge	
	Carex tumulicola	foothill sedge	
	Cyperus eragrostis	tall flatsedge	
	Cyperus strigosus	false nutsedge	
	Eleocharis macrostachya	spike rush	
	Scirpus microcarpus	panicled bulrush	
Iridaceae - Iris Family			
	Iris douglasiana	Douglas iris	
	Sisyrinchium bellum	blue-eyed grass	
Juncaceae - Rush Family			
	Juncus bufonius var. *bufonius*	toad rush	
	Juncus effusus var. *pacificus*	Pacific rush	
	Juncus ensifolius	dagger-leaf rush	
	Juncus patens	common rush	

	Luzula comosa var. laxa	wood rush	
Liliaceae - Lily Family			
	Clintonia andrewsiana	clintonia	
	Prosartes hookeri (Disporum hookeri)	Hooker's fairybell	
	Scoliopus bigelovii	fetid adders tongue	
Melanthiaceae - False-Hellebore Family			
	Toxicoscordion fremontii (Zigadenus f.)	death camus	
	Trillium ovatum	western trillium	
	Veratrum fimbriatum **CRPR 4.3**	**fringed false hellebore**	
Orchidaceae - Orchid family			
	Calypso bulbosa	calypso orchid	
	Corallorhiza maculata	spotted coralroot	
	Corallorhiza mertensiana	Merten's coralroot	
	Goodyera oblongifolia	rattlesnake plantain	
	Listera banksiana	Northwest twayblade	
	Piperia candida **CRPR 1B.2**	**white flowered piperia**	
Poaceae - Grass Family			
	Agrostis gigantea	redtop	x
	Agrostis pallens	deune bent grass	
	Agrostis stolonifera	creeping bent	x
	Aira caryophyllea	silver European hairgrass	x
	Anthoxanthum occidentale (Hierochloe o.)	sweet grass	
	Anthoxanthum ordoratum	sweet vernal grass	x
	Avena barbata	slender wild oat	x
	Briza maxima	big quaking grass	x
	Briza minor	little quaking grass	x
	Bromus diandrus	ripgut brome	x
	Bromus carinatus var. carinatus	California brome	
	Bromus hordeaceus	soft chess	x
	Bromus orcuttianus	Orcutt's brome	
	Bromus vulgaris	Columbia brome	
	Calamagrostis bolanderi **CRPR 4.2**	**Bolander's reedgrass**	
	Cortaderia jubata	jubata grass	x
	Cynosurus echinatus	hedgehog dogtail	x
	Dactylis glomerata	orchard grass	x
	Danthonia californica	California oatgrass	
	Deschampsia elongata	slender hairgrass	
	Elymus glaucus subsp. glaucus	blue wildrye	
	Festuca arundinacea	tall fescue	x

	Festuca bromoides	brome fescue	x
	Festuca idahoensis	Idahoe fescue	
	Festuca occidentalis	western fescue	
	Festuca octaflora	six weeks grass	
	Festuca perennis (Lolium multiflorum)	perennial ryegrass	x
	Festuca subulata	bearded fescue	
	Festuca subuliflora	crinkle awn fescue	
	Gastridium phleoides	nit grass	x
	Glyceria elata	fowl mannagrass	
	Holcus lanatus	common velvet grass	x
	Melica subulata	Alaskan oniongrass	
	Phalaris arundinacea	reed canary grass	
	Phalaris californica	California canary grass	
	Poa annua	annual blue grass	x
	Poa kelloggii	Kellogg's blue grass	
	Polypogon australis	Chilean beardgrass	x
	Polypogon monspeliensis	annual beard grass	x
	Rytidosperma penicillatum (Danthonia pilosa)	hairy oatgrass	x
	Trisetum canescens	smooth trisetum	
Ruscaceae - Butcher's-Broom Family			
	Maianthemum racemosum (Smilacina racemosa)	branched false solomon's seal	
	Maianthemum stellatum (Smilacina stellata)	star false solomon's seal	

Appendix D: Bryophytes and Lichens of Big River (BR) and Salmon Creek (SC) River Forests, TCF

Nomenclature largely follows:

For Mosses: Norris D.H. and J.R. Shevock. 2004. Contrb. toward a bryoflora of CA: I. A Specimen-Based Catalogue of Mosses. Madrono 51(1): 1-131. II. A Key to the Mosses. Madrono 51 (2) 133-269

P. Wilson (ed.) [2018] California Moss eFlora, http://ucjeps.berkeley.edu/CA_moss_eflora/inde1.html

For Liverworts: Doyle W.T. and R.E. Stotler. 2006. Contributions toward a bryoflora of California III. Keys and Annotated Species Catalogue for Liverworts and Hornworts. Madrono 53: 89-197.

For Lichens: Brodo I.M., S.D. Sharnoff, and S. Sharnoff. 2001. Lichens of N. America. Yale Univ. Press.

S. Sharnoff. 2014. A Field Guide to California Lichens. Yale Univ. Press.

Esslinger, T. E. 2016. A cumulative checklist for the lichen-forming, lichenicolous, and allied fungi of the continental United States and Canada. North Dakota State University, Version 22: http://www.ndsu.edu/pubweb/~esslinge/chcklst/chcklst7.htm, [accessed Jan 1, 2018] Fargo, ND.

Survey Dates: 2008 - 2018 (same as vascular plants (Appendices B & C)

Big River mosses=63, liverworts=15, llchens=34; Salmon Creek mosses=45, liverworts=11, lichens=9

MOSSES	Habitat	BR	SC
AULACOMNIACEAE			
Aulacomnium androgynum	On rotten logs and old stumps	x	x
BARTRAMIACEAE			
Anacolia menziesii	moist soil of old road bed, rock face	x	
Bartramia stricta	on soil in sunny opening	x	
Philonotis capillaris	moist soil on roadbed, costa long-excurrent	x	x
Philonotis fontana	moist soil along road, costa hardly excurrent	x	
BRACHYTHECIACEAE			
Amblystegium serpens	wet, seep across dirt road	x	
Brachythecium frigidum	On moist banks next to creek	x	x
Brachythecium velutinum	shady dry drainage		x
Brachythecium starkei	moist soil, edge of trail		x
Homalothecium nuttallii	On hardwood bark and rock	x	x
Homalothecium pinnatifidum		x	
Isothecium cristatum	On old fallen logs	x	x
Isothecium spiculiferum	On wax myrtle trunk		x
Isothecium stoloniferum	On shaded logs and boulders	x	
Kindbergia oregana	On shaded duff and tree bases and logs, old roadbeds	x	x
Kindbergia praelonga	On moist to wet logs, rock along streams, stem lvs decurrent	x	x
Scleropodium cespitans	Mats of creeping stems with julaceous ± pinnate branches. On litter, soil, tree bases.	x	x
Scleropodium obtusifolium	On boulders in streams or seasonal streamlets	x	x

Scleropodium touretii	Mats of prostrate, weakly julaceous stems and ascending tips. Soil and rock away from seasonal streams	x	x
BRYACEAE			
Bryum canariense (Rosulabryum c.)	moist soil		x
Bryum capillare (Rosulabryum c.)	sunny habitat, soil over rock, similar to R. torquescens but tubers not scarlet	x	x
Bryum gemmiparum (Imbribryum g.)	On wet rock in streambed, no hairpoints	x	
Bryum torquescens (Rosulabryum t.)	soil, rock, litter, tree truncks, rotten wood. Scarlet tuberss. Hair points conspicuous	x	x
BUXBAUMIACEAE			
Buxbaumia piperi	On damp soil and rotten logs	x	
CRYPHAEACEAE			
Dendroalsia abietina	On red alder, oak bark, tanoak	x	x
DICRANACEAE			
Dicranella howei	On moist mineral soil banks; seta 5-8mm reddish, lvs 2mm; sporophyte arcuate.	x	
Dicranum fuscescens	On shaded rotten log; stems tomentose below	x	x
Dicranum howellii	shaded wood; stems rhizoid matted	x	
Orthodicranum tauricum	On shaded logs and tree bases; lf tips broken	x	x
DITRICHACEAE			
Ceratodon purpureus	On bare soil in sunny sites	x	
Ditrichum ambiguum	On shaded soil of roadbanks; erect sporophyte, seta reddish.	x	x
Ditrichum schimperi	Bare soil and roadbeds; erect sporophyte; seta yellow, 10-30mm.		x
Pleuridium acuminatum		x	
FISSIDENTACEAE			
Fissidens bryoides	Semiaquatic, moist habitats. All leaf margins bordered; many leaf pairs	x	x
Fissidens crispus	Seasonally moist soil, roadbanks, trails. All leaf margins bordered; up to 20 lf pairs	x	x
Fissidens grandifrons	springs, seeps, creeks, usually calcareous		x
FONTINALACEAE			
Fontinalis neomexicana	aquatic, submersed in pond	x	

FUNARIACEAE			
Funaria hygrometrica	On sunny soil on road edge	x	x
GRIMMIACEAE			
Codriophorus varius (Racomitrium varium)	On rock, moist or dry	x	
Grimmia laevigata	on shady rock	x	
Grimmia lisae	On rocks at high water line	x	
HYPNACEAE			
Hypnum circinale	On shaded conifer bases; mats of downward facing stems, pale green; more coastal	x	x
Hypnum subimponens	On shaded rock and logs; mats with pinnately branched stems	x	
Pseudotaxiphyllum elegans	On damp soil and duff in shade, shiney complanate stems with paraphyllia	x	x
LEPTODONTACEAE			
Alsia californica	Shaded branch of Torreya californica	x	x
LESKEACEAE			
Claopodium whippleanum	On bare soil in sun or shade	x	x
LEUCOBRYACEAE			
Campylopus introflexus	exotic species of clayey roadbeds	x	x
LEUCODONTACEAE			
Pterogonium gracile	Rock and hardwood trunks, bay bark; lvs serrate above; double costa to mid leaf	x	
MNIACEAE			
Epipterygium tozeri	On moist bare soil with other mosses	x	x
Leucolepis acanthoneuron	On moist soil along stream	x	x
Rhizomnium glabrescens	moist to wet soil along stream, lvs entire	x	x
Plagiomnium insigne	wet, sandy floodplain bottoms; plants prostrate	x	x
Plagiomnium venustum	On decaying humus, and roadbed; plants erect; longer teeth	x	x
Pohlia wahlenbergii	On shaded wet soil	x	
NECKERACEAE			
Bryolawtonia vancouveriensis	On trunk of bay trees, complanate stems	x	
Metaneckera menziesii	on red alder trunks; costa present	x	

Neckera douglasii	Epiphytic on California nutmeg, red alder; costa absent	x	
Porotrichum bigelovii	On wet shaded rock along streams. Lvs ~ 3mm	x	x
ORTHODONTIACEAE			
Orthodontium gracile	dense, silky, yellow-green tufts of erect stems; on *Sequoia* bark		x
ORTHOTRICHACEAE			
Orthotrichum bolanderi	soil of roadcut		x
Orthotrichum consimile	hardwood bark		x
Orthotrichum lyelii	on bark of tanoak, Quercus, Doug fir	x	x
Orthotrichum rivulare	old wood of bridge just above waterline	x	
Orthotrichum tenellum	bark of tanoak	x	
PLAGIOTHECIACEAE			
Plagiothecium laetum	tree trunks, occasionally rock; complanate light greens stems; costa absent	x	
POLYTRICHACEAE			
Atrichum selwynii	On bare mineral soil, roadcuts	x	x
Polytrichastrum alpinum	On shady rock face	x	
Polytrichum juniperinum	On bare or humusy soil; leaf with reddish apex	x	x
POTTIACEAE			
Didymodon vinealis	On soil or rock, sun or shade	x	x
Timmiella crassinervis	On bare soil in sun or shade	x	x
RHABDOWEISIACEAE			
Amphidium californicum	In shaded underhangs of outcrops	x	
SELIGERIACEAE			
Dicranoweisia cirrata	dead wood of fallen logs	x	x
LIVERWORTS			
ANEURACEAE			
Aneura pinguis	Water splashed rock along stream, & shaded seeps	x	x
AYTONIACEAE			
Asterella bolanderi	On moist mossy bank	x	x

CALYPOGEIACEAE			
Calypogeia sp.	On damp shaded soil	x	x
CEPHALOZIACEAE			
Cephalozia bicuspidata	On shaded soil and humus	x	x
CEPHALOZIELLACEAE			
Cephaloziella divaricata	On soil over rock	x	
CONOCEPHALACEAE			
Conocephalum conicum	moist stream banks	x	x
FRULLANIACEAE			
Frullania nisquallensis	Epiphytic on red alder	x	x
Jungermannia rubra	On moist bare soil banks	x	
GEOCALYCACEAE			
Chiloscyphus polyanthos	submerged in creek on rock	x	
JUNGERMANNIACEAE			
Jungermannia rubra	On moist shaded soil	x	
LEPIDOZIACEAE			
Lepidozia reptans (micky mouse hands)	On shaded base of Redwood	x	x
MARCHANTIACEAE			
Marchantia polymorpha	on moist soil near water	x	x
PORELLACEAE			
Porella navicularis	On shaded hardwood bark	x	x
SCAPANIACEAE			
Lophozia sp.	with Scapania	x	
Scapania bolanderi	on shady roadcuts and stream banks	x	x
TARGIONIACEAE			
Targionia hypophylla	on soil bank	x	x
HORNWORTS			

ANTHOCEROTACEAE			
Anthoceros sp	On moist to wet bare soil	x	x
LICHENS			
Cladonia caricosa	On soil	x	
Cladonia cenotea	roadbanks with mosses and litter	x	
Cladonia coniocraea	On shaded soil banks	x	
Cladonia fimbriata		x	
Cladonia furcata	On shaded soil and old wood	x	x
Cladonia py1idata		x	
Cladonia squamosa	old redwood stumps, soil over rocks	x	
Cladonia transcendens	weathered stump near coast	x	
Cladonia verruculosa		x	
Collema nigrescens	on low branch of Baccharis pilularis and Salix sitchensis		x
Hypogymnia apinnata	conifer branches	x	
Hypogymnia enteromorpha	Doug fir branches	x	x
Hypogymnia imshaugii	bark and wood	x	x
Leptogium palmatum (L. corniculatum)	On shaded soil banks	x	x
Leptogium gelatinosum	on road	x	
Leptogium lichenoides		x	
Leptogium platynum	Moist soil of old roadbed	x	
Lobaria linita	on soil on road	x	
Lobaria oregana	Mostly coniferous trees	*x*	
Lobaria polmonaria	alder trunks, Doug fir branches	x	x
Parmelia sulcata	on red alder	x	
Parmotrema arnoldii	On hardwood bark	x	
Peltigera malacea		x	
Peltigera membranacea	on soil, litter	x	x
Peltigera neopolydactyla	moist soil edge or road	x	x
Pilophorus acicularis	On shaded soil banks	x	
Platismatia herrei	on doug fir bark, isidiate margin	x	
Platismatia stenophylla	doug fir bark	x	
Pseudocyphellaria anthraspis	Epiphytic on hardwoods	x	
Ramalina farinacea	conifer and hardwood	x	
Sticta limbata		x	
Tuckermannopsis orbata	On conifer branches	x	
Usnea arizonica	Epiphytic	x	
Usnea filipendula	Epiphytic on conifers; on Salix near coast	x	
Usnea longissima	Methusulah's beard	x	x

Appendix E. The CNPS Ranking System

California Rare Plant Rank 1A: Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere. Plants with a California Rare Plant Rank of 1A are presumed extirpated or extinct because they have not been seen or collected in the wild in California for many years. A plant is extinct if it no longer occurs anywhere. A plant that is extirpated from California has been eliminated from California, but may still occur elsewhere in its range. All of the plants constituting California Rare Plant Rank 1A meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Should these taxa be rediscovered, and impacts proposed to individuals or their habitat, they must be analyzed during preparation of environmental documents relating to the California Environmental Quality Act (CEQA), or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 1B: Plants Rare, Threatened, or Endangered in California and Elsewhere. Plants with a California Rare Plant Rank of 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. California Rare Plant Rank 1B plants constitute the majority of taxa in the CNPS *Inventory*, with more than 1,000 plants assigned to this category of rarity. All of the plants constituting California Rare Plant Rank 1B meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 2A: Plants Presumed Extirpated in California, But Common Elsewhere. Plants with a California Rare Plant Rank of 2A are presumed extirpated because they have not been observed or documented in California for many years. This list only includes plants that are presumed extirpated in California, but more common elsewhere in their range. All of the plants constituting California Rare Plant Rank 2A meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Should these species be rediscovered, any impacts proposed to individuals or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 2B: Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere. Except for being common beyond the boundaries of California, plants with a California Rare Plant Rank of 2B would have been ranked 1B. From the federal perspective, plants common in other states or countries are not eligible for consideration under the provisions of the Federal Endangered Species Act. With California Rare Plant Rank 2B, we recognize the importance of protecting the geographic range of widespread species. In this way we protect the diversity of our own state's flora and help maintain evolutionary processes and genetic diversity within species. All of the plants constituting California Rare Plant Rank 2B meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat must be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 3: Plants About Which More Information is Needed - A Review List
Plants with a California Rare Plant Rank of 3 are united by one common theme - we lack the necessary information to assign them to one of the other ranks or to reject them. Nearly all of the plants constituting California Rare Plant Rank 3 are taxonomically problematic. For each California Rare Plant Rank 3 plant we have provided the known information and indicated in the "Notes" section of the CNPS *Inventory* record where assistance is needed. Data regarding distribution, endangerment, ecology, and taxonomic validity are welcomed and can be submitted by emailing the Rare Plant Program at rareplants@cnps.org. Many of the plants constituting California Rare Plant Rank 3 meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and are eligible for state listing. Impacts to these species or their habitat should be analyzed during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, as they may meet the definition of Rare or Endangered under CEQA Guidelines §15125 (c) and/or §15380.

California Rare Plant Rank 4: Plants of Limited Distribution - A Watch List
Plants with a California Rare Plant Rank of 4 are of limited distribution or infrequent throughout a broader area in California, and their status should be monitored regularly. Should the degree of endangerment or rarity of a California Rare Plant Rank 4 plant change, we will transfer it to a more appropriate rank. Some of the plants constituting California Rare Plant Rank 4 meet the definitions of the California Endangered Species Act of the California Department of Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and we strongly recommend that California Rare Plant Rank 4 plants be evaluated for impact significance during preparation of environmental documents relating to CEQA, or those considered to be functionally equivalent to CEQA, based on CEQA Guidelines §15125 (c) and/or §15380. This may be particularly appropriate for: The type locality of a California Rare Plant Rank 4 plant, Populations at the periphery of a species' range, Areas where the taxon is especially uncommon, Areas where the taxon has sustained heavy losses, or Populations exhibiting unusual morphology or occurring on unusual substrates.

Threat Ranks
0.1-Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
0.2-Moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
0.3-Not very threatened in California (less than 20% of occurrences threatened / low degree and immediacy of threat or no current threats known)
Notes:
The above Threat Rank guidelines only represent a starting point in the assessment of threat level. Other factors, such as habitat vulnerability and specificity, distribution, and condition of occurrences, are also considered in setting the Threat Rank.
Many of the Threat Ranks have not been reassessed since the time they were first designated after implementation of the Rare Plant Status Review Process, and therefore may not represent the current level of threats associated with a given taxon.
The Threat Ranks do not designate a change of environmental protections. For instance a CRPR 1B.3 plant has the same environmental protections as a CRPR 1B.1 plant, and it is mandatory that both be fully considered during preparation of environmental documents relating to CEQA.

State and Federal Status

For each taxon with official status under the California Endangered Species Act (CESA), the Federal Endangered Species Act (FESA), and/or the Native Plant Protection Act (NPPA), the plant's status is presented. Our definitions conform to those found in California state law and federal regulations.

Global Ranking

The *global rank* (G-rank) is a reflection of the overall status of an element throughout its global range. Both Global and State ranks represent a letter+number score that reflects a combination of Rarity, Threat and Trend factors, with weighting being heavier on Rarity than the other two.
Species or Natural Community Level
G1 = Critically Imperiled — At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2 = Imperiled — At high risk of extinction due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.
G3 = Vulnerable — At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors.
G4 = Apparently Secure — Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5 = Demonstrably Secure — Common; widespread and abundant.

Note: Subspecies receive a T-rank attached to the G-rank. With the subspecies, the G-rank reflects the condition of the entire species, whereas the T-rank reflects the global situation of just the subspecies or variety. For example: *Chorizanthe robusta* var. *hartwegii*. This plant is ranked G2T1. The G-rank refers to the whole species range i.e., *Chorizanthe robusta.* The T-rank refers only to the global condition of var. *hartwegii*.

State Ranking

The *state rank* (S-rank) is assigned much the same way as the global rank, but state ranks refer to the imperilment status only within California's state boundaries.
S1 = Critically Imperiled — Critically imperiled in the state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2 = Imperiled — Imperiled in the state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3 = Vulnerable — Vulnerable in the state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4 = Apparently Secure — Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5 = Secure — Common, widespread, and abundant in the state.

Note: Other considerations used when ranking a species or natural community include the pattern of distribution of the element on the landscape, fragmentation of the population/stands, and historical extent as compared to its modern range. It is important to take a bird's eye or aerial view when ranking sensitive elements rather than simply counting element occurrences. Uncertainty about the rank of an element is expressed in two major ways: By expressing the ranks as a range of values: e.g., S2S3 means the rank is somewhere between S2 and S3. By adding a ? to the rank: e.g., S2? This represents more certainty than S2S3, but less certainty than S2.

Other symbols:
GH - All sites are historical; the element has not been seen for at least 20 years, but suitable habitat still exists (SH = All California sites are historical).
GX - All sites are extirpated; this element is extinct in the wild (SX = All California sites are extirpated).
GXC - Extinct in the wild; exists in cultivation.
G1Q - The element is very rare, but there are taxonomic questions associated with it.
T - Rank applies to a subspecies or variety.