

Status of Native Monterey Pine (*Pinus radiata*) Ecosystems, and The First Monterey Pine Forest Ecosystem Conservation Plan

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I. Present Distribution

1. Planted

Monterey pine or *Pinus radiata* grows worldwide on a minimum of 7 million planted acres of tree farms. This amount grows almost entirely in Chile, New Zealand, Australia, Spain and South Africa. *Radiata* at present takes up about 3% of the international trade in wood and wood products, and that is likely to double in the middle distant future. It is the leading exotic plantation species in Spain, Chile, Australia and New Zealand and is of lesser but still significant importance in S. Africa, Kenya, Argentina and Uruguay. Except for Christmas trees it is almost unknown as a farmed species in the U.S. *Radiata* is widely planted in temperate climates as an attractive, fast growing tree.

Radiata grown in tree farms are almost without exception hybrids, in most cases extreme hybrid clones. In these tree farms all three types of diversity - genetic, species and community diversity is measurable and essentially non-existent.

2. Native Populations

The native population of Monterey pine and its habitat is a very different story. All three types of diversity - genetic, species and community diversity in these native forest ecosystems is very rich in all three measures. This rare forest supports some 19 other imperiled plant species

An analogy of the importance of native forest as opposed to a tree farm is described by Monterey Herald Columnist Bruce Cowan "*In recent decades disease hit the domesticated tomato and corn crops in the U.S. and threatened to devastate our agriculture. Fortunately, wild tomato plants still existed in Peru, and the wild ancestor of corn in Mexico. Genes were found in these wild populations that proved resistant to the diseases.*"

The remainder of this article discusses only native *radiata* forest ecosystem habitat.

Present distribution of the native populations is limited to approximately 9,000 - 11,000 acres in three (3) locations on the Pacific Coast of North America. There are three remaining locations in California. By far the largest is in its namesake Monterey. The other populations are at Ano Nuevo (north of Santa Cruz), Cambria (north of San Luis Obispo). Two tiny populations of a 2-needle variant occur on Mexican islands - Cedros and Guadalupe off the coast of Baja California. In 1908 the tree species inhabited two other islands, Santa Rosa and Santa Cruz, but those are apparently now extirpated.

Radiata does not naturally occur more than about 5 miles from the seacoast or more than about 300 meters (1,000 feet) above sea level. The generally accepted explanation is the inland and altitude reach of summer fog. The only places it is found growing above 800 feet ASL is where sea breezes ascend a coastal ridge causing fog to form.

a. Monterey Peninsula (Monterey County 4500 - 6900 acres)

Jeffers Forest (~450 acres) is possibly the largest native Monterey pine forest in "good" health with the least contamination by hybrids. The Jacks Peak Park area has large core area stands surrounding it, but is known to have been genetically contaminated by extensive plantings of hybrid radiata on its tallest central ridge in the 1950's and 1960's.

b. Cambria (San Luis Obispo County ~2300 acres)

None of the stands in Cambria are rated any better than "Fair" health by a forester. They are under severe stress with a high incidence of dwarf mistletoe, gall rust and have extensive infestations of bark beetle, and as of 2004 pitch canker.

c. Ano Nuevo (Santa Cruz County ~1500 acres)

Ano Nuevo has been logged in the past and has some hybrid contamination. Those areas with genetic contamination are the healthy stands. The uncontaminated native stands with the exception of two stands totaling 44 acres, are not rated any better than "Fair" health by a forester.

d. Islands (Mexico ~450 acres)

The population on Guadalupe Island may have been lost. It had been rapidly declining and only 45 trees and no seedlings existed the last time a census was taken in 1988. The pines on Cedros island appear to have a stable population but "have been considered more closely related to the Bishop pine."

3. Changes in Historic Distribution

It is estimated that in 1850, the total worldwide occupied habitat for Monterey pine was around 16,000 healthy, genetically diverse acres.

As of 2004, less than 2,500 acres are in good health as determined by a forester - not an ecologist. When considering stands of good health and relatively free of genetic contamination there are possibly only as few as 600 total acres.

II. Extinction Threats - Historical and Present

1. Development

Since roughly the beginning of western human settlement in about 1850, development, by far, has been the main reason for the loss and fragmentation of radiata habitat area. The development of the cities of Pacific Grove, Monterey and Carmel and the unincorporated Pebble Beach area have destroyed more Monterey pine forest than all other threats combined. This has led to the decline in health for the majority of the remaining stands.

Of the six remaining stands recognized as high quality native radiata forest, the forest in best health (Jeffers Forest owned by Pebble Beach Company) remains under immediate threat of development. As of April 2004 there is an active application to convert it into a

golf course and mansions. The largest stand (Aguajito Property also owned by Pebble Beach Company) has plans drawn up for development in the next decade.

a. Potential Loss of Areas Mistakenly Considered Protected.

i. **Permanent - Isn't.** When Huffman (Pebble Beach Company Consultant) reports "the 25 natural and urban forest stands that are permanently protected within the County..." they define permanent far too strongly.

ii. County Parks aren't Permanent.

The largest "permanently protected" stand described referred to by the report is Jacks Peak (630 acres) owned by Monterey County Parks. This is the very same agency which proposed in Nov 1994 to sell off a nearby "permanently protected" park near Mount Toro to build a golf course. Public outrage caused this proposal to be withdrawn.

iii. California State Parks aren't Permanent

The third largest area Huffman described as "permanently protected" is Pt Lobos, sometimes referred to as the "Crown Jewel" in the California State Park system. Nevertheless during the California budget problems of 1991 the State seriously considered selling several state parks.

iv. **Federal Wilderness areas** may be the strongest and longest lasting protection by designation of governmental agency, but still isn't necessarily permanent. A land swap of federal wilderness occurred in Carmel Valley - some 5 miles from stands of native radiata. This would allow a for-profit dam to be built on land that is currently designated wilderness.

v. Deed Restrictions Can be Removed - Reversion Clauses Cannot.

Land Use Lawyer Anthony Lombardo admits that he "removes deed restrictions all the time." The only method which appears permanently legally solid is a deed reversion clause.

2. Disease

Monterey pines are harmed and killed by a wide variety of native and invasive pests including the red turpentine beetles, dwarf mistletoe and western gall rust. None of these poses a catastrophic threat. The largest current disease threat is a fungus called Pitch Canker.

a. Pitch Canker Fungus (*Fusarium subglutinans* f. sp. *pini*)

i. History

The fungus was common in the southeastern United States previous to 1986. It was first detected in California and in *Pinus radiata* (Monterey pine) in 1986. In 1992 Carmel began a survey of infected trees, finding only one. By November 1993, 132 infected trees were found which began to awaken governmental and public concern. By 1996 the number of infected trees in Carmel had risen to 586.

ii. **Symptoms**

In certain observational plots, up to 85% of the Monterey Pine trees have become symptomatic. That is not to say the other 15 percent won't get the disease. Trees can have the disease at a cellular level without exhibiting human scale symptoms.

iii. **Mortality vs. Symptoms**

In 1986 there was little data on the percent of symptomatic trees that die from the disease. Some symptomatic Monterey Pine trees have survived eight (8) years, others have died within two (2) years. While it may take up to a decade for the tree to die exclusively from the disease, trees weakened by fusarium are then susceptible to quick death from attack by bark beetles. As of 2004 some recent research estimates mortality up to 30%.

iv. **Susceptibility v. Resistance**

There is some evidence that new growth has a higher rate of infection than mature tissue. Young trees appear to have a higher number of infections than mature trees. Planted trees seem to have a very high rate of infection. Trees in high humidity (near the ocean) seem to have higher rate of infection than trees in lower humidity (farther from ocean or higher in altitude).

Trees standing alone or those more exposed to human impacts by [edge effect](#) appear significantly more affected than trees in deep core areas of a natural Monterey pine forest - away from human impacts.

3. Genetic Contamination

Native forests lose genetic diversity when crowded out by Monterey pine hybrids and clones which are planted extensively worldwide. Monterey pine hybrids are known to have been planted at the western ridge in Jack's Peak park in Monterey and at Ano' Nuevo.

III. Imperiled Status

1. International

In 1986, before Pine Pitch Canker was found in California, the United Nations Department of Food and Agriculture, which analyzes and sets international policy for forest protection and sustainability, recognized the situation on a global scale and declared Monterey pine an Endangered Species.

2. National - United States

In 1988(?) US-Fish & Wildlife Service added Monterey Pine (*Pinus radiata*) as a Federal Category 2 Candidate for Endangered Species Act protection where existing information indicates it may warrant listing.

3. National - New Zealand

In 1994 New Zealand's Minister of Forestry, John Falloon, wrote an official letter to Monterey County expressing serious concern about the potential loss of genetic diversity in native Monterey pine forests.

4. State of California

- a. **ESHA:** The **California Coastal Commission** considers native Monterey pine forest ecosystems "**Environmentally Sensitive Habitat Area**" which some consider more substantial protection than provided by endangered species laws. In 1984 they considered the loss of nine acres a "**substantial long-term impact.**"
- b. In 1993 the **California Department of Fish and Game** put Monterey pine on its "Special plants list."
- c. **Sensitive:** In 1999 the Monterey County General Plan Update staff considered Monterey pine a "Sensitive Resource" when they list it first, ahead of the live Oak, in the Slide show presentation - which is on their Web Site.

5. Non-Governmental Expert Imperilment Opinions ¹

- a. **Rare:** The **Jepson Manual**, a catalog of books considered the definitive encyclopedia for California plants and trees, states that Monterey pine is "**rare.**"
- b. **Endangered:** In 1994 without knowing of the United Nation's declaration, the legislatively recognized **California Native Plant Society** strengthened its concern of Monterey Pine by rating it "1B". Their **only stronger rating is "1A" which means extinct** - gone forever - like the Mammoth.
- c. **Endangered:** The April 6, 1994 Draft Environmental Impact Report for the Pebble Beach Lot program expressed concern that the project could cause "**endangerment to the Monterey pine species itself.**"
- d. **Monterey Pine Imperiled before Pine Pitch Canker - remains Imperiled.**

Pebble Beach Company has paid biologists (notably not ecologists) to claim that Monterey pine forests' imperilment is overstated. In 2004 Zander claimed that because the pitch canker threat is not as large as it was once estimated, that Monterey pines are now safe.

This claim's fatal flaw is that all the respected agencies and experts found Monterey pine to be imperiled prior to 1994, **before the threat of pitch canker** emerged. In April 1994 the Pebble Beach Lot Program Draft EIR stated "**It is too early to evaluate the effects of this pathogen ...**"

¹ **Pebble Beach Company (PBC) has bitterly fought any protection for imperiled species on their property.** The only so-called "experts" who have disputed the imperiled status of the Monterey Pine Forest ecosystems are those directly paid by PBC (Hoffman, Zander) or their research projects are directly funded by PBC (Storer and Wood). Huffman's conclusions are easily and entirely refuted and none of them are trained as Forest Ecologists.

IV. State, Federal and International Agency Plans and Actions

1. Agency Plans

There are no known management plans from state or federal agencies.

2. Federal & State Protection Actions.

None. Other than research there are no state or federal protection efforts. There is no native radiata on any federal property including BLM land, Wilderness areas or U.S. National Forest land. California's Point Lobos State Park contains somewhat less than 400 acres. Unfortunately there is some evidence that this population was heavily planted with hybrid (genetically uniform or contaminated) seed by the U.S. military during World War II.

3. Research

There are dozens of studies on radiata.

There is current genetic research to identify a radiata strain that would be resistant to the Pitch Canker. However even if successful, a resistant clone or strain can never replace, supplant or recreate the genetic diversity or genetic adaptability of the existing natural radiata forest ecosystems.

V. Protection Needed

1. The population dynamics of Monterey pine remain mostly unknown.

No one knows exactly how much Monterey pine forest ecosystem habitat must be set aside to ensure its permanent healthy self-sustainable survival. We do know the central principles of Conservation Biology. For a natural habitat to be self-sustaining these rules apply:

- Bigger areas are better,
- A single large habitat is better than several small ones of same total area,
- Untouched habitat is better than human managed habitat,
- Connected habitat is better than fragmented habitat,
- Large native animals are better than none.

We also know the smallest native Monterey pine forest stand found to be in at least "Good" health (by a forester - not an ecologist) is a 36 acre parcel which is a subset of a 56 acre stand. This stand is surrounded by recent development so it can not yet be concluded that a 56 acre stand can remain perpetually healthy and self-sustaining.

The next smallest healthy stand is some 105 acres. This stand has had less development induced fragmentation and edge effects. However, a highly traveled road was paved through it in 1985. As of 2004 the forest is suffering from the impacts of vehicles, dog walkers and children. Sustainability cannot be insured for this 105 acre area if any significant population dynamic "cycle" exceeds 100 or even 20 years, which is highly likely since the lifespan of the dominant species is 80 - 180 years. If so, larger areas with more insulation

from man-made impacts may be needed. Notably, this 105 acre stand has had very low seedling regeneration for the past 20-25 years.

2. Losing just nine acres of native Monterey pine forest is a Substantial ... Long-Term impact

In 1984 The California Coastal Commission recognized how important just a few acres of native Monterey Pine ecosystem are to its protection and recovery. "*The approximately 9 acres of native Monterey pine forest to be cleared for the golf course represents a substantial long-term impact.*" - Spanish Bay Project Final approval 1984 pg 25.

3. Conservative caution requires us to not cumulatively lose another acre of native Monterey pine forest ecosystem.

This means we must protect all remaining native Monterey pine forest ecosystem habitat.

This specifically includes those areas described in the otherwise discredited Huffman (PBC Consultant) Report as: "**Remaining native Radiata habitat in Good Health.**"

Preserving these areas will allow the best defense to combat both loss of habitat from development and retain maximum genetic diversity for resisting the current threat from Pitch Canker, and future attacks by other diseases.

Additionally, it would be wise to similarly protect those areas of the next highest health rating, "Fair", which are contiguous to those areas listed above of the highest health rating. Contiguousness provides a buffer from man-made insults and insurance where we have underestimated either the threats or overestimated our conservation acts.

| Remaining Native Radiata habitat in Good Health | | | |
|--|--|--------------|--|
| Common Name | Parcel Names | Acres | Threats * |
| Jeffers Forest (includes Pescadero Canyon & East Stillwater watersheds) | P, Q, R, Y | 350 | 240 Acre Golf Course Application by Pebble Beach Co. active as of Feb 2004. |
| North Jacks Peak | Pebble Beach Co.'s Aguajito Property | 715 | 1996-1999 - Resort Planned |
| Mormon Property | Corporation of the President of Mormon | 417 | No known plans. However, property owner, could propose development at any time. |
| Pacific Grove High Cross Country Course, next to Rip Van Winkle park. | Areas C, B-2 & Navajo Tract | 105 | 29 acres of houses and a driving range are proposed. |
| Indian Village & Spyglass Hill | Pebble Beach Co. | 56 | 1994 - 20 acres of mansions are proposed. PBC application still active in 2004. |
| Del Mesa Forest | Del Mesa Carmel | 228 | Relatively Protected |

| | Open Space | | |
|-------------------------|----------------------------------|------------|--|
| Jack's Peak Park | Jack's Peak Regional Park | 630 | County owned. The County tried to sell a nearby park for a golf course development in 1994. |
| Total | | 2,502 | |
| | | | |

* All radiata forests are threatened by Pitch Canker. Large, healthy, contiguous native stands have the largest genetic diversity, thus the best chance of survival against the disease.
