11770

California Coastal Closed-Cone Conifer Forest and Woodland

BpS Model/Description Version: Aug. 2020

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| **Modelers** |  | **Reviewers** |  |
| Mark Borchert | mborchert@fs.fed.us | None | None |
| John Foster | jfoster@tnc.org | None | None |
| None | None | None | None |

Vegetation Type

Forest and Woodland

Map Zone

3

Geographic Range

Closed-cone conifer forests extend from the Monterey Bay area to Baja California, Mexico, including the Channel Islands. All are coastal or near-coastal in their distribution, especially the cypress species. Only *Pinus coulteri* and *P. attenuata* reach inland -- into the western San Bernardino Mountains and into the Santa Ana Mountains.

Biophysical Site Description

These forests and woodlands are found on marine sedimentary, non-metamorphosed features, often with podsols on sterile sandstone. They are limited to coastal areas with a moderate maritime climate and they likely receive more annual precipitation than nearby coastal chaparral. These occurrences can also include pygmy woodland expressions where nearly lateritic subsoil underlies acidic sands (ancient marine terraces).

This system occurs in localized patches, often confined to specific soil substrates. In the Monterey Bay area*, Cupressus macrocarpa* and *C. goveniana* occur, whereas in the Santa Cruz Mountains, there are patches of *C. abramsiana* on excessively drained, nutrient-poor soils. *Cupressus sargentii* also occurs as small, isolated stands from Big Sur to northern Santa Barabara County, usually growing on serpentinite soils under the direct influence of the maritime climate. *Cupressus forbseii* and *C. stephensonii* occur as small, scattered islands in the Peninsular Ranges of San Diego County.

Vegetation Description

This ecological system is defined by the group of *Cupressus* and *Pinua* species that retain their seeds until some sort of disturbance causes the cones to open. Cones may open in response to fire, but may open for other reasons (e.g., desiccation).

Cypresses in the Monterey Bay area are *Cupressus macrocarpa* and *C. goveniana*, and in the Santa Cruz Mountains, *C. abramsiana*. These species are highly localized in their distribution and are often confined to specific soil substrates (e.g., *C. goveniana*), such as excessively drained, nutrient-poor soils.

Other associated plant species include *Arctostaphylos nummularia*, *Ledum groenlandicum*, *Vaccinium ovatum*, *Gaultheria shallon*, *Rhododendron macrophyllum*, and *Morella californica* (= *Myrica californica*). The lichen and moss component of this system is very diverse and can be abundant in these communities, which include *Cladonia* spp.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| CUMA2 | *Cupressus macrocarpa* | Monterey cypress |
| CUGO | *Cupressus goveniana* | Gowen cypress |
| CUAB | *Cupressus abramsiana* | Santa Cruz island cypress |
| PICOC | *Pinus contorta var. contorta* | Lodgepole pine |
| PICOB | *Pinus contorta var. bolanderi* | Bolander beach pine |
| PITO | *Pinus torreyana* | Torrey pine |
| PIRA2 | *Pinus radiata* | Monterey pine |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

Most of the closed-cone conifers are killed in crown fires because they grow in or near highly flammable chaparral. Moreover, they self-prune poorly, so fire carries easily into the canopy. In addition, because they grow in dense thickets of small-stem individuals, they may burn intensely even in the absence of chaparral. Basically, the fire regime of many closed-cone conifers is the same as that of the surrounding shrublands and particularly characterizes *C. sargentii*, *C. forbesii*, *C. stephensonii*, *P. coulteri*, and *P. attenuata*.

Post-fire regeneration of these species is linked closely to the frequency of fire relative to cone bank accumulation. For example, *C. sargentii* needs at least 20yrs between fires to accumulate a cone bank sufficient to regenerate the stand. *Pinus coulteri* likely needs at least 25yrs and preferably 30yrs to develop an adequate cone bank. Fires that kill a stand before an adequate cone bank is in place will disappear (immaturity risk), as has been observed in *C. forbesii* and *C. sargentii*. Fire opens closed cones, but not all stands necessarily burn in crown fires. Some may burn in ground and surface fires.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 46 | 48 |  |  |
| Moderate (Mixed) | 87 | 26 |  |  |
| Low (Surface) | 87 | 26 |  |  |
| All Fires | 22 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

Scale Description

Patches are limited in size, often due to soil characteristics. Disturbances are frequently stand-replacing events and are often introduced from adjacent vegetation types.

Adjacency or Identification Concerns

Identification of the biophysical settings relies on the presence of one or a cluster of these species. The surrounding systems could be maritime chaparral, coastal sage scrub, coastal grassland, and possibly coastal live oak.

Issues or Problems

Native Uncharacteristic Conditions

Comments

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 0.5-1.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | 1.0-3.0 | A | A | A | A | A | A | A | A | A | A |
| Shrub | >3.0 | A | A | A | A | A | A | A | A | A | A |
| Tree | 0-5 | B | B | B | B | B | B | B | B | B | B |
| Tree | 5-10 | B | B | B | B | B | B | B | B | B | B |
| Tree | 10-25 | C | C | C | C | C | C | C | C | C | C |
| Tree | 25-50 | C | C | C | C | C | C | C | C | C | C |
| Tree | >50 | C | C | C | C | C | C | C | C | C | C |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 21 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |

Description

An early-development state when there are no cones. Stands are open, with fire annuals and perennials abundant in the first 3yrs. Conifer cover is from 0-20% during this stage. Trees are 0.10m (seedlings) to 3m (saplings) in height. Tree species are not listed because the composition depends so much on site conditions.

Replacement fire occurs.

*Maximum Tree Size Class*  
None

Class B 54 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |

Description

A mid-development state when cones are accumulating (net increase) in the canopy. Trees are 4-10m (poles) in height. Shrubs beneath the pines have 100% closure and reach their maximum height. Tree species are not listed because the composition depends so much on site conditions.

Replacement fire resets age; mixed fire and surface fire maintain.

*Maximum Tree Size Class*  
None

Class C 25 Late Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |

Description

A late-development state, generally >30yrs of age. Conifers in the stands range from 50-100% canopy closure. Shrubs in the understory have reached their full height and continue to grow, but at a reduced rate. Trees are taller than 10m. The net increase in closed cones slows during this stage. Tree species are not listed because the composition depends so much on site conditions.

Replacement fire resets age.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:OPN | 10 |
| Mid1:OPN | 11 | Late1:CLS | 30 |
| Late1:CLS | 31 | Late1:CLS | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.008 | 125 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.009 | 111 | No | 0 |
| Mixed Fire | Mid1:OPN | Mid1:OPN | 0.009 | 111 | No | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.025 | 40 | Yes | 0 |
| Surface Fire | Late1:CLS | Mid1:OPN | 0.028 | 36 | Yes | 0 |
| Mixed Fire | Late1:CLS | Mid1:OPN | 0.028 | 36 | Yes | 0 |
| Replacement Fire | Late1:CLS | Early1:ALL | 0.028 | 36 | Yes | 0 |

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