

Cupressus abramsiana
(Santa Cruz Cypress)

**5-Year Review:
Summary and Evaluation**



Connie Rutherford, U.S. Fish and Wildlife Service, 2007

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

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5-YEAR REVIEW

***Cupressus abramsiana* (Santa Cruz cypress)**

1. GENERAL INFORMATION

Purpose of 5-Year Reviews:

The U.S. Fish and Wildlife Service (Service) is required by section 4(c)(2) of the Endangered Species Act (Act) to conduct a status review of each listed species at least once every 5 years. The purpose of a 5-year review is to evaluate whether or not the species' status has changed since it was listed (or since the most recent 5-year review). Based on the 5-year review, we recommend whether the species should be removed from the list of endangered and threatened species, be changed in status from endangered to threatened, or be changed in status from threatened to endangered. Our original listing of a species as endangered or threatened is based on the existence of threats attributable to one or more of the five threat factors described in section 4(a)(1) of the Act, and we must consider these same five factors in any subsequent consideration of reclassification or delisting of a species. In the 5-year review, we consider the best available scientific and commercial data on the species, and focus on new information available since the species was listed or last reviewed. If we recommend a change in listing status based on the results of the 5-year review, we must propose to do so through a separate rule-making process defined in the Act that includes public review and comment.

Species Overview:

Cupressus abramsiana is a small-statured tree in the cypress family (Cupressaceae), with mature trees reaching 82 feet (ft) (25 meters (m)) in height. The leaves are light green and scale-like, and the grey bark is fibrous, thin, and broken into vertical strips or plates. The average age at which individuals start producing cones is 11 years. The pollen cones are up to 0.16 inch (in) (4 millimeters) long and produce copious quantities of pollen that is windblown. The seed cones are approximately 1 in (2.5 centimeters (cm)) long and bear 8 to 10 seeds. The seeds are released from the cones at a slow rate throughout the life of the tree unless burned, in which case seed release is accelerated. Areas that have been recently disturbed through fire or mechanical means (e.g., scraping) can support a high density of saplings. Trees may live in excess of 100 years; one individual was recently estimated to be between 127 and 162 years old. The species is known from five populations in the Santa Cruz Mountains in Santa Cruz and San Mateo Counties, California, spanning a range of 15 miles (24 kilometers) from north to south.

Methodology used to complete the review:

This review was prepared by staff of the Ventura Fish and Wildlife Office, U.S. Fish and Wildlife Service (Service). We collected information 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 genus name for this taxon reverted from *Cupressus* to *Callitropsis*; in 2009, the genus name was proposed to be changed to *Hesperocyparis*. For this review, we will continue to use the name under which the species was listed, *Cupressus*

abramsiana. A report by Jodi McGraw (2007) was the primary source for information on current population trends for three of the five populations of *Cupressus abramsiana*. We received no public comments in response to our Federal Register (FR) notice initiating a request for information on this species.

Contact Information:

Lead Regional Office: Diane Elam, Deputy Division Chief for Listing, Recovery, and Habitat Conservation Planning, and Jenness McBride, Fish and Wildlife Biologist, Region 8, Pacific Southwest; 916-414-6464.

Lead Field Office: Connie Rutherford, Listing and Recovery Coordinator for Plants, Ventura Fish and Wildlife Office; 805-644-1766 ext. 306.

Cooperating Field Office: Elizabeth Warne, Botanist, Sacramento Fish and Wildlife Office; 916-414-6600.

Federal Register (FR) Notice Citation Announcing Initiation of This Review: A notice announcing initiation of the 5-year review of this taxon and the opening of a 60-day period to receive information from the public was published in the Federal Register on February 14, 2007 (72 FR 7064). No information was received as a result of this request.

Listing History:

Original Listing

FR Notice: 52 FR 679

Date of Final Listing Rule: January 8, 1987

Entity Listed: species (*Cupressus abramsiana*)

Classification: Endangered

State Listing

Cupressus abramsiana was listed by the State of California as endangered in 1979.

Review History:

The status of the species was reviewed during preparation of the recovery plan published in 1998. In 2006, a field assessment was made for three of the five populations. Otherwise, no formal review has been undertaken since the time of listing.

Species' Recovery Priority Number at start of 5-year review: The recovery priority number for *Cupressus abramsiana* is 14 according to the Service's 2008 Recovery Data Call for the Ventura Fish and Wildlife Office, based on a 1-18 ranking system where 1 is the highest-ranked recovery priority and 18 is the lowest (Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 FR 43098, September 21, 1983). This number indicates that the taxon is a species facing a low degree of threat with a high recovery potential.

Recovery Plan or Outline

Name of plan: Recovery Plan for the Santa Cruz Cypress

Date issued: September 1998

II. REVIEW ANALYSIS

Application of the 1996 Distinct Population Segment (DPS) policy

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

Information on the Species and its Status

Species Biology and Life History

Cupressus abramsiana is a small-statured tree in the cypress family (Cupressaceae). Mature trees reach 82 ft (25 m) in height. The leaves are light green and scale-like, and the grey bark is fibrous, thin, and broken into vertical strips or plates. The pollen cones are up to 0.16 in (4 mm) long and produce copious quantities of pollen that is windblown. The seed cones are approximately 1 in (2.5 cm) long and bear 8 to 10 seeds. It has some resemblance to Gowen cypress (*Cupressus goveniana*), though its seeds and cones are slightly larger than those of Gowen cypress.

Spatial Distribution

Cupressus abramsiana is known from five populations in the Santa Cruz Mountains in Santa Cruz and San Mateo Counties, California, spanning a range of 15 miles (24 km) from north to south. The Butano Ridge and Bracken Brae populations consist of single continuous stands, while the Eagle Rock population consists of three stands, and the Majors Creek population consists of two stands. The Bonny Doon population consists of several stands in close proximity with scattered trees between the denser stands; due to the large scale at which mapping was done at the time, the recovery plan portrayed this population as covering the largest area of all the stands.

Abundance

Based on recent mapping and population sampling, McGraw (2007) has updated the estimates for aerial extent and population size for three of the five populations (Butano Ridge, Eagle Rock, Majors Creek). Stands were either censused in their entirety or sampled using 97 ft x 12 ft (30 m x 4 m) quadrats; specific trees have been marked to facilitate monitoring their fate over time. All three populations sampled cover a smaller aerial extent and support larger populations than

previously thought. Taylor (in litt. 2005) estimated population size for the Bracken Brae population. The following table compares estimated acreage and population size for the populations based on data available at the time the recovery plan was prepared in 1998 with what we know now:

Table 1: Comparison of acreage and abundance estimates over time

Population	Acreage estimates (in acres)		Abundance estimates	
	Corrected 1998 data ^a	2007 data ^a	1998 estimates ^b	2005 and 2007 estimates ^a
Butano Ridge	25	7.7	200+	2,786
Eagle Rock	23	8.8+	700	3,594
Bracken Brae	24	[24]	200+	10,000-20,000 ^c
Bonny Doon	128	[128]	3,000+	[3,000]
Majors Creek	53	19.2+	1,000+	22,755
Totals	253	187.7	5,100	47,135

Numbers in brackets are carried forward from data of prior years.

^a Derived from McGraw (2007)

^b Derived from Service (1998)

^c Derived from Taylor (in litt. 2005).

The potential lifespan of individual *Cupressus abramsiana* trees is unknown; however, linear regression estimates that the largest trees (over 10 in (25.4 cm) in diameter) may be on the order of 100 years old (Lyons 1988). A recent ring count aged an individual from the Bracken Brae population to be between 127 and 162 years old (Rodriguez, in litt. 2008).

The average age at which individuals start producing cones is 11 years. McGraw (2007) found that, of 315 trees sampled across 3 populations, 88 percent of them were reproductive, based on the presence of new cones on the branch tips. The seeds are then released from the cones at a slow rate throughout the life of the tree unless burned, in which case seed release is accelerated. Seed viability drops to 10 percent in 30-year-old trees (Kuhlmann 1986).

Areas that have been recently disturbed through fire or mechanical means (e.g., scraping) can support a high density of saplings. Lyons (1988) found that a recently disturbed portion of the Bracken Brae site supported a density of 0.86 trees per square m (0.8 per square yard). As with many tree species, mortality is high during the early years of stand development, and so the lowest densities are in areas with trees in larger size classes.

McGraw (2007) compared age-size class distributions for the Butano Ridge and Eagle Rock populations with what Lyons (1988) observed approximately 20 years ago. At the Butano Ridge population, most trees were in the 3- to 5-in diameter (7.7-12.7 cm) size class in 1988; in 2007, most trees were in the 5- to 10-in diameter (12.8-25.4 cm) size class, possibly showing a natural progression of increased size with age of trees in the stand (McGraw 2007). However, the difference in placement of transects between the two researchers may also account for at least some of the difference in size class distributions observed.

At the Eagle Rock population in 1988, most trees were also in the 3- to 5-in (7.7-12.7 cm) diameter size class (Lyons 1988). McGraw found that trees showed a bimodal distribution of age-size classes, with the most trees being from 1- to 3-in in diameter (2.5-7.6 cm), but with many trees also being larger than 5 in (12.8 cm) (McGraw 2007).

The Majors Creek population has a smaller proportion of large trees compared to the Butano Ridge and Eagle Rock populations, with most of the trees having a diameter of less than 6 in (15 cm), and very few large trees (McGraw 2007).

Eight percent of the trees included in monitoring transects in 2006 appeared to be senescent (McGraw 2007). Small trees appeared to be senescing due to self thinning in response to low light. In other instances, dead trees were observed on rock outcroppings which, due to high light and low litter conditions, are conducive to seedling establishment, but unable to support larger tree growth. Wind-throw (trees blown down) also was observed as a cause of mortality (McGraw 2007).

Habitat or Ecosystem

Cupressus abramsiana populations occur as patches within a mosaic of coastal chaparral and mixed evergreen forests, including knobcone pine (*Pinus attenuata*), ponderosa pine (*Pinus ponderosa*), and redwood (*Sequoia sempervirens*) forests. All populations occur on or near dry ridges that are located inland from the coastal fog belt.

Soils tend to be sandy or gravelly, and therefore well-drained and porous. They are derived from marine sandstone substrates or material weathered from sandstone or shale. These soils also tend to be very low in nutrients and organic content. While vegetation types on adjacent soil types are mesic, vegetation within the *Cupressus abramsiana* stands tends to be lower in cover and more open in appearance.

The habitat that supports the Bracken Brae population is one of two out of the five populations that is unique because the soils present include not only the shallow xerorthent soils that are most characteristic for the species, but also Zayante coarse sand soils. The Zayante soils are the basis for the unique Sandhills habitat that are found more commonly a few miles to the south between the communities of Bonny Doon and Zayante, and support a unique assemblage of plant and wildlife species, several of which are federally listed (McGraw 2004).

Changes in Taxonomic Classification or Nomenclature

The taxonomy of cypresses has long been problematic because of their similar appearance (Lanner 1999). Since being listed, *Cupressus abramsiana* has been included with Gowen cypress by some (Eckenwalder 1993) and maintained a separate species by others (Bartel 1993). An initial genetic study confirmed the close relationship between *Cupressus abramsiana* and Gowen cypress while still recognizing them as separate taxa (Bartel et al. 2003). In a recent study of members of the cypress family, Little (2006) combined molecular sequence data with data on morphological characteristics to present a revision of the taxonomic relationships among them. In doing so, all North American members of the genus *Cupressus*, including what was

Cupressus abramsiana, were moved to the genus *Callitropsis* (Little 2006). In 2009, the western cypresses, including *Cupressus abramsiana*, were segregated from the “true” cypresses and moved to a new genus, *Hesperocyparis* (Adams et al. 2009).

Five-Factor Analysis

The following five-factor analysis describes and evaluates the threats attributable to one or more of the five listing factors outlined in section 4(a)(1) of the Act.

FACTOR A: Present or Threatened Destruction, Modification, or Curtailment of Habitat or Range

At the time of listing in 1987, we discussed that all the *Cupressus abramsiana* populations were threatened either by residential development, agricultural conversion, logging, and or alteration of the natural fire frequency that maintains the stands (52 FR 679). In particular, one-third of the Bracken Brae population was eliminated by a residential development, and additional phases of the project were pending. The Bonny Doon population was being threatened by a proposed vineyard development (California Department of Fish and Game (CDFG) 2002). The Majors Creek and Eagle Rock populations were threatened by logging and residential development. The privately owned section of the Butano Ridge population was subject to logging as well as a potential threat from oil and gas drilling.

Since the time of listing, the remaining portion of the Bracken Brae population was acquired by a conservation-minded landowner, thus reducing the threat of development on those lands. Habitat for all of the Eagle Rock stands and most of the Majors Creek stands have been acquired and ownership transferred to California Department of Parks and Recreation (CDPR). Additional habitat was also acquired by CDFG at the Bonny Doon Ecological Reserve, thereby reducing the threat of vineyard development (CDFG 2002). No logging or oil and gas drilling have occurred within or near the Butano Ridge population since the time of listing, and no such activities are being planned within the County Park boundaries (Sam Herzberg, Planner, San Mateo County Parks, pers. comm. 2009). Therefore, we believe the threats from alteration of habitat due to residential development, agricultural conversion, drilling, and logging, have been eliminated or substantially lessened since the time of listing. The effects on habitat due to altered fire regimes are discussed under FACTOR E below.

Conservation Efforts Undertaken

Many efforts have been undertaken since the time of listing to conserve and protect habitat for *Cupressus abramsiana*, including the following.

Bonny Doon population: The Bonny Doon Ecological Reserve was established in 1989 when the Nature Conservancy purchased 505 ac (204 ha) that had been slated for conversion to a vineyard. Ten acres (4 ha) were added to the Reserve in 1990, and an additional 37 ac (15 ha) were added in 1998 (CDFG 2002). The Reserve is managed by CDFG; a management plan for the Reserve is under development. The draft plan includes two objectives for *Cupressus abramsiana*: 1) enhance seedling establishment through removal of French broom (*Genista*

monspessulana) and other shrubby exotics, and by controlling the duff layer through controlled fire or mechanical means; and 2) reduce threats of disease and genetic contamination through monitoring the condition of the population, and determining whether the presence of Monterey cypress (*Cupressus macrocarpa*) individuals are a concern (CDFG 2002).

A separate vegetation management plan was developed in 2005 (California Department of Forestry and Fire Protection 2005); the objectives include enhancing sensitive habitat for listed species and improving forest health. As part of the plan, a trial program to thin a senescent patch of *Cupressus abramsiana* was initiated in 2005 (Peterson, in litt. 2005); response of *Cupressus abramsiana* to the thinning is not yet known.

Eagle Rock population: Lands supporting this population were purchased by the Sempervirens Fund in 1987 and then transferred to Big Basin Redwoods State Park (Service 1998); with the possible exception of a few scattered individuals, the population is entirely on State Park lands.

Majors Creek population: Seventy percent of the lands that support this population (Gray Whale Ranch) were acquired by Save-the-Redwoods League in 1996, then transferred to CDPR and added to Wilder State Park in 1999 (as noted on the website <http://www.savetheredwoods.org> on November 5, 2007). Management of the park is currently directed by the Public Works Plan; this plan states that “the Santa Cruz Cypress forest on the property will be managed to enhance and perpetuate the population. Under this Public Works Project, no trails or public use are proposed for the Santa Cruz cypress area.” (CDPR 1997)

Bracken Brae population: This is the only population entirely within private ownership. It occurs on lands designated by the County of Santa Cruz as an environmentally sensitive habitat and special forest; these designations place certain restrictions on how the land can be used, which are discussed under FACTOR D below (County of Santa Cruz 1994). In 2007, the Sempervirens Fund and the Service met with the landowner to discuss options for ensuring the conservation of these lands in the future; currently, the landowner is voluntarily managing these lands to conserve *Cupressus abramsiana*.

FACTOR B: Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

At the time of listing, this factor was not considered a threat; and we do not consider it a threat at the current time.

FACTOR C: Disease or Predation

At the time of listing, this factor was not considered a threat. During the time the recovery plan was in preparation, we discussed a potential threat from sawfly (order Hymenoptera) larvae. However, during recent surveys, McGraw (2007) did not observe any damage caused by sawfly larvae.

FACTOR D: Inadequacy of Existing Regulatory Mechanisms

At the time of listing, we only noted that the species received no specific protection under California state law. Although the species had been state-listed as endangered since 1979, we did not discuss the potential protections that could result from state laws, including the California Endangered Species Act and the California Environmental Quality Act. In addition, the County of Santa Cruz designated all *Cupressus abramsiana* stands as Special Forests; lands so designated are subject to a series of policies that would be applied during the planning process for proposed projects and would promote the conservation of those lands (County of Santa Cruz 1994). For instance, the portion of a parcel that can be disturbed is restricted to 25 percent or 0.25 acre (0.1 ha), whichever is less; the remaining portion of the parcel must be dedicated as open space or with a conservation easement; and applicants are to enter into a “declaration of restriction” that allows for a prescribed burning program or other management measures that would mimic natural fires. In addition, for cypress forests in particular, there is a minimum 50-foot (15 m) setback required between the forest and any development. However, at the time of listing, the threat of alteration and destruction of *Cupressus abramsiana* habitat on private lands that was discussed (see FACTOR A above) was in part due to the inadequacy of the state and local laws and regulations to provide sufficient protection of its habitat.

Since the time of listing, lands that support portions of several populations have passed from private ownership to State ownership (CDPR and CDFG). The largest remaining parcels in private ownership are owned by a conservation-minded party. Therefore, because the threat of alteration of habitat has been substantially lessened, the concern regarding the adequacy of existing regulatory mechanisms on a landscape scale has diminished.

On a smaller scale, the cutting of individual trees, particularly for the creation of firebreaks adjacent to urban habitation, is a continuing concern. Such activity has been noted adjacent to the Bracken Brae and Bonny Doon populations (Rutherford, pers. obs. 2007). Guidelines put forth by the California Department of Forestry and Fire Protection (CDF) and local fire departments generally do not address the issue of how to treat state and federally listed species that occur within the recommended fire clearance zone (CDF 2006).

FACTOR E: Other Natural or Manmade Factors Affecting Its Continued Existence

At the time of listing, we identified alteration of natural fire cycles and vandalism as additional threats to the species (52 FR 679). Climate change is an additional potential threat that was not discussed at the time of listing.

Alteration of fire cycles

The release of seeds from the “closed cones” and the subsequent germination of *Cupressus abramsiana* seed are stimulated by fire. Natural fire cycles were estimated to be between 50 and 100 years (Keeley 1981 in Bartel and Knudsen 1982). The effects of altered fire frequencies on other cypress taxa have been studied. With a shorter fire interval, the species may face “immaturity risk” – that is, widespread mortality of trees prior to their maturity may reduce the reproductive potential of the population (Zedler 1977, de Gouvenain and Ansary 2006).

Conversely, a “senescence risk” may occur if the fire interval is longer than the lifespan of trees within the population, resulting in lower population vitality, reduced cone production, and reduced seedling establishment (Ne’eman et al. 1999).

The regeneration of stands, particularly those that are even-aged and where no management is being undertaken to spread the demographic profile (i.e., increase the diversity of age classes), is the greatest challenge to the long-term persistence of this species. Reproductive potential, as indicated by the large number (88 percent) of sampled trees bearing new cones, is strong (McGraw 2007). Moreover, numerous observations indicate that seeds will readily germinate with other forms of disturbance, such as scraping or other disturbance that exposes mineral soil (Kuhlmann 1986, Service 1998, McGraw 2007). While controlled burning may more closely mimic the action of a natural fire, scraping could be used as a form of management in certain situations where proximity to urban habitation precludes controlled burning as an option. While maintaining mixed age/size stands of *Cupressus abramsiana* will be important to its long-term persistence, the concern of lowered reproductive potential due to either longer or shorter fire cycles is somewhat lessened due to the larger number of individuals that we now know exist in at least four of the five populations.

In June 2008, a wildfire (named the Martin fire) burned between 56 and 80 percent of the Bonny Doon Ecological Reserve (CDFG 2008). The fire, which burned approximately 520 acres (210 ha) in total, spread quickly in part due to dry conditions, including the driest spring on record, and strong, dry, northerly winds (California Department of Forestry and Fire Protection 2008). In a post-fire assessment, CDFG also estimated that the fire burned 45 percent of the *Cupressus* individuals and 63 percent of what had been mapped as Santa Cruz cypress forest (approximately 4 out of 6 acres (2 out of 3 ha)) (CDFG 2008). The assessment also states that, while all the *Cupressus* individuals in one of the two large stands on the Reserve were killed, “all the mature trees examined in this area have released seed which looks viable, so recruitment should be excellent” (CDFG 2008). The other large stand of trees, as well as individuals scattered throughout other portions of the Reserve, were not burned and the largest individuals, although within the burn area, were not as affected and are expected to recover (CDFG 2008). An interagency working group has been formed to identify and pursue research and monitoring needs related to biological resources, including *Cupressus abramsiana*, within the Reserve (Spickler, in litt. 2008).

Climate change

Current climate change predictions for terrestrial areas in the Northern Hemisphere indicate warmer air temperatures, more intense precipitation events, and increased summer continental drying (Field et al. 1999, Cayan et al. 2005, IPCC 2007). Recently, the potential impacts of climate change on the flora of California were discussed by Loarie et al. (2008). Based on modeling, they predicted that species’ distributions will shift in response to climate change, specifically that the species will “move” or disperse to higher elevations and northward, depending on the ability of each species to do so. Species diversity will also shift in response to these changes with a general trend of diversity increases shifting towards the coast and northwards with these areas becoming de facto future refugia. However, predictions of climatic conditions for smaller sub-regions such as California remain uncertain. It is unknown at this

time if climate change in California will result in a warmer trend with localized drying, higher precipitation events, or other effects. While we recognize that climate change is an important issue with potential effects to listed species and their habitats, we lack adequate information to make accurate predictions regarding its effects to *Cupressus abramsiana* at this time.

Vandalism

Vandalism was noted at the time of listing as a concern; the largest tree in the Bonny Doon population had recently been cut down. As noted under FACTOR D above, individual trees have been cut down for fire clearance adjacent to urban habitation. Trees adjacent to the Majors Creek population have been cut down during construction of illegal trails on State Park property (CDPR 2000). In 2007, evidence of mountain biking, motorcycling, and equestrian activity were observed on illegal trails variously within the Majors Creek and Eagle Rock populations (McGraw 2007). Illegal activity may be increasing with the increasing number of inhabitants in the urban-wildland interface. Although such activity is a concern with respect to how park lands are being managed, we do not believe the current level of impact on *Cupressus abramsiana* is affecting its long-term persistence.

III. RECOVERY CRITERIA

Recovery plans provide guidance to the Service, States, and other partners and interested parties on ways to minimize threats to listed species, and on criteria that may be used to determine when recovery goals are achieved. There are many paths to accomplishing the recovery of a species and recovery may be achieved without fully meeting all recovery plan criteria. For example, one or more criteria may have been exceeded while other criteria may not have been accomplished. In that instance, we may determine that, over all, the threats have been minimized sufficiently, and the species is robust enough, to downlist or delist the species. In other cases, new recovery approaches and/or opportunities unknown at the time the recovery plan was finalized may be more appropriate ways to achieve recovery. Likewise, new information may change the extent that criteria need to be met for recognizing recovery of the species. Overall, recovery is a dynamic process requiring adaptive management, and assessing a species' degree of recovery is likewise an adaptive process that may, or may not, fully follow the guidance provided in a recovery plan. We focus our evaluation of species status in this 5-year review on progress that has been made toward recovery since the species was listed (or since the most recent 5-year review) by eliminating or reducing the threats discussed in the five-factor analysis. In that context, progress towards fulfilling recovery criteria serves to indicate the extent to which threat factors have been reduced or eliminated.

The recovery plan states that *Cupressus abramsiana* can be reclassified to threatened status when: protection is secured for all five populations and their habitat from the primary threats of logging, agricultural conversion, and development. Essentially all of the 356 acres (ac) (144 hectares (ha)) of known habitat is necessary to conserve the species (addresses Listing Factors A and D).

Three of five populations occur primarily or entirely on lands that are being managed for conservation-oriented purposes, including the Butano Ridge population at Pescadero County

Park, the Bonny Doon population at Bonny Doon Ecological Reserve managed by CDFG, and the Eagle Rock population at Big Basin State Park managed by CDPR. One population (Majors Creek) is primarily on lands at Gray Whale Ranch State Park and with a small portion on privately owned land. The fifth population (Bracken Brae) is entirely on private lands owned by a conservation-oriented party and is on lands designated by the County of Santa Cruz as an environmentally sensitive habitat area. Note that the acreage covered by *Cupressus abramsiana* is smaller than stated in the recovery plan (see Table 1), but that all populations are located on parcels larger than the populations themselves. It is our assessment that this criterion has been met to a large extent. We believe this criterion is appropriate with respect to the recovery of the species.

The recovery plan states that *Cupressus abramsiana* can be delisted when: all five populations are assured of long-term reproductive success, with insurance against failure provided by the availability of banked seed (addresses Listing Factor E).

Recent information indicates most of the populations contain a larger number of individuals than previously known. In addition, all of the populations recently sampled showed high levels of new cone formation, which is an indicator of reproductive vigor. Some populations contain a large proportion of larger-sized trees and do not show evidence of vigorous recruitment, while other populations contain a relatively larger proportion of smaller-sized trees. Therefore, while seed production appears to be strong, recruitment – which depends more on extrinsic factors such as the availability of habitat – is more variable between populations. Seed has been banked for some, but not all, populations (Ranch Santa Ana Botanic Garden 2008). This criterion has been partially met. We believe this criterion is appropriate with respect to the recovery of the species.

Factors B and C are not considered relevant to the recovery of the species at this time.

IV. SYNTHESIS

Threats to *Cupressus abramsiana* from residential development, agricultural conversion, and logging have decreased since the time of listing. This has been achieved primarily through the acquisition of lands for conservation by CDPR and CDFG. One parcel (Bracken Brae) has been transferred from one private landowner to another, and lessened the threat from residential development in doing so. We could find no evidence that oil and gas drilling have been a threat to the species at the Butano site.

The long-term persistence of *Cupressus abramsiana* populations is still a concern. The germination and establishment of new seedlings depends on either fire or a managed substitute for fire (e.g., controlled burns, thinning, or other methods) to manage the demographic profile of the population. Research on suitable management methods has only begun recently at Bonny Doon Ecological Reserve; the results of such efforts are not yet known. The 2008 Martin Fire at the Reserve will provide an opportunity to observe post-fire regeneration of *Cupressus abramsiana* particularly with varying intensities of fire.

We believe *Cupressus abramsiana* now meets the definition of threatened, rather than endangered, for two reasons. The primary threats the species faced at the time of listing have been greatly reduced. In addition, recent information indicates that there are a substantially larger number of individuals than were known at the time of listing. Therefore, the risk of extinction has greatly lessened. We believe that the species meets the definition of threatened because, although most threats have been reduced, the species still faces threats to its long-term persistence due to a low level of regeneration. If management actions are not undertaken to ameliorate this low level of regeneration, the species could again face the risk of extinction.

V. RESULTS

Recommended Listing Action:

- ☒ Downlist to Threatened
- ☐ Uplist to Endangered
- ☐ Delist (Indicate reasons for delisting per 50 CFR 424.11):
 - ☐ Extinction
 - ☐ Recovery
 - ☐ Original data for classification in error
- ☐ No Change

New Recovery Priority Number and Brief Rationale: [Note if no change.]

Listing and Reclassification Priority Number and Brief Rationale:

Reclassification (from Endangered to Threatened) Priority Number: 6

This reclassification priority number is based on a 1-6 ranking scale where 6 is the lowest priority and indicates an unpetitioned action for a species with low impact on human activities (low management impact) (48 FR 43098, September 21, 1983).

VI. RECOMMENDATIONS FOR ACTIONS OVER THE NEXT 5 YEARS

1. The Service should continue to pursue efforts to secure the long-term conservation of the Bracken Brae population.
2. The Service should work with the California Department of Forestry and Fire Protection to clarify guidelines issued to landowners located adjacent to *Cupressus abramsiana* populations.
3. The Service should work with the County of Santa Cruz to clarify local protections for *Cupressus abramsiana*.
4. The Service should work with agency and academic partners to determine rates of recruitment needed to maintain the long-term persistence of all populations.

5. The Service should support research that focuses on management strategies that will enhance the long-term persistence of *Cupressus abramsiana*. In particular, the Service should participate in the inter-agency working group that has been established to address such issues in the aftermath of the Martin Fire at Bonny Doon Ecological Reserve.
6. The Service should partner with the Center for Plant Conservation and member gardens (e.g., Rancho Santa Ana Botanic Garden, Santa Barbara Botanic Garden, and UC Berkeley Botanic Garden) to ensure that seed representing all *Cupressus abramsiana* populations are banked at the National Seed Laboratory.

VII. REFERENCES CITED

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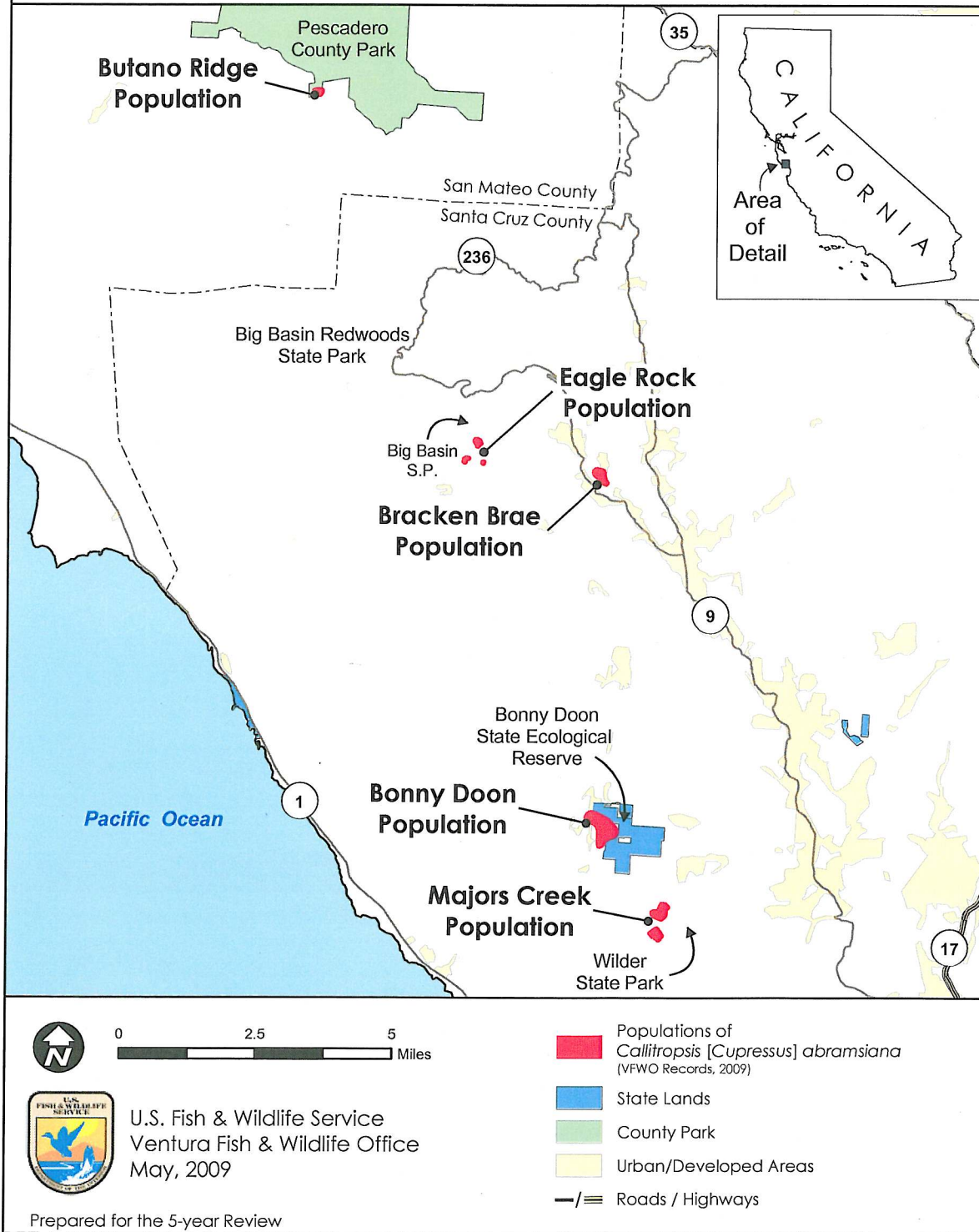
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Figure 1. Distribution of *Callitropsis* [*Cupressus*] *abramsiana* (Santa Cruz Cypress)



U.S. FISH AND WILDLIFE SERVICE
5-YEAR REVIEW

Cupressus abramsiana (Santa Cruz cypress)

Current Classification: Endangered

Recommendation Resulting From the 5-Year Review:

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

Appropriate Listing/Reclassification Priority Number: 6 (This action indicates a species with low management impact and a non-petitioned action.)

Review Conducted By: Connie Rutherford

FIELD OFFICE APPROVAL:

Lead Field Supervisor, U.S. Fish and Wildlife Service

Approve Diane K. Nole Date 8/10/09

Sacramento Fish and Wildlife Office Field Supervisor, U.S. Fish and Wildlife Service

Approve guthrie Date 8-12-09

REGIONAL OFFICE APPROVAL:

Assistant Regional Director, U.S. Fish and Wildlife Service, Region 8

Approve M. L. For Date 8/17/09

* current
fire that
is ongoing has
not yet been
evaluated.