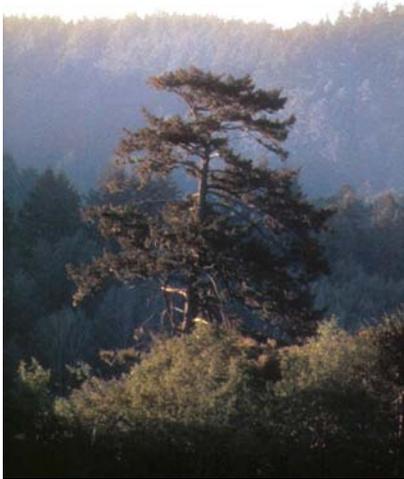


FIELD KEY TO THE PLANT COMMUNITIES



Point Reyes National Seashore, Golden Gate National Recreation Area, San Francisco Water Department Watershed Lands, Mount Tamalpais, Tomales Bay, and Samuel P. Taylor State Parks

Appendix A. Point Reyes National Seashore, Golden Gate National Recreation Area, and Surrounding Wildlands Plant Community Classification and Mapping Project Final Report



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This plant community key was developed as part of a comprehensive vegetation classification and mapping effort initiated by The National Park Service in Point Reyes National Seashore in 1997. This collaborative effort was conducted in part through a contract with Environmental Systems Research Institute (ESRI). The plant community classification and initial draft plant community key were developed by the senior vegetation ecologist for the California Department of Fish and Game, Todd Keller-Wolf. After several seasons of field testing during the accuracy assessment phase of the associated plant community mapping project the key underwent a major revision by National Park Service Staff Pam van der Leeden and David Schirokauer. Several botanical field technicians including Amy Parravano, David Williard, Dina Robertson, Sasha Gennet, Ann Huber, Barbara Moritsch, and Carrie Stewart also contributed to this effort. Major funding was provided by the National Park Service's Fire Program, and Inventory and Monitoring Program along with Point Reyes National Seashore and Golden Gate National Recreation Area.

Introduction:

This key is also Appendix A within the Point Reyes National Seashore, Golden Gate National Recreation Area, and Surrounding Wildlands Plant Community Classification and Mapping Project Final Report. All vegetation types described here are derived from an ordination analysis of 366 vegetation plots collected throughout the study area in 1997 and 1998 for the National Park Service vegetation mapping project using the California Native Plant Society's releve method. Detailed discussion of the methods is available in the report associated with this key. The original draft key has been substantially enhanced in this final version using field-based observation and plot data analysis acquired during an extensive (1,200 plots) accuracy assessment of the accompanying GIS-based plant community map.

Plots that don't key to association level may be candidates for new vegetation types. A minimum of three releve plots sampled in different stands would be needed to formally describe a new type. A list of proposed new types that have not been formally described is presented in the Final Report and is also available in the vegetation plots database associated with this project.

How to use the key:

This is not a dichotomous key; there are often more than two choices for each section. Read all options in each list in order to choose the best match for your vegetation plot. The key will direct you first to the life forms: tree, shrub and herbaceous, and then lead you through more specific lists based on dominance/ subordination or presence/ absence of significant species.

Due to the high diversity of the vegetation communities in the area, this is a complex key. You will need to collect plant composition data that includes not only those species that are dominant but also those 'indicator species' whose presence may cause the plot to key to another vegetation type. The index at the end of this key can be used as a list of plant species required to use this key.

Using percent cover data to arrive at plant community:

All references to percent cover in the key are to absolute cover unless specified in a particular section as relative cover.

Absolute cover: The actual percentage of the surface area of the plot that is covered by a species or physiognomic group (trees, shrubs, herbaceous) As in “coyote brush covers 30% of the plot.” Absolute cover of all species or physiognomic groups when added together may total greater than 100% because this is not a proportional number and plants can overlap each other. For example, a plot could have 25% tree cover, 40% shrub cover, and 50% herbaceous cover.

Relative cover: The percentage of the surface area of the plot that is covered by one species or physiognomic group (trees, shrubs, herbaceous) as compared or relative to the amount of surface of the plot covered by all species or groups. Thus, 50% relative cover means that half of the total proportion of cover of all species or physiognomic groups is composed of the single species or group in question. Relative cover values are a proportional number that when added together, total 100% for each plot. For example, a dune vegetation plot with 25% cover dune sagebrush and 25% cover iceplant estimated using absolute cover would translate to 50% relative cover of dune sagebrush and 50% relative cover of iceplant.

The following terms are used throughout the key to describe percent cover.

Dominant: >50% relative cover

Dominance refers to the preponderance of vegetation cover in a stand of uniform composition and site history. It may refer to cover of an individual species (as in dominated by Douglas-fir, or it may refer to dominance by a physiognomic group as in “dominated by shrubs”. Dominance refers to the relative cover of one species or physiognomic group as compared to another species or physiognomic group. Anything over 50% relative cover is said to dominate a stand, however, see dominance by layer, below.

Strongly dominant: 60%+ relative cover

A species in the dominant life form has 60% or greater relative cover.

Co-dominant: each species has 30-60% relative cover

Co dominance refers to two or more species in a stand with near equal cover. In general, co-dominance can occur among species which have between 30 and 60% relative cover each.

Significant: 1-5% absolute cover

A species has 1-5 percent absolute cover.

Important: >1% absolute cover

A species is considered important if it has greater than 1% absolute cover. This term is contrasted with dominant to mean that the species is always present in greater than 1% cover, but not always dominant.

Dominance by layer: Tree, shrub, and herbaceous layers are considered physiognomically distinct. A vegetation type is considered to belong to a certain physiognomic group if it is dominated by one layer. Layers are prioritized in order of height. The tallest layer, if it meets a minimum absolute cover of 16% is said to dominate and the type is usually named in the alliance level of classification by the most characteristic species in that dominant layer. Thus, if a stand has 16% trees, 50% shrubs, and 30% herbaceous species, it is a tree type and “dominated” by trees, even though the understory layers have greater cover.

Apical dominance: In general, trees and shrubs are considered dominant because of their height and may define a type even with very low cover, as low as 16%. They will almost always be considered to dominate where lower growing species have equal or higher cover. In some cases the herbaceous layer is taller than the shrub layer. In those cases the tallest layer takes precedence as in *Calamagrostis nutkanesis/Baccharis pilularis* (Pacific reedgrass/coyote brush) association.

Certain species are weighted more heavily than others in determining a vegetation type. California blackberry and poison oak are often discounted, because they are common. These widespread and adaptable species are usually found in many vegetation types and will only define a vegetation type when specified in the key.

If there is a species present in high cover for which no type exists in the key, there are two options. The plot can key to another species that is present in high cover. For example, a plot with 35% cover toyon and 30% holly-leaved cherry would key to holly-leaved cherry since there is no toyon type defined in the study area. If this is not a reasonable option, the plot can be designated “unable to key.” Plots that are unable to key may be candidates for new vegetation types.

Estimating cover using percents rather than cover classes is preferable because it gives the fullest picture of the vegetation present. It enables later review of the data to confirm choice of plant community and may help to describe new vegetation types and answer future management or research questions. If a less rigorous and faster approach is needed, for example, the project is not primarily a vegetation project, the following cover classes are compatible with the key and may be used.

- 1 <1 percent**
- 2 1-5 percent**
- 3a 6-15 percent**
- 3b 16-25**
- 4 26-50**
- 5 51-75**
- 6 76-100**

Other important terms:

Alliance: Plant communities based on dominant/diagnostic species of uppermost or dominant stratum. Part of the US National Vegetation Classification (USNVC) hierarchy.

Association: The most botanically detailed plant community designation based on dominant species and multiple co or subdominant indicator species from any strata. Part of the USNVCS

Stand: A stand is the basic physical unit of plant communities in a landscape. It has no set size. Some vegetation stands are very small, such certain wetland types, and some may be several square kilometers in size, such certain forest types. A stand is defined by two main unifying characteristics:

- 1) It has compositional integrity. Throughout the site, the combination of species is similar. The stand is differentiated from adjacent stands by a discernable boundary that may be abrupt or occur indistinctly along an ecological gradient.
- 2) It has structural integrity. It has a similar history or environmental setting that affords relatively similar horizontal and vertical spacing of plant species. For example, a hillside forest originally dominated by the same species that burned on the upper part of the slopes, but not the lower, would be divided into two stands. Likewise, a sparse woodland occupying a slope with very shallow rocky soils would be considered a different stand from an adjacent slope with deeper, moister soil and a denser woodland or forest of the same species.

The structural and compositional features of a stand are often combined into a term called homogeneity. For an area of vegetated ground to meet the requirements of a stand, it must be homogeneous at the scale being considered. The associated plant community mapping project had a Minimum Mapping Unit (MMU) of 0.5 hectares.

Shrub: A multi-stemmed plant with noticeably woody stems that is between 0.2 and 5 meters tall.

Sub-shrub: A multi-stemmed plant with noticeably woody stems less than 0.5 m tall.

Diagnostic species: A species typically found in the dominant stratum of a vegetation association and lending its name to that association.

Plant community nomenclature: species separated by “-” are within the same stratum, species separated by “/” are in different strata. The number at the end of each plant community name is the ‘PI-code’ used for labeling plant community polygons for the associated GIS based plant community map.

Key to Main Vegetation Divisions:

- I.** Vegetation dominated by non- herbaceous species including grasses, grass-like plants, and broad-leaved herbaceous species. Shrub species, if present, of lower absolute cover than herbs and grasses (no more than 15% cover). Subshrubs, if present, may form up to 25 percent cover but never taller than dominant herbaceous vegetation. Trees, if present, may compose up to 15 percent cover.

Division A- Herbaceous Vegetation- page 7.

- II.** Vegetation dominated by shrubs or sub-shrubs. Trees, if present, may compose up to 15 percent cover in stand, herbaceous species may total higher cover than shrubs, but are shorter in stature. Shrubs are always greater than 15 percent cover and are distributed relatively evenly over the stand.

Division B- Shrub Vegetation- page 20.

- III.** Vegetation dominated by trees (at least 5 m tall). Tree canopy is greater than 15 percent cover over denser sub-canopies of shrub and herbaceous species and is distributed relatively evenly over the stand.

Division C- Tree Vegetation- page 27.

Division A- Herbaceous Vegetation

Section I

Vegetation dominated by grasses or grass-like species, lacking a significant overstory of trees or shrubs, may have low shrubs or subshrubs present in significant amounts, but these are over-topped by the dominant grasses..... **Native and non-native grasslands**

IA. Upland grasslands generally away from the immediate coast and not associated with saturated soil throughout the growing season, shrubs no more than 15% cover, or up to 25% cover if they are subshrubs over-topped by the dominant grass species.

A1. Native perennial grasslands- Upland grasslands with greater than 15% relative cover of native perennial grass species. May include scattered shrubs (up to 15%) of coyote brush (*Baccharis pilularis*) and California sagebrush (*Artemisia californica*). Dominant native grass species include purple needlegrass (*Nassella pulchra*), foothill needlegrass (*Nassella lepida*), California oatgrass (*Danthonia californica*), tufted hairgrass (*Deschampsia caespitosa*), Pacific reed grass (*Calamagrostis nutkaensis*), meadow barley (*Hordeum brachyantherum*), and California melic (*Melica californica*.) Some stands fit the types below.**California Annual Grassland with Native Component Mapping Unit (67020)**

1. Purple needlegrass (*Nassella pulchra*) is the dominant native grass. May have significant cover of coyote brush. Some stands fit the association below. **Purple Needlegrass (*Nassella pulchra*) Alliance (67030)**
 - a. Coyote brush- Purple needlegrass associating with coyote brush. If coyote brush is greater than 15% cover see the shrub type, *Baccharis/Nassella pulchra*, page 19
..... ***Nassella pulchra/ Baccharis pilularis Association (67031)***
2. California oatgrass (*Danthonia californica*) is the dominant native grass. Some stands fit the association below.....
...**California Oatgrass (*Danthonia californica*) Alliance (67040) (in part)**
 - a. European hairgrass- California oatgrass associating with silver European hairgrass (*Aira caryophylla*)
.....***Danthonia californica- Aira caryophylla Association (67041)***
3. Tufted hairgrass (*Deschampsia caespitosa*) is the dominant native grass. Upland stands of this alliance occur without mesophytic species such as *Juncus* spp. and usually include a significant cover of non-native annual grass species. For mesic stands see page 9. Some stands fit the associations below.....
.....**Tufted Hairgrass (*Deschampsia caespitosa*) Alliance (52040)**

- a. California oatgrass- tufted hairgrass associating with significant cover of California oatgrass.
...*Danthonia cespitosa*-*Danthonia californica* Association (52041)
- b. Point Reyes horkelia- tufted hairgrass associating with significant cover of the rare Point Reyes horkelia (*Horkelia marinensis*.) This association is the less common of the two and is found on sandier soils.
.....*Danthonia cespitosa*- *Horkelia marinensis* Association (52042)
- 4. Red fescue (*Festuca rubra*) is the dominant native grass. These stands are similar to upland tufted hairgrass stands, but are rare in the study area.....
.....**Red Fescue (*Festuca rubra*) Alliance (52050)**
- 5. Pacific reed grass (*Calamagrostis nutkaensis*) is the dominant native grass. Upland stands may mix with non-native annual or perennial grass species. For mesic reed grass types, see page 11. Some stands fit into the association described below.
.....**Pacific Reed grass (*Calamagrostis nutkaensis*) Alliance (46020)**
 - a. Coyote brush- Pacific reed grass associating with significant cover of coyote brush. If coyote brush cover is greater than 15%, and reed grass is not taller, or if coyote brush has more than 25% cover as a subshrub, see the shrub type, *Baccharis pilularis*/ Native Grassland Association, page 20.....
.....***Calamagrostis nutkaensis*/*Baccharis pilularis* Association (46021)**
- A2. Non-native perennial grasslands- Upland grasslands dominated by non-native perennial grasses with no more than 15% relative cover of native perennial or non-native annual grasses. The following species are typical dominants and may occur in mixed or monocultural stands: tall fescue (*Festuca arundinacea*), velvet grass (*Holcus lanatus*), Harding grass (*Phalaris aquatica*), perennial ryegrass (*Lolium perenne*). No associations are defined.....
..... **Introduced Coastal Perennial Grassland Alliance (47030)**
- A3. Non-native annual grasslands- Grasslands dominated by non-native annual grass species with no more than 15% relative cover of native perennial species. Dominant species include Italian ryegrass (*Lolium multiflorum*), foxtail (*Hordeum murinum*), brome spp. (*Bromus* spp), brachypodium (*Brachypodium distachyon*), vulpia (*Vulpia* spp.), and oats spp. (*Avena* spp.) For stands dominated by tall weedy forb vegetation, see page 15.....
..... **California Annual Grassland Mapping Unit (67010)**

IB. Coastal perennial grasslands typically of terraces and dunes, usually within two miles of the coast and below 500 feet elevation. Shrubs are no more than 15% cover, or up to 25% cover if they are subshrubs over-topped by the dominant grass species.

A1. Stands dominated by non-native perennial grasses.

1. Non-native perennial grasslands- Grasslands of coastal terraces, swales, and slopes dominated by non-native perennial grasses with no more than 15% relative cover of native perennial or non-native annual grasses. The following species are typical dominants and may occur in mixed or monocultural stands: tall fescue (*Festuca arundinacea*), velvet grass (*Holcus lanatus*), Harding grass (*Phaleris aquatica*), perennial ryegrass (*Lolium perenne*). No associations are defined.....
..... **Introduced Coastal Perennial Grassland Alliance (47030)**

2. Non-native beachgrass- Grasslands of stabilized sand dunes along the immediate coast, dominated by the non-native invasive European beachgrass (*Ammophila arenaria*). This species forms dense monocultures where it dominates. Some stands fit the association below.....
..... **European Beachgrass (*Ammophila arenaria*) Alliance (47010)**

- a. Spiny sandmat- European beachgrass associating with significant cover of spiny sandmat (*Cardionema ramosissimum*)
..... ***Ammophila arenaria*-*Cardionema ramosissimum* Association (47011)**

A2. Stands dominated by native bunch grasses.

1. Native perennial grasslands- coastal grasslands with greater than 15% relative cover of native perennial grass species. May include scattered shrubs of coyote brush (*Baccharis pilularis*) and California sagebrush (*Artemisia californica*.) Dominant native grass species are tufted hairgrass (*Deschampsia caespitosa*) and Pacific reed grass (*Calamagrostis nutkaensis*.) Some stands fit into the types described below.
... **California Annual Grassland with Native Component Mapping Unit (67020)**

- a. Tufted hairgrass- Low to medium height, under one meter, bunch-grass grassland of moist terraces and coastal bluffs, especially on the Point Reyes peninsula. These stands are dominated by tufted hairgrass (*Deschampsia caespitosa*). Mesophytic species such as rushes and sedges are often present. A significant proportion of sub-shrub coyote brush may be present, but this is no taller than the tufted hairgrass.
..... **Tufted Hairgrass (*Deschampsia caespitosa*) Alliance (52040)**

- b. California oatgrass (*Danthonia californica*) is the dominant native grass. Some stands fit the association below.....
.....**California Oatgrass (*Danthonia californica*) Alliance (67040) (in part)**
 - aa. California oatgrass- Tufted hairgrass associating with significant cover of California oatgrass (*Danthonia californica*)
.....***Danthonia caespitosa-Danthonia californica* Association (52041)**
 - bb. Point Reyes horkelia- Tufted hairgrass associating with significant cover of the rare Point Reyes horkelia (*Horkelia marinensis*.) This association is the less common of the two and is found on sandier soils.
.....***Danthonia caespitosa-Horkelia marinensis* Association (52042)**

- 2. Pacific reed grass- Tall (0.75-1.5 m) bunch grass grassland of moist coastal bluffs, swales and depressions dominated by Pacific reed grass (*Calamagrostis nutkaensis*). These stands may have up to 25% cover of coyote brush as a subshrub. See also mesic coyote brush stands, page 20, and for upland reed grass stands, see page 8. Some stands fit into the association described below.....
.....**Pacific Reed grass (*Calamagrostis nutkaensis*) Alliance (46020)**
 - a. Sedges/rushes- Pacific reed grass associating with significant cover of one or more species of sedge (*Carex spp.*) and rush (*Juncus spp.*) and sometimes small-fruited bulrush (*Scirpus microcarpus*) as well, often in a patchwork effect. May have up to 15% salmonberry (*Rubus spectabilis*.) Other associating species often include purple velvet grass (*Holcus lanatus*) and California blackberry (*Rubus ursinus*) in the drier stands, and potentilla (*Potentilla anserina*), hedge nettle (*Stachys ajugoides*), lady fern (*Athyrium filix-femina*), and horsetail (*Equisetum spp.*) in the moister stands.
.....***Calamagrostis nutkaensis-Carex-Juncus* Association (46022)**

IC. Grasslands or vegetation dominated by grass-like plants associated with permanently wet or saturated soil throughout the growing season. These are stands dominated by rushes, sedges, bulrush and or Pacific reed grass. Any one of these may dominate or they may co-dominate, occurring together in a mixture or patchwork pattern. Other associating species often include purple velvet grass (*Holcus lanatus*) and California blackberry (*Rubus ursinus*) in the drier stands, and potentilla (*Potentilla anserina*), hedge nettle (*Stachys ajugoides*), lady fern (*Athyrium filix-femina*), and horsetail (*Equisetum spp.*) in the moister stands.

A1. Vegetation dominated by members of the rush (Juncaceae,) sedge (Carex) or bulrush (Cyperaceae) families associated with moist swales, marsh edges, and other moist-to-wet freshwater habitats apart from standing water. May also include stands co-dominated by rushes, sedges, bulrush and Pacific reed grass.

1. Rushes- Stands dominated or co-dominated by *Juncus patens* and/or *Juncus effusus* (usually var. *brunneus*). May include hybrids of the two species. Many stands fit into the associations described below..... **Rush (*Juncus spp.*) Alliance (52030)**
 - a. *Juncus effusus*- stands dominated by *Juncus effusus*. Several other species of *Juncus* or *Luzula* including *Juncus patens*, *Juncus bufonius*, *Juncus lesueurii*, *Juncus phaeocephalus*, or *Luzula comosa* may be common. May include substantial cover of mesic weedy species such as *Erechtites minima*.....
..... ***Juncus effusus* (var. *brunneus*) Association (52031)**
 - b. *Juncus patens*- stands dominated by *Juncus patens*. Several other species of *Juncus* or *Luzula* including *Juncus effusus*, *Juncus bufonius*, *Juncus lesueurii*, *J. phaeocephalus*, or *Luzula comosa* may be common. May include substantial cover of mesic weedy species such as *Erechtites minima*.....
..... ***Juncus patens* Association (52032)**
2. Slough sedge- stands dominated by slough sedge (*Carex obnupta*). Many stands fit into the association described below.
.....**Slough Sedge (*Carex obnupta*) Alliance (52060)**
 - a. *Juncus patens*- Slough sedge with significant cover of rush (*Juncus patens*.) Field sampling has identified stands with *Juncus effusus* as the dominant associating rush species, however these have not been formally defined.
.....***Carex obnupta*- *Juncus patens* Association (52061)**
3. Small-fruited bulrush- Stands dominated by small-fruited bulrush (*Scirpus microcarpus*). No associations defined.
..... **Small-fruited Bulrush (*Scirpus microcarpus*) Alliance (52070)**

A2. Vegetation dominated by true grasses or co-dominated by grasses and members of the rush (Juncaceae) or sedge or bulrush (Cyperaceae) families.

1. Pacific reed grass (*Calamagrostis nutkaensis*) is the principal grass. These stands may have up to 25% cover of coyote brush as a subshrub. For upland stands, see page 8. Many stands fit into the mesophytic association described below
..... **Pacific Reed grass (*Calamagrostis nutkaensis*) Alliance (46020)**
 - a. Sedges/rushes- Pacific reed grass associating with significant cover of one or more species of sedge (*Carex spp.*) and rush (*Juncus spp.*) often in a patchwork pattern. May have up to 15% salmonberry (*Rubus spectabilis*).....
..... ***Carex nutkaensis*-*Carex*-*Juncus* Association (46022)**

ID. Grass-like vegetation of fresh water marshes and other standing fresh water. (emergent and aquatic grass-like plants). Vegetation dominated by California bulrush, cattail, and spikerush. These stands are found in the wettest areas in or at the edge of standing water such as marshes or stock ponds. Bur-reed (*Sparganium spp.*) and water parsley (*Oenanthe sarmentosa*) are common associates.

1. California bulrush- Vegetation dominated by California bulrush (*Scirpus californicus*) Other emergent aquatic species such as bur-reed (*Sparganium erectum*) and water parsley (*Oenanthe sarmentosa*) may be present in significant cover..... **Bulrush (*Scirpus californicus*) Alliance (55030)**
2. Broad-leaved cattail- Vegetation strongly dominated by broad-leaved cattail (*Typha latifolia*). **Cattail Alliance (55060)**
3. Bulrush/Cattail- Vegetation co-dominated (30-60% relative cover of each) by bulrush (*Scirpus californicus*) and cattail (*Typha latifolia*). The two species together define their alliance.
.....**Bulrush - Cattail (*Scirpus californicus*-*Typha latifolia*) Alliance (55040)**
4. Spikerush- Vegetation characterized by spikerush (*Eleocharis spp.*)
..... **Spikerush (*Eleocharis spp.*) Alliance (55050)**

IE. Grass-dominated vegetation of salt marshes and tidal flats. Vegetation cover may be low. If neither shrub nor herb cover totals at least 25 percent, vegetation cover may be calculated as relative cover. If total vegetation cover is less than 15 percent, plot is considered unvegetated. **Beaches or Mudflats (90402)**

1. Saltgrass- Vegetation of upper salt marsh edges, usually dominated by saltgrass (*Distichlis spicata*). If not dominant, saltgrass has higher absolute cover than any other single species. If pickleweed is at least 15% cover and/or is co-dominant with saltgrass, see Pickleweed Alliance, page 15. Other salt marsh species such as jaumea (*Jaumea carnosa*), sea lavender (*Limonium californicum*), arrow-grass (*Triglochin concinna*), and alkali heath (*Frankenia salina*) may be present in significant cover. Some stands fit into the association described below.....

..... **Saltgrass (*Distichlis spicata*) Alliance (51010)**

a. Frankenia/jaumea- Saltgrass with significant cover of frankenia (*Frankenia salina*) and jaumea (*Jaumea carnosa*)

...***Distichlis spicata-Frankenia salina-Jaumea carnosa Association (51011)***

2. Cordgrass- Vegetation of lower salt marshes usually adjacent to mud flats and tidal channels, dominated by the rhizomatous native cordgrass (*Spartina foliosa*). No associations are defined.....**Cordgrass (*Spartina foliosa*) Alliance (56010)**

Section II

Vegetation dominated by annual or perennial native or non-native forbs.
..... **Native and non-native forblands**

IIA. Vegetation of coastal dunes, bluffs and salt marshes dominated by perennial forbs including iceplant, coast buckwheat, dune sagewort and pickleweed. Vegetation cover may be low. If neither shrub nor herb cover totals at least 25 percent, vegetation cover may be calculated as relative cover. If total vegetation cover is less than 15 percent, plot is considered unvegetated..... **Dunes, Bluffs, Cliffs, or Outcrops (90401)**
..... **Beaches or Mudflats (90402)**

A1. Iceplant- Vegetation dominated by the invasive non-native iceplant (*Carpobrotus edulus*), usually of coastal dunes, iceplant generally greater than 50% relative cover. This species forms dense monocultures where it dominates. No associations are defined.
..... **Iceplant (*Carpobrotus edulus*) Alliance (62040)**

A2. Coastal dune and bluff vegetation dominated by native perennial forbs that may be slightly woody at the base. Total vegetation cover is typically relatively low, with much open sand. Note these species may also be considered sub-shrubs.

1. Coast buckwheat- Vegetation of coastal bluffs and sandy headlands dominated by coast buckwheat (*Eriogonum latifolium*). No associations defined.
..... **Coast Buckwheat (*Eriogonum latifolium*) Alliance (62050)**

2. Dune sagewort- Vegetation typically of stabilized dunes dominated by dune sagewort (*Artemisia pycnocephala*) with several other herbaceous species such as *Abronia* spp., *Camissonia* spp. and *Frageria chilensis* present. If iceplant is present in greater than 50% cover, see Iceplant Alliance above. Some stands fit into the association described below.
..... **Dune Sagewort (*Artemisia pycnocephala*) Alliance (6206)**

a. Spiny sandmat- Dune sagewort associating with significant cover of spiny sandmat (*Cardionema ramossisimum*)
***Artemisia pycnocephala-Cardionema ramossisimum* Association (62062)**

A3. Pickleweed- Vegetation dominated by the native perennial salt marsh sub-shrubby or herbaceous pickleweed (*Salicornia virginica*). Pickleweed has at least 15% absolute cover over a sometimes higher cover of saltgrass (*Distichlis spicata*), or other short annual or perennial grasses; the two species may co-dominate. Other salt marsh species such as jaumea (*Jaumea carnosa*), sea lavender (*Limonium californicum*), arrow-grass (*Triglochin concinna*), and alkali heath (*Frankenia salina*) may be present in significant cover. Many stands fit the association below. **Pickleweed (*Salicornia virginica*) Alliance (64030)**

- a. Saltgrass/jaumea- Pickleweed with significant cover of saltgrass and jaumea.
Pickleweed and saltgrass may co-dominate.....
.....*Salicornia virginica-Distichlis spicata-Jaumea carnos*a Association (64032)

IIB. Vegetation dominated by tall non-native weedy annual or biennial forbs including wild radish (*Raphanus sativus*), Italian thistle (*Carduus pycnocephala*), black mustard (*Brassica nigra*) and poison hemlock (*Conium maculatum*). May have significant non-native annual grass component such as ripgut grass (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), and meadow barley (*Hordeum spp.*) Some stands fit the associations below.....
.....**California Annual Grassland Mapping Unit (67010)**

- a. Brachypodium- Stands dominated by the non-native grass brachypodium (*Brachypodium distachyon*).....*Brachypodium distachyon* Association (67011)
- b. Wild radish- Stands dominated by the non-native wild radish (*Raphanus sativus*).
..... *Raphanus sativus* Association (67012)

Section III

1. Active pasture or agricultural fields- These areas are used as enclosures for cattle or horses, are managed to produce silage for cattle, or are fields used for other agricultural purposes. This is an artificial vegetation type and does not include grazed grasslands and other grazed naturally occurring vegetation types in the project area.
.....**Active Pasture or Agriculture (90200)**

Division B- Shrub Dominated Vegetation

Section I

Sclerophyllous temperate broad-leaved shrublands dominated by chaparral shrubs including manzanita, chamise, leather oak and holly-leaved cherry as well as coffeeberry

..... **Chaparral Vegetation**

IA. Manzanita chaparral. Manzanita (*Arctostaphylos spp.*) dominates the stand.

1. Sensitive manzanita - chaparral strongly dominated (60% or greater relative cover) by the sensitive manzanita (*Arctostaphylos nummularia*), restricted to sedimentary outcrops adjacent to forest in the northern study area on Bolinas Ridge and on Mt. Tamalpais. Some plots fall within the association described below
.....**Sensitive Manzanita (*A. nummularia*) Alliance (21480)**
 - a. Huckleberry/giant chinquapin- sensitive manzanita associating with significant cover of huckleberry (*Vaccinium ovatum*) and giant chinquapin (*Chrysolepis chrysophylla*). ***Arctostaphylos nummularia-Vaccinium ovatum-Chrysolepis chrysophylla* Association (21481)**
2. Eastwood manzanita- chaparral strongly dominated by Eastwood manzanita (*Arctostaphylos glandulosa*) Some stands fit into the association described below.
..... **Eastwood Manzanita (*Arctostaphylos glandulosa*) Alliance (21210)**
 - a. Interior live oak- Eastwood manzanita stands characterized by the presence of interior live oak (*Quercus wislizenii var. frutescens*) shrubs.....
.....***Arctostaphylos glandulosa-Quercus wislizenii* Association (21260)**
3. Tamalpais manzanita- chaparral dominated by the rare endemic Tamalpais manzanita (*Arctostaphylos hooker montana*) which occurs on serpentine outcrops on Mt. Tamalpais
.....**Tamalpais Manzanita (*Arctostaphylos hookeri Montana*) Alliance (21440)**
4. Woolly-leaf manzanita- chaparral dominated by woolly-leaf manzanita (*Arctostaphylos tomentosa*). In the study area this is a rare type found only on San Francisco water district lands. No associations are defined.
.....**Woolly-leaf Manzanita (*Arctostaphylos tomentosa*) Alliance (21450)**
5. Mixed manzanita- Chaparral dominated by manzanita species which does not fit the alliances described above. More than one species of manzanita present.....
..... **Mixed Manzanita Alliance (preliminary) (21470)**

IB. Chamise chaparral. Chamise (*Adenostoma fasciculatum*) dominates the stand.

1. Chamise - stands dominated by the needle-leaved chaparral shrub, chamise (*Adenostoma fasciculatum*) often mixed with other shrub species, but always at least 60% relative shrub cover. Chamise is often co-dominant with Eastwood manzanita with significant cover of interior live oak (*Quercus wislizenii* var. *frutescens*) in its shrub form, and/or buckbrush (*Ceanothus cuneatus*) and sticky monkey flower (*Mimulus aurantiacus*). Chamise stands are often bordered by Douglas-fir. This type is found in the northern portion of the study area on Bolinas Ridge and in the southern portion of the study area on Mt. Tamalpais and the San Francisco water district lands. The most common chamise type in the study area is co-dominated by chamise and Eastwood manzanita with other associating shrubs as described above. Most chamise stands fit into the associations described below.....
..... **Chamise (*Adenostoma fasciculatum*) Alliance (21110)**
 - a. Eastwood manzanita- Chamise dominates but has less than 80% relative shrub cover and shares the canopy with Eastwood manzanita (*Arctostaphylos glandulosa*), the two species often co-dominating. Interior live oak (*Quercus wislizenii* var. *frutescens*) in its shrub form may have significant cover. Buckbrush (*Ceanothus cuneatus*) and/or sticky monkey flower (*Mimulus aurantiacus*) are often present in significant cover.....
..... ***Arctostaphylos fasciculatum*-*A. glandulosa*-*Quercus wislizenii* Association (21140)**
 - b. Sticky monkey flower- Chamise is strongly dominant with at least 80% relative shrub cover, no other large shrub species form significant cover. Sticky monkey flower (*Mimulus aurantiacus*) is present. This type is described from sedimentary rocks on upper slopes and spurs of Bolinas Ridge in the northern portion of the study area. This type is rare in the study area.....
..... ***Arctostaphylos fasciculatum*-*Mimulus aurantiacus* Association (21142)**

IC. Chaparral dominated by broad-leaved sclerophylls other than chamise or manzanita species including holly-leaved cherry, leather oak and coffeeberry.

1. Holly-leaved cherry- Chaparral dominated by holly-leaved cherry (*Prunus illicifolia*). This type occurs primarily in the San Francisco water district lands in the southern portion of the study area. Some stands fit into the association described below. **Holly-leaved Cherry (*Prunus illicifolia*) Alliance (21250)**
 - a. Pacific sanicle- Holly-leaved cherry associating with Pacific sanicle.
.....***Prunus illicifolia* /*Sanicula crassicaulis* Association (21251)**
2. Leather oak- Chaparral dominated by leather oak (*Quercus durata*). This is a rare type described from serpentine outcrops near Mt. Tamalpais. Often in association with Eastwood manzanita (*A. glandulosa*).....
.....**Leather Oak (*Quercus durata*) Alliance (21270)**
3. Coffeeberry- Scrub dominated by the broad-leaved sclerophyll coffeeberry (*Rhamnus californica*). In composition and ecological setting this scrub is more related to coastal scrubs than true chaparral, being found in mesic coastal sites within the summer fog belt, however, physiognomically the dominant species is chaparral-like. Some plots fit into the association described below.
..... **Coffeeberry (*Rhamnus californica*) Alliance (21460)**
 - a. Coyote brush/beeplant- coffeeberry associating with coyote brush and beeplant.
..... ***Rhamnus californica*-*Baccharis pilularis*/*Scrophularia californica* Association (21461)**

Section II

Scrub dominated by microphyllous (small-leaved) or broad-leaved evergreen species generally considered to be part of the northern coastal scrub habitat. Includes coyote brush, bush lupine, dune goldenbush, dune sagewort, as well as blue blossom and the invasive non-native gorse and broom species..... **Coastal Scrub Vegetation**

IIA. Coyote brush- Scrubs characterized by a high cover of coyote brush (*Baccharis pilularis*) relative to herbs or other shrubs. Coyote brush scrub varies from low diversity, early seral, openly-spaced types verging on various grassland alliances to tall, dense multi-species scrubs which may or may not be seral to other scrub or forest types. Coyote brush is always at least 15% absolute cover if associating with herbaceous species and at least 30% relative shrub cover in dense scrubs. **Note:** A plot with up to 25% cover of subshrubs may key to an herbaceous type, see Division A- Herbaceous Vegetation. Coyote brush is the most diverse and variable alliance in the study area, represented by 19 associations described below.....

..... **Coyote Brush (*Baccharis pilularis*) Alliance (24050)**

1A. Coyote brush in open stands with total shrub cover for all shrubs at 50% or less absolute cover. Coyote brush cover is 15-50% and is mixed with various grass or herb species. California blackberry (*Rubus ursinus*) is often present in significant cover. A stand with 15-50% coyote brush cover may also key to 1B or 1C. See below.

1. Generally occupies drier hills and slopes where coyote brush appears to be colonizing grasslands on upper slopes and ridges away from the immediate coast.
 - a. Purple needlegrass (*Nassella pulchra*) is the major native grass component although non-native annual grasses and forbs may co-dominate.
.....***B. pilularis/Nassella pulchra* Association (24056)**
 - b. Native grasses in association with coyote brush that do not fit the types described above or below. This type may be dominated by native grass species not described in these alliances or by a mixture of native grasses, where none have significant cover
.....***B. pilularis/Native Grassland Association (preliminary) (24058)***
 - c. Non-native annual grasses, including slender wild oats (*Avena barbata*), Italian ryegrass (*Lolium multiflorum*), soft chess (*Bromus hordeaceus*), and *Vulpia bromoides* are a significant herbaceous component. Purple needlegrass is not a significant component.
.....***B. pilularis/Annual Grassland Association (preliminary) (24057)***

2. Coyote brush mixed with mesophytic grass species, found close to the coast, often represented by the prostrate (low) form of this species.
 - a. Tufted hairgrass (*Deschampsia caespitosa*) the major grass species.....
..... ***B. pilularis/Deschampsia caespitosa* Association (2406)**
 - b. California oatgrass (*Danthonia californica* the principal grass species.
..... ***B. pilularis/Danthonia californica* Association (24061)**
 - c. Native grasses in association with coyote brush that do not fit the types described above or below. This type may be dominated by native grass species not described in these alliances or by a mixture of native grasses, where none have significant cover.
.....***B. pilularis/Native Grassland* Association (24058)**
 - d. Non-native perennial grass species (including *Holcus lanatus*, *Phaleris aquatica*, *Festuca arundinacea*) associated with coyote brush.
...***B. pilularis/Non-native Grassland* Association (preliminary) (24065)**
3. California blackberry/weedy spp.- Coyote brush in relatively mesic early seral stages associating with California blackberry (*Rubus ursinus*) and an understory of mesophytic weedy species, including annual and perennial non-native grasses and forbs. Poison oak is often present. No significant cover of native grasses.
..... ***B. pilularis-Rubus ursinus/Weedy* Association (24064)**
4. Coyote brush stands on moist slopes, in swales and adjacent to wetlands, mixed with mesophytic grasses or grass-like plants.
 - a. Slough sedge- coyote brush mixes with significant cover of slough sedge (*Carex obnupta*) and rushes (*Juncus patens*). See also Rush Alliance, page 11.
..... ***B. pilularis/Carex obnupta -Juncus patens* Association (2406)**
 - b. Pacific reed grass- coyote brush associating with significant cover of Pacific reed grass. Coyote brush is usually shorter and in lower in cover. This type belongs to the Pacific Reedgrass alliance and is therefore considered an herbaceous type. If coyote brush cover is greater than 15%, and reed grass is not taller, or if coyote brush has more than 25% cover as a subshrub, see the shrub type, *Baccharis pilularis/ Native Grassland* Association, above.....
.....***Calamagrostis nutkaensis/Baccharis pilularis* Association (46021)**
(Pacific Reedgrass Alliance in part)
 - c. Non-native perennial grass species (including *Holcus lanatus*, *Phaleris aquatica*, *Festuca arundinacea*) associated with coyote brush
.....***B. pilularis/Non-native Grassland* Association (preliminary) (24065)**

5. Coyote brush associated with low coastal bluff and sand dune species along the immediate coast.

- a. Dudleya- coyote brush associating with dudleya (*Dudleya farinosa*) on low coastal bluffs.....***B. pilularis /Dudleya farinosa* Association (24069)**
- b. Yellow bush lupine- coyote brush associating with yellow bush lupine (*Lupinus arboreus* and/or dune lupine (*Lupinus chamissonis*) in dune scrub. Lupines may be near equal cover to coyote brush. See also Yellow bush lupine Alliance, page 24 and Dune lupine- Goldenbush Alliance, page 23 ...
***B. pilularis- Lupinus arboreus-Lupinus chamissonis* Association (24052)**

1B. Coyote brush in dense scrubs with total shrub cover for all shrubs greater than 50% absolute cover. These dense scrubs are dominated by coyote brush (50% or higher relative shrub cover) or co-dominated, with other shrub species making up 30-60% cover relative to coyote brush. Poison oak is frequent in these stands. Grasses are relatively unimportant. Scrubs co-dominated by coyote brush and another shrub species should be keyed to the alliance of the non-coyote brush species if an alliance has been defined for that type. For example, scrub co-dominated by coyote brush and blue blossom would key to blue blossom.

- a. Oceanspray (*Holodiscus discolor*) is present in at least 1% cover in addition to other mesophytic species.
.....***B. pilularis-Holodiscus discolor* Association (24062)**
- b. Lizardtail - Typically a dense coastal bluff type mixed with at least 1% cover of lizardtail (*Eriophyllum staechadifolium*). California sagebrush may be important (>1%) in cover.
.....***B. pilularis-Eriophyllum staechadifolium* Association (24060)**
- c. Sword fern- Mesophytic scrub with sword fern (*Polystichum munitum*) common in the understory.
.....***B. pilularis/Polystichum munitum* Association (24053)**
- d. California sagebrush- Relatively xerophytic scrub of south and southwest-facing slopes with greater than 5% cover of California sagebrush (*Artemisia californica*) associated with dominant coyote brush. lizardtail (*Eriophyllum staechadifolium*) if present, less than 1% cover. See also California Sagebrush Alliance, page 25.
***B. pilularis-Artemisia californica-Toxicodendron/Monardella villosa* Association (24051)**
- e. Coffeeberry (*Rhamnus californica*) is present in significant cover. Thimbleberry (*Rubus parviflorus*) is a characteristic component.
***B. pilularis- Rhamnus californica-Rubus parviflorus* Association (24055)**

- f. Blue blossom (*Ceanothus thyrsiflorus*) is a major component
..... ***B. pilularis-Ceanothus thyrsiflorus* Association (24054)**
- g. Holly-leaved cherry- Mixture of mesic chaparral with holly-leaved cherry
..... ***B. pilularis-Prunus illicifolia* Association (preliminary) (24067)**
- h. California hazel- Mesic mature coyote brush scrub with significant cover of
California hazel (*Corylus cornuta*).
..... ***B. pilularis-Corylus cornuta* Association (24066)**
- i. Poison oak (*Toxicodendron diversilobum*) is a major component (>5%
cover) in the stand, often approaching coyote brush in cover. Other
diagnostic species in associations listed above are lacking. For example, a
coyote brush stand with 25% cover of poison oak and 7% cover of sword
fern (*Polystichum munitum*) would not key to poison oak but to *Baccharis-*
Polystichum.. ***B. pilularis-Toxicodendron diversilobum* Association (24059)**

1C. Coyote brush associating with low coastal bluff and sand dune species along the
immediate coast.

- a. Dudleya- coyote brush associating with dudleya (*Dudleya farinosa*) on low coastal
bluffs ***B. pilularis /Dudleya farinosa* Association (24069)**
- b. Yellow bush lupine- coyote brush associating with yellow bush lupine (*Lupinus*
arboreus and/or dune lupine (*L. chamissonis*) in dune scrub. Lupines may be near
equal cover to coyote brush. See also Yellow bush lupine Alliance, page 25 and
Dune lupine- Goldenbush Alliance, below.....
.....***B. pilularis- Lupinus arboreus-Lupinus chamissonis* Association (24052)**

IIB. Scrubs dominated by microphyllous (small-leaved) shrubs with little to no coyote brush.
With dune vegetation types, overall vegetation cover is often low, with much open sand. If
neither shrub nor herb cover totals at least 25 percent, vegetation cover may be calculated as
relative cover. If total vegetation cover is less than 15 percent, plot is considered unvegetated.

..... **Dunes, Bluffs, Cliffs, or Outcrops (90401)**

- 1. California sagebrush (*Artemisia californica*) dominated scrub. California sagebrush
generally has 3 times or greater cover than coyote brush and other shrub species. No
associations are defined.
.....**California Sagebrush (*Artemisia californica*) Alliance (24080)**
- 2. Dune lupine- Scrub dominated or co-dominated by dune lupine (*Lupinus arboreus*)
and dune goldenbush, otherwise known as mock heather, (*Ericameria ericoides*).
Generally one or the other of these species is dominant. Coyote brush and dune
sagebrush (*Artemisia pycnocephala*) may also be conspicuous, but not dominant. Dune
lupine and dune goldenbush together define the alliance
.....**Dune Lupine-Goldenbush (*Lupinus chamissonis-Ericameria ericooides*)
Alliance (62061)**

3. Broom spp.- Stands dominated by any of three non-native invasive broom species (*Genista monspeliensis*, *Cytisus scoparius*, *Cytisus striatus*). No associations are defined. **Broom (*G. monspeliensis*, *Cytisus spp.*) Alliance (24040)**
4. Gorse- Stands dominated by the non-native invasive shrub gorse (*Ulex europaea*). In the study area gorse is usually found in mesic coastal terrace locations. This type usually has a relatively open non-native grass understory in the study area. No associations are defined. **Gorse (*Ulex europaea*) Alliance (24999)**

IIE. Scrubs dominated by semi-sclerophyllous evergreen species largely restricted to mesic coastal scrubs undisturbed for long periods.

1. Coffeeberry- Stands dominated by California coffeeberry (*Rhamnus californica*). These stands appear to represent a late dynamic stage of coastal scrubs that were once dominated by coyote brush. Many stands fit into the association described below. **Coffeeberry (*Rhamnus californica*) Alliance (21460)**
 - a. Coffeeberry associating with significant cover of coyote brush and beeplant (*Scrophularia californica*).
.....***Rhamnus californica*-*Baccharis pilularis*/*Scrophularia californica* Association (21461)**
2. Wax myrtle- Stands dominated by the tall California wax myrtle (*Morilla [Myrica] californica*). Stands are usually very small and associated with mesic conditions in sheltered swales and low areas near coast. No associations are defined.....
.....**California Wax Myrtle (*Morilla [Myrica] californica*) Alliance (20010)**
3. Blue blossom- Stands dominated by blue blossom (*Ceanothus thyrsiflorus*). May occur as dense stands associated with forest, woodlands and chaparral at Point Reyes and in southern GGNRA units or as low coastal bluff scrub on serpentine as at the Presidio in San Francisco. Many of the former stands are the result of the Point Reyes Vision Fire of October 1995. Some stands fit into the associations described below.....**Blue blossom (*Ceanothus thyrsiflorus*) Alliance (20020)**
 - a. Huckleberry-thimbleberry- Stands originating from burned forest of Bishop pine (*Pinus muricata*) or Douglas-fir (*Pseudotsuga menziesii*) on Inverness Ridge. Blue blossom associating with significant cover of huckleberry and thimbleberry.....
.....***Ceanothus thyrsiflorus* - *Vaccinium ovatum*-*Rubus parviflorus* Shrubland Association (20022)**
 - b. Coyote brush/poison oak- Stands associated with *Baccharis pilularis* alliance stands in coastal scrub. Blue blossom associating with significant cover of coyote brush and poison oak. ...***Ceanothus thyrsiflorus* - *B. pilularis*-*Toxicodendron diversilobum* Shrubland Association (20021)**

IIC. Yellow bush lupine- Coastal scrubs dominated by the broad-leaved evergreen yellow bush lupine (*Lupinus arboreus*), without any other major shrubby species present. These are generally dynamic, short-lived stands. Yellow bush lupine may mix with dune species (*Artemisia pycnocephala*), bluff scrub species (*Eriophyllum staechadifolium*), weedy forbs and annual grasses, and native grasses and herbs (*Danthonia californica*, *Pteridium aquilinum*). This type often occupies sandy or disturbed areas such as pastures and dunes near the coast. No associations are defined..... **Yellow bush lupine (*Lupinus arboreus*) Alliance (19010)**

IID. Coastal dune and bluff vegetation dominated by sub-shrubs, perennial forbs that may be slightly woody at the base. Total vegetation cover is typically low. If neither shrub nor herb cover totals at least 25 percent, vegetation cover may be calculated as relative cover. If total vegetation cover is less than 15 percent, plot is considered unvegetated.
..... **Dunes, Bluffs, Cliffs, or Outcrops (90401)**

1. Coast buckwheat- Vegetation of coastal bluffs and sandy headlands dominated by coast buckwheat (*Eriogonum latifolium*). No associations are defined.....
..... **Coast Buckwheat (*Eriogonum latifolium*) Alliance (62050)**

2. Dune sagewort- Vegetation typically of stabilized dunes dominated by dune sagewort (*Artemisia pycnocephala*), with several other herbaceous species such as iceplant (*Carpobrotus edulis*) and spiny sandmat (*Cardionema ramosissimum*) usually present. Iceplant, if present, has less than 50 percent relative cover. If greater than 50 percent relative cover, see Iceplant Alliance, page 14. Some stands fit into the association described below.
..... **Dune Sagewort (*Artemisia pycnocephala*) Alliance (62064)**

a. Spiny sandmat- Dune sagewort associating with significant cover of spiny sandmat (*Cardionema ramosissimum*).....
..... ***Artemisia pycnocephala-Cardionema ramosissimum* Association (62062)**

Section III

Scrubs dominated by cold-deciduous shrubs including poison oak, California hazel, salmonberry and Mexican elderberry. Arroyo willow stands, although technically a shrub type in the study area because of the species height and shrubby growth form, are described in the tree division of this key along with the other willow types. See Arroyo Willow Alliance, page 33. Vegetation types in this section range from coastal bluffs to mesic openings in Douglas-fir forest. **Temperate Cold-deciduous Shrublands**

1. Poison oak- Scrubs dominated by poison oak (*Toxicodendron diversilobum*). These stands are closely associated with coastal scrub in the study area and exhibit relatively mesic conditions, often occurring on north slopes and on concave slopes. Most stands have coyote brush (*Baccharis pilularis*) as a component, but poison oak is 2-10 times higher in cover than coyote brush. Some stands fit the association below. **Poison Oak (*Toxicodendron diversilobum*) Alliance (30040)**
 - a. Coyote brush/thimbleberry- Poison oak associating with significant cover of coyote brush and thimbleberry
.....***Toxicodendron diversilobum*-*B. pilularis*-*Rubus parviflorus* Association (30041)**
2. California hazel (*Corylus cornuta*) dominates in tall scrub on steep concave slopes in a few locations on southern Inverness Ridge, surrounded by Douglas-fir alliance. Some stands fit into the association described below.
..... **California Hazel (*Corylus cornuta*) Alliance (3001)**
 - a. Sword fern- California hazel associating with significant cover of sword fern.
.....***Corylus cornuta*/*Polystichum munitum* Association (30011)**
3. Salmonberry (*Rubus spectabilis*) dominates in mesic scrubs associated with gullies, swales, and other bottomlands, often adjacent to riparian forest or scrub in the coastal areas. **Salmonberry (*Rubus spectabilis*) Alliance (30050)**
4. Mexican elderberry dominates the stand
..... **Mexican Elderberry (*Sambucus mexicana*) Alliance (30020)**
5. Sweet-brier (*Rosa eglanteria*) dominates the stand
..... **Sweet-brier (*Rosa eglanteria*) (preliminary) (30030)**

Division C- Tree Dominated Vegetation

Section I

Stands dominated by coniferous evergreen trees including Douglas-fir (*Pseudotsuga menziesii*), coast redwood (*Sequoia sempervirens*), Bishop pine (*Pinus muricata*), Monterey pine (*Pinus radiata*), and Monterey cypress (*Cupressus macrocarpa*)
..... **Needle-leaved Evergreen Forest**

IA. Forests of giant pointed-crowned conifers with maximum height approaching 50-70 meters dominated by Douglas- fir or coast redwood. Approximately 80% of these forests in the study area are dominated by fir, with redwood forests making up the remaining 20 %.
..... **Giant Temperate or Subpolar Needle-leaved Evergreen Forest**

1. Douglas fir- Stands dominated by Douglas-fir (*Pseudotsuga menziesii*). These forests have a highly variable canopy cover. Douglas-fir forest is our most common forest in the project area and is characterized by Douglas-fir dominant canopy often with a strong component of hardwood trees, usually California Bay (*Umbellularia californica*), but tanoak (*Lithocarpus densiflorus*) or individual coast live oak (*Quercus agrifolia*) may be present. The shrub understory is also highly variable, but is usually moderate to very dense. Coffeeberry *Rhamnus californica*, huckleberry (*Vaccinium ovatum*), California hazel (*Corylus cornuta*), poison oak (*Toxicodendron diversilobum*) and coyote brush (*Baccharis pilularis*) are the most common shrubs. Sword fern (*Polystichum munitum*) often dominates the herbaceous layer. Roughly 70% of Douglas-fir forest occurs in the northern portion of the study area, much of it concentrated to the west of Highway One from Inverness to Bolinas. The remaining 30% or so is found in the southern portion of the study area, with a large occurrence in the Montara Mountain area. The most common fir forest of the study area contains several hardwood species in association with fir, as well as a mixture of shrub species and sword fern as described above. Some stands fit the associations below.....
..... **Douglas-fir (*Pseudotsuga menziesii*) Alliance (2010)**

1A. California bay is a strong component in the tree canopy. Oaks or tanoak are lower in cover than bay or absent.

- a. Coffeeberry is the major understory species
.....***Pseudotsuga menziesii-Umbellularia californica /Rhamnus californica Association (2015)***
- b. Sword fern is the major understory species.....
.....***Pseudotsuga menziesii-Umbellularia californica/Polystichum munitum Association (2011)***

1B. Oaks or tanoaks are the major subcanopy species. California bay is lower in cover or absent.

- a. Coast live oak is the major subcanopy species
.....***Pseudotsuga menziesii-Quercus agrifolia* Association (2013)**
- b. Canyon live oak is the major subcanopy species. Other broad-leaved trees such as tanoak may be present. This type occurs on the higher slopes of Mt. Tamalpais in the study area
.....***Pseudotsuga menziesii- Quercus chrysolepis* Association (2014)**
- c. Tanoak is the major subcanopy species. Coffeeberry is present in the understory
***Pseudotsuga menziesii- Lithocarpus densiflorus/ Rhamnus californica* Association (2020)**

1C. Coyote brush- Douglas-fir occurs over scrub, sometimes in dwarf form, usually young trees invading a coastal scrub site. Coyote brush is the major understoryshrub
.....***Pseudotsuga menziesii/Baccharis pilularis* Association (2012)**

2. Coast redwood- Stands dominated by coast redwood. Tanoak (*Lithocarpus densiflorus*) is often a significant component, sometimes co-dominating with redwood. California bay (*Umbellularia californica*) or Pacific madrone (*Arbutus menziesii*) are also often present in significant cover. Some stands may have strong dominance by redwood with very little other tree cover. California hazel (*Corylus cornuta*) and huckleberry (*Vaccinium ovatum*) are the most common understory shrubs, with shrub cover usually sparse to moderate. Sword fern (*Polystichum munitum*) often dominates the herbaceous layer. Roughly 60% of redwood forest occurs in the southern portion of the study area, much of it found in Muir Woods and on the Phleger Estate. Redwoods in the northern portion of the study area are concentrated on southern Bolinas ridge. The most common redwood forest of the study area contains one to several hardwood species in association with redwood, as well as shrub species and sword fern as described above. Some stands fit into the associations described below
.....**Coast Redwood (*Sequoia sempervirens*) Alliance (2050)**

- a. Tanoak is a significant component, sometimes co-dominating with redwood. Douglas-fir is absent from the canopy
***Sequoia sempervirens-Lithocarpus/Vaccinium ovatum* Association (2051)**
- b. Both Douglas-fir and California bay present in significant cover
....***Sequoia sempervirens-Pseudotsuga-Umbellularia* Association (2052)**

IB. Forests dominated by rounded-crowned conifers, dominated by Bishop or Monterey pine, or Monterey cypress.

1. Bishop pine (*Pinus muricata*) is the dominant tree in the forest canopy. Madrone (*Arbutus menziesii*), tanoak (*Lithocarpus densiflorus*), coast live oak (*Quercus agrifolia*) or California bay (*Umbellularia californica*) are often present in significant cover. Huckleberry (*Vaccinium ovatum*) is important to dominant in the shrub layer. Other species common in the understory include salal (*Gaultheria shallon*) and sword fern (*Polystichum munitum*). Stands of bishop pine tend to be even-aged, usually originating after stand destroying fires. The bishop pine forests in the study area are mature forests except for those that burned in the Vision Fire of 1995. Bishop pine forests in the study area occur only on the northern portions of Inverness Ridge and neighboring areas. Approximately 35% of these forests burned in the Vision Fire of 1995. These burned bishop pine forests are characterized by a patchwork of extremely dense stands of regenerating pines, alternating with extremely dense stands of blue blossom (*Ceanothus thyrsiflorus*) and Marin manzanita (*Arctostaphylos virgata*). The most common bishop pine forest of the study area contains one to several hardwood species in association with mature bishop pine, as well as huckleberry and other species as described above. Some stands fit the association below

..... **Bishop Pine (*Pinus muricata*) Alliance (3030)**

- a. Madrone/Huckleberry- This type may have any of the major broad-leaved evergreen tree species as significant sub-canopy, but always has at least the presence of Pacific madrone and at least 1% huckleberry in the understory.
.....***Pinus muricata*-*Arbutus menziesii*/*Vaccinium ovatum* Association (3031)**
2. Monterey pine or Monterey cypress- These stands are characterized by planted groves dominated by either Monterey pine (*Pinus radiata*) or Monterey cypress (*Cupressus macrocarpa*), invasive in some areas, usually with sparse to low shrub and herbaceous cover. Understory species are often non-native. Approximately 90% of these forests are found scattered throughout the southern portion of the study area. No associations are defined

..... **Monterey Pine (*Pinus radiata*) Alliance (non-native) (3120)**

.....**Monterey Cypress (*Cupressus macrocarpa*) Alliance (non-native) (3120)**

Section II

Evergreen broad-leaved forests and woodlands dominated by one or more of several species including: California bay (*Umbellularia californica*), coast live oak (*Quercus agrifolia*), eucalyptus (*Eucalyptus globulus*), tanoak (*Lithocarpus densiflorus*), giant chinquapin (*Chrysolepis chrysophylla*), and Pacific madrone (*Arbutus menziesii*). California bay and coast live oak are by far the most abundant, comprising roughly 50 and 40% respectively of these forests, these two species often associating with each other

.....**Winter-rain Evergreen Sclerophyllous Forests and Woodlands**

1. California bay- Stands dominated by California bay (*Umbellularia californica*) or co-dominated by bay and coast live oak (*Quercus agrifolia*) with each species comprising 30-60% relative canopy cover. Tanoak, Douglas- fir (*Pseudotsuga menziesii*) or California buckeye (*Aesculus californica*) may have significant cover. Though uncommon, a bay forest may have up to 50% relative cover of tanoak or, very rare, up to 60% relative cover of canyon live oak (*Quercus wislizenii*). Hence a stand with higher cover of oaks than bay can key to bay forest. Note: If coast live oak is > 60% relative cover see coast live oak alliance, page 31. The bay forest understory is variable; it can be a moderately dense shrub understory often dominated by hazel (*Corylus cornuta*), coffeeberry (*Rhamnus californica*), red elderberry (*Sambucus racemosa*) and/or poison oak (*Toxicodendron diversilobum*). If there is no significant shrub cover, sword fern (*Polystichum munitum*) usually dominates understory. Approximately 70% of bay forest is found in the northern portion of the study area. The most common California bay forest of the study area contains coast live oak and other hardwood species, and individual firs in association with bay, as well as several shrub species and sword fern, as described above. Some stands fit the associations below
-**California Bay (*Umbellularia californica*) Alliance (1010)**
 - a. Coast live oak- California bay shares the canopy with coast live oak. Either species may dominate with 30-60% relative cover each, but most stands are dominated by California bay. Poison oak and hazel are common understory species. This is the common “bay-oak” or “oak-bay” forest or woodland of the study area. Note: If coast live oak is > 60% relative cover see coast live oak alliance, page 31
 -***Umbellularia californica-Quercus agrifolia/Toxicodendron* Association (1014)**
 - b. Sword fern- Bay is strongly dominant (60% or greater relative cover) in the canopy with a relatively dense understory dominated by sword fern. Other small deciduous trees/ large shrubs (red elderberry, California buckeye) may be common in the subcanopy
 -***Umbellularia californica/Polystichum munitum* Association (1012)**
 - c. Tanoak- Bay dominates with significant cover of tanoak
 -***Umbellularia californica-Lithocarpus densiflorus* Association (1011)**

- d. Canyon live oak- California bay shares the canopy with up to 60% relative cover of canyon live oak. This is a rare type in the study area and is described from rocky upper slopes of Mt. Tamalpais.
.....***Umbellularia californica-Quercus chrysolepis* Association (1013)**
2. Coast live oak- Forests and woodlands dominated by coast live oak (*Quercus agrifolia*). Generally coast live oak is the major canopy species with >50% relative cover, usually with a significant component of California bay (*Umbellularia californica*). Stands where coast live oak and bay co-dominate are classified as California bay. If bay is 30% or greater relative cover see California bay alliance- page 30. Douglas- fir individuals may be present. Understory is usually open to moderate with poison oak being the most commonly found shrub, often fairly high in cover. Coffeeberry (*Rhamnus californica*), coyote brush (*Baccharis pilularis*), toyon (*Heteromeles arbutifolia*), and hazel (*Corylus cornuta*) may be present. Herb cover is usually low. Approximately 80% of coast live oak is found in the southern portion of the study area on the San Francisco peninsula. The most common coast live oak woodland of the study area contains a significant component of California bay and poison oak as described above. Some stands fit the association below
..... **Coast Live Oak (*Quercus agrifolia*) Alliance (12020)**
- a. California bay- Stands strongly dominated by coast live oak (60% or greater relative cover) with significant cover of California bay, however bay is always less than 30% relative cover. Madrone may or may not share the canopy. ***Quercus agrifolia/(Arbutus menziesii)-Umbellularia californica* Association (12021)**
- b. Poison oak- Stands strongly dominated by coast live oak (60% or greater relative cover) with a relatively dense understory of poison oak. Hazel may or may not share the understory
...***Quercus agrifolia/Toxicodendron-(Corylus cornuta)* Association (12022)**
3. Eucalyptus- Forests dominated by the non-native Blue Gum Eucalyptus (*Eucalyptus globulus*). These have been planted or have invaded native communities. Eucalyptus is usually very dominant in the canopy. Monterey Pine (*Pinus radiata*)/ Monterey cypress (*Cupressus macrocarpa*) or individuals of Douglas-fir (*Pseudotsuga menziesii*), California bay (*Umbellularia californica*) or coast live oak (*Quercus agrifolia*) may be present. The understory is usually sparse often including remnants of the native community. Poison oak (*Toxicodendron diversilobum*) and non-native or native berry (*Rubus spp.*) are common shrubs. Eucalyptus forests in the study area are characterized by a thick litter layer formed by this species distinctive peeling bark, and tendency to drop seedpods, twigs and branches. Roughly 80% of eucalyptus stands are found scattered throughout the southern portion of the study area. No associations are defined..... **Eucalyptus (*Eucalyptus globulus*) Alliance (1030)**

4. Tanoak- Forests dominated by tanoak (*Lithocarpus densiflorus*). Tanoak usually shares the canopy with a strong presence of Pacific madrone (*Arbutus menziesii*) and coast redwood (*Sequoia sempervirens*) but may strongly dominate the canopy. Douglas- fir (*Pseudotsuga menziesii*) is usually present in significant cover. Tanoak is often found adjacent to Coast redwood and Douglas-fir forests. The understory is variable. Huckleberry (*Vaccinium ovatum*) may strongly dominate the shrub layer. Tanoak forests are relatively rare in the study area and are threatened by sudden oak death disease. Almost all tanoak forests occur in the southern portion of the study area in the Phleger Estate area. Tanoak forest can also be found on Mt. Tamalpais and Bolinas Ridge. No associations are defined.....**Tanoak (*Lithocarpus densiflorus*) Alliance (1070)**

5. Giant chinquapin- Generally short (5-10m) forests strongly dominated (>60% relative cover) by dense, clonal stands of giant chinquapin (*Chrysolepis chrysophylla*), occurring on upper slopes and ridges adjacent to Douglas-fir (*Pseudotsuga menziesii*) forest, often transitional between forest and chaparral. Huckleberry (*Vaccinium ovatum*) is significant in cover, often present in high cover, forming a dense understory to chinquapin. Chinquapin forest is rare in the study area. It occurs in higher portions of northern (Mt. Tamalpais, Bolinas and Inverness Ridges) and southern (Montara Mountain) study area. The most common chinquapin forest in the study area is strongly dominated by chinquapin with a strong presence of huckleberry in the understory as described in the association below.
..... **Giant Chinquapin (*Chrysolepis chrysophylla*) Alliance (1090)**

- a. Huckleberry- Giant chinquapin associating with significant cover of huckleberry in the understory
..... ***Chrysolepis chrysophylla* /*Vaccinium ovatum* Association (1091)**

6. Pacific madrone- Woodlands dominated by Pacific madrone (*Arbutus menziesii*). Madrone usually shares the canopy with a strong component of tanoak (*Lithocarpus densiflorus*). Madrone woodlands are rare in the study area and are found almost entirely in the southern portion of study area on the Phleger Estate and adjacent lands. No associations are defined
..... **Pacific Madrone (*Arbutus menziesii*) Alliance (12030)**

Section III

Stands dominated by deciduous broad-leaved trees of riparian and upland forests woodlands and shrublands dominated by the following species: Willows (*Salix spp.*) including arroyo willow in its shrub form, red alder (*Alnus rubra*), and California Buckeye (*Aesculus californicus*). Approximately 50% of these forests in the study area are dominated by alder, with willows making up an additional 40 % or so

..... **Winter-deciduous broad leaved forests and woodlands**

IIIA. Riparian tree or tree in shrub form dominated stands in or immediately adjacent to streams, swamps, ponds, lakes or other fresh water, dominated by willows or red alder.

1. Arroyo willow- Stands dominated by Arroyo Willow (*Salix lasiolepis*) which is structurally variable; most stands are tall shrublands, some are forests. Typically, arroyo willow in its shrub form, usually 5-7 meters in height, strongly dominates the canopy. Other taller willows (*Salix spp.*), or red alder (*Alnus rubra*) may be present in small quantities however arroyo willow is always at least 50% relative cover. The understory is usually extremely dense because of the thicket- forming growth habit of this species. Shrubs such as berry species (*Rubus parviflorus*, *Rubus spectabilis*, *Rubus discolor*, *Rubus ursinus*) are most commonly found woven through the understory. Wax myrtle (Morilla [*Myrica*] *californica*) or poison oak (*Toxicodendron diversilobum*) may be present. Sedges (*Carex spp.*), rushes (*Juncus spp.*), small-fruited bulrush (*Scirpus microcarpus*) along with hedge nettle (*Stachys ajugoides*), beeplant (*Scrophularia californica*), and ferns (lady fern- *Athyrium filix-femina*, bracken fern- *Pteridium aquilinum*) dominate the herbaceous layer. This type is found equally throughout the northern and southern portions of the study area. The most common arroyo willow type of the study area is strongly dominated by dense arroyo willow in its shrub form and contains a significant component *Rubus* species as described above. These and stands with yellow willow (*Salix lucida*) fit the associations below..... **Arroyo Willow (*Salix lasiolepis*) Alliance (32080)**
 - a. *Rubus spp.*- Arroyo willow associating with one to several *Rubus* (berry) species (*Rubus parviflorus*, *Rubus spectabilis*, *Rubus discolor*, *Rubus ursinus*) woven through the understory ***Salix lasiolepis*/Rubus Association (7062)**
 - b. Yellow willow- arroyo willow associating with significant cover of yellow willows. Usually has one to several *Rubus spp.* in the understory. This is considered a forest type because of the taller yellow willows.
.....***Salix lasiolepis*-*Salix lucida* association (mixed willow type) (7061)**
2. Yellow willow (*Salix lucida*) strongly dominates the tree canopy. Arroyo willow (*Salix lasiolepis*) is usually present in significant cover. Red alder (*Alnus rubra*) may be present. Berry species (*Rubus ursinus*, *Rubus discolor*) usually occur in significant cover in the understory. Yellow willow forest is rare in the study area. It is found in both northern and southern portions of the study area. No associations are defined.
.....**Yellow willow (*Salix lucida*) Alliance (7030)**

3. Red willow (*Salix laevigata*) is the major tree dominant in the canopy. May include lesser amounts of yellow willow (*Salix lucida*) and have a variable understory with such species as dogwood (*Cornus sericea*), stinging nettle (*Urtica dioica*), and water parsley (*Oenanthe sarmentosa*). This type is rare in the study area. No associations are define... **Red Willow (*Salix laevigata*) Alliance (7050)**

4. Black willow (*Salix gooddingii*) is the major tree canopy species. Other understory willows or other riparian species such as blue elderberry (*Sambucus mexicana*) and/or dogwood (*Cornus sericea*) are of minor importance. This type is very rare in the study area.**Black Willow (*Salix gooddingii*) Alliance (7040)**

5. Red alder (*Alnus rubra*) is the principal overstory dominant and often shares the canopy with patchy yet significant cover of California bay (*Umbellularia californica*). Arroyo willow (*Salix lasiolepis*) is often present in the subcanopy. The understory is usually moderate to dense. Berry species (*Sambucus racemosa*, *Rubus spectabilis*, *Rubus parviflorus*, *Rubus ursinus*) are common shrubs. Hedge nettle (*Stachys ajugoides*), sedges (*Carex spp. especially Carex obnupta*), stinging nettle (*Urtica dioica*), rushes (*Juncus spp.*), small-fruited bulrush (*Scirpus microcarpus*), and ferns (lady fern- *Athyrium filix-femina*, sword fern- *Polystichum munitum*) dominate the herbaceous layer. Roughly 90% of red alder forest is found in the northern study area. The most common red alder forest in the study area has patchy California bay cover, a shrub layer dominated by red elderberry and *Rubus spp.*, and a variable herbaceous understory as described above. Some stands fit into the associations described below. **Red Alder (*Alnus rubra*) Alliance (7070)**
 - a. Salmonberry/Red elderberry- Red alder associating with a regular presence of the winter deciduous shrubs salmonberry and red elderberry
.....***Alnus rubra*/*Rubus spectabilis*-*Sambucus racemosa* Association (7071)**

 - b. Arroyo willow- Red alder associating with arroyo willow, with willow being lower in cover and always in the understory of mature stands. *Rubus spp.* are often present in significant cover.
.....***Alnus rubra*/*Salix lasiolepis* Association (7072)**

IIIB. Stands dominated by non-riparian upland species of hills and slopes.

1. California buckeye- Cold-deciduous upland woodlands of relatively small stands dominated by California Buckeye (*Aesculus californica*). May be found less commonly in riparian corridors. This type is rare in the study area, mostly occurring in the southern portion of the study area on San Francisco Water District lands. No associations are defined
.....**California Buckeye (*Aesculus californica*) Alliance (14020)**

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Point Reyes National Seashore-Golden Gate National Recreation Area
Vegetation Community Key

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Plant Community Descriptions

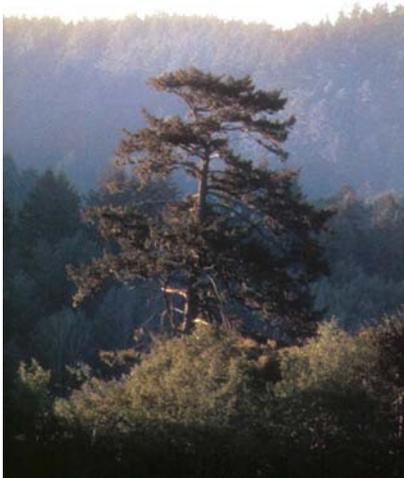


Point Reyes National Seashore, Golden Gate National Recreation Area, San Francisco Water Department Watershed Lands, Mount Tamalpais, Tomales Bay, and Samuel P. Taylor State Parks

Appendix B. Point Reyes National Seashore, Golden Gate National Recreation Area, and Surrounding Wildlands Plant Community Classification and Mapping Project Final Report

October 31, 2003

Todd Keeler-Wolf



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Introduction:

These descriptions are also Appendix B within the Point Reyes National Seashore, Golden Gate National Recreation Area, and Surrounding Wildlands Plant Community Classification and Mapping Project Final Report. All vegetation types described here are derived from an ordination analysis of 366 vegetation plots collected throughout the study area in 1997 and 1998 for the National Park Service vegetation mapping project using the California Native Plant Society's releve method. Detailed discussion of the methods is available in the report associated with these descriptions.

Vegetation plots that don't key to association level may be candidates for new vegetation types. A minimum of three releve plots sampled in different stands would be needed to formally describe a new type. A list of proposed new types that have not been formally described is presented in the Final Report and is also available in the vegetation plots database associated with this project.

Each description is written in a standardized format used by NatureServe to induct newly defined vegetation types into the National Vegetation Classification System (see below for descriptive template).

Information In Vegetation Descriptions

GLOBAL NAME

Association name based on Latin names of dominant or characteristic plant species. The association (or plant association) is the finest level of the classification system. It is the level at which community inventory and conservation action are aimed.

COMMON NAME

Association common name; same as the GLOBAL NAME but with common names instead of scientific names for the species. Common names are derived from the NRCS Plants database.

SYNONYMS

Other names by which the community may be more easily recognized or described.

PHYSIOGNOMIC CLASS

The second level of the National Vegetation Classification System that is a vegetation structural classification adapted from UNESCO in 1973 and Driscoll et al., 1984. This level is based on the structure of the vegetation. This is determined by the height and relative percentage of cover of the dominant life - forms: tree, shrub, dwarf - shrub, herbaceous, and nonvascular.

PHYSIOGNOMIC SUBCLASS

The third level of the National Vegetation Classification System. This level is determined by the predominant leaf phenology of classes defined by a tree, shrub, or dwarf - shrub stratum; the persistence and growth form of herbaceous and nonvascular vegetation; and particle size of the substrate for sparse vegetation (e.g., consolidated rocks, gravel / cobble).

PHYSIOGNOMIC GROUP

The fourth level of the National Vegetation Classification System. The group generally represents a grouping of vegetation units based on leaf characters such as broadleaf, needleleaf, microphyllous, and xeromorphic. These units are identified and named with broadly defined macroclimatic types to provide a structural - geographic orientation, but the ecological climate terms do not define the groups *per se*.

PHYSIOGNOMIC SUBGROUP

The fifth level of the National Vegetation Classification System represents a distinction between natural vegetation including natural, seminatural and some modified vegetation, and cultural vegetation (planted / cultivated).

FORMATION

The sixth level of the National Vegetation Classification System represents a grouping of community types that share a definite physiognomy or structure and broadly defined environmental factors such as elevation and hydrologic regime.

ALLIANCE: Level of the National Vegetation Classification System reflecting a physiognomically uniform group of plant associations sharing one or more diagnostic species (dominant, differential, indicator, or character) that (generally) are found in the uppermost stratum of the vegetation.

CLASSIFICATION CONFIDENCE LEVEL: The degree of confidence associated with the classification of the Element (association or alliance). This confidence is based on the quality and type of data used in the analysis as well as the extent to which the entire (or potential) range of the Element was considered.

1. STRONG

Classification based on recent field data. Information is based on Element Occurrences or other data based on occurrences that can be relocated. Classification considers information collected across the entire range or potential range of the Element. Classification may be based on quantitative or qualitative data.

PRNS - GGNRA

Characteristic species for the association, if different from global species.

VEGETATION DESCRIPTION

Globally

Additional comments on vegetation attributes of the association including species richness, diversity, physiognomic structure, spatial distribution of vegetation, strata height, dominant life - forms, coverage of unvegetated substrate, and additional compositional comments.

PRNS - GGNRA

Vegetation description for the association, if different from global concept.

OTHER NOTEWORTHY SPECIES

High ranked species, animals, endemics, disjuncts, or exotics that are found within occurrences of this association.

CONSERVATION RANK

Global Element Rank that characterizes the relative rarity or endangerment of the association worldwide. The ranking system is based on the NatureServe national system of global and state rarity. This is a ordinal scale ranking from 1 (rarest) to 5 (most ubiquitous) both as the type occurs in a given state (the "S" rank) and **Globally** (the "G" rank). Further description of the criteria may be found at the NatureServe website (<http://www.natureserve.org/>)

RANK JUSTIFICATION

Reason for assigning the Global Element Rank, such as number of occurrences, number of hectares, total area reduction from original, threats, degradation, and so forth.

DATABASE CODE

Element Code from the National Community Database.

COMMENTS

Globally

Any other comments about this association not covered in the fields above such as landscape relationships, inclusion communities, and so forth.

PRNS - GGNRA

Any other comments about this association specific to the mapping area including notes about possible problems in photo interpretation.

PLOTS USED TO DESCRIBE THIS TYPE (association or alliance): Each of the sample relevé plots used to describe the vegetation are listed. They refer to the sample names given in the plots database for the vegetation sampling for this project.

Tree Dominated Plant Communities

Evergreen Forests and Woodlands Supercluster

Forests: California Bay, Douglas - fir, and Coast Live Oak Mesocluster

California Bay – Coast Live Oak Superalliance

California Bay Alliance

California Bay (*Umbellularia californica*) Alliance - pi code 01011

This alliance is represented by three associations in the mapping area, all first described during this study. They are arranged bioclimatically from the coolest and most moist (*Umbellularia californica* - *Quercus chrysolepis* Association) to the warmest and driest (*Umbellularia californica* - *Quercus agrifolia* / *Toxicodendron* - (*Corylus cornuta*) Association). The most widespread association is the mesic *Umbellularia californica* / *Polystichum munitum* Association. In addition to these associations there were several other expressions of this alliance sampled during the study, suggesting further variation within the study area. These plots include stands characterized by the following species combinations:

Umbellularia californica - *Lithocarpus densiflorus* plot: (PRNS81)

Umbellularia californica - *Garrya elliptica* plot: (PRNS073) tall scrub with equal or more *Garrya*)

Umbellularia californica - *Quercus wislizeni* plots: (GGNRA253, PRNS187)

RANGE:

Globally

The California Bay alliance ranges from Southwestern Oregon to San Diego County and includes stands in the California Coast ranges, Klamath Mountains and the lower western slopes of the Sierra - Cascade Ranges.

Umbellularia californica - *Lithocarpus densiflorus* Association (preliminary)

- pi code 01011 Insufficient relevé plots to describe this association, currently rolled into classification hierarchy with *Umbellularia californica* / *Polystichum munitum* Association - pi code 01012)

Umbellularia californica / *Polystichum munitum* Association

- pi code 01012

COMMON NAME	California Laurel / Pineland Sword Fern Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Winter - rain broad - leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Lowland or submontane winter - rain broad - leaved evergreen sclerophyllous forest

ALLIANCE *Umbellularia californica* Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is known from the vicinity of the San Francisco Bay area including Alameda, Marin, Contra Costa, and San Mateo Counties (Keeler - Wolf personal observation 1998 - 2000). It is possible that this association continues farther north and south in the outer Coast Ranges of California.

PRNS / GGNRA

Stands of this association are primarily found throughout the Olema Valley and on the east side of the Bolinas Ridge.

ENVIRONMENTAL DESCRIPTION

Globally

This association is a relatively mesic type that occupies ravine bottoms or northerly or north - easterly facing slopes in the San Francisco Bay area. Stands may occupy slopes up to 45% steep and are usually found on marine sediments including soils derived from the Franciscan Formation.

PRNS / GGNRA

Stands of this association grow on moderate to steep slopes of all aspects. They can inhabit any slope position, and prefer fine sandy to coarse sandy loams. Most stands are in narrow, relatively deep canyons or valleys.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Umbellularia californica*
Shrub *Polystichum munitum*

CHARACTERISTIC SPECIES

Globally

This association is only known in detail from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. However, anecdotal observations (Keeler - Wolf personal observations) of this association in the Berkeley and Oakland Hills of Contra Costa County indicate *Polystichum munitum* as the principal understory species with *Umbellularia californica* as the principal canopy species.

PRNS / GGNRA

Tree *Umbellularia californica*
Shrub *Polystichum munitum*

VEGETATION DESCRIPTION

Globally

This association as seen in the Berkeley and Oakland Hills is composed of a dense canopy of up to 95% cover of single to multiple stemmed individuals of *Umbellularia californica* from 12 to 20 m tall with a sparse shrub and sapling layer of various species including *Corylus cornuta*, *Symphoricarpos mollis*, and *Ribes malvaceum*. The herbaceous layer is dominated by open to dense clumps of *Polystichum munitum* estimated as covering from 15 to 80% of the ground.

PRNS / GGNRA

This forest association is heavily dominated by *Umbellularia californica*, which forms an intermittent to continuous canopy between 10 - 20 meters in height. Some stands have other tree species present, but these seldom attain much cover. Some shrubs, such as *Toxicodendron diversilobum* or *Rhamnus californica* ssp. *californica*, occasionally attain small tree stature. *Polystichum munitum* dominates the shrub layer between 1 - 2 meters, contributing up to 80% cover. Other shrubs may include *Corylus cornuta*, *Toxicodendron diversilobum*, and / or *Rubus ursinus*. The herbaceous layer is fairly open, but can include such species as *Stachys ajugoides*, *Scrophularia californica*, *Erechtites minima* (exotic), *Athyrium filix - femina*, *Pteridium aquilinum*, *Sanicula crassicaulis*, and / or *Heracleum maximum*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4S4

RANK JUSTIFICATION There are over 250 stands of this vegetation mapped within the Point Reyes National Seashore and the association occurs in many other parts of the San Francisco Bay Area. However, most stands are small and many are adjacent to development and have been affected by human mediated impacts.

COMMENTS

PRNS / GGNRA

Exotics are impacting this vegetation.

Plots used to develop this description (n=13): PRNS34, PRNS121, PRNS062, PRNS087, PRNS096, PRNS133, PRNS166, PRNS203, marinsp01, marinsp04, marinsp13, PRNS144, ggnra290

Umbellularia californica - Quercus chrysolepis Association

- pi code 01013

COMMON NAME	California Bay - Canyon Live Oak Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen Forest
PHYSIOGNOMIC GROUP	Winter - rain broad - leaved evergreen sclerophyllous forest
FORMATION	PHYSIOGNOMIC SUB GROUP Natural / Semi - Natural Lowland or submontane winter - rain evergreen sclerophyllous forest

ALLIANCE *Umbellularia californica* Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

Mapping Unit Code:

RANGE

Globally

This association is only known from the Mount Tamalpais region including Mt. Tamalpais State Park and the Bolinas Ridge portion of Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Umbellularia californica - Quercus chrysolepis* forest association are found on the Bolinas and San Rafael topographic quads within the mapping areas of **PRNS / GGNRA**.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Umbellularia californica* forest association are found at among the highest elevations (1920 - 2447ft) of vegetation plots sampled in the mapping area. They occur on the upper 1 / 3 of 13 - 34 degree, north facing slopes. Soil textures range from medium to very fine sandy loam to coarse loamy sand. . A high percentage (95 - 99%) of litter is found under the forest canopy and gravel makes up 20 - 65% of the topsoil. These stands generally occur on shallow rocky soil and may be immediately adjacent to the *Arctostaphylos*

glandulosa - *Quercus wislizeni* chaparral on southerly - facing slopes on the opposite side of the ridges. Locally these *Umbellularia californica* - *Quercus chrysolepis* stands have probably the coolest average winter temperatures and are usually above the influence of the summer marine layer. They are thus probably the most interior and continental of any forest association in the study area.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree: *Umbellularia californica*, *Quercus chrysolepis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Elymus glaucus*, *Iris sp.*

Tree: *Umbellularia californica*, *Quercus chrysolepis*, *Pseudotsuga menziesii*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Umbellularia californica* - *Quercus chrysolepis* forest association form an open herb layer, an open shrub layer and a continuous tree layer with 0 - 60% at 5 - 10 m tall and 25 - 100% cover at 10 - 20 m tall. This association is dominated by an intermittent to continuous layer of *Umbellularia californica*. *Quercus chrysolepis* is also present and sometimes may have a higher percent cover than *Umbellularia californica*. *Elymus glaucus*, *Pseudotsuga menziesii*, and *Iris sp.* are usually present and *Corylus cornuta*, *Rosa gymnocarpa*, *Toxicodendron diversilobum*, *Carex sp.*, *Polystichum munitum*, *Quercus agrifolia* and a variety of other understory species may also be present. On slightly deeper soils, at lower slope positions, and on similar aspects this association often occurs adjacent to stands of *Pseudotsuga menziesii* alliance.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G3S3?

RANK JUSTIFICATION The distribution of this association is unknown beyond the confines of Mt Tamalpais. It is likely to be relatively widespread in the lower montane belt of California, but uncommon because the two characteristic tree species do not tend to overlap and form large stands.

COMMENTS

PRNS / GGNRA

Relationships between this association and the *Pseudotsuga menziesii* / *Umbellularia californica* - *Quercus menziesii* association are close and further sampling in the area may show them to be one and the same.

Plots used to develop this description (n=2): GGNRA298, GGNRA387

***Umbellularia californica* - *Quercus agrifolia* / *Toxicodendron diversilobum* (*Corylus cornuta*) Association**

- pi code 01014

COMMON NAME	California Laurel - Coastal Live Oak / Pacific Poison Oak Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Winter - rain broad - leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Lowland or submontane winter - rain broad - leaved evergreen sclerophyllous forest
ALLIANCE	Umbellularia californica Forest Alliance
CLASSIFICATION CONFIDENCE	LEVEL 2
USFWS WETLAND SYSTEM	Upland

RANGE

Globally

This association is known from the vicinity of the San Francisco Bay Area. It is also common in the East Bay Hills of Alameda and Contra Costa Counties (Keeler - Wolf personal observation 1998 - 2000). Upon further investigation, it may be found to be more widespread to the south and north in the California Coast Ranges.

PRNS / GGNRA

This association is found throughout the **PRNS / GGNRA** planning area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Stands presumably of this association occur on neutral slope exposures on marine sediments and volcanic rocks in the East May Hills. Additional information about its global characteristics is not available without inventory. Compared to the *Umbellularia* / *Polystichum munitum* association this is the more xeric.

PRNS / GGNRA

This association grows on moderate to steep slopes of all aspects. Stands are found on lower to upper slopes. Many stands are in small east - west-tending drainages where the overall influence of the sheltered drainage overrides the micro - scale effect of slope exposure. Soils are coarse loamy sands to moderately fine clay loams. Some stands occur on soils derived from Franciscan parent material.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree	<i>Umbellularia californica</i> , <i>Quercus agrifolia</i>
Tall Shrub	<i>Corylus cornuta</i>
Shrub	<i>Toxicodendron diversilobum</i>

CHARACTERISTIC SPECIES

Globally

Tree	<i>Quercus agrifolia</i> , <i>Umbellularia californica</i> , and <i>Arbutus menziesii</i>
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PRNS / GGNRA

Tree *Umbellularia californica*, *Quercus agrifolia*
Shrub *Toxicodendron diversilobum*

VEGETATION DESCRIPTION

Globally

This association is similar to the local description where it has been observed in the East Bay Hills. *Quercus agrifolia* and *Umbellularia californica* cover is variable, both species comprising at least 25% of the relative cover of trees. *Arbutus menziesii* is in most stands, but is usually substantially less cover than the other two trees.

PRNS / GGNRA

This forest is characterized by co - dominance of *Quercus agrifolia* and *Umbellularia californica*, either of which can dominate any specific stand. *Arbutus menziesii* is often present at low cover values. Other trees like *Pseudotsuga menziesii*, *Pinus muricata*, *Lithocarpus densiflora*, and / or *Aesculus californica* may also be present in small amounts. The tree canopy is continuous, and between usually 10 - 20 meters of height. *Corylus cornuta* is often the most common tall shrub, while *Toxicodendron diversilobum* dominates the shrub stratum between 1 - 2 meters. *Rubus parviflorus*, *Polystichum munitum*, *Heteromeles arbutifolia* and *Baccharis pilularis* may also occur in the shrub layer. The herbaceous layer is diverse, and may be intermittent to continuous. Typical herbaceous species include *Polystichum munitum*, *Clinopodium (Saturegia) douglasii*, *Stachys ajugoides*, *Pteridium aquilinum*, and / or *Athyrium filix - femina*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4S4

RANK JUSTIFICATION There are over 700 stands of this association mapped throughout the **PRNS / GGNRA** planning area. However, the association is only known from the San Francisco Bay Area currently.

COMMENTS

PRNS / GGNRA

This association is intermediate between *Quercus agrifolia* alliance and *Umbellularia californica* alliance stands. During the early phases of analysis of plots we had originally split this association into a more xeric *Quercus agrifolia* - *Umbellularia californica* type and a more mesic *Umbellularia californica* - *Quercus agrifolia* type. Upon further analysis, this appears to be unwarranted. These stands are currently placed in the *Umbellularia californica* alliance because most of the local stands have a relatively high percentage of *Umbellularia*. However further investigation and analysis of samples from other parts of its range may suggest that the association is better placed within the *Quercus agrifolia* alliance.

Plots used to develop this description (n=4): PRNS081, PRNS074, PRNS100, ggnra354

Coast Live Oak Alliance

Coast Live Oak (*Quercus agrifolia*) Alliance - pi code 12020

The *Quercus agrifolia* alliance is represented by one variable association in the area. The treatment below encompasses all variation sampled except for a single riparian plot mixed with *Salix gooddingii* (GGNRA317). This alliance is limited to the California Floristic Province (Hickman 1993) and ranges from Mendocino Co. to Northern Baja California, Mexico.

***Quercus agrifolia* - (*Arbutus menziesii*) - *Umbellularia californica* Association
(preliminary)**

- pi code 12021 Insufficient relevé plots to describe this association, currently rolled into classification hierarchy with *Umbellularia californica* - *Quercus agrifolia* / *Toxicodendron diversilobum* Association - pi code 01014)

***Quercus agrifolia* / *Toxicodendron diversilobum* - (*Corylus cornuta*) Association**

- pi code 12022

COMMON NAME	Coastal Live Oak / Pacific Poison Oak - (Beaked Hazelnut) Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Winter - rain broad - leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Lowland or submontane winter - rain broad - leaved evergreen sclerophyllous forest

ALLIANCE *Quercus agrifolia* Woodland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is known from the vicinity of the San Francisco Bay Area. It has been observed in Alameda, Contra Costa, Marin, and Santa Cruz Counties (Keeler - Wolf personal observation). A similar and possibly analogous association; the *Quercus agrifolia* / *Toxicodendron diversilobum* association has been described throughout much of the central California Coast Ranges by Allen *et al.* (1991)

PRNS / GGNRA

This association is found throughout the **PRNS / GGNRA** planning area. In the Point Reyes portion, stands are clumped along the San Andreas Fault zone. Moving south the distribution broadens, but primarily remains along valley floor margins.

ENVIRONMENTAL DESCRIPTION

Globally

This association is a relatively xeric southerly - facing woodland or forest. Most stands in the East Bay Hills are on middle to upper thirds of slopes or on edges of grasslands on all slope positions. Most stands appear to be on marine sedimentary rocks in the East Bay Hills, but may occur on granitic substrates and on calcareous substrates in the Santa Cruz Mountains. These stands alternate between *Umbellularia* - *Quercus agrifolia* / *Toxicodendron* stands on more mesic neutral (northwest or southeast to east) exposures in many drainages in the East May Municipal Utility District and East Bay Regional Park lands.

PRNS / GGNRA

This vegetation grows along valley margins on moderate slopes. Locally, stands can be found on the lower to upper third of a slope on any aspect. Most of the stands are small. However the few large stands tend to occur on upper or mid slopes. Soils are coarse to fine sandy loams. This is a drier forest than the *Umbellularia* - *Q. agrifolia* / *Toxicodendron* association, with a more open xerophytic understory, usually missing mesophytic species such as *Polystichum munitum*, and *Vaccinium ovatum*.

MOST ABUNDANT SPECIES

Globally

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Discriptions

Tree *Quercus agrifolia*
Shrub *Toxicodendron diversilobum*

PRNS / GGNRA

Tree *Quercus agrifolia*

CHARACTERISTIC SPECIES

Globally

Tree *Quercus agrifolia*
Shrub *Toxicodendron diversilobum*

PRNS / GGNRA

Tree *Quercus agrifolia*
Shrub *Toxicodendron diversilobum*

VEGETATION DESCRIPTION

Globally

Throughout the San Francisco Bay area this structure and species composition of this association appears similar to the local description.

PRNS / GGNRA

Quercus agrifolia is the sole or dominant tree forming an intermittent to continuous canopy usually between 10 and 20 meters in height. *Umbellularia californica* maybe present, in low cover. The shrub layer is open to intermittent. *Toxicodendron diversilobum* is an important species. *Corylus cornuta* is present in some stands. Other shrub associates may include *Rubus ursinus*, *Rhamnus californica* ssp. *californica*, *Lonicera hispidula*, *Heracleum maximum*, and / or *Holcus lanatus*. The herbaceous layer is open but diverse. *Pteridium aquilinum*, *Clinopodium douglasiana*, *Heteromeles arbutifolia*, *Stachys ajugoides* and / or *Erechtites minima* are often present.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4S4?

RANK JUSTIFICATION Over 250 stands of this association are mapped in the **PRNS / GGNRA** planning area. However, the association is known only from the San Francisco Bay area where relatively few large stands are protected.

COMMENTS

Globally

Allen *et al.* (1991) reports on this or a similar association from Sonoma County to San Luis Obispo County.

PRNS / GGNRA

Exotics are impacting this vegetation.

Plots used to describe this association (n=4): PRNS158, PRNS175, GGNRA385, GGNRA376

California Buckeye Alliance

Aesculus californica Woodland Alliance Stands - pi code 14020

This alliance is poorly represented by samples in the study area and no associations have been described locally. The general account below describes the alliance in context of the study area.

COMMON NAME California Buckeye Woodland

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Descriptions

SYNONYM	Mainland cherry forest, Mixed north slope forest (Holland); California buckeye series (PSW - 45); Northern oak woodland (Thorne); Montane hardwood forest (WHR)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Deciduous woodland
PHYSIOGNOMIC GROUP	Cold - deciduous woodland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Cold - deciduous woodland
ALLIANCE	<i>Aesculus californica</i> Woodland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association occurs from the Northern California Interior Coast Ranges, through the Central California Coast Ranges into the Southern California Mountains and Valleys, and in the foothills of the Sierra Nevada.

PRNS / GGNRA

Relatively small and local stands dominated by California buckeye occur in the southern portion of the mapping area on the San Francisco Municipal Water District lands. Two plots were taken.

ENVIRONMENTAL DESCRIPTION

Globally

Stands of this association occur on steep, north - facing slopes. Soils are shallow and moderately to excessively drained.

PRNS / GGNRA

One plot on very gently sloping, southeast - facing wash on fine sandy loam, elevation 482 ft; second plot on east - southeast - facing slope on coarse loamy sand, elevation 1056 ft.

MOST ABUNDANT SPECIES

Globally

Tree *Aesculus californica*, *Pinus sabiniana*, *Quercus wislizeni*, and *Umbellularia californica*
Shrub *Prunus ilicifolia*, *Fraxinus dipetala*, *Heteromeles arbutifolia*

PRNS / GGNRA

Tree *Aesculus californica*, *Pseudotsuga menziesii*
Shrub *Prunus ilicifolia*, *Heteromeles arbutifolia*

CHARACTERISTIC SPECIES

Globally

Tree *Aesculus californica*

PRNS / GGNRA

Tree *Aesculus californica*

VEGETATION DESCRIPTION

Globally

Aesculus californica is sole, dominant, or important with *Pinus sabiniana*, *Prunus ilicifolia*, *Quercus wislizeni*, or *Umbellularia californica* in the tree canopy; *Fraxinus dipetala* and *Heteromeles arbutifolia* may be present. Trees < 10 m; canopy continuous or intermittent, one or two - tiered. Shrubs infrequent. Ground layer sparse

PRNS / GGNRA

Stand strongly dominated by California buckeye in the tree layer, with *Prunus ilicifolia* and *Heteromeles arbutifolia* in the shrub layer. Trees <10m (one plot with emergent Douglas - fir); canopy continuous, two - tiered, shrub layer intermittent to open, ground layer continuous to intermittent. Small stands occur on slopes adjacent to *Quercus agrifolia* alliance stands in Marin Co.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3 S3

RANK JUSTIFICATION Stands are typically small and localized in foothills of Cismontane northern and central California

COMMENTS

Globally

Griffin (1977) suggests plants of this series are tree - sized because they grow in locations of low fire frequency. California buckeye - dominated stands in Sierra Nevada foothills lack *Prunus ilicifolia*; otherwise they are similar to those in the coast ranges that have hollyleaf cherry (Klyver 1931).

PRNS / GGNRA

Stands are generally associated with *Quercus agrifolia* alliance stands.

Plot defining the presence of this alliance (n=1): GGNRA323

Pacific Madrone Alliance

Arbutus menziesii Forest Alliance Stands - pi code 12030

This alliance is poorly represented by samples in the study area and no associations have been described locally. The general account below describes the alliance in context of the study area.

COMMON NAME	Pacific Madrone Woodland
SYNONYM	Mixed evergreen forest, Tanoak forest (Holland); Tanoak series (PSW - 45); Northern mixed evergreen forest (Thorne); Montane hardwood forest (WHR)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen Woodland
PHYSIOGNOMIC GROUP	Temperate Broad - leaved Evergreen Woodland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Temperate Broad - leaved Evergreen Woodland

ALLIANCE *Arbutus menziesii* Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Occurs in California in the Central and Northern California Coast Ranges, and in the Klamath Mountains.

PRNS / GGNRA

Woodlands dominated by Pacific madrone are uncommon in the Pt. Reyes area. A single stand was sampled on the San Francisco Municipal Water District lands in the southern portion of the mapping project area. Other stands (unsampled) occur in the GGNRA adjacent to Samuel P. Taylor State Park.

ENVIRONMENTAL DESCRIPTION

Globally

Pacific madrone woodlands may occur on all slope aspects. Soils are well - drained and may be sandstone, volcanic, granitic, or marine sedimentary; elevations 100 - 1500m.

PRNS / GGNRA

Stands in the Point Reyes National Seashore and Golden Gate National Recreation Area in Marin and San Mateo Counties tend to occur on the inland sides of the "mixed evergreen" belt in settings that are mid - way in moisture relations between *Umbellularia californica* (mesic) and *Quercus agrifolia* (more xeric) alliance stands. The single plot taken occurs on north - northeast - facing gentle slope, on fine clay loam soils.

MOST ABUNDANT SPECIES

Globally

Tree: *Arbutus menziesii*, *Lithocarpus densiflorus*, *Pinus coulteri*, *P. lambertiana*, *P. ponderosa*, *Pseudotsuga menziesii*, *Quercus agrifolia*, *Q. chrysolepis*, *Q. kelloggii*, *Umbellularia californica*

PRNS / GGNRA

Tree: *Arbutus menziesii*, *Quercus wislizeni*
Shrub: *Mimulus aurantiacus*

CHARACTERISTIC SPECIES

Globally

Arbutus menziesii

PRNS / GGNRA

Arbutus menziesii

VEGETATION DESCRIPTION

Globally

Arbutus menziesii is sole or dominant in the tree canopy; *Lithocarpus densiflorus*, *Pinus coulteri*, *P. lambertiana*, *P. ponderosa*, *Pseudotsuga menziesii*, *Quercus agrifolia*, *Q. chrysolepis*, *Q. kelloggii*, and / or *Umbellularia californica* may be present. Trees < 75 m; canopy continuous, may be two - tiered. Shrubs infrequent or common. Ground layer sparse to abundant.

PRNS / GGNRA

Uncommon in the mapping area, only one stand sampled; had low scrubby madrones over a mixture of bush monkeyflower (*Mimulus aurantiacus*) and mixed chaparral species. Trees <10m; canopy open; Shrubs frequent; ground layer intermittent.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G3S3

RANK JUSTIFICATION *Arbutus menziesii* stands are locally distributed in Northern California and may occur in Oregon and Washington.

COMMENTS

Globally

Arbutus menziesii is an important component in several alliances. The term "mixed evergreen forest" is most commonly associated with *Arbutus menziesii*, but stands called mixed evergreen forest vary in composition (Barbour 1988b, Sawyer et al. 1977). The original concept of mixed evergreen forests was created to describe hardwood stands in the Santa Lucia Mountains where *Arbutus menziesii*, *L. densiflorus*, live oaks, and *Umbellularia californica* grow in mixed stands. This is Cooper's (1922) broad sclerophyll formation.

Munz (1968) and Whittaker (1960) expanded the term mixed evergreen to include *Pseudotsuga menziesii* - *Lithocarpus densiflorus* stands. Azet et al. (1992) argue that *L. densiflorus* is the primary naturally regenerating

species in southwestern Oregon, whereas *P. menziesii* importance is a result of past fires (Azet & Wheeler 1982). Jimerson (1993) comes to the same conclusion for western Klamath Mountains in California. *Arbutus menziesii* forms single species tree dominated stands in the western Klamath Mountains and in the North Coast Ranges.

Sawyer et al. (1977c) called stands in northwestern California of *Arbutus menziesii*, *L. densiflorus*, and *P. menziesii* *Pseudotsuga* / hardwood forests. Other authors (Keeler - Wolf 1990, Bingham & Sawyer 1991, 1993, Stuart 1993) refer to Douglas - fir / hardwood forests. [The slash indicates the two - tiered character of the old growth stands]. The *Arbutus menziesii* alliance stands are generally more xeric than *Lithocarpus densiflorus* or *Pseudotsuga menziesii* alliance stands and do not have significant cover of those other two species.

Arbutus menziesii is a vigorous sprouter following most fire events. Its thin smooth bark makes young and middle age stems susceptible to even light to moderate surface fires. Multiple trunks from the base suggest fire history. Small seeds are produced in the fleshy berry like fruits in the fall. Many species of birds including Varied thrushes, Robins, and Band - tailed pigeons commonly disperse the fruit. Seedlings require forest openings to germinate (FEIS 2002).

In Napa valley (263A), stands occupy slopes on the east side of the Valley adjacent to *Pseudotsuga menziesii* stands. Some of these may be related to thinning of individuals of *Pseudotsuga menziesii*. Small stands do occur in the Santa Lucia Mountains of Monterey County (M262A). In Humboldt County (M261A) in the Trinity River drainage near Willow Creek, stands dominated by *A. menziesii* occupy southerly facing slopes while adjacent northerly facing slopes have Douglas - fir - tanoak alliance stands. Currently no stands are known in the Sierra Nevada (M261E), however the species is widespread in the northwestern portion of the range.

This is probably the least common of the several broad - leaf sclerophyllous tree alliances of California. The conditions under which stands of this alliance grow are relatively poorly understood. Relatively droughty, well - drained soils and xeric exposures in relatively high rainfall areas seem to be preferred. Fire and logging history may have some influence on the distribution and maintenance of the stands. Further investigation of the ecology of this alliance is needed.

PRNS / GGNRA

The single stand sampled in the San Francisco Municipal Watershed could be augmented with other samples in Marin Co portion of the mapping area. Further description following sampling would be valuable to determine the relationships with other forest and woodland alliance stands in the area..

Plot used to define this alliance locally (n=1): GGNRA331

Douglas-fir Superalliance

Douglas - Fir Alliance

Douglas - fir (*Pseudotsuga menziesii*) Alliance - pi code 02010

This alliance is represented by five associations all defined first in this project. They are represented by one early seral association that represents increasing dominance of *P. menziesii* in Coyote Brush coastal scrub (*Pseudotsuga menziesii* / *Baccharis pilularis* Association) and the others which are arranged along both moisture and temperature gradients from warm and dry (*Pseudotsuga menziesii* / *Quercus agrifolia* Association) to mesic (*Pseudotsuga menziesii* / *Umbellularia californica* / *Rhamnus californica* Association) to more moist (*Pseudotsuga menziesii* / *Umbellularia californica* / *Polystichum munitum* Association) to coolest and wettest (*Pseudotsuga menziesii* / *Quercus chrysolepis* Association). In addition to these associations several unclassified samples were taken suggesting further variation. These include:

Pseudotsuga menziesii / *Lithocarpus densiflorus* / *Rhamnus californicus* plots: (PRNS150, PRNS149)

Pseudotsuga menziesii / *Aesculus californicus* plot: (GGNRA336)

Pseudotsuga menziesii / *Quercus wislizeni* - *Arctostaphylos hookeri montana* plot (GGNRA330 invading serpentine chaparral)

Pseudotsuga menziesii / *Myrica californica* Plot: (GGNRA366)

RANGE:

Globally

The range of this alliance is from Washington state to the central California Coast Ranges and the northern Sierra Nevada. Recent classification work in stands from California suggests that this alliance may be best described as a series of related alliances based on associated tree species (Bingham 2002 MS) If this proves to be correct the treatment of associations in the mapping area may include *Pseudotsuga menziesii* / *Lithocarpus densiflorus* alliance, and *P. menziesii* - *Quercus chrysolepis* alliance stands, as well as the *P. menziesii* alliance, the only one currently accepted by the national vegetation classification.

Pseudotsuga menziesii / *Umbellularia californica* / *Polystichum munitum* Association

- pi code 02011

COMMON NAME	Douglas - fir / California Laurel / Pineland Sword Fern Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Temperate or subpolar needle - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Giant temperate or subpolar needle - leaved evergreen forest

ALLIANCE *Pseudotsuga menziesii* Giant Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory.

PRNS / GGNRA

Stands of this association are found throughout the inland portions of the PRNS / GGNRA planning area. The association is particularly common on the southern half of Inverness Ridge.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association grows on the middle to upper third of moderate slopes. Aspects are mostly north and east. Stands are found in the inland valleys and prefer medium to fine silt or sandy loams. Generally this is a more mesic forest than the *P menziesii* / *Umbellularia* / *Rhamnus californica* association. It occurs on concave slopes or on more northerly aspects than that association.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree	<i>Pseudotsuga menziesii</i>
Tree	<i>Umbellularia californica</i>
Shrub	<i>Polystichum munitum</i>

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree	<i>Pseudotsuga menziesii</i>
Tree	<i>Umbellularia californica</i>
Shrub	<i>Polystichum munitum</i>

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest forms a two - tiered canopy with *Pseudotsuga menziesii* dominating the upper canopy. The top tier is intermittent, and generally less than 35 meters in height. The lower tree canopy is dominated by *Umbellularia californica*, though *Lithocarpus densiflorus*, *Quercus agrifolia* and / or *Aesculus californica* may provide minor cover. The shrub layer is open with only minor cover contributed by *Vaccinium ovatum*, *Rhamnus californica* ssp. *californica*, *Rubus ursinus*, and / or *Rubus parviflorus*. *Polystichum munitum* is the dominant understory species. Other common herbaceous associates may include *Pteridium aquilinum*, *Iris douglasiana*, and / or *Stachys ajugoides*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4S4?

RANK JUSTIFICATION There are hundreds of stands of this vegetation mapped throughout the **PRNS / GGNRA** planning area. However, it is unclear how widespread this association is beyond the mapping area.

COMMENTS

Globally

PRNS / GGNRA

Most of the stands have been logged over the past 150 years. The Mt Vision fire of November 1995 affected numerous stands of this association in the central Inverness Ridge area of PRNS. Post fire monitoring in this area will provide useful information on the transition states of vegetation formerly of this association. This association is the *Pseudotsuga menziesii* dominated analog to the *Umbellularia californica* / *Polystichum munitum* Association of the California Bay alliance. Disturbance ecology (fire history and logging history) may have a significant role to play in the determination of whether a stand is a member of the *Pseudotsuga menziesii* alliance or the *Umbellularia californica* alliance.

Plots used to describe this association (n=9): GGNRA257, PRNS148, marinsp07, PRNS095, marinsp20, GGNRA318, GGNRA338, GGNRA279, PRNS162

***Pseudotsuga menziesii* / *Baccharis pilularis* Association**

- pi code 02012

COMMON NAME	Douglas Fir / Coyote Brush Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen Forest
PHYSIOGNOMIC GROUP	Temperate or Subpolar Needle - Leaved Evergreen Forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Giant Temperate or Subpolar Needle - Leaved Evergreen Forest

ALLIANCE *Pseudotsuga menziesii* Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Pseudotsuga menziesii* / *Baccharis pilularis* forest association are found throughout the mapping areas of **PRNS / GGNRA**.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Pseudotsuga menziesii* / *Baccharis pilularis* association are found at low elevations on mid to upper sides of 8 - 25 degree slopes. Soil textures range from loam to coarse loamy sand of shale origin. This association is an early seral stage of the *Pseudotsuga menziesii* alliance where it is invading stands of *Baccharis pilularis*. The seral stage of the *Baccharis* stands being invaded seems to be variable. Some of the *Baccharis* stands are late seral (e.g., those with much *Rhamnus californica*, while others are rather early seral (e.g., those with *Ceanothus thyrsiflorus*). Certain areas such as the vicinity of Palomarin and the Point Reyes Bird Observatory (PRNS unit) seem to have been rapidly invaded by *Pseudotsuga menziesii*, while others are more slowly invaded. Local site conditions and stochastic and locally favorable dispersal and establishment events are likely responsible for the variation.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*, *Ceanothus thyrsiflorus*

Tree: *Pseudotsuga menziesii*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Mimulus aurantiacus*

Shrub: *Baccharis pilularis*, *Rubus ursinus*, *Toxicodendron diversilobum*, *Ceanothus thyrsiflorus*

Tree: *Pseudotsuga menziesii*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Pseudotsuga menziesii* / *Baccharis pilularis* forest association forms an open herb layer, an intermittent to continuous shrub layer with 2 - 10 % cover at 0.5 - 1 m tall, 10 - 30% cover at 1 - 2 m tall and 10 - 55% cover at 2 - 5 m tall, and an intermittent to continuous tree layer with 9 - 75% cover at 5 - 10 m tall, 0 - 55% cover at 10 - 20 m tall, and 0 - 30% cover at 20 - 30 m tall. It is dominated by *Pseudotsuga menziesii* and *Baccharis pilularis*. *Toxicodendron diversilobum*, *Rubus ursinus*, and *Mimulus aurantiacus* are also present. Other species that may be present include *Ceanothus thyrsiflorus*, *Quercus agrifolia*, *Pinus muricata*, *Heteromeles arbutifolia*, *Lonicera hispidula*, *L. involucrata*, *Marah fabaceus*, *M. oregonus*, *Plantago lanceolata*, *Ribes californicum*, *R. sanguineum*, *Sanicula sp.*, *Scrophularia californica*, *Umbellularia californica*, *Rhamnus californica*, *Rhamnus purshiana*, *Quercus berberidifolia* and *Chlorogalum sp.* This association is found at low elevations on mid to upper sides of 8 - 25 degree slopes. Soil textures range from loam to coarse loamy sand of shale origin.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G4S4?

RANK JUSTIFICATION This appears to be largely a early seral association arising from the invasion of young *Pseudotsuga menziesii* into stands of *Baccharis pilularis*. This kind of setting occurs throughout much of the outer North Coast Ranges of California, but since the association has not been inventoried beyond the confines of the mapping area its abundance is speculative.

COMMENTS

PRNS / GGNRA

Abies grandis has been planted in the San Francisco Municipal watershed lands and occurs in samples of this association locally.

Plots used to describe this association (n=3): GGNRA381, PRNS092, GGNRA378

***Pseudotsuga menziesii* / *Quercus agrifolia* Association**

- pi code 02013

COMMON NAME	Douglas Fir / Coastal Live Oak Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Temperate or subpolar needle - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Giant temperate or subpolar needle - leaved evergreen forest

ALLIANCE *Pseudotsuga menziesii* Giant Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory.

PRNS / GGNRA

This forest is found throughout the **PRNS / GGNRA** planning area. Stands are more common in the central and southern portions, and tend to be more than a kilometer from the open coast.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest grows on the lower to middle third of moderate to steep slopes. Aspects are generally south southeast. Soils are moderately fine sandy clay loams, sometimes derived from Franciscan Melange parent materials. This is the most xeric of the three *P. menziesii* associations in the study area. It is environmentally closely related to the *Umbellularia* - *Quercus agrifolia* / *Toxicodendron* association of the *Umbellularia californica* alliance.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree *Pseudotsuga menziesii*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree *Pseudotsuga menziesii*

Tree *Quercus agrifolia*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest forms a two - tiered canopy with *Pseudotsuga menziesii* dominating the upper canopy. The upper canopy is intermittent to continuous and generally more than 30 meters in height. *Quercus agrifolia* or *Umbellularia californica* may dominate the lower tree canopy, though *Umbellularia californica* is not present in all stands. The shrub layer can be open to intermittent, and is highly variable. *Corylus cornuta* is often present, as are *Toxicodendron diversilobum*, *Rubus ursinus* and / or *Rubus parviflorus*. The herbaceous layer is open to continuous, and often contains *Clinopodium douglasiana*, *Stachys ajugoides*, *Maianthemum stellatum*, *Iris douglasiana*, *Sanicula crassicaulis*, and / or *Erechtites minima*. *Dryopteris arguta* is important in some stands.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3?S3?

RANK JUSTIFICATION Over 150 stands of this vegetation are mapped within the **PRNS / GGNRA** planning area. However the association is not known beyond the study area.

COMMENTS

Globally

PRNS / GGNRA

This association is the *Pseudotsuga menziesii* dominated analog to the *Umbellularia californica* - *Quercus agrifolia* / *Toxicodendron* - (*Corylus cornuta*) Association of the California Bay alliance. Disturbance ecology (fire history and logging history) may have a significant role to play in the determination of whether a stand is a member of the *Pseudotsuga menziesii* alliance or the *Umbellularia californica* alliance.

Plots used to describe this association (n=8): marinsp08, PRNS142, PRNS082, marinsp06, marinsp19, GGNRA280, GGNRA335, GGNRA362

***Pseudotsuga menziesii* / *Quercus chrysolepis* Association**

- pi code 02014

COMMON NAME Douglas Fir / Canyon Live Oak Forest
SYNONYM None
PHYSIOGNOMIC CLASS Forest
PHYSIOGNOMIC SUBCLASS Evergreen forest
PHYSIOGNOMIC GROUP Temperate or subpolar needle - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP Natural / Semi - natural
FORMATION Giant temperate or subpolar needle - leaved evergreen forest

ALLIANCE Pseudotsuga menziesii Giant Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Golden Gate National Recreation Area and adjacent Mt Tamalpais State Park. Information about its global range is not available without additional inventory.

PRNS / GGNRA

This forest is found on Bolinas Ridge and Mt. Tamalpais in GOGA planning area. Stands are scattered in the upper elevations. This association is represented by 3 plots: GGNRA275, GGNRA283, GGNRA285.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest grows on the upper third of moderate to steep slopes. Elevations range from 1627 - 1785 ft. Aspects are generally northerly (nw to ne). Slopes range from 8 to 28 degrees. Microtopography within the stands are generally linear or concave. Soils are moderately fine sandy loam to coarse loamy sand, derived from Franciscan Melange parent materials. Soils are typically moderately deep and well developed. This is the coldest and highest elevation of the four *P. menziesii* associations in the study area. It is environmentally closely related to the *Quercus chrysolepis* - *Umbellularia* association of the *Umbellularia californica* alliance, which is found on shallower rocky soils often adjacent to stands of this association.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree *Pseudotsuga menziesii*
Tree *Quercus chrysolepis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree *Pseudotsuga menziesii*
Tree *Quercus chrysolepis*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest forms a two - tiered canopy with *Pseudotsuga menziesii* dominating the open to intermittent upper canopy from 15 to 30 m. The sub - canopy is intermittent to continuous and generally less than 15 meters in height. *Quercus chrysolepis* present in the lower tree canopy, ranging from 1 - 60% cover. *Umbellularia californica* may or may not be present in the tree layer but is always present at least in the shrub layer (average 8 %). The shrub layer can be open to intermittent, and is highly variable with the most consistent species including *Lonicera hispidula*, *Heteromeles arbutifolia*, and *Toxicodendron diversilobum*. The herbaceous layer is open to continuous, and often contains *Melica californica*, *Elymus glaucus*, *Polystichum munitum*, *Osmorhiza chilensis*, and / or *Iris douglasiana*. Some stands have non - native grasses and herbs such as *Brachypodium distachyon*, *Carduus pycnocephalus*, and *Briza maxima* in minor amounts.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3?S3?

RANK JUSTIFICATION Over 150 stands of this vegetation are mapped within the **PRNS / GGNRA** planning area. However, the association is not known beyond the study area.

COMMENTS

Globally

Note: this association may prove to be a part of the recently described *P. menziesii* / *Quercus chrysolepis* alliance (Bingham 1999). If so it may range further north into the middle and inner coast ranges of Northern California.

PRNS / GGNRA

Note this association was defined through re - analysis of plots following the final labeling of the vegetation map. All stands of this association were most accurately labeled “02015 - *Pseudotsuga menziesii* / *Umbellularia californica* / *Rhamnus californica*” Association in the original map.

Plots used to describe this association (n=4): GGNRA275, GGNRA285, GGNRA283, GGNRA386

***Pseudotsuga menziesii* / *Umbellularia californica* / *Rhamnus californica* Association**
- pi code 02015

COMMON NAME	Douglas Fir / California Laurel / California False Buckthorn Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Temperate or subpolar needle - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Giant temperate or subpolar needle - leaved evergreen forest

ALLIANCE *Pseudotsuga menziesii* Giant Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory.

PRNS / GGNRA

Stands of this association are found throughout the inland portions of the **PRNS / GGNRA** planning area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest is found on moderate to steep slopes throughout the inland valleys of the **PRNS / GGNRA** planning area. Stands grow from the lower slope to ridge positions on any aspect, and prefer moderately fine to coarse sandy clay loams. Generally this is a slightly more xeric forest than the *P. menziesii* -

Umbellularia / *Polystichum munitum* forest, with most stands occurring on convex or linear slopes or slopes with more southerly aspects.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree	<i>Pseudotsuga menziesii</i>
Tree	<i>Umbellularia californica</i>
Shrub	<i>Rhamnus californica</i> ssp. <i>californica</i>

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree	<i>Pseudotsuga menziesii</i>
Tree	<i>Umbellularia californica</i>
Shrub	<i>Rhamnus californica</i> ssp. <i>californica</i>

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest forms a two - tiered canopy with *Pseudotsuga menziesii* dominating the upper canopy. The top tier is intermittent and generally about 30 meters or greater in height. The lower tree canopy is usually dominated by *Umbellularia californica*, though this species' cover varies widely from stand to stand. *Rhamnus californica* ssp. *californica* dominates the shrub layer and sometimes completely replaces *Umbellularia californica* in the short tree stratum. Other shrubs commonly found in this forest include *Toxicodendron diversilobum*, *Sambucus racemosa*, *Polystichum munitum*, *Pteridium aquilinum*, *Baccharis pilularis*, *Artemisia californica*, *Rubus ursinus* and / or *Rubus parviflorus*. The herbaceous layer is open to intermittent and often includes *Stachys ajugoides*, *Erechtites minima*, and / or *Maianthemum stellatum*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4S4?

RANK JUSTIFICATION

There are hundreds of stands of this vegetation mapped throughout the **PRNS / GGNRA** planning area. However, it is unclear how widespread this association is beyond the mapping area.

COMMENTS

PRNS / GGNRA

This is a somewhat drier community than the *Pseudotsuga menziesii* / *Umbellularia californica* / *Polystichum munitum* Forest. It occurs on more southerly or neutral exposures and on upper slopes, while the other association is more strongly tied to mesic northeast facing or concave slopes.

Plots used to describe this association (n=3): PRNS083, PRNS120, PRNS106

***Pseudotsuga menziesii* / *Lithocarpus densiflorus* / *Rhamnus californica* Association
(preliminary)**

- pi code 02020 Insufficient relevé plots to describe this association, currently rolled into classification hierarchy with *Pseudotsuga menziesii* / *Umbellularia californica* / *Rhamnus californica* Association - pi code 02015)

Hazel Alliance

Hazel (*Corylus cornuta*) Alliance - pi code 30010

This alliance is apparently narrowly distributed in central coastal California. It has been reported by M. Vasey (pers comm. 2002) from the San Francisco Peninsula and is otherwise known only from the Point Reyes Peninsula within the study area. It is currently represented by one association, described below.

***Corylus cornuta* / *Polystichum munitum* Association**

- pi code 30011

COMMON NAME	Beaked Hazelnut / Pineland Sword Fern Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Mixed evergreen - deciduous shrubland
PHYSIOGNOMIC GROUP	Mixed evergreen - cold - deciduous shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Mixed evergreen - cold - deciduous shrubland

ALLIANCE To be determined (putatively, *Corylus cornuta*)

CLASSIFICATION CONFIDENCE LEVEL 3

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Although *Corylus cornuta* is widespread throughout the Pacific States no alliance has heretofore been defined for it.

PRNS / GGNRA

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this association are found on moderate slopes with a northern to eastern exposure. This vegetation grows in the middle third of the slope on moderately coarse to fine sandy loams. Stands are typically in concave areas surrounded by *Pseudotsuga menziesii* alliance stands. Stands are small, usually under 3 ha. There are 14 stands mapped in the area, all on the southern portion of Inverness Ridge.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Tall Shrub *Corylus cornuta*
Herbaceous *Polystichum munitum*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This vegetation is heavily dominated by *Corylus cornuta* forming a closed shrub canopy between 2 - 5 meters in height, with individual emergent tall shrubs. *Marah fabaceus* and *Rubus ursinus* are common shrub associates. *Polystichum munitum* is present in the herbaceous and short shrub layers at low cover values. Other common associates may include *Rubus parviflorus*, *Stachys ajugoides*, *Urtica dioica*, and / or *Elymus glaucus*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G2S2?

RANK JUSTIFICATION Presumably rare, not reported elsewhere throughout the broad range of *Corylus cornuta*.

COMMENTS

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Plots used to define this association and alliance (n=2): PRNS138, PRNS137

Coast Redwood and Tanoak Mesocluster
Redwood – Tanoak Superalliance

Coast Redwood Alliance

Coast Redwood (*Sequoia sempervirens*) Forest Alliance - pi code 02050

This alliance is represented by two associations in the study area one mixed with *Pseudotsuga menziesii* and the other without this conifer, but with good representation of *Lithocarpus* in the tree layer and *Vaccinium ovatum* in the shrub layer. Some additional variation is expressed in certain sampled stands which may have strong dominance by Redwood with very little other tree cover (PRNS141), a plot with *Quercus chrysolepis* and *Umbellularia* as the major subcanopy species (GGNRA276), a plot with the subcanopy composed of *Lithocarpus* and *Quercus wislizeni* (GGNRA332), and a plot with *Lithocarpus* as the understory tree but with no *Vaccinium ovatum* in the understory (marinsp05).

This alliance is largely endemic to California ranging from SW Oregon near Brookings, south to Salmon Creek in Southern Monterey County, California.

***Sequoia sempervirens* / *Lithocarpus densiflorus* / *Vaccinium ovatum* Association**

- pi code 02051

COMMON NAME	Redwood / Tanoak / Black Huckleberry Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Temperate or subpolar needle - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Giant temperate or subpolar needle - leaved evergreen forest

ALLIANCE *Sequoia sempervirens* Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global range is not available without additional inventory. It is likely that the majority of stands of redwood in the Muir Woods National Monument (Marin County) are also this association.

PRNS / GGNRA

Stands of this forest type are found in the Olema Creek vicinity of the Golden Gate National Recreation Area, and at scattered locations south to the southern end of the mapping area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest type is found on gentle to moderate slopes of all aspects. Stands grow on the middle to upper third of the slope, on moderately fine to medium sandy clay loams. Some soils are derived from Franciscan Melange. Stands are variable in structure not only because of past logging, but also because of

environmental effects. Extremely low stature stands exist on the upper slopes of west facing canyons coming off of Bolinas Ridge. The *S sempervirens* individuals may only be 10 - 15 m tall, and appear stunted due to restriction by fine grained mudstone substrate. These stands, adjacent to various chaparral stands are in contrast to those stands in the canyon bottoms where trees may be up to 80 m tall.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree *Sequoia sempervirens*
Tree *Lithocarpus densiflorus*
Shrub *Vaccinium ovatum*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall Tree *Sequoia sempervirens*
Tree *Lithocarpus densiflorus*
Shrub *Vaccinium ovatum*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This vegetation often forms a two - tiered canopy, with *Sequoia sempervirens* forming an intermittent to continuous tall tree canopy between 20 - 80 meters, and *Lithocarpus densiflorus* important in the lower tree layer. In some stands *Umbellularia californica* may be equally important. *Vaccinium ovatum* is the dominant shrub in the open to intermittent shrub layer. *Corylus cornuta* is often present. The herbaceous layer is open, with *Polystichum munitum* and *Pteridium aquilinum* the most common species.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3S3?

RANK JUSTIFICATION This association is only known from a limited number of stands within the GOGA planning area. Its historical extent has been severely reduced by logging.

COMMENTS

Globally

PRNS / GGNRA

Most stands show signs of past logging. Some additional variation is expressed in certain sampled stands which may have strong dominance by Redwood with very little other tree cover, a plot with *Quercus chrysolepis* and *Umbellularia* as the major subcanopy species, a plot with the subcanopy composed of *Lithocarpus* and *Quercus wislizeni*, and a plot with *Lithocarpus* as the understory tree but with no *Vaccinium ovatum* in the understory.

Plots used to define this association (n=10): PRNS139, PRNS001, PRNS146, PRNS145, GGNRA295, GGNRA294, GGNRA291, GGNRA289, GGNRA278, Marinsp15

Sequoia sempervirens - Pseudotsuga menziesii - Umbellularia californica

Association

- pi code 02052

COMMON NAME	Coast Redwood - Douglas Fir Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen Forest
PHYSIOGNOMIC GROUP	Temperate or Subpolar Needle - Leaved Evergreen Forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Giant Temperate or Subpolar Needle - Leaved Evergreen Forest

ALLIANCE Sequoia sempervirens Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Sequoia sempervirens - Pseudotsuga menziesii* forest association are found throughout the mapping areas of **PRNS / GGNRA**, east of the Point Reyes Peninsula.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Sequoia sempervirens - Pseudotsuga menziesii* forest association are found at low elevations on the mid 1 / 3 to entire side of 14 - 34 degree slopes. Aspects are southeast to southwest.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Soil textures range from moderately fine sandy clay loam to medium to very fine sandy loam of Franciscan Melange.

PRNS / GGNRA

Tree: *Sequoia sempervirens, Pseudotsuga menziesii, Umbellularia californica*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree: *Sequoia sempervirens*, *Pseudotsuga menziesii*, *Umbellularia californica*, *Lithocarpus densiflorus*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Sequoia sempervirens* - *Pseudotsuga menziesii* forest association form an open ground layer with 2 - 18% cover at 0 - 25 cm tall and 25 - 1 cm tall, an open to intermittent shrub layer with 2 - 12% cover at 0.5 - 1 m tall, 10% cover t 1 - 2 m tall, 2 - 45% cover at 2 - 5 m tall, and an intermittent to continuous tree layer with 16 - 21% cover at 5 - 10 tall, 30 - 37% cover at 10 - 20 m tall, 25 - 40% cover at 20 - 30 m tall, and 0 - 40% cover greater than 30 m tall. This association is dominated by *Sequoia sempervirens* and *Pseudotsuga menziesii*, and *Umbellularia californica*, *Lithocarpus densiflorus* are also present. Understory species may include *Corylus cornuta*, *Polystichum munitum*, *Iris douglasiana*, *Lonicera hispidula*, *Smilacina sp.*, *Galium sp.*, *Pteridium aquilinum*, *Stachys ajugoides*, *Toxicodendron diversilobum*, *Quercus sp.* and a variety of other understory species. This association may be differentiated from the *S. sempervirens* / *Lithocarpus densiflora* / *Vaccinium ovatum* association by the presence of tree - size *Pseudotsuga menziesii* and the general absence of *Vaccinium ovatum* in the understory.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G4S3?

RANK JUSTIFICATION This association is only known locally, but likely extends further north and south in the Central and northern Coast Ranges of California.

COMMENTS

Plots used to define this association (n=3): Marinsp02, GGNRA286, PRNS143

Tanoak Alliance

Lithocarpus densiflorus Forest Alliance - pi code 01070

This alliance is poorly represented in the study area and the general description below treats the stands observed in the study area.

COMMON NAME	Tanoak Forest
SYNONYM	Mixed Evergreen Forest, Tanoak Forest (Holland); Tanoak Series (PSW - 45); Northern Mixed Evergreen Forest (Thorne);
PHYSIOGNOMIC CLASS	Montane Hardwood Forest (WHR)
PHYSIOGNOMIC SUBCLASS	Woodland
PHYSIOGNOMIC GROUP	Evergreen woodland
PHYSIOGNOMIC SUB GROUP	Temperate broad - leaved evergreen woodland
FORMATION	Natural / semi - natural
	Temperate broad - leaved evergreen woodland
ALLIANCE	<i>Lithocarpus densiflorus</i> Alliance
CLASSIFICATION CONFIDENCE LEVEL	
USFWS WETLAND SYSTEM	Upland

RANGE

Globally

In California occurs along Northern California Coast, Central California Coast Ranges, Klamath Mountains and in the Sierra Nevada.

PRNS / GGNRA

A single plot in the study area was located on the northeast side of Bolinas Ridge.

ENVIRONMENTAL DESCRIPTION

Globally

All slope aspects; soils well - drained, mostly sandstone, schist - derived; elevation 100 - 1500m.

PRNS / GGNRA

Northeast slope aspect on sandy clay loam soil; evidence of prior logging; many downed tanoaks.

MOST ABUNDANT SPECIES

Globally

Tree: *Lithocarpus densiflorus*, *Arbutus menziesii*, *Pinus coulteri*, *Pinus lambertiana*,
Pseudotsuga menziesii, *Quercus agrifolia*, *Q. chrysolepis*, *Q. kelloggii*, *Umbellularia californica*.

PRNS / GGNRA

Tree: *Lithocarpus densiflorus*
Shrub: *Vaccinium ovatum*

CHARACTERISTIC SPECIES

Globally

Tree: *Lithocarpus densiflorus*

PRNS / GGNRA

Tree: *Lithocarpus densiflorus*

VEGETATION DESCRIPTION

Globally

Lithocarpus densiflorus is sole or dominant in the tree canopy; *Arbutus menziesii*, *Pinus coulteri*, *P. lambertiana*, *Pseudotsuga menziesii*, *Quercus agrifolia*, *Q. chrysolepis*, *Q. kelloggii*, and / or *Umbellularia californica* may be present. Trees < 75 m; canopy continuous, may be two - tiered. Shrubs infrequent or common. Ground layer sparse to abundant.

PRNS / GGNRA

Lithocarpus densiflorus strongly dominant in the tree layer; trees < 20 m; canopy continuous; Shrubs intermittent; ground layer vegetation intermittent.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G4S4

RANK JUSTIFICATION Generally wide - spread in coastal northern California, but nowhere extensive. Some stands are the result of selective logging and other disturbance removing original conifer overstory.

DATABASE CODE

COMMENTS

Globally

Lithocarpus densiflorus is an important component in several alliances. The term "mixed evergreen forest" is most commonly associated with *L. densiflorus*, but stands called mixed evergreen forest vary in composition (Barbour 1988b, Sawyer et al. 1977). The original concept of mixed evergreen forests was created to describe hardwood stands in the Santa Lucia Mountains where *Arbutus menziesii*, *L. densiflorus*, live oaks, and *Umbellularia californica* grow in mixed stands. This is Cooper's (1922) broad sclerophyll formation.

Munz (1968) and Whittaker (1960) expanded the term mixed evergreen to include *Pseudotsuga menziesii* - *Lithocarpus densiflorus* stands. Azet et al. (1992) argue that *L. densiflorus* is the primary naturally regenerating species in southwestern Oregon, whereas *P. menziesii* importance is a result of past fires (Azet & Wheeler 1982). Jimerson (1993) comes to the same conclusion for western Klamath Mountains in California. The low elevation associations are called *Lithocarpus densiflorus* series even though *P. menziesii* is an important component.

Sawyer et al. (1977c) called stands in northwestern California of *Arbutus menziesii*, *L. densiflorus*, and *P. menziesii* *Pseudotsuga* / hardwood forests. Other authors (Keeler - Wolf 1990, Bingham & Sawyer 1991, 1993, Stuart 1993) refer to Douglas - fir / hardwood forests. [The slash indicates the two tiered character of the old stands].

The reason for not following Forest Service terminology (Jimerson 1993) is to be able to recognize associations with tanoak dominance [*Lithocarpus densiflorus* alliance] as different from stands where *L. densiflorus* shares the canopy with *P. menziesii* (*Pseudotsuga menziesii* - *Lithocarpus densiflorus* alliance). Differences in interpretation can be accommodated by remembering that an association can be placed in different categories by following the conventions of each classification.

PRNS / GGNRA

Further sampling in the southern portion of the GGNRA on the San Francisco Peninsula should result in sufficient stands sampled to identify the association(s) present in the mapping area.

Plot used to define this alliance locally (n=1): PRNS140

Bishop Pine and Mesic Chaparral Mesocluster
Bishop Pine – Chinquapin Superalliance

Bishop Pine Alliance

Bishop Pine (*Pinus muricata*) Forest Alliance - pi code 03030

This alliance is represented by one association in the area. Some additional variation is expressed by a plot sampled including a stand with a strong *Gaultheria shallon* shrub understory. The range of the alliance is from Humboldt County, northern California to Guadalupe Island off Central Baja California.

***Pinus muricata* - *Arbutus menziesii* / *Vaccinium ovatum* Association**

- pi code 03031

COMMON NAME	Bishop Pine - Pacific Madrone / Evergreen Blueberry Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Temperate or subpolar needle - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Rounded - crowned temperate or subpolar needle - leaved Evergreen forest

ALLIANCE *Pinus muricata* Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Because *Pinus muricata* alliance stands are spotty and restricted to California, it is likely that only a few other localities for this association may exist. One possible location is the vicinity of Salt Point State park in Sonoma County.

PRNS / GGNRA

This association is only found on the Point Reyes Peninsula, on the west shore of Tomales Bay near Tomales Bay State Park and on the northern portion of Inverness Ridge.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association grows on gentle to moderate slopes on northern and eastern exposures. Stands are typically found on the middle third of the slope. Soils are moderately fine to coarse sandy clay loams.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Pinus muricata*
Shrub *Vaccinium ovatum*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Pinus muricata*
Shrub *Vaccinium ovatum*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Pinus muricata is the dominant tree in the canopy, usually with small amounts of *Arbutus menziesii*. Individuals of *Quercus agrifolia*, *Umbellularia californica*, and / or *Chrysolepis chrysophylla* var. *chrysophylla* may be present. The canopy is intermittent to continuous and is typically less than 20 but occasionally up to 30 meters in height. *Vaccinium ovatum* is important to dominant in the shrub canopy. The shrub layer is sparse to intermittent. *Corylus cornuta* or *Rhamnus californica* ssp. *californica* are often present and sometimes dominate the shrub layer. *Lithocarpus densiflora* may also be important. The herbaceous layer is sparse but may contain *Polystichum munitum*, *Pteridium aquilinum*, *Rubus ursinus*, *Gaultheria shallon*, *Clinopodium douglasiana*, and / or *Lonicera hispidula*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G2S2

RANK JUSTIFICATION This association is only known from Point Reyes National Seashore, and is confined to a very small area.

COMMENTS

Globally

Stands of *Pinus muricata* tend to be even aged, usually originating after stand destroying fires.

PRNS / GGNRA

A good portion of the 12,500 acre Mt Vision Fire of November 1995 burned *Pinus muricata* forest, presumably this association. Regeneration by *P muricata* in this fire has generally been excellent. Monitoring efforts are underway by NPS to follow the transition states of vegetation in the burned *Pinus muricata* forest, as well as in other vegetation types within the fire perimeter.

Plots used to define this association (n=6): PRNS179, PRNS093, PRNS066, PRNS 205, PRNS180, marinsp09

Sargent Cypress Alliance

- pi code 03150 (preliminary) Insufficient relevé plots to describe this alliance at this time.

(Monterey Pine – Monterey Cypress Superalliance)

Cupressus Sargentii Woodland Alliance

Giant Chinquapin Alliance

Giant Chinquapin (*Chrysolepis chrysophylla*) Forest Alliance - pi code 01090

All stands of this alliance fall under a single association described below. This new alliance has been defined from these local stands. The range of the alliance as is currently known is only anecdotally known from beyond the study area, but probably is restricted to California and includes the Santa Cruz Mountains and the outer north Coast Ranges north to Mendocino County.

***Chrysolepis chrysophylla* var. *minor* / *Vaccinium ovatum* Association**

- pi code 01091

COMMON NAME	Dwarf Golden Chinquapin / Evergreen Blueberry Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen Forest
PHYSIOGNOMIC GROUP	Temperate broad - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Hemi - sclerophyllous temperate broad - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP	Natural
ALLIANCE	Dwarf Golden Chinquapin

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global range is not available without additional inventory. Similar *Chrysolepis chrysophylla* var. *minor* stands have been noted in the Santa Cruz Mountains (Hecht *et al.* 1973). However, any vegetation similar to this association appears to be limited to the outer coast Ranges of California in the vicinity of San Francisco Bay (Keeler - Wolf personal observations 1973 - 1999).

PRNS / GGNRA

Stands of this association are mapped in the southern portion of PRNS including Bolinas Ridge, Mt Tamalpais State Park and southward, scattered throughout GGNRA and San Francisco Water District lands (San Mateo County).

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found on gentle to moderate slopes on all aspects. Stands are found on upper slopes and ridges. Soils recorded are fine, sandy loams. Most stands appear to occupy relatively fine - grained substrates derived from marine sedimentary rocks. Stands are relatively small and occupy upper thirds of ridges and ridge tops where soils are shallow and rocky. Adjacent vegetation includes *Arctostaphylos nummularia* association, *Pseudotsuga menziesii* alliance stands, *Sequoia sempervirens* alliance stands, and *Adenostoma fasciculatum* alliance stands. The associated shrubby alliance stands occupy the poorest soils

while the tree alliances occupy the better developed soils of the adjacent north facing slopes and ravines. Most of the *Chrysolepis chrysophylla* stands are near the upper level of average summer fog and are intermediate in soil development between chaparral and forest. They appear to occupy a narrow interface between forest and chaparral usually forming small stands less than 2 ha in size.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Tall Shrub *Chrysolepis chrysophylla* var. *chrysophylla*
Shrub *Vaccinium ovatum*, *Chrysolepis chrysophylla* var. *minor*
Herbaceous *Pteridium aquilinum*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Tall Shrub *Chrysolepis chrysophylla* var. *minor*
Shrub *Vaccinium ovatum*, *Chrysolepis chrysophylla* var. *minor*

VEGETATION DESCRIPTION

Chrysolepis chrysophylla var. *minor* forms an open to continuous tall shrub or short tree canopy 5 - 10 meters in height. Scattered individuals of other evergreen tree species may be present including *Sequoia sempervirens* and / or *Pseudotsuga menziesii*. *Vaccinium ovatum* is conspicuous in the shrub layer with 35% to 90% cover. *Toxicodendron diversilobum*, *Baccharis pilularis*, *Arctostaphylos glandulosa*, *Quercus wislizeni*, and / or *Quercus berberidifolia* may also be present. The herbaceous layer is fairly sparse, but usually contains *Pteridium aquilinum*. *Xerophyllum tenax* and *Pickeringia montana* are occasional associates.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3S3?

RANK JUSTIFICATION See above discussion of range, likely to be small size stands of limited geographic extent

COMMENTS

PRNS / GGNRA

There is some uncertainty about the identity of the subspecific taxon of *Chrysolepis chrysophylla* in the mapping area. Both *C. chrysophylla* var. *chrysophylla* (typically a tall single - trunked tree) and *C. C.* var. *minor* (typically a multistemmed shrub or short tree) are reported from the mapping area (Hickman 1993, Munz 1998). Most of the individuals in this association are tall shrubs that have the habit of clonal, multiple stemmed individuals. However, many of these individuals may be up to 10 m tall (small tree size). These individuals do not resemble the "Giant Chinquapins" (*C.c.* var. *chrysophylla*) of the North Coast Ranges (Keeler - Wolf 1988) and the Klamath Province further north in California, and are thus considered the "shrub form" (var. *minor*).

Plots used to define this association and alliance (n=4): PRNS190, PRNS117, GGNRA371, GGNRA329, GGNRA292

Monterey Pine – Monterey Cypress Superalliance

Monterey Cypress Alliance

Monterey Cypress (*Cupressus macrocarpa*) Alliance

- pi code 03120

All stands of this alliance were locally initiated by introduced individuals. No associations have been described. The following general account is descriptive of the stands in the area.

COMMON NAME	Monterey Cypress Stands
SYNONYM	Monterey Cypress Forest (Cheatham & Haller); Cypress Series (PSW - 45); Coastal Closed - cone Coniferous Woodland (Thorne); Closed - cone Pine - cypress (WHR)
PHYSIOGNOMIC CLASS	Woodland
PHYSIOGNOMIC SUBCLASS	Evergreen Woodland
PHYSIOGNOMIC GROUP	Temperate or Subpolar Needle - leaved Evergreen Woodland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Rounded - crowned Temperate or Subpolar Needle - leaved Evergreen Woodland
ALLIANCE	<i>Cupressus macrocarpa</i> stands

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association occurs on the Central California Coast.

PRNS / GGNRA

A single plot in project area located near Spring Valley Ridge, Montara Mountain Quad.. Numerous non - native stands have been planted. Most are small. Some of the largest and oldest are on the Presidio of GGNRA.

ENVIRONMENTAL DESCRIPTION

Globally

Native California stands occur on headlands on granitic - derived soils from sea - level to 20 meters elevation. Planted stands occur up and down the California coast, but are most common from central to northern CA within a few miles of the coast.

PRNS / GGNRA

No native stands locally. The single plot occurs in a planted grove on sandy loam soils at nearly 800 ft. elevation, adjacent to Coast Live Oak Alliance.

MOST ABUNDANT SPECIES

Globally

Tree: *Cupressus macrocarpa*

PRNS / GGNRA

Tree: *Cupressus macrocarpa*

Shrub: *Rhamnus purshiana*, *Toxicodendron diversilobum*

Herb: *Galium aparine*

CHARACTERISTIC SPECIES

Globally

Tree: *Cupressus macrocarpa*

PRNS / GGNRA

Tree: *Cupressus macrocarpa*

VEGETATION DESCRIPTION

Globally

Cupressus macrocarpa Monterey cypress sole tree in canopy. Trees < 25 m; canopy open. Shrubs infrequent. Ground layer sparse.

PRNS / GGNRA

Cupressus macrocarpa strongly dominates the tree canopy with some emergent *Arbutus menziesii* and *Quercus agrifolia*; Trees <20m, canopy intermittent; Shrubs infrequent; ground layer intermittent.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

C. macrocarpa is a rare, CNPS List 1B plant (CNPS 2001). However the stands are planted in **PRNS / GGNRA** and are considered exotic

RANK JUSTIFICATION Although plantations exist in the state and worldwide, only two natural populations occur in Monterey Co. Green (1929) reported that 10,000 trees grew in these populations at that time; three - fourths in the Cypress Point grove, and the rest near Seventeen Mile Drive at Pebble Beach.

DATABASE CODE

COMMENTS

Globally

A description by Vogel et al. (1977) suggests that *C. macrocarpa* associates with alliances rather than forming one.

Disturbance Effects and Vegetation Dynamics

General: Easily killed by fire, trees may regenerate from seed in closed (serotonous) cones, as with other California *Cupressus*. However, the natural fire return rate is too slow to perpetuate most stands in nature. The tree has been seen to open cones on warm days and shed seed without the aid of fire.

Status Regionally

Central California Coast (261Aj). Noted above native to north western Monterey County, Point Lobos, and Monterey Peninsula

PRNS / GGNRA

Northern California Coast (263A) Planted along roads and as hedgerows and specimen ornamentals throughout the coastal areas. In Point Reyes National Seashore and Golden Gate National Recreation area (263Ak, Al) trees are commonly planted around ranch houses and in groves providing shelter from strong coastal winds. Some groves have natural regeneration. For example groves at Fort Cronkhite at Marin Headlands, GGNRA are invading well developed *Baccharis - Artemisia* association stands.

Plot used to define the alliance locally (n=1): GGNRA367

Monterey Pine (*Pinus radiata*) Alliance

- pi code 03120

All stands of this alliance were initiated from introduced plantings and do not constitute natural associations. The following general description serves to describe stands in the study area.

COMMON NAME Monterey Pine Forest
SYNONYMS Monterey Pine Forest (Holland), (Cheatham & Haller);
Monterey Pine Series ((PSW - 45); Coastal Closed - cone
Coniferous Forest (Thorne); Closed - cone Pine - Cypress
(WHR)
PHYSIOGNOMIC CLASS Forest
PHYSIOGNOMIC SUBCLASS Evergreen forest
PHYSIOGNOMIC GROUP Temperate or subpolar needle - leaved evergreen forest
PHYSIOGNOMIC SUB GROUP Natural / semi - natural
FORMATION Rounded - crowned temperate or subpolar needle - leaved
evergreen forest

ALLIANCE *Pinus radiata* Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Native stands limited to Central California Coast

PRNS / GGNRA

No plots were sampled, however *Pinus radiata* has been planted widely throughout the study area as windbreaks and "groves." In some cases individual plantings have expanded and become locally invasive.

ENVIRONMENTAL DESCRIPTION

Globally

Maritime terraces and headlands at sea - level to 300 meters; soils excessively drained.

PRNS / GGNRA

Maritime terraces and headlands at sea - level to 300 meters; soils excessively drained.

MOST ABUNDANT SPECIES

Globally

Pinus radiata

PRNS / GGNRA

Pinus radiata

CHARACTERISTIC SPECIES

Globally

Pinus radiata

PRNS / GGNRA

Pinus radiata

VEGETATION DESCRIPTION

Globally

Pinus radiata sole or dominant tree or important with *Quercus agrifolia* in the tree canopy; *Arbutus menziesii*, *Pinus attenuata*, *P. muricata*, *P. ponderosa*, *Pseudotsuga menziesii*, and / or *Sequoia sempervirens* may be present. Trees < 30 m; canopy continuous or intermittent. Shrubs absent, infrequent, or common. Ground layer sparse or abundant.

PRNS / GGNRA

Pinus radiata sole or dominant tree or important with *Quercus agrifolia* in the tree canopy; *Arbutus menziesii*, *Cupressus macrocarpa*, *Eucalyptus globulus*, *Pinus attenuata*, *P. muricata*, *P. ponderosa*, *Pseudotsuga menziesii*, and / or *Sequoia sempervirens* may be present. Trees < 30 m; canopy continuous or intermittent. Shrubs absent, infrequent, or common. Ground layer sparse or abundant.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK Native stands GIS1, locally exotic

RANK JUSTIFICATION For native stands the introduced pine pitch canker (*Fusarium subglutans pini*) is currently a serious disease in the Monterey stands. Possibly as a result of the advanced age of many of the stands, making them more susceptible to disease. Most remains in private ownership in an area of continued development. Genetic contamination from nursery stock from non - native sources is another problem. Non - native plantations are numerous up and down Coastal California.

COMMENTS

Globally

Plantations exist in the state and worldwide, but only three natural areas exist in California near Año Nuevo in Santa Cruz and San Mateo Cos., on the Monterey peninsula in Monterey Co., and at Cambria in San Luis Obispo Co.

Qualitative descriptions (Jones & Stokes 1994) point out the high level of variation in species composition among the three areas where *Pinus radiata* grows. At the Año Nuevo area, *P. radiata* associates with *Arbutus menziesii*, *P. attenuata*, *P. ponderosa*, *Pseudotsuga menziesii*, *Quercus agrifolia*, and / or *Sequoia sempervirens*. In the other areas, the *Pinus radiata* grows with *P. muricata*, and *Q. agrifolia*.

Cylinder (1995) describes links between marine terrace conditions and *P. radiata* success. His eight proposed types indicate that *P. radiata* dominates in stands of distinct species composition on different terraces, and that *P. radiata* it is also a secondary species in other alliances.

PRNS / GGNRA

Although native to three stands in CA, there are many planted stands including several in the Point Reyes National Seashore and Golden Gate National Recreation Area. Most of these are exhibiting some evidence of natural regeneration from seed.

No plots sampled locally (n=0).

Eucalyptus Superalliance

Eucalyptus Alliance

Eucalyptus spp. Alliance Stands - pi code 01030

This alliance is represented by numerous introduced stands in the study area. The following description provides a general profile of the alliance in California with reference to the stands in the local mapping area. No plots were sampled in this alliance.

COMMON NAME	Eucalyptus stands
SYNONYM	Eucalyptus series (PSW - 45)
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Evergreen forest
PHYSIOGNOMIC GROUP	Winter - rain broad - leaved evergreen sclerophyllous forest
PHYSIOGNOMIC SUB GROUP	Natural / semi - natural
FORMATION	Lowland or submontane winter - rain evergreen sclerophyllous forest

ALLIANCE *Eucalyptus* Woodland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Eucalyptus stands occur on the Northern, Central, and Southern California Coasts, the Southern Mountains and Valleys, and on the Channel Islands.

PRNS / GGNRA

No *Eucalyptus* plots sampled in study area, however *E. globulus* has been widely planted throughout as windbreaks and groves. Some of the largest stands occur near Bolinas, Dogtown, and on the ranches on the northern Point Reyes Peninsula.

ENVIRONMENTAL DESCRIPTION

Globally

Occurs on all slopes at elevations from sea - level to 300 meters.

PRNS / GGNRA

Occurs on all slopes at elevations from sea - level to 300 meters.

MOST ABUNDANT SPECIES

Globally

Eucalyptus spp.

PRNS / GGNRA

Eucalyptus spp.

CHARACTERISTIC SPECIES

Globally

Eucalyptus spp.

PRNS / GGNRA

Eucalyptus spp.

VEGETATION DESCRIPTION

Globally

Eucalyptus is the sole or dominant tree in the canopy; few other species present. Trees < 50 m; canopy continuous. Shrubs infrequent. Ground layer sparse.

PRNS / GGNRA

Eucalyptus is the sole or dominant tree in the canopy; few other species present. Trees < 50 m; canopy continuous. Shrubs infrequent. Ground layer sparse.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK Exotic

RANK JUSTIFICATION Exotic

COMMENTS

Globally

Most *Eucalyptus* species in CA are vigorous resprouters following fire and other stem disturbance. Several species are frost - sensitive and stem dieback has been a regular feature of *E. globulus* stands in the Great Valley and in the Central and Northern Coast Ranges following major freezes (e.g., 1990, 1973). Most *E. globulus* stands have originated by plantings, however many stands appear to be self - perpetuating now that they are established. Certain Eucalyptus species are being attacked by Australian insect bersts that have been inadvertently introduced along with their hosts. Planted *Eucalyptus camaldulensis* and *E. rudis* stands are currently plagued by the Red Gum Lerp Psyllid, (*Glycaspis brimblecombei*) in southern and central California. The insects may or may not kill the trees, but they regularly defoliate them and reduce their vigor

PRNS / GGNRA

Local groves, especially along fence rows and roads. They are more common in the southern subsections. Many groves in the PRNS and GOGA study area were planted in the late 1800's and early 1900's as windbreaks in what was naturally coastal shrubby or herbaceous alliance stands.

Plots used to define this association (n=0): no plots sampled

Winter Deciduous Forest / Scrub Supercluster
Riparian Forest Mesocluster
Red Alder Superalliance

Red Alder Alliance

Red Alder (*Alnus rubra*) Forest Alliance - pi code 07070

This alliance is represented by two associations in the study area, both defined with data collected in this project. Both associations occur in permanently saturated soils associated with streams and other permanent bodies of water. The range of this alliance is from Central Coastal California to Southern coastal Alaska.

***Alnus rubra* / *Rubus spectabilis* - *Sambucus racemosa* Association**

- pi code 07071

COMMON NAME	Red Alder / Salmon raspberry - Red Alder Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous forest
PHYSIOGNOMIC GROUP	Cold - deciduous forest
PHYSIOGNOMIC SUB GROUP	Natural Semi - natural
FORMATION	Seasonally flooded cold - deciduous forest
ALLIANCE	Red Alder / Salmon Raspberry Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Palustrine

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. It is likely that this association occurs throughout the outer coast ranges of Northern California.

PRNS / GGNRA

This forest is found throughout the **PRNS / GGNRA** planning area, though it is more common in the northern sections.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this forest are found in draws, streamsides, and gullies, which have permanent or semi - permanent surface water. Slopes are gentle to moderate, and aspects are generally north and east. Soils are coarse sandy loams to moderately fine sandy clay loams.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Alnus rubra*
Shrub *Rubus (spectabilis, ursinus, parviflorus)*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Alnus rubra*
Shrub *Rubus spectabilis*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest is dominated by *Alnus rubra*, which forms an intermittent to continuous canopy usually less than 20 meters in height. *Umbellularia californica* and / or *Salix lasiolepis* may be present in small amounts. The shrub layer is generally co - dominated by *Sambucus racemosa* and *Rubus* species, generally *Rubus spectabilis*, though *Rubus parviflorus* and / or *Rubus ursinus* are sometimes more common. The herbaceous layer is sparse to open, and often includes *Urtica dioica*, *Stachys ajugoides*, *Erechtites minima*, *Polystichum munitum*, *Scrophularia californica*, and / or *Athyrium filix - femina*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3G4?

RANK JUSTIFICATION There are approximately 70 stands of this vegetation mapped in the **PRNS / GGNRA** planning area. No other stands are known. However, this is likely to be a more widespread type in northern coastal California and perhaps to Oregon and Washington.

COMMENTS

PRNS / GGNRA

The selection of *Rubus* spp. as characteristic species for this association is based upon a study by Sawyer (2000) which shows that in the outer North Coast Ranges of California, *Rubus ursinus*, *R. parviflorus*, and *R. spectabilis* may act as ecological analogs and replace one another in several vegetation types . Channelization, exotics and erosion are impacting this association.

Plots used to define this association (n=6): PRNS35, PRNS64, PRNS111, PRNS009, PRNS 204, Marinsp10

***Alnus rubra* / *Salix lasiolepis* Association**

- pi code 07072

COMMON NAME	Red Alder / Arroyo Willow Forest Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	PHYSIOGNOMIC SUBCLASS
PHYSIOGNOMIC GROUP	Deciduous Forest
PHYSIOGNOMIC SUB GROUP	Cold - Deciduous Forest
	Natural / Semi - Natural

FORMATION Temporarily Flooded Cold - Deciduous Forest

ALLIANCE *Alnus rubra* Forest Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland or Wetland: Palustrine Forested Wetland.

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. However, it is likely that this type occurs along the central and north coast of California and perhaps further north into Oregon and Washington.

PRNS / GGNRA

Stands of the *Alnus rubra* / *Salix lasiolepis* forest association occur throughout the Point Reyes Peninsula and along several creeks in Samuel P. Taylor State Park.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from along permanent streams in the Point Reyes National Seashore and vicinity. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Alnus rubra* / *Salix lasiolepis* forest association are found on low gradient streams and their banks, including upper terraces. Soil textures range from moderately fine sandy clay loam to medium sand of gravelly alluvium. All stands inventoried occurred along permanent streams.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree: *Alnus rubra* / *Salix lasiolepis*

Shrub: *Rubus ursinus*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herb: *Urtica dioica*

Shrub: *Alnus rubra*, *Salix lasiolepis*, *Rubus ursinus*

Tree: *Alnus rubra*, *Salix lasiolepis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Alnus rubra* / *Salix lasiolepis* forest forms an open herb layer with 2 - 10% cover at 0 - 25 cm and 3 - 31% cover at 25 - 50cm tall, an open to continuous shrub layer with 6 - 22% cover at 0.5 - 1 m tall,

5 - 30% cover at 1 - 2 m tall, and 2 - 50% cover at 2 - 5 m tall, and an open to continuous tree layer 4 - 40% cover at 5 - 10 tall, 4 - 45% cover at 10 - 20m tall, and 0 - 60% cover at 20 - 30 m tall. It is dominated by either *Alnus rubra* or *Salix lasiolepis*. However, either species must be at least 25% relative cover. *Rubus ursinus* and *Urtica dioica* are also present. A variety of other species may include *Artemisia douglasiana*, *Carex sp.*, *Ribes sp.*, *Equisetum sp.*, *Rumex crispus*, *Veronica americana*, *Lonicera involucrate*, *Acer negundo*, *Rubus discolor*, *Scirpus microcarpus*, *Polugonum sp.*, and *Vinca major*.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G4 S3

RANK JUSTIFICATION It is likely that this association is largely restricted to small riparian stands along coastal streams and rivers in central and northern California.

COMMENTS

PRNS / GGNRA

Several stands of this association are heavily invaded by exotics such as *Vinca minor*, *Rubus discolor*, and *Conium maculatum*.

Plots used to define this association (n=3): marinsp03, PRNS112, PRNS132

Wax Myrtle – Salmonberry Superalliance

California Wax Myrtle Alliance

California Wax Myrtle (*Morella californica*) Shrub Alliance - pi code 20010

This alliance is defined for the first time using data from this study. Its range is conjectural at this point, but probably includes the outer California Coast Ranges from central California to southwestern Oregon.

COMMON NAME	Pacific Bayberry Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad - leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Temperate broad - leaved evergreen shrubland with a sparse Evergreen tree layer
ALLIANCE	Putatively <i>Morella californica</i> (newly defined)

CLASSIFICATION CONFIDENCE LEVEL 3

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Other stands have been sampled in San Mateo County at Montara Mountain (CNDDDB 2001). These stands are within a few miles of the southwestern portion of the mapping area. It is likely that this alliance is more widespread in Northern California.

PRNS / GGNRA

ENVIRONMENTAL DESCRIPTION

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This alliance is found in permanently moist soils adjacent to brackish and freshwater lagoons and along small seeps and streams within the coastal strip usually less than 1 mile from the coast. Occasionally stands occur on the upper third of moderate slopes with northern to eastern aspects. Stands grow on moderately coarse sandy loams. The stands are associated with *Rubus spectabilis* alliance stands, *Carex obnupta* alliance stands, *Scirpus microcarpus* alliance stands, *Calamagrostis nutkaensis* alliance stands, and *Baccharis pilularis* / *Carex obnupta* stands.

MOST ABUNDANT SPECIES

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall shrub *Morella californica*

CHARACTERISTIC SPECIES

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tall shrub *Morella californica*

VEGETATION DESCRIPTION

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This vegetation includes stands dominated by *Morella californica*, which forms a fairly closed canopy between 2 - 5 meters in height. Other shrubs may include *Toxicodendron diversilobum*, *Baccharis pilularis*, *Rubus ursinus*, *Ribes sanguineum*, *Holodiscus discolor*, *Garrya elliptica*, and *Vaccinium ovatum*. Herbs include: *Erechtites minima* (exotic), *Urtica dioica*, *Pteridium aquilinum*, *Polystichum munitum*, *Marah fabaceus*, *Phacelia malvifolia*, and *Marah fabaceus*. Stands are generally small (<1ha).

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4S3?

RANK JUSTIFICATION Stands are small and located in coastal zone in Northern California.

COMMENTS

PRNS / GGNRA

Exotic species are impacting this alliance.

Plots used to define this alliance (n=4): PRNS058, PRNS171, PRNS159, PRNS169

Salmonberry Alliance

Coastal Bramble (*Rubus spectabilis* - *R. parviflorus* - *R. ursinus*) Alliance - pi code 30050

This alliance has been recently described from work done in northern coastal California (Belsher 1999). The phases of this alliance are variable and may or may not include all species mentioned in the alliance name. Most stands defined locally in the study area are dominated and characterized by *Rubus spectabilis*.

COMMON NAME	Salmonberry - Bulrush Scrub - Shrub Wetland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Deciduous shrubland
PHYSIOGNOMIC GROUP	Cold - deciduous shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Semi - permanently flooded cold - deciduous shrubland
ALLIANCE	To be determined, Putatively <i>Rubus spectabilis</i> Shrubland
Alliance	

CLASSIFICATION CONFIDENCE LEVEL 3

USFWS WETLAND SYSTEM

RANGE

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. *Rubus spectabilis* is widespread in the Pacific Northwest from San Francisco Bay area to Alaska. However, no alliance has been defined for it elsewhere.

PRNS / GGNRA

ENVIRONMENTAL DESCRIPTION

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This alliance occurs on gentle slopes on the margins of wetlands. Soils range from coarse, loamy sands derived from granite to medium clay loam derived from marine sediments. Stands occur on the Point Reyes Peninsula along low drainages, seeps, and swales usually within 1 - 2 km from the coast. Stands are most often adjacent to *Salix lasiolepis*, *Carex obnupta*, *Scirpus microcarpus*, and *Juncus effuses* var. *brunneus* alliance stands

MOST ABUNDANT SPECIES

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Shrub *Rubus spectabilis*, *Rubus parviflorus*, *Lonicera involucrata*, *Sambucus racemosa*
Herbaceous *Scirpus microcarpus*, *Stachys ajugoides*, *Heracleum maximum*

CHARACTERISTIC SPECIES

Globally

This alliance is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Shrub *Rubus spectabilis*

VEGETATION DESCRIPTION

This alliance includes stands dominated by *Rubus spectabilis* with *Stachys ajugoides* *Heracleum maximum*, and a variety of other mesophilic to hydrophilic herbs dominating the understory. The herbaceous layer is typically open, while the shrub canopy is continuous. Other species may include *Urtica dioica*, *Juncus effuses* var. *brunneus* and *Oenanthe sarmentosa*. *Rubus spectabilis* forms dense clonal thickets along seeps, ponds, lagoons, and creeks in the foggy coastal strip of the mapping area. Species composition may vary with some species such as *Scirpus microcarpus* and *Lonicera involucrata* codominate in certain areas. Stands are usually small, but may range up to 2.5 ha.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4 S2.2?

RANK JUSTIFICATION *Rubus spectabilis* stands are relatively uncommon in Northern California along the coast from Marin to Del Norte Counties.

DATABASE CODE To be determined

COMMENTS

PRNS / GGNRA

Grazing and competition from exotics are impacts in this association.

Plots used to define this alliance (n=4): PRNS088, PRNS 063, PRNS157, PRNS172

Arroyo, Red, Black, and Yellow Willow Superalliance

Arroyo Willow Alliance

Arroyo Willow (*Salix lasiolepis*) Alliance - pi code 32080

This alliance is represented by at least two associations locally. Both occupy permanently moist riparian settings along creeks, streams, seeps and swamps. The National Vegetation Classification considers this alliance to be a scrub alliance, however the local associations are considered to be forest due to the preponderance of tall *S. lasiolepis* growing in relatively dense stands. In addition to the two defined associations additional variation in the alliance is shown by individual plots with the following distinctions:

Salix lasiolepis - *Salix gooddingii* - *Cornus glabra*: (GGNRA345) (mixed willow plot)

Salix lasiolepis / *Oenanthe sarmentosa* plot: (PRNS67)

Salix lasiolepis - *Salix scouleri* - *Salix exigua*: mixed willow plot (GGNRA328)

Salix lasiolepis - *Salix lucida* Association

- pi code 07061

COMMON NAME	Arroyo Willow - Shining Willow Forest
SYNONYM	None
PHYSIOGNOMIC CLASS	Forest
PHYSIOGNOMIC SUBCLASS	Deciduous forest
PHYSIOGNOMIC GROUP	Cold - deciduous forest

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Discriptions

PHYSIOGNOMIC SUB GROUP Natural / Semi - natural
FORMATION Seasonally flooded cold - deciduous forest

ALLIANCE To be determined

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Palustrine

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory.

PRNS / GGNRA

This forest is found throughout the **PRNS / GGNRA** planning area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This vegetation grows along the margins or on depositions within low - gradient, freshwater streams. Stands are subjected to seasonal flooding. Soils are fine to coarse loamy sand deposited by flooding.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Salix lasiolepis*, *Salix lucida*
Shrub *Salix lasiolepis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Salix lasiolepis*, *Salix lucida*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This forest forms an intermittent to continuous tree canopy between 5 - 10 meters in height. *Salix lasiolepis* and *Salix lucida* co - dominate. The shrub layer is open to intermittent and *Salix lasiolepis* is important. *Rubus ursinus*, *Toxicodendron diversilobum*, *Heracleum maximum*, *Sambucus racemosa*, and / or *Scrophularia californica* may also be present. The herbaceous layer is open to intermittent, and may include *Equisetum arvense*, *Urtica dioica*, *Conium maculatum* (exotic), *Juncus patens* and / or *Juncus effusus*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3S3?

RANK JUSTIFICATION Uncertain distribution beyond the mapping area, but likely to be relatively uncommon except on the north coast of California

COMMENTS

PRNS / GGNRA

This is considered a forest type because the tall shrub *Salix lasiolepis* is mixed with the taller *Salix lucida* which does attain tree stature. Exotics, dumping and erosion impact stands of this forest.

Plots used to define this association (n=4): PRNS192, PRNS 161 GGNRA316, PRNS90

***Salix lasiolepis* / *Rubus spp.* Association**

- pi code 07062

COMMON NAME Arroyo Willow / California Dewberry Forest
SYNONYM None
PHYSIOGNOMIC CLASS Forest
PHYSIOGNOMIC SUBCLASS Deciduous forest
PHYSIOGNOMIC GROUP Cold - deciduous forest
PHYSIOGNOMIC SUB GROUP Natural / Semi - natural
FORMATION Seasonally flooded cold - deciduous forest

ALLIANCE To be determined

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Palustrine

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. However, it is likely to occur throughout the coastal areas of Central California.

PRNS / GGNRA

This forest is found throughout the **PRNS / GGNRA** planning area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association grows on the margins of low - gradient streams and on seasonally saturated draws and basins. Slopes are gentle, and stands are found on all aspects.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area . Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Salix lasiolepis*
Shrub *Rubus* sp.

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Tree *Salix lasiolepis*
Shrub *Rubus* sp.

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This vegetation is structurally variable; some stands are forests, others tall shrublands. *Salix lasiolepis* dominates the tree and tall shrub layers. The upper canopy is less than 20 meters in height, and can be intermittent to continuous. *Rubus ursinus* and / or *Rubus discolor* may be present in the shrub layer. *Rubus* sp. may dominate the shrub canopy, or contribute only minor coverage. Other shrubs present may include *Toxicodendron diversilobum*, *Baccharis pilularis*, and / or *Lonicera involucrata*. The herbaceous layer is open to intermittent. *Polystichum munitum*, *Scrophularia californica*, *Plantago lanceolata* (exotic), *Stachys ajugoides*, *Urtica dioica* and / or *Erechtites minima* may be present.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4S4?

RANK JUSTIFICATION Likely to be relatively common in coastal California. However, distribution is speculative at this time.

COMMENTS

PRNS / GGNRA

Exotics, grazing and water diversions effect stands of this vegetation.

Plots used to describe this association (n=5): PRNS076, PRNS168, PRNS38, GGNRA 342, GGNRA379

Yellow Willow Alliance

Yellow Willow (*Salix lucida*) Alliance stands - pi code 07030

Stands of this alliance are not currently well enough represented to define associations within the study area. The following description will serve to define the general characteristics of the alliance as it occurs locally.

COMMON NAME

Pacific Willow Thickets

SYNONYMS

Central Coast Cottonwood - sycamore Riparian Forest,
Central Coast Riparian Scrub, Freshwater Swamp, Great
Valley Mixed Riparian Forest, Great Valley Willow
Scrub, Red Alder Riparian Forest, Southern Cottonwood -

Willow Riparian Forest, Southern Willow Scrub (Holland);
Willow Series (PSW - 45); Riparian Woodland (Thorne);
Freshwater Emergent Wetland (WHR)

PHYSIOGNOMIC CLASS Forest, Woodland, Shrubland
PHYSIOGNOMIC SUBCLASS Deciduous Forest, Deciduous Woodland, Deciduous
Shrubland
PHYSIOGNOMIC GROUP Cold - deciduous Forest, Cold - deciduous Woodland, Cold -
Deciduous Shrubland
PHYSIOGNOMIC SUB GROUP Natural / Semi - natural
FORMATION Seasonally flooded cold - deciduous forest; Temporarily
flooded woodland; Temporarily flooded cold - deciduous
woodland; Temporarily flooded shrubland; Temporarily
flooded cold - deciduous shrubland.

ALLIANCE *Salix lucida* ssp. *lasiandra* seasonally, Temporarily Flooded
Forest, Woodland, Shrubland Alliance Complex

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Palustrine shrub - scrub

RANGE

Globally

California Floristic Province

PRNS / GGNRA

Two plots in the study area located near Nicasio Ridge and the Coast Guard Housing.

ENVIRONMENTAL DESCRIPTION

Globally

Habitats seasonally flooded, saturated. Water chemistry: fresh. Floodplains; low - gradient depositions along rivers, streams. The national inventory of wetland plants (Reed 1988) lists *Salix lucida* ssp. *lasiandra* as a OBL. Elevation: sea level - 2700 m.

PRNS / GGNRA

The two plots in the study area located on terraces on soils from fine clay to medium sand.

MOST ABUNDANT SPECIES

Globally

Tree: *Salix lucida* ssp. *lasiandra*, *Acer macrophyllum*, *Alnus rhombi folia*, *Cornus sericea*,
Platanus racemosa, *Populus balsamifera*, *P. fremontii*

Shrub: *Sambucus mexicana*

PRNS / GGNRA

Tree: *Salix lucida* ssp. *lasiandra*, *Alnus rubra*, *S. lasiolepis*

Shrub: *Rubus ursinus*, *Artemisia douglasiana*, *Athyrium filix - femina*, *Lonicera involucrata*

CHARACTERISTIC SPECIES

Globally

Salix lucida ssp. *lasiandra*

PRNS / GGNRA

Salix lucida ssp. *lasiandra*

VEGETATION DESCRIPTION

Globally

Salix lucida ssp. *lasiandra* is sole or dominant in the shrub or tree canopy; *Acer macrophyllum*, *Alnus rhombi folia*, *Cornus sericea*, *Platanus racemosa*, *Populus balsamifera*, *P. fremontii*, *Salix* spp., and / or *Sambucus mexicana* may be present. If shrubland, emergent trees may be present. Shrubs < 15 m; canopy continuous. Shrubs sparse under tree canopy. Ground layer variable; may include *Athyrium filix - femina*, *Artemisia douglasiana*.

PRNS / GGNRA

Salix lucida ssp. *Lasiandra* dominant to strongly dominant in the tree canopy; *Alnus rubra* present in one plot, *S. lasiolepis* in the other; trees <20m, canopy continuous. Shrubs intermittent to continuous under the tree canopy. Ground layer sparse.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G4 S3

RANK JUSTIFICATION Usually found in small stands adjacent to permanent moisture. In California tends to occur along coastal rivers and creeks with little non - natural disturbance.

COMMENTS

Globally

Willow stands may or may not be dominated by a single species. If no dominant willow is present at low elevations, then place the stands in the Arroyo willow alliance. Montane and subalpine willow stands are placed in separate classes since different willow species are restricted to those elevations. Stands of the *Salix lucida* ssp. *lasiandra* alliance have environment conditions similar to alder, cottonwood, and other willow alliances.

Status Regionally

Central California Coast Ranges (M262A): Small stands occur along the upper reaches of the San Antonio River, Monterey Co.

Southern California Mountains and Valleys (M262A): small stands line several permanent rivers and streams including the Santa Margarita and the Santa Ana Rivers.

PRNS / GGNRA

Northern California Coast Ranges (263A): Stands, though typically small are common near Olema and Pt Reyes Station (261A1) insufficient samples exist to define associations. Stands may have herbaceous understory.

Plots used to define the alliance locally (n=2): PRNS68, GGNRA384

Black Willow Alliance

Salix gooddingii Alliance Stands - pi code 07040

This alliance is represented locally by a single plot. The following general description will serve to define the alliance.

COMMON NAME

Black willow thicket

SYNONYM

Central Coast Riparian Scrub, Great Valley Cottonwood Forest, Great Valley Mixed riparian Forest, Mojave Riparian Forest, Sonoran Cottonwood - willow Riparian Forest, Southern Cottonwood - willow Riparian Forest, Southern Willow Scrub (Holland); Willow Series (PSW - 45); Riparian Woodland (Thorne); Desert Riparian, Freshwater Emergent Wetland (WHR).

PHYSIOGNOMIC CLASS

Woodland

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Descriptions

PHYSIOGNOMIC SUBCLASS Deciduous Woodland
PHYSIOGNOMIC GROUP Cold - deciduous Woodland
PHYSIOGNOMIC SUB GROUP Natural / Semi - natural
FORMATION Temporarily Flooded Cold - deciduous Woodland

ALLIANCE *Salix gooddingii* Temporarily Flooded Alliance

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Palustrine forested or shrub - scrub

RANGE

Globally

In California occurs across the Northern California Interior Coast Ranges, Great Valley, Sierra Nevada Foothills, Southern California Coast, Southern California Mountains and Valleys, Mojave and Sonoran Deserts. Also occurs in New Mexico, Texas and throughout the southwestern U.S.

PRNS / GGNRA

Single plot in study area located near Spring Valley Ridge.

ENVIRONMENTAL DESCRIPTION

Globally

Habitats temporarily flooded, saturated. Water chemistry: fresh. Floodplains; low - gradient depositions along rivers, streams; meadow edges. The national inventory of wetland plants (Reed 1988) lists *Salix gooddingii* as a OBL. In California most stands are in inland or southern coastal riparian settings which have warm to hot summers. Stands in northern coastal California are less common.

PRNS / GGNRA

Plot located along dry creek in sandy loam soils at 716 ft. elevation.

MOST ABUNDANT SPECIES

Globally

Salix gooddingii

PRNS / GGNRA

Salix gooddingii, Sambucus mexicana

CHARACTERISTIC SPECIES

Globally

Salix gooddingii

PRNS / GGNRA

Salix gooddingii

VEGETATION DESCRIPTION

Globally

Salix gooddingii is dominant in the shrub or tree canopy; *Alnus rhombifolia*, *Baccharis pilularis*, *B. salicifolia*, *Platanus racemosa*, *Populus balsamifera*, *P. fremontii*, *Salix hookeriana*, *S. laevigata*, *S. lasiolepis*, *S. lucida* ssp. *lasiandra*, *S. sitchensis*, *Sambucus mexicana*, *Cornus sericea* and / or *Washingtonia filifera* may be present. If shrubland, emergent trees may be present. Shrubs < 3 m; canopy continuous. Shrubs sparse under tree canopy. Ground layer variable.

PRNS / GGNRA

Salix gooddingii dominant in the shrub canopy; *Sambucus mexicana* also present; Shrubs < 5 m, canopy continuous. Some emergent *Quercus agrifolia* and *Pseudotsuga menziesii*. Ground layer open.

OTHER NOTEWORTHY SPECIES *Cornus sericea*, *Pseudotsuga menziesii*, *Quercus agrifolia*

CONSERVATION RANK G4 S3

RANK JUSTIFICATION Stands are widespread, but not usually extensive and subject to riverbank erosion control and channel modification.

COMMENTS

Globally

Willow stands may or may not be dominated by a single species. Montane and subalpine willow stands are placed in separate classes since different willow species are restricted to those elevations. Stands of *S. gooddingii* have environmental conditions similar to alder, cottonwood, and other willow alliances, however, *S. gooddingii* stands are typically most prevalent at low elevations in CA, rarely ranging up above the foothill belt. Most *S. gooddingii* stands are arborescent.

Salix gooddingii is an important riparian tree or shrub in the West. Its ecology is tied to stand modify and creating disturbances, especially winter floods. It blooms and fruits in early spring. The wind - dispersed seed is viable for a few days. Germination is best on fine - grained, moist, bare soil. Established plants tolerate seasonal inundation. *S. gooddingii* resprouts from a root crown in lighted conditions. Plants are top - killed by low and moderate fire, but reprints vigorously. Seedling establishment after fire may be high if seasonal and moisture requirements are met.

Status Regionally

Northern California Interior Coast Ranges (M261C). Occurs occasionally at lower elevations along major streams and rivers

Central California Coast Ranges (M262A): Small stands occur along the upper reaches of the San Antonio River, Monterey Co. Stands are apparently rare on the San Francisco Peninsula, Only one plot was sampled in the San Francisco Municipal Watershed adjacent to Golden Gate National Recreation Area.

Northern California Coast Ranges (263A): stands are scattered along major lowland streams and rivers Great Valley (262A). Small stands common along Sacramento River and other major tributaries, common as small stands along drainage ditches and in Wildlife Refuges in Sacramento and San Joaquin Valleys.

Sierra Nevada Foothills (M261F).

Southern California Coast (261B). Common in flood control basins and along perennial streams in lowlands

Southern California Mountains and Valleys (M262B).

Mojave Desert (322A) common along Mojave River and Owens River and Colorado Desert (322C) stands are small and local, common along main Colorado River, in some cases only a few plants that mixes with *Populus fremontii* and *Washingtonia filifera*.

PRNS / GGNRA

Stands appear to be rare locally.

Plot used to define alliance locally (n=1): GGNRA358

Red Willow Alliance

Red Willow (*Salix laevigata*) Alliance Stands - pi code 07050

Locally red willow alliance stands are scattered in riparian settings. Currently insufficient samples exist to define associations. The following account will serve to distinguish the local expression of the alliance.

COMMON NAME

Red willow thickets

SYNONYMS

Central Coast Cottonwood - sycamore Riparian Forest,
Central Coast Riparian Scrub, Great Valley Mixed Riparian
Forest, Modoc - Great Basin Cottonwood - willow Riparian
Forest, Mojave Riparian Forest, Southern Willow Scrub

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Discriptions

PHYSIOGNOMIC CLASS (Holland); Willow Series (PSW - 45); Riparian Woodland
PHYSIOGNOMIC SUBCLASS (Thorne); Fresh Emergent Woodland (WHR).
Woodland
PHYSIOGNOMIC GROUP Deciduous Woodland
PHYSIOGNOMIC SUB GROUP Cold - deciduous Woodland
FORMATION Natural / Semi - natural
Temporarily Flooded Cold - deciduous Woodland

ALLIANCE *Salix laevigata* Temporarily Flooded Woodland Alliance

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Palustrine forested or shrub - scrub

RANGE

Globally

Throughout California, intermountain West.

PRNS / GGNRA

ENVIRONMENTAL DESCRIPTION

Globally

Habitats seasonally flooded, saturated. Water chemistry: fresh. Ditches; floodplains; lake edges; low - gradient depositions along rivers, streams. Elevation sea - level to 1700 m.

PRNS / GGNRA

Three plots in study area occurring on bottoms or washes on coarse to fine sandy loams at elevations below 800 ft.

MOST ABUNDANT SPECIES

Globally

Tree: *Salix laevigata*, *Alnus rhombifolia*, *Platanus racemosa*, *Populus fremontii*
Shrub: *Baccharis pilularis*, *B. salicifolia*, *Salix spp.*, *Sambucus mexicana*
Herb: *Urtica dioica*, *Oenanthe sarmentosa*

PRNS / GGNRA

Tree: *Salix laevigata*, *Quercus agrifolia*, *Salix lasiandra*, *Myrica californica*
Shrub: *Ribes sanguineum*, *Toxicodendron diversilobum*, *Rubus ursinus*, *Cornus sericea*, *Rubus parviflorus*
Herb: *Urtica dioica*, *Stachys ajugoides*, *Dryopteris arguta*, *Carex nudata*, *Oenanthe sarmentosa*

CHARACTERISTIC SPECIES

Globally

Tree: *Salix laevigata*

PRNS / GGNRA

Tree: *Salix laevigata*

VEGETATION DESCRIPTION

Globally

Salix laevigata is sole or dominant shrub or tree in the canopy; *Alnus rhombifolia*, *Baccharis pilularis*, *B. salicifolia*, *Platanus racemosa*, *Populus fremontii*, *Salix spp.*, and / or *Sambucus mexicana* may be present. If shrubland, emergent trees may be present. Shrubs < 15 m; canopy continuous. Shrubs sparse under tree canopy. Ground layer variable may include high cover of large forbs such as *Urtica dioica*, and *Oenanthe sarmentosa*.

PRNS / GGNRA

Salix laevigata important in the tree layer; *S. lasiandra*, *Quercus agrifolia*, *Myrica californica* also present. Trees <20m. Shrub layer open to continuous. Ground layer continuous to intermittent. The three plots sampled suggest variation and include a *Salix laevigata* a - *S. lucida* / *Cornus sericea* plot: (GGNRA341), *Salix laevigata* / *Urtica dioica* plot: (GGNRA 361), and *Salix laevigata* / *Oenanthe sarmentosa* plot: (GGNRA365).

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G5S4

RANK JUSTIFICATION Widespread in western U.S. in riparian situations.

COMMENTS

Globally

Salix laevigata is a fast growing tree willow adapted to many riparian settings in the Western US. It requires permanent moisture and is widely dispersed throughout the area by its copious small seeds attached to cottony filamentous hairs. It will resprout after physical stem damage and individuals live for at least 90 years. Most natural flooding regimes maintain a matrix of young to medium aged stands, however in flood controlled situations stabilized flooding regimes may enable dense stands of large mature trees to develop, sometimes crowding riverbanks and forming arching canopies over the main watercourse.

Status Regionally

Northern California Interior Coast Ranges (M261C). Occurs occasionally at lower elevations along major streams and rivers

Central California Coast Ranges (M262A): Small stands occur along the Salinas River, Monterey Co. three stands were sampled in the Golden Gate National Recreation Area in San Mateo County

Northern California Coast Ranges (263A): stands are scattered along major lowland streams and rivers

Great Valley (262A). Small stands common along Sacramento River and other major tributaries

Sierra Nevada Foothills (M261F). occasional along major rivers and streams. Common along the Kern River near Lake Isabella.

Southern California Coast (261B). occasional in flood control basins and along perennial streams in lowlands

Southern California Mountains and Valleys (M262B).

Mojave Desert (322A) occasional along Mojave River and Owens River and adjacent to springs and seeps throughout the region.

PRNS / GGNRA

Stands are locally distributed in swampy areas such as the Olema Marsh. Other stands occur in riparian areas adjacent to Red Alder (*Alnus rubra*), Pacific shining willow (*Salix lucida* ssp. *pacifica*) or Arroyo willow (*Salix lasiolepis*) stands.

Plots used to define the alliance locally (n=4): GGNRA341, GGNRA 361,GGNRA365

Shrub Dominated Plant Communities

Chaparral Supercluster

Xeric Chaparral Mesocluster

Chamise – Manzanita Superalliance

Chamise Alliance

Chamise (*Adenostoma fasciculatum*) Alliance - pi code 21110

This alliance is represented by a single association in the study area. It is a non - serpentine chaparral, found on marine sedimentary and metamorphic rocks. Additional variation is expressed in individual plots with the following characteristics: *Adenostoma fasciculatum* - *Ceanothus thyrsiflorus* - *Prunus ilicifolia* (GGNRA343) from the San Francisco Watershed lands on the San Francisco Peninsula.

Chamise alliance is the most widespread chaparral vegetation in California and ranges from Shasta Co. in the north to northwestern Baja California, Mexico.

Adenostoma fasciculatum - *Arctostaphylos glandulosa* - *Quercus wislizeni* Association

- pi code 21140

COMMON NAME	Common Chamise - Eastwood's Manzanita - Interior Live Oak Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad - leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Sclerophyllous temperate broad - leaved evergreen shrubland
ALLIANCE	<i>Adenostoma fasciculatum</i> Evergreen Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Although the three characteristic species of this association are widespread in California and an association known as the *Adenostoma fasciculatum* - *Arctostaphylos glandulosa* occurs in Southern Coastal California (Gordon and White, 1994), this association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. It is likely that this association occurs throughout the central California Coast Ranges.

PRNS / GGNRA

This association is found in the Mount Tamalpais region of the mapping area. It is the common non - serpentine chaparral on the southerly facing slopes near the summit ridge of the mountain.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

COMMON NAME Chamise - Bush Monkey Flower Shrubland Association
SYNONYM None
PHYSIOGNOMIC CLASS Shrubland
PHYSIOGNOMIC SUBCLASS Evergreen Shrubland
PHYSIOGNOMIC GROUP Temperate Broad - leaved Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP Natural / Semi - Natural
FORMATION Sclerophyllous temperate broad - leaved evergreen shrubland

ALLIANCE *Adenostoma fasciculatum* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Similar stands with these two characteristic species occur in Alameda and Contra Costa counties of Central Coastal California. It is likely that this association is more widespread in central coastal California.

PRNS / GGNRA

Stands of the *Adenostoma fasciculatum* - *Mimulus aurantiacus* shrubland association are locally limited to the upper slopes of Bolinas Ridge and Mount Tamalpais in the mapping area of **PRNS / GGNRA**.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found on the upper 1 / 3 of rocky, 16 - 30 degree angle, south facing slopes. Soil textures range from medium loam to moderately coarse sandy loam of sandstone origin. Most stands are above the average summer fog layer.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Adenostoma fasciculatum*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous:

Shrub: *Adenostoma fasciculatum*, *Quercus chrysolepis*, *Mimulus aurantiacus*

VEGETATION DESCRIPTION

Globally

ALLIANCE *Arctostaphylos glandulosa* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Although both characteristic species and the alliance are widespread in California, this association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Areas. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Arctostaphylos glandulosa* - *Quercus wislizeni* shrubland association are apparently restricted to the My Tamalpias region of the PRNS and GGNRA mapping area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found at low elevations on the upper 1 / 3 or ridge tops of 15 - 22 degree slopes with south - southeast aspects. Soil textures range from generally moderately fine sandy clay loam to moderately coarse, sandy loam of sandstone or siltstone origin. These slopes are generally gravelly or cobbly. Most stands are above the average level of summer fog.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Arctostaphylos glandulosa*

Tree / Shrub: *Quercus wislizeni*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Aira caryophyllea*, *Mimulus aurantiacus*, *Lonicera hispidula*

Shrub: *Arctostaphylos glandulosa*

Tree / Shrub: *Quercus wislizeni*, *Lithocarpus densiflorus*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Arctostaphylos glandulosa* - *Quercus wislizeni* shrubland association form an open understory herb layer with 7% at .5 - 1 m tall and an open to continuous shrub layer with 6 - 63% cover at 1 - 2m tall, and 18 - 85% at 2 - 5 m tall. *Arctostaphylos glandulosa* (45 - 65 % cover) - and *Quercus wislizeni*(15 - 30 % cover) are dominant. *Lonicera hispidula*, *Aira caryophyllea*, *Mimulus aurantiacus*, and *Lithocarpus*

densiflorus are also present. Additional species, contributing little cover, vary and may include *Umbellularia californica*, *Adenostoma fasciculatum*, *Heteromeles arbutifolia*, *Melica torreyana*, *Gallium nuttallii*, *Holcus lanatus*, *Pellaea mucronata*, *Ceanothus cuneatus*, *Bromus diandrus*, *Agrostis hallii*, *Iris sp.* *Ceanothus sp.* *Vaccinium ovatum*, *Lepichinia calycina* and *Pteridium aquilinum*. *Quercus wislizeni* may act as a shrub or a small tree in this association, probably reflecting varying moisture and fire history between stands.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3 S3?

RANK JUSTIFICATION The two characteristic species are widespread but the association has only been described from the vicinity of Mt. Tamalpais in Marin County.

COMMENTS

PRNS / GGNRA

The average cover of the characteristic species in the three stands sampled is similar. It is possible that some of the shrubby live oaks in this association are *Q. parvula* and not *Q. wislizenii*.

Plots used to describe this association (n=4): PRNS183, PRNS189, PRNS185, GGNRA296

Mount Tamalpais Manzanita Alliance

Hooker Manzanita (*Arctostaphylos hookeri ssp. montana*) Alliance - pi code 21440

This alliance is limited to the outer central coast ranges of California and is typically considered part of the maritime chaparral habitat. Individual stands are represented in different geographical areas by different subspecies of *A. hookeri*. The local stands are unique in that they are found on serpentine and are represented by the endemic *A. hookeri ssp. montana*, only known from the Mt. Tamalpais area.

COMMON NAME	Mount Tamalpais Manzanita Shrubland Alliance
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Temperate Broad - leaved Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Sclerophyllous temperate broad - leaved evergreen shrubland

ALLIANCE *Arctostaphylos hookeri ssp. montana* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This alliance is only known from the Golden Gate National Recreation area and adjacent areas on Mount Tamalpais State Park. Because the characteristic species is endemic to Mt Tamalpais the global extent is essentially the same as the local extent

PRNS / GGNRA

Stands of the *Arctostaphylos hookeri ssp montana* shrubland alliance are found on Mt. Tamalpais in the mapping areas of MARINSP and PRNS.

ENVIRONMENTAL DESCRIPTION

Globally

Stands of the *Arctostaphylos hookeri* ssp *montana* shrubland alliance are found at rocky serpentine ridge tops or the upper 1 / 3 of south facing slopes that are convex or curved. Soil textures range from moderately coarse, sandy loam. This alliance is found on gravelly soils derived from serpentine.

PRNS / GGNRA

Stands of the *Arctostaphylos hookeri* ssp *montana* shrubland alliance are found at rocky serpentine ridge tops or the upper 1 / 3 of south facing slopes that are convex or curved. Soil textures range from moderately coarse, sandy loam. This alliance is found on gravelly soils derived from serpentine.

MOST ABUNDANT SPECIES

Globally

Shrub: *Arctostaphylos hookeri* ssp *montana* , *Adenostoma fasciculatum*

PRNS / GGNRA

Shrub: *Arctostaphylos hookeri* ssp *Montana*, *Adenostoma fasciculatum*

CHARACTERISTIC SPECIES

Globally

This alliance is only known from the Mt Tamalpias area of the mapping project *Arctostaphylos hookeri* ssp. *montana* (Mt. Tamalpias manzanita) is a local endemic and Mt. Tamalpias is its only known locality.

PRNS / GGNRA

Shrub: *Arctostaphylos hookeri* ssp *montana*, *Adenostoma fasciculatum*, *Arctostaphylos glandulosa glandulosa*.

VEGETATION DESCRIPTION

Globally

see below **PRNS / GGNRA** vegetation description.

PRNS / GGNRA

Stands of the *Arctostaphylos hookeri* ssp *montana* shrubland alliance form an intermittent herb layer averaging 40% cover at 25 - 50 cm tall and an intermittent shrub layer averaging 35% cover at 0.5 to 1 m tall. It is dominated by *Arctostaphylos hookeri montana*, a rare species generally found on serpentine outcrops on Mt. Tamalpais. *Adenostoma fasciculatum*, *Arctostaphylos glandulosa glandulosa* is also found at this alliance. *Heteromeles abutifolia*, *Calamagrostis ophitis*, *Melica* sp, *Clarkia*, *Vulpia myuros*, *Eriodytion californicum*, *Pseudotsuga menziesii*, *Castilleja foliolosa*, *Iris douglasiana*, and *Hypericum concinnum* may also contribute minor cover. Compared to the other chaparral alliances on serpentine in the Mt Tamalpias area, this alliance is lower in stature and occupies the tops of ridgelines or dry exposed southerly - facing upper slopes. It is strongly dominated by *A. hookeri* ssp. *montana*. This species makes up ca. 70 - 90% relative cover of the stands.

OTHER NOTEWORTHY SPECIES *Arctostaphylos hookeri* ssp *montana* is a rare species only found on serpentine outcrops on Mt. Tamalpais.

CONSERVATION RANK

G1S1.2

RANK JUSTIFICATION The only known populations of the species defining this type are on Mt Tamalpias, Marin County.

COMMENTS

PRNS / GGNRA

These stands were not reliably mapped in the project due to indistinct photo signatures. However it is likely that no more than a dozen large stands exist.

Plots used to describe this alliance (n=2): PRNS184, Marinsp17

Leather Oak Alliance

Leather Oak (*Quercus durata*) Alliance - pi code 21270

This alliance is represented by a single association in the study area and is a typical serpentine chaparral, found on the upper slopes of Mt. Tamalpais in the study area. The alliance is endemic to California and typically (though not always) occurs on serpentine rocks from Shasta Co. to Santa Barbara County.

***Quercus durata* - *Arctostaphylos glandulosa* Association**

- pi code21270

COMMON NAME	Leather Oak - Eastwood Manzanita Shrubland Association
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Temperate Broad - leaved Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Sclerophyllous temperate broad - leaved evergreen shrubland

ALLIANCE *Quercus durata* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Quercus durata* - *Arctostaphylos glandulosa* shrubland association are found at Mt. Tamalpais, in the San Rafael 7.5 minute topographic quad in the mapping areas of GGNRA.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. It is likely that this type of serpentine chaparral occurs elsewhere in the Central California Coast Ranges.

PRNS / GGNRA

Stands of the *Quercus durata* - *Arctostaphylos glandulosa* shrubland association are found at relatively high elevations (2371 - 2532 ft) of Mt. Tamalpais on mid to upper 1 / 3 of moderate to steep, rocky, southeast to southwest facing slopes. Soil textures are coarse loamy sand from serpentine rocks.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Quercus durata*, *Arctostaphylos glandulosa*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Quercus durata*, *Arctostaphylos glandulosa*, *Adenostoma fasciculatum*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association forms dense stands that are dominated by *Quercus durata* - *Arctostaphylos glandulosa* in the shrub layer with continuous cover with 2 - 67% cover at 1 - 2 m tall and 30 - 100% cover at 2 - 5 m tall. Often found in this association is *Iris douglasiana* and *Toxicodendron diversilobum*, *Heteromeles arbutifolia*, *Rhamnus californica*, *Adenostoma fasciculatum*, *Eriodictyon californicum*, and *Baccharis pilularis*. Trees in this association may include shrubby *Umbellularia californica* and young or emergent *Pseudotsuga menziesii*. Other species that contribute to minor cover may include *Quercus chrysolepis*, *Peridium aquilinum*, *Ceanothus cuneatus*, and *Arctostaphylos virgata*. This association is often adjacent to stands of *Arctostaphylos hookeri* ssp. *montana* association, or *Adenostoma fasciculatum* - *Arctostaphylos glandulosa* - *Ceanothus jepsonii* / *Calamagrostis ophitidis* association.

OTHER NOTEWORTHY SPECIES *Arctostaphylos virgata* (Marin Manzanita) a rare species, is occasionally present in stands of this association.

CONSERVATION RANK G3S3?

RANK JUSTIFICATION Although both widespread species, generally *Quercus durata* and *Arctostaphylos glandulosa* do not associate commonly in the California Central coast Ranges. *Quercus durata* is a serpentine indicator and *A. glandulosa* is a widespread species off of serpentine and only locally an indicator of serpentine soils (Kruckeberg 1984).

COMMENTS

PRNS / GGNRA

Plots used to describe this association (n=3): GGNRA258, GGNRA254, GGNRA256

Woolly - Leaf Manzanita Alliance

Woolly - leaf Manzanita (*Arctostaphylos tomentosa*) Alliance - pi code 21450

This alliance is generally considered part of the maritime chaparral and is endemic to the outer coast ranges of central and northern California. It is represented locally by stands on Montara Mountain and in other adjacent areas of the San Francisco Peninsula. The following general description characterizes the alliance including the stands known from the study area.

COMMON NAME	Woolly - leaf Manzanita Maritime Chaparral
SYNONYM	Central Maritime Chaparral, Northern Maritime Chaparral, Poison - oak Chaparral (Holland); Manzanita Series (PSW - 45); Mixed chaparral (Thorne); Mixed Chaparral (WHR)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Temperate Broad - leaved Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Sclerophyllous Temperate Broad - leaved Evergreen
Shrubland	
ALLIANCE	<i>Arctostaphylos tomentosa</i> Shrubland

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Central California Coast and Coastal Ranges. Griffin (1978) describes stands near Fort Ord in Monterey Co.; NDDDB has plot data on file for Contra Costa Co., Fort Ord Military Reservation in Monterey Co., and Burton Mesa in Santa Barbara Co.

PRNS / GGNRA

A single plot of chaparral dominated by Woolly - leaf Manzanita (*Arctostaphylos tomentosa*) was recorded in the mapping area, found in SF Peninsula area, near Montara Mtn., San Mateo County.

ENVIRONMENTAL DESCRIPTION

Globally

Bluffs, dunes, mesas, outcrops, slopes, terraces. Soils sand, sandstone, shale, or volcanic - derived. Elevation sea - level - 1500m.

PRNS / GGNRA

Middle of northeast - facing slope; undulating topography; soil medium to fine sandy loam with abundant litter cover.

MOST ABUNDANT SPECIES

Globally

Tree: *Cercocarpus betuloides*, *Quercus agrifolia*
Shrub: *Arctostaphylos tomentosa*, *Adenostoma fasciculatum*, *Artemisia californica*, *Baccharis pilularis*, *Eriogonum fasciculatum*, *Heteromeles arbutifolia*, *Rhamnus californica*, *Salvia mellifera*, *Toxicodendron diversilobum*

PRNS / GGNRA

Tree: *Quercus agrifolia*
Shrub: *Arctostaphylos tomentosa*, *Toxicodendron diversilobum*

CHARACTERISTIC SPECIES

Globally

Shrub: *Arctostaphylos tomentosa*

PRNS / GGNRA

Shrub: *Arctostaphylos tomentosa*

VEGETATION DESCRIPTION

Globally

Forms of *Arctostaphylos tomentosa* are dominant or important in the shrub canopy with one or more rare *Ceanothus* spp. or *Arctostaphylos* spp.; *Adenostoma fasciculatum*, *Artemisia californica*, *Baccharis pilularis*, *Eriogonum fasciculatum*, *Heteromeles arbutifolia*, *Rhamnus californica*, *Salvia mellifera*, and / or *Toxicodendron diversilobum* may be present. Emergent *Cercocarpus betuloides* and / or *Quercus agrifolia* may be present. Shrubs < 3 m; canopy continuous. Ground layer sparse.

PRNS / GGNRA

Single plot in mapping area with *Arctostaphylos tomentosa* strongly dominant in the shrub canopy with *Toxicodendron diversilobum*. Emergent *Quercus agrifolia* present. Shrubs <5m; canopy continuous; ground layer sparse. Plot adjacent to Oak Woodland and Redwood Alliances.

OTHER NOTEWORTHY SPECIES The following local manzanita are found along central California coast. The CNPS List 1B plants are *Arctostaphylos cruzensis*, *A. edmundsii*, *A. glutinosa*, *A. hookeri* ssp. *hearstiorum*, *A. h. ssp. hookeri*, *A. h. ssp. Montana*, *A. imbricata*, *A. luciana*, *A. montaraensis*, *A. morroensis*, *A. nummularia* var. *sensitiva*, *A. osoensis*, *A. pajaroensis*, *A. pechoensis*, *A. pilosula*, *A. pumila*, *A. purissima*, *A. rudis*, *A. silvicola*, *Arctostaphylos tomentosa* ssp. *bracteosa*, *A. t. ssp. crustacea*, *A.t. ssp. daciticola*, and *A. t. ssp. eastwoodiana*, *A. wellsii*. The CNPS List 4 plants are *A. hooveri* and *A. obispoensis* (CNPS 2001).

Local *Ceanothus* species are also well represented along central California coast: *Ceanothus cuneatus* var. *fascicularis*, *C. c. var. rigidus*, *C. dentatus*, *C. hearstiorum*, *C. impressus*. and *C. maritimus* (a CNPS List 1B plant) (CNPS 2001). Currently we are recognizing stands that have *A. tomentosa* as a consistent component as part of this alliance, even if other species may be the dominant.

CONSERVATION RANK

G2 S2

RANK JUSTIFICATION Many areas of chaparral on the central California coast and Coastal Ranges have concentrations of local, endemic *Arctostaphylos* and *Ceanothus* species. Such areas are often called maritime chaparral. In this alliance, forms of *Arctostaphylos tomentosa* are a common component along with familiar members of other forms of chaparral and coastal scrub. Local stands in the Santa Cruz Mountains (Af), including Montara Mountain within the Golden Gate national Recreation Area, where locally Montara Manzanita (*A. montaraensis*) may be present or even dominate the stands. Stands of Morro Manzanita (Ak) are threatened and management by prescribed fire has proven difficult and tricky (Tyler et al 2000). Stands are restricted to local areas such as Burton Mesa (Davis and Hickson 1988, Odion 1995) where numerous endemic shrub species may occur.

COMMENTS

Globally

The commonly perceived chaparral syndrome of relatively high fire frequencies is not true in many of these coastal stands (see below). Instead the edaphic restriction of stands is often more influential in their maintenance. Many coastal stands are restricted to coarse marine sandstone, Aeolian sand deposits, or fine textured mud and siltstones including the Purissima formation, Monterey Formation, and others (Wells 1962, Norris and Webb 1990).

Natural fire regimes in coastal chaparral are characterized by relatively long intervals between fire events. The evidence for many coastal stands suggests that intervals were commonly > 100 years (Keeley 2002),

however Native American burning may have greatly increased frequencies in some areas. *Arctostaphylos tomentosa* resprouts following fire. However, many of its associated local endemic *Arctostaphylos* are obligate seeders.

Plot - based descriptions: Griffin (1978) describes stands near Fort Ord in Monterey Co.; NDDDB has plot data on file for Contra Costa Co., Fort Ord Military Reservation in Monterey Co., and Burton Mesa in Santa Barbara Co. Golden Gate National Recreation Area sampled a plot near Montara Mtn., San Mateo County (Keeler - Wolf et al. 2002).

Status regionally

Central California Coast (261A): local stands in the Santa Cruz Mountains (Af), including Montara Mountain within the Golden Gate national Recreation Area, where locally Montara Manzanita (*A. montaraensis*) may be present or even dominate the stands. Stands of Morro Manzanita (Ak) are threatened and management by prescribed fire has proven difficult and tricky (Tyler et al 2000). Southern California Coast (261B): Stands are restricted to local areas such as Burton Mesa (Davis and Hickson 1988, Odion 1995) where numerous endemic shrub species may occur.

PRNS / GGNRA

A. tomentosa stands appear to be local in the Montara Mountain area of the study area. Dynamics of similar stands of maritime chaparral (Odeon and Tyler 2002, VanDyke and Hall 2001) suggest careful observation and monitoring of species diversity and colonization trends would be useful to understand optimum management for fire - based regeneration. Most stands of maritime chaparral studied appear to do well with long intervals between fires.

Plot used to define alliance locally (n=1): GGNRA327

Bishop Pine and Mesic Chaparral Mesocluster

Sensitive Manzanita Superalliance

Sensitive Manzanita Alliance

Sensitive Manzanita (*Arctostaphylos nummularia*) Alliance - pi code 21480

This alliance is represented by a single association, found locally only on Bolinas Ridge. The sensitive manzanita alliance is restricted to the outer coast ranges of Central and Northern California from the Santa Cruz Mountains to Mendocino Stands are locally restricted to marine sedimentary rocks and are often surrounded by forest alliance stands on adjacent deeper soils.

Arctostaphylos nummularia var. *sensitiva* - *Vaccinium ovatum* - *Chrysolepis chrysophylla* var. *minor* Association

- pi code 21481

COMMON NAME	Sensitive Manzanita - Huckleberry - Giant Chinquapin Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Temperate Broad - leaved Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Sclerophyllous temperate broad - leaved evergreen shrubland
ALLIANCE	<i>Arctostaphylos nummularia</i> var. <i>sensitiva</i> Shrubland Alliance (putative)

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Similar stands occur in the Santa Cruz Mountains in Big Basin State Park (Hecht et al. 1973). The range of sensitive manzanita is restricted to the Santa Cruz Mountains and the Mount Tamalpais area.

PRNS / GGNRA

Stands of the *Arctostaphylos nummularia* var. *sensitiva* - *Vaccinium ovatum* - *Chrysolepis chrysophylla* shrubland association are mapped only on the Bolinas Ridge portion of the mapping area of **PRNS / GGNRA**.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Golden Gate National Recreation Area and Mt Tamalpais State Park. Information about its global characteristics is not available without additional inventory. Similar stands of *A. nummularia* - dominated chaparral occur in the Santa Cruz Mountains of Santa Cruz and San Mateo Counties (Hect *et al.* 1993)

PRNS / GGNRA

This association is found at moderate elevations (ca. 1600 ft.) on gradual upper slopes and ridge tops with west to southwest aspects. Soil textures range from moderately coarse sandy loam of Franciscan Melange (marine mudstone and siltstone) origin.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Golden Gate National Recreation Area and Mt Tamalpais State Park. Information about its global characteristics is not available without additional inventory. Other stands inventoried in the Santa Cruz Mountains share all three of the **PRNS / GGNRA** abundant species, but have not been quantitatively sampled.

PRNS / GGNRA

Shrub: *Arctostaphylos nummularia* var. *sensitiva*, *Vaccinium ovatum*, *Chrysolepis chrysophylla*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Pteridium aquilinum*

Shrub: *Arctostaphylos nummularia* var. *sensitiva*, *Vaccinium ovatum*, *Chrysolepis chrysophylla*,
Arctostaphylos glandulosa,

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Arctostaphylos nummularia* - *Vaccinium ovatum* - *Chrysolepis chrysophylla* shrubland association is dominated by *Arctostaphylos nummularia* var. *sensitiva*. *Vaccinium ovatum* and *Chrysolepis chrysophylla* contribute to significantly less cover, but are common and constant in this association. *Pteridium aquilinum*, and *Arctostaphylos glandulosa* also constant in this association. *Pickeringia*

Coastal Scrub Supercluster (in part)

Dune Vegetation Mesocluster (in part)

Coyote Brush Alliance (in part)

Coyote Brush (*Baccharis pilularis*) Alliance [in part] - pi code 24050

The Coyote Brush shrubland alliance is the most diverse single alliance in the study area. Because of the way it is defined by the predominance of *B. pilularis* in the shrub layer, and the broad environmental tolerance of that species within the study area, the *B. pilularis* alliance can be expressed in several settings. The following association is the single association within the dune vegetation.

Baccharis pilularis - *Lupinus arboreus* / *Lupinus chamissonis* Association

- pi code 240523

COMMON NAME	Coyote Brush - Yellow Bush and / or Dune Lupine Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	<i>Baccharis pilularis</i> Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Baccharis pilularis* - *Lupinus arboreus* and / or *L. chamissonis* shrubland association are found primarily on stabilized dunes adjacent to the immediate coast in the mapping areas of GGNRA and PRNS.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Baccharis pilularis* - *Lupinus arboreus* and or *L. chamissonis* shrubland association are found at low elevations on 0 - 21 degree slopes of dunes, planes, and mid 1 / 3 of slopes facing southwest to south - southwest. Soil textures range from medium sand of sand dunes to shale. Most stands are on dunes or sand sheets near the immediate coast. They often occupy the so - called "back dune" scrub (e.g., Holland 1986) areas near the interface of upland terraces and bluffs and the dune vegetation.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Bromus diandrus*, *Pteridium aquilinum*, *Vulpia sp.*, *Eschscholzia californica*
Shrub: *Baccharis pilularis*, *Lupinus arboreus*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. *Lupinus arboreus* is an introduced species from Point Reyes north (Pickart and Sawyer 1998), which may or may not occur on sandy substrates. While *L. chamissonis* is largely restricted to sand and is common from Oregon to southern California.

PRNS / GGNRA

Herbaceous: *Bromus diandrus*, *Pteridium aquilinum*, *Vulpia sp.*,
Shrub: *Baccharis pilularis*, *Lupinus arboreus*, *L. chamissonis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Baccharis pilularis* - *Lupinus arboreus* and or *L. chamissonis* shrubland association form an open to intermittent herb layer with 6 - 55% cover at 0 - 25cm tall, 11 - 30% at 25 - 50cm tall, and 10 - 51% cover at 0.5 - 1 m tall and an open to intermittent shrub layer 0 - 65% at 1 - 2 m tall. Average overall cover is 55%. This shrubland association is dominated by *Baccharis pilularis* and *Lupinus arboreus* and *Bromus diandrus*, *Pteridium aquilinum*, *Vulpia sp.*, are also found in this association although they contribute to minor cover. Various other species may also contribute to minor cover, including, *Poa douglasii*, *Cardioniema ramosissimum*, *Eriogonum latifolium*, *Eschscholzia californica*, *Rubus ursinus*, *Bromus carinatus maritimus*, *Marah fabaceus*, *Carpobrotus edulis* (exotic), *Claytonia perfoliata*, *Lotus scoparius*, *Dudleya farinosa*, *Melica imperfecta*, *Osmorhiza chilensis*, *Toxicodendron diversilobum*, *Polypodium californicum* and *Leymus triticoides*. This association is often adjacent to beach communities. *Lupinus arboreus* is a short - lived perennial, which may or may not be present in the stands in vegetative form. *L. chamissonis* is rarely the dominant but is present in 75% of the plots at between 2 and 15% cover.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3S3?

RANK JUSTIFICATION Stands with low exotic species component are rare and stands in general are restricted to the few well developed dune systems along the California coast.

COMMENTS

Globally

PRNS / GGNRA

There is some debate on whether *Lupinus arboreus* is native to Point Reyes. Most floras (Hickman 1993 and Munz 1968) list *L. arboreus* as native from Point Reyes south. The dune front vegetation of the Point Reyes Peninsula has been clearly modified by the presence of *Ammophila arenaria* and *Carpobrotus edulis* (see discussion in Pickart and Sawyer 1998). Local back dune ecology has also potentially been altered by the introduction of *L. arboreus*. It is uncertain whether the clearly native *L. chamissonis* is

affected by the presence of the physically similar *L. arboreus*. However, both do co - occur naturally in coastal dunes of Central and Southern California (Sawyer and Keeler - Wolf 1995).

Plots used to define this association (n=4): PRNS030, GGNRA392, PRNS055, PRNS151

Dune Lupine – Dune Sagewort – Dunegrass Superalliance (in part)

Dune Lupine - Goldenbush Alliance

Dune Lupine - Goldenbush (*Lupinus chamissonis* - *Ericameria ericoides*) Alliance

- pi code 62063

This alliance is represented by a single association in the study area. However, additional variation in the alliance is expressed in two additional plots with the following characteristics: One plot dominated strongly by *Ericameria ericoides* without *L. chamissonis* but with *L. arboreus* (PRNS015) and another without *Ericameria*, but dominated by *L. chamissonis* with *Toxicodendron diversilobum* (PRNS043). It is likely that further sampling will refine the association. The range of this alliance is from Northern California to NW Baja California.

Lupinus chamissonis - *Ericameria ericoides* Association

- pi code 62061

COMMON NAME	Dune Lupine - California Heath - Goldenrod -
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP	Natural
FORMATION	Microphyllous Evergreen Shrubland
ALLIANCE	Lupinus chamissonis - Ericameria ericoides Shrub Alliance

CLASSIFICATION CONFIDENCE LEVEL 3

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is known from Northern and Central California coastal dune systems from Humboldt County to Monterey County..

PRNS / GGNRA

This association is found along the open coast in dunes. Most stands are located north of the Pt. Reyes lighthouse to the tip of Tomales Point. Additional stands occur in the Golden Gate National Recreation area from Rodeo Lagoon to the Baker Beach area of the San Francisco Presedio.

ENVIRONMENTAL DESCRIPTION

Globally

This association occurs on coastal dunes. It has been reported (at the alliance level) from stabilized dunes up and down much of the California coast to at least as far south as Point Conception. (Sawyer and Keeler - Wolf 1995).

PRNS / GGNRA

This association grows on the stabilized dunes of coastal bars, river mouths, spits along coastlines, coastal bluffs and terraces. Stands occur along the summer fog - influenced coast of California and occur on undulating topography.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub *Ericameria ericoides*, *Lupinus chamissonis*
Forb *Cardioniema ramosissimum*, *Monardella undulata* *Poa douglasii*

CHARACTERISTIC SPECIES

Globally

This association is characterized by the presence of the two shrubs *Lupinus chamissonis* and *Ericameria ericoides*. The cover of the two species vary from stand to stand, some stands strongly dominated by one or the other, and some with near equal mixes of the two. Numerous additional species may be present including *Baccharis pilularis*, *Lupinus arboreus*, and *Artemisia pycnocephala* (Sawyer and Keeler - Wolf 1995). Locally *Ericameria* seems to be generally more abundant than *Lupinus chamissonis*.

PRNS / GGNRA

Shrub *Ericameria ericoides*, *Lupinus chamissonis*
Forb *Abronia latifolia*

VEGETATION DESCRIPTION

Globally

This association is typified by a varied mixture of the two characteristic species. Stands always occur on dunes along the coast. In some cases these may be climbing dunes (forced up coastal bluffs by prevailing onshore winds), but typically these are hummocky dunes along low lying coastlines immediately back from the beach. Cover is variable from 10% to over 60%.

PRNS / GGNRA

This shrubland association is characterized by a variable mix of *Ericameria ericoides* and *Lupinus chamissonis*. In most local stands *Ericameria* is the dominant shrub with *L. chamissonis* making up less than half of the total vegetation cover. The shrub canopy is open. Some individuals of *Baccharis pilularis* may be present. Forbs may include *Monardella undulata*, *Gilia capitata* ssp. *chamissonis*, *Camissonia* sp., *Vulpia* sp. (exotic), and / or *Solanum* sp. (exotic). *Poa douglasii* and various exotic graminoids may be present.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G2S2.2

RANK JUSTIFICATION Native coastal dune vegetation is threatened and has been decimated throughout much of California and elsewhere on the Pacific coast. Introduction of invasive non - native species such as *Ammophila arenaria* and *Carpobrotus edulus* have invaded native stands of this association and have altered the physical setting of native dune systems throughout CA (Pickart and Sawyer 1999)

COMMENTS

PRNS / GGNRA

Grazing has impacted many stands of this association.

Plots used to define this association (n=3): PRNS50, PRNS47, GGNRA391

Dense Coyote Brush and Related Scrub Mesocluster

Coyote Brush – California Sagebrush Superalliance

California Sagebrush Alliance

California Sagebrush (*Artemisia californica*) Alliance - pi code 24080

This alliance is poorly represented in the study area. A few plots are strongly dominated by *A. californica* and technically fall within the description. However, most stands have at least some *Baccharis pilularis* in them and are probably more closely related to the *B. pilularis* alliance. The following description will serve as a general characterization of the *Artemisia californica* alliance as it occurs in the study area.

COMMON NAME	California Sagebrush Scrub
SYNONYMS	Central Lucian Coastal Scrub, Diablan Sage Scrub, Northern Coastal Bluff Scrub, Riversidian Upland Sage Scrub, Southern Coastal Bluff Scrub, Venturan Coastal Sage Scrub (Holland); Coastal Bluff Scrub, Sagebrush Scrub, Sagebrush - monkeyflower Scrub (Jones & Stokes); Coastal Sagebrush Series (PSW - 45); Southern Coastal Scrub (Thorne); Coastal Scrub (WHR)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Microphyllous Evergreen Shrubland
ALLIANCE	<i>Artemisia californica</i> Shrubland
CLASSIFICATION CONFIDENCE LEVEL	
USFWS WETLAND SYSTEM	Upland

RANGE

Globally

This association occurs along the Central and Southern California coasts, the Central California Coastal Ranges, the Southern California Mountains and Valleys, the Channel Islands, and also in Baja California.

PRNS / GGNRA

Field crews for the mapping project sampled one stand at Golden Gate National Recreation Area, Marin Co. This alliance reaches its northern - most distribution in Marin Co. and is represented locally on southwest - facing slopes in the Marin Headlands area of GGNRA.

ENVIRONMENTAL DESCRIPTION

Globally

The *Artemisia californica* alliance occurs on steep, south - facing slopes on rarely flooded low - gradient deposits along streams. Soils may be alluvial, colluvial, or bedrock - derived, and shallow to moderately deep.

PRNS / GGNRA

A single plot in the mapping area on gravelly, southwest - facing slope; soil: coarse loamy sand. Local stands appear to transcend to *Baccharis pilularis* alliance (often *B. pilularis* - *Artemisia californica* - *Toxicodendron diversilobum* association) on slightly less exposed and dry sites.

MOST ABUNDANT SPECIES

Globally

Shrub: *Artemisia californica*, *Adenostoma fasciculatum*, *Baccharis pilularis*, *Encelia californica*, *E. farinosa*, *Eriogonum fasciculatum*, *Isocoma menziesii*, *Keckiella cordifolia*, *Lotus scoparius*, *Mimulus aurantiacus*, *Salvia apiana*, *S. leucophylla*, *S. mellifera*, *Toxicodendron diversilobum*, and / or *Yucca whipplei*

PRNS / GGNRA

Shrub: *Artemisia californica*, *Eriophyllum staechadifolium*, *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

Artemisia californica

PRNS / GGNRA

Artemisia californica

VEGETATION DESCRIPTION

Globally

Artemisia californica is dominant in the shrub canopy; *Adenostoma fasciculatum*, *Baccharis pilularis*, *Encelia californica*, *E. farinosa*, *Eriogonum fasciculatum*, *Isocoma menziesii*, *Keckiella cordifolia*, *Lotus scoparius*, *Mimulus aurantiacus*, *Salvia apiana*, *S. leucophylla*, *S. mellifera*, *Toxicodendron diversilobum*, and / or *Yucca whipplei* may be present. Emergent *Rhus integrifolia*, *Quercus douglasii*, or *Sambucus mexicana* trees may be present. Shrubs < 2 m; canopy continuous or intermittent. Ground layer variable.

PRNS / GGNRA

Artemisia californica dominant in the shrub canopy; *Eriophyllum staechadifolium* significant, *Baccharis pilularis* present. Shrubs <1m; ground layer sparse.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G4S4

RANK JUSTIFICATION The alliance is widespread in central and southern coastal California.

COMMENTS

Globally

This alliance is often considered part of the coastal scrub that is better thought of as a collection of alliances. This approach allows comparison of stands of similar composition regardless of geographic location. Coast bluff scrub descriptions of most authors are included here. In general, *Artemisia californica* is a central and southern California alliance, ranging into northern Baja California. Stands of the alliance become less extensive northward along the coast. Northern - most stands may occur in the Diablo Range of Alameda Co. Stands along the immediate coast tend to become mixed with *Baccharis pilularis* and are better called the *Artemisia californica* - *Baccharis pilularis* alliance and the northern most outer coast range stands of this alliance are probably in southern Marin County.

Keeler - Wolf (1990e) qualitatively describes *Artemisia californica* stands at Limekiln Creek RNA (now part of the Cone Peak Gradient RNA) in Monterey Co.

Status Regionally:

Central California Coast (261A): common in the Santa Lucia Mountains primarily above and inland of the zone of summer fog

Southern California Coast (261B): Widespread throughout the LA Basin, the Orange County Coast and coastal San Diego County, also common in the Santa Monica Mountains and other parts of coastal Ventura and Santa Barbara counties.

Central California Coastal Ranges (M262A): common in the Diablo Range, and the inner coast ranges of San Benito, Monterey and San Luis Obispo counties. Often interfaces with *Salvia mellifera* and *Eriogonum fasciculatum* alliance stands, also often adjacent to *Quercus agrifolia* and less commonly with *Q douglasii* alliance stands, also frequently associates with *Bromus - Avena* annual grassland alliance stands. Southern California Mountains and Valleys (M262Ba): Common. Inland forms tend to associate with *Salvia apiana*, *Encelia farinosa*, and *Eriogonum fasciculatum* alliance stands; and coastal forms tend to associate with *Salvia leucophylla* or *Eriogonum cinereum* stands.

PRNS / GGNRA

Further sampling may identify association level stands in the southern portion of the study area. The relationships with the adjacent *Baccharis pilularis* and *Baccharis pilularis - Artemisia californica* stands need to be clarified. The Borchart et al. (2000) treatment of their mixed *Baccharis pilularis - Artemisia californica* alliance may have warrant locally for such stands.

Plots used to define the alliance locally (n=2): GGNRA309, GGNRA263

Coyote Brush Alliance (in part)

Coyote Brush (*Baccharis pilularis*) Alliance (in part) - pi code 24050

This portion of the Coyote Brush alliance is characterized by stands with high shrub cover. It contains the highest diversity of associations of the alliance. It is more ecologically closely related to local stands of *Ceanothus thyrsiflorus*, *Rhamnus californica*, *Prunus illicifolia*, and *Toxicodendron diversilobum* alliances than to other stands of *Baccharis pilularis* on dunes or moist coastal grasslands. See discussion of the alliance under dune vegetation, drier coastal grassland / open scrub, and moist coastal grassland for additional information on this alliance. This alliance is endemic to California, found primarily in the outer coast ranges from Humboldt to San Diego County, but best represented in central coastal California. The recent work by Borchart et al (2000) suggests that *Baccharis pilularis - Artemisia californica - Toxicodendron diversilobum / Monardella villosa* Shrubland association included herein may better be coandered part of a *B. pilularis - Artemisia californica* alliance. However, we are taking the conservative approach here until further information about the relationship between *B. pilularis* and *Artemisia californica* is clarified elsewhere.

***Baccharis pilularis - Artemisia californica - Toxicodendron diversilobum / Monardella villosa* Association**
- pi code 24051

COMMON NAME	Coyote Brush - Coastal Sagebrush - Pacific Poison Oak / Coyote Mountain balm Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Microphyllous evergreen shrubland
ALLIANCE	<i>Baccharis pilularis</i> Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Anecdotal observation of this association by

Todd Keeler - Wolf (personal communication June 20001) supports the occurrence of this association from the Vicinity of Point Reyes south to at least Central Monterey County. Similar associations with *Baccharis pilularis* and *Artemisia californica* as main components have been noted as far south as Los Angeles County (Heady et al 1977, Kirkpatrick and Hutchinson 1977)

PRNS / GGNRA

This association is widespread throughout the **PRNS / GGNRA** planning area. Over 200 polygons of this association are mapped.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only positively known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association grows on moderate, east south, southwest, or west - facing slopes. Stands are found from the lower to upper third of the slope. Soils vary from clay to coarse, loamy sand.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only positively known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub *Baccharis pilularis*, *Artemisia californica*, *Toxicodendron diversilobum*
Forb *Monardella villosa* ssp. *villosa*, *Eriophyllum staechadifolium*

VEGETATION DESCRIPTION

Globally

This association is only known positively from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

The shrub canopy of this association is dominated by either *Baccharis pilularis* or *Artemisia californica*. *Toxicodendron diversilobum* can also be very important. The canopy is open to continuous, and 1 - 2 meters in height. The subshrubs *Monardella villosa* ssp. *villosa* and *Eriophyllum staechadifolium* are often present at low cover values. The herbaceous layer is very diverse and can include *Clinopodium douglasii*, *Maianthemum stellatum*, *Briza minor* (exotic), *Sanicula crassicaulis*, *Diplacus aurantiacus* and / or *Stachys ajugoides*.

OTHER NOTEWORTHY SPECIES Shrub *Dirca occidentalis*, a CNPS list 4 plant (Skinner and Pavlik, 1994) is sometimes found within this association.

CONSERVATION RANK G4 S4

RANK JUSTIFICATION There are over 200 stands of this association mapped within the **PRNS / GGNRA** mapping area.

COMMENTS

PRNS / GGNRA

Plots used to define this association (n=7): GGNRA303 , GGNRA347, GGNRA288, GGNRA348, GGNRA270, PRNS099, GGNRA319

Baccharis pilularis / Dudleya farinosa Association

- pi code 24069

COMMON NAME	Coyote Brush - Cliff Lettuce Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland

ALLIANCE *Baccharis pilularis* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. . Similar vegetation sharing many of the same species has been found throughout central and northern coastal California from Monterey County to Mendocino County (Keeler - Wolf, personal observation 1991 - 2001).

PRNS / GGNRA

Stands of *Baccharis pilularis / Dudleya farinosa* shrubland association are found on coastal bluffs and climbing dunes on the Point Reyes Peninsula and perhaps in other parts of the mapping area such as Fort Funston and Marin Headlands.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory

PRNS / GGNRA

Stands of *Baccharis pilularis / Dudleya farinosa* shrubland association are found at low elevations on the mid to upper 1 / 3 of southeast to southwest facing, 31 - 45degree slopes. Soil textures range from fine silty clay to sand and are of shale or conglomerate parent material. Stands are immediately adjacent to the coast on bluffs of sedimentary rock or on sand dunes and sheets that have been blown up on headlands from prevailing onshore salt - laden winds.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Dudleya farinosa*, *Eriophyllum staechadifolium*, *Vulpia sp.*, *Bromus carinatus*, *Bromus diandrus*, *Carpobrotus edulis*, *Gnaphalium purpureum*, *Hypochaeris radicata*, *Lolium perenne*, *Plantago erecta*

Shrub: *Baccharis pilularis*, *Lupinus arboreus*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Much of the Northern Coastal Bluff scrub vegetation of Holland (1986) is equivalent to this association)

PRNS / GGNRA

Stands of *Baccharis pilularis* / *Dudleya farinosa* shrubland association form an intermittent to continuous herb layer with 51 - 75% cover at 0 - 25 cm tall and a short shrub layer of 14 - 25% cover at 25 - 50 cm tall. This association is dominated by *Baccharis pilularis* in its low prostrate form (formerly known as *B. pilularis* var. *pilularis*) and characterized by the succulent rosette herb *Dudleya farinosa*. The stands also include the low shrubs *Eriophyllum staechadifolium* and *Lupinus arboreus*, and a number of herbaceous species including *Vulpia sp.*, *Bromus carinatus*, *Carpobrotus edulis*, *Bromus diandrus*, *Gnaphalium purpureum*, *Hypochaeris radicata*, *Lolium perenne*, *Plantago erecta*, which contribute to minor cover. A variety of other species may be found in this association including *Iris douglasiana*, *Nassella pulchra*, *Chlorogalum pomeridianum*, *Elymus glaucus*, *Erigeron glaucus*, *Fragaria chiloensis*, *Pinus radiata*, *Phacelia californica*, *Anagallis arvensis*, *Eriogonum latifolium*, *Festuca rubra*, and *Grindelia stricta*. This association is often found adjacent to disturbed grassland associations, but may also occur near denser, taller associations of *Baccharis pilularis* alliance, in particular the *B. pilularis* - *Eriophyllum staechadifolium* association. This association is found at low elevations on the mid to upper 1 / 3 of southeast to southwest facing, 31 - 45degree slopes. Soil textures range from fine silty clay to sand and are of shale, dune, or conglomerate parent material.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3S3?

RANK JUSTIFICATION Intact coastal bluff scrub equating to this association is relatively rare in CA due to human development and invasion from exotics.

COMMENTS

Globally

PRNS / GGNRA

The stands sampled locally suggest that this association is relatively heavily besieged with invasive exotics.

Plots used to define this association (n=2): PRNS194, PRNS036

***Baccharis pilularis* - *Eriophyllum staechadifolium* Association**

- pi code 24060

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Descriptions

COMMON NAME	Coyote Brush - Seaside Woolly Sunflower Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	<i>Baccharis pilularis</i> Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. It was described from the Northern Coast of California by Baxter (1992) and reported by Sawyer and Keeler - Wolf (1995). This association has been identified as far south as Monterey County, but Marin County appears to be its northern limit (Keeler - Wolf personal observation).

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Eriophyllum staechadifolium* shrubland association are scattered throughout the coastal portion of the mapping areas of GGNRA and PRNS. Most stands are in Golden Gate National Recreation Area including the Marin Headlands and the Presidio - Baker Beach units.

ENVIRONMENTAL DESCRIPTION

Globally

This association is a coastward expression of the *Baccharis pilularis* alliance. The character species, *Eriophyllum staechadifolium* is largely restricted to bluffs and slopes within a short distance of the open ocean coast. Stands are commonly exposed to strong onshore winds and are often bathed in fog by salt-laden winds much of the year.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Eriophyllum staechadifolium* shrubland association are found at low elevations of linear, lower to mid 1 / 3 of 20 - 31 degree slopes with north to northwest aspects. Soil textures range from moderately fine sandy clay loam to moderately coarse sandy loam over shale or silty mudstone.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Fragaria chiloensis*, *Satureja douglasii*, *Pteridium aquilinum*, *Mimulus aurantiacus*, *Toxicodendron diversilobum*, *Rhamnus californica*, *Artemisia californica*

Shrub: *Baccharis pilularis*, *Eriophyllum staechadifolium*,

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Satureja douglasii*, *Pteridium aquilinum*, *Mimulus aurantiacus*, *Erigeron glaucus*, *Rubus ursinus*, *Toxicodendron diversilobum*, *Holcus lanatus*, *Fragaria chiloensis*, *Rhamnus californica*, *Artemisia californica*

Shrub: *Baccharis pilularis*, *Eriophyllum staechadifolium*

VEGETATION DESCRIPTION

Globally

This association appears to be similar in composition to the locally described stands wherever it occurs (see PRNS - GOGA description below).

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Eriophyllum staechadifolium* shrubland association vary in structure forming an open to intermittent herb layer of 2 - 60% cover at 0 - 25 cm tall, 11 - 30% cover at 25 to 50 cm tall 15 - 35% at 0.5 to 1 m tall and 0 - 90% cover at 1 - 2 m tall. Average total vegetation cover is 85%. This association is dominated by *Baccharis pilularis* and *Eriophyllum staechadifolium* and includes *Satureja douglasii*, *Pteridium aquilinum*, *Mimulus aurantiacus*, *Erigeron glaucus*, *Rubus ursinus*, *Toxicodendron diversilobum*, and *Holcus lanatus*. It may also include, *Fragaria chiloensis*, *Rhamnus californica*, and *Artemisia californica*.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3S3

RANK JUSTIFICATION Stands occupy a narrow coastal strip with relatively small total area, from south - Central to north - central California. Many stands are affected by invasive exotics such as *Cortaderia* spp. (Pampas grass), *Holcus lanatus* (velvet grass), *Carpobrotus edulus* (iceplant) and other species.

COMMENTS

PRNS / GGNRA

Plots used to define this association in addition to Baxter (1992), (n=2): GGNRA259, PRNS098

***Baccharis pilularis* - *Corylus cornuta* Association (preliminary)**

- pi code 24066 Insufficient relevé plots to describe this association, currently rolled into classification hierarchy with *Baccharis pilularis* - *Rhamnus californicus* - *Rubus parviflorus* Association - pi code 24055)

Coyote Brush – Blue Blossom Superalliance

Coyote Brush Alliance (in part)

***Baccharis pilularis* - *Ceanothus thyrsiflorus* Association**

- pi code 24054

COMMON NAME	Coyote Brush - Blue Blossom Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural

FORMATION Lowland microphyllous evergreen shrubland

ALLIANCE *Baccharis pilularis* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Ceanothus thyrsiflorus* shrubland association are found throughout the Montara Mountain and Bolinas topographic quads of the mapping areas of GGNRA. It has also been observed on the southern portion of Point Reyes Peninsula.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Ceanothus thyrsiflorus* shrubland association are found at low elevations on 4 - 24 degree slopes with north to northwest facing slopes. Soil textures range from moderately coarse sandy loam to moderately fine sandy clay loam. Stands on Point Reyes were affected by the 1995 Mt. Vision fire and have young individuals of *C. thyrsiflorus* and resprouts of *B. pilularis*.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*, *Ceanothus thyrsiflorus*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*, *Ceanothus thyrsiflorus*

VEGETATION DESCRIPTION

Globally

This association is only known from the Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Ceanothus thyrsiflorus* shrubland association form an open to continuous herb layer with 4 - 40% cover at 0 - 25 cm tall, 5 - 40% cover at 25 - 50 cm tall, and 1 - 25% cover at 0.5 - 1 m tall, an intermittent to continuous shrub layer with 35 - 90% at 1 - 2 m tall and sometimes and open tree layer with 1 - 5% cover at 5 - 10m tall. It is dominated by *Baccharis pilularis* and *Ceanothus*

thyrsiflorus, *Toxicodendron diversilobum* is usually present and a variety of other species found in this association may include *Bromus hordeaceus*, *B. carinatus*, *Chlorogalum pomeridianum*, *Satureja douglasii*, *Sanicula crassicaulis*, *Pseudotsuga menziesii*, *Rhamnus californica*, *Rubus ursinus* or *R. parviflorus*, and *Marah fabaceus*. This association is frequently found adjacent to *Baccharis pilularis* - *Toxicodendron diversilobum* association stands. This association is found at low elevations on 4 - 24 degree slopes with north to northwest facing slopes. Soil textures range from moderately coarse sandy loam to moderately fine sandy clay loam

OTHER NOTEWORTHY SPECIES *Arctostaphylos montaraensis*, a rare species is found at one of the six plots (GGNRA368).

CONSERVATION RANK G3S3?

Plots used to define this association (n=6): GGNRA340, GGNRA382, GGNRA266, GGNRA368, GGNRA297, GGNRA374

Blue Blossom Alliance

Blueblossom (*Ceanothus thyrsiflorus*) Alliance

- pi code 20020

This alliance is represented in the study area by two associations. The *Ceanothus thyrsiflorus* - *Baccharis pilularis* - *Toxicodendron diversilobum* Association is more closely related to the coastal scrubs with high *Baccharis pilularis* cover and the *Ceanothus thyrsiflorus* - *Vaccinium ovatum* - *Rubus parviflorus* Association occurs within the vicinity of stands of *Pinus muricata* and *Pseudotsuga menziesii* alliance and appears to largely represent a post - fire association following the Mt. Vision Fire. The range of this alliance is from Humboldt County to Monterey County along the outer coast ranges of California.

***Ceanothus thyrsiflorus* - *Baccharis pilularis* - *Toxicodendron diversilobum* Association**

- pi code 20021

COMMON NAME	Blueblossom - Coyote Brush - Poison oak Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad - leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Hemi - sclerophyllous temperate broad - leaved evergreen shrubland

ALLIANCE *Ceanothus thyrsiflorus* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 3

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Stands of the *Ceanothus thyrsiflorus* Shrubland Alliance occur from the central California coast to Oregon and inland to the lower elevations of the Klamath ranges. It is likely that this association occurs along the coastal strip of Northern and Central California, however, no plot data exist beyond the confines of **PRNS / GGNRA**. A description of *Ceanothus thyrsiflorus* alliance stands from the Cone Peak Gradient Research Natural Area (Keeler - Wolf 1990) likely substantiates the existence of this association as far south as central Monterey County.

PRNS / GGNRA

Stands of the *Ceanothus thyrsiflorus* - *Baccharis pilularis* - *Toxicodendron diversilobum* shrubland association are found throughout the mapping area of **PRNS / GGNRA**. Stands generally occur below 600 ft elevation and within 2 miles of the coast, well within the summer fog belt.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. However, likely stands occur throughout the coastal strip of Northern and Central California. This is a low elevation scrub tied to foggy coasts. It occurs within the main distribution of the *Baccharis pilularis* alliance and is usually within sight of the ocean.

PRNS / GGNRA

This association is found at low elevation on middle to upper slopes. Most stands are within 1 - 2 miles from the open coast. Aspects are generally north and east.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Shrub: *Ceanothus thyrsiflorus*, *Baccharis pilularis*, *Toxicodendron diversilobum*, *Rubus ursinus*,
Herbaceous: *Pteridium aquilinum*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Shrub: *Ceanothus thyrsiflorus*, *Rubus ursinus*, *Toxicodendron diversilobum*, *Baccharis pilularis*

VEGETATION DESCRIPTION

This vegetation includes stands co - dominated by *Ceanothus thyrsiflorus* and *Rubus ursinus* with 35% - 100% cover provided by the two dominant species. *Baccharis pilularis* and *Toxicodendron diversilobum* fill out the shrub canopy. The canopy is between 1 - 2 meters in height, but emergent individuals may be present. *Pteridium aquilinum* and a wide variety of herbaceous species contribute minor cover.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4?

RANK JUSTIFICATION Within the **PRNS / GGNRA** area the mapping unit for this association has 54 mapped occurrences. The parent alliance is also ranked G4.

DATABASE CODE To be determined

COMMENTS

Globally

We suggest that this association may be one of the most common associations of this alliance in the cool coastal strip of northern and central California.

PRNS / GGNRA

One stand sampled in the San Francisco Municipal Watershed lands of the southern portion of the mapping area (GGNRA321) has a high cover of *Heteromeles arbutifolia* (20%). It is possible that there is further

variation in this association that has not been sampled in this southern area. This association is being influenced by exotic species.

Plots used to define this association (n=3): PRNS078, PRNS070, GGNRA321

Ceanothus thyrsiflorus* - *Vaccinium ovatum* - *Rubus parviflorus
- pi code 20022

COMMON NAME	Blueblossom - Black Huckleberry - Thimbleberry Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad - leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Hemi - sclerophyllous temperate broad - leaved evergreen shrubland

ALLIANCE *Ceanothus thyrsiflorus* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 3

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Stands of the *Ceanothus thyrsiflorus* Shrubland Alliance occur from the central California coast to Oregon and inland to the lower elevations of the Klamath ranges. This association is likely to occur elsewhere in the range, but is unconfirmed outside the **PRNS / GGNRA** area

PRNS / GGNRA

Stands of the *Ceanothus thyrsiflorus* - *Vaccinium ovatum*—*Rubus parviflorus* shrubland association appear to be locally restricted to the Inverness Ridge portion of the Point Reyes Peninsula.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found at higher elevation on granitic slopes of Inverness Ridge. Most stands are the result of the 1995 Mount Vision Fire. *Ceanothus thyrsiflorus* is an obligate seeding species, which dominates areas a few years after fire. These stands were part of the *Pinus muricata* alliance stands prior to the Mt Vision fire. The characteristic species: *Rubus parviflorus* and *Vaccinium ovatum* are both common understory species in the unburned portions of the *Pinus muricata* alliance. Field notes on the plots sampled in 1997 suggest that the *Ceanothus* and associated shrubs were still rapidly growing and most were less than 2 m in height. Aspects are generally north and east.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Shrub: *Ceanothus thyrsiflorus*

Herbaceous: *Erechtites minima* (exotic), *Pteridium aquilinum*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global species composition is not available without additional inventory.

PRNS / GGNRA

Shrub: *Ceanothus thyrsiflorus*, *Vaccinium ovatum*, *Rubus parviflorus*

VEGETATION DESCRIPTION

This vegetation includes stands dominated by *Ceanothus thyrsiflorus* forming a fairly open shrub canopy between 1 - 2 meters in height. The understory may contain *Chrysolepis chrysophylla* var. *minor*, *Pteridium aquilinum*, *Gaultheria shallon*, *Erechtites minima* and a wide variety of herbaceous species contributing minor cover. The two other characteristic species; *Vaccinium ovatum* and *Rubus parviflorus* occur in low cover, but may increase following resprouting from fire.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3S3?

RANK JUSTIFICATION This is a temporally defined type (fire - following) apparently of limited distribution.

Within the **PRNS / GGNRA** area the association seems restricted to higher elevation or moister sites than the more common *Ceanothus thyrsiflorus* - *Baccharis pilularis* - *Toxicodendron diversilobum* association. The parent alliance is also ranked G4.

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

This association is not mapped because the air photos were taken too close to the date of the fire to detect it.

Plots used to define this association (n=2): PRNS057 PRNS176

Mature Coyote Brush – Coffeberry – Poison Oak Superalliance

Coyote Brush Alliance (in part)

***Baccharis pilularis* - *Rhamnus californica* - *Rubus parviflorus* Association**

- pi code 24055

COMMON NAME	Coyote Brush - Coffeeberry - Thimbleberry Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland

ALLIANCE

Baccharis pilularis Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM

Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore and the Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Rhamnus californica* - *Rubus parviflorus* shrubland association are found throughout the Montara Mountain 7.5 minute topographic quad within the mapping areas of GGNRA.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Rhamnus californica* - *Rubus parviflorus* shrubland association are found at moderate elevations (samples taken from 1423 - 1561ft., but observed as low as 300 ft.) on 0.5 - 10degree slopes with southeast facing slopes. Soil textures range from medium to very fine sandy loam to moderately coarse sandy loam. Most of these stands occur on ridges within the summer fog belt and may receive substantial additional moisture from fog drip. This is a late seral stage of *Baccharis pilularis* alliance. Notes for the sample plots suggested that these stands had not been disturbed for many years. This is also in keeping with the model of *Baccharis* transition states into a *Rhamnus californica* alliance in moist foggy coastal areas of the study area.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*, *Rhamnus californica*, *Toxicodendron diversilobum*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*, *Rhamnus californica*, *Rubus parviflorus*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Rhamnus californica* - *Rubus parviflorus* shrubland association forms an open herb layer with 5 - 17% cover at 0 - 25 cm tall and 5 - 15% cover at 25 - 50 cm tall, and a open to continuous shrub layer with 13 - 15% cover at 0.5 - 1 m tall, 70 - 85% cover at 1 - 2 m tall, and 0 - 8%

cover at 2 - 5 m tall. It is dominated by *Baccharis pilularis*, *Rhamnus californica*, and *Rubus parviflorus*. *Scrophularia californica*, *Rubus ursinus*, *Heracleum lanatum*, *Pteridium aquilinum*, *Satureja douglasii*, *Vaccinium ovatum* and *Toxicodendron diversilobum* are usually also present. Other species that may be present are *Ceanothus palmeri*, *Mimulus aurantiacus*, and *Polystichum munitum*.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G2S2?

RANK JUSTIFICATION This association appears to be relatively uncommon in the study area, particularly notable in the Montara Mountain area of the southern portion of GOGA. It has not been inventoried from any other portion of the range of *Baccharis pilularis* alliance.

COMMENTS

PRNS / GGNRA

Plots used to define this association (n=2): GGNRA355, GGNRA369

***Baccharis pilularis* - *Holodiscus discolor* Association**

- pi code 24070

COMMON NAME	Coyote Brush - Oceanspray Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland

ALLIANCE *Baccharis pilularis* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Holodiscus discolor* shrubland association are found within the 7.5 minute topographic quads of Point Bonita and Montara Mountain within the mapping areas of GGNRA.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Holodiscus discolor* shrubland association are found at low elevations (190 - 962 ft) on 16 - 31 degree slopes with southeast to north - northwest aspects. This association is found on the middle 1 / 3 to the entire convex to concave slopes. Soil textures range from medium to very fine sandy loam to moderately coarse, sandy loam from sandstone. This is a mesophytic association that, if found on southerly exposures is usually found on concave slopes.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Festuca rubra*, *Mimulus aurantiacus*

Shrub: *Baccharis pilularis*, *Holodiscus discolor*, *Toxicodendron diversilobum*, *Quercus agrifolia*,
Rhamnus californica, *Rubus ursinus*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Mimulus aurantiacus*

Shrub: *Baccharis pilularis*, *Holodiscus discolor*

VEGETATION DESCRIPTION

Globally

This association is only known from the Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Holodiscus discolor* shrubland association vary in structure with 5 - 40% cover at 0 - 25 cm tall, 7 - 40% cover at 25 cm tall, 10 - 25% cover at 0.5 - 1 m tall, 0 - 50% at 1 - 2 m tall, and 0 - 45% cover at 2 - 5 m tall. This association is dominated by *Baccharis pilularis* (14 - 35% cover) and *Holodiscus discolor* (3 - 20% cover) and usually includes *Toxicodendron diversilobum*, *Rhamnus californica*, *Rubus ursinus*, *Mimulus aurantiacus*. *Festuca rubra* may be a common grass and *Quercus agrifolia* may also be very common as a low wind - swept shrub. A variety of other species may be found including *Corylus cornuta*, *Festuca californica*, *Lonicera hispidula*, *Eriophyllum staechadifolium*, *Heraclium lanatum*, *Stachys bullata*, *Umbellularia californica*, *Symphoricarpos mollis*, *Satureja douglasii*, and *Pteridium aquilinum*. This association appears to occur adjacent to wooded or forested alliance stands and may represent the transition between *Baccharis pilularis* alliance and various coastal forests such as *Quercus agrifolia*, *Umbellularia californica*, and *Pseudotsuga menziesii* alliances. Such common shrubs in this *B. pilularis* - *Holodiscus discolor* association as *Corylus cornuta* and *Holodiscus discolor* are also common associates of these forest alliances. Many individuals of the aforementioned trees are stunted in these stands, the result of salt - laden winds.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G3S3?

RANK JUSTIFICATION Uncertain distribution beyond the study area.

COMMENTS

PRNS / GGNRA

Plots used to define this association (n=3): GGNRA271, GGNRA337, GGNRA380

***Baccharis pilularis* / *Polystichum munitum* Association**

- pi code 24053

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Discriptions

COMMON NAME Coyote Brush - Sword Fern Shrubland Association
SYNONYM None
PHYSIOGNOMIC CLASS Shrubland
PHYSIOGNOMIC SUBCLASS Evergreen Shrubland
PHYSIOGNOMIC GROUP Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP Natural / Semi - Natural
FORMATION Lowland microphyllous evergreen shrubland

ALLIANCE *Baccharis pilularis* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Grams *et al.* (1977) also notes this association from the Point Reyes Peninsula.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Polystichum munitum* shrubland association are found in the coastal areas of Point Reyes Peninsula and the Marin Headlands unit of GOGA. It has not been inventoried from other portions of the study area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Polystichum munitum* shrubland association are found at low elevations on 19 - 25 degree, north facing slopes and are found on the middle to the entire sides of slopes. Soil textures range from medium to very fine sandy loam to moderately coarse sandy loam of granitic origin. These stands are currently unknown off of granitic substrate. These stands are often adjacent to other forms of *Baccharis pilularis* alliance such as *B. pilularis* - *Toxicodendron diversilobum* (on adjacent westerly or easterly - facing slopes), *B. pilularis* - *Artemisia californica* / *Monardella villosa* (on southerly - facing slopes), or *B. pilularis* - *Ceanothus thyrsiflorus* (on neutral slopes). On adjacent bottomland *Salix lasiolepis*, *Rubus spectabilis*, *Salix lasiolepis* / *Rubus* sp. and *Alnus rubra* / *Sambucus racemosa* associations may occur. This association appears to have the capacity to develop following regrowth of *B. pilularis* alliance after clearing of north - facing exposures for pasture. Some stands near Drakes Estero (Johnson's Oyster Farm) were cleared in the early part of this century. It is likely that this association may further proceed without disturbance to the *B. pilularis* - *Holodiscus discolor* or *B. pilularis* - *Rhamnus californica* - *Rubus parviflorus* associations, depending on microclimate and geographic location.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herb: *Polystichum munitum*

Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herb: *Polystichum munitum*

Shrub: *Baccharis pilularis, Toxicodendron diversilobum, Rubus parviflorus, Rubus ursinus*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Polystichum munitum* shrubland association form an open herb layer with 6 - 15% cover at 0 - 25 cm tall and 9 - 20% cover at 25 - 50 cm tall, and an intermittent shrub layer with 50 - 65% cover at 0.50 - 1 m tall, and 51 - 57% cover at 1 - 2 m tall. The overall affect is a dense two tiered shrubland with *B. pilularis* forming the dominant overstory and *Polystichum munitum* the dominant understory. Also present in this association is *Agrostis pallens, Erechites minima, Pteridium aquilinum, Stachys ajugoides, Holodiscus discolor, Iris douglasiana, Toxicodendron diversilobum, Rubus parviflorus, Rubus ursinus, Smilacina stellata, Heracleum lanatum, Holcus lanatus, Marah fabaceus, Satureja douglasii* and *Scrophularia californica*. Other species that may be present are *Calamagrostis nutkaensis, Berberis pinnata, Galium californicum, Rhamnus californica, and Elymus californicus*.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3S3?

RANK JUSTIFICATION Stands are restricted to northerly exposures and are relatively late - seral. They are only known from the mapping area at this time.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Plots used to define this association in addition to Grams (1977), (n=2): PRNS170, PRNS182

***Baccharis pilularis* - *Toxicodendron diversilobum* Association**

- pi code 24059

COMMON NAME	Coyote Brush - Pacific Poison Oak Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Mixed evergreen - deciduous shrubland
PHYSIOGNOMIC GROUP	Mixed evergreen - cold - deciduous shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Mixed evergreen - cold - deciduous shrubland
ALLIANCE	<i>Baccharis pilularis</i> Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM

Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global range is not available without additional inventory. It is likely that this association is widespread in coastal California from near the Oregon border south to at least the vicinity of Santa Barbara.

PRNS / GGNRA

This association is widespread throughout the **PRNS / GGNRA** mapping area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association grows on gentle to moderately steep slopes of all aspects and all upland slope positions. Soils are generally medium to fine sandy loams. This is probably the most abundant association of *Baccharis pilularis* alliance in the **PRNS / GGNRA** mapping area. It is found from the immediate coast to several miles inland, usually within the influence of the summer fog belt. It is usually dense in cover and appears to be present in moderately young to moderately old stands of the alliance. The progression of *B. pilularis* associations in the area ranges from the invasive open grassy stands including the *Baccharis pilularis* - *Rubus ursinus* association, to old thick stands that are co - dominated with *Rhamnus californica* ssp. *californica* (California coffeeberry). The stands of *B. pilularis* - *Toxicodendron diversilobum* association appear to occupy the modal representation of temporal development of stands of this alliance.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*, *Toxicodendron diversilobum*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*, *Toxicodendron diversilobum*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this association are heavily dominated by *Baccharis pilularis* and *Toxicodendron diversilobum*, which typically combine for more than 50% cover. The shrub canopy is usually between 1 - 2 meters in height. Other shrubs present often include *Rubus ursinus* and / or *Heteromeles arbutifolia*. The herbaceous layer is diverse and often includes *Pteridium aquilinum*, *Aira caryophyllea* (exotic), and / or *Heracleum*

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Discriptions

maximum. Many graminoids can be present like *Holcus lanatus* (exotic), *Bromus hordeaceus* (exotic), *Nassella lepida*, and / or *Nassella pulchra*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G5S5?

RANK JUSTIFICATION There are hundreds of stands of this association mapped in the **PRNS / GGNRA** study area and it is likely to be widespread beyond the mapping area.

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

Exotics are an important impact to this association.

Plots used to define this association (n=17): PRNS021, PRNS063, GGNRA312, GGNRA377, GGNRA360, PRNS010, PRNS155, GGNRA373, PRNS 154, PRNS109, PRNS025, PRNS164. PRNS107, GGNRA351, GGNRA346, GGNRA315, PRNS053

California Coffeeberry Alliance

***Rhamnus californica* Alliance**

- pi code 21460

This alliance was defined from the data collected in this study and so far as is currently known restricted to the vicinity of the study area from Point Reyes Peninsula to the Montara Mountain area. It is represented by a single association.

***Rhamnus californica* - *Baccharis pilularis* / *Scrophularia californica* Association**

- pi code 21461

COMMON NAME California Coffeeberry - Coyote Brush / California Figwort
Shrubland

SYNONYM None

PHYSIOGNOMIC CLASS Shrubland

PHYSIOGNOMIC SUBCLASS Evergreen Shrubland

PHYSIOGNOMIC GROUP Temperate broad - leaved evergreen shrubland

PHYSIOGNOMIC SUB GROUP Natural / Semi - natural

FORMATION Temperate broad - leaved evergreen shrubland

ALLIANCE To be determined

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Our expectation is that this is a common association along the immediate coast of Northern California from Santa Cruz county north to Humboldt County.

PRNS / GGNRA

Stands of this association are found throughout the **PRNS / GGNRA** mapping area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association grows on moderate north and east facing slopes, from the lower to upper third of the slope. Stands prefer soils which retain moisture much of the year such as moderate sandy loams. This association is likely the result of a transition from late seral associations of *B pilularis* alliance such as *Baccharis / Polystichum* or *Baccharis / Rhamnus - Rubus parviflorus* stands into *Rhamnus californica* alliance stands if undisturbed for several years. It appears that *Rhamnus californica* does not colonize disturbed *B. pilularis* stands for many years and typically occupies stands in relatively mesic sites such as northerly facing slopes. It is uncertain what happens to relatively old *Rhamnus californica* ssp. *californica* - *Baccharis pilularis / Scrophularia californica* association stands following fire or other disturbance. *Rhamnus* will resprout vigorously following fire (McMurray, 1990). *Baccharis pilularis* has a variable response depending on intensity, resprouting more vigorously when burned in low to moderate intensity fires (Keeler - Wolf personal observation). It appears that the oldest stands are those most strongly dominated by *Rhamnus californica*. Many of these older stands show senescence in the canopy of individual *Rhamnus* shrubs and a very heavy lichen load on the stems of the shrubs.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Rhamnus californica* ssp. *californica*, *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Rhamnus californica* ssp. *californica*, *Baccharis pilularis*

Forb: *Scrophularia californica*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This vegetation is heavily dominated by *Rhamnus californica* ssp. *californica* and *Baccharis pilularis*, which combine for 50% - 90% cover. *Toxicodendron diversilobum* may be present (usually less than 10%) . The canopy is densest between 2 - 5 meters. *Scrophularia californica* is diagnostic in the herbaceous and short shrub layers, ranging from a few percent to 35% cover.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4 S4

RANK JUSTIFICATION There are well over 150 stands of this vegetation mapped in the **PRNS / GGNRA** mapping area.

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

Exotics are an impact on this association.

Plots used to define this association (n=8): GGNRA357, GGNRA372, GGNRA326, PRNS167, PRNS119, PRNS105, PRNS074, PRNS 206

Poison Oak Alliance

Poison Oak (*Toxicodendron diversilobum*) Alliance

- pi code 30040

This alliance is represented by one association locally. It is very closely related to other dense coastal scrub associations in different alliances such as *Rhamnus californica* and *Baccharis - Rhamnus* associations, however is strongly dominated by poison - oak. The range of this alliance is from Humboldt Co to Los Angeles Co. along the coast of California.

***Toxicodendron - Baccharis pilularis - Rubus parviflorus* Association**

- pi code 30041

COMMON NAME	Poison Oak - Coyote Brush - Thimbleberry Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Mixed Evergreen - Deciduous Shrubland
PHYSIOGNOMIC GROUP	Mixed Evergreen - Cold - deciduous Shrubland
PHYSIOGNOMIC SUB GROUP	Natural
FORMATION	Mixed Evergreen - Cold - deciduous Shrubland
ALLIANCE	To be determined , putatively <i>Toxicodendron diversilobum</i> shrubland alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory.

PRNS / GGNRA

This association is common in the southern units of GOGA as at Sweeney Ridge and on the San Francisco Municipal Water District Lands. It is uncommon in Marin Headlands and at Point Reyes.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found on the upper third of moderate slopes. Aspects are north to east and soil textures can vary from medium silty loams to moderately coarse sandy loams. Slopes are often concave. This association is a mesic expression of the "North Coastal Scrub" where *Toxicodendron* is strongly dominant. It is clearly related to other *Baccharis pilularis* associations and with further investigation may be considered a phase of that alliance.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Toxicodendron diversilobum*, *Baccharis pilularis*, *Rubus sp.*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Toxicodendron diversilobum*, *Baccharis pilularis*, *Rubus parviflorus*.

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Vegetation within this association includes stands dominated by *Toxicodendron diversilobum* with significant amounts of *Baccharis pilularis* and *Rubus parviflorus* or *Rubus ursinus* in the shrub layer. The shrub canopy is fairly continuous and between 1 - 2 meters in height. Emergent, shrubby individuals of *Pseudotsuga menziesii* are often present. *Marah fabaceus* is usually present at about 1% cover. Species present in the herbaceous layer may include *Scrophularia californica*, *Sanicula crassicaulis*, *Pteridium aquilinum*, *Phacelia californica*, and / or *Maianthemum stellatum*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3S3?

RANK JUSTIFICATION Although *Toxicodendron diversilobum* is an abundant species, stands strongly dominated by this species only occur close to the coast in Central and Northern California. As far as is known these stands are few in number and relatively small in size.

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

This association is ecologically similar to the *Baccharis pilularis* - *Toxicodendron* association of the *Baccharis pilularis* alliance. However, in most cases *Toxicodendron* is dominated by from 2 to 10 times the cover of *Baccharis pilularis*. These stands are relatively mesic, more so than the typical *Baccharis* -

Toxicodendron association. The largest stands are on east and NE - facing slopes in fog gaps as near the summit of Highway 92 in San Mateo County.

Plots used to define this association (n=7): GGNRA370, GGNRA356, GGNRA375, GGNRA325, PRNS102, GGNRA353, GGNRA363

Holly-leafed Cherry- Coyotebrush Superalliance

Holly - Leafed Cherry Alliance

Holly - leaf Cherry (*Prunus illicifolia*) Alliance

- pi code 21250

This alliance is represented locally by a single association. However additional variation is exhibited in a plot with: *P. illicifolia* and *Ceanothus thyrsiflorus* as the main shrub species: (GGNRA339).

In general, this alliance is considered throughout most of its range a mesic chaparral that may range far inland. However, locally it is near its most coastal low elevation expression and shares more ecologically with associated dense coastal scrubs. The alliance ranges from NW Baja California, Mexico to the north coast ranges of California. It does not occur in the Sierra Nevada foothills.

***Prunus ilicifolia* / *Sanicula crassicaulis* Association – pi code 21251**

COMMON NAME	Hollyleaf Cherry / Sanicula Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	evergreen Shrubland
PHYSIOGNOMIC GROUP	sclerophyllous shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Temperate sclerophyllous shrubland

ALLIANCE *Prunus ilicifolia* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Prunus ilicifolia* / *Sanicula crassicaulis* shrubland association are found within the Montara Mountain 7.5 minute topographic quad in the mapping areas of GGNRA, including the San Francisco Watershed lands.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Prunus ilicifolia* / *Sanicula crassicaulis* shrubland association are found at low elevations on 4 - 13 degree slopes. Aspects are east - northeast to southwest on undulating lower to upper slopes. Soil textures range from moderately fine sandy clay loam to moderately coarse sandy loam.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Sanicula crassicaulis*, *Toxicodendron diversilobum*

Shrub: *Prunus ilicifolia*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Sanicula crassicaulis*, *Heracleum lanatum*, *Marah fabaceus*, *Silybum marianum*

Shrub: *Prunus ilicifolia*, *Dirca occidentalis*, *Heteromeles arbutifolia*, *Toxicodendron diversilobum*

VEGETATION DESCRIPTION

Globally

This association is only known from the Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Prunus ilicifolia* / *Sanicula crassicaulis* shrubland association form dense stands dominated by *Prunus ilicifolia* with continuous cover of 60 - 80 percent cover in the shrub layer. *Sanicula crassicaulis* is an important understory herb with from 5 to 30% cover. A variety of herbs and shrubs that are often found in this association include *Dirca occidentalis*, *Sanicula crassicaulis*, *Toxicodendron diversilobum*, *Heracleum lanatum*, *Marah fabaceus*, *Ribes californicum*, *Heteromeles arbutifolia*, *Ceanothus thyrsiflorus*. Other species that may be included in stands are *Conium maculatum*, *Sambucus mexicana*, *Ribes sanguineum*, *Stellaria media*, *Galium aparine*, *Dryopteris arguta*, *Solanum douglasii*, *Smilacina racemosa*, *Satureja douglasii*, *Carduus pycnocephalus*, *Artemisia californica*, *Baccharis pilularis*, *Solanum xanti*, *Hesperocnide tenella*, and *Polystichum munitum*. This association is often adjacent *Baccharis* Alliance communities and is found at low elevations on 4 - 13 degree slopes. Aspects are east - northeast to southwest on undulating lower to upper slopes. Soil textures range from moderately fine sandy clay loam to moderately coarse sandy loam.

OTHER NOTEWORTHY SPECIES *Dirca occidentalis* is considered a list 1B rare species by California Native Plant Society (Skinner and Pavlik 1994).

CONSERVATION RANK

G2S2?

RANK JUSTIFICATION This is the northernmost and most coastal expression of the *Prunus ilicifolia* alliance. Its occurrence adjacent to typically north coastal alliance stands such as *Baccharis pilularis* and *Toxicodendron diversilobum* are unusual. Throughout most of its range it is a dry chaparral alliance with the center of its range in the South Coast Ranges and the Southern California Mountains (Borchert 2000)

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Note all plots of this association were defined from the Montara Mountain area and further stands should be searched out further south in the San Francisco Peninsula and Santa Cruz Mountains. Transitional

relationships with *Baccharis pilularis* and *Ceanothus thyrsiflorus* alliance stands should be investigated further.

Plots used to define this association (N=5): GGNRA313, GGNRA314, GGNRA320, GGNRA324, GGNRA350

Coyote Brush Alliance (in part)

***Baccharis pilularis* / *Prunus illicifolia* Association (preliminary)**

- pi code 24067 Insufficient relevé plots to describe this association, currently rolled into classification hierarchy with Holly - leafed Cherry Alliance - pi code 21250)

Wax Myrtle – Salmonberry Superalliance

Mexican Elderberry Alliance

Mexican Elderberry (*Sambucus mexicana*) Alliance

- pi code 30020

COMMON NAME	Mexican Elderberry Stands
SYNONYMS	Elderberry Savanna (Holland); Riparian Woodland (Thorne); Freshwater Emergent Wetland (WHR)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Deciduous Shrubland
PHYSIOGNOMIC GROUP	Cold - deciduous Shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Intermittently Flooded Cold - deciduous Shrubland
ALLIANCE	<i>Sambucus mexicana</i> Intermittently Flooded Shrubland
CLASSIFICATION CONFIDENCE LEVEL	
USFWS WETLAND SYSTEM	Palustrine Forested

RANGE

Globally

Located in California in the Central California Coastal Ranges, Great Valley, and Southern California Coast. The species ranges from southern British Columbia and western Alberta to California, Arizona, and New Mexico It extends east into western Montana, western Colorado, and Trans - Pecos Texas, south into northwest Mexico (Crane 1989).

PRNS / GGNRA

No plots were taken. *S. mexicana* occurs in small scattered stands in the study area.

ENVIRONMENTAL DESCRIPTION

Globally

Habitat intermittently flooded. Water chemistry: fresh. Floodplains. The national list of wetland plants (Reed 1988) lists *Sambucus mexicana* as a Facultative wetland species in California.

PRNS / GGNRA

Habitat intermittently flooded. Water chemistry: fresh. Floodplains. May also occur on slopes as a sparse overstory to mesic shrub species characteristic of the coastal scrub.

MOST ABUNDANT SPECIES

Globally

Sambucus mexicana

PRNS / GGNRA

Sambucus mexicana

CHARACTERISTIC SPECIES

Globally

Sambucus mexicana

PRNS / GGNRA

Sambucus mexicana

VEGETATION DESCRIPTION

Globally

Sambucus mexicana is dominant in the shrub canopy; *Fraxinus latifolia*, *Salix exigua*, *Toxicodendron diversilobum*, and / or *Vitis californica* may be present. Emergent *Populus fremontii* *Quercus agrifolia*, or *Quercus lobata* may be present. Shrubs < 8 m tall; canopy continuous, intermittent, or open. Ground layer grassy. Mature individuals of *S. mexicana* are the host for the larvae of the endangered valley longhorn elderberry beetle, a spectacular species endemic to the Great Valley Province of California

PRNS / GGNRA

Sambucus mexicana occurs in small scattered stands in the study area, typically as open woodlands or tall shrublands over a shorter shrub cover dominated by *Baccharis pilularis*, *Rhamnus californica*, and other mesic shrubland species.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G3 S3

RANK JUSTIFICATION *Sambucus mexicana* stands are often in relatively frequently disturbed settings such as riparian zones or meadow edges or in openings in moist forest habitats and in moist areas within drier, more open habitats. It is part of the riparian communities of the Central Valley of California, and stands may be found in relatively gravelly alluvium and upper terrace deposits associated with *Populus fremontii*, or *Quercus lobata* alliance stands. Mature individuals of *S. mexicana* are the host for the larvae of the endangered valley longhorn elderberry beetle, a spectacular species endemic to the Great Valley Province of California. In Oregon and California it is being used for riparian plantings and streambank stabilization plantings. Natural stands are limited by their moisture requirements and the limited extent of riparian terraces in the Great Valley, and Southern California Mountains and Valleys sections.

DATABASE CODE

COMMENTS

Globally

Plants of *Sambucus mexicana* are common in many alliances, often as emergent trees or tall shrubs over coastal scrubs, chaparrals, or as an understory shrub in forests. This alliance includes only those stands with relative high cover of *S. mexicana* (including *S. caerulea*) in the overstory .

The way in which plants are classified varies greatly among references. *The Jepson Manual* considers *Sambucus mexicana* to be comparable to *S. caerulea*. Munz (1968) differentiates *S. caerulea* from *S. mexicana* on leaflet number and location. Kartesz & Meacham (1999) consider that California has two subspecies of continental ranging *S. nigra* (*S. n. ssp. caerulea* and *S. n. ssp. Canadensis* = *S. mexicana*). The first subspecies grows at montane elevations in the mountains and occurs as individual plants. The second subspecies grows as individuals and in local stands at low elevations.

Sambucus mexicana is a multi - stemmed tall shrub and occasionally a single stemmed small tree, with soft pithy wood. It is relatively fast growing, and is relatively short lived (Crane 1989). There are good seed crops almost every year, and the seeds are dispersed by birds and other animals that eat the fruit. Seeds retain their viability for up to 16 years in storage. Seedlings may bloom and bear fruit by their 2nd or 3rd year. Plants can reach full size in 3 to 4 years. It is a mesophyte and does not typically occur in soils saturated through the growing season.

Blue elderberry is able to resprout and seed buried in seed banks germinates following fire. Since it is short lived and shade intolerant, blue elderberry is usually absent from the understory of closed - canopy forests before fire occurs and must rely on seed banks for regeneration.

Blue elderberry is a palatable browse plant that is sought and consumed in excess of its relative importance in the vegetative community by elk and deer. Its fruit provides food for many species of birds including bluebirds, magpies, warbling vireo, western tanager, house finch, green - tailed towhee, woodpeckers, grosbeaks, Townsend solitaire, grouse, quail, pheasant, and hummingbirds who visit flowers for nectar (Crane 1989).

Status Regionally

Central California Coastal Ranges (M262A) occasional stands on upper river and stream terraces
Great Valley (262A). Occasional usually small stands along American River, Sacramento River, Feather River and other major streams and rivers
Southern California Mountains and Valleys (M262B). Occasional small stands in alluvial scrub settings adjacent to major intermittent streams such as Santa Ana River, San Gabriel River, etc.

PRNS / GGNRA

Local stands are largely upland as opposed to bottomland. Successional relationships in these stands are unclear, but may only represent transitional stands to woodland dominated by *Umbellularia* and / or *Quercus agrifolia*.

Plot used to define this alliance locally (n=1): GGNRA383

Drier Coastal Grassland / Open Scrub Mesocluster

Open Grassy – Yellow Bush Lupine – Coyote Brush Superalliance

Coyote Brush Alliance (In Part)

Coyote Brush (*Baccharis pilularis*) Alliance (in part)

- pi code 24050

This portion of the Coyote Brush alliance is represented by three associations with relatively low shrub cover and relatively high herbaceous cover. Most of the stands placed in this ecological group are responding to relatively recent or repeated disturbance and represent *Baccharis pilularis* colonizing or re-colonizing herb dominated stands that may have been maintained by grazing or other disturbance.

Baccharis pilularis / Non - native Grassland Association (preliminary)

- pi code 24065

COMMON NAME	Coyote Brush / annual non - native grass Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland

ALLIANCE *Baccharis pilularis* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is currently only described from the Point Reyes National Seashore and Suisun Marsh (Solano County, CA). It is likely to be a common and widespread association from Northern to Southern coastal California. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* / annual non - native grass shrubland association are found throughout the mapping areas of MARINSP and GGNRA.

ENVIRONMENTAL DESCRIPTION

Globally

Outside of the mapping area, this association is only known from Suisun Marsh (Keeler - Wolf *et al.* 2000) There it is occasional where it occupies edges of disturbed grasslands and levee banks below 10 ft above sea level.

PRNS / GGNRA

Stands of the *Baccharis pilularis* / annual non - native grass shrubland association are found at low elevations on the mid 1 / 3 to ridge tops of approximately 15 - degrees, south to southwest facing slopes. Soil textures range from medium to very fine sandy loam to moderately fine silty clay loam.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. At Suisun Marsh (Keeler - Wolf et al 2000) *Baccharis pilularis* is the most common shrub from 55 - 70 % while annual exotic grasses such as *Lolium multiflorum*, *Bromus diandrus*, and *Avena barbata* along with annual herbs such as *Raphanus sativa* comprise most of the herbaceous cover

PRNS / GGNRA

Herbaceous: *Avena barbata*, *Lolium perenne*, *Bromus hordeaceus*, *Vulpia bromoides*, *Plantago lanceolata*

Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Avena barbata*, *Anagallis arvensis*, *Vulpia sp.*, *Sonchus asper*

Shrub: *Baccharis pilularis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. The relatively stochastic colonization of areas by different species of introduced annual grasses in California has precluded a definitive set of indicator species beyond the general category of “annual non - native grasses” for this association.

PRNS / GGNRA

Stands of the *Baccharis pilularis* / annual non - native grass shrubland association vary in structure, forming an open to continuous herb layer with 0 - 20% at 0 - 25 cm tall and 20 - 70% at 25 - 50 cm tall, open to intermittent shrub layer with 0 to 40% cover at 0.5 to 1 m, and 0 - 60% cover at 1 - 2m tall. It is dominated by *Baccharis pilularis* and a variety of annual introduced grasses including *Avena barbata*, *Bromus hordeaceus*, *Vulpia bromoides*, and *Plantago lanceolata*. A variety of other species are also found in this association including *Briza minor*, *Toxicodendron diversilobum*, *Brassica nigra*, *Elymus glaucus*, *Filago gallica*, *Lolium multiflorum*, *Plantago lanceolata*, *Viola sp.*, and *Sisyrinchium bellum*. Other species may include *Avena fatua*, *Bromus hordeaceus*, *Chlorogalum pomeridianum*, *Bromus sterilis*, *Geranium dissectum*, *Lactuca serriola*, *Nassella pulchra*, *Dipsacus fullonum*, *Briza maxima*, and *Aira caryophyllea*.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G5S5?

RANK JUSTIFICATION Likely to be a common association in disturbed coastal sites throughout most of California.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

We expect that this association occurs on somewhat drier, more fine - grained soils than the related *B. pilularis* - *Rubus ursinus* association. The latter association may occur more regularly in cool seaward sites,

while the former is often in warmer, drier settings. However, both are similar and share some species and with more data it may be warranted to combine them as one association.

Plots used to define this association (n=3): Marinsp21, Marinsp12, GGNRA333

Baccharis pilularis - Nassella pulchra Association

- pi code 24056

COMMON NAME	Coyote Brush / Purple Needle Grass Shrubland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland

ALLIANCE Baccharis pilularis Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory. It is likely that this association exists in other parts of central coastal California such as the Santa Cruz Mountains.

PRNS / GGNRA

Stands of the *Baccharis pilularis - Nassella pulchra* shrubland association are found throughout the mapping areas of GGNRA, including plots from the Point Bonita and the San Mateo 7.5 minute topographic quads, and PRNS.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis - Nassella pulchra* shrubland association are found at low elevations on the mid to upper 1 / 3 of 14 - 45 degree angle, usually on undulating slopes with east - southeast to southwest aspects. Soil textures range from moderately fine clay loam to medium to very fine sandy loam and are from shale or sandstone origin. In the Marin Headlands unit of GOGA, where this association occurs commonly, these stands occupy the south - facing ridgelines of spur ridges where grazing kept the *Baccharis* from invading for many years. Currently many of these stands are being more rapidly colonized by *Baccharis* as a result of reduced grazing. There is probably a dynamic relationship between soil type (xeric fine grained, but relatively shallow) and disturbance (more frequent disturbance from grazing reduces *Baccharis*), which if shifted will result in either more grass or more *Baccharis* in these stands.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herb: *Nassella pulchra*, *Anagallis arvensis*
Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herb: *Nassella pulchra*, *Plantago lanceolata*, *Gnaphalium californicum*
Shrub: *Baccharis pilularis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

The *Baccharis pilularis* - *Nassella pulchra* shrubland association forms an intermittent to continuous herb layer with 15 - 75% cover at 0 - 25 cm tall, 0 - 30% cover at 25 - 50 cm tall, and an open to intermittent shrub layer with 5 - 40% cover at .5 - 1 m tall, and 0 - 75% cover at 1 - 2m tall. This is an open scrub - steppe dominated by *Baccharis pilularis* and characterized by the bunchgrass *Nassella pulchra*. There is a variety of other species that may be found in this association. Often found in this association is *Achillea millefolium*, *Aira caryophylla*, *Vulpia myuros*, *Plantago lanceolata*, *Lolium multiflorum*, *Gnaphalium californicum*, *Anagallis arvensis*, *Galium sp.*, *Avena barbata*, *Erodium sp.*, *Hypochaeris sp.*, *Chlorogalum pomeridianum*, *Sonchus sp.*, *Danthonia californica*. Species contributing to minor amounts of cover vary and may include *Artemisia californica*, *Agrostis sp.*, *Briza minor*, *Bromus carinatus*, *Castilleja brevistyla*, *Dichondra donelliana*, *Eschscholzia californica*, *Eriogonum latifolium*, *Grendelia stricta*, *Lotus sp.*, *Madia sp.*, *Marah fabaceus*, *Pteridium aquilinum*, *Rubus ursinus*, *Rumex acetosella*, *Sanicula crassicaulis*, and *Silene gallica*. Often adjacent to *Baccharis* and *Toxicodendron diversilobum* Associations, this shrubland association is found at low elevations on the mid to upper 1 / 3 of 14 - 45 degree angle, usually undulating slopes with east - southeast to southwest aspects. Soil textures range from moderately fine clay loam to medium to very fine sandy loam and are of shale or sandstone origin.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3S3?

RANK JUSTIFICATION Distribution of this type is uncertain beyond the study area, but it is likely to be relatively uncommon as a result of altered disturbance regime, and presence of invasive exotics.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Plots used to define this association (n=4): GGNRA302, PRNS011, PRNS124, GGNRA352

***Baccharis pilularis* / *Danthonia californica* Association**

- pi code 24061

COMMON NAME Coyote Brush / California Oatgrass Shrubland Association
SYNONYM None
PHYSIOGNOMIC CLASS Shrubland
PHYSIOGNOMIC SUBCLASS Evergreen Shrubland
PHYSIOGNOMIC GROUP Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP Natural / Semi - Natural
FORMATION Lowland microphyllous evergreen shrubland

ALLIANCE *Baccharis pilularis* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. It is likely that this association is transitional between “coastal terrace prairie” and “north coastal scrub” communities (*sensu* Holland 1986), and was thus at a time prior to invasive exotic grass colonization, relatively common. Stands with high cover of native grasses such as *Danthonia californica* are now restricted in northern and central coastal California. It is likely that some of the best remaining stands of this association occur within the mapping area of this project.

PRNS / GGNRA

Stands of the *Baccharis pilularis* / *Danthonia californica* shrubland association are restricted to the immediate coastal strip of the Point Reyes Peninsula and perhaps a few sites in Golden Gate National Recreation Area adjacent to Tomales Bay and in Marin Headlands.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* / *Danthonia californica* shrubland association are found at convex or linear, middle 1 / 3 of slopes to ridge tops of 8 - 45 degree slopes on all aspects. Soil textures range from coarse sandy loam to moderately fine clay loam of shale, siltstone, and sandstone. The stands may occur on the landward side of coastal dune systems such as at North Beach on Point Reyes Peninsula. Some stands have more windblown sand in the soil surface layer while others are found on fine - grained marine sediments. Moisture content is somewhat higher than surrounding upland annual grassland vegetation, but somewhat lower than adjacent *Deschampsia cespitosa* alliance stands or stands of the *Baccharis pilularis* - *Deschampsia cespitosa* association.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Danthonia californica*
Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Danthonia californica*
Shrub: *Baccharis pilularis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* / *Danthonia californica* shrubland association have a continuous herbaceous cover of 65 - 95% cover at 0 - 25 cm tall and 4 - 25% cover at 25 - 50 cm tall. It is dominated by low subshrubs of *Baccharis pilularis* (30% average cover) and *Danthonia californica* (25% average cover), and usually includes *Pteridium aquilinum*, *Aira caryophyllea*, *Plantago lanceolata*, *Achillea millefolium*, *Holcus lanatus*, *Bromus carinatus maritimus*, *Carex sp.*, *Cirsium quercetorum*, *Rumex acetosella*. Often found in this association is *Iris douglasiana*, *Eriogonum latifolium*, *Vulpia sp.*, *Elymus glaucus*, *Bromus hordeaceus*, *Grindelia stricta*, *Hypochaeris radicata*, *Gnaphalium californicum*, and *Madia sp.* This association is frequently found adjacent to annual grasslands.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G2S2

RANK JUSTIFICATION A strong native grass component of *Danthonia californica* is rare in *Baccharis pilularis* stands as a result of replacement of native grasses by invasive exotic grass species.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Grazing has affected some stands for years.

Plots used to define this association (n=5): PRNS045, PRNS002, PRNS003, PRNS008, PRNS013

***Baccharis pilularis* / *Deschampsia cespitosa* Association**

- pi code 24068

COMMON NAME	Coyote Brush / Tufted Hairgrass Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland
ALLIANCE	<i>Baccharis pilularis</i> Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM

Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. It was described from the Point Reyes Peninsula by Elliott and Wehausen (1974). It is likely that prior to invasion of exotic grasses in the coastal terrace and dune systems of Northern California, this association was more common. Small remnant stands of similar vegetation occur at locations such as Salt Point State Park, Sonoma County, CA (California Natural Diversity Database 1993).

PRNS / GGNRA

Only a few stands of *Baccharis pilularis* / *Deschampsia cespitosa* shrubland association occur in the mapping area of PRNS. The stands are limited to the central portion of the Point Reyes Peninsula near North Beach. Data is also available for this association from Elliot & Wehausen (1974).

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Baccharis pilularis* / *Deschampsia cespitosa* shrubland association are found on linear dune tops of 5 - degree slopes facing north - northwest. The soil textures are moderately coarse sandy loam from stabilized sand dunes. The north - facing sides of fog - shrouded dunes of North Beach provide a surprisingly mesic environment, allowing the mesophytic association to develop. Litter and humus content on the soil surface is relatively high for most dune vegetation.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Deschampsia cespitosa*, *Aira caryophyllea*, *Danthonia californica*, *Holcus lanatus*, *Iris douglasiana*

Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Deschampsia cespitosa*

Shrub: *Baccharis pilularis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

There is limited data for this association since only one plot was recorded in this study. However this association forms an intermittent (Sawyer and Keeler - Wolf 1995) to continuous herb layer with 45% cover at 0 - 25 cm tall and 40% cover at 25 - 50 cm tall. It is dominated by *Baccharis pilularis* and *Deschampsia cespitosa* and may include *Aira caryophyllea*, *Danthonia californica*, *Holcus lanatus*, *Iris douglasiana*, *Vulpia sp.*, *Hypochaeris radicata*, *Rubus ursinus*, *Rumex acetosella* and *Bromus carinatus*. *Bromus hordeaceus*, *Erigeron glaucus*, *Gnaphalium purpureum*, *Lupinus arboreus*, *Plantago lanceolata*, and *Stachys ajugoides* may contribute minor amounts of cover. This association may be adjacent to *Ammophila arenaria*, and *Juncus* stands, *Baccharis - Lupinus* Dunes and Cultivated Pastures. Stands of *Baccharis pilularis / Deschampsia cespitosa* shrubland association are found at linear ridge tops of 5 - degree slopes facing north - northwest. The Soil textures range from moderately coarse sandy loam from sand dunes.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G2S1

RANK JUSTIFICATION This association may occur in Oregon, but is very rare in California.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Plots used to define this association in addition to Elliott and Wehausen (1974), (n=1): PRNS048

Baccharis pilularis - Rubus ursinus / Weedy Association

- pi code 24064

COMMON NAME Coyote Brush - California Blackberry / weedy herb Shrubland Association

SYNONYM None

PHYSIOGNOMIC CLASS Shrubland

PHYSIOGNOMIC SUBCLASS Evergreen Shrubland

PHYSIOGNOMIC GROUP Microphyllous evergreen shrubland

PHYSIOGNOMIC SUB GROUP Natural / Semi - Natural

FORMATION Lowland microphyllous evergreen shrubland

ALLIANCE *Baccharis pilularis* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. However, it is likely that this association is common in foggy coastal areas in northern California expressing a stage transition from open pasture and perennial non - native grassland to a more continuous cover of *Baccharis pilularis*.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Rubus ursinus* / weedy herb shrubland association are found throughout the coastal strip within the mapping areas of PRNS and GGNRA.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Rubus ursinus* / weedy herb shrubland association are found at low elevations on the lower 1 / 3 to ridge tops of 18 - 35 degree, southwest to northwest facing slopes. Soil textures range from moderately fine silty clay loam to coarse loamy sand. This association typically occupies the coastal terrace and coastward sides of the mapping area. *Rubus ursinus* is a common colonizer of moist area in this zone and this association is indicative of a slightly cooler and moister setting than the *Baccharis pilularis* / annual non - native grass association. Under equivalent moisture conditions, it also indicates a somewhat more advanced stage in the stand dynamics of the *B pilularis* alliance than the former association.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Baccharis pilularis*, *Rubus ursinus*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herb: *Satureja douglasii*
Shrub: *Baccharis pilularis*, *Rubus ursinus*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Baccharis pilularis* - *Rubus ursinus* / weedy herb shrubland association forms an open to intermittent herb layer with 3 - 30% cover at 0 - 25% cm tall, 10 - 40% cover at 25 - 50 cm, an open to intermittent shrub layer with 8 - 60% cover at 0.5 - 1 m tall, 20 - 65% cover at 1 - 2 m tall, and 0 - 40% cover at 2 - 5 m tall. It is dominated by *Baccharis pilularis* and *Rubus ursinus*. *Toxicodendron diversilobum* and *Satureja douglasii* are usually present and a variety of other species that may also be present include *Lonicera hispidula*, *Rhamnus californica*, *Aster chilensis*, *Oemleria cerasiformis*, *Heracleum lanatum*, *Marah fabaceus*, *Holcus lanatus*, *Agrostis* sp., *Briza minor*, *Plantago lanceolata*, *Pteridium aquilinum*, *Geranium dissectum*, *Scrophularia californica*, and *Hypochaeris radicata*.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G5S5?

RANK JUSTIFICATION This is likely to be an early seral *Baccharis pilularis* association that is widespread in coastal northern California

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Plots used to define this association (n=3): PRNS156, GGNRA264, GGNRA359

Baccharis pilularis - Native Grassland Association (preliminary)

- pi code 24058 Insufficient relevé plots to describe this association)

Baccharis pilularis - Annual Grassland Association (preliminary)

- pi code 24057 Insufficient relevé plots to describe this association, previously listed as *Baccharis pilularis* / *Avena barbata* Association)

Sweet Brier (*Rosa eglanteria*) Alliance (preliminary)

- pi code 30030 Insufficient relevé plots to describe this alliance at this time.

Mixed Broom Alliance

Broom (*Cytisus*, *Genista*, *Spartium* spp.) Alliance

- pi code 24040

This alliance is represented locally by at least three species of introduced Eurasian leguminous shrubs, collectively known as “broom”. The most widespread and invasive species is *Genista monspessulana*. The alliance in California ranges throughout the outer coast ranges from the Oregon border to Mexico, and also occurs in the Sierra Nevada foothills.

COMMON NAME	Broom stands
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Microphyllous evergreen shrubland
ALLIANCE	<i>Cytisus scoparius</i> , <i>Genista monspessulana</i> , <i>Spartium junceum</i> Alliance

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Upland

RANGE

Globally

In California broom stands occur throughout the Southern, Central, and Northern California Coast Ranges, the Klamath Mountains and Southern Cascades, the Southern California Mountains and Valleys, and the Sierra Nevada and its Foothills.

PRNS / GGNRA

Two plots dominated by broom species in the project area, near the peak of Monticello Trail, and off Marincello Road, about ¼ mile from the split with Bobcat Trail on its west side.

ENVIRONMENTAL DESCRIPTION

Globally

All upland slopes; elevation sea - level - 1000m.

PRNS / GGNRA

Plots dominated by the noxious weedy shrub, gorse (*Ulex europaeus*), in this area usually in mesic coastal terrace locations, with a relatively open, non - native grass understory. Plots dominated by either *Cytisus scoparius* or *C. striatus* on upper slopes or terraces on coarse sandy to fine silty - clay loam.

MOST ABUNDANT SPECIES

Globally

Shrub: *Cytisus scoparius*, *Genista monspessulana*, *Spartium junceum*, *Ulex europaeus*

PRNS / GGNRA

Shrub: *Cytisus striatus*, *Cytisus scoparius*, *Ulex europaeus*

CHARACTERISTIC SPECIES

Globally

Shrub: *Cytisus scoparius*, *Genista monspessulana*, *Spartium junceum*, *Ulex europaeus*

PRNS / GGNRA

Shrub: *Cytisus striatus*, *Cytisus scoparius*, *Ulex europaeus*

VEGETATION DESCRIPTION

Globally

Cytisus scoparius, *Genista monspessulana*, *Spartium junceum*, or *Ulex europaeus* sole dominant shrub in the canopy; other species of *Cytisus* or *Genista* may be present. Emergent trees may be present. Shrubs < 6 m; canopy continuous. Ground layer sparse.

PRNS / GGNRA

Cytisus scoparius, *C. striatus*, or *Ulex europaeus* dominant in shrub canopy; *Baccharis pilularis* significant in one plot; Shrubs 1 - 5m, canopy intermittent to continuous; ground layer sparse.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK Exotic

RANK JUSTIFICATION Invasive in many areas of coastal California

DATABASE CODE

COMMENTS

Globally

Invasiveness of broom species is well appreciated. Ten species of broom or gorse from four legume genera are included in this type. *The Jepson Manual* recognizes three *Cytisus*, five *Genista*, one *Spartium*, and one *Ulex* in California. French broom, Spanish broom, and Scotch broom are the major invading brooms of disturbed areas in the state. The following are uncommon or locally common: *Cytisus multiflorus*, *Cytisus striatus*, *Genista canariensis*, *Genista linifolia*, *Genista maderensis*, *Genista stenopetala*, and *Ulex europaeus*. In areas where trees form dense canopies with age, broom is killed; however a persistent seed bank remains. The treatment here is broad, recognizing the importance of these introduced species in the vegetation of California. The most invasive species in central California appears to be *Genista monspessulana*. It is likely that with further sampling, individual broom alliances and associations will be defined. These may include Spanish broom (*Spartium junceum*) from southern coastal California, French

Broom (*Genista monspessulana*) from central California, and Scotch Broom (*Cytisus multiflorus*) from northern California.

PRNS / GGNRA

Genista monspessulana is a common and persistent invader of ecotones between *Quercus agrifolia* and various open herbaceous stands of vegetation including California annual grassland and non - native perennial grassland. Canary Island Broom (*Cytisus striatus*) also forms local stands in the Marin Headlands portion of GGNRA.

Plots used to define this alliance locally: None

Plots used to describe this association (n=0): no plots sampled

Heather Fields Alliance (preliminary)

– pi code 90210

Yellow Bush Lupine Alliance

Yellow Bush Lupine (*Lupinus arboreus*) Shrubland Alliance

- pi code 19010

Although the alliance is common in the study area, no associations were defined. This is primarily the result of the early seral state of most stands with the short lived perennial *Lupinus arboreus* colonizing many different types of open herbaceous vegetation. The following general account will serve to distinguish the alliance as it is expressed locally.

COMMON NAME	Yellow Bush Lupine Scrub
SYNONYMS	Northern Coastal Bluff Scrub, Northern Dune Scrub, Venturan Coastal Sage Scrub (Holland); Lupine Series (PSW - 45); Northern Coastal Scrub (Thorne); Coastal Scrub (WHR)
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen shrubland
PHYSIOGNOMIC GROUP	Temperate broad - leaved evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / semi - natural
FORMATION	Temperate broad - leaved evergreen shrubland
ALLIANCE	<i>Lupinus arboreus</i> Shrubland Alliance
CLASSIFICATION CONFIDENCE LEVEL	2
USFWS WETLAND SYSTEM	Upland

RANGE

Globally

Northern and Central California Coast

PRNS / GGNRA

Point Reyes Peninsula, Marin County.

ENVIRONMENTAL DESCRIPTION

Globally

Stabilized dunes of coastal bars, river mouths and spits along coastline; coastal bluffs and terraces; elevation sea - level to 30 meters.

PRNS / GGNRA

Most plots on moderate, slopes on coarse sandy loam within one mile of the Pacific Ocean..

MOST ABUNDANT SPECIES

Globally

Shrub: *Lupinus arboreus*, *Alnus rubra*, *Baccharis pilularis*, *Myrica californica*

PRNS / GGNRA

Shrub: *Lupinus arboreus*, *Rubus ursinus*

Herb: *Achillea millefolium*, *Brassica rapa*

CHARACTERISTIC SPECIES

Globally

Lupinus arboreus

PRNS / GGNRA

Lupinus arboreus

VEGETATION DESCRIPTION

Globally

Lupinus arboreus is sole or dominant in the shrub canopy; *Alnus rubra*, *Baccharis pilularis*, and / or *Myrica californica* present. Shrubs < 2 m; canopy continuous or intermittent. Ground layer variable.

PRNS / GGNRA

Lupinus arboreus dominant in the shrub canopy; *Rubus ursinus* present; shrubs <2m, canopy intermittent. Herbs present include *Achillea millefolium* and *Brassica rapa*; layer intermittent.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G4S4, partially exotic

RANK JUSTIFICATION Stands south of Point Reyes peninsula are generally considered native while, northern CA stands are exotic (Sawyer and Keeler - Wolf 1995).

DATABASE CODE

COMMENTS

Globally

The range of *Lupinus arboreus* covers most of central and northern California coast. It grows on coastal dunes, headlands, and terraces. This California native is considered an "exotic" north of Manchester Beach in Mendocino Co. In Humboldt Co., it has a history of being planted to stabilize sand (Miller 1988). It is very successful at colonizing and enriching the sand, and as a result is changing vegetation patterns. *L. arboreus* stands in Humboldt Co. are being managed by annual removal to restore stands of the *Ambrosia chamissonis* alliance and enhance populations of rare species (Pickart & Sawyer 1998).

PRNS / GGNRA

Stands may occur on dunes, grazed annual and perennial grasslands and on coastal bluffs. The rapid growth and senescence of the local stands make them difficult to verify due to presence (or absence) in aerial photographs, but general absence (or presence) a few years hence. The history of the local stands is not entirely clear and at least some seed may have been introduced (J. Sawyer, personal communication 2002).

Plots used to define this alliance locally (n=2): PRNS177, PRNS173, PRNS023

Gorse Alliance

Gorse (*Ulex europaeus*) Alliance

- pi code 24999

This invasive alliance is represented by a single association in the study area. The dominant is a European species that has become a troublesome and invasive weed in the outer north coast ranges of California.

Ulex europaeus Association
- pi code 24999

COMMON NAME	Gorse Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Temperate Broad - leaved Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP	Natural
FORMATION	Temperate Broad - leaved Evergreen Shrubland

ALLIANCE To be determined

CLASSIFICATION CONFIDENCE LEVEL 3

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. *Ulex europaeus* is a common introduced species of the north coast of California and it is likely that other introduced stands with high cover can be considered as this association. The native range of *Ulex europaeus* is northwestern Europe, including the British Isles.

PRNS / GGNRA

This association is only known from the mainland side of Tomales Bay, at the mouth of the estuary near the town of Tomales.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this association are found on gentle to moderate, east facing slopes. This association grows on the lower to upper third of the slope, on moderately coarse, sandy loams derived from Franciscan Melange. These stands typically on land with a long grazing history. Prior to colonization by *Ulex* the land was dominated by non - native annual grassland.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Ulex europaeus* (exotic)

CHARACTERISTIC SPECIES

Globally

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Discriptions

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub : *Ulex europaeus* (exotic)

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is dominated by *Ulex europaeus* (exotic). The canopy is open to intermittent. A wide variety of exotic and native forbs and graminoids are usually present. These can include *Hypochaeris radicata* (exotic), *Calystegia purpurata*, *Plantago lanceolata* (exotic), *Chlorogalum pomeridianum*, *Anagallis arvensis* (exotic), *Carex* sp., *Rubus ursinus*, and / or *Holcus lanatus* (exotic).

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK Introduced exotic

RANK JUSTIFICATION

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

This vegetation can be extremely invasive. Every effort should be made to remove it.

Plots used to define this association (n=2): PRNS059, PRNS061

Moist Coastal Grassland Mesocluster (in part)

Pacific Reedgrass- Carex- Juncus Superalliance (in part)

Coyote Brush Alliance (in part)

Coyote Brush (*Baccharis pilularis*) Alliance (in part)

- pi code 24050

***Baccharis pilularis* / *Carex obnupta* - *Juncus patens* Association**

- pi code 24063

COMMON NAME	Coyote Brush / slough sedge - western rush shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous evergreen shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Lowland microphyllous evergreen shrubland

ALLIANCE *Baccharis pilularis* Shrubland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland / Wetland Palustrine Emergent Wetland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. *Carex obnupta* is a common sedge and *Juncus patens* a common rush in many coastal areas of Northern California. These species are likely to form mixes with *Baccharis pilularis* in many relatively undisturbed freshwater wetland borders.

PRNS / GGNRA

Stands of *Baccharis pilularis* / *Carex obnupta* - *Juncus patens* shrubland association are found throughout the mapping areas of GGNRA and PRNS. They usually occur in low - lying swales and adjacent to seeps and ponds along the coastal strip below 200 ft. elevation.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Baccharis pilularis* / *Carex obnupta* - *Juncus patens* shrubland association are found in bottomlands adjacent to creeks and swales or on the lower thirds of slopes up to 9 degrees. Soil texture is moderately fine silty clay loam. Parent material is marine sediments. The stands occur adjacent to several associations including *Nassella pulchra*, *Carex obnupta*, and non - native perennial grassland stands. *Baccharis pilularis* does tolerate some intermittent flooding and temporarily saturated soils, however, the *B. pilularis* / *Carex obnupta* - *Juncus patens* association represents the moistest environment known for the *B. pilularis* alliance.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Carex obnupta*, *Juncus patens*, *Holcus lanatus*

Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Carex obnupta*, *Juncus patens*, *Holcus lanatus*, *Mentha pulegium*, *Plantago lanceolata*, *Bromus carinatus*, *Cirsium vulgare*, *Conium maculatum*, *Elymus glaucus*, *Erechtites minima*

Shrub: *Baccharis pilularis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Baccharis pilularis* / *Carex obnupta* - *Juncus patens* shrubland association form an open to intermittent herbaceous with 2 - 20% cover at 0.5 - 1 m tall and an open to intermittent shrub layer with 3 - 50% cover at 1 - 2 m tall. This association is dominated by *Baccharis pilularis*, *Carex obnupta* and *Juncus patens* and *Holcus lanatus* is also commonly found. *Bromus hordeaceus*, *Mentha pulegium*, *Plantago lanceolata*, *Bromus carinatus*, *Cirsium vulgare*, *Conium maculatum*, *Elymus glaucus* and *Erechtites minima* contribute to minor cover. Other species that may be found contributing to minor cover in this association is *Lolium multiflorum*, *Lolium perenne*, *Mentha pulegium*, *Mimulus guttatus*, *Pteridium aquilinum*, *Rubus ursinus*, *Iris douglasiana*.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G3S3?

RANK JUSTIFICATION Despite the uncertainty of the extent of this vegetation type, stands of coastal marsh dominated by sedges, rushes with an open to intermittent *Baccharis pilularis* shrub cover are expected to be relatively uncommon in Northern California.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Plots used to describe this association (n=3): GGNRA390, PRNS012, PRNS039

Herbaceous Plant Communities

Grassland – Herbaceous Supercluster

Moist Coastal Grassland Mesocluster

Pacific Reedgrass – Carex – Juncus Superalliance

Pacific Reedgrass Alliance

Pacific Reedgrass (*Calamagrostis nutkaensis*) Alliance - pi code 46020

This alliance is represented by two associations in the study area. The *Calamagrostis nutkaensis* - *Baccharis pilularis* Association is an upland association found on moist wind - swept coastal bluffs and hills and the *Calamagrostis nutkaensis* - *Carex* - *Juncus* Association occurs on more moist - to - wet bottomlands and lower slopes. The alliance ranges from Washington and British Columbia to San Francisco.

Calamagrostis nutkaensis - *Baccharis pilularis* Association

- pi code 46021

COMMON NAME	Pacific Reedgrass / Coyote Brush Herbaceous Vegetation
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland
PHYSIOGNOMIC SUB GROUP	Natural
FORMATION	Tall sod temperate grassland

ALLIANCE *Calamagrostis nutkaensis* Herbaceous Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Stands of the *Calamagrostis nutkaensis* Herbaceous Alliance occur along the California, Oregon and Washington coasts. The *Calamagrostis nutkaensis* / *Baccharis pilularis* association is known only from the Point Reyes Peninsula, although it is likely to occur in other areas where the range of the two species overlap from San Mateo County California to central coastal Oregon.

PRNS / GGNRA

This association is only known from the vicinity of the Point Reyes National Seashore. Stands are found inland of the coastal zone in scattered locations from Tomales Point southwards to Drake's Estero

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association occurs on gentle to moderate slopes (9 - 28 degrees). It is found from mid - slope to ridge positions with northern to eastern exposures. Stands are located within 5 kilometers of the Pacific Ocean. .

Plots used to define this association (n=4): PRNS097, PRNS026, PRNS056, PRNS071

***Calamagrostis nutkaensis* - *Carex* spp. - *Juncus* spp. Association**

- pi code 46022

COMMON NAME	Nootka Reedgrass - Sedge - Rush	Herbaceous Wetland
SYNONYM	None	
PHYSIOGNOMIC CLASS	Herbaceous vegetation	
PHYSIOGNOMIC SUBCLASS	Perennial graminoid vegetation	
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland	
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural	
FORMATION	Seasonally flooded temperate or subpolar grassland	
ALLIANCE	<i>Calamagrostis nutkaensis</i> Herbaceous Alliance	

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Palustrine

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory.

PRNS / GGNRA

Stands of this association are scattered throughout the Point Reyes peninsula.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Vegetation fitting the general description of this association has been identified in Sonoma County near Bodega Head, Salt Point and Sea Ranch (CNDDDB administrative report north coast vegetation field survey July 1993.)

PRNS / GGNRA

This vegetation grows in seasonally saturated soils on gentle slopes of all aspects. Stands prefer seeps, basins, swales, and plains, which collect water during the rainy season. Soils are moderately coarse to fine sandy loams. Stands are generally small, under 2 ha. Moisture relations are intermediate between permanently saturated herbaceous associations such as *Scirpus microcarpus* association and intermittently flooded types such as *Deschampsia cespitosa* alliance stands.

MOST ABUNDANT SPECIES

Globally

This association is only positively known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Graminoid : *Calamagrostis nutkaensis*, *Carex* sp., *Juncus effusus* var. *brunneus*, *Juncus patens*,

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Graminoid : *Calamagrostis nutkaensis*, *Carex sp.*, *Juncus sp.*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this vegetation are normally dominated by *Calamagrostis nutkaensis*, which can contribute up to 70% cover in the canopy. *Carex* and *Juncus* species also contribute significant cover. These may include *Juncus effusus* var. *brunneus*, *Juncus patens*, *Carex obnupta*, *Carex densa*, and / or *Carex hartfordii*. Common associates may include *Scrophularia californica*, *Rubus spectabilis*, *Rubus ursinus*, *Erechtites minima* (exotic), *Holcus lanatus* (exotic), and / or *Iris douglasiana*. The canopy is between 1 - 2 meters in height.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G2 S2.1

RANK JUSTIFICATION Stands are of limited extend due to type conversion and development and are limited to within a few km of the coast

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

Exotics and grazing are impacts on stands of this association.

Plots used to define this association (n=4): PRNS017, GGNRA310, PRNS049, PRNS122

Rush Alliance

**Coastal Rush (*Juncus effusus* - *J. patens*) Alliance
- pi code 52030**

This alliance is currently represented by a single association locally. However, further association level variation is likely to exist with further sampling. Currently several undescribed plots sampled fall into this alliance including:

- Juncus bufonius* (PRNS195)
- Juncus patens* plots: (PRNS037, PRNS103, GGNRA389)
- J. patens* - *Erechtites minima* plot: (GGNRA301)
- Juncus leisurii* - *J. phaeocephalus* plot: (PRNS163)
- Luzula comosa* plot: (PRNS181)

The alliance is currently poorly defined and ranges from Washington to Southern California mostly along the coast.

***Juncus effusus* var. *brunneus* Association**

- pi code 52031

COMMON NAME Common Rush Herbaceous Wetland
SYNONYMS None

Point Reyes National Seashore - Golden Gate National Recreation Area
Plant Community Discriptions

PHYSIOGNOMIC CLASS	Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Seasonally flooded temperate or subpolar grassland
ALLIANCE	To be determined (Preliminarily, <i>Juncus effusus</i> alliance)

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM	Palustrine
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RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Other stands of *Juncus effusus* have been identified from Humboldt County, to Monterey County California. However, there has been no systematic sampling of these stands to identify floristic affinities.

PRNS / GGNRA

Stands of this association are scattered throughout the Point Reyes peninsula and Marin Headlands of GOGA.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Vegetation fitting the general description of this association has been identified in coastal wetlands throughout much of California. *Juncus effusus* var. *brunneus* is the common coastal variety that is likely to compose most of these stands (Hickman 1993).

PRNS / GGNRA

This vegetation grows in seasonally saturated soils on flats, depressions, or gentle slopes of all aspects. Stands prefer basins, bottoms and plains, which are saturated during the rainy season and usually hold have saturated or at least moist soils most of the growing season. Soils are moderately coarse to fine sandy loams. Stands are generally small, under 2 ha. Moisture relations are slightly drier than the permanently saturated herbaceous associations such as *Scirpus microcarpus* and the *Carex obnupta* - *Juncus patens* associations. *Juncus effusus* stands are often able to persist in a degraded form in heavily grazed pastures where species associates are largely exotic.

MOST ABUNDANT SPECIES

Globally

This association is only positively known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. *Juncus effusus* often dominates stands of seasonally flooded wetlands along the outer coastal strip of Northern California. However, it is only known quantitatively from the **PRNS / GGNRA** mapping area.

PRNS / GGNRA

Graminoid: *Juncus effusus* var. *brunneus*, *Lolium perenne*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Graminoid: *Juncus effusus* var. *brunneus*, *Potentilla anserina* var. *pacifica*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this vegetation are normally dominated by *Juncus effusus* var. *brunneus*, which can contribute up to 60% cover (range 15 - 60% n=4) in the canopy. *Potentilla anserina* var. *pacifica* is present in all stands but usually contributes only minor cover. Other species that may cover greater than 4% may include, *Lolium perenne* (exotic) and *Holcus lanatus* (exotic), *Trifolium wormskioldii*, *Trifolium repens* (exotic), *Equisetum telmateia braunii*, *Vicia* sp (exotic) and / or *Vulpia* sp (exotic). The canopy is between 1 - 2 meters in height.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4 S4?

RANK JUSTIFICATION Stands are of limited extend, are limited to within a few km of the coast, but are expected to be found to be common and range more widely than just the study area, along the outer coast of Northern, central and possibly southern California.

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

Exotics and grazing are impacts on stands of this association. However, *Juncus effusus* is relatively tolerant of grazing.

Plots used to define this association (n=4): PRNS027, PRNS072, PRNS201, PRNS115

***Juncus patens* Association**

- pi code 52032

COMMON NAME	Common Rush - Velvet Grass Herbaceous Wetland
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Intermittently flooded temperate or subpolar grassland
ALLIANCE	To be determined (Preliminarily, <i>Juncus effusus</i> - <i>Juncus patens</i> alliance)

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Palustrine

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Other stands of *Juncus patens* have been identified from Humboldt County, to San Diego County California. However, there has been no systematic sampling of these stands to identify floristic affinities.

PRNS / GGNRA

Stands of this association are scattered throughout the Point Reyes peninsula and Marin Headlands of GOGA.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Vegetation fitting the general description of this association has been identified in coastal wetlands throughout much of California. *Juncus effusus* var. *brunneus* is the common coastal variety that is likely to compose most of these stands (Hickman 1993).

PRNS / GGNRA

This vegetation grows in seasonally moist soils on gentle slopes of all aspects. Stands prefer basins, bottoms and plains, which are saturated during the rainy season and usually dry to moist soils during most of the growing season. Soils are moderately coarse to fine sandy loams. Stands are generally small, under 2 ha. Moisture relations are drier than the *Juncus effusus* var. *brunneus* seasonally flooded association or the more permanently saturated herbaceous associations such as *Scirpus microcarpus* and *Carex obnupta* - *Juncus patens* associations. *Juncus patens* stands are often able to persist in a degraded form in heavily grazed pastures where species associates are largely exotic. They resprout after heavy grazing and may be relatively unpalatable to cattle given their abundance in some heavily grazed moist pastures.

MOST ABUNDANT SPECIES

Globally

This association is only positively known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. *Juncus patens* often dominates stands of seasonally flooded wetlands along the outer coastal strip of Northern California. However, it is only known quantitatively from the **PRNS / GGNRA** mapping area.

PRNS / GGNRA

Graminoid *Juncus patens*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Graminoid *Juncus patens*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this vegetation are normally dominated by *Juncus patens*, which can contribute up to 60% cover (range 15 - 60% n=4) in the canopy. The introduced perennial grass *Holcus lanatus* is present in all stands and varies from 10 to 50% cover. Other species that may cover greater than 4% may include, *Erechtites*

minima, (exotic), *Lolium multiflorum* (exotic) *Mentha pueligium* (exotic), *Plantago lanceolata*(exotic), *Mimulus guttatus*, *Juncus bufonius*, *Oenanthe sarmentosa*, *Trifolium campestre*, (exotic), and / or *Vulpia* sp (exotic). The canopy is between 1 - 2 meters in height.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G4 S4?

RANK JUSTIFICATION

Stands are of limited extend, are limited to within a few km of the coast, but are expected to be found to be common and range more widely than just the study area, along the outer coast of Northern, central and possibly southern California. The characteristic species is tolerant of disturbance and is often found in ditches, moist coastal pastures, and trail sides; all widespread situations along the coast of California..

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

Exotics and grazing are regular impacts on stands of this association. It remains to be seen if there are any stands of *Juncus patens* association that are defined by primarily native associates.

Plots used to define this association (n=4): pore037, pore103, GGNRA389, GGNRA301

Small-Fruited Bulrush Alliance

**Small - fruited Bulrush (*Scirpus microcarpus*) Temporarily Flooded Alliance
- pi code 52070**

This alliance is represented by a single association locally. The alliance and the association were defined from the data for this project. The range of the alliance is currently poorly understood, but is probably from Central California to northern coastal California.

***Scirpus microcarpus* Association**

- pi code 52070

COMMON NAME	Small Fruited Bulrush Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Perennial Grassland
PHYSIOGNOMIC GROUP	Temperate of Subpolar Grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Semi permanently flooded temperate or subpolar grassland

ALLIANCE *Scirpus microcarpus* Grassland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Wetland, Palustrine, Emergent Wetland

RANGE

Globally

This association is only known from the Point Reyes National Seashore and Suisun Marsh. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Several stands of this association are mapped from the **PRNS / GGNRA** area. They occur in freshwater marshes in the Marin Headlands, Olema Valley, Abbotts Lagoon, and Inverness Ridge portions of the mapping area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found on 0 - 5degree slopes with flat to southwestern aspects that are usually on linear / even basins / wetlands. Soil textures range from fine sandy clay to moderately fine sandy clay loam of granitic origin. Most stands occupy saturated ground either adjacent to permanent or temporary ponds or adjacent to springs and seeps. Surrounding vegetation includes *Alnus rubra* alliance stands, *Rubus spectabilis* association, and stands of non - native perennial grassland, such as *Holcus lanatus*.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Scirpus microcarpus*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Scirpus microcarpus, *Oenanthe sarmentosa*, *Stachys ajugoides*, *Carex obnupta*, *Mimulus guttatus*, *Juncus effusus* and *Epilobium sp.*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Scirpus microcarpus forms a continuous canopy in the shrub layer with 70 - 90 percent cover of 1 - 2 m tall with an open herb layer of 2 - 25% cover at 25 cm - 1 m. This association is dominated by *Scirpus microcarpus* with an herb layer of *Oenanthe sarmentosa* *Stachys ajugoides*, *Carex obnupta*, *Mimulus guttatus*, *Juncus effusus* and *Epilobium sp.* in the understory. Other herbs in the understory may include *Anthyrium filix - femina*, *Claytonia sibirica*, *Mimulus moschatus*, *Calamagrostis nutkaensis*, *Sonchus oleraceus* and *Scirpus cernuus*.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G3S2.2

RANK JUSTIFICATION Few stands occur and all are relatively small, less than 5 acres. Searches elsewhere in the outer north Coast Ranges of California for such stands has not been fruitful (CNDDDB 1993).

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Plots used to define this association (n=2): PRNS123, PRNS193

Slough Sedge Alliance

Slough Sedge (*Carex obnupta*) Alliance

- pi code 52060

This alliance is represented by a single association in the study area. It ranges from Washington to Central California along the coastal strip.

***Carex obnupta* - *Juncus patens* Association**

- pi code 52061

COMMON NAME	Slough Sedge - Spreading Rush Herbaceous Wetland
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Seasonally flooded temperate or subpolar grassland
ALLIANCE	To be determined (Preliminarily, <i>Carex obnupta</i> alliance)
CLASSIFICATION CONFIDENCE LEVEL	2
USFWS WETLAND SYSTEM	Palustrine

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Other stands of *Carex obnupta* have been identified from Humboldt County, California (Pickart and Sawyer, 1998) and attributed to the *Carex* spp. series (Sawyer and Keeler - Wolf 1995)

PRNS / GGNRA

Stands of this association are scattered throughout the Point Reyes peninsula and Marin Headlands of GOGA.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Vegetation fitting the general description of this association has been identified in backdune wetlands in Humboldt County (Pickart and Sawyer 1998)

PRNS / GGNRA

This vegetation grows in seasonally saturated soils on gentle slopes of all aspects. Stands prefer basins, bottoms and plains, which collect water during the rainy season and usually hold water through or have saturated soils most of the growing season. Soils are moderately coarse to fine sandy loams. Stands are

generally small, under 2 ha. Moisture relations are close to permanently saturated herbaceous associations such as *Scirpus microcarpus* association.

MOST ABUNDANT SPECIES

Globally

This association is only positively known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. *Carex obnupta* often dominates stands of seasonally flooded wetlands along the outer coastal strip of Northern California. However, its association with *Juncus patens* is only known from the **PRNS / GGNRA** mapping area.

PRNS / GGNRA

Graminoid: *Carex obnupta*, *Juncus patens*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Graminoid: *Carex obnupta*, *Juncus patens*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore and Golden Gate National Recreation Area. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this vegetation are normally dominated by *Carex obnupta*, which can contribute up to 90% cover (range 15 - 90% n=4) in the canopy. *Juncus patens* is present in all stands and may also contribute significant cover. Other species that may cover greater than 4% may include *Juncus effusus* var. *brunneus*, *Juncus phaeocephalus*, *Juncus balticus*, *Carex densa*, and / or *Carex harfordii*. Common associates may include *Scrophularia californica*, *Rubus spectabilis*, *Rubus ursinus*, *Erechtites minima* (exotic), *Holcus lanatus* (exotic), *Lotus corniculatus* (exotic) and / or *Iris douglasiana*. The canopy is between 1 - 2 meters in height. *Baccharis pilularis* may cover up to 10% of the stands. Stands with > 10% *Baccharis* are classified as the *Baccharis pilularis* / *Carex obnupta* - *Juncus patens* association.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK G3 S3?

RANK JUSTIFICATION Stands are of limited extent, are restricted to within a few km of the coast, but are expected to range more widely than just the study area, along the outer coast of Northern California.

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

Exotics and grazing are impacts on stands of this association.

Plotus used to define this association (n=4): PRNS196, GGNRA268, GGNRA269, GGNRA305

Introduced Perennial Grasland – *Deschampsia* Superalliance

Tufted Hairgrass Alliance

Tufted Hairgrass (*Deschampsia cespitosa*) Alliance

- pi code 52040

This alliance is represented locally by two associations. The *Deschampsia cespitosa* - *Danthonia californica* association is found on moist terraces and gentle slopes while the *Deschampsia cespitosa* - *Horkelia marinensis* Grassland Association occurs on sandy soils adjacent to stabilized dunes. This is a very wide - ranging alliance occurring in mountains and cool coastal strips throughout much of North America.

Deschampsia cespitosa - *Danthonia californica* Association

- pi code 52041

COMMON NAME	Tufted Hairgrass - California Oatgrass Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Perennial Graminoid Vegetation
PHYSIOGNOMIC GROUP	Temperate of Subpolar Grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	1 Sod Temperate Grassland

ALLIANCE Deschampsia cespitosa Grassland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. It was likely to be more widespread along the coast from Santa Cruz Co north to Washington, prior to the introduction of invasive exotic annual and perennial grasses. Small stands resembling this association have been inventoried at Salt Point State Park in Sonoma County (California Natural Diversity Database 1993). The National Vegetation Classification (November 1999) lists this type from CA and Oregon.

PRNS / GGNRA

Stands of *Deschampsia cespitosa* - *Danthonia californica* Grassland Association are restricted to the outer Point Reyes Peninsula the mapping area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Other similar stands at Salt Point State Park occur adjacent to the coastal bluffs as a rim of native grassland adjacent to non - native annual and perennial grassland.

PRNS / GGNRA

This vegetation is found on flat to moderately sloping terrain (0 to 17 - degrees). Soil textures range from medium sand to loamy sand, to moderately fine sandy loam. Substrate may be stabilized dunes, granitic, or siltstone. Stands occur adjacent to the dune fields of the North Beach area of the Point Reyes Peninsula and on slopes on Tomales Point. The stands frequently occur adjacent to *Lupinus arboreus*, *Baccharis* - *Lupinus* dune scrub, *Ammophila arenaria* stands, and various non - native grassland stands. They are generally moister and more poorly - drained soils than adjacent sand sheets with *Baccharis pilularis* -

Deschampsia cespitosa association and occupy lower slope positions and more mesic to moist sites than the *Danthonia californica* - *Aira caryophyllea*, association. Compared to the *Deschampsia cespitosa* - *Horkelia marinensis* association it is less likely to associate with stabilized coastal dunes.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Deschampsia cespitosa*, *Danthonia californica*,
Shrub or subshrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Deschampsia cespitosa*, *Danthonia californica*,

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Similar stands occur in the coastal strip of the Sonoma County.

PRNS / GGNRA

Stands of *Deschampsia cespitosa* - *Danthonia californica* grassland association form a continuous herb layer of 60%5 - 60% cover 0 - 25 cm and 25 - 95% at 25 - 50 cm tall. There is usually less than 20% cover between 0.5 and 1 m tall. This association is dominated by *Deschampsia cespitosa* and *Danthonia californica* *Aira caryophyllea*. *Plantago lanceolata*, *Lolium perrene*, *Rumex acetosella* and *Nassella pulchra* may also be present.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G2 S2

RANK JUSTIFICATION Stands are few and small in California, may have been decimated and destroyed by type conversion to invasive exotic grassland.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

The *Deschampsia cespitosa* alliance is represented by montane and coastal associations in California. The coastal associations are more threatened and rare due to the impacts of invasive alien grasses, inappropriate grazing regimes, and impacts associated with development.

Plots used to define this association (n=4): PRNS028, PRNS077, PRNS052, PRNS031

***Deschampsia cespitosa* - *Horkelia marinensis* Association**

- pi code 52042

COMMON NAME	Tufted Hairgrass - Marine Horkelia grassland association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Perennial Graminoid Vegetation
PHYSIOGNOMIC GROUP	Temperate of Subpolar Grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Tall Sod Temperate Grassland
ALLIANCE	<i>Deschampsia cespitosa</i> Grassland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. It was likely to be more widespread along the coast from Santa Cruz Co. north to Washington, prior to the introduction of invasive exotic annual and perennial grasses. Small stands resembling this association have been inventoried at Salt Point State Park in Sonoma County (California Natural Diversity Database 1993).

PRNS / GGNRA

Stands of *Deschampsia cespitosa* - *Danthonia californica* Grassland Association are restricted to the outer Point Reyes Peninsula the mapping area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Other similar stands at Salt Point State Park occur adjacent to the coastal bluffs as a rim of native grassland adjacent to non - native annual and perennial grassland.

PRNS / GGNRA

This vegetation is found on north - easterly facing slopes of 3 to 9 - degrees. Soil textures range from medium sand to coarse loamy sand. Substrate may be stabilized dunes or siltstone, beneath a sandy surface. Stands occur adjacent to and among the sand fields of the Point Reyes Peninsula. The stands frequently occur adjacent to *Lupinus arboreus*, *Baccharis* - *Lupinus* dune scrub, *Ammophila arenaria* stands, and various non - native grass stands. They are generally moister and more poorly - drained soils than adjacent sand sheets with *Baccharis pilularis* - *Deschampsia cespitosa* association and occupy lower slope positions and more mesic to moist sites than the *Danthonia californica* - *Aira caryophyllea*, association. Compared to the *Deschampsia cespitosa* - *Danthonia californica* association it is more likely to associate with stabilized coastal dunes or sand fields.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Deschampsia cespitosa*, *Danthonia californica*,

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Deschampsia cespitosa*, *Danthonia californica*,

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Deschampsia cespitosa* - *Horkelia marinensis* grassland association form an intermittent to continuous herb layer of up to 25% mosses and lichens, 40 - 50% cover 0 - 25 cm and 7 - 15% at 25 - 50 cm tall. This association is dominated by *Deschampsia cespitosa*, *Horkelia marinensis* is usually from 1% to 18% cover. Other species are characteristic of coastal dunes and include: *Cardioniema ramosissimum*, *Armeria maritimum*, *Gnaphalium purpureum*, *Vulpia bromoides* (exotic), *Carpobrotus edulus* (exotic), and *Holcus lanatus* (exotic).

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3 S1?

RANK JUSTIFICATION Stands are few and small in California, may have been decimated and destroyed by type conversion to *Ammophila arenaria* and *Carpobrotus edulus* exotic alliances.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

The *Deschampsia cespitosa* alliance is represented by montane and coastal associations in California. The coastal associations are more threatened and rare due to the impacts of invasive alien grasses, inappropriate grazing regimes, and impacts associated with development.

Plots used to define this association (n=2): PRNS032, PRNS029

Red Fescue Alliance

Red Fescue (*Festuca rubra*) Grassland Alliance

- pi code 52050

This alliance is uncommon in the study area. Insufficient plot data exists to define associations. The following account will serve to describe the alliance locally.

COMMON NAME	Red fescue coastal prairie
SYNONYM	Coastal Prairies (Holland)
PHYSIOGNOMIC CLASS	Herbaceous
PHYSIOGNOMIC SUBCLASS	Perennial graminoid
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland
PHYSIOGNOMIC SUB GROUP	Natural / semi - natural
FORMATION	Medium - tall sod temperate or subpolar grassland
ALLIANCE	<i>Festuca rubra</i> Herbaceous Alliance

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM

Upland; Wetland: palustrine emergent

RANGE

Globally

Festuca rubra dominated stands are rare and scattered on coastal headlands on the Northern California Coast and in the Northern California Coast Ranges and in Oregon and Washington.

PRNS / GGNRA

A single plot in the study area identified at Point Reyes National Seashore, just north of Kehoe Ranch. However, other stands have been observed in the area.

ENVIRONMENTAL DESCRIPTION

Globally

Wetlands habitats are seasonally or permanently saturated with shallow water table. Water chemistry: fresh. Upland habitats occur at all topographic locations, from sea - level to 3500 meters. Soil texture clay, loam, sand. Stands may also occur on moist coastal terraces that are not wetlands.

PRNS / GGNRA

Upland location; southwest - facing; gently - sloping; soils medium to fine sandy loam; area currently being grazed. Other stands observed appear to be on deep fine - grained coastal terrace soils.

MOST ABUNDANT SPECIES

Globally

Herb: *Festuca rubra*

Shrub: *Baccharis pilularis, Artemisia californica*

PRNS / GGNRA

Herb: *Festuca rubra, Iris douglasiana, Bromus hordeaceus, Plantago lanceolata, Lolium perenne, Hypochaeris radicata*

CHARACTERISTIC SPECIES

Globally

Festuca rubra

PRNS / GGNRA

Festuca rubra

VEGETATION DESCRIPTION

Globally

Festuca rubra dominant or most conspicuous native grass in the ground layer; *Achillea millefolium, Artemisia suksdorfii, Avena barbata, Bromus carinatus, Camassia leichtlinii, Erigeron glaucus, Elymus glaucus, Eriophyllum lanatum, Festuca idahoensis, Danthonia californica, Calamagrostis nutkaensis, Koeleria macrantha, Nassella pulchra, Solidago Canadensis, and Viola adunca* may be present. Emergent trees and shrubs such as *Baccharis pilularis, and Lupinus arboreus*; The coniferous trees *Pseudotsuga menziesii, Pinus contorta, and Picea sitchensis*, may be present. Grass canopy < 1 m; intermittent to closed.

PRNS / GGNRA

Festuca rubra dominant in the ground layer with few emergent *Baccharis pilularis; Iris douglasiana, Bromus hordeaceus, Plantago lanceolata, Lolium perenne, Hypochaeris radicata* also present; Grass canopy < 1 m, continuous.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G3 S1.1

RANK JUSTIFICATION *Festuca rubra* is probably the rarest of the coastal terrace prairie alliances. This has much to do with the loss of original stands due to agriculture, introduction of exotics, and development.

DATABASE CODE

COMMENTS

Globally

Grasslands in northwest California are given the collective name of coastal prairie (Heady et al. 1977b). The coastal prairie occurs in two phases: the grasslands on coastal terraces are called terrace grasslands, and the inland grasslands found commonly on ridges and hilltops are called balds or prairies. Throughout the coastal northern California these prairies mix with *Pseudotsuga menziesii* - *Lithocarpus densiflorus* and *Sequoia sempervirens* forest and *Quercus garryana* woodlands on a coarse scale. *Festuca rubra*, dominated stands are rare and scattered on coastal headlands in northern California, Oregon and Washington. It often occurs as small patches in a mosaic of grassland, shrubland and forest communities. *Festuca rubra* is probably the rarest of the coastal terrace prairie alliances. This has much to do with the loss of original stands due to agriculture, introduction of exotics, and development.). The soils are derived from colluvium or sand, and are usually shallow, well - drained, and have a significant component of gravels. Persistent strong winds, salt - spray, and the shallow soils are important factors in the maintenance of these grasslands.

The few stands of *Festuca rubra* in CA appears to occur within the summer fog belt close to the coast in windswept locations. Today many former *Festuca rubra* grasslands are either dominated by perennial grasses such as *Anthoxanthum odoratum*, *Arrhenatherum elatius*, *Danthonia pilosa*, and *Holcus lanatus* or by annual grasses such as *Bromus hordeaceus* and *Cynosures cristatus*, *Lolium multiflorum*, and *Teaniatherum caput - medusae*.

Fires were probably important in the past in limiting invasion of these grasslands by coniferous tree species. Fire suppression over the past 80 years may have resulted in successional changes from grasslands to shrublands and forests.

PRNS / GGNRA

Point Tom and the Tomales Point stands in Marin Co. have non - native grass composition dominated by *Holcus*, but also include *Calamagrostis nutkaensis*, *Danthonia californica*, *Deschampsia cespitosa*, *Nassella pulchra*, *Iris douglasii*, and *Gentiana affinis* var. *ovata*. The most important known location for *F. rubra* stands in CA occurs at Point Reyes, where 16 stands have been inventoried with absolute cover of > / =15% *F. rubra* (Point Reyes Accuracy assessment database 2001). Some of these stands are formally members of other alliance stands, such as *Baccharis pilularis*, or *Nassella pulchra*.

Plots used to define this alliance locally (n=1): PRNS044

Introduced Coastal Perennial Grassland Alliance

Introduced Coastal Perennial Grassland Alliance

- pi code 47030

This alliance is characterized by several perennial non - native grasses. It has replaced native grass stands and native coastal scrubs as a result of clearing, planting of pasture grasses, and grazing disturbance throughout much of northern Coastal California and adjacent Oregon and Washington. Insufficient plot data exists to define associations.

COMMON NAME

Introduced coastal perennial grassland

SYNONYM

Coastal prairie (Holland, Munz)

PHYSIOGNOMIC CLASS

Herbaceous

PHYSIOGNOMIC SUBCLASS	Perennial graminoid
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland
PHYSIOGNOMIC SUB GROUP	Natural / semi - natural
FORMATION	Short sod temperate or subpolar grassland
ALLIANCE	Introduced Coastal Perennial Grassland Alliance
CLASSIFICATION CONFIDENCE LEVEL	
USFWS WETLAND SYSTEM	Upland; wetland: palustrine emergent

RANGE

Globally

In California on the Northern California Coast and in the Northern California Coast Ranges.

PRNS / GGNRA

ENVIRONMENTAL DESCRIPTION

Globally

Wetland habitats seasonally or permanently saturated with shallow water table. Water chemistry: fresh. On uplands at all topographic locations. Elevations from sea - level to 3500 meters. Soil texture clay, loam, sand.

PRNS / GGNRA

The sampled stands are on upland habitats on sand to sandy loam soils. Some un - sampled stands dominated by *Holcus lanatus* appear to be close ecologically to some *Calamagrostis nutkaensis* and *Juncus patens* or *Carex obnupta* stands.

MOST ABUNDANT SPECIES

Globally

Holcus lanatus, *Anthoxanthum odoratum*, *Arrhenatherum elatius*, *Danthonia pilosa*

PRNS / GGNRA

Holcus lanatus

CHARACTERISTIC SPECIES

Globally

Holcus lanatus, *Anthoxanthum odoratum*, *Arrhenatherum elatius*, *Danthonia pilosa*, and other non - native perennial grasses.

PRNS / GGNRA

Ammophila arenaria, *Festuca arundinacea*, *Holcus lanatus*, *Lolium perenne*, *Phalaris aquatica*.

VEGETATION DESCRIPTION

Globally

Introduced perennial grasses are dominant in the ground layer; *Agrostis stolonifera*, *Anthoxanthum odoratum*, *Arrhenatherum elatius*, *Bromus carinatum*, *Carex tumulicola*, *Dactylis glomerata*, *Danthonia californica*, *Deschampsia cespitosa*, *Elymus glaucus*, *Festuca idahoensis*, *F. rubra*, *Holcus lanatus*, *Phalaris aquatica*, *Poa secunda*, *P. pratensis*, and / or *Pteridium aquilinum* may be present. Emergent shrubs and trees may be present. Grass canopy < 1 m; intermittent to closed.

PRNS / GGNRA

Introduced perennial grasses are dominant in the ground layer. *Ammophila arenaria*, *Festuca arundinacea*, *Holcus lanatus*, *Lolium perenne*, *Phalaris aquatica* may be present. Emergent shrubs may be present. Grass canopy < 1m. intermittent to continuous.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK Exotic

RANK JUSTIFICATION Exotic and invasive, persisting and overtaking native grassland stands along the coast of Northern California.

DATABASE CODE

COMMENTS

Globally

Grasslands in northwest California are given the collective name of coastal prairie (Heady et al. 1977b). Many of the original native grasslands have been replaced by grasslands dominated by non - native perennial grasses from Eurasia. The coastal prairie occurs in two phases: the grasslands on coastal terraces are called terrace grasslands, and the inland grasslands found commonly on ridges and hilltops are called balds or prairies. Throughout the coastal northern California these prairies mix with *Pseudotsuga menziesii* - *Lithocarpus densiflorus* and *Sequoia sempervirens* forest and *Quercus garryana* woodlands on a coarse scale.

The original grasslands are considered to have been dominated by *Danthonia californica*, *Festuca idahoensis*, or *F. rubra* (Brett - Davy 1902). Today many grasslands are either dominated by perennial grasses such as *Anthoxanthum odoratum*, *Arrhenatherum elatius*, *Danthonia pilosa*, and *Holcus lanatus* or by annual grasses such as *Bromus hordeaceus* and *Cynosurus cristatus*, *Lolium multiflorum*, and *Teaniatherum caput - medusae*. Once established, these non - native grasses are usually effectively excluders of most native grass species.

Plot - based descriptions: Grenier (1989) and Saenz & Sawyer (1986) defined an association in Redwood National Park, Humboldt Co.; Jimerson (1993) four associations in Six Rivers National Forest; Heady et al. (1977b) and Foin & Hektner (1977) two associations, Brown (1993) established monitoring sites that were dominated by *Holcus lanatus* at Sonoma Coast State Beaches, and NDDB has plot data on file for *Holcus lanatus* - dominated stands in Sonoma Co.

PRNS / GGNRA

Insufficient plot data exist to define associations locally. With further data it may become reasonable to defined separate alliances as well as associations using dominant or characteristic species such as *Holcus lanatus*, *Festuca arundinacea*, etc. These exotic grasses are persisting in areas where grazing pressure is relatively high, but also persist in areas where grazing pressure is lower than previous decades.

Plots used to define this alliance locally (n=5): GGNRA308, PRNS051, PRNS016, GGNRA307, PRNS042

Drier Coastal Grassland / Open Scrub Mesocluster

Native – Weedy Grassland Superalliance

California Annual Grassland Mapping Unit

- pi code 67010

This widespread alliance characterized by non - native annual grasses and forbs, is represented by two associations locally. In addition there are several individual plots suggesting further differentiation. These include: *Hordeum murinum* - *Lolium perenne* plot: (PRNS089), *Bromus diandrus* - *Phacelia distans* - *Carpobrotus sandy* plot (PRNS084), and *Bromus diandrus* - *Lolium multiflorum* plot (PRNS152). It is likely that with further sampling additional associations can be distinguished locally. The range of this alliance includes most of Cismontane California. Because of the large variation of species in this alliance locally we have chosen to include a general description of the alliance below, followed by descriptions of the two associations defined locally.

COMMON NAME

California Annual Grassland

SYNONYM

Non - native grassland, Wildflower Field (Holland);
Cismontaine Introduced Grasses (Cheatham & Haller)
Bromegrass Series, Wild Oats Series (PSW - 45); Great
Valley and Coast Range Grassland (Thorne); Annual
Grass (WHR)

PHYSIOGNOMIC CLASS

Herbaceous

PHYSIOGNOMIC SUBCLASS

Annual Graminoid or Forb

PHYSIOGNOMIC GROUP

Temperate or Subpolar Annual Grassland or Forb

PHYSIOGNOMIC SUB GROUP

Natural / Semi - natural

FORMATION

Short Temperate Annual Grassland

ALLIANCE

Bromus diandrus - *B. Hordeaceus* - *Hordeum* sp. Alliance
(California Annual Grassland Alliance)

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM

Upland

RANGE

Globally

This association occurs along the Central, Southern, and Northern California Coast, Central Valley, Klamath Mountains, Northern California Coastal Ranges, Northern California Interior Coastal Ranges, Sierra Nevada Foothills, Central California Coast Ranges, Southern California Mountains and Valleys, Mojave Desert, and Baja California.

PRNS / GGNRA

Five plots at just the alliance level were taken in the Pt. Reyes National Seashore and Golden Gate National Recreation Area study site, in the Pierce Point and Willow Camp Trail areas.

ENVIRONMENTAL DESCRIPTION

Globally

California annual grasslands occur on all topographic locations. They may occur on shallow rocky soils that once supported native scrub and chaparral or may occur on deep, fine - textured soils that originally supported native grasslands or steppes. The latter conditions are often indicated by a low percentage of native annual and perennial grassland species.

PRNS / GGNRA

Plots in the study area were located on slopes and ridge tops at sea - level to 400ft elevation; soils sandy loam to sand.

MOST ABUNDANT SPECIES

Globally

Avena spp., *Brassica* spp., *Bromus* spp., *Castilleja* spp., *Cynosurus echinatus*, *Erodium* spp., *Eschscholzia californica*, *Lasthenia* spp., *Lupinus* spp., *Triphysaria eriantha*

PRNS / GGNRA

Lolium multiflorum, *Bromus diandrus*, *Carduus pycnocephala*, *Brassica nigra*, *Vulpia bromoides*, *Avena* spp., *Rumex acetosella*, *Geranium dissectum*, *Bromus hordeaceus*, *Pteridium aquilinum*, *Carpobrotus edulis*, *Phacelia distans*, *Amsinckia spectabilis*, *Lupinus arboreus*, *Lolium perenne*.

CHARACTERISTIC SPECIES

Globally

Avena spp., *Bromus* spp., *Lolium* spp., and other annual grasses.

PRNS / GGNRA

Lolium multiflorum, *Bromus diandrus*, *Carduus pycnocephala*, *Vulpia* spp.

VEGETATION DESCRIPTION

Globally

Annual grasses and herbs dominant in ground layer; *Avena* spp., *Brassica* spp., *Bromus* spp., *Castilleja* spp., *Cynosurus echinatus*, *Erodium* spp., *Eschscholzia californica*, *Lasthenia* spp., *Lupinus* spp., *Triphysaria eriantha* may be present. Emergent shrubs and trees may be present. Grass < 1 m; continuous or open.

PRNS / GGNRA

Annual grasses and herbs dominate the ground layer; *Lolium multiflorum*, *L. perenne*, *Bromus diandrus*, *B. hordeaceus*, *Avena* spp., *Vulpia bromoides*, *Carduus pycnocephala*, *Brassica nigra*, *Rumex acetosella*, *Germanium dissectum*, *Pteridium aquilinum*, *Phacelia distans*, *Amsinckia spectabilis*, *Lupinus arboreus* may be present. Grass / herb canopy <1m, continuous.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK Exotic

RANK JUSTIFICATION Exotic

DATABASE CODE

COMMENTS

Globally

This extensive grassland is composed of many alien and native annual species; composition varies among stands. Fall temperatures and precipitation are major factors determining grassland composition, along with light intensity affected by shading from plants and litter, and differences in micro - topography (Evans & Young 1989). The fine scale variation in temporal and spatial structure found in the California annual grassland suggests that recognition of many alliances is not useful (Bartolome 1989).

Plot - based descriptions: Saenz & Sawyer (1986) report on sites grazed for the full 1982 season. They were dominated by dogtail, in what now is Redwood National Park in Humboldt Co., Foin & Hektner (1986) define a Stable meadow in Sonoma Co.; Schlising & Sanders (1982) two associations associated with vernal pools in Butte Co.; Parsons & Stohlgren (1989) one Slender oat association at Sequoia National Park in Tulare Co.; Kopecko & Lathrop (1975) two types associated with vernal pools at Santa Rosa Plateau in Riverside Co.

PRNS / GGNRA

Insufficient plot data exist for development of more than two association level descriptions locally. There is some evidence that certain species considered within the California annual grassland may be used as indicators of individual alliances (e.g., *Avena barbata*, *Bromus diandrus*). However, further plot data from around California is needed before subdivision of this complex is attempted. There is also evidence that native annual herbs such as *Trifolium* spp, *Lotus* spp., *Lasthenia* spp., and *Lupinus* spp. may also form their own alliances. With further sampling and subsequent analysis locally it is likely that the taxonomy will change radically for this generic alliance.

Plots used to describe this association (n=0): no plots sampled

***Brachypodium distachyon* Association**

- pi code 67011

COMMON NAME	None
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUB GROUP	Non - native
FORMATION	Short temperate annual grassland

ALLIANCE	<i>Bromus diandrus</i> - <i>B. Hordeaceus</i> - <i>Hordeum</i> sp. Alliance (California Annual Grassland Alliance)
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CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM	Upland
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RANGE

Globally

This association is only known from the Golden Gate National Recreation Area and from the Santa Cruz Mountains several miles south of the study area (see comments section). Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Brachypodium distachyon* grassland association are found throughout the mapping area of GOGA within the Bolinas and Montara 7.5 minute topographic quads.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Golden Gate National Recreation Area and the Santa Cruz Mountains. In both areas the stands are found on xeric exposures in areas that were likely to have supported native grasslands prior to the introduction of non - native grasses and forbs. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found on a wide range of elevations (48 - 1403 ft.) on mid to upper slopes and back slopes that are 12 - 32 degrees with southeast to southwest aspects. Soil textures range from moderately fine sandy clay loam to moderately course sandy loam.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Brachypodium distachyon*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Brachypodium distachyon*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Brachypodium distachyon* grassland association are usually dense grasslands under 1 m in height. They form an open to continuous herb layer with 15 - 95% cover at 0 - 25 cm tall, 5 - 30% cover at 25 - 30 cm tall, 0 - 80% cover at 0.5 to 1 m tall and 0 - 3% cover at 1 - 2 m tall. This association is dominated by *Brachypodium distachyon*. Other common herbs present may include *Hypochaeris glabra*, *Carpobrotus edulis*, *Brassica rapa*, *Nassella pulchra*, *Cynosurus echinatus*, and *Avena fatua*. Other species are variable and include a variety of invasive exotics. Often adjacent to *Baccharis pilularis* and *Pseudotsuga menziesii* alliance stands, this association is found on soils that are moderately fine sandy clay loam to moderately coarse sandy loam often with a relatively high percentage of litter.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK Non - native exotic G4 S4?

RANK JUSTIFICATION

DATABASE CODE to be added

COMMENTS

Globally

About 30 stands of *Brachypodium distachyon* - dominated annual grassland have been sampled in the Santa Cruz mountains from 20 - 50 miles south of the mapping area. These records have been entered in the California Vegetation Information System Database (CNDDDB 2001) They contain similar mixes of species to the PRNS samples including *Nassella pulchra* up to 30% cover. It appears that *B. distachyon* - dominated annual grassland occurs on soils suited for grass species and may have once been dominated by *Nassella pulchra*. Most Santa Cruz Mountains stands have *Nassella pulchra* as the principal native associate, suggesting that *B. distachyon* is a relatively close ecological equivalent to *Nassella pulchra* and may compete for sites with this important native species. Some stands in the Santa Cruz mountains and locally at Golden Gate National Recreation Area also have evidence of invasion by shrubs such as *Baccharis pilularis*. Most of the stands with *Baccharis* are underlain by a relatively coarser soil. It is likely that many of these stands were once stands of *Baccharis pilularis* alliance, converted by clearing and grazing.

PRNS / GGNRA

This annual grassland appears to have replaced once perennial stands of *Nassella pulchra* and possibly *Danthonia californica* Alliance. *Brachypodium* is most abundant in areas within 5 miles of the coast and occurs on soils that were likely occupied previously by native grassland.

Plots used to define this association (n=4): GGNRA274, GGNRA282, GGNRA261, GGNRA262

***Raphanus sativus* Association**

- pi code 67012

COMMON NAME	Radish Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Annual graminoid or forb vegetation
PHYSIOGNOMIC GROUP	Temperate or subpolar annual grasslands or forb vegetation
PHYSIOGNOMIC SUB GROUP	Non - native
FORMATION	Short temperate annual grassland
ALLIANCE	<i>Bromus diandrus</i> - <i>B. Hordeaceus</i> - <i>Hordeum</i> sp. Alliance (California Annual Grassland Alliance)

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Raphanus sativus* grassland association are found throughout the mapping area of PRNS.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found on upper linear, slopes of 7 - 9 degrees and ridge tops. Aspects range from north to south. Found on granitic soils that are medium loam to moderately coarse, sandy loam.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Raphanus sativus*, *Lolium multiflorum*, *Bromus diandrus*

CHARACTERISTIC SPECIES

Globally

PRNS / GGNRA

Herbaceous: *Raphanus sativus*, *Bromus diandrus*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Raphanus sativus* grassland association form an intermittent to continuous grassland with 15 - 95% cover at 0 - 25 cm tall, 5 - 30% at 25 - 50 cm tall, 80% at 0.5 - 1 m tall and 3 percent at 1 - 2m tall. This association is dominated by *Raphanus sativus*. *Bromus diandrus* and or *Lolium multiflorum* may also be common. *Stellaria media*, *Marah fabaceus*, *Claytonia perfoliata*, *Rumex acetosella*, *Vulpia bromoides*, *Amsinkia spectabilis* and a variety of other herbaceous species contribute minor cover. This association is found on upper linear, 7 - 9 degree slopes and ridge tops with aspects that range from north to south and found on granitic soils that are medium loam to moderately coarse sandy loam.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK Invasive exotic

RANK JUSTIFICATION

DATABASE CODE

COMMENTS

Globally

Radish patches are minor variants of annual grassland probably reflecting certain disturbance regimes conducive to proliferation of these tall annuals over shorter annual grasses. This association is only known from the Point Reyes National Seashore. Similar *Raphanus sativus* dominated weedy stands occupy many disturbed areas in Cismontane California below about 600 m. However, only a few plots exist. Two plots from Suisun Marsh (Keeler - Wolf et al 2000) are widely divergent one with vestiges of brackish marsh species such as *Distichlis spicata* and *Frankinia salina* and another with an equal cover of the invasive yellow star thistle *Ceanotaurea solstitialis*. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Plots used to define this association (n=3): PRNS060, PRNS085, PRNS118

**California Annual Grassland With Native Component Mapping Unit
- pi code 67020**

**California Oatgrass Alliance
California Oatgrass (*Danthonia californica*) Alliance
- pi code 67040**

This alliance is represented by a single association in the study area. It occurs in moist to relatively dry coastal grasslands. The alliance ranges from Southern Oregon to Central California. It overlaps ecologically with the *Nassella pulchra* alliance and a single plot (PRNS004) demonstrates this overlap.

***Danthonia californica* - *Aira caryophyllea* Association
- pi code 67040**

COMMON NAME	California Oatgrass - Silver European Hairgrass Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation

PHYSIOGNOMIC SUBCLASS Perennial Graminoid Vegetation
PHYSIOGNOMIC GROUP Temperate of Subpolar Grassland
PHYSIOGNOMIC SUB GROUP Natural / Semi - Natural
FORMATION Tall Sod Temperate Grassland

ALLIANCE *Danthonia californica* Grassland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Danthonia californica* - *Aira caryophyllea* Grassland Association are throughout the mapping area of PRNS.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This vegetation is found on gentle convex, south - southwest facing dunes / sand fields. Soil textures range from medium sand or silt. Stands occur adjacent to the dune fields of the North Beach area of the Point Reyes Peninsula. They are on better - drained soils than adjacent flats with *Deschampsia cespitosa* association

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Danthonia californica*, *Aira caryophyllea*,

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Danthonia californica*, *Aira caryophyllea*, *Plantago lanceolata*, *Lolium perrene*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Similar stands occur in the coastal strip of the Santa Cruz Mountains in San Mateo County (CNDDDB 2001). However those stands tend to be drier and have more cover of non - native annuals such as *Brachypodium distachyon*.

PRNS / GGNRA

Stands of *Danthonia californica* - *Aira caryophyllea* grassland association form an intermittent herb layer of 40% cover 0 - 25 cm and 25 - 50 cm tall, and 20% cover at 0.5 - 1 m tall. This association is dominated by *Danthonia californica* and *Aira caryophyllea*. *Plantago lanceolata*, *Lolium perrene*, *Rumex acetosella* and *Bromus hordeaceus* may also be present. It is often adjacent to introduced perennial grasslands and *Juncus* meadows.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3S2?

RANK JUSTIFICATION This association has probably been greatly reduced in extent and quality as a result of increased grazing and introduction of exotics.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

The *Danthonia californica* alliance was once more widespread in the area prior to introduction of non - native annual and perennial grasses. *Aira caryophyllea* is a diminutive non - native annual species native to Europe. This association is indicative of the relatively dry well - drained sites within this alliance.

Plots used to define this association (n=3): PRNS197, PRNS136, PRNS019

Purple Needlegrass Alliance

Purple Needlegrass (*Nassella pulchra*) Alliance

- pi code 67030

This alliance is represented by a single association in the study area. This association is closely related to the *Baccharis pilularis* / *Nassella pulchra* association of the *B. pilularis* alliance. However, it is not dominated by *B. pilularis*. Additional variation is represented by a single *Nassella pulchra* - *Melica californica* plot (GGNRA281). This alliance is restricted to Cismontane California from Shasta County to San Diego County.

***Nassella pulchra* - *Baccharis pilularis* Association**

COMMON NAME	Purple needlegrass and Coyote Brush Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Perennial graminoid vegetation
PHYSIOGNOMIC GROUP	Temperate or Subpolar Grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi Natural
FORMATION	Medium - tall sod temperate or subpolar grassland

ALLIANCE *Nassella pulchra* Grassland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

A few stands of *Nassella pulchra* - *Baccharis pilularis* grassland association are found throughout the Sweeney Ridge portion of GGNRA and are common in the Marin Headlands portion of GGNRA. Data collected by Cort Johnson (San Jose State University 1998 in California Vegetation Information System CNDDDB 2001) is also available on this association south in the Santa Cruz Mountains. Plot data were collect from within the Pt. Bonita 7.5 minute topographic quad.

ENVIRONMENTAL DESCRIPTION

Globally

This association is known from the Point Reyes National Seashore and from the Santa Cruz Mountains of San Mateo and Santa Cruz Counties. The few stands sampled in the Santa Cruz Mountains suggest a similar composition, environment, and cover of the dominant species to samples from **PRNS / GGNRA**. Stands may occur further north and south along the California Coast. Parent material may also be marine sediments or granitic.

PRNS / GGNRA

This vegetation is found at low elevations (281 - 237 ft.), on undulating lower to upper parts of southeast to west - southwest facing slopes (18 - 32 degree angles). It is found on medium silt loam to moderately fine sandy loam often with Chert parent material derived from the Franciscan Formation.

MOST ABUNDANT SPECIES

Globally

Santa Cruz Mountains stands herbaceous: *Nassella pulchra*, *Danthonia californica*, *Lolium perenne*, *Aira caryophyllea*, and *Vulpia bromoides*.

PRNS / GGNRA

Herbaceous: *Nassella pulchra*, *Plantago lanceolata*, *Anagallis arvensis*
Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is known from the Point Reyes National Seashore and Golden Gate National Recreation Area and the adjacent Santa Cruz Mountains to the south. Unpublished information on the presence of this association suggests it occurs southward in the Coast Ranges to at least Central Santa Cruz County (C. Johnson personal communication 1998). Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Nassella pulchra*
Shrub: *Baccharis pilularis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore and from the Santa Cruz Mountains. No systematic survey of its global range has been attempted. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of *Nassella pulchra* - *Baccharis pilularis* grassland association form an intermittent to continuous herbaceous layer of 20 - 50% cover at 0 - 25 cm tall, and 25 - 45% cover at 25 - 50 cm tall and an open shrub layer of with 0 - 10% cover at 0.5 - 1 m tall. It is dominated by *Nassella pulchra* and *Baccharis pilularis consanguinea*. A variety of other herbaceous species that may be present include *Plantago lanceolata*, *Anagallis arvensis*, *Vulpia bromoides*, *Plantago erecta*, *Dichondra donelliana*, *Melica californica*, *Artemisia californica*, *Achillea millefolium*, *Eriogonum latifolium*, *Lolium multiflorum*,

Freshwater Wetland Herb Mesocluster

Bulrush – Cattail Superalliance

Spikerush Alliance

Spikerush [*Eleocharis (montevidensis, palustris, quinqueflora)* Alliance

pi code 55050

This alliance is poorly represented locally and no associations have been defined. The following general descriptions will serve to characterize it locally. The alliance as is currently defined is very wide ranging throughout much of North America.

COMMON NAME	Spikerush Stands
SYNONYMS	Transmontane Freshwater Marsh, Coastal and Valley Freshwater Marsh, Montane Freshwater Marsh, Wet Montane Meadow, Freshwater Seep (Holland); Coastal and Valley Freshwater Marsh, Great Basin Freshwater Marsh, Valley Alkali Marsh, Great Basin Alkali Marsh (Cheatham & Haller); Alkali Meadow, Freshwater Marsh (Thorne); Fresh Emergent Wetland (WHR)
PHYSIOGNOMIC CLASS	Herbaceous
PHYSIOGNOMIC SUBCLASS	Perennial graminoid
PHYSIOGNOMIC GROUP	Temperate or subpolar grassland
PHYSIOGNOMIC SUB GROUP	Natural / semi - natural
FORMATION	Seasonally flooded temperate or subpolar grassland
ALLIANCE	<i>Eleocharis (montevidensis, palustris, quinqueflora)</i> Seasonally Flooded Herbaceous Alliance

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Estuarine, palustrine

RANGE

Globally

Widespread throughout California and much of western North America.

PRNS / GGNRA

A single plot in the project area was located on the Giacomini Ranch.

ENVIRONMENTAL DESCRIPTION

Globally

Habitat permanently flooded, regularly flooded, semipermanently flooded, seasonally, flooded, irregularly flooded, irregularly exposed. Water chemistry: fresh, mixohaline, mixosaline. Bay, estuary, dune swale, backwater, bank, margins of rivers, channel, creek, ditch margins, lake beds; lagoon, pond, reservoir margins, along fault sag ponds. Soils peaty or mucky. Elevation: 45 m - 3500 m

PRNS / GGNRA

Stand located at south side of small pond in fine, silty clay soil, adjacent to *Juncus balticus* stand.

MOST ABUNDANT SPECIES

Globally

Eleocharis alliance stands have been considered as part of vernal pools in several parts of California (Keeler - Wolf et al 1997). They are also part of the coastal freshwater marsh and montane freshwater marsh ecosystems (Holland 1986). These stands typically occupy small areas and are often narrow strips between relatively more permanently saturated or flooded ecosystems and adjacent drier ecosystems. As with all narrow wetland alliances, this alliance should be considered sensitive.

PRNS / GGNRA

Note there is some confusion about the alliance identification of these stands. *Torreyochloea pallida* also may form its own alliance and further sampling is required to define these stands both at the alliance and association level.

Plot used to define this alliance locally (n=1): PRNS178

Bulrush - Cattail Alliance

**Large Bulrush - Cattail (*Scirpus californicus* - *Typha latifolia*) Alliance
- pi code 55020**

This alliance is represented locally by one association. It is a widespread North American alliance.

***Scirpus californicus* - *Typha latifolia* Association**

- pi code 55040

COMMON NAME	Bulrush - Cattail Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Perennial Grassland
PHYSIOGNOMIC GROUP	Temperate of Subpolar Grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Semi permanently flooded temperate or subpolar grassland

ALLIANCE *Scirpus californicus* - *Typha latifolia* Grassland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Wetland, Palustrine, Emergent Wetland

RANGE

Globally

This association is known from the Point Reyes National Seashore and from Suisun Marsh, Solano County, California (Keeler - Wolf *et al* 2000). Almost 800 stands covering about 2100 acres were mapped there. It is likely that this association is widespread in California and other western states. However, information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

About 70 stands of this or similar *Scirpus* or *Typha* - dominated vegetation are mapped throughout the **PRNS / GGNRA** area. Most are small, less than 5 acres.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore and Suisun Marsh, Solano County. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is found on flat, linear basins / wetlands. Soil textures range from medium silt loam to moderately fine clay loam of mixed alluvium and Franciscan mélange. Water typically is at the surface throughout the growing season. Water chemistry is typically fresh to brackish.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore and Suisun Marsh. *Typha latifolia*, *T. dominicensis*, and *T. angustifolia* are common along with *Scirpus californicus*. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

herb: *Scirpus californicus*, *Lemna minor*, *Typha latifolia*, *Typha dominicensis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

herb: *Scirpus californicus*, *Typha latifolia*, *Typha dominicensis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore and Suisun Marsh (Keeler - Wolf *et al.* 2000). In both areas stands occur in a mixture of fresh and brackish marshes. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Scirpus californicus* - *Typha latifolia* grassland association form an open to intermittent layer of 10 - 44 percent cover at 1 - 2 m tall, and 25 - 40 percent cover at 2 - 5 m tall dominated by *Scirpus californicus* and sometimes *Typha latifolia*. *Lemna minor* may be common in the understory. *Juncus effusus*, *Typha dominicensis*, *Calamagrostis nutkaensis*, and *Polygonum amphibium* may also contribute to minor cover in the understory. This association is found on flat, linear basins / wetlands. Water is present on the surface throughout the growing season. Soil textures range from medium silt loam to moderately fine clay loam of mixed alluvium and Franciscan mélange.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G5 S4

RANK JUSTIFICATION This association is expected to be widespread in marshes throughout California and the Pacific states

DATABASE CODE

COMMENTS

Globally

The relatively simple association of one to three species of *Typha* and *Scirpus californicus* and / or *Scirpus acutus* has been anecdotally reported throughout many marshes in California from the coast to the inner valleys and deserts. It likely ranges further east throughout much of North America.

PRNS / GGNRA

Typha latifolia, *angustifolia*, and *dominicensis* are closely related species that often hybridize. Research in Suisun Marsh (Keeler - Wolf *et al.* 2000) suggested that it was not possible to consistently individuate stands with different *Typha* species either taxonomically or environmentally. Thus, though this type is listed as *T. latifolia* - *Scirpus californicus*, it also includes other species of *Typha* such as *T. dominicensis*.

The alliance should probably be considered as a *Typha* sp. - *Scirpus californicus* alliance, however to remain consistent with the existing alliance classification (Sawyer & Keeler - Wolf 1995).

Plots used to define this association in addition to Keeler - Wolf et al. (2000), (n=2): PRNS127, PRNS116

Bulrush (*Scirpus californicus*) Alliance

Large Bulrush (*Scirpus californicus-Scirpus acutus*) Alliance

– pi code 55030

This alliance is locally represented currently by two plots and associations have not been defined. The following general account will serve to characterize the local expression of the alliance as is currently understood.

COMMON NAME Large Bulrush Association
SYNONYMS Coastal and Valley Freshwater Marsh, Great Basin Freshwater

Marsh, Valley Alkali Marsh, Great Basin Alkali Marsh (Cheatham & Haller); Alkali Meadow, Freshwater Marsh (Thorne); Fresh Emergent Wetland (WHR)

PHYSIOGNOMIC CLASS Herbaceous
PHYSIOGNOMIC SUBCLASS Perennial graminoid
PHYSIOGNOMIC GROUP Temperate or subpolar grassland
PHYSIOGNOMIC SUB GROUP Natural / semi-natural
FORMATION Semipermanently flooded temperate or subpolar grassland

ALLIANCE *Scirpus californica-Scirpus acutus* Permanently Flooded Herbaceous Alliance

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Estuarine intertidal persistent emergent, palustrine nonpersistent emergent saline, palustrine persistent emergent freshwater, palustrine persistent emergent saline.

RANGE

Globally

Widespread throughout CA and much of western North America.

PRNS / GGNRA

Two plots in the Point Reyes National Seashore, at Pelican Lake and near Drake's Beach.

ENVIRONMENTAL DESCRIPTION

Globally

Habitat permanently flooded, regularly flooded, semipermanently flooded, seasonally, flooded, irregularly flooded, irregularly exposed. Water chemistry: fresh, mixohaline, hyperhaline, mixosaline, hypersaline. Bay, estuary, dune swale, slough terrace edges, berm, levees, backwater, bank, bottomland margins of rivers, channel, creek, ditch margins, lake beds; lagoon, pond, reservoir margins, along fault sag ponds. May occur from coastal brackish marshes to interior valley freshwater marshes, to haline or saline settings adjacent to alkali playas and seeps in the deserts. In the Bay Delta Region (Suisun Marsh) *S. acutus-S. californicus* stands occupy the tidally influenced brackish bays and large sloughs. They occur along narrow tidal creeks and in saturated relatively freshwater marsh often adjacent to *Distichlis spicata*, *Typha* sp., and *Salicornia virginica* alliance stands. Soils peaty or mucky. Elevation 45-3000 meters.

PRNS / GGNRA

One plot documented in the study area occurred on the north-east shore of Pelican Lake on sandy loam soils. The second plot occurred above Drake's Beach; soils at this location clay loam.

MOST ABUNDANT SPECIES

Globally

Herb: *Scirpus californica*, *S. acutus*

PRNS / GGNRA

Herb: *Scirpus californica*, *Typha domingensis*, *Lemna minor*, *Adenostoma fasciculatum*, *Arctostaphylos glandulosa* ssp. *glandulosa*

CHARACTERISTIC SPECIES

Globally

Herb: *Scirpus californica*, *S. acutus*

PRNS / GGNRA

Herb: *Scirpus californica*,

VEGETATION DESCRIPTION

Globally

Scirpus californicus and or *S. acutus* sole or dominant in herb canopy; *Anemopsis californica*, *Alisma plantago-aquatica*, *Carex athrostachya*, *Cyperus eragrostis* *Distichlis spicata*, *Eleocharis rostellata*., *Scirpus americanus*, *S. fluvitalis*, *Scirpus nevadensis*, *Typha latifolia*, *T. domingensis*, and/or *T. angustifolia* may be present. May include some scattered wetland shrubs such as *Rosa californica*. Herbs < 4 m tall; cover open, intermittent, or continuous.

PRNS / GGNRA

Scirpus californicus strongly dominant in the herb canopy in Pelican Lake plot with few other species present; *Scirpus californica* dominant in herb layer of Drake's Beach plot with *Typha domingensis* present; *Lemna minor*, *Adenostoma fasciculatum*, *Arctostaphylos glandulosa* also present; Herbs <5m tall; canopy continuous to intermittent.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G5 S3.2

RANK JUSTIFICATION

S. acutus/californicus stands have been decimated by draining and conversion of marshes throughout the Central Valley. They were once the most widespread saturated fresh water emergent wetland alliance of California and are indicative of high quality and important resources for wildlife. A threat in the Bay-Delta region (262A1) is the perennial pepperweed (*Lepidium latifolium*), which can invade and overtake stands of this alliance without apparent physical disturbance. Bay-Delta stands are indicative of high quality non-managed wetlands and are home to several rare species of plants such as *Liliaopsis masonii* and provide nesting and foraging habitat for the Suisun Marsh Song sparrow.

DATABASE CODE

COMMENTS

Globally

Vegetation is characterized by medium to tall graminoids, which typically range from 1 to over 3 m. Some stands are heavily dominated by one or two *Scirpus* species while others have several graminoids common throughout the stand. *Scirpus acutus* and *S. californicus* form stands in many wetlands throughout California. This alliance may occur from coastal brackish marshes to interior valley freshwater marshes, to haline or saline settings adjacent to alkali playas and seeps in the deserts. In the Bay Delta Region (Suisun Marsh) *S. acutus-S californicus* stands occupy the the tidally influenced brackish bays and large

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Plant Community Discriptions

sloughs. They occur along narrow tidal creeks and in saturated relatively freshwater marsh often adjacent to *Distichlis spicata*, *Typha sp.*, and *Salicornia virginica* alliance stands.

Scirpus acutus and *S. californicus* are rhizomatous and can survive surface fires by resprouting from the underground rhizomes. Seeds are small and are wind born assisted by capillary bristles. Stands are subject to decimation and deterioration by drought and by modified hydrology. Some stands are large enough and sufficiently long-persisting to have produced peat layers. Some peat fires have occurred in fossil stands of this alliance in the Sacramento and San Joaquin Delta.

Status regionally:

Great Valley (262A) This alliance was extensive covering many thousands of acres in pre-European times from the valley basins near Willows (Ac) south to Tule and Buena Vista Lakes (Av, Ay)

Sierra Nevada (M2361E); Stands of *S. acutus* have been observed as high as 2600 m in Yosemite National Park near Tuolumne Meadows (Eo).

Northern California Coast (263A) Barnhart *et al.* (1992) describe Humboldt Bay marshes (Ae). Central California Coast (261A) MacDonald (1977) describes stands in Francisco Bay

Southern California Coast (261B) Ferren (1989), Ferren *et al.* (1995) and MacDonald (1977) describe stands in south coastal California

Mojave Desert (322A) Stands occur along permanent water as at Saratoga Marsh (Death Valley Ab) and near Zyzzyx (Ai)

Sonoran Desert (322B) Stands occur along the Colorado River (Bd)

PRNS / GGNRA

Stands occur in Olema Marsh and other small marshes on the Point Reyes Peninsula

Plots used to define the alliance locally (n=2): pore046, pore125

Cattail Alliance (preliminary)

– pi code 55060 (mapped to 55040, Bulrush - Cattail - Spikerush Marsh Mapping Unit)

Coastal Scrub Supercluster (in part)

Dune Vegetation Mesocluster (in part)

Dune Lupine – Dune Sagewort – Dunegrass Superalliance (in part)

European Dunegrass Alliance

European Dunegrass (*Ammophila arenaria*) Alliance

- pi code 47010

This alliance is represented by a single association in the study area. It is distinguished by a non - native invasive species that was intentionally planted to stabilize dunes on the coast of California. On the Pacific coast of North America it now ranges from Washington to southern California.

Ammophila arenaria - *Cardioniema ramosissimum* Grassland Association

COMMON NAME	European Beach Grass - none Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Perennial Graminoid Vegetation
PHYSIOGNOMIC GROUP	Temperate or Subpolar Grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Medium - tall sod temperate or subpolar grassland

ALLIANCE *Ammophila arenaria* Grassland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. It is suspected that this association is representative of many of the non - native stands of *Ammophila arenaria* up and down the Pacific coast of North America. *Ammophila arenaria* has been planted and colonized most dune systems in coastal California. *Cardioniema ramosissimum* is a common dune associate from Baja California to Washington.

PRNS / GGNRA

This association is restricted to the dune systems of The Point Reyes Peninsula including North Beach, Abbots Lagoon, and Drakes Beach.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. However, it is suspected to occur throughout much of the dune grassland stands of northern California and perhaps south to Baja California and north to Washington State.

PRNS / GGNRA

Stands of the *Ammophila arenaria* - *Cardioniema ramosissimum* grassland association is found on undulating southeast to north slopes of sand dunes. Slopes are 2 - 18 degrees. Soil textures are medium sand.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Ammophila arenaria*

Shrub: *Baccharis pilularis*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Ammophila arenaria*, *Cardioniema ramosissimum*

Shrub: *Baccharis pilularis*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of the *Ammophila arenaria* - *Cardioniema ramosissimum* grassland association forms an intermittent to continuous canopy with 40 - 86% cover at 0.5 - 1 m. This vegetation is dominated by *Ammophila arenaria* and *Baccharis pilularis*. *Gnaphalium sp.*, *Sonchus sp.*, *Carpobrotus edulis*, *Vulpia sp.*, *Pteridium aquilinum*, *Rubus ursinus* and a variety of other herbaceous species may contribute to minor cover. The herbaceous perennial *Cardioniema ramosissimum* occurs in virtually all stands at low cover. This association is found on undulating southeast to north slopes of sand dunes. Slopes are 2 - 18 degrees. Soil textures range from medium sand.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK Non - native G5S5

RANK JUSTIFICATION Non - native invasive exotic

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

This association is widespread on the main Point Reyes beaches wherever *Ammophila* has become established but has sufficient openings to allow some native vegetation cover. It is a non - native association composed of a non - native dominant with scattered native dune land species.

Plots used to define this association locally (n=3): PRNS018, PRNS054, PRNS110

Dune Sagewort Alliance

Dune Sagewort (*Artemisia pycnocephala*) Alliance

- pi code 62064

This alliance is represented by a single association in the study area. It has been formerly considered as part of the Dune mat (*Ambrosia chamissonis*) Herbaceous Alliance. The *Artemisia pycnocephala* "alliance" is considered a phase of this alliance by Sawyer & Keeler - Wolf (1995). It likely deserves full alliance consideration and is treated accordingly herein. Although occasionally considered a "scrub", this alliance is by definition, an herbaceous alliance, dominated by herbaceous perennial dune species. The range of this alliance is so far as known from Northern Coastal California (Humboldt Co.) to San Diego County.

Artemisia pycnocephala - *Cardioniema ramosissimum* Association

- pi code 62062

COMMON NAME	Beach Wormwood - Sandcarpet Shrubland
SYNONYM	None
PHYSIOGNOMIC CLASS	Shrubland
PHYSIOGNOMIC SUBCLASS	Evergreen Shrubland
PHYSIOGNOMIC GROUP	Microphyllous Evergreen Shrubland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Microphyllous Evergreen Shrubland
ALLIANCE	<i>Artemisia pycnocephala</i> Alliance (New and not in National Vegetation Classification)

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Upland

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Other stands of *Artemisia pycnocephala* dominated coastal dune vegetation occur from Humboldt county to at least Monterey County in California. This is a newly described alliance as well as association and further data is needed on distribution and composition throughout its range. Previously it was considered a phase of the *Ambrosia chamissonis* alliance (Sawyer and Keeler - Wolf 1995, Pickart and Sawyer 1999), however, the general absence of *A. chamissonis* from many stands in the **PRNS / GGNRA** mapping area suggests that this alliance should be segregated.

PRNS / GGNRA

This association is found in dune fields and on sandy beaches within the **PRNS / GGNRA** mapping area.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Stands of this association are found on sandy substrates along beaches and in dune fields. Slopes are gentle, and aspects are generally northwest. Stands are currently small, usually less than 2 acres in size. They occupy dune slopes and ridges most commonly along North Beach on the Point Reyes Peninsula. The non - native invasive *Ammophila arenaria* alliance grassland and the *Carpobrotus edulis* alliance (Ice plant) are threatening to invade many stands of this association.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Artemisia pycnocephala*
Forb: *Carpobrotus edulis* (exotic)

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Shrub: *Artemisia pycnocephala*
Forb: *Cardioniema ramosissimum*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This short shrub association is dominated by *Artemisia pycnocephala* which consistently contributes about 20% cover to the subshrub canopy. *Carpobrotus edulis* (exotic) dominates the herbaceous layer with about 15% cover, while *Cardioniema ramosissimum* is present at 3 - 4% cover. Emergent individuals of *Ericameria ericoides* up to 1 meter in height usually contribute minor cover. Other common subshrub associates may include *Lotus scoparius*, *Eriogonum latifolium*, *Grindelia stricta* var. *stricta* and / or *Grindelia stricta* var. *platyphylla*.

OTHER NOTEWORTHY SPECIES The rare *Monardella undulata* (CNPS list 4) occurs in some stands

CONSERVATION RANK G3S3?

RANK JUSTIFICATION A. *pycnocephala* stands similar to the local stands are probably distributed in the major dune systems in northern and central California. However, many such stands are of small extent and of low quality due to invasive exotics.

DATABASE CODE To be determined

COMMENTS

Globally

PRNS / GGNRA

Exotics are threatening most stands of this association in the mapping area.

Plots used to define this association (n=3): PRNS135, PRNS199, PRNS134, PRNS198

Dune Sagewort - Goldenbush Complex Mapping Unit
- pi code 62060

Ice Plant Alliance

Iceplant (*Carpobrotus* species) Herbaceous Alliance
- pi code 62040

This alliance is not defined at the association level locally. The following general description will serve to distinguish the local stands

COMMON NAME	Iceplant Mats
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous
PHYSIOGNOMIC SUBCLASS	Perennial Forb
PHYSIOGNOMIC GROUP	Temperate or Subpolar Perennial Forb
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Low Temperate or Subpolar Perennial Forb
ALLIANCE	<i>Carpobrotus</i> species Herbaceous Alliance

CLASSIFICATION CONFIDENCE LEVEL

USFWS WETLAND SYSTEM Upland

RANGE

Globally

Iceplant mats occur along the Northern, Central, and Southern California Coasts, the Central Valley, and on the Channel Islands.

PRNS / GGNRA

Iceplant stands occur in disturbed areas throughout the Pt. Reyes National Seashore and Golden Gate National Recreation Area. Almost all of the extensive stands are on dunes and coastal bluffs immediately adjacent to the ocean.

ENVIRONMENTAL DESCRIPTION

Globally

Occurs on bluffs, disturbed land and sand dunes of the immediate coastline from sea - level to 100meters elevation.

PRNS / GGNRA

Occurs on bluffs, disturbed land and sand dunes of the immediate coastline from sea - level to 100meters elevation.

MOST ABUNDANT SPECIES

Globally

Herbs: *Carpobrotus*, *Mesembryanthemum* species; *Malephora crocea*

PRNS / GGNRA

Carpobrotus edulis, *Baccharis pilularis*, *Artemisia pycnocephala*, *Ammophila arenaria*, *Amsinckia spectabilis spectabilis*, *Bromus diandrus*, *Phacelia distans*

CHARACTERISTIC SPECIES

Globally

Herbs: *Carpobrotus*, *Mesembryanthemum* species; *Malephora crocea*

PRNS / GGNRA

Carpobrotus edulis

VEGETATION DESCRIPTION

Globally

Carpobrotus, *Mesembryanthemum* species or *Malephora crocea* are the sole or dominant herb in the ground canopy; *Abronia latifolia*, *Ambrosia chamissonis*, *Eriogonum latifolium*, and / or *Poa douglasii* may be present. Emergent shrubs may be present. Herbs < 50 cm; canopy continuous.

PRNS / GGNRA

Carpobrotus edulis is significant in the ground layer. *Ammophila arenaria*, *Bromus diandrus*, *Artemisia pycnocephala*, *Phacelia distans*, *Amsinckia spectabilis spectabilis* may be present. Emergent *Baccharis pilularis consanguinea* may be present. Herbs < 50cm; canopy continuous.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

RANK JUSTIFICATION

DATABASE CODE

COMMENTS

Globally

This treatment is broadly defined to recognize the importance of these introduced species in California's vegetation. The invasive character of several taxa in the *Aizoaceae* is well appreciated in California, especially on coastal dune habitats. Three genera are included in this series. *The Jepson Manual* includes five taxa in the genera *Carpobrotus*, *Malephora*, and *Mesembryanthemum* as having naturalized in the state. These taxa have historically been placed in *Mesembryanthemum*, but now referred to as *Carpobrotus chinensis*, *C. edulis*, *Malephora crocea*, *Mesembryanthemum crystallinum*, *M. nudiflorum*. All are invasive and replace native dune species particularly members of the *Ambrosia chamissonis* and *Lupinus chamissonis* - *Ericameria ericoides* alliances.

Status Regionally

Northern California Coast (263A) *Carpobrotus edulis* is the most common invader of dune habitats and is widespread on most dune systems

Central California Coast (261B) *Mesembryanthemum* sp. and *Carpobrotus edulis* are both common on dune systems

Southern California Coast (261B) *Mesembryanthemum* sp. and *Carpobrotus edulis* are both common on dune systems. In the Channel Islands (Bc) *Mesembryanthemum* sp. Have crowded out many native herbaceous and subshrub stands on the northern Channel islands. Salt build up from the leaves has effectively changed the soil chemistry of some of these stands and effectively excludes native species from recolonizing (Vivrette & Muller 1977).

Great Valley (262A): stands occur in Suisun marsh and in other Delta areas of the Sacramento - San Joaquin delta (Keeler - Wolf *et al.* 2000)

Management Implications:

Widely planted as a soil binder on embankments and as an ornamental in coastal districts (Prescott and Venning, 1984) iceplants (especially *Carpobrotus edulis*) Can form impenetrable mats that crowd out other species. For years, local southern California fire departments has recommended Ice plant to people with houses in fire prone areas. Ice plant is also often used to control erosion. However, during years with lots of rain, the succulent Ice plant swells with water and can cause entire slopes to slide from the increased weight. *Carpobrotus edulis* is considered one of the most invasive wildland plants in California by the

California Exotic Plants Pest Council (CalEPPC List of Exotic Pest Plants of Greatest Ecological Concern 2002 <http://www.cal-ipc.org/ip/inventory/pdf/Inventory1999.pdf>). Iceplant stands are being removed to restore native vegetation on the coastal dunes and enhance populations of rare species (Pickart & Sawyer 1998). Removal of these species is time - consuming by hand - pulling (Large mats can be removed by rolling them up like a carpet) and yet is easier and more cost effective than removal of *Ammophila arenaria* (Albert, 1996). Many California state park, and National Park lands along the coast are actively removing iceplant and replacing it with native dune species such as members of the *Ambrosia chamissonis* and *Lupinus chamissonis* - *Ericameria ericoides* alliances.

PRNS / GGNRA

Ice Plant has been established at North Beach, Marin Headlands, and other portions of the PRNS - GOGA area for many years. Where unchecked, it continues to expand and overwhelm native dune and coastal bluff stands. However, active suppression has been occurring with exotic plant species control projects over the past several years. Successful eradication elsewhere in California has been demonstrated and the effort to eradicate is less than certain other coastal dune species such as *Ammophila arenaria* (Pickhart and Sawyer 1998).

Plots used to describe this association (n=0): no plots sampled

Coast Buckwheat Alliance (preliminary)

-pi code 62050

Insufficient relevé plots to describe this alliance, currently rolled into classification hierarchy with Dune Sagewort - Goldenbush Complex Mapping Unit - pi code 62060)

Salt Marsh Supercluster

Salt Marsh Mesocluster

Pickleweed – Saltgrass Superalliance

Saltgrass Alliance

Saltgrass (*Distichlis spicata*) Alliance

- pi code 51010

A single association represents this alliance locally.

Distichlis spicata - *Frankinia salina* - *Jaumea carnosa* Association

- pi code 51011

COMMON NAME	Saltgrass - Frankinia - Alkali Heath - Jaumea Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Perennial Grassland
PHYSIOGNOMIC GROUP	Temperate of Subpolar Grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Intermittently flooded temperate or subpolar grassland

ALLIANCE *Distichlis spicata* Grassland Alliance

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Wetland, Estuarine, Intertidal, Emergent Wetland

RANGE

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Similar tidal brackish marshes with *Distichlis spicata* occur from Humboldt County to Monterey County, CA. It is likely that this association ranges throughout this area.

PRNS / GGNRA

Stands of *Distichlis spicata* - *Frankinia salina* - *Jaumea carnosa* grassland association are found throughout the mapping area of PRNS within brackish to haline tidal wetlands.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. Similar stands of tidal wetland *Distichlis spicata* alliance occur at Suisun Marsh, Solano County CA (Keeler - Wolf *et al.* 2000) and in San Francisco Bay. All stands occupy brackish estuarine environments.

PRNS / GGNRA

This association is found on slopes of 0 - 4 degrees with generally flat or neutral aspects in the lower to upper parts of wetlands / basins. Soil textures range from fine silty clay to medium sand. Parent materials are sandstone, mixed alluvium and other.

MOST ABUNDANT SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Distichlis spicata*, *Salicornia virginica*, *Jaumea carnosa*, *Frankinia salina*

CHARACTERISTIC SPECIES

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Herbaceous: *Distichlis spicata*, *Salicornia virginica*, *Jaumea carnosa*, *Frankinia salina*, *Triglochin maritima*

VEGETATION DESCRIPTION

Globally

This association is only known from the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory. In Suisun Marsh (Keeler - Wolf *et al.* 2000) a very similar if not identical vegetation was called *Distichlis spicata* - *Triglochin maritima* association. It did not have as high a constancy of *Frankinia* as the PRNS association, but was very similar in most other respects including the commonness of *Jaumea carnosa*, *Triglochin maritima*, *Glaux maritima*, and *Limonium californicum*.

PRNS / GGNRA

This association is dominated by *Distichlis spicata*, *Frankinia salina* and *Jaumea carnosa* forming a continuous herb layer of 90 - 99 percent cover at 0 - 25 cm tall and 1 - 10 % cover at 25 - 50 cm tall. *Triglochin concinna* and *T. maritima*, *Grindelia stricta*, and *Limonium californicum* are also commonly found in this association. This association is often adjacent to *Salicornia* associations. It is found on 0 - 4 degree slopes facing south - southeast to south - southwest in the lower to upper parts of wetlands / basins. Soil textures range from fine silty clay to medium sand. Parent materials are sandstone, mixed alluvium and "other" (including muck).

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK

G3S 2.2

RANK JUSTIFICATION Unmanaged tidal wetlands are rare in CA due to landfill, marsh levees, and intensive wildlife management

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

Stands are generally small to moderate size (from 0.5 to 5 acres) and may form "salt meadows" adjacent to more low lying *Salicornia* stands. Small matrix stands of *Grindelia stricta* and *Juncus balticus* may represent additional associations not considered locally due to their small size. Such vegetation was identified at Suisun Marsh (Keeler - Wolf *et al.* 2000) where smaller minimum map units were defined.

Plots used to define this association (n=6): PRNS014, PRNS007, PRNS079, PRNS020, PRNS006, PRNS 202

Pickleweed Alliance

Pickleweed (*Salicornia virginica*) Alliance

- pi code 64050

This alliance is represented by a single association locally. It is ecologically similar to the local representation of the *Distichlis spicata* alliance, but is usually found in more regularly inundated tidal wetlands. A single *Salicornia virginica* - *Hordeum brachyantherum* plot: (PRNS075) suggests further variation. The alliance's range is from Northern California to Baja California.

***Salicornia virginica* - *Distichlis spicata* - *Jaumea carnosa* Association**

- pi code 64031

COMMON NAME	Woody Saltwort - Coastal Saltgrass - Marsh Jaumea Tidal Herbaceous Vegetation
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous vegetation
PHYSIOGNOMIC SUBCLASS	Perennial forb vegetation
PHYSIOGNOMIC GROUP	Temperate or subpolar perennial forb vegetation
PHYSIOGNOMIC SUB GROUP	Natural / Semi - natural
FORMATION	Tidal temperate or subpolar perennial forb vegetation
ALLIANCE	<i>Salicornia virginica</i> (<i>bigelovii</i>) Tidal Herbaceous Vegetation

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Temporarily flooded hydromorphic rooted vegetation

RANGE

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global range is not available without additional inventory. Similar associations co - dominated by *Salicornia* and *Distichlis* have been defined for Suisun Marsh, Solano County, CA Keeler - Wolf *et al.* 2000) and have been observed in several tidal marshes of San Francisco Bay (Keeler - Wolf pers. obs. 1998)

PRNS / GGNRA

Stands of this association are found along the brackish , tidally influenced margins of Tomales Bay, Bolinas Lagoon, and Drakes Bay.

ENVIRONMENTAL DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This vegetation grows at the shallow mouths of streams and creeks where the water is brackish. These areas flood with the tides twice daily.

MOST ABUNDANT SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Forb: *Salicornia virginica*

Graminoid: *Distichlis spicata*

CHARACTERISTIC SPECIES

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

Forb: *Salicornia virginica*, *Jaumea carnosa*

Graminoid: *Distichlis spicata*

VEGETATION DESCRIPTION

Globally

This association is only known from the vicinity of the Point Reyes National Seashore. Information about its global characteristics is not available without additional inventory.

PRNS / GGNRA

This association is dominated by *Salicornia virginica*, which contributes 40 - 100% cover in the subshrub layer. *Jaumea carnosa* contributes minor cover, but is consistently present. The graminoid *Distichlis spicata* is present, and varies from 3 - 40% cover. Other common associates may include *Cordylanthus maritimus* ssp. *palustris*, *Triglochin maritima*, *Triglochin concinna*, *Schoenoplectus maritimus*, and / or *Spartina foliosa*.

OTHER NOTEWORTHY SPECIES None

CONSERVATION RANK To be determined

RANK JUSTIFICATION

DATABASE CODE To be determined

COMMENTS

Globally

At Suisun Marsh, Solano County California (Keeler - Wolf et al 2000) a very similar or equivalent association of tidal wetland was defined as a *Distichlis spicata* - *Salicornia virginica* association. It was defined by co - dominance of *S. virginica* and *D. spicata* either species may be > or = 30% relative cover. All plots had small numbers of *Jaumea carnosa* and *Triglochin maritima*. We suspect that this is the same association as is currently defined herein. The only difference appears to be the higher cover of *Distichlis* that is reported from Suisun Marsh. Another association defined from Suisun Marsh was called the *Salicornia* / *Distichlis* association and was characterized by strong dominance of *Salicornia* with *Distichlis* ranging from 4 to 20 % cover. Most plots of this type contained some non - native species and were found in managed wetlands. None of those plots had *Jaumea*.

PRNS / GGNRA

One stand partially burned in the October 1995 Vision fire has much wider plant diversity than other stands. Altered flood and tidal regimes are adversely effecting this association.

Plots used to define this association (n=7): marinsp11, PRNS108, PRNS165, PRNS041, PRNS040, PRNS005, PRNS022

Cordgrass Superalliance

Cordgrass Alliance

Cordgrass (*Spartina foliosa*) Alliance

- pi code 56010

This alliance is represented locally by a single association. It is floristically simple, strongly dominated by the nominate species with few, if any other vascular species present. The alliance ranges along the Pacific Coast from Northern California to Northern Baja California.

Spartina foliosa Association

- pi code 56010

COMMON NAME	California Cordgrass Grassland Association
SYNONYM	None
PHYSIOGNOMIC CLASS	Herbaceous Vegetation
PHYSIOGNOMIC SUBCLASS	Perennial Grassland
PHYSIOGNOMIC GROUP	Temperate of Subpolar Grassland
PHYSIOGNOMIC SUB GROUP	Natural / Semi - Natural
FORMATION	Tidal temperate or subpolar grassland
ALLIANCE	<i>Spartina foliosa</i> Grassland Association

CLASSIFICATION CONFIDENCE LEVEL 2

USFWS WETLAND SYSTEM Wetland, Estuarine, Intertidal, Emergent Wetland

RANGE

Globally

This association is only known from the Point Reyes National Seashore and from Suisun Marsh (Keeler - Wolf *et al.* 2000). Information about its global characteristics is not available without additional inventory. However, anecdotal information discussing relatively pure stands of *Spartina foliosa* (e.g., Hickman 1993) suggests that this association occurs throughout coastal salt marshes of California south to the Pacific coast of Mexico.

PRNS / GGNRA

Stands of this association are found throughout the mapping area of PRNS in Tomales Bay, Drakes Bay, and Bolinas Lagoon.

ENVIRONMENTAL DESCRIPTION

Globally

This association is known from the Point Reyes National Seashore and from Suisun Marsh (Keeler - Wolf *et al.* 2000). Other anecdotal observations in San Pablo and San Francisco Bay suggest that it regularly occupies the outer edges of tidal mudflats in the areas with deepest tidal water. *Salicornia virginica* alliance typically occupies the landward edges of the stands.

PRNS / GGNRA

At **PRNS / GGNRA** the environment is similar to the global description above. This association is found on flat, linear / even basins / wetlands with no slope. It occurs on medium silt soil textures and silty alluvium parent material.

MOST ABUNDANT SPECIES

Globally

Typically stands are monotypes with *S. foliosa* comprising most or all of the vegetative cover, occasionally with some minor cover of *Salicornia virginica*.

PRNS / GGNRA

Herbaceous: *Spartina foliosa*

CHARACTERISTIC SPECIES

Globally

Herbaceous: *Spartina foliosa*

PRNS / GGNRA

Herbaceous: *Spartina foliosa*

VEGETATION DESCRIPTION

Globally

Similar to the **PRNS / GGNRA** description below.

PRNS / GGNRA

Stands of this association are dominated by an intermittent layer of *Spartina foliosa*, with 34 - 55% cover at 0.5 - 1 m tall. Approximately 25% cover is from algae, 5% is 0 - 25 cm tall, 1 % is 25 - 50 cm tall, and 2 - 11% of the cover is 1 - 2m tall. *Salicornia virginica*, and algae may contribute to minor cover in the understory. This association is found on flat, linear / even basins / wetlands with slopes of zero degrees. This is on medium silt soil textures and silty alluvium parent material.

OTHER NOTEWORTHY SPECIES

CONSERVATION RANK G3S3.2

RANK JUSTIFICATION There are numerous stands, but all are small and many are threatened by dredging, marsh filling, and other development threats.

DATABASE CODE

COMMENTS

Globally

PRNS / GGNRA

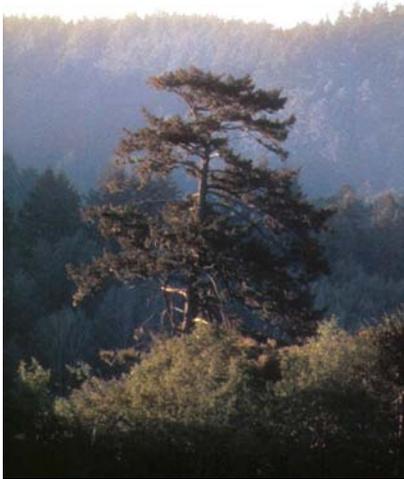
Plots used to describe this association (n=0): no plots sampled

Accuracy Assessment Confusion Matrices



Point Reyes National Seashore, Golden Gate National Recreation Area, San Francisco Water Department Watershed Lands, Mount Tamalpais, Tomales Bay, and Samuel P. Taylor State Parks

Appendix C. Point Reyes National Seashore, Golden Gate National Recreation Area, and Surrounding Wildlands Plant Community Classification and Mapping Project Final Report



December 31, 2003

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Acknowledgments

This confusion matrices are part of a comprehensive vegetation classification and mapping effort initiated by The National Park Service in Point Reyes National Seashore in 1997. This collaborative effort was conducted in part through a contract with Environmental Systems Research Institute (ESRI). The plant community classification and initial draft plant community key were developed by the senior vegetation ecologist for the California Department of Fish and Game, Todd Keller-Wolf. Major funding was provided by the National Park Service's Fire Program, and Inventory and Monitoring Program along with Point Reyes National Seashore and Golden Gate National Recreation Area.

Introduction:

These matrices are also appendix c within the Point Reyes National Seashore, Golden Gate National Recreation Area, and Surrounding Wildlands Plant Community Classification and Mapping Project Final Report. All vegetation types described here are derived from an ordination analysis of 366 vegetation plots collected throughout the study area in 1997 and 1998 for the National Park Service vegetation mapping project using the California Native Plant Society's releve method. Plant communities were mapped by aerial photo interpretation of 1:24,000 true color photos acquired in March of 1994. An extensive accuracy assessment was conducted during which the plant community types of approximately 1,200 ground truth plots were compared with the photo interpreted plant community polygon labels. These matrices display the results of these comparisons. Detailed discussion of the methods used to derive these matrices is available in the report associated with this key.

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Plant Community Map Accuracy Assessment - Superalliance 24 Classes

Vegetation Superalliances Identified Through Photo-Interpretation

Vegetation Superalliances Identified by Field Crews	California Bay- Coast Live Oak	Eucalyptus	Redwood- Tanoak	Bishop Pine- Chinquapin	Douglas-fir	Monterey Pine- Monterey Cypress	Arroyo, Red, Black, and Yellow Willow	Red Alder	Open Grassy Coyotebrush- Yellow Bush Lupine	Wax Myrtle- Salmonberry	Coyotebrush- Blueblossom	Chamise- Manzanita	Holly-leaved Cherry- Coyotebrush	Mature Coyotebrush- Coffeeberry- Poison Oak	Sensitive Manzanita	Coyotebrush - Unable to key	Coyotebrush- California Sagebrush	Dune Lupine- Dune Sagewort- Dunegrass	Pacific Reedgrass- Carex- Juncus	Introduced Perennial Grassland- Deschampsia	Pickleweed- Saltgrass	Bullrush- Cattail	Cordgrass	Native- Weedy Grassland	N/A	Total	Percent Correct (User)	Confidence Interval -	Confidence Interval +
	California Bay- Coast Live Oak	89	2	6	4	2	1	1	5	1																	111	80.2%	73.5%
Eucalyptus	4		1																							5	80.0%	40.6%	119.4%
Redwood- Tanoak	4	45	1																							50	90.0%	82.0%	98.0%
Bishop Pine- Chinquapin	2		22								1															25	88.0%	75.3%	100.7%
Douglas-fir	1	4	66		1	1	4		1	2			1													81	81.5%	73.8%	89.2%
Monterey Pine- Monterey Cypress		1		15		1																				17	88.2%	72.4%	104.0%
Arroyo, Red, Black, and Yellow Willow	1				46				2									4								53	86.8%	78.2%	95.4%
Red Alder	1		1	8	28		1																			39	71.8%	58.7%	84.9%
Open Grassy Coyotebrush- Yellow Bush Lupine								79					8		5	10	10	5						4		121	65.3%	57.8%	72.8%
Wax Myrtle- Salmonberry	1					3		12										1								17	70.6%	49.5%	91.7%
Coyotebrush- Blueblossom	2									11	1	3					2									19	57.9%	36.6%	79.2%
Chamise- Manzanita											36		6													42	85.7%	75.6%	95.8%
Holly-leaved Cherry- Coyotebrush			1							6	3															10	60.0%	29.5%	90.5%
Mature Coyotebrush- Coffeeberry- Poison Oak			2	3		3	1	13	1	9	3	71			9	2	4									121	58.7%	50.9%	66.5%
Sensitive Manzanita										3			3													6	50.0%	8.1%	91.9%
Coyotebrush - Unable to key						1			1	1	1		8		6	1	2	1								22	36.4%	17.2%	55.5%
Coyotebrush- California Sagebrush							7		1		9		36		1	1	1							2		58	62.1%	50.7%	73.4%
Dune Lupine- Dune Sagewort- Dunegrass											1		2	50		1										54	92.6%	85.8%	99.4%
Pacific Reedgrass- Carex- Juncus						2	5	1			4				4	86	6	4	1					2		115	74.8%	67.7%	81.9%
Introduced Perennial Grassland- Deschampsia						1	7										4	5	26					4		47	55.3%	42.3%	68.3%
Pickleweed- Saltgrass																					48		5			53	90.6%	83.0%	98.1%
Bullrush- Cattail						1											1					8				11	72.7%	46.1%	99.4%
Cordgrass																							1		2	3	66.7%	5.2%	128.1%
Native- Weedy Grassland							9											4	4					23		40	57.5%	43.4%	71.6%
N/A			2				2	2	6		4				3	1	1						2	1		24			
Total	101	5	51	26	79	15	70	35	127	18	28	45	12	107	9	8	55	80	117	46	56	9	9	36	1144				
Producer Accuracy	88%	80%	88%	85%	84%	100%	66%	80%	62%	67%	39%	80%	50%	66%	33%	NA	65%	63%	74%	57%	86%	89%	22%	64%					
Confidence Interval -	82.3%	40.6%	79.8%	71.1%	76.0%	96.7%	55.7%	67.4%	54.7%	45.6%	22.3%	69.1%	22.1%	58.4%	1.9%		54.0%	53.0%	66.4%	43.4%	77.1%	66.1%	-6.1%	49.3%					
Confidence Interval +	93.9%	119%	96.6%	98.2%	91.0%	103%	75.8%	92.6%	69.7%	87.7%	56.3%	90.9%	77.9%	74.3%	64.7%		76.9%	72.0%	80.6%	69.6%	94.3%	112%	50.6%	78.4%					

Overall Accuracy 71.7

Kappa 69.7

Plant Community Map Accuracy Assessment - Mesocluster 11 Classes

Vegetation Mesocluster Identified Through Photo-Interpretation

Vegetation Mesocluster Identified by Field Crews

	Forest: California Bay, Douglas-fir, and Coast Live Oak	Bishop Pine and Mesic Chaparral	Forest: Coast Redwood and Tanoak	Riparian Forest	Drier Coastal Grassland/ Open Scrub	Dense Coyotebrush and related scrub	Xeric Chaparral	Dune vegetation	Moist Coastal Grassland	Salt Marsh	Freshwater Wetland Herb	NA	Total	Percent Correct (User)	Confidence Interval -	Confidence Interval +
Forest: California Bay, Douglas-fir, and Coast Live Oak	159	1	6	9	6	5	5						191	83.2%	78.5%	88.0%
Bishop Pine and Mesic Chaparral	3	43		1			4						51	84.3%	75.0%	93.7%
Forest: Coast Redwood and Tanoak	6		45										51	88.2%	79.8%	96.6%
Riparian Forest	3			97				5					105	92.4%	87.6%	97.1%
Drier Coastal Grassland/ Open Scrub					111	13		11	24				159	69.8%	63.5%	76.1%
Dense Coyotebrush and related scrub	8	2		5	22	161		3	6				207	77.8%	72.8%	82.8%
Xeric Chaparral		7					31						38	81.6%	69.9%	93.2%
Dune vegetation					1	3		43	1				48	89.6%	81.3%	97.9%
Moist Coastal Grassland				4	18	4		8	120	4	1		159	75.5%	69.5%	81.4%
Salt Marsh										55			55	100.0%	99.1%	100.9%
Freshwater Wetland Herb				1					1	1	7		10	70.0%	41.2%	98.8%
NA	1	2		6	10	18	5	15	6	5	1		69			
Total	180	55	51	123	168	204	45	80	163	65	9		1143			
Percent Correct (Producer)	88.3%	78.2%	88.2%	78.9%	66.1%	78.9%	68.9%	53.8%	73.6%	84.6%	77.8%					
Confidence Interval -	84.1%	68.1%	79.8%	72.4%	59.8%	74.0%	56.4%	44.0%	67.6%	76.5%	49.4%					
Confidence Interval +	92.5%	88.3%	96.6%	85.3%	72.4%	83.9%	81.4%	63.5%	79.6%	92.7%	106.1%					

Overall Accuracy 76.3%
Kappa 73.1%

Plant Community Map Accuracy Assessment - Supercluster 6 Classes

Vegetation Supercluster Identified Through Photo-Interpretation

Vegetation Supercluster Identified by Field Crews	Vegetation Supercluster Identified Through Photo-Interpretation							Total	Percent Correct (User)	Confidense Interval -	Confidense Interval +
	Evergreen Forest and Woodland	Winter Deciduous Forest/Scrub	Coastal Scrub	Chaparral	Grassland- Herbaceous	Salt Marsh	N/A				
Evergreen Forest and Woodland	280	23	20	17				340	82.4%	78.8%	85.9%
Winter Deciduous Forest/Scrub	2	101	2		5	1		111	91.0%	86.1%	95.9%
Coastal Scrub	14	7	353	6	50	2		432	81.7%	78.5%	84.9%
Chaparral	6			45				51	88.2%	79.8%	96.6%
Grassland- Herbaceous		6	38		178	6		228	78.1%	73.3%	82.8%
Salt Marsh						55		55	100.0%	99.1%	100.9%
N/A	2	6	21	5	6	6		46	NA		
Total	304	143	434	73	239	70		1263			
Percent Correct (Producer)	92.1%	70.6%	81.3%	61.6%	74.5%	78.6%					
Confidense Interval -	89.4%	64.0%	78.1%	51.6%	69.6%	69.8%					
Confidense Interval +	94.8%	77.2%	84.5%	71.7%	79.3%	87.4%					

Overall Accuracy 80.1%
Kappa 74.2%

Plant Community Map Accuracy Assessment - Community (Vegetation Management) 8 Classes

Plant Communities Identified Through Photo-Interpretation

Plant Communities Identified by Field Crews	Bishop Pine	Coastal Dunes	Coastal Scrub	Douglas-fir/ Coast Redwood	Grassland	Hardwood Forest	Herbaceous Wetlands	NA	Riparian Forest/ Shrubland	Unvegetated	Total	Percent Correct (User)	Confidense Interval -	Confidense Interval +
	Bishop Pine	31		1	2		4			1		39	79.5%	67.6%
Coastal Dunes		37	7		2						46	80.4%	69.7%	91.1%
Coastal Scrub		9	357	6	25	8	3		8		416	85.8%	82.9%	88.8%
Douglas-fir/ Coast Redwood	2		10	98		22			4		136	72.1%	65.4%	78.8%
Grassland			32		91		10		2		135	67.4%	60.4%	74.4%
Hardwood Forest	2		14	14		98			15		143	68.5%	61.8%	75.3%
Herbaceous Wetlands		1	10		21		97		2		131	74.0%	67.4%	80.7%
NA		5	53	2	3		3		2		68	NA		
Riparian Forest/ Shrubland			6	1	2				87		96	90.6%	85.2%	96.0%
Unvegetated		1					2				3	NA		
Total	35	53	490	123	144	132	115	0	121	0	1213			
Percent Correct (Producer)	88.6%	69.8%	72.9%	79.7%	63.2%	74.2%	84.3%	NA	71.9%	NA				
Confidense Interval -	78.3%	58.5%	69.5%	73.3%	56.2%	67.6%	78.3%		64.8%					
Confidense Interval +	98.8%	81.1%	76.3%	86.1%	70.2%	80.9%	90.4%		79.0%					

Overall Accuracy 73.9%

Kappa 67.5%

Plant Community Map Accuracy Assessment - Formation 21 Classes

Vegetation Formations Identified Through Photo-Interpretation

Vegetation Formations Identified by Field Crews	Vegetation Formations Identified Through Photo-Interpretation																				Total	Percent Correct (User)	Confidence Interval -	Confidence Interval +	
	Lowland or Submontane Winter-rain Evergreen Sclerophyllous Forest	Giant Temperate or Subpolar Needle-leaved Evergreen Forest	Rounded-Crowned temperate or Subpolar Needle-leaved Evergreen Forest	Temporarily Flooded Cold-deciduous Forest	Sclerophyllous Evergreen Woodland	Cold-deciduous Woodland	Temperate Broad-leaved Evergreen Shrubland	Hemi-sclerophyllous Temperate Broad-leaved Evergreen Shrubland	Sclerophyllous Temperate Broad-leaved Evergreen Shrubland	Microphyllous Evergreen Shrubland	Temporarily Flooded Cold-deciduous Shrubland	Tall Bunch Temperate Grassland	Medium-tall Sod Temperate or Subpolar Grassland	Intermittantly flooded Temperate or Subpolar Grassland	Saturated Temperate or Subpolar Grassland	Tidally Flooded Temperate or Subpolar Grassland	Low Temperate or Subpolar Perennial Forb Vegetation	Saturated Temperate Perennial Forb Vegetation	Tall Temperate or Subpolar Grassland (dominated by annual graminoids)						
Lowland or Submontane Winter-rain Evergreen Sclerophyllous Forest	68	8	1	3	6			1	2		1	1								91	74.7%	66.7%	82.8%		
Giant Temperate or Subpolar Needle-leaved Evergreen Forest	10	119		3		1			1	8	1									143	83.2%	77.7%	88.7%		
Rounded-Crowned temperate or Subpolar Needle-leaved Evergreen Forest	1		35	1	1				1											39	89.7%	80.5%	99.0%		
Temporarily Flooded Cold-deciduous Forest		1		52	1					1		16								71	73.2%	63.9%	82.6%		
Sclerophyllous Evergreen Woodland	5	6	1	2	28				3	2		1								48	58.3%	45.6%	71.1%		
Cold-deciduous Woodland	1					3						1								5	60.0%	14.0%	106.0%		
Temperate Broad-leaved Evergreen Shrubland							8			3							1			12	66.7%	40.1%	93.2%		
Hemi-sclerophyllous Temperate Broad-leaved Evergreen Shrubland					1			13		4	1	1								20	65.0%	45.0%	85.0%		
Sclerophyllous Temperate Broad-leaved Shrubland	3	3						5	62	8										81	76.5%	68.2%	84.9%		
Microphyllous Evergreen Shrubland		3		1	1		1	3	2	242	13	3	4	6	1	2			14	306	79.1%	75.1%	83.1%		
Temperate Cold-deciduous Shrubland	1	1		1	1			1	1	3	17	2								28	60.7%	43.7%	77.7%		
Temporarily Flooded Cold-deciduous Shrubland				4				1	1	1	1	15	2							24	62.5%	44.2%	80.8%		
Tall Bunch Temperate Grassland							1			4		1	27						1	39	69.2%	55.8%	82.7%		
Medium-tall Sod Temperate or Subpolar Grassland							3			10		1	3	30					2	56	53.6%	41.7%	65.4%		
Intermittantly flooded Temperate or Subpolar Grassland														11				7		18	61.1%	39.4%	82.8%		
Temporarily-flooded Temperate or Subpolar Grassland							1			10	1	1	14	4	4	27	1		1	67	40.3%	29.7%	50.9%		
Saturated Temperate or Subpolar Grassland												1			1	1	8		1	12	66.7%	40.1%	93.2%		
Tidally Flooded Temperate or Subpolar Grassland																3			1	4	75.0%	26.9%	123.1%		
Low Temperate or Subpolar Perennial Forb Vegetation									5	1			1			2		25		34	73.5%	59.6%	87.4%		
Saturated Temperate Perennial Forb Vegetation													6	1			5		23	35	65.7%	51.1%	80.3%		
Tall Temperate or Subpolar Grassland (dominated by annual graminoids)							2			12			1	4		5				45	46.7%	33.3%	60.0%		
Total	89	141	37	67	39	4	16	24	72	313	37	43	51	45	23	46	9	8	45	32	37	1178			
Percent Correct (Producer)	76.4%	84.4%	94.6%	77.6%	71.8%	75.0%	50.0%	54.2%	86.1%	77.3%	45.9%	34.9%	52.9%	66.7%	47.8%	58.7%	88.9%	37.5%	55.6%	71.9%	56.8%				
Confidence Interval -	68.4%	79.0%	87.1%	68.5%	58.7%	26.9%	26.3%	35.4%	78.7%	73.3%	31.1%	21.8%	40.5%	54.0%	28.5%	45.7%	66.1%	3.1%	42.3%	57.2%	42.0%				
Confidence Interval +	84.4%	89.8%	102.1%	86.7%	84.9%	123.1%	73.7%	73.0%	93.5%	81.4%	60.8%	48.0%	65.4%	79.3%	67.1%	71.7%	111.7%	71.9%	68.9%	86.5%	71.5%				
Overall Accuracy	71.1%																								
Kaapa	67.5%																								

Plant Community Map Accuracy Assessment - Group 8 Classes

Vegetation Groups Identified Through Photo-Interpretation

Vegetation Groups Identified by Field Crews	Vegetation Groups Identified Through Photo-Interpretation								Total	Percent Correct (User)	Confidense Interval -	Confidense Interval +
	Winter-rain Evergreen Sclerophyllous Forest and Woodland	Needle-leaved Evergreen Forest	Winter-deciduous broad-leaved forests and woodlands	Coastal Scrub Vegetation	Chaparral Vegetation	Temperate Cold-deciduous Shrublands	Native and non-native grasslands	Vegetation dominated by Annual or Perennial forbs				
Winter-rain Evergreen Sclerophyllous Forest and Woodland	107	16	5	3	5	3			139	77.0%	70.7%	83.2%
Needle-leaved Evergreen Forest	12	154	5	8	2	1			182	84.6%	79.9%	89.3%
Winter-deciduous broad-leaved forests and woodlands	2	1	55	1		17			76	72.4%	63.3%	81.5%
Coastal Scrub Vegetation	2	3	1	274	2	18	23	15	338	81.1%	77.4%	84.7%
Chaparral Vegetation	3	3		13	62				81	76.5%	68.2%	84.9%
Temperate Cold-deciduous Shrublands	2	1	5	6	1	35	2		52	67.3%	55.6%	79.0%
Native and non-native grasslands				43		5	179	14	241	74.3%	69.4%	79.1%
Vegetation dominated by Annual or Perennial forbs				5		1	15	48	69	69.6%	59.7%	79.4%
Total	128	178	71	353	72	80	219	77	1178			
Percent Correct (Producer)	83.6%	86.5%	77.5%	77.6%	86.1%	43.8%	81.7%	62.3%				
Confidense Interval -	77.8%	82.0%	68.6%	73.8%	78.7%	34.0%	77.2%	52.6%				
Confidense Interval +	89.4%	91.0%	86.3%	81.4%	93.5%	53.5%	86.3%	72.1%				

Overall Accuracy 77.6

Kappa 72.8

Plant Community Map Accuracy Assessment - Herb Density

Herb Densities Identified Through Photo-Interpretation

Herb Densities Identified by Field Crew:	No Herbs	>60% cover	40 - 60% cover	25 - 40% cover	10 - 25% cover	1 - 2% cover	Total	Percent Correct (User)
	No Herbs	2						2
>60% cover	1	181	41	41	16	4	284	63.7
40 - 60% cover			1	4	4		9	11.1
25 - 40% cover		1	1	2		1	5	40.0
10 - 25% cover				3			3	0.0
1 - 2% cover							0	NA
Total	1	184	43	50	20	5	303	
Percent Correct (Producer)	0.0	98.4	2.3	4.0	0.0	0.0		
Overall Accuracy	60.7%							

Plant Community Map Accuracy Assessment - Herb Height

Herb Heights Identified Through Photo-Interpretation

Herb Heights Identified by Field Crews	Herb Heights Identified Through Photo-Interpretation								Total	Percent Correct (User)
	No Herbs	<0.5 m	0.5 - 2 m	2 - 5 m	5 - 15 m	15 - 35 m	35 - 50 m	>50 m		
No Herbs	1	6	7						13	0.0
<0.5 m	1	131	27	2	1				162	80.9
0.5 - 2 m		39	100		1				140	71.4
2 - 5 m			8	1					8	0.0
5 - 15 m					1				0	NA
15 - 35 m						1			0	NA
35 - 50 m							1		0	NA
>50 m								1	0	NA
Total	1	176	142	2	1	1	0	0	323	
Percent Correct (Producer)	0.0	74.4	70.4	0.0	0.0	0.0	NA	NA		

Overall Accuracy 71.5%

Plant Community Map Accuracy Assessment - Shrub Density

Shrubs Densities Identified Through Photo-Interpretation

		<u>Shrubs Densities Identified Through Photo-Interpretation</u>						Total	Percent Correct (User)
		No Shrubs	>60% cover	40 - 60% cover	25 - 40% cover	10 - 25% cover	1 - 2% cover		
Shrubs Densities Identified by Field Cre	No Trees	5	2	3				5	0.0
	>60% cover	5	258	38	65	15	5	386	66.8
	40 - 60% cover		37	9	32	5	1	84	10.7
	25 - 40% cover		27	8	17	10	3	65	26.2
	10 - 25% cover		10	8	14	3	3	38	7.9
	1 - 2% cover		4	3				7	0.0
	Total	5	338	69	128	33	12	585	
Percent Correct (Producer)	0.0	76.3	13.0	13.3	9.1	0.0			

Overall Accuracy 49.1%

Plant Community Map Accuracy Assessment - Shrub Height

Shrub Heights Identified Through Photo-Interpretation

Shrub Heights Identified by Field Crews	Shrub Heights Identified Through Photo-Interpretation								Total	Percent Correct (User)
	No Shrubs	<0.5 m	0.5 - 2 m	2 - 5 m	5 - 15 m	15 - 35 m	35 - 50 m	>50 m		
No Shrubs	4	2	11	4	1				18	0.0
<0.5 m		18	21	1					40	45.0
0.5 - 2 m	1	57	249	16	10				333	74.8
2 - 5 m	3		76	20	7				106	18.9
5 - 15 m			2		1				3	33.3
15 - 35 m									0	NA
35 - 50 m									0	NA
>50 m									0	NA
Total	4	77	359	41	19	0	0	0	500	
Percent Correct (Producer)	0.0	23.4	69.4	48.8	5.3	NA	NA	NA		

Overall Accuracy 57.6%

Plant Community Map Accuracy Assessment - Tree Density

Tree Densities Identified Through Photo-Interpretation

		Tree Densities Identified Through Photo-Interpretation						Total	Percent Correct (User)
		No Trees	>60% cover	40 - 60% cover	25 - 40% cover	10 - 25% cover	1 - 2% cover		
Tree Densities Identified by Field Crews	No Trees	1	2				3	0.0	
	>60% cover	2	193	17	19	1	232	83.2	
	40 - 60% cover		67	12	12	4	95	12.6	
	25 - 40% cover		49	9	16	12	87	18.4	
	10 - 25% cover		19	8	7	3	41	7.3	
	1 - 2% cover			1		1	2	0.0	
Total		2	329	49	54	21	5	460	
Percent Correct (Producer)		0.0	58.7	24.5	29.6	14.3	0.0		

Overall Accuracy **48.7%**

Plant Community Map Accuracy Assessment - Tree Height

Tree Heights Identified Through Photo-Interpretation

		Tree Heights Identified Through Photo-Interpretation							Total	Percent Correct (User)	
		No Trees	<0.5 m	0.5 - 2 m	2 - 5 m	5 - 15 m	15 - 35 m	35 - 50 m			>50 m
Tree Heights Identified by Field Crews	No Trees				1	8	1			10	0.0
	<0.5 m									0	NA
	0.5 - 2 m			1		1				2	50.0
	2 - 5 m			9	9	6				24	37.5
	5 - 15 m	1	1	18	29	140	14	1		204	68.6
	15 - 35 m		3	3	2	96	27	2	1	134	20.1
	35 - 50 m				1	4	14	3	1	23	13.0
	>50 m					1				1	0.0
	Total	1	4	31	42	256	56	6	2	398	
Percent Correct (Producer)	0.0	0.0	3.2	21.4	54.7	48.2	50.0	0.0			

Overall Accuracy 45.2%