

## Galbreath Special Status Species Assessment - Grasses, Lilies, & Orchids

*Before I worked on this project, I had no idea how to apply GIS to basic ecological concepts.  
– Christoph Schopfer, Geography Major*

### Project Summary

A team of students and Center staff mapped potential habitat for 110 special status plants and animals on the Galbreath Wildlands Preserve. We identified special status species with potential to occur in the Galbreath Preserve using existing agency databases and publications. These included fungi, bryophytes, plants, invertebrates, amphibians, reptiles, birds and mammals. For each species, we collected biological information, undertook GIS-based habitat suitability analysis, and assessed the likelihood of occurrence within preserve boundaries. The project created professional experience for Biology and Geography undergraduates and graduate students who worked on an interdisciplinary team to develop assessment techniques and methods. See [Methods \(PDF\)](#) and [Species List \(PDF\)](#) for additional information.



**Project Lead:** Claudia Luke

**Dates:** 2010-2011

**Funding:** Robert and Sue Johnson Family

**Students:** Neal Ramus (Business), Emily Harvey (Biology), Kandis Gilmore (Biology), Linden Schneider (Biology), Christoph Schopfer (Geography), James Sherwood (Geography)

### Grasses, Lilies, & Orchids

These results are part of a larger assessment of all special status species with potential to occur at the Galbreath Wildlands Preserve. Assessments were conducted as planning exercise and do not constitute evidence of occurrence.

## **Alismataceae**

*Alisma gramineum*, Grass Alisma: [ALGR Text](#), [ALGR Map](#)

## **Cyperaceae**

*Carex comosa*, Bristly Sedge: [CACO Text](#), [CACO Map](#)

*Carex saliniformis*, Deceiving Sedge: [CASA Text](#), [CASA Map](#)

## **Lilaceae**

\**Allium peninsulare* var. *franciscanum*, Franciscan Onion: [ALPE Text](#), [ALPE Map](#)

*Calochortus raichei*, The Cedars Fairy-Lantern: [CARA Text](#), [CARA Map](#)

*Erythronium revolutum*, Coast Fawn Lily: [ERRE Text](#), [ERRE Map](#)

*Fritillaria roderickii*, Roderick's Fritillary: [FRRO Text](#), [FRRO Map](#)

## **Orchidaceae**

\**Piperia candida*, White-Flowered Rein Orchid: [PICA Text](#), [PICA Map](#)

## **Poaceae**

*Dichanthelium lanuginosum* var. *thermale*, Geysers Dichanthelium: [DILA Text](#), [DILA Map](#)

*Glyceria grandis*, American Manna Grass: [GLGR Text](#), [GLGR Map](#)

*Pleuropogon hooverianus*, North Coast Semaphore Grass: [PLHO Text](#), [PLHO Map](#)

## **Potamogetonaceae**

*Potamogeton epihydrus* ssp. *nuttallii*, Nuttall's Ribbon-Leaved Pondweed: [POEP Text](#), [POEP Map](#)

*Lilioposida (Grasses, Lillies, Orchids): Alismataceae*  
**Grass Alisma (*Alisma gramineum*)**  
**Potential Occurrence: Unlikely To Occur**

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**Status:**

Federal: None

State: None

CNPS: 2.2

Other: None



**Species Description:** Grass Alisma is a monocot with linear to narrowly lanceolate leaves (CNPS 2010; Hickman 1996). The inflorescence is scapose and umbel or panicle like with a smooth peduncle and bisexual flowers with flat receptacles, white to pink petals and more or less curved styles of the many pistils. The fruit is a strongly compressed achene with lateral walls generally thin and opaque. (Hickman 1996)

**Nomenclature:** *Alisma gramineum* Lej. Alismataceae (USDA 2010)

**Synonyms:** *Alisma geyeri* Torr. (Regents of the University of California 2010)

**Distribution:** This species is known largely from the Modoc Plateau in northeastern California, but there are several documented occurrences in Mendocino County north of Willits in elevations between 390 to 1800 m (Calflora 2010; CNPS 2010; Hickman 1996).

**Life History & Threats:** Grass Alisma is a perennial rhizomatous aquatic herb that behaves like an annual (ARKive 2010; CNPS 2010). When the flowers grow underwater they are [cleistogamous](#) allowing for self pollination (eFloras 2008). In contrast, terrestrial plants are chastagomous, allowing for open pollination (eFloras 2008). The germination of seed may rely on freezing or the disturbance of mud after the seed falls (ARKive 2010). The greatest threat to this species is road construction (CNPS 2010). In addition the algal growth associated with eutrophication of water bodies and competition from other marginal and aquatic species is contributing to the decline of this species (UK Biodiversity Action Plan 2010).

**Habitat & Habitat Associations:**

**Habitat:** Freshwater or brackish lakes and marshes or on muddy shores of lakes and marshes where the dominant vegetation is emergent, suffrutescent herbs adapted to seasonally or permanently saturated soils (CNPS 2010; eFloras 2008; Smith and Wheeler 1992). It can also be found in shallow waters or mud around the margins of rivers, ponds and ditches (ARKive 2010).

**Elevation:** 390 to 1800 m (CNPS 2010). (The Study Area ranges from 230 to 710 m).

**Geology and Soils:** muddy areas (CNPS 2010)

**Species Associations:** cannot tolerate competition from other plants (ARKive 2010)

*Other Special Habitat Features:* open habitats, nutrient rich conditions (ARKive 2010)

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as areas with:

- above 360 m (includes a 30 m buffer on known elevational occurrences of this species)
- edges of ponds and drainages. (Note that many ponds in the area are below 360 m and do not show up as potential habitat on the map).

Springs and seeps are common throughout the Study Area but are not available in a GIS database. Seeps typically occur in open grassy areas and are dominated by rushes (*Juncus* spp.), sedge (*Cyperus eragrostis*), mint (*Menthe pulegium*), bracken ferns (*Pteridium aquilium*). Springs, sites with surface water, occur in many habitat types and vary in species composition.

#### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* Habitat for this species is seasonally or perennially saturated soils associated with surface water in open areas above 360 m. The GIS map indicates that these types of habitats may occur at three ponds along the southwestern border of the Preserve and in the upper reaches of drainages. This distribution shown is an overestimate of potential habitat: at this elevation, the drainages are seasonal and rarely wet enough to provide habitat for this species. The distribution also underestimates potential habitat since springs and seeps are common throughout the Preserve, but are not mapped.

Habitat quality for this species at ponds, seeps and springs is poor to moderate. The three ponds, two natural and one agricultural, are shaded by surrounding coniferous and broadleaf upland forest types. Seeps and springs typically occur in open grassy areas and are dominated by rushes (*Juncus* spp.), sedge (*Cyperus eragrostis*), mint (*Menthe pulegium*), bracken ferns (*Pteridium aquilium*). These sites are inappropriate for this species, which is intolerant of competition and requires open habitats. The most likely areas for this species to occur could be pig wallows. Pig wallows that are in open areas and, if only sporadically used, could provide the open, muddy habitat needed by Grass Alisma.

#### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not document this species (SSU Field Station and Nature Preserves 2010).

Nearest Occurrence to the Galbreath Wildlands Preserve: Grass Alisma is known from 8 occurrences in Mendocino County (Calflora 2010), all north of the Preserve. The nearest documented occurrence of is 40 miles north of the Preserve in the Noyo River watershed (Calflora 2010), a distance over 3 times further than the greatest distance documented among reported occurrences in Mendocino County.

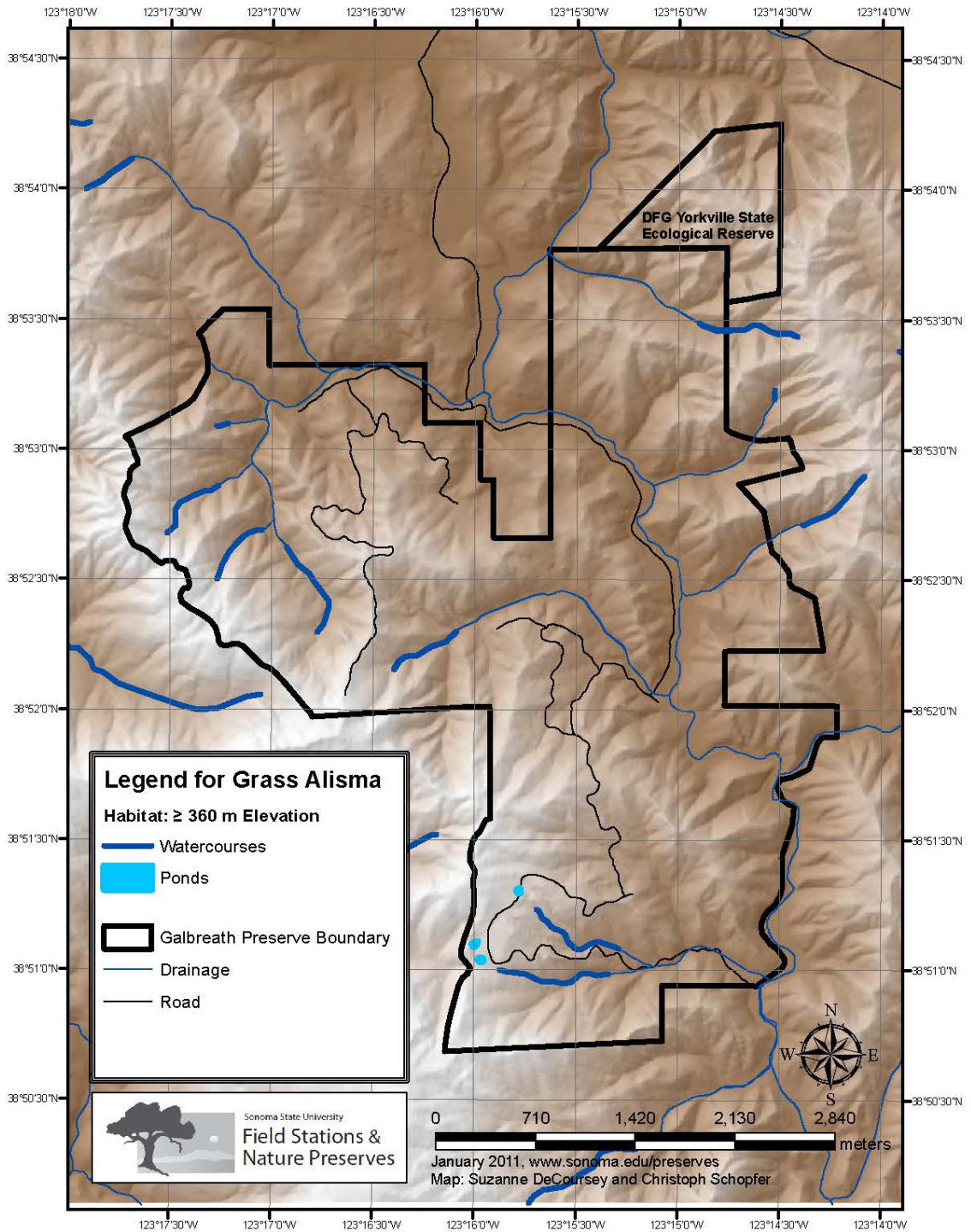
*Summary:* We anticipate that this species is “Unlikely to Occur” in the Galbreath Wildlands Preserve due to the poor habitat quality and low habitat abundance in the Preserve, and the remoteness of other documented occurrences from the Preserve.

## References

- ARKive. 2010. <<http://www.arkive.org/ribbon-leaved-water-plantain/alisma-gramineum/>>. Accessed 2010 Jun 24.
- Calflora. 2010. Information on California plants for education, research and conservation.<<http://www.calflora.org/>>. Accessed 2010 Jun 19.
- California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>>. Accessed 2010 Jun 19.
- eFloras 2008. Flora of North America. <<http://www.efloras.org>>. Accessed 2010 Jun 27.
- Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup>ed. London: University of California Press, Ltd.1101 p.
- Landry LM. 2010. *Alisma gramineum*. <[http://calphotos.berkeley.edu/cgi/img\\_query?enlarge=0000+0000+0410+1458](http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0410+1458)>. Accessed 2010 Jun 27.
- Landsdown RV. 2010. Ribbon-Leaved Water-Plantain (*Alisma gramineum*). <<http://www.arkive.org/ribbon-leaved-water-plantain/alisma-gramineum/image-A2454.html>>. Accessed 2010 Oct 4.
- Regents of the University of California. 2010. The Jepson Online Interchange California Floristics. <<http://ucjeps.berkeley.edu/interchange/>>. Accessed 2010 Oct 4.
- Smith GL, Wheeler CR. 1992. A flora of the Vascular Plants of Mendocino County, California. San Francisco: University of San Francisco. 63 p.
- SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.
- UK Biodiversity Action Plan. 2010. Species Action Plant. Ribbon-leaved Water-plantain (*Alisma gramineum*). <<http://www.ukbap.org.uk/UKPlans.aspx?ID=83>>. Accessed 2010 Jun 27.
- United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/nameSearch?keywordquery=Alisma%20gramineum&mode=sci name>>. Accessed 2010 Oct 4.

**Species Account Description:** Linden Schneider

Figure 5: Potential habitat for Grass Alisma (*Alisma gramineum*)



*Liliopsida (Grasses, Lilies and Orchids): Cyperaceae*  
**Bristly Sedge (*Carex comosa*)**  
**Potential Occurrence: Likely to Occur**

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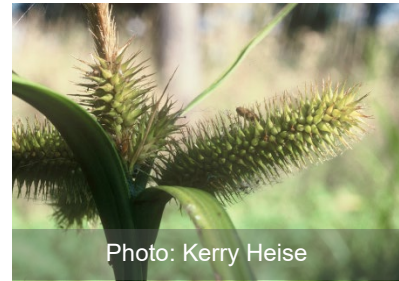
**Status:**

Federal:

State: none

CNPS: 2.1

Other: None



**Species Description:** The Bristly Sedge is a monocot reaching to 50 to 100 cm tall (Hickman 1996). The leaves are long, glabrous and 3 ranked, with a closed sheath with the lower sheath front shredding into a network of fringe of veins and a ligule less than or equal to its width (NatureServe 2009; Hickman 1996). The lower pistillate spikelets are on long, nodding stalks and usually greater than two where as the top 1 to 5 spikelets are staminate (Hickman 1996). The pistillate flower bract is generally white or cream with a pale reddish center and a linear awn greater than the body (Hickman 1996). The perigynium is spreading, more or less angled, stalked and shiny green to gold with beak teeth 1.2 to 2.3 mm and outcurved (Hickman 1996).

**Nomenclature:** *Carex comosa* Boott Cyperaceae (USDA 2010)

**Synonyms:** *Carex pseudocyperus* var. *comosa* (IPNI 2005)

**Distribution:** This species is found throughout North America and occurs in a number of counties in California specifically in the inner North Coast Ranges below 625 m (CNPS 2010; eFloras 2008; Hickman 1996).

**Life History & Threats:** The Bristly Sedge is a monoecious short rhizomed perennial herb that flowers from May to September and its fruits are eaten by water fowl (CNPS 2010; Hickman 1996; USGS 2006). This species invades gaps in wetlands where it grows vegetatively for the first years and then flowers when larger (WNHP 2003). Threats to this species are marsh drainage, road maintenance, herbicides, pesticides, housing developments, invasive species, logging, shoreline development, and altered hydrological regimes (CNPS 2010; NatureServe 2009; WNHP 2003)

**Habitat & Habitat Associations:**

**Aquatic Habitat Types:** Habitats for this species are marshes and swamps or around lake margins dominated by emergent, suffrutescent herbs adapted to seasonally or permanently saturated soils, wet thickets, stream, pond and lakeshores, depressions in wet meadows, ditches, seeps, bogs, freshwater tidal marshes and wet areas in valley and foothill grassland dominated by introduced Mediterranean grasses and native herbs (CNPS 2010; eFlora 2008; WNHP 2003; Hilty 2010).

*Topography and Microclimates:* Shallow water or on emergent stumps, floating logs, and floating mats of vegetation (eFloras 2008). Prefers full sun to light shade (Hilty 2010).

*Elevation:* 0 to 625 m (CNPS 2010) (The Study Area ranges from 200 to 740 m).

*Geology and Soils:* mucky (oxidized organic materials that accumulate in swamps and marshes) to slightly sandy soil (Hilty 2010; Troeh and Thompson 2005).

*Species Associations:*

Associated species may include *Carex utriculata*, *Potentilla palustris*, *Typha latifolia*, *Spiraea douglasii*, *Dulichium arundinaceum*, and *Phalaris arundinacea*. (From WNHP 2003).

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as areas:

- below 655 m in elevation (includes a buffer of 30 m on known elevational occurrences for this species)
- ponds
- streams
- grasslands.

Springs and seeps are common throughout the Study Area but are not available in the GIS database. Swamps, marshes, wet thickets, bogs, and lakes do not occur on the Preserve.

**Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* Bristly Sedge occurs in wet areas in full sun to light shade where emergent vegetation is supported. Habitat quality in the Preserve is poor to moderate. Many habitat types where this species are found (e.g., swamps, marshes, bogs) are not present. Ponds and streams in the Preserve are often either too shaded (ponds and tributaries to Rancheria Creek) or too scoured during floods (mainstem of Rancheria Creek) to be conducive to supporting perennial emergent vegetation.

The best quality potential habitat for Bristly Sedge in the Preserve is likely springs and seeps which are common in a wide variety of habitats throughout the Preserve. Seeps occur in open grassy areas and are typically dominated by rushes (*Juncus* spp.), sedge (*Cyperus eragrostis*), mint (*Menthe pulegium*) and bracken ferns (*Pteridium aquilium*). Springs, sites with surface water, occur in many habitat types and vary in species composition. The potential for these sites to support Bristly Sedge may be lowered by the presence of invasive species and a history of logging at the Preserve, both of which are known threats to this species. Seeps and springs are however, abundant increasing the likelihood of occurrence.

*Nearest Occurrence:*

Documented Occurrences in Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not document this species (SSU Field Station and Nature Preserves 2010).



Nearest Occurrence to Galbreath Wildlands Preserve: Species is known from 5 occurrences in Mendocino County (Calflora 2010) and occurs at sites to the north and south of the Preserve. The nearest occurrence is 12 miles northeast of the Galbreath Wildlands Preserve in the Hopland quad in the Upper Russian River watershed (Calflora 2010). Occurrence of this species on the Preserve would be within its known distributional range (Calflora 2010).

*Summary:* We anticipate the Bristly Sedge to be “Likely to Occur” because potential habitat (seeps) is moderate in quality and abundant on the Preserve, and the Preserve is bracketed by occurrences to the north and south of the Preserve.

## References

Calflora. 2010. Information on California plants for education, research and conservation. <<http://www.calflora.org/>>. Accessed 2010 Jun 29.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>>. Accessed 2010 Jun 29.

eFloras 2008. Flora of North America. Published on the Internet < <http://www.efloras.org>>. Accessed 2010 Jun 29.

Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup> printing. London: University of California Press, Ltd. 1122 p.

Hilty J. 2010. Grasses, Sedges and Non-Flowering Plants of Illinois. <[http://www.illinoiswildflowers.info/grasses/grass\\_index.htm#bb\\_sedge](http://www.illinoiswildflowers.info/grasses/grass_index.htm#bb_sedge)>. Accessed 2010 Jun 29.

Heise K. 2009. *Carex comosa* Bristly Sedge. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Carex+comosa](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Carex+comosa)>. Accessed 2001 May 15.

International Plant Name Index (IPNI). 2005. <<http://www.ipni.org/>>. Accessed 2010 Jun 29.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. <<http://www.natureserve.org/explorer>>. Accessed 2010 Jun 29.

SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

Taylor DW. 1997. *Carex comosa* Bristly Sedge. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Carex+comosa](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Carex+comosa)>. Accessed 2011 May 15.

Troeh FR, Thompson LM. 2005. Soils and Soil Fertility. 6<sup>th</sup> ed. Ames, IW; Blackwell Publishing. p. 25-26.

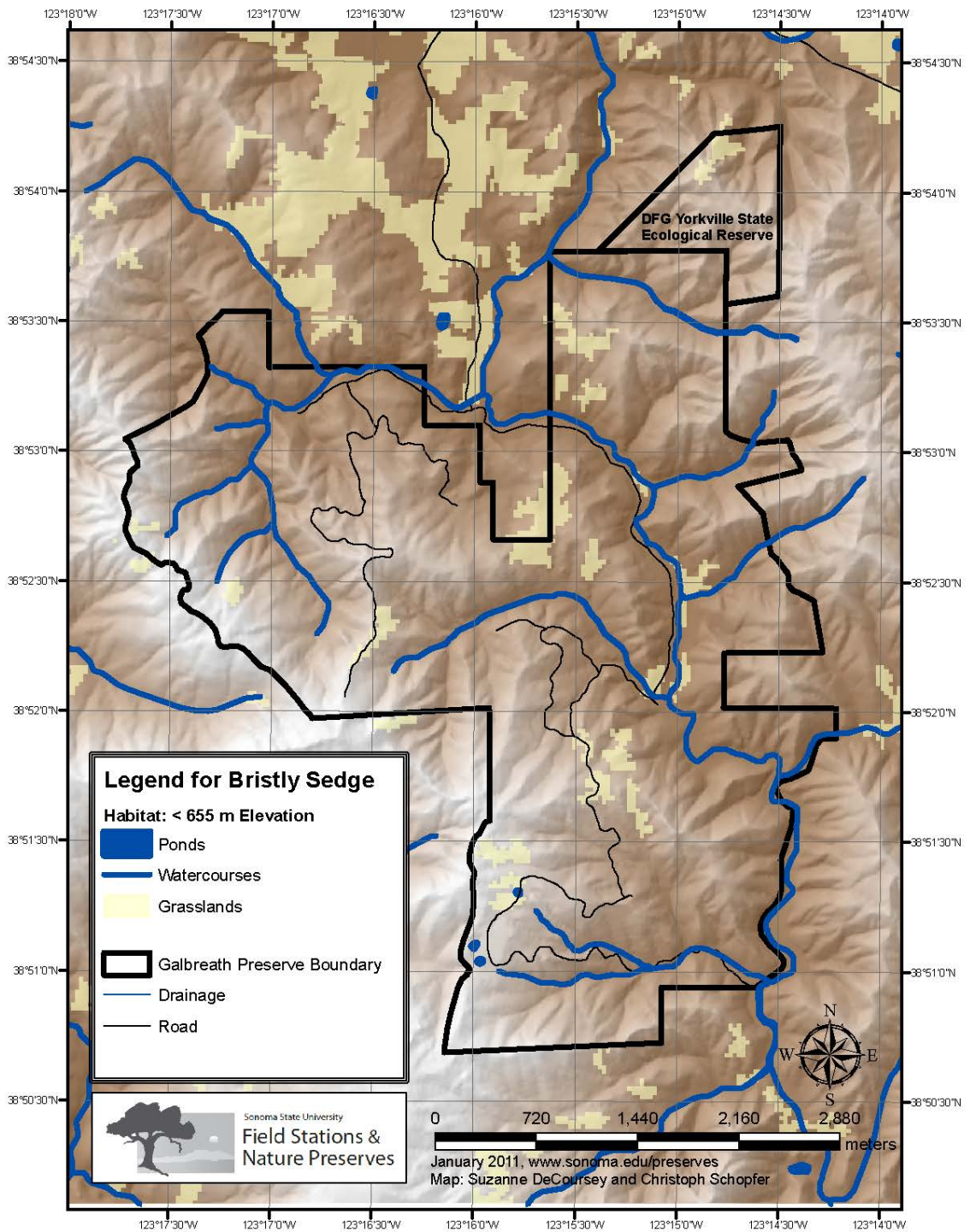
United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/nameSearch?keywordquery=carex+comosa&mode=sciname&submit.x=0&submit.y=0>>. Accessed 2011 May 15.

United States Geological Survey [USGS]. 2006. Northeast Wetland Flora Field Office Guide to Plant Species.  
<<http://www.npwrc.usgs.gov/resource/plants/florane/species/4/potaepih.htm>>. Accessed 2010 Jun 29.

Washington Natural Heritage Program (WNHP). 2003. Field Guide to Selected Rare Vascular Plants of Washington.  
<<http://www1.dnr.wa.gov/nhp/refdesk/fguide/htm/fsfgabc.htm>>. Accessed 2010 Jun 29.

**Species Account Description:** Linden Schneider

**Figure 6: Potential habitat for Bristly Sedge (*Carex comosa*)**



*Liliopsida (Grasses, Lillies, Orchids): Cyperaceae*  
**Deceiving Sedge (*Carex saliniformis*)**  
**Potential Occurrence in Preserve: Not Expected to Occur**

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**Status:**

Federal: None

State: None

CNPS: 1B.2

Other: None



**Species Description:** The Deceiving Sedge is loosely cespitose with a glabrous stem and flat leaves (Hickman 1996). The inflorescence generally has one spikelet per node, with the terminal 3 being staminate and the lower 3 or more being pistillate (Hickman 1996). The lowest spikelet bract is generally greater than the inflorescence and not sheathing (Hickman 1996). There are 8 to 20 perigynia per spikelet and they are sessile and papillate with a tapered body and a dark red-brown, unnotched tip (Hickman 1996).

**Nomenclature:** *Carex saliniformis* Mack. Cyperaceae (USDA 2010)

**Synonyms:**

*Carex saliniformis* is listed as a synonym of *Carex hassei* L. H. Bailey (From Regents of the University of California 2010)

**Distribution:** This species ranges from Humboldt to Santa Cruz County between elevations of 3 and 230 m, and the type locality is in Mendocino City (CNPS 2010; Smith and Wheeler 1992).

**Life History & Threats:** The Deceiving Sedge is a perennial rhizomatous, herbaceous monocot that blooms in June and July (CNPS 2010). This species is possibly threatened by grazing and taller, perennial, generally non-native grasses (CNPS 2010; Maslach 2008)

**Habitat & Habitat Associations:**

**Aquatic Habitat:** Habitat for this species is seeps, mesic marshes and swamps, which can be coastal and salty (CNPS 2010).

**Vegetation Types:** Habitat for this species is coastal prairie dominated by dense and tall perennial grasses and grass-like herbs, coastal scrub dominated by dense shrubs with grassy openings, and meadows dominated by dense grasses, sedges, and herbs, which thrive under seasonally moist to saturated conditions (CNPS 2010)

**Topography and Microclimates:** open areas, meadows that are grazed or mowed, and along trails (Hickman 1996; Maslach 2008)

**Elevation:** 3 to 230 m (CNPS 2010) (The Study Area ranges from 230 to 710 m).

*Geology and Soils*: heavy soil wet during rainy season (Maslach 2008)

*Species Associations*: The Deceiving Sedge has been documented growing with coyote thistle (*Eryngium armatum*), witchgrass (*Panicum capillare*), tinker's penny (*Hypericum anagalloides*) and coast lotus (*Lotus formosissimus*). Does not thrive when other taller, perennial, generally non-native grasses are in habitat (Maslach 2008).

**Conceptual Basis for GIS Model Development**: Potential habitat in the Study Area was mapped as areas:

- below 260 m (a 30 m buffer around known elevational occurrences is included)
- grasslands.

#### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat*: Habitat for Deceiving Sedge is grassland seeps or springs below 230 m. The GIS map indicates that grasslands below 260 m are not present on the Galbreath Wildlands Preserve. In addition, habitat quality is poor. While springs and seeps are common throughout the Galbreath Wildlands Preserve, seeps are typically dominated by rushes (*Juncus* spp.), sedge (*Cyperus eragrostis*), mint (*Menthe pulegium*), bracken ferns (*Pteridium aquilium*), and this species does not thrive in areas with these tall, perennial species.

#### *Nearest Occurrence*:

Documented Occurrences in the Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not document this species (SSU Field Station and Nature Preserves 2010).

Nearest Occurrence to the Galbreath Wildlands Preserve: This species is known from from 38 occurrences in Mendocino County, and in counties to the north (Humboldt) and south (Sonoma)(Calflora 2010). All documented occurrences in Mendocino County occur closer to the coast than the Preserve (Calflora 2010). The nearest occurrence is approximately 16 miles southwest of the Preserve in the Gualala River watershed (Calflora 2010).

*Summary*: We anticipate that Deceiving Sedge is “Not Expected to Occur” because grassland seeps do not occur within the known elevational range of this species.

#### **References**

Calflora. 2010. Information on California plants for education, research and conservation. <<http://www.calflora.org/>> Accessed 2010 Jun 22.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>> Accessed 2010 Jun 22.

Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup>ed.. London: University of California Press, Ltd. 1134 p.

Maslach W. 2008. Botanical Survey and ESHA Assessment. <<http://www.gualalamac.com/>> Accessed 2010 Jun 24.

Matson S. 2003. *Carex saliniformis*. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Carex+saliniformis](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Carex+saliniformis)>. Accessed 2010 Nov 2.

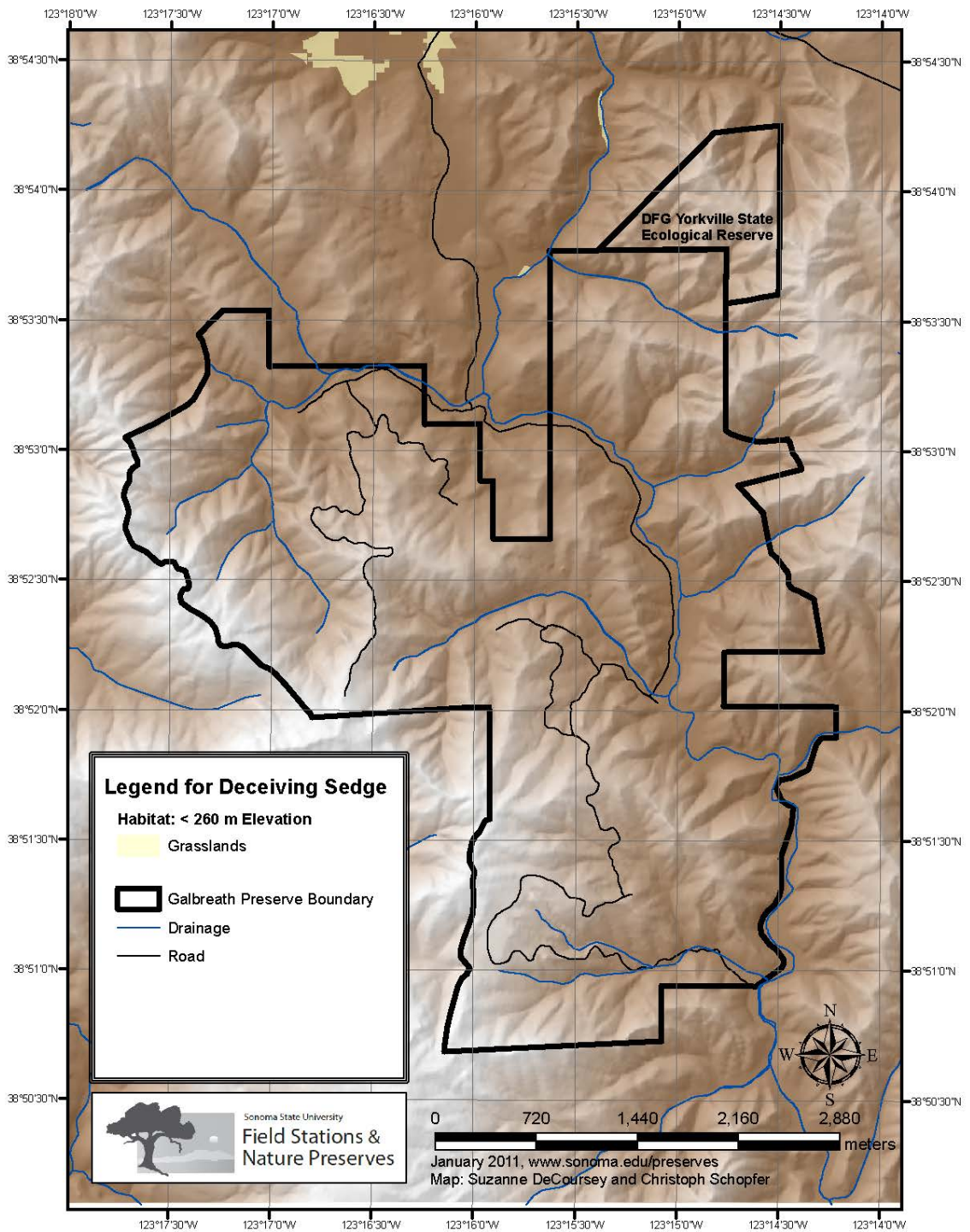
Smith GL, Wheeler CR. 1992. A flora of the Vascular Plants of Mendocino County, California. San Francisco: University of San Francisco. 36 p.

SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/profile?symbol=CASA6>>. Accessed 2010 Nov 2.

**Species Account Description:** Linden Schneider

**Figure 6: Potential habitat for Deceiving Sedge (*Carex saliniformis*)**



*Liliopsida (Grasses, Lilies, Orchids): Liliaceae*  
**Franciscan Onion (*Allium peninsulare* var. *franciscanum*)**  
**Potential Occurrence: Known to Occur**

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**Status:**

Federal: None

State: None

CNPS: 1B.2

Other: None



**Species Description:** The Franciscan Onion has 1 to 5 basal, channeled to cylindrical, curved leaves and a 12 to 45 cm stem (Hickman 1996). The bulb is 8 to 15 mm, ovoid to spheric with an outer coat of brown or gray with surface orientation that is laterally elongate, V-shaped and herring bone like (Hickman 1996). The inflorescence is generally a 5 to 35 flowered umbel with pedicels 8 to 20 mm (Hickman 1996). The flowers are 8 to 12 mm with red-purple, lanceolate to elliptic, erect perianth parts with recurved tips and a barely thickened, unlobed or minutely 3 lobed stigma (eFloras 2008; Hickman 1996).

**Nomenclature:** *Allium peninsulare* Lemmon ex Greene var. *franciscanum* McNeal & Ownbey Liliaceae (USDA 2010)

**Synonyms:** none

**Distribution:** This species occurs in California on the Central Coast, in the San Francisco Bay Area Region, on the North Coast and in the North Coast Ranges from Santa Clara county north to Mendocino County (Calflora 2010; CNPS 2010; Hickman 1996).

**Life History & Threats:** This species is a perennial bulbiferous herbaceous monocot and is threatened by development, foot traffic, non-native plants and trail maintenance (CNPS 2010).

**Habitat & Habitat Associations:**

**Vegetation Types:** Habitat for this species is cismontane woodland dominated deciduous, evergreen trees or both with open canopies and valley and foothill grassland dominated by introduced Mediterranean grasses and native herbs (CNPS 2010).

**Topography and Microclimates:** dry hillsides (Hickman 1996)

**Elevation:** 53 to 300 m (CNPS 2010) (The Study Area ranges from 200 to 740 m).

**Geology and Soils:** clay, volcanic, often serpentinite soils (eFloras 2010; CNPS 2010). Weak serpentine soil indicator (Calflora 2010).

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as areas:



- below 330 m in elevation (includes a 30 m buffer on known elevational occurrences of this species)
- grasslands or cismontane woodlands (i.e. mixed, montane mixed and single dominant hardwoods vegetation types with canopy cover between 10 and 40%)

We additionally identified as best potential habitat as:

- clay soils (i.e. clay loam) on dry hillsides (south, southwest, or southeast facing slopes with > 7 degree slope)

Serpentine soils, while common regionally, are not indicated by the GIS soil data as occurring in the Study Area. To verify the GIS information, we identified all areas (11 sites) of exposed rocky soils from high-resolution satellite imagery. During site visits to these areas, the only serpentine found were rocks exposed by road maintenance activity at a waterbar. Volcanic soils are not present in the Study Area.

### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* The best habitat for Franciscan Onion in the Preserve is predominantly cismontane woodlands with clay soils below 330 m. This type of habitat is limited in the Galbreath Wildlands Preserve, occurring predominantly along portions of Rancheria Creek and its tributaries. The best soils are located along Levingston Creek.

Habitat quality is moderate to good. Franciscan Onion is weakly associated with serpentine soils and with volcanic soils, both of which do not occur in the Preserve. However, the sites with clay soils may provide high quality habitat for this species.

### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: Franciscan Onion was found at 4 roadside sites (~1300 individuals) in southern and central areas of the Preserve in 2013 (Geri Hulse-Stevens, and Kerry Heise, pers. comm; location and abundance data available from SSU Preserve staff). Note that these data are not shown on the attached map.

Nearest Occurrence the Galbreath Wildlands Preserve: Franciscan Onion was known previously from 1 occurrence in Mendocino County, the most northern reported occurrence for this species. It is more common to the south in Sonoma County (15 occurrences) and counties south of San Francisco (Calflora 2010). Literature reports indicate that the species is rare but widespread throughout Sonoma County. The nearest documented occurrence to the Preserve is 11 miles to the east in the upper reaches of the Middle Russian River watershed (Calflora 2010).

*Summary:* This species is “Known to Occur” on the Preserve.

### **References**

Calflora. 2010. Information on California plants for education, research and conservation. <<http://www.calflora.org/>> Accessed 2010 Jun 28.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>> Accessed 2010 Jun 28.

Corelli T. 2007. *Allium peninsulare* var. *franciscanum*. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Allium+peninsulare+var.+franciscanum](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Allium+peninsulare+var.+franciscanum)>. Accessed 2010 Nov 2.

eFloras 2008. Flora of North America. <<http://www.efloras.org>>. Accessed 2010 Jun 28.

Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup>ed. London: University of California Press, Ltd. 1178 p.

Saint Mary's College of California. 1995. *Allium peninsulare* var. *franciscanum*. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Allium+peninsulare+var.+franciscanum](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Allium+peninsulare+var.+franciscanum)>. Accessed 2010 Nov 2.

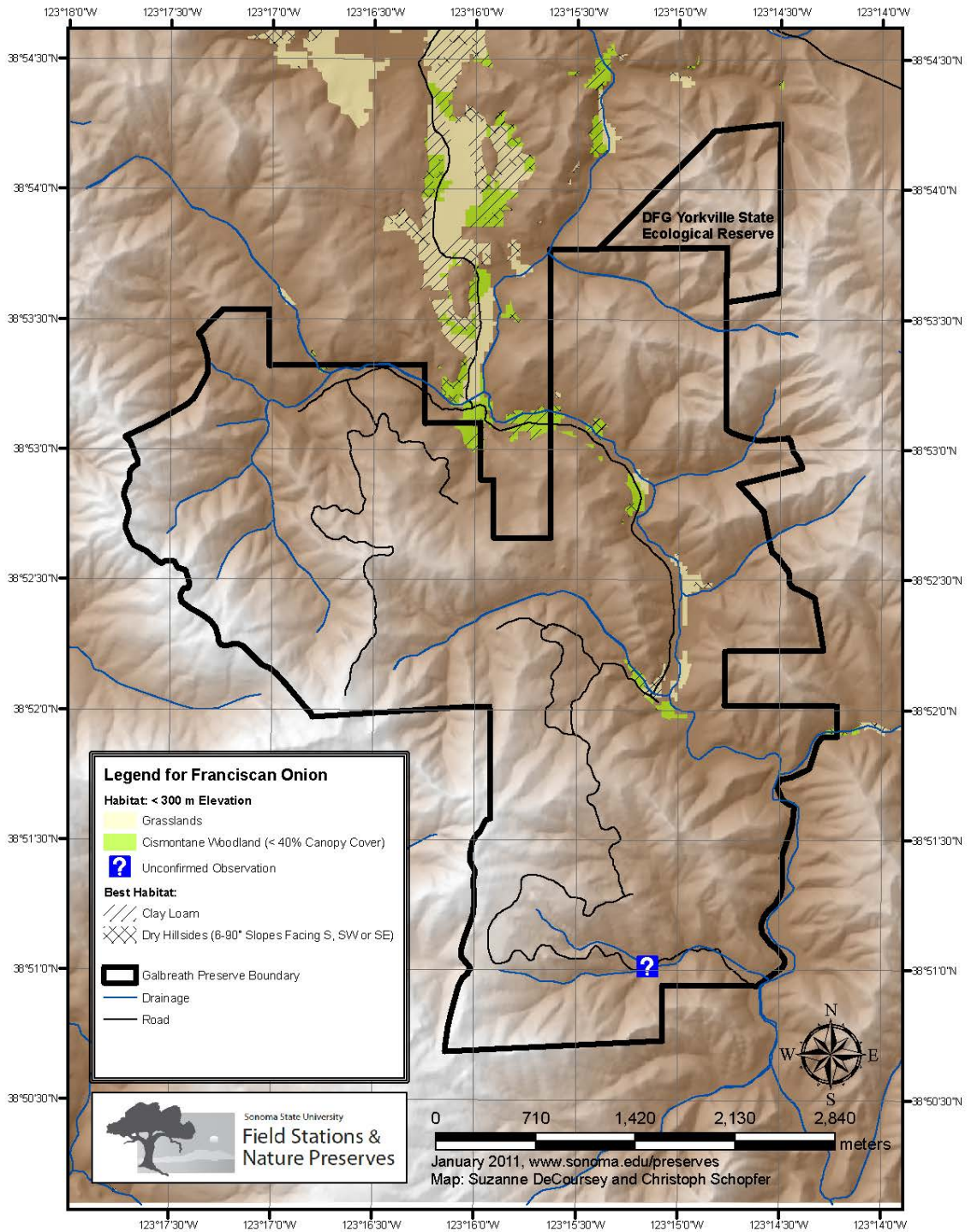
Schneider L. 2010. Personal communication. 2010 Jun 12.

SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/nameSearch?mode=symbol&keywordquery=ALPEF>>. Accessed 2010 Oct 4.

**Species Account Description:** Linden Schneider

**Figure 8: Potential habitat for Franciscan Onion (*Allium peninsulare franciscanum*)**



*Liliopsida (Grasses, Lilies and Orchids): Liliaceae*  
**The Cedars Fairy Lantern (*Calochortus raichei*)**  
**Potential Occurrence: Not Expected to Occur**

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**Status:**

Federal: None

State: None

CNPS: 1B.2

Other: None



Photo: John Game



Photo: Steve

**Species Description:** The Cedars Fairy Lantern is very glaucous, standing 1 to 100 cm tall with a simple stem, persistent, 10 to 40 cm basal leaves and 1 to 4 cauline leaves (Hickman 1996). The inflorescence is nodding with 1 or 2 flowers. The flowers are closed at the tip and more or less spheric with 35 to 45 mm, pale yellow, obovate petals that are ciliate throughout with a hairy surface and a depressed nectary bordered by long, slender hairs (Hickman 1996). As the flowers age they become bright, rusty orange (Gerritsen and Parsons 2007). The fruit is a capsule 25 to 35 mm, nodding and angled. The seeds are irregular and dark brown (Hickman 1996).

**Nomenclature:** *Calochortus raichei* Farwig & Girard Liliaceae (USDA 2010)

**Synonyms:** None

**Distribution:** This species occurs in the southern outer North Coast Range and is known largely from headwaters area of Big Austin Creek in Sonoma County (eFloras 2008; Hickman 1996)

**Life History & Threats:** The Cedars Fairy Lantern is a perennial, bulbiferous herb blooming from May to August and is a strict serpentine endemic (Calflora 2010; CNPS 2010; Hickman 1996). This species is threatened by road construction and mining (CNPS 2010).

**Habitat & Habitat Associations:**

**Vegetation Types:** The habitat for this species is on serpentinite in closed cone coniferous forests in which the dominating trees are serotinous-coned conifers, chaparral dominated by mostly evergreen shrubs with thick, leathery leaves and stiff branches, and open woodlands (CNPS 2010; eFloras 2008).

**Topography and Microclimates:** Partial shade to full sun (Gerritsen and Parsons 2007)

**Elevation:** 200 to 490 m (CNPS 2010) (The Study Area ranges from 230 to 710 m)

**Geology and Soils:** Strict serpentine endemic, 95% of occurrences are on ultramafics (Calflora 2010). Open serpentine and serpentinite (CNPS 2010; Hickman 1996)

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as areas:

- below 510 m elevation (A 30 m elevation buffer was added to species known elevational range)
- chaparral (i.e. Northern mixed chaparral)
- cismontane woodlands (i.e., mixed hardwoods, mixed montane hardwoods or single dominant hardwoods with canopy cover < 40%).

Serpentine soils, while common regionally, are not indicated by the GIS soil data as occurring in the Study Area. No closed cone conifers are known to occur in the Study Area.

### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* The Cedars Fairy Lantern is a strict serpentine endemic that occurs in chaparral, open woodlands, and closed-cone coniferous forest. Habitat for this species does not occur in the Preserve. Serpentine soils, while common regionally, are not indicated by the GIS soil data as occurring in the Study Area. To verify the GIS information, we identified all areas (11 sites) of exposed rocky soils from high-resolution satellite imagery. During site visits to these areas, the only serpentine found were rocks exposed by road maintenance activity at a waterbar.

#### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not document this species (SSU Field Station and Nature Preserves 2010).

Nearest Occurrence to the Galbreath Wildlands Preserve: This species is only known from 22 occurrences in Sonoma County (Calflora 2010). The nearest occurrence is approximately 13 miles south of the Galbreath Wildlands Preserve in the Tombs Creek quad in the Gualala River watershed (Calflora 2010). Occurrence of this species on the Preserve would constitute a northern range extension.

*Professional Consultations:* “Unless there is serpentine, and probably lots of it, it is extremely unlikely that ... *Calochortus raichei* ...[is] present.” (R. Raiche pers comm.).

*Summary:* We anticipate the Cedars Fairy Lantern to be “Not Expected to Occur” because serpentine soils do not occur in the Preserve.

### **References**

Calflora. 2010. Information on California plants for education, research and conservation. <<http://www.calflora.org/>> Accessed 2010 Jul 12.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>> Accessed 2010 Jul 12.

eFloras 2008. Flora of North American. Published on the Internet <<http://www.efloras.org/>>. Accessed 2010 Jul 12.

Game J. 1998. The Cedars Mariposa Lilly *Calochortus raichei*. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Calochortus+raichei](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Calochortus+raichei)>. Accessed 2011 May 15.

Gerritsen ME, Parsons R. 2007. *Calochortus: Mariposa lilies & their relatives*. Portland; Timber Press, Inc. 59 p.

Hickman JC editor. 1996. *The Jepson Manual Higher Plants of California*. 3<sup>rd</sup> printing. London: University of California Press, Ltd. 1122 p.

Lowens S. 2005. Cedars Mariposa Lilly *Calochortus raichei*. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Calochortus+raichei](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Calochortus+raichei)>. Accessed 2011 May 15.

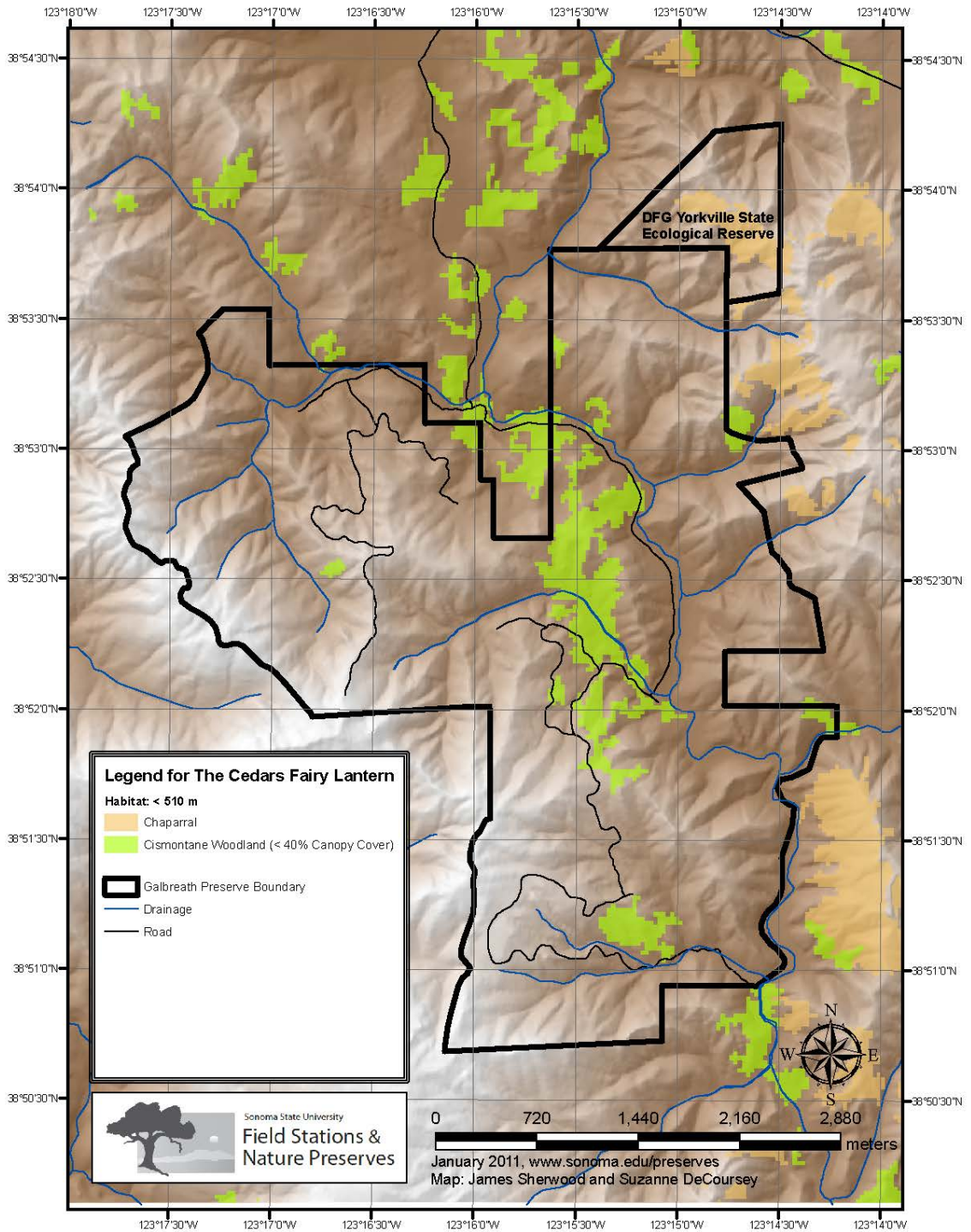
SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

Raiche R. 2010. Personal communication. 2010 Jul 12.

United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/nameSearch?mode=symbol&keywordquery=CARA16>>. Accessed 2010 Jul 17.

**Species Account Description:** Linden Schneider

**Figure 9: Potential habitat for The Cedars Fairy Lantern (*Calochortus raichei*)**



*Liliopsida (Grasses, Lillies, Orchids): Liliaceae*  
**Coast Fawn Lilly (*Erythronium revolutum*)**  
**Potential Occurrence: Likely to Occur**

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**Status:**

Federal: None

State: None

CNPS: 2.2

Other: None



**Species Description:** The Coast Fawn Lilly has widely lanceolate to ovate, brown or white mottled leaves, with entire to wavy margins (Hickman 1996). The inflorescence is a raceme of 15 to 40 cm high with one to three flowers (Hickman 1996). The perianth segments are lanceolate to narrowly elliptic and are pink with yellow bands at the base (Hickman 1996). The filaments of the stamens are white to pink and the anthers are yellow. The style is white to pink and the stigma three lobed, slender and recurved (Hickman 1996). The fruit is an oblong to ovoid capsule (Hickman 1996).

**Nomenclature:** *Erythronium revolutum* Sm. Liliaceae (USDA 2010)

**Synonyms:** none

**Distribution:** This species occurs on the North Coast and in the North Coast Ranges into British Columbia between 0 and 1,350 m (CNPS 2010; Hickman 1996)

**Life History & Threats:** The Coast Fawn Lilly is a bulbiferous herb blooming from March to August (CNPS 2010). It is threatened by logging, non-native plants, road maintenance and possibly grazing (CNPS 2010).

**Habitat & Habitat Associations:**

**Aquatic Habitat Types:** Habitat for this species is on the edges of bogs and fens dominated by perennial herbs and low shrubs, and North Coast coniferous forest stream banks (CNPS 2010; Ladybird Johnson Wildflower Center 2010).

**Vegetation Types:** Habitat for this species is broadleaved upland forest dominated by stands of evergreen or deciduous broadleaved trees that are 5 meters tall or more, and mesic North Coast coniferous forests dominated by needle leaved evergreen trees (CNPS 2010)

**Topography and Microclimates:** Open to moderately shaded areas (WNHP 2003). Generally within 100 km of the coast (eFloras 2008).

Given excellent drainage (modification of compacted or other water-holding soils may be necessary), moderate summer watering, and full or part shade (morning and winter sun may be tolerated), grows especially well in **zone 16** and also in zone 17. (From Jepson Horticultural Interchange 2006)



*Elevation:* 0 to 1,350 m (CNPS 2010) (The Study Area ranges from 230 to 710 m).

*Geology and Soils:* Moist mineral soil (WNHP 2003). Rich moist well drained soil (Ladybird Johnson Wildflower Center 2010).

*Other Special Habitat Features:* river terraces (eFloras 2008)

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as:

- coniferous forest ( i.e. Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) or Pacific Douglas fir (*Pseudotsuga menziesii* var. *menziesii*) vegetation with a canopy cover of  $\geq 40\%$ )
- broadleaf upland forests (i.e., mixed, montane mixed, or single dominant hardwoods with a canopy cover of  $\geq 40\%$ )

Best potential habitat was identified as areas above with:

- perennial streams
- stream terraces
- very well-drained soils. Because well-drained soils are found throughout the entire Study Area, mapping them adds no information to the habitat assessment. Instead, we mapped very well-drained soils (defined as those with the plurality of soil volume listed as “excessively drained” or “somewhat excessively drained” in soil survey reports) as best habitat for this species.

#### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* Best habitat for Coast Fawn Lily in the Preserve are moist stream banks in coniferous and broadleaved upland forests. These forests types are common throughout the Preserve, but the perennial streams and stream terraces required by this species are restricted to tributaries of Rancheria Creek. Stream terraces are likely underestimated in the GIS map: visible terraces identified from satellite data are shown; field surveys are needed to identify smaller terraces or those obscured by vegetation.

Habitat quality is good. The forested moist conditions along streamsides appears to be adequate for supporting this species. Even though areas with very well-drained soils do not co-occur with streamside habitat, well-drained soils are widespread throughout the Preserve.

#### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: A previous site visit of the Galbreath Wildlands Preserve did not find this species (SSU Field Station and Nature Preserves 2010)

Nearest Occurrence to the Galbreath Wildlands Preserve: This species is predominantly found in Mendocino and Humboldt counties. Two occurrences are reported from Sonoma County, indicating that this species ranges further to the south

than the Preserve. This species is known from 24 occurrences in Mendocino County (Calflora 2010). The nearest occurrence is on the Philo quad to the northwest of the Preserve in the Navarro River watershed (Calflora 2010; CNPS 2010).

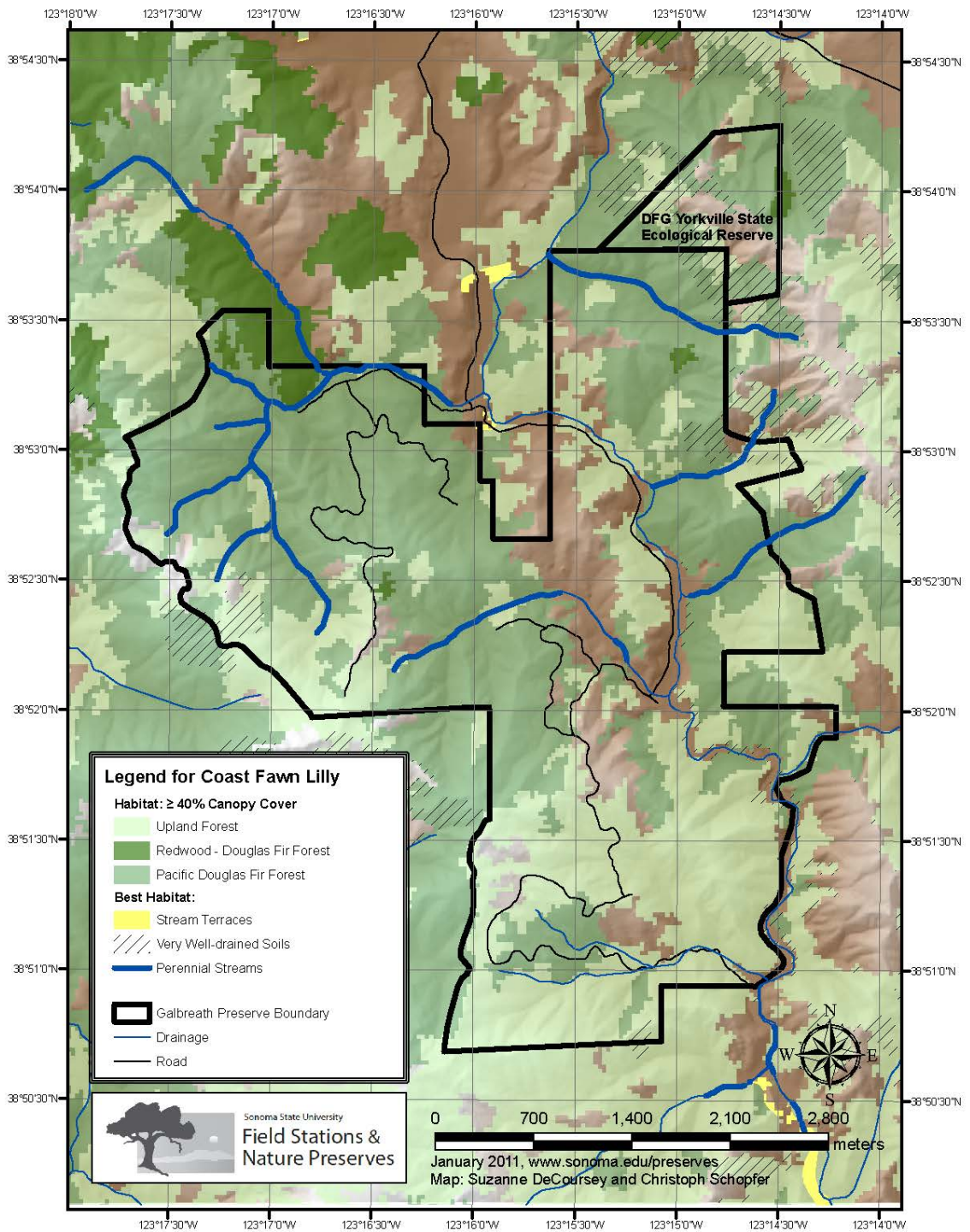
*Summary:* Coast Fawn Lily is “Likely to Occur” because habitat quality is good, habitat is abundant, the species is bracketed by known occurrences to the north and south, and the species has been found nearby (relative to distances observed among other occurrences).

## References

- Calflora. 2010. Information on California plants for education, research and conservation. <<http://www.calflora.org/>>. Accessed 2010 Jun 22.
- California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>>. Accessed 2010 Jun 22.
- eFloras. 2008. Flora of North America. Published on the Internet < <http://www.efloras.org>>. Accessed 2010 Jun 24.
- Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup>ed.. London: University of California Press, Ltd. 1194 p.
- Jepson Horticultural Database. 2006. <[http://ucjeps.berkeley.edu/cgi-bin/get\\_hort.pl?taxon=Fritillaria%20biflora%20var.%20biflora](http://ucjeps.berkeley.edu/cgi-bin/get_hort.pl?taxon=Fritillaria%20biflora%20var.%20biflora)>. Accessed 2010 Jun 24.
- Ladybird Johnson Wildflower Center. 2010. <<http://www.wildflower.org/explore/>>. Accessed 2010 Jun 24.
- Matson S. 2007. *Erythronium revolutum*. <[http://calphotos.berkeley.edu/cgi/img\\_query?enlarge=0000+0000+0407+1298](http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0407+1298)>. Accessed 2010 Jun 24.
- SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.
- Wagner C. 2006. *Erythronium revolutum*. <[http://calphotos.berkeley.edu/cgi/img\\_query?enlarge=0000+0000+0106+0354](http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0106+0354)>. Accessed 2010 Jun 22.
- Washington Natural Heritage Program (WNHP). 2003. Field Guide to Selected Rare Vascular Plants of Washington. <http://www1.dnr.wa.gov/nhp/refdesk/fguide/htm/fsfgabc.htm>. Accessed 2010 Jun 22.
- United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/profile?symbol=ERRE5>>. Accessed 2010 Oct 4.

**Species Account Description:** Linden Schneider

Figure 10: Potential habitat for Coast Fawn Lilly (*Erythronium revolutum*)



**Status:**

Federal: None

State: Endangered

CNPS: 1B.1

Other: None



Photos: Haleh Paymard

**Species Description:** Roderick's Fritillary is a perennial herb growing 10 to 45 cm high from a bulb (Hickman 1996). It has 3 to 7 alternate oblong to ovate leaves often crowded just above the base (Hickman 1996). The flower is nodding, 1.8 to 4 cm with narrowly ovoid, dark brown, greenish purple or yellowish green perianth parts. The fruit is an angled, thin walled, loculicidal capsule with many flat brownish seeds (Hickman 1996).

**Nomenclature:** *Fritillaria roderickii* Knight Liliaceae (USDA 2010)

**Synonyms:** The taxonomy of this species is under revision. USDA (2010), CNPS (2010), and Smith and Wheeler (1992) all identify the primary synonym as *F. grayana*. Hickman(1996) also lists *F. biflora* var. *biflora* as a synonym to *F. roderickii*. Callfora (2010) lists *F. roderickii* as a synonym for *F. biflora* var. *ineziana*:

Taxonomic validity has been questioned; further study needed. A synonym of *F. biflora* var. *biflora* in *The Jepson Manual*. USFWS uses the name *F. grayana*. See *Four Seasons* 2(2):14-16 (1967) for original description. (From CNPS 2010)

**Distribution:** This species occurs in the North Coast Range specifically in Napa, Mendocino, and Sonoma counties from 15 to 600 m (CNPS 2010, Hickman 1996, Smith and Wheeler 1992). CNPS (2010) reports that plants are introduced in Mendocino and Sonoma Counties. The type specimen for *F. roderickii* was found in Mendocino County about 4 miles south of Point Arena (Roderick 1965). NatureServe (2009) lists the distribution for *F. biflora* var. *ineziana* as "California: Mendocino County (*F. roderickii*) and Hillsborough area in San Mateo Co."

**Life History & Threats:** Roderick's fritillary is threatened by road maintenance, residential development, and erosion (CNPS 2010)

**Habitat & Habitat Associations:**

**Vegetation Types:** Habitat descriptions for this species (i.e., *F. roderickii*, *F. grayana*, *F. biflora* var. *biflora* or *F. biflora* var. *ineziana*) vary among leading texts and on-line databases:

CalFlora (2010): *F. roderickii* - Coastal Prairie, Valley Grassland, Northern Coastal Scrub

Hickman (1996): *F. biflora var biflora* - Grassy slopes, mesas, serpentine barrens.

NatureServe (2009): *F. garyana* - Clay and serpentine soils within Valley Grassland and Foothill/Cismontane Woodland communities. 0 - 200 m.

CNPS (2010): *F. roderickii* - Coastal bluff scrub (CBSCr), Coastal prairie (CoPrr), Valley and foothill grassland (VFGrs)

#### *Topography and Microclimates:*

Given excellent drainage ... and full or nearly full sun (tolerates summer afternoon sun), grows especially well in zones 20 and 21 and also in zones 14, 15, 16, 17, and 24. (From Jepson Horticultural Database 2006)

*Elevation:* 15 to 600 m (CNPS 2010; Smith and Wheeler 1992) (The Study Area ranges from 230 to 710 m).

*Geology and Soils:* clay or serpentine (NatureServe 2009)

*Species Associations:* Roderick's Fritillary is associated with grasses, coastal shrubs, broadleaved and evergreen trees (CNPS 2010, NatureServe 2009).

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as areas:

- below 630 m (includes a 30 m buffer relative to known elevational occurrences)
- grasslands or cismontane woodland (mixed, montane mixed, or single dominant hardwoods with a canopy cover of 10-40%)

Best potential habitat in areas defined above with clay, clay loam soil texture. Serpentine soils are not known to occur on the Preserve (see below).

#### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* Best habitat for this species in the Preserve is cismontane woodland and grasslands below 630 m with clay parent material. Low elevation grasslands and cismontane woodlands generally run north-south through the central portion of the Preserve, and clay and clay loam soils are common within these vegetation types. Serpentine soils, while common regionally, are not indicated by the GIS soil data as occurring in the Study Area. To verify the GIS information, we identified all areas (11 sites) of exposed rocky soils from high-resolution satellite imagery. During site visits to these areas, the only serpentine found was rocks exposed by road maintenance activity at a waterbar.

Habitat quality is difficult to assess given the uncertainty of habitat requirements for this species. We list habitat quality as moderate: clay soils occur within appropriate vegetation types but serpentine, a habitat element noted as coincident with many occurrence of this species, is lacking in the Preserve.

*Nearest Occurrence:*

Documented Occurrence in the Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not find this species (SSU Field Station and Nature Preserves 2010)

Nearest Occurrence to the Galbreath Wildlands Preserve: This species (here including *F. roderickii*, *F. biflora* var. *biflora*, and *F. grayana*) is known from 21 occurrences in Mendocino County (CalFlora 2010), all located north of the Preserve. The nearest occurrence is approximately 5 miles northwest of the Preserve in the Navarro Watershed (Calflora 2010). The greatest nearest neighbor distances among reported occurrences in Mendocino County is over 30 miles.

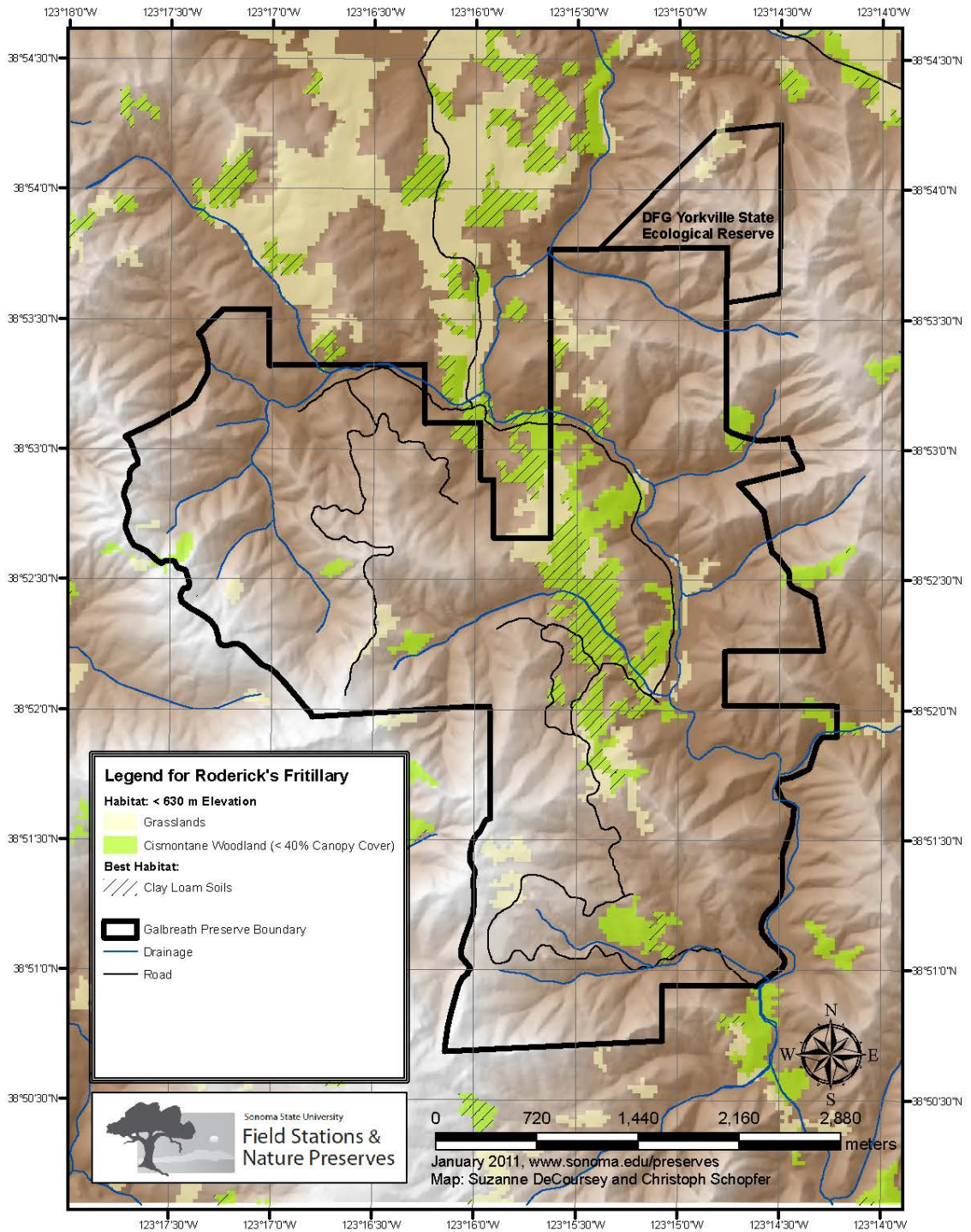
*Summary:* We anticipate this species is “Likely to Occur” due to the large areas of moderate quality habitat and the close proximity of the nearest documented occurrence (relative to maximum distances observed among known occurrences).

## References

- Calflora. 2010. Information on California plants for education, research and conservation. <<http://www.calflora.org/>>. Accessed 2010 Jun 18.
- California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>>. Accessed 2010 Jun 18.
- Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup> printing. London: University of California Press, Ltd. 1195 p.
- Jepson Horticultural Database. 2006. <[http://ucjeps.berkeley.edu/cgi-bin/get\\_hort.pl?taxon=Fritillaria%20biflora%20var.%20biflora](http://ucjeps.berkeley.edu/cgi-bin/get_hort.pl?taxon=Fritillaria%20biflora%20var.%20biflora)>. Accessed 2010 Jun 24.
- NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life. Version 7.1. <<http://www.natureserve.org/explorer>> Accessed 2010 Jun 18.
- Paymard H. 2008. *Fritillaria roderickii*; Roderick’s Fritillaria. <[http://calphotos.berkeley.edu/cgi/img\\_query?enlarge=0000+0000+0608+0165](http://calphotos.berkeley.edu/cgi/img_query?enlarge=0000+0000+0608+0165)>. Accessed 2010 Oct 4.
- Roderick W. 1967. Consortium of California Herbaria. <[http://ucjeps.berkeley.edu/cgi-bin/new\\_detail.pl?RSA276624](http://ucjeps.berkeley.edu/cgi-bin/new_detail.pl?RSA276624)>. Accessed 2010 Jun 24.
- Smith GL, Wheeler CR. 1992. A flora of the Vascular Plants of Mendocino County, California. San Francisco: University of San Francisco. 104 p.
- SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. Compiled by CNPS Milo Baker Chapter, Linden Schneider, and others. Updated June 2009. [http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf).
- United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/profile?symbol=FRGR4>>. Accessed 2010 Oct 4.

**Species Account Description:** Linden Schneider

**Figure 11: Potential habitat for Roderick's Fritillary (*Fritillaria roderickii*)**



*Liliopsida (Grasses, Lilies, Orchids): Orchidaceae*  
**White-Flowered Rein Orchid (*Piperia candida*)**  
**Potential Occurrence: Known to Occur**

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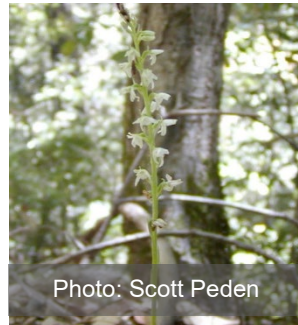
**Status:**

Federal: None

State: None

CNPS: 1B.2

Other: None



**Species Description:** The White-Flowered Rein Orchid has 2 to 5, 7 to 18 cm long basal leaves (Hickman 1996). The inflorescence is 7 to 30 cm and more or less one sided and open (Hickman 1996). The upper sepal is white or green with white margins and pointed forward (Hickman 1996). The lower two sepals are white with a green midvein (Hickman 1996). The lateral petals are pointed forward to slightly ascending and white with a green midvein (Hickman 1996). The lip is narrowly triangular, white and recurved towards the spur (Hickman 1996).

**Nomenclature:** *Piperia candida* R. Morgan & Ackerman Orchidaceae (USDA 2010)

**Synonyms:** none

**Distribution:** This species ranges from Alaska to California where it is found in the northwest and the southwest San Francisco Bay Area (Hickman 1996; NatureServe 2009).

**Life History & Threats:** The White-Flowered Rein Orchid is a perennial herb with a tuber or bulb like caudex blooming from May to September (CNPS 2010). Threats to this species include logging, forest harvesting and development (CNPS 2010; NatureServe 2009).

**Habitat & Habitat Associations:**

**Vegetation Types:** Habitat for this species is broadleaved upland forest dominated by evergreen or deciduous broadleaved trees more than 5 meters tall, North Coast coniferous forests dominated by needle leaved evergreen trees, lower montane coniferous forests dominated by open to dense stands of conifers and broadleaved trees in the understory, and chaparral (CNPS 2010; eFloras 2008).

**Topography and Microclimates:** Open to shaded sites (Hickman 1996). Not more than 150 km from the coast (eFloras 2008).

**Elevation:** 30 to 1,310 m (CNPS 2010) (The Study Area ranges from 230 to 710 m)

**Geology and Soils:** Sometimes serpentinite (CNPS 2010). This species is a weak indicator of serpentine soil (Calflora 2010).



**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as:

- Broadleaved upland forests (i.e. mixed, mixed montane or single dominant hardwoods with canopy cover  $\geq$  40%)
- North coast coniferous forests (i.e. Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var. *menziesii*) vegetation types with a canopy cover of  $\geq$  40%)
- Chaparral (i.e. Northern mixed chaparral or scrub oak)

**Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* White-Flowered Rein Orchid occurs in chaparral, and shaded broadleaved and coniferous forests. Chaparral does not occur within Preserve boundaries, but the shaded woodlands and forests required by this species are abundant (Figure 12).

Habitat quality is likely only moderate. This species is known to be negatively impacted by forestry practices and the Preserve has a long history of logging which was only discontinued in 2000. Timber harvest plans indicate that both clear cut and selection cut methods were used to harvest Redwood, Douglas Fir, and hardwoods at least as far back as 1988. This may have compromised the quality of habitat for White-Flowered Rein Orchids.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: White-flowered rain orchid was found at 12 roadside sites (300 individuals) in northern areas of the Preserve in 2013 (Geri Hulse-Stevens, Kerry Heise, Patty Madigan, Janet Olave pers. comm; location and abundance data available from SSU Preserve staff). Note that these data are not shown on the attached map.

Nearest Occurrence to the Galbreath Wildlands Preserve: This species is documented in areas to the north and south of the Preserve and is known from 16 occurrences in Mendocino County (Calflora 2010). The nearest occurrence is approximately 16 miles north of the Galbreath Wildlands Preserve in the Navarro River watershed (Calflora 2010). Occurrence of this species on the Preserve would not be a range extension from known distributional records (Calflora 2010).

*Summary:* The White-flowered Rein Orchid is “Known to Occur” on the Preserve.

**References**

Calflora. 2010. Information on California plants for education, research and conservation. <<http://www.calflora.org/>>. Accessed 2010 Jul 2.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>>. Accessed 2010 Jul 2.

Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup> printing. London: University of California Press, Ltd. 1215 p.

eFloras 2008. Flora of North American. Published on the Internet <<http://www.efloras.org>>. Accessed 2010 Jul 2.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. <<http://www.natureserve.org/explorer>>. Accessed 2010 Jul 2.

Peden S. 2002. *Piperia candida* Peral Orchid. < [http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Piperia+candida](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Piperia+candida)>. Accessed 2011 Apr 25.

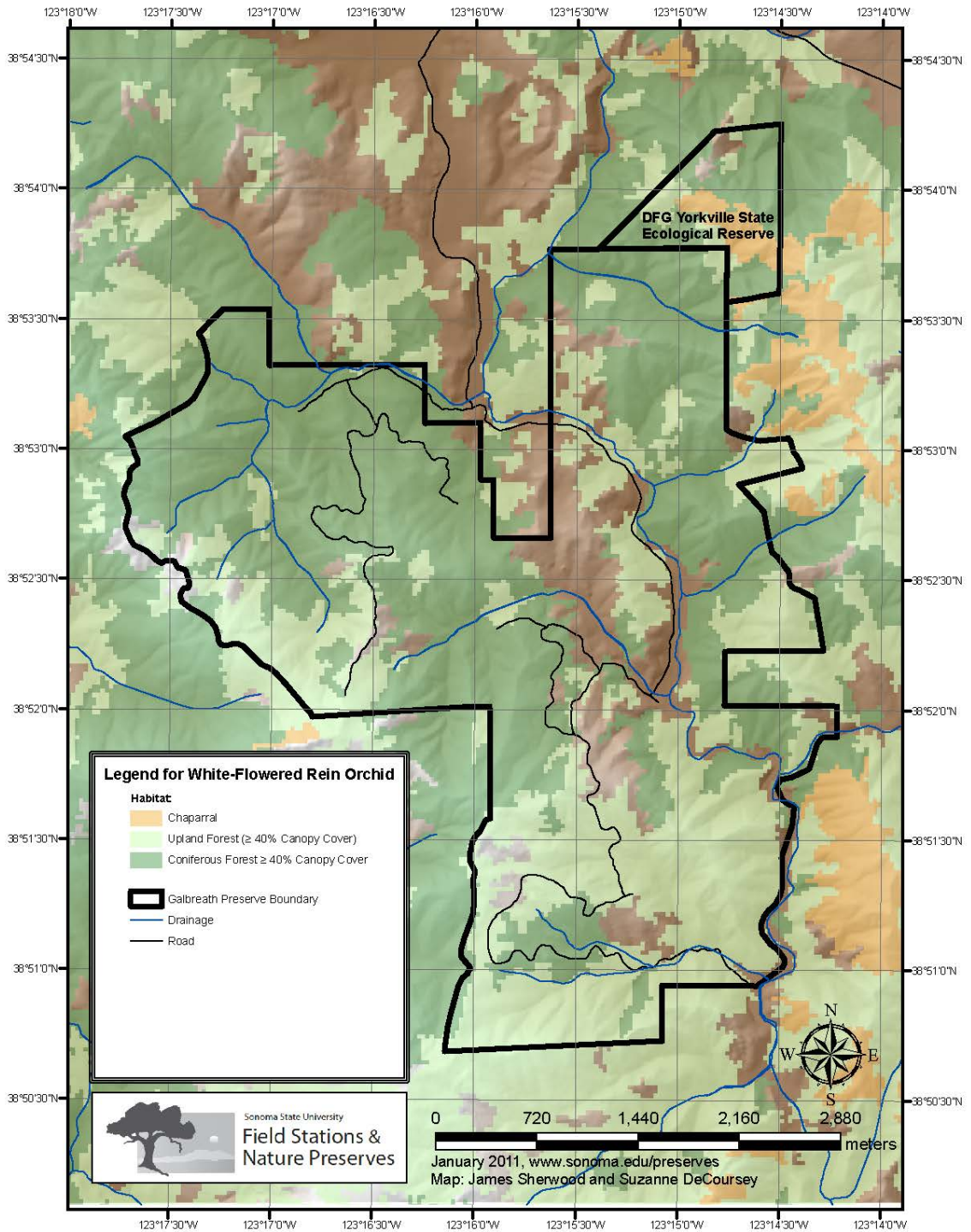
Post D. 1986. *Piperia candida* White-flowered Rein Orchid. < [http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Piperia+candida](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Piperia+candida)>. Accessed 2011 Apr 25.

SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/nameSearch?mode=symbol&keywordquery=PICA13>>. Accessed 2010 Jul 20.

**Species Account Description:** Linden Schneider

Figure 12: Potential habitat for White-Flowered Rein Orchid (*Piperia candida*)



*Liliopsida (Grasses, Lilies, Orchids): Poaceae*  
***Geysers dichantherium (Dichantherium lanuginosum var. thermale)***  
**Potential Occurrence: Unlikely to Occur**

**Status:**

Federal: None

State: Endangered

CNPS: 1B.1

Other: none



Photo: Julie Kierstead Nelson

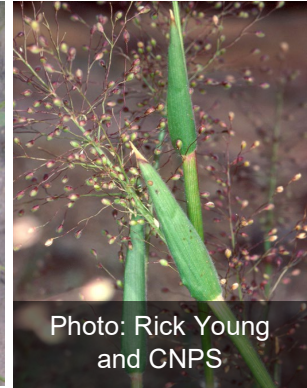


Photo: Rick Young  
and CNPS

**Species Description:** Geysers *Dichantherium* ranges from 10 to 60 cm tall (Hickman 1996). The leaf and leaf sheath are hairy (Hickman 1996). The inflorescence is 5 to 8 cm with a glabrous or short hairy axis and one spikelet per node (Hickman 1996). The spikelet is 1.5 to 2.6 cm, obovate to elliptic and the lower glume is one veined, with an acute tip (Hickman 1996). The lower floret of the spike is sterile and the lemma is seven veined (Hickman 1996).

**Nomenclature:** *Dichantherium lanuginosum* (Elliot) Gould var. *thermale* (Bol.) Spellenb. Poaceae (USDA 2011)

**Synonyms:** The taxonomy of this species is under revision:

CNPS (2010) and Calflora (2010) list *D. lanuginosum* var. *thermale* as the current name with synonyms *D. acuminatum* var. *thermale*, *Panicum acuminatum* var. *acuminatum* and *P. thermale*. Hickman (1996) lists *P. acuminatum* var. *acuminatum*. Smith and Wheeler (1992) list *D. acuminatum* var. *acuminatum*.

CNPS (2010) ranks only *D. lanuginosum* var. *thermale* and *P. thermale* as List 1B.1

**Distribution:** Distribution descriptions for this species vary among leading texts and online databases:

Hickman (1996): *P. acuminatum* var. *acuminatum*: Northwestern California, Cascade Range, Sierra Nevada, Great Central Valley, Central Coast, San Francisco Bay Area, Outer South Coast Ranges, Southwestern California, White and Inyo Mountains.

Smith and Wheeler (1992): *D. acuminatum* var. *acuminatum*: Widely collected North Coast counties except in Mendocino County. Here it occurs sparsely between Hwy 101 and the coast.

CNPS (2010): *D. lanuginosum* var. *thermale*: Known only from The Geysers geothermal area.

Calflora (2010): *D. lanuginosum* var. *thermale*: Has occurrence records throughout the state. In Mendocino County the distribution varies between the Coast and east of Laytonville.

**Life History & Threats:** Geysers Dichanthelium is a perennial grass that flowers from June to August (CNPS 2010). It is threatened by energy development, erosion, non-native plants and potentially threatened by road maintenance (CNPS 2010)

**Habitat & Habitat Associations:**

Habitat descriptions for this species vary among leading texts and on-line databases:

*Aquatic Habitat Types:*

CNPS (2010): *D. lanuginosum* var. *thermale*: sometimes streamside

Calflora (2010): *D. lanuginosum* var. *thermale*: wetland riparian

Hickman (1996): *P. acuminatum* var. *acuminatum*: Moist places, marshes, stream banks

*Vegetation Types:*

CNPS (2010): *D. lanuginosum* var. *thermale*: closed cone coniferous forests, riparian forests, valley and foothill grassland

Calflora (2010): *D. lanuginosum* var. *thermale*: Closed cone coniferous forest

Smith and Wheeler (1992): *D. acuminatum* var. *acuminatum*: Maritime grassland openings

*Elevation:* 305 - 825 m (CNPS 2010) (The Study Area ranges from 230 to 710 m)

*Geology and Soils:* Geothermally altered soil (CNPS 2010). Sandy clay loam (Smith and Wheeler 1992)

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as:

- above 285 m elevation (includes a 30 m buffer around elevations of known occurrences)
- grasslands
- riparian vegetation. A 130 m buffer was placed around Rancheria Creek (the only creek in the Galbreath Wildlands Preserve with significant riparian scrub or forest) to indicate areas with disjunct patches of riparian vegetation.

We additionally mapped best potential habitat in the areas identified above as:

- streams
- sandy clay loam soils (clay loam, loam, or sandy loam soil textures)

Note that no closed cone conifers or geothermally altered soils are known to occur in the Study Area.

### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* With Geysers Dichantherium under taxonomic revision, we chose to be inclusive of all habitats described for potentially synonymous taxa. With this approach, Geysers Dichantherium occurs in wet or moist areas of grasslands, riparian, and closed-cone forests, and can be associated with geothermal soils. Because no geothermally altered soils or closed-cone forests occur in the Preserve, habitat is limited to moist grasslands and riparian areas.

Habitat quality for these types is poor to moderate and limited in abundance. Rancheria Creek provides poor habitat since the channel is highly erosional with limited patchy riparian scrub and forest that is too small to register on the GIS datalayer. The most likely area for this species may be moist areas in grasslands. Springs and seeps are common throughout the Preserve. Seeps in open grassy areas are typically dominated by rushes (*Juncus* spp.), sedge (*Cyperus eragrostis*), mint (*Menthe pulegium*), and bracken ferns (*Pteridium aquilium*). Most open grasslands in the Preserve are invaded by non-native European annuals and Harding Grass, which may pose a threat to Geysers Dichantherium,

### *Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not find this species (SSU Field Station and Nature Preserves 2010).

Nearest Occurrence to the Galbreath Wildlands Preserve: The 7 documented occurrences in Mendocino County are for the widespread *P. acuminatum* var. *acuminatum* (Calflora 2010). All occurrences are found approximately 40 miles north of the Preserve (Calflora 2010). In Sonoma County, *D. lanuginosum* var. *thermale* is found on the extreme eastern edge of the county in The Geysers quadrant, while the remaining records distributed throughout the county are for *P. acuminatum* var. *acuminatum* (Calflora 2010). The nearest occurrence is 11 miles southwest of Study Area in Sonoma County in the Gualala River watershed (Calflora 2010).

*Summary:* We anticipate that Geysers Dichantherium is “Unlikely to Occur” because reported occurrences of *D. lanuginosum* var. *thermale* are over 25 miles away to the southeast. Habitat is of poor to moderate quality and may be sufficient to support the widespread *P. acuminatum* var. *acuminatum*, but lacks the geothermally altered soils required by *D. lanuginosum* var. *thermale*.

### **References**

Calflora. 2010. Information on California plants for education, research and conservation. [web application]. <<http://www.calflora.org/>>. Accessed 2010 Jun 18.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>>. Accessed 2010 Jun 18.

Center For Plant Conservation (CPC). 2010. CPC National Collection Plant Profile. <[http://www.centerforplantconservation.org/collection/cpc\\_viewprofile.asp?CPCNum=2434](http://www.centerforplantconservation.org/collection/cpc_viewprofile.asp?CPCNum=2434)>. Accessed 2010 Jun 18.

Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup>ed. London: University of California Press, Ltd. 1278 p.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. <<http://www.natureserve.org/explorer>>. Accessed 2010 Jun 18.

Nelson JK. 2009. *Panicum acuminatum* var. *acuminatum*. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Dichanthelium+lanuginosum+var.+thermale|Panicum+acuminatum+var.+acuminatum](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Dichanthelium+lanuginosum+var.+thermale|Panicum+acuminatum+var.+acuminatum)>. Accessed 2011 Feb 6.

Smith GL, Wheeler CR. 1992. A flora of the Vascular Plants of Mendocino County, California. San Francisco: University of San Francisco. 71 p.

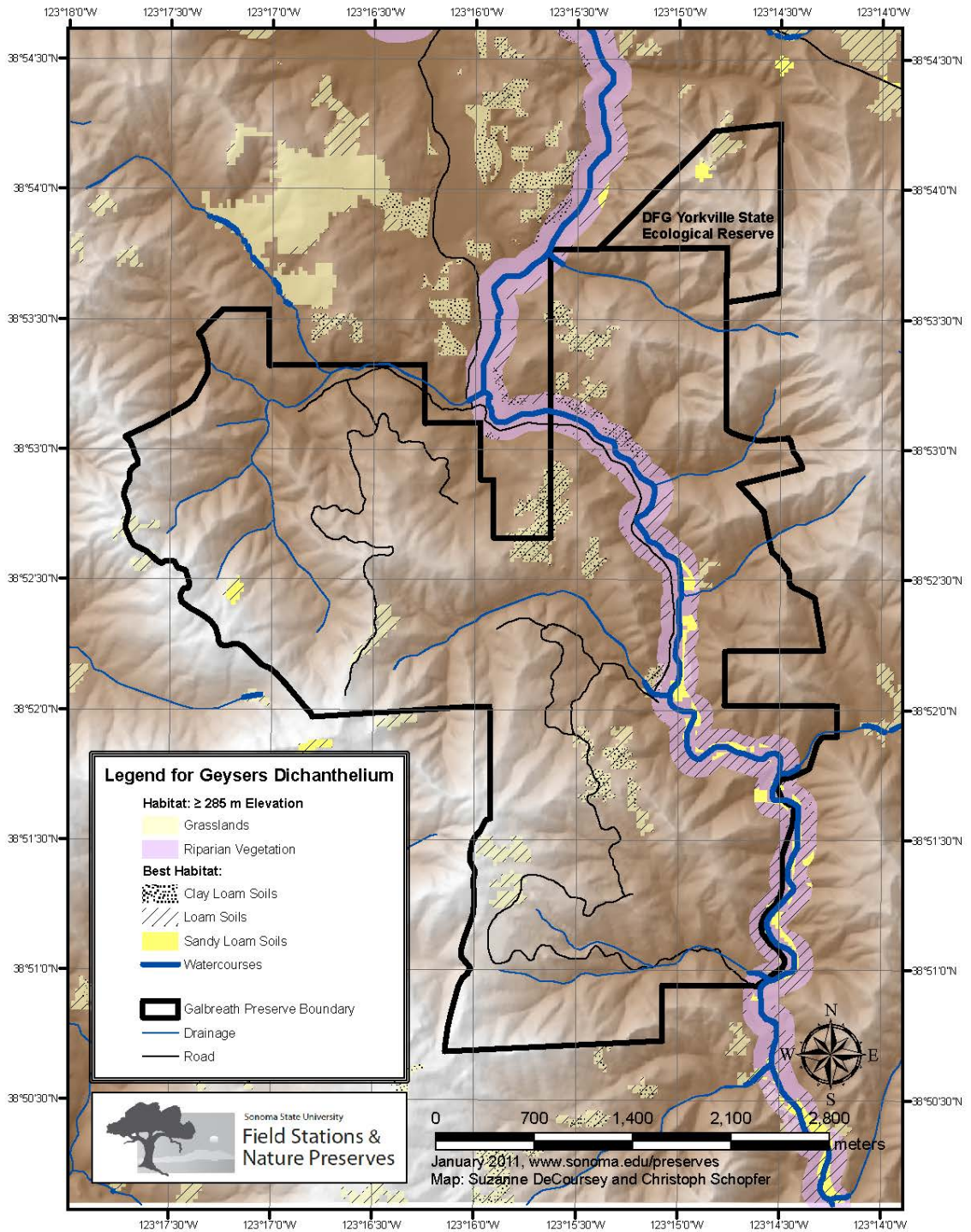
SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/nameSearch?mode=symbol&keywordquery=DIACT2>>. Accessed 2011 Feb 6.

Young R and CNPS. 2011. *Dichanthelium lanuginosum* var. *thermale*. Geysers Dichanthelium. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Dichanthelium+lanuginosum+var.+thermale|Panicum+acuminatum+var.+acuminatum](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Dichanthelium+lanuginosum+var.+thermale|Panicum+acuminatum+var.+acuminatum)>. Accessed 2011 Feb 6.

**Species Account Description:** Linden Schneider

Figure 13: Potential habitat for Geysers *Dichantheium* (*Dichantheium lanuginosum thermale*)





*Liliopsida (Grasses, Lilies, Orchids): Poaceae*  
**American Manna Grass (*Glyceria grandis*)**  
**Potential Occurrence: Unlikely to Occur**

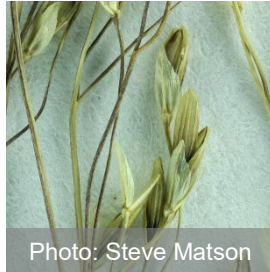
**Status:**

Federal: None

State: None

CNPS: 2.3

Other: None



**Species Description:** American Manna Grass is a monocot with the stem rooting at nodes and growing 90 cm to 2 m tall (Hickman 1996). The inflorescence is panicle like, 16 to 40 cm high, nodding with branches spreading (Hickman 1996). The spikelet is made of one floret, breaking above glumes, and the palea tip is irregular to widely V-notched (Hickman 1996).

**Nomenclature:** *Glyceria grandis* S. Watson Poaceae (USDA 2010)

**Synonyms:** *Glyceria grandis* var. *grandis* (Regents of the University of California 2010)

**Distribution:** This species occurs throughout North America and on the west coast is found from California's North Coast and North Coast Ranges to British Columbia (CNPS 2010, Hickman 1996).

**Life History & Threats:** The American Manna Grass is a perennial rhizomatous grass that blooms from June to August (CNPS 2010).

Somewhat threatened by land-use conversion and habitat fragmentation, and to a lesser extent by forest management practices (Southern Appalachian Species Viability Project 2002). (NatureServe 2009)

**Habitat & Habitat Associations:**

**Aquatic Habitat Types:** Habitat for this species is bogs and fens dominated by perennial herbs and low shrubs, seeps dominated by dense grasses, sedges, and herbs which thrive under seasonally moist to saturated conditions, and stream banks and lake margins (CNPS 2010).

**Vegetation Types:** Meadows dominated by dense grasses, sedges, and herbs, which thrive under seasonally moist to saturated conditions (CNPS 2010).

**Elevation:** 15 to 1,980 m (CNPS 2010). (The Study Area ranges from 230 to 710 m).

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as:

- Seeps in grasslands.

While seeps are abundant in the Study Area, they are not available for mapping in the GIS database. Instead, we mapped grasslands. Note that no bogs or fens occur in the Study Area.

- Stream banks and pond margins

#### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* American Manna Grass occupies open wet areas with dense vegetation, such as seeps in meadows, stream banks and lake margins. Potential habitat within the Preserve is scattered, but some areas may be good quality. While the potential habitat map (Figure 14) suggests that habitat is common, it overestimates appropriate areas:

- Only a fraction of the grassland areas contain seeps that are wet enough to support this species.
- Most of the tributaries to Rancheria Creek are heavily shaded and not expected to support the heavy herbaceous growth preferred by this species.
- The three ponds located on the southwestern Preserve boundary are the only areas that offer lake margin habitat. Some of these are heavily shaded.

Habitat quality at some sites may, however, be moderate to good. Seeps are common in grasslands areas throughout the Preserve. The seeps are typically dominated by rushes (*Juncus* spp.), sedge (*Cyperus eragrostis*), mint (*Menthe pulegium*), bracken ferns (*Pteridium aquilium*), species which thrive under the same conditions as American Manna Grass.

#### *Nearest Occurrence:*

Documented Occurrences on the Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not document this species (SSU Field Station and Nature Preserves 2010).

Nearest Occurrence to the Galbreath Wildlands Preserve: American Manna Grass has not be documented south of Mendocino County in coastal California. In Mendocino County, it is known from a cluster of 8 occurrences (Calflora 2010) approximately 16 miles northwest of Preserve (Calflora 2010). Occurrence on the Preserve would constitute a southern and eastern range extension in coastal California.

*Summary:* The American Manna Grass is “Unlikely to Occur” on the Preserve because, although habitat quality may be good at some sites, habitat is limited and occurrence at the Preserve would constitute a southern and eastern range extension for this species in coastal California.

#### **References**

Calflora. 2010. Information on California plants for education, research and conservation. <<http://www.calflora.org/>>. Accessed 2010 Jun 22.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory/>>. Accessed 2010 Jun 22.

Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup>ed.. London: University of California Press, Ltd. 1262 p.

Matson S. 2008. *Glyceria grandis*. < [http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Glyceria+grandis](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Glyceria+grandis)>. Accessed 2011 Feb 27.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life. Version 7.1. <<http://www.natureserve.org/explorer>>. Accessed 2010 Jun 22.

Regents of the University of California. 2010. The Jepson Online Interchange California Floristics. <<http://ucjeps.berkeley.edu/interchange/>> Accessed 2010 Jul 17.

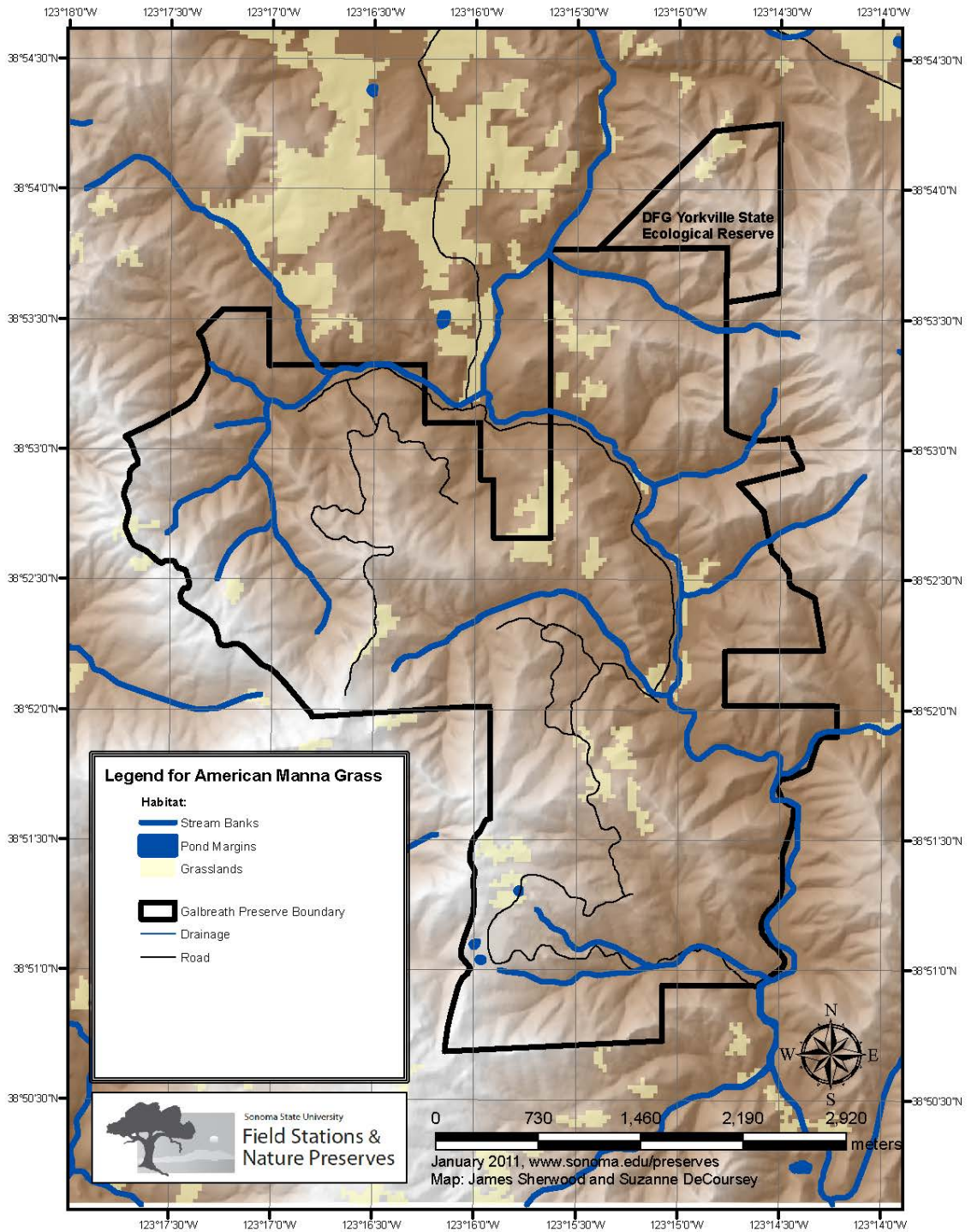
SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

Taylor DW. 2004. *Glyceria grandis*. American Mannagrass. < [http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Glyceria+grandis](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Glyceria+grandis)>. Accessed 2011 Feb 27.

United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/profile?symbol=GLGR>>. Accessed 2010 Jul 17.

**Species Account Description:** Linden Schneider

Figure 14: Potential habitat for American Manna Grass (*Glyceria grandis*)



*Liliopsida (Grasses, Lilies, Orchids): Poaceae*  
**North Coast Semaphore Grass (*Pleuropogon hooverianus*)**  
**Potential Occurrence: Likely to Occur**

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**Status:**

Federal:  
None

State: Threatened

CNPS: 1B.1

Other: none



**Species Description:** The North Coast Semaphore Grass is 100 to 160 cm tall, with generally cauline leaves, fused sheath margins more than half their length and a membranous ligule (Hickman 1996). The inflorescence is raceme like and 20 to 35 cm (Hickman 1996). The spikelet is 2.8 to 2.5 cm and ascending with glumes much smaller than the lowest floret, the lower is 1 veined and the upper is 1 to 3 veined (Hickman 1996). The lemma is 7 to 9 prominently veined with a 1 to 5 mm awn (Hickman 1996). The palea is the same size as the lemma with appendages on the veins (Hickman 1996).

**Nomenclature:** *Pleuropogon hooverianus* (L.D. Benson) J.T. Howell Poaceae (USDA 2010)

**Synonyms:** *Pleuropogon refractus* (A. Gray) Benth. ex Vasey var. *hooverianus* L. D. Benson, *Lophochlaena refracta* A.Gray var. *hooverianus* (L.D.Benson) Á.Löve & D.Löve (IPNI 2005; Regents of the University of California 2010).

**Distribution:** This species occurs only in Mendocino, Sonoma and Marin Counties in elevations ranging from between 10 and 617 m (Calflora 2010; CNPS 1992; Smith and Wheeler 1992).

**Life History & Threats:** The North Coast Semaphore Grass is a tall perennial, rhizomatous grass that is dormant during the summer and blooms April to June (CNPS 2010; Sholars and Golec 2007). This species is threatened by timber harvest, roadside maintenance, feral pigs, herbicides, mowing, conifer encroachment, and invasive species (CNPS 2010; Sholars and Golec 2007). It is potentially threatened by invasive species such as annual ryegrass (*Lolium multiflorum*), Harding grass (*Phalaris aquatica*), and pennyroyal (*Mentha pulegium*) (Sholars and Golec 2007).

**Habitat & Habitat Associations:**

**Aquatic Habitat Types:** Seeps, vernal pools, marshy areas (CNPS 2010; NatureServe 2009)

**Vegetation Types:** Habitats for this species is open mesic areas of broadleaved upland forests dominated by stands of evergreen or deciduous trees 5 meters tall or more which form closed canopies, North Coast coniferous forests dominated by needle leaved evergreen trees, and relatively open meadows dominated by more or less dense grasses, sedges and herbs that thrive, at least seasonally, under moist or saturated conditions (CNPS 2010; NatureServe

2009). It is also found in shady grove-meadow interfaces and forest openings within Coastal Redwood (*Sequoia sempervirens*) groves (NatureServe 2009; Sholars and Golec 2007).

*Topography and Microclimates:* vernal pools, full to partial light, but can tolerate shade (NatureServe 2010; Sholars and Golec 2007)

*Elevation:* 10 to 617 m (CNPS 2010) (The Study Area ranges from 230 to 710 m)

*Geology and Soils:* not tolerant of soil disturbance or compaction (Sholars and Golec 2007)

*Species Associations:* North coast semaphore grass is associated with Coastal Redwood (*Sequoia sempervirens*), grasses and sedges (CNPS 2010; NatureServe 2009).

**Conceptual Basis for GIS Model Development:** Potential habitat in the Study Area was mapped as:

- below 647 m in elevation (includes a 30 m buffer around known elevational occurrences of this species).
- North Coast coniferous forests (i.e. Redwood-Douglas fir mix (*Sequoia sempervirens*-*Pseudotsuga menziesii*) and Pacific Douglas fir (*Pseudotsuga menziesii* var. *menziesii*) vegetation types) with a canopy cover of  $\geq 40\%$ .
- broadleaved upland forests (i.e. mixed, mixed montane or single dominant hardwoods with canopy cover  $\geq 40\%$ ).
- grasslands

We additionally mapped possible best potential habitat in the areas identified above as:

- moist areas (i.e., areas with poor drainage with high water capacity)
- seasonal ponds

### **Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* North Coast Semaphore Grass occurs in moist or wet areas in grasslands, and dense coniferous or hardwood forests. Potential habitat as mapped (Figure 15) significantly overestimates the abundance of potential habitat, since this species only occurs in wet or seasonally wet areas in the vegetation types shown. Springs and seeps are relatively common on the Preserve.

Habitat quality is likely poor to moderate in the Preserve. In grasslands, seeps typically occur are dominated by rushes (*Juncus* spp.), sedge (*Cyperus eragrostis*), mint (*Mentha pulegium*), bracken ferns (*Pteridium aquilium*). Springs occur in many habitat types and vary in species composition. Three of the factors identified as threats to this species occur at the Preserve and suggest that habitat at these wet areas may not be high quality:

- Many wet areas on the Preserve are invaded by Harding Grass, *Philaris aquatica*, and Pennyroyal, *Mentha pulegium*, which are expected cause declines in North Coast Semaphore Grass.

- The Preserve has a history of logging. Timber harvest plans indicate that both clear cut and selection cut methods were used to harvest Redwood, Douglas Fir, and hardwoods at least between 1988 and 2000.
- Feral pigs are abundant on the Preserve and often dig up and wallow in springs and seeps.

*Nearest Occurrence:*

Documented Occurrences in the Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not document this species (SSU Field Station and Nature Preserves 2010).

Nearest Occurrence to the Galbreath Wildlands Preserve: This species is documented from sites to the north and south of the Preserve and occurs in the inner and outer North Coast Ranges. In Mendocino County it is documented at 22 occurrences (Calflora 2010). The nearest occurrence is approximately 14 miles northeast of the Galbreath Wildlands Preserve in the Elledge Peak quad in the Upper Russian River watershed (Calflora 2010).

*Summary:* We anticipate the North Coast Semaphore grass to be “Likely to Occur.” Habitat quality is likely poor to moderate, localized, and scattered. However, the Preserve is bounded by occurrences to the north, south, east and west, suggesting that the Preserve lies well within this species range and may still occur in some seeps where high quality habitat may have endured.

**References**

Calflora. 2010. Information on California plants for education, research and conservation. [web application]. <<http://www.calflora.org/>> Accessed 2010 Jun 18.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>> Accessed 2010 Jun 18.

Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup>ed.. London: University of California Press, Ltd. 1284 p.

International Plant Name Index (IPNI). 2005. <<http://www.ipni.org/>>. Accessed 2010 Jul 20.

Kelley B.(2005). *Pleuropogon hooverianus*.< [http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Pleuropogon+hooverianus](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Pleuropogon+hooverianus)>. Accessed 2011 Apr 30.

McMorrow S. (2003). *Pleuropogon hooverianus*.< [http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Pleuropogon+hooverianus](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Pleuropogon+hooverianus)>. Accessed 2011 Apr 30.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. . <<http://www.natureserve.org/explorer>> Accessed 2010 Jun 18.

Regents of the University of California. 2010. The Jepson Online Interchange California Floristics. <<http://ucjeps.berkeley.edu/interchange/>> Accessed 2010 Jul 20.

Sholars T and Golec C. 2007. Rare Plants of the Redwood Forest and Forest Management Effects. Proceedings of the redwood region forest science symposium: What does the Future Hold? Gen. Tech. Rep. PSW-GTR-194. Albany, CA: Pacific Southwest Research Station, Forest Service, U.S. Department of Agriculture; p. 185-200

Smith GL, Wheeler CR. 1992. A flora of the Vascular Plants of Mendocino County, California. San Francisco: University of San Francisco. 77 p.

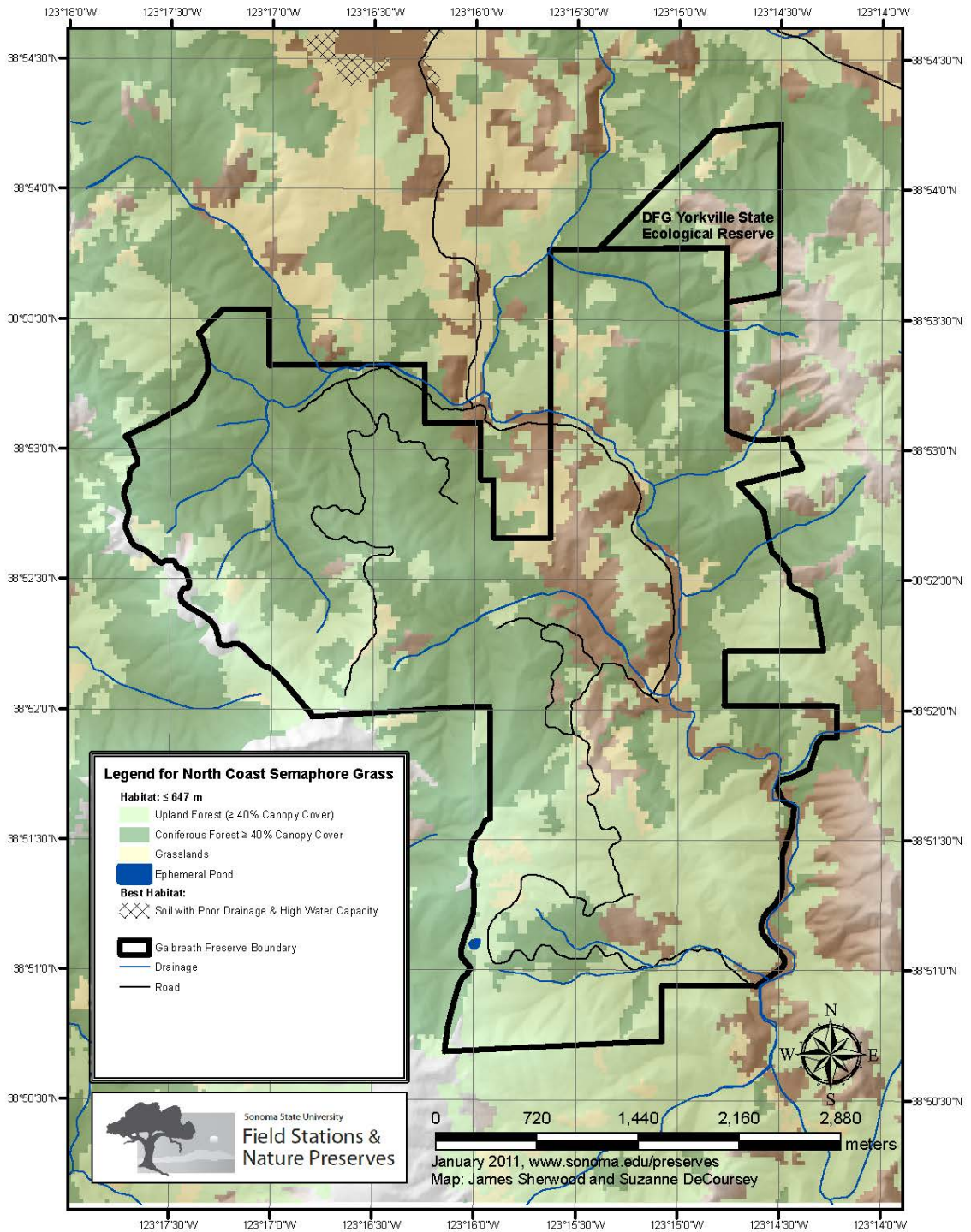
SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/nameSearch?mode=symbol&keywordquery=PLHO2>>. Accessed 2010 Jul 20.

**Species Account Description:** Linden Schneider



Figure 15: Potential habitat for North Coast Semaphore Grass (*Pleuropogon hooverianus*)



*Liliopsida (Grasses, Lilies, Orchids):Potamogetonaceae*  
**Nuttall's Pondweed (*Potamogeton epihydrus* ssp. *nuttallii*)**  
**Potential Occurrence: Unlikely to Occur**

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**Status:**

Federal: None

State: None

CNPS: 2.2

Other: None



**Species Description:** Nuttall's Pondweed is aquatic, growing from slender, matted rhizomes with simple linear, ribbon like leaves and somewhat flattened stems (Hickman 1996). The inflorescence a 1 to 4 cm spike with an inconspicuous bisexual flower of four greenish, clawed perianth parts, four stamens, and four pistils (Hickman 1996). The fruit is a spheric to obovate drupe with a 3 keeled back and concave sides (Hickman 1996).

**Nomenclature:** *Potamogeton epihydrus* Raf. ssp. *nuttallii* (Cham. & Schltld.) Calder & Roy L. Taylor Potamogetonaceae (USDA 2010)

**Synonyms:** *Potamogeton epihydrus* Raf. ,*Potamogeton nuttallii* Cham. & Schltld., *Potamogeton epihydrus* Raf. var. *nuttallii* (Cham. & Schltld.) Fernald (IPNI 2005; Regents of the University of California 2010)

**Distribution:** This species occurs in North America and Europe as well as California where it is found in the High Sierra Nevada, the Modoc Plateau and the North Coast Ranges at elevations between 369 and 2,172 m (CNPS 2010; eFloras 2008; Hickman 1996).

**Life History & Threats:** Nuttall's pondweed is a perennial herb and seeds are eaten by water fowl (CNPS 2010; USGS 2006). The greatest threats to this species are recreational activities, water contamination, land use conversion, and habitat fragmentation (CNPS 2010).

**Habitat & Habitat Associations:**

*Aquatic Habitat Types:* Still or flowing shallow waters of lakes, freshwater wetlands, riparian wetlands, ponds, rivers, irrigation ditches and streams (CNPS 2010; eFloras 2008; Hickman 1996).

*Elevation:* 369 to 2,172 m (CNPS 2010) (The Study Area ranges from 230 to 710 m)

*Other Special Habitat Features:* can be in fresh to alkaline water (Hickman 1996)

**Conceptual Basis for GIS Model Development:** Potential habitat was in the Study Area was mapped as areas

- above 339 m in elevation (includes 30 m buffer around known elevational occurrences)
- drainages and ponds with perennial water

**Potential Occurrence in the Galbreath Wildlands Preserve:**

*Habitat:* Nuttall's Pondweed occurs in perennial water above 369 m elevation. Within the Preserve, potential habitat is restricted to upper portions of 3 tributaries to Rancheria Creek, and two ponds (one is man-made). The quantity of potential habitat is overestimated (Figure 16); although all of these tributaries retain water in some areas throughout the summer, not all sections of the tributaries shown are perennial. Habitat quality in these areas is likely moderate because water quality has likely been impacted by increased erosion during the long history of logging on Preserve lands.

*Nearest Occurrence:*

Documented Occurrences in Galbreath Wildlands Preserve: Previous species list for the Galbreath Wildlands Preserve did not document this species (SSU Field Station and Nature Preserves 2010).

Nearest Occurrence to Galbreath Wildlands Preserve: Nuttall's Pondweed range is described as occurring in the North Coast Ranges, but has been documented only in Mendocino County. Of the 8 documented occurrences (Calflora 2010), the nearest is approximately 40 miles north of the Galbreath Wildlands Preserve in Willits in the Upper Main Eel River watershed (Calflora 2010). Occurrence of this species on the Preserve would be a southern range extension in coastal California (Calflora 2010).

*Summary:* We anticipate Nuttall's Pondweed to be "Unlikely to Occur" in the Preserve. While habitat quality may be moderate, a history of logging suggests that habitat quality was likely poorer in the past, and occurrence at the Preserve would constitute a 40 miles southward range extension for the species.

**References**

Calflora. 2010. Information on California plants for education, research and conservation. [web application]. <<http://www.calflora.org/>>. Accessed 2010 Jun 19.

California Native Plant Society (CNPS). 2010. Inventory of Rare and Endangered Plants. Online edition, v7-10b. <<http://www.cnps.org/inventory>>. Accessed 2010 Jun 19.

eFloras 2008. Flora of North America. Published on the Internet <<http://www.efloras.org>>. Accessed 2010 Jun 27.

Hickman JC editor. 1996. The Jepson Manual Higher Plants of California. 3<sup>rd</sup>ed.. London: University of California Press, Ltd. 1304 p.

International Plant Name Index (IPNI). 2005. <<http://www.ipni.org/>>. Accessed 2010 Jun 27.

Regents of the University of California. 2010. The Jepson Online Interchange California Floristics. <<http://ucjeps.berkeley.edu/interchange/>> Accessed 2010 Jul 20.

Saint Mary's College of California. 1995. *Potamogeton epihydrus* ssp. *nutallii* Nuttall's Pondweed. <[http://calphotos.berkeley.edu/cgi-bin/img\\_query?rel-taxon=contains&where-taxon=Potamogeton+epihydrus+ssp.+nutallii](http://calphotos.berkeley.edu/cgi-bin/img_query?rel-taxon=contains&where-taxon=Potamogeton+epihydrus+ssp.+nutallii)>, Accessed 2011 Apr 30.

SSU Field Stations and Nature Preserves. 2010. Galbreath Wildlands Preserve Vascular Plant List. <[http://www.sonoma.edu/preserves/docs/galbreath\\_vascular\\_plants.pdf](http://www.sonoma.edu/preserves/docs/galbreath_vascular_plants.pdf)>. Accessed 2010 Jun.

United States Department of Agriculture (USDA). 2010. PLANTS Profile. <<http://plants.usda.gov/java/profile?symbol=USLO50>>. Accessed 2010 Jul 20.

United States Geological Survey [USGS]. 2006. Northeast Wetland Flora Field Office Guide to Plant Species. <<http://www.npwrc.usgs.gov/resource/plants/florane/species/4/potaepih.htm>>. Accessed 2010 Jun 27.

**Species Account Description:** Linden Schneider

Figure 18: Potential habitat for Nuttall's Ribbon-Leaved Pondweed (*Potamogeton epihydrus nuttallii*)

