

Gowen cypress
(*Callitropsis [=Cupressus] goveniana*)

5-Year Review:
Summary and Evaluation



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U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
Ventura, California

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5-YEAR REVIEW
Gowen cypress (*Callitropsis [=Cupressus] goveniana*)

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5-YEAR REVIEW
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1. GENERAL INFORMATION

1.1. Reviewers

Lead Regional or Headquarters Office: Region 8, California and Nevada: Diane Elam, Deputy Division Chief for Listing, Recovery, and Habitat Conservation Planning, and Jenness McBride, Fish and Wildlife Biologist: 916-414-6464

Lead Field Office: Ventura Fish and Wildlife Office: Chris West, Fish and Wildlife Biologist, 707-822-7201; Connie Rutherford, Listing and Recovery Coordinator, 805-644-1766

1.2. Methodology used to complete the review:

This review was carried out by staff of the Ventura Fish and Wildlife Office. Information was collected from a variety of sources including: the Internet, published and unpublished literature, personal communications with experts in the field, and direct field observation. In 2006, the name of the genus for this taxon reverted to *Callitropsis*; at the same time, the taxon was re-recognized as a full species rather than a subspecies. For this review, we will use the currently recognized name for the taxon, *Callitropsis goveniana*, rather than use the name under which the species was listed, (*Cupressus goveniana* ssp. *goveniana*). We received no information from the public in response to our Federal Register (FR) notice initiating a request for information on this subspecies (see section 1.3.1, below).

1.3. Background:

1.3.1. FR Notice citation announcing initiation of this review:

On February 14, 2007, the U.S. Fish and Wildlife Service (Service) announced initiation of the 5-year review for this taxon under the name *Cupressus goveniana* ssp. *goveniana* and asked for information from the public regarding the subspecies' status (U.S. Fish and Wildlife Service 2007). No information was received as a result of this request.

1.3.2. Listing history

Original Listing

FR notice: 63 FR 43100

Date listed: August 12, 1998

Entity listed: subspecies (*Cupressus goveniana* ssp. *goveniana*)

Classification: threatened

1.3.3. Associated rulemakings

None

1.3.4. Review History

The status of *Callitropsis goveniana* was reviewed during preparation of the Recovery Plan for this subspecies, which was approved in 2004. Otherwise, no formal 5-year review has been conducted.

1.3.5. Species' Recovery Priority Number at start of 5-year review

The Recovery Plan indicates that the recovery priority number is 9C on a scale of 1 to 18. This number indicates a subspecies under a moderate degree of threat and a high potential for recovery. The letter C indicates that there is some degree of conflict from construction or other development projects.

1.3.6. Recovery Plan or Outline

Name of plan or outline: *Recovery Plan for Five Plants from Monterey County, California*

Date issued: August 18, 2004

Dates of previous revisions, if applicable: N/A

2. REVIEW ANALYSIS

2.1. Application of the 1996 Distinct Population Segment (DPS) policy

The Endangered Species Act of 1973, as amended, defines species as including any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate wildlife. This definition limits listings as distinct population segments (DPS) only to vertebrate species of fish and wildlife. Because the species under review is a plant and the DPS policy is not applicable, the application of the DPS policy to the species listing is not addressed further in this review.

2.2. Recovery Criteria

2.2.1. Does the species have a final, approved recovery plan containing objective, measurable criteria?

Yes
 No

2.2.2. Adequacy of recovery criteria

2.2.2.1. Do the recovery criteria reflect the best available and most up-to-date information on the biology of the species and its habitat?

Yes
 No The impacts of human-caused erosion were not recognized or discussed at the time of listing, nor when the Recovery Plan was written.

2.2.2.2. Are all of the five listing factors that are relevant to the species addressed in the recovery criteria (A, the present or threatened destruction, modification, of curtailment of its habitat or range; B, overutilization for commercial, recreational, scientific, or educational purposes; C, disease and predation; D, inadequacy of existing regulatory mechanisms; and E, other natural or human-caused factors) (and is there no new information to consider regarding existing or new threats)?

Yes
 No See 2.2.2.1, above.

2.2.3. List the recovery criteria as they appear in the recovery plan, and discuss how each criterion has or has not been met, citing information (for threats-related recovery criteria, please note which of the five listing factors are addressed by that criterion. If any of the five listing factors are not relevant to this species, please note that here):

The recovery objective for *Callitropsis goveniana* is removal from the U.S. Fish and Wildlife Service's list of threatened and endangered species. At the time the Recovery Plan was written, all Listing Factors were identified as potential threats to the persistence of this species. However, we do not believe that Listing Factor B poses a relevant threat to the species at this time.

2.2.3.1. (Recovery Plan III.A.5.a.) Monitoring of the Del Monte Forest population and the Point Lobos population for a minimum of 10 years (or longer if needed) shows long-term reproductive success in both populations. As determined by research, protected habitat must be of adequate size (large enough to support a functioning ecosystem, including areas that support suitable unoccupied habitat for population expansion and fluctuations in distribution) to ensure that ecosystem and community processes and associated species (e.g., hydrologic regime, fire, food webs, fauna, Monterey pine forest communities) are maintained, and that the locations are adequate to provide for population expansion and for colonization of new areas as microhabitat conditions change.

This recovery criterion addresses Listing Factors A and E. This criterion specifically calls for monitoring ecosystem parameters to ensure that natural processes are able to function. This is critical for this species, because a limited amount of suitable habitat is available. Because no such long-term monitoring has been initiated at either stand of *Callitropsis goveniana*, we consider that this criterion has not been met. We believe that this criterion is adequate and appropriate to the recovery of this species.

2.2.3.2. (Recovery Plan III.A.5.b.) Twelve or more years (or possibly as much as one generation) of monitoring have determined that successful recruitment

has increased the overall size of both populations. Regeneration success should be measured in terms of abundant natural regeneration (with parental contributions from many trees for genetic purposes) and measured directly with genetic analysis if possible.

This recovery criterion addresses Listing Factors A and E. An increase in the overall size of the population may be possible at the Del Monte Forest site due to available habitat in the old quarry site and areas of reduced density resulting from a fire in 1987. At Point Lobos, the proximity of pure Monterey pine (*Pinus radiata*) forest, deep drainages, and potentially unsuitable soil types bordering the stand, in conjunction with the high density of vegetation within much of the occupied habitat, may limit opportunities for population growth. However, certain management practices, such as vegetation thinning and/or restoration of old roadways within the stand, may increase the carrying capacity of this stand. Since no such long-term monitoring at either stand of *Callitropsis goveniana* has been initiated, we consider that this criterion has not been met. We believe that this criterion is adequate and appropriate to the recovery of this species.

2.2.3.3. (Recovery Plan III.A.5.c.) A prescribed burn plan is established to improve surrounding habitat to reduce high vegetative cover and promote recruitment, or research has documented an alternative method to burning that is successful in promoting reproduction. Appropriate management to improve the surrounding habitat would need to be successfully implemented. Funds must be available for appropriate long-term management.

This recovery criterion addresses Listing Factors A and E. No prescribed burn activity or planning has been undertaken at either *Callitropsis goveniana* site. Similarly, no research has been undertaken to determine appropriate surrogates for burning as a method to reduce vegetative cover and in turn promote recruitment and improve the surrounding habitat. As a result, we consider that this criterion has not been met. We believe that this criterion is adequate and appropriate to the recovery of this species.

2.2.3.4. (Recovery Plan III.A.5.d.) A seed bank is established at a recognized institution certified by the Center for Plant Conservation (CPC). The seed bank is needed for protection of the species in case of an unforeseen naturally occurring event that would create a lack of reproduction or die-off from disease. Seeds should represent the remaining genetic diversity of the species and the viability (i.e., germination percentage) of the seed collection should be determined.

While some horticultural use of this species has been documented, the sources of these lineages are unknown. A single adult specimen from the Huckleberry Hill population in the Del Monte Forest grows in the University of California at Santa Cruz Arboretum, but the specimen is not being utilized in any formal seed banking capacity (S. McCabe, Coordinator of Research and Education, Curator of

Succulents, Arboretum, University of California, Santa Cruz, pers. comm. 2007). Three batches of seed totaling approximately 1200 seeds are housed at Rancho Santa Ana Botanic Garden (a CPC affiliate) (M. Wall, Seed Curator and Program Manager, Rancho Santa Ana Botanic Garden, *in litt.* 2007). All three of these batches originated from the Del Monte Forest stand and it is estimated that 33 percent of these may be viable (M. Wall *in litt.* 2008). Two are from along one trail and the third is from along a second trail. Germination experiments on these seeds showed a germination rate of 9 percent (M. Wall *in litt.* 2008). This collection represents a very small proportion of the remaining genetic diversity of this species and should not be considered a seed bank. This collection is not funded, further testing for viability is not planned, and additional collection of seed has not been contracted for this species (M. Wall *in litt.* 2008). We consider that this criterion has not been met. We believe that this criterion is adequate and appropriate to the recovery of this species.

2.3. Updated Information and Current Species Status

2.3.1. Biology and Habitat

Morphology and Life History Characteristics

Callitropsis goveniana is a small coniferous tree in the cypress (Cupressaceae) family. It is sparsely branched with a wide crown, and its foliage is composed of light-green scale-like leaves. The species achieves pollination by wind; female cones are subglobose, 10 to 15 millimeters (0.4 to 0.6 inches) long, and cones bear 90 to 110 dark brown to black seeds (Bartel 1993). Female cones are serotinous, only opening to release seeds when exposed to very high heat or fire, and may be produced on a tree as young as four years of age (Wolf and Wagener 1948). These adaptations are typically associated with frequent fires (Jones and Stokes Associates 1996).

Distribution

The two populations of *Callitropsis goveniana* are located in coastal Monterey County, California, approximately 4.0 miles (6.4 kilometers) apart. One population is located on Huckleberry Hill in the Del Monte Forest on the Monterey Peninsula, and covers approximately 100 acres (40 hectares). The second population is located on Point Lobos State Reserve (Reserve), a unit managed by the California Department of Parks and Recreation (State Parks) on the inland side of Highway 1, and covers 19 acres (8 hectares) (T. Moss, Ranger/Naturalist, Restoration Planner, California State Parks, unpubl. data 2007a). Even though cypresses are wind-pollinated, we believe that the two populations are biologically isolated because of the distance between the populations, and the fact that the two populations are not in alignment with each other and the prevailing northwesterly winds.

It is widely believed that during the last glacial era, the temperate coastal climate was more favorable for cypress and other conifers; increasing aridity since then probably accounts for the restriction of cypress and other species to a few coastal sites (Vogl et al. 1988). No records exist that document the historical extent of the two groves. The last

major loss of trees of the species was in the early 1980s, before the species was listed, when approximately 840 trees were cut in the Del Monte Forest stand for construction of the Poppy Hills Golf Course (U.S. Fish and Wildlife Service 2004).

Habitat Characteristics

The species generally occurs in pygmy forest and maritime chaparral habitats (Jones and Stokes Associates 1996). Both of these habitat types are represented in the Point Lobos population (Doak et al. 2000). The tree may also occur in pure stands or in mixed stands with Monterey pines or Bishop pines (*Pinus muricata*). Frequently an understory of chaparral shrubs is also present with *Callitropsis goveniana*.

The species is adapted to shallow Cieneba or podzolic soil types, overlaid by a shallow hardpan soil. Specific adaptation to these soils, which exhibit severely reduced nutrient availability, precludes establishment by other local tree types. This adaptation essentially restricts the species to two small islands of historical habitat on the Monterey coast.

Recruitment

Recruitment rates for the species are extremely low in maritime chaparral habitat due to the high density of vegetation and the intolerance of this species to germinate in a shaded environment (Doak et al. 2000). Recruitment is higher, but still low, in mixed conifer habitat (Doak et al. 2000). This recruitment effect is reflected in the age distributions within these habitat types. The chaparral habitat tree ages are skewed toward much older age classes, while the trees in the mixed conifer habitat, where recruitment is higher, exhibit a much broader age distribution (Doak et al. 2000). The effect on overall population numbers of these recruitment rates is unknown, and more research would be needed to draw any definitive conclusions about potential increases or declines.

The role of fire in regeneration and recruitment

Three general types of disturbance drive regeneration in most mature forests: continuous, fine-scale gap-phase, and catastrophic (Veblen 1992). Continuous regeneration is rare and occurs when a highly shade tolerant species undergoes continuous recruitment and growth into the canopy. Fine-scale gap-phase regeneration is generally characterized by recruitment in gaps, often caused by treefall; this is common in communities that have attained compositional equilibrium and often results in a mosaic of gap, building, and mature phases (Veblen 1992). Catastrophic disturbance is generally unpredictable, large in scale, and will usually result in an entire stand or large portions of a stand being replaced after a single disturbance event and thus results in an even-age structure in the next forming stand. For the chaparral communities of central California, the normal disturbance regime type is catastrophic and the agent is fire. *Callitropsis goveniana* is well-adapted to this disturbance regime.

While Doak et al. (2000) found that cones will open with age and Tom Moss (pers. comm. 2007b) has observed cones opening during periods of hot weather, the mass synchronized openings of the serotinous cone type observed during fire events are likely a critical part of the natural regeneration process for this species. This synchronized seed dispersal ensures that many parent trees will contribute seed to the freshly-cleared

podzolic soils required by *Callitropsis goveniana* for seedling establishment, and lead to the prolific post-fire recruitment observed in this species (Jones and Stokes Associates 1996, Doak et al. 2000, D. Rogers *in litt.* 2002, V. Yadon *in litt.* 2002). It is likely that limited fine-scale gap-phase regeneration occurs in areas bordering pure stands where more nutrient-rich soils allow Monterey and Bishop pines to grow. Occasional losses of large individual pines in such areas will allow establishment of *C. goveniana* individuals. However, it is likely that this sort of recruitment, in infrequently occurring light gaps, is opportunistic rather than the standard type of regeneration for this species.

At least three fires have burned within the Del Monte Forest population of *Callitropsis goveniana* in the last 100 years (Service 2004). Additionally, human driven disturbance in the form of tree cutting, recreation, and road and trail formation have removed individual trees at irregular intervals. As a result of this irregular disturbance, there is a broad range of tree ages and vegetation densities within this stand. Areas within this population where vegetation density is low due to recent disturbance exhibit high levels of recruitment of this species (C. West, U.S. Fish and Wildlife Service biologist, pers. obs. 2007). Further evidence for the catastrophic disturbance model of regeneration is provided by the age structures of *C. goveniana* in the Point Lobos area (Doak et al. 2000). While some variation in age was found in individuals in the bordering mixed conifer areas, the majority of individuals were of only two age classes, indicating two separate catastrophic disturbance events.

Considering that this species relies on catastrophic disturbance, utilizing a gap-phase program focusing on replacement of individuals, as suggested by M. Zander (Zander *in litt.* 1996), to manage *Callitropsis goveniana* populations is unlikely to succeed. The morphological traits exhibited by this species (serotiny, small tree stature, rapid production of cones, shade intolerance, and even-aged stands) indicate evolution under natural successional cycles driven by fire and the high likelihood that this species has evolved to germinate, grow, and reproduce as a stand (California State Parks 1979, Perry and Lotan 1979, Callaway and Davis 1993, Johnson and Gutsell 1993, Enright et al. 1998). Such disturbance regimes, and the resulting stand growth patterns, are not uncommon and must be considered in order to design effective management strategies that will achieve the recovery goals of healthy stands and sustainable populations. It is likely that the best management tool to achieve “abundant natural regeneration” as called for in the Recovery Plan would be to initiate partial stand replacement via controlled burns as disturbance events in 50- to 70- year cycles, as suggested by Yadon (*in litt.* 2002) or 85-year cycles as suggested by Doak et al. (2000). Using computer modeling to simulate such fire cycles, as has been done by Franklin et al. (2001) and Syphard et al. (2006) could clarify this cycle period. Subsequent monitoring should be undertaken for at least one fire cycle rather than the 12 years suggested in the Recovery Plan, and should include a genetic analysis component to ensure widespread recruitment from parent individuals throughout the stand (D. Rogers *in litt.* 2002).

Genetic and Taxonomic Findings

Based on genetic analysis completed since listing, the taxon was rerecognized as a full species (Bartel et al. 2003). In a recent review of Old World and New World cypresses,

data from anatomy, biochemistry, micromorphology, reproductive development, reproductive morphology, and vegetative morphology were combined with molecular sequence data and used to revise their taxonomy (Little 2006). In doing so, the genus name for *Cupressus goveniana*, along with other *Cupressus* taxa, was revised to *Callitropsis* – hence the current name *Callitropsis goveniana*. The taxonomic realignment, published since listing, changes the listed entity from subspecies to full species in a different genus, but does not alter the definition, distribution, or range of the taxon from what it was at the time of listing.

Genetic diversity measures for this species is unknown since no examination of genetic diversity between populations or within each population has been undertaken.

2.3.2. Five-Factor Analysis (threats, conservation measures, and regulatory mechanisms)

2.3.2.1. (A) Present or threatened destruction, modification or curtailment of its habitat or range:

Development

At the time of listing, development was the primary threat to this species (63 FR 43100). The species was listed as threatened in 1998 primarily due to habitat loss from development of privately owned land contiguous with what is now known as the Huckleberry Hill stand. This threat continues, as proposals for additional development of residential neighborhoods and golf courses are currently under review by the County of Monterey. Recent proposals from the Pebble Beach Company include the removal of *Callitropsis goveniana* individuals and the increase of urbanization immediately adjacent to the Del Monte Forest stand (Monterey County Planning and Building Inspection 2007a). Mitigation proposals via landscaping using the species have been presented, but would not adequately mimic functional, natural habitat. This species is part of a complex successional system in habitats shaped by fire.

Current development proposals would result in direct removal of the species and encroach on habitat that is already surrounded by urbanized areas. Existing development allowed on the immediate edge of occupied habitat, such as that along the upper ridge of Huckleberry Hill, will constrain active management techniques (such as prescribed burning) that are likely to be necessary in the future. Similar encroachment can be seen around the Point Lobos occurrence, where properties immediately surrounding the stand continue to be developed (C. West, pers. obs. 2007). The proximity of permanent structures and human habitation is likely to impede future management of both occurrences. With no room for stand expansion, this development makes it difficult to increase the size of both populations called for in the Recovery Plan.

Succession

Another result of this urbanization is the exclusion of fire from habitat that is adjacent to developed areas. Fire exclusion was considered to be a primary threat at the time of listing and remains a major and growing threat to this species (V. Yadon *in litt.* 2002; Jones and Stokes Associates 1996; 63 FR 43100). As succession continues, and native chaparral along with non-native species fills in as understory, the availability of bare soil exposed to direct sun that this taxon requires for establishment will be reduced. Fire is necessary to clear the understory and litter layers and remains the best management tool for maintaining *Callitropsis goveniana* habitat (Jones and Stokes Associates 1996). As mentioned previously, development continues to encroach and surround *C. goveniana* habitat, and the ability to safely and effectively use fire as a management tool has been greatly reduced. Jones and Stokes Associates (1996) found that “existing development surrounding the Huckleberry Hill cypress occurrence likely precludes the use of fire as a management tool.” For this reason, continued development on lands immediately adjacent to occupied habitat may still indirectly alter the occupied habitat.

State Parks has discussed plans for constructing a trail to allow public viewing of the Point Lobos population of *Callitropsis goveniana* (T. Moss, pers. com. 2007b). State Parks has not yet begun to assess the potential impacts of this project on *C. goveniana*.

Conservation Measures Undertaken

State Parks personnel have made concerted efforts to remove non-native plants such as French broom (*Genista monspessulana*) from areas around the Point Lobos stand (T. Moss, pers. comm. 2007b), and the Pebble Beach Company is continuing its policy of non-native plant removal within and surrounding the Del Monte Forest stand (D. Messenger *in litt.* 2002). These removal efforts have been effective, but small-scale re-establishment of non-native species into previously cleared areas has been observed (C. West, pers. obs. 2007). This sort of manual non-native plant control will likely be necessary as part of ongoing management activities both around and within the *Callitropsis goveniana* stands.

The potential exists for population expansion at the Huckleberry Hill site into an unused sand quarry, while expansion of the population at the Point Lobos site would require restoration of old roadways which comprise 5.9 percent of the existing stand (T. Moss, unpublished data 2007a).

Summary of Factor A:

The entirety of the Del Monte Forest population is contained within private property owned by the Pebble Beach Company. While agreements are in place to protect this population, recent proposals indicate that this population is not secure. Most of the Point Lobos population occurs on state park lands. Other than for observations that scattered development is occurring in the vicinity, specific information on the status of *Callitropsis goveniana* individuals on adjacent private lands were not available for

this review. Plans for development of access trails at this site could impact some parts of this population unless they are routed to correspond with existing access roads as part of a restoration effort. The biggest current threat facing *C. goveniana* is that of secondary succession in the absence of natural fire regimes. Fire is required to open the serotinous seed cones of the species, as well as to clear the dense understory of chaparral vegetation to create light gaps required by this shade-intolerant species.

2.3.2.2. (B) Overutilization for commercial, recreational, scientific, or educational purposes:

At the time of listing, overutilization was not considered a threat to this species, and is not considered a threat now.

2.3.2.3. (C) Disease or predation:

At the time of listing, this was not considered a threat to this species. While there is no imminent threat from any specific disease, the potential effects of a disease on a dense, thicket-like stand of trees inhabiting a small area would be substantial. The fungal parasite *Seiridium cardinale*, which causes cypress canker disease, has reached epidemic status in the Mediterranean cypress (*Cupressus sempervirens*) in Greece, and a similar outbreak of disease or introduction of insect pests in the Monterey Peninsula region could be catastrophic for *Callitropsis goveniana* (D. Rogers *in litt.* 2002). Increasing this threat is the fact that many cankers and root molds may become more prevalent as water conditions change and place additional stress on individual trees. The likelihood of this taking place increases with microclimatic changes, which may occur due to ongoing threats from air pollution and climate change (D. Rogers *in litt.* 2002). An additional threat is possible due to the suppression of fire in *C. goveniana* stands, which may result in increases in diseases and pests in an aging forest (Jones and Stokes Associates 1996). Although no insect or disease threat has been identified for this species at this time, stand health in the two extant populations should be monitored to preclude any such future losses.

2.3.2.4. (D) Inadequacy of existing regulatory mechanisms:

County Protections: *Callitropsis goveniana* and its habitat are mentioned in two separate sections of the Monterey County Local Coastal Program. The Carmel Area Land Use Plan includes Gowen Cypress Woodland among its supported rare, endangered, or sensitive terrestrial species and habitats and so designates all areas occupied by this species as critical (Monterey County Planning and Building Inspection 2007b). This designation applies to the environmentally sensitive habitat of the Gowen Cypress Woodland as well as to *C. goveniana* itself due to its federally threatened status and its 1B.2 endangered designation by the California Native Plant Society (2007).

The Del Monte Forest Area Local Land Use Plan (Monterey County Planning and Building Inspection 2007c) and the Monterey County Coastal Implementation Plan (Monterey County Planning and Building Inspection 2007d) describe management requirements, and specifically address environmentally sensitive habitat protections,

buffer zones, tree removal regulations, and other various development-oriented guidelines. Generally, in environmentally sensitive areas and habitats, all development should be avoided except where it is necessary to support resource-dependent uses that are unable to be located elsewhere (Monterey County Planning and Building Inspection 2007b; Monterey County Planning and Building Inspection 2007d). Land use and development adjacent to environmentally sensitive habitat areas should be allowed only at densities compatible with long term protection and maintenance of the adjoining resources (Monterey County Planning and Building Inspection 2007b). A buffer zone of 100 feet (30.5 meters) between any environmentally sensitive habitat and any potential development site should be observed and access to these sensitive areas should be controlled (Monterey County Planning and Building Inspection 2007b; Monterey County Planning and Building Inspection 2007d).

While a 100-foot buffer may be adequate when considering direct impacts to habitat, additional space may be required to implement certain management methods. Specifically, the utilization of controlled burns as a management tool for mimicking natural fire cycles in *Callitropsis goveniana* habitat may require a larger buffer to adequately manage crews, equipment, smoke, and other issues.

According to the Del Monte Forest Area Land Use Plan (Monterey County Planning and Building Inspection 2007c), *Callitropsis goveniana* should be treated in the same manner as Monterey cypress (*Callitropsis [Cupressus] macrocarpa*), which in turn should be treated as Monterey pine with respect to removal of trees in the case of fuels reduction or disease. This plan states that removal of any significant (diameter of 12 inches [30.5 centimeters] or greater) Monterey pine requires a Coastal Development Permit to be obtained. This strategy, however, may not be useful for management of *C. goveniana*, because in most cases individuals do not attain a 12-inch diameter trunk size. This strategy is contradicted by the Del Monte Forest Coastal Implementation Plan (20.147.050.A.1.b.) (Monterey County Planning and Building Inspection 2007d), where it is stated that a coastal development permit must be obtained for the removal of trees except for “removal of hazardous trees which pose an immediate danger to life or structures or where a diseased tree is determined by a qualified professional forester to represent a severe and serious infection hazard to the rest of the forest . . . , except for Monterey cypress in its indigenous range,....” No specific regulations in this document address removal of *C. goveniana*.

State Protections: *Callitropsis goveniana* is not a State-listed taxon under the California Endangered Species Act; however, the California Environmental Quality Act (chapter 2, section 21050 et seq. of the California Public Resources Code) affords some protection to the taxon under State law via mitigation requirements because there are both Federal and county protections in place for the species. In addition, the goal of the resource management program within California State Parks is to protect, restore, and maintain the natural resources in the State Park System (California State Parks 2007). The resource management plan for Point Lobos State Reserve includes a statement of purpose which states, “the purpose of Point Lobos State Reserve is to

perpetuate forever, for public enlightenment, inspiration and esthetic enjoyment, an area of unique natural beauty and ecological significance including the Monterey cypress-covered headlands, unique Gowen cypress pygmy forests... and the aquatic and terrestrial flora and fauna in an essentially pristine state.” (California State Parks 1979).

Federal Protections: No populations occur on Federal lands. Where the species occurs on private lands, protections afforded by section 7 of the Endangered Species Act are triggered only if there is a Federal nexus (i.e., an action funded, permitted, or carried out by a Federal agency).

Summary of Factor D: The above-listed regulations provide certain protections for *Callitropsis goveniana* on private and public property. California State Park natural resource goals provide direction to protect, restore, and maintain habitat for the species on state park lands at Point Lobos State Reserve. While some regulatory protections are afforded the species, many of the current threats to the species are either unregulated or not addressed by land use regulations (e.g., invasive species encroachment, habitat type conversion, fragmentation effects). The most applicable regulation affecting such threats relates to buffer zones around existing populations which are likely not wide enough to provide adequate management flexibility.

2.3.2.5. (E) Other natural or manmade factors affecting its continued existence:

Erosion

Erosion was not identified as a threat to this species at the time of listing. Recent observations at the Del Monte Forest stand indicate that activity from hikers and mountain bikers is causing considerable and damaging erosion (C. West, pers. obs. 2007). Trails cut through the surrounding area and even enter the stand itself. Mountain bike jumps and bridges made from cut tree trunks from within the stand are also visible throughout the area (C. West, pers. obs. 2007). The Pebble Beach Company does not currently have the personnel resources necessary to patrol or enforce no trespassing laws on these portions of its property (E. Love, Forester, Pebble Beach Company, pers. comm. 2007).

Remnants of old, cleared roadways, totaling 5.9 percent of the grove, exist within the Point Lobos stand (T. Moss, unpublished data 2007a). Removal of anchoring vegetation and poor drainage in these areas have allowed the topsoil to be completely washed away in much of the road system and caused severe erosion in the surrounding habitat (C. West, pers. obs. 2007). Continued flushing with surface water during rains prevents soil accumulation and vegetation establishment. Water seeping from the soil layer upslope of one of these exposed areas, or water falling as rain onto an exposed area, is not slowed by soil or vegetation, and therefore accumulates and behaves like a stream. Upon reaching natural drainages, this swift-moving water cuts deep ravines, further removing the limited topsoil and eroding habitat (C. West, pers. obs. 2007).

Invasive Species

At the time of listing, displacement by invasive species was considered a major threat (63 FR 43100). While this threat remains, much work has been done to control problem species. Recently, no pampas grass (*Cortaderia* sp.) was observed at either population of *Callitropsis goveniana*, and while considerable numbers of French Broom were present at both occurrences, they were all small, recently-recruited individuals that germinated between removal projects (C. West, pers. obs. 2007). These control efforts are critical to the persistence of *C. goveniana*, and will need to be continued for the foreseeable future.

Lack of Recruitment

At the time of listing, lack of recruitment was not considered a major threat to this species. Currently, recruitment seems to be occurring with frequency only at the Del Monte Forest population, where fires have cleared portions of the stand of ground litter, understory, and canopy on at least three occasions in the last 100 years (C. West, pers. obs. 2007). At the Point Lobos stand, recruitment was primarily associated with the mixed conifer habitat and was very limited in the maritime chaparral habitat, where it was likely hindered by the understory plant community (Doak et al. 2000). This threat will likely continue until the natural disturbance cycles discussed in section 2.3.1 can be restored or until adequate surrogates for natural disturbance factors are identified and implemented.

2.4 Synthesis

Callitropsis goveniana exists in only two natural occurrences. The species was listed as threatened in 1998 primarily due to habitat loss from development of privately owned land contiguous with what is now known as the Huckleberry Hill stand. Proposals for additional development of residential neighborhoods and golf courses are currently under review by the County of Monterey. The population on Point Lobos Natural Reserve land is largely protected from direct development. Development in areas immediately adjacent to both stands continues; such changes in surrounding land use will limit future management activities that can be undertaken to benefit *C. goveniana*. Additional pressures on these small stands exist in the form of trampling from mountain-bikers and hikers, erosion from mountain-bikers and poorly-formed roads, and low recruitment due to disruption of natural successional cycles resulting from suppression of the natural fire regime. All of these pressures threaten the continued existence of this species.

Because there are only two populations of this species, other potential threats should not be overlooked. In an aging population with limited recruitment; senescence, disease, and invasion by pest species are possible. Additionally, without sufficient recruitment, over time regular mortality of old trees may cause population numbers to drop and make the individual occurrences more susceptible to stochastic extinction.

Because all threats that were known at the time of listing are still threats, and because little progress has been made toward implementing management actions that would generate stable recruitment regimes or improve habitat conditions, we conclude that *Callitropsis goveniana* still meets the definition of threatened. No status change is recommended at this time.

3. RESULTS

3.1. Recommended Classification

- Downlist to Threatened
- Uplist to Endangered
- Delist (Indicate reasons for delisting per 50 CFR 424.11):
- No change is needed

3.2. New Recovery Priority Number: 8C. This number indicates a species under a moderate degree of threat and a high potential for recovery and reflects the taxonomic changes that have been applied to this species. The letter C indicates that there is some degree of conflict from construction or other development projects. The new recovery priority number reflects the change in taxonomy from a subspecies to a species.

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

1. Experiments should be undertaken using mechanical clearing and controlled burns to determine effects of treatment and of burn level due to excessive fuel build up on the standing seed crop, existing trees and on effectiveness of vegetation clearing for recruitment of young saplings. Any experiments conducted should include a genetic analysis component to determine the diversity of recruitment based on clearing method used. Current opportunistic recruitment is most likely to occur on the edges of the stand where expansion into tree gaps left by Monterey or Bishop Pines is possible. This narrows the genetic recruitment possibilities. In species where catastrophic disturbance drives stand level replacement, such events should be followed by recruitment from many different parental lineages. This must be monitored to assure widespread recruitment and broad genetic representation (D. Rogers *in litt.* 2002).
2. Reclaim road and trail systems within existing stands. Restoration of these areas by replacing topsoil and planting native vegetation to anchor it in place could reduce erosion and increase the amount of suitable habitat within the existing stands. Within the Point Lobos stand, 1.1 acres (0.46 hectares) could be recovered, allowing for recruitment to increase population size (T. Moss, unpublished data 2007a).
3. An effort should be made to determine where trees have been intentionally planted within the naturally occurring populations. For each of these plantings, it should be noted from where the

seeds originated. All plantings should be undertaken from stock that derives from, and thus is genetically consistent with, the targeted planting area (D. Rogers *in litt.* 2002).

4. In addition to the distance between stands, differences between the two stands in terms of soil types and vegetation associations also indicate a high likelihood that the two populations are genetically differentiated (D. Rogers *in litt.* 2002). Genetic analyses should be undertaken to determine the relatedness of the two stands and a seed bank should be created by collecting seed from both stands and many individuals per site.

5. Any plans for trail construction or recreational public use at Point Lobos State Reserve should only be considered if natural ecological processes within the stand will not be negatively impacted. In addition, no structures, fencing, signage, or other improvements should be installed near or within the stand that could hinder management activities (e.g., heavy equipment use, prescribed burns, etc.).

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U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW of Gowen cypress (*Callitropsis [Cupressus] goveniana*)

Current Classification: Threatened

Recommendation resulting from the 5-Year Review:

Downlist to Threatened

Uplist to Endangered

Delist

No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: N/A

Review Conducted By: Christopher West

FIELD OFFICE APPROVAL:

Field Supervisor, Fish and Wildlife Service

Approve _____ Date _____

REGIONAL OFFICE APPROVAL:

Regional Director, Fish and Wildlife Service

Approve _____ Date _____

U.S. FISH AND WILDLIFE SERVICE
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Current Classification: Threatened

Recommendation resulting from the 5-Year Review:

- Downlist to Threatened
- Uplist to Endangered
- Delist
- No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: N/A

Review Conducted By: Christopher West, Ventura Fish and Wildlife Office

FIELD OFFICE APPROVAL:

Field Supervisor, Fish and Wildlife Service

Approve  Date 3/26/08

REGIONAL OFFICE APPROVAL:

Regional Director, Fish and Wildlife Service

Approve  Date 3/31/08