

Monterey Cypress



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INTRODUCTION

As the coast of California slowly retreats from the sea, Monterey Cypress trees stand vigil, vanguards at the fringe of the continent. Together, the last vestiges of an ancient forest, they weather the constant drumming of the waves, shrouded in mysterious fog, veiled in thread like lichen that hangs like tattered cloth from branches contorted by the ever present breeze that blows chilled as it crosses the cold deep ocean. Survivors of prehistory, they are relics now. Isolated on only two coastal strands, they maintain the memory of the ancient lands they held and the extents of their forbearers, still telling the story of change in a landscape of time few have witnessed.

The history and fate of this tree is inexorably linked to the geological procession of changes that have occurred in California. At its nadir, during the Pleistocene, the Monterey Cypress dominated the coastal region and extended deep into the interior with the fog. Its range began to wither as the continent experienced geologic uplift, when the Sierra Nevada and the Santa Lucia and other coastal ranges were raised to their present height. The inland sea began to drain and dry and the moisture of the ocean reached less far. Needing the microclimate of the coastal zone, the Monterey Cypress retreated to its edge, until slowly it was confined to its present, decimated state.

Dramatically they stand now, cleaving to the faces of granitic bluffs, their roots wedged into every crack in the rocks that are slowly crumbling into the sea. Their tangle of roots, exposed by erosion, glitter with encrustations of salt and push deeply into the faulting of the rock, splitting it further. Further inland, though seldom more than several hundred feet, they form thick groves. The young are sinuous and free flowing, a mess of chaotic bramble, with dense crowns shaped like uncombed hair. The elders are bent and cracked like dried skin with sporadic spurts of vegetation that seem like the tufts of hair that grow in old men's ears. In this precarious balance, between the sea and the earth, between the old and the young of the species, these are the last naturally occurring Monterey Cypress.

To early settlers the ephemeral shapes of the trees must have suggested the divine. Legends of their arrival to the narrow range they inhabit include being transplants from Syria of Lebanese Cedar by the devout wishing to propagate the species of the holy land or that Buddhist monks from Japan cultivated and sculpted them in intense meditation,

contemplating the endlessness of the sea. They are thought uniquely Californian, being perhaps the tree with the smallest natural range in the world, though it also has become one of the most cultivated. Their range has been the site of canneries, whaling operations, cattle grazing, and even a planned town. Early conservationist, though, recognized their rarity and sought to protect their natural habitat. Because they have inspired us, moving poets, authors, artists, and laymen, they have survived human impacts to their natural surrounding; but, in the glacial pace of geological time, as threats from man and nature persist, they may be succumbing. Now, it may be dependent upon us that they survive.

HABITAT

Monterey Cypress (*Cupressus Macrocarpa* syn. *Callitropsis Macrocarpa*; "macrocarpa" meaning large fruit) occurs naturally in just two small regions: the north and south promontories that enclose Carmel Bay (Fig. 1). By far, the largest population of Monterey Cypress is in the northern portion of Carmel Bay at Cypress Point and further along the coast between the cities of Monterey and Carmel in the unincorporated town of Pebble Beach. Naturally, these trees are seldom found further than an eighth mile from the coast, and are most dense less than a hundred yards from the coast (Jepson 1909, 119). Early tree surveys found that Cypress Point was the largest grove, containing approximately 7,850 trees. The grove of trees located within the Pebble Beach/Del Monte forest was estimated to be 2,700 trees. Point Lobos State Reserve, which encloses the southern portion of the bay, also has a significant, though much smaller, population (Peattie 1991, 241). Despite their limited range they are now propagated globally. Historically, the range of these trees extended south to Mexico and significantly further inland, before the uplifting of the coastal ranges blocked moisture being carried by onshore weather and sea levels rose forcing a dramatic retreat of the primitive cypress forest until just these small remnants remained, isolated even from each other (Fig. 2) (Johnston 1996, 67; Jepson 1909, 25).

Physical Characteristics

In its native state, Monterey Cypress seldom reaches more than fifty feet high. Its girth remains slim, between one and three feet, the trunk and branches being grotesquely twisted and bent so that the growth rings are nearly incomprehensibly folded tightly over one another. The nutrient poor granitic soils, salt spray, and high winds stunt growth. Some though still achieve massive sizes. Fully grown, several Monterey Cypresses are recorded as mega trees. Specimens average eighty feet, though they can exceed one hundred feet tall, and they can have crowns that spread over one hundred feet wide. Its diameter can swell to as wide as thirteen feet at the base, growing nearly symmetrically, in the typical, pyramidal shape associated with conifers. The largest in the United States is found in the city of Pescadero on the San Mateo coast. Several of the tallest in the US are found in San Francisco, in the Presidio, where they were planted to stabilize dunes and to add grandeur to the historic military base (Bronaugh 2004, 8). Easily and frequently propagated, on plantations Monterey Cypress regularly reaches the height it must have reached when it surrounded California's vast inland sea. The largest trees globally are found in New Zealand, where it has been grown since the mid 1800s. The tallest Monterey Cypresses in New Zealand stretch nearly one hundred and sixty feet tall and have diameters greater than sixteen feet (*Gymnosperm Database* 2009).

Common Forms. In natural conditions, fringing the littoral zone, one of three typical, unusual shapes, is generally assumed. The first occurs when the lower branches are increasingly thickened and the crown is formed into irregular shapes. The second is characterized by trees, largely denuded of branches in the lower extremities, that culminate in broad flat-topped crowns of tightly woven branchlets. These flat crowns may be up to twenty times wider than high. The numerous small branching of upper level limbs creates a thick, impenetrable mat. The third shape forms among trees that are tightly grouped; together they form dense, hedge like foliage in pointed wall leeward of prevailing winds. The most exposed trees, as a result of uneven mechanical strain on their trunks, due either to persistent winds or uneven branching, swell at the base, buttressing themselves against the unbalanced forces and may lay supine across the ground. These buttresses form thick, python like forms that strain against the surrounding rock, sometimes dislodging it. Buttressing in trees appears to correlate with root development: trees with insufficient root structure or support will buttress themselves. It is the mechanical stress of the wind that most dominates their shape.

Further inland, where the trees grow in protective groves, their shape commonly assumes the inherited, less dramatic, triangular form (Engbeck 1975, 33).

Foliage. The leaves are bright, untinged green, scale like and tiny, ranging from just one twelfth to a fifth of an inch and occur in broader clusters called sprays one half to an inch and a half long. Juvenile leaves are needle like and less than a third of an inch in length. The cones are tightly clustered on short boughs and are composed of four to six pairs of scales with thick central bosses. Each cone is initially green before weathering to grey and contains approximately one hundred and forty seeds. Seeds range in size from one to two sixteenths of an inch and are irregularly shaped from being crowded in the cone. The cones are moderately serotinous, being able to open without wildfire; they will often open on hot summer's days and in fall during periods of "Indian Summer" (Jepson 1909, 119). There is concern, however, that the suppression of wildfire in its native ranges is causing low germination rates. Controlled burns have been attempted at Point Lobos, though these were halted due to complaints by nearby residents (Buonogatti 2009).

Age. The maximum age Monterey Cypress can attain in its natural setting is not directly known. Due to their rarity and interest they are not cut and their distorted forms often make interpretation of their tree rings difficult. What is known has been determined from fallen trees and extrapolated based on observed growth rates. Monterey Cypress can grow very quickly. Historical documents often purported the trees to be thousands of years old; hyperbole based on earlier myths surrounding the trees. These ages are still sometimes cited by modern sources. Contemporary estimates have established a range between two and three hundred years old with two hundred as an average and three hundred as an extreme (Peattie 1991, 242).

Taxonomy. It was first discovered, it is speculated, in 1786 by the French explorer La Perouse while making a voyage around the world. His landing at Monterey was commemorated in the Pacific Grove Museum by a cypress that stands in the botanical garden. Specimens and records, though, never made it back from this expedition. Most of the records of the expedition were lost in shipwrecks and storms in the New Hebrides, now the nation of Vanuatu, in the south Pacific (Guppy 1925, 20).

The species was first taxonomically described in 1846 by Karl Theodore Hartweg, an employee of the London Horticulture Society. In 1846, conflicts between Mexico and America were stirring in California leading the botanist to focus on botanical classification close to his base in Carmel. He collected his first specimens on Huckleberry Hill (Guppy 1925, 19). Though seeds had been collected and planted as a shelter and windbreak plant in England, Europe, and New Zealand earlier, since at least 1831, it was on Hartweg's specimens that the species designation was based. Prior to redesignation, the tree had been classified as *Cupressa Lambertiana*. A.B. Lambert had collected the seeds and distributed them to the London Horticulture Society previously (McClintock 2001, 72).

Variations. The seed of the Monterey Cypress is readily germinated in as little as two or three weeks in open nursery beds and early growth is vigorous, attested by their successful cultivation in other coastal climates globally. The tree has been planted in Europe, Africa, Australia, New Zealand and South America, as well as throughout California. Their propagation has led to the development of several different cultivars, isolating different leaf, branching, and color characteristics. The *lutes* variation has golden leaf tips that gradually assume the common bright green hue. The *crippsii* variation has more loosely bunched, spreading leaves with a lighter, yellowish hue. In the *lambertiana* variation the leaves also have a spreading characteristic as well as a greater tolerance of poor soils. New Zealand has the most cultivars, having developed the *lambertiana* variation as well as five other unique subtypes that have been bred to isolate different growing habits, creating dwarf and narrow forms associated with other Cypress species. A small grove, approximately just twenty trees, designated *farallonensis*, also exists on South Farallon islands, though the origin of these trees is unknown (Engbeck 1975, 36).

Reclassification. Recent evidence, following the discovery of a new cypress like species in Vietnam, suggests that Monterey Cypress may not be as closely related to old world cypresses as previously thought, instead being related to the *juniperus* genus. Genetic evidence provided support enough that the official taxonomy was changed from the *Cupressae*, old world cypress genus, to the genus *Callitropsis*, a new designation within the cypress family. To be taxonomically correct Monterey Cypress is now designated *Callitropsis Macrocarpa* (Little 2006, 461).

Propagation

Outside of their native range, Monterey Cypress has been valued for its rapid growth, valuable timber, and ability to be readily trained as a hedge and other ornamental shapes. It has been propagated for use as a lumber source and more commonly as windbreaks, protecting crops, orchards, and pasture and stabilizing coastal sand dunes. Attempts have been made to propagate the tree in the drier interior, but outside of the coastal zone, the tree rarely survives longer than 25 years, succumbing to poor growth and fungal infections (Baker 1971, 191).

San Francisco. This widespread propagation is readily visible along California's coast. For many early settlers along the coast, the often fierce winds made habitation and cultivation of food crops a challenge. Wind carries away moisture and wind-borne particles abrade sensitive growth. For this reason few trees or tall trees were present in the predominant dune and coastal scrub habitat of San Francisco and Marin counties. In the Marin headlands, Monterey Cypress was an obvious choice to protect farms and dairies and several are found along the Marin shoreline, usually trained into boxy shapes very different from the typical appearance. In San Francisco, near the coast in what is now Golden Gate Park, coastal dune habitat was prevalent. To stabilize these dunes, and make the surroundings more amenable for other types of plantings, Monterey Cypress, Monterey Pine, and Eucalyptus were planted to reduce the shifting of the sands. These original trees are the dominant arboreal vegetation in Golden Gate Park, comprising ninety percent of the forest canopy (Keator, Yamane, Lewis 1995, 38).

Another location in San Francisco where Monterey Cypress is prominent is the Presidio. Prior to American occupation of the Presidio in 1846, the site, never fully developed by the Spaniards, was also dune habitat swept with bitterly cold winds. American forces undertook large-scale plantings of Monterey Cypress, Monterey Pine, and Eucalyptus (Hoover, Kyle, Rensch 2002, 351).

Difficulty. Plantings of Monterey Cypress, though, have become less common. As they age, Monterey Cypress is susceptible to a weakening of the larger limbs, making them prone to failure, especially in high winds. Replacing aging trees in public areas like Golden Gate Park and the Presidio has become an important concern for park managers (Sullivan 2004, 35). Though the Presidio is undertaking renewed planting efforts, planting hundreds of new Monterey Cypresses, to renew the existing

plant cover. Several old, dying, trees have been removed and hundreds of seedlings have been planted in their place (The Presidio Trust 2009).

HISTORY

The indigenous habitants of Monterey coast were the Ohlone indians. The Ohlone village Ichxenta, thought to be the oldest Ohlone settlement in Monterey, having been inhabited at least 2,500 years ago, is located at the mouth of San Jose creek, which flows into Carmel Bay. It is likely that the Ohlone made use of the Monterey Pine, also an endemic, localized, species found near Monterey Cypress, using the pine nuts as a food source. The main use of the Monterey Cypress was medicinal. A potion made from the leaves was used to treat Rheumatism (Moerman 1998, 189).

Point Lobos

Point Lobos, the southward margin of the Monterey Cypress was an important food gathering location for coastal people. Large middens are found throughout the reserve. Old camping sites are identifiable by the rings of darker earth, and even in the granite bluffs, far above the sea, scattered shells litter the ground, left there by Native Americans. Middens are prominent features throughout the park. Point Lobos is often called the jewel of the state parks system, and it was due to the presence of Monterey Cypress that the land was reserved and protected, first privately by an enlightened land owner that recognized the value of the trees, and publicly when the state of California purchased the property in 1933 (California State Parks 2009).

Allan Memorial Grove. The largest Cypress Grove in Point Lobos is the Allan Memorial Grove, a 15 acre refuge. Point Lobos has historically been the site of many diverse uses: pasture, whaling, fisheries, quarry, and shipping depot. Coal was discovered in the hills East of Point Lobos, and the deep water coves along the point made it easy for steamers to moor close to shore and collect the coal for transport. When coal was no longer profitable, the Carmelo Land and Coal Company subdivided the property, intending to develop a town. Six hundred and forty acres were sold to Alexander M. Allan. Allan limited his use of the property to Abalone fishing and slowly began to purchase the surrounding property. Recognizing the impact visitors were having to the Cypress grove, Allan

fenced in the property, collected tolls from visitors, and limited the use of the property to day picnicking. The fifteen acre grove was donated to the state in his memory by the Allan family (California Department Parks and Recreation 2009).

Del Monte Forest

Early during the period of settlement in Monterey, it is likely that the trees around Cypress Point were preserved from development for one reason: the property was inherited by one person. This prevented the subdividing of the property into parcels which facilitated the acquisition of the property later by the Southern Pacific railroad. The region was developed as an isolated retreat in which much of the surroundings was left unaffected, including the Monterey Cypress which was valued for its visual effect. The railroad was developed in conjunction with the Hotel Del Monte, now the Monterey Naval Post Graduate Language School, and the surrounding grounds were lavishly landscaped in the Victorian Romanticist style (Gray 1885, 433). A major attraction were large mazes demarcated by Monterey Cypress trained into hedges and guests to the hotel could ride carriages through the forest and along the coast, on what became a seventeen-mile drive, where at different stops amusements would await: ostrich and exotic animals, actors dressed as Indians, and a tour through the Cypress grove, which came to be popularly known as "Lebanese Cedars (Aiken 1905, 178; Stromberg 2009)."

Creation of the Lebanese Cedar Legend. The legend that these trees were descendents of the cedars of Lebanon, the trees used to construct the original temple of Solomon, is thought to have been created by Aleck Early, a carriage driver at the Del Monte hotel that led tours along seventeen mile drive. Aleck Early had been the porter to Charles Crocker, owner of the Pacific Railroad and developer of the Del Monte hotel. Aleck's position with the hotel came at the request of Crocker, and Aleck would often entertain guest with tales of his travels with the railroad baron. Aleck became well known for his story telling skills; guests often reserved him as their driver when they came to stay at the Del Monte.

At Cypress point Aleck would tell the story of an ancient civilization that had settled on the shores of Monterey six thousand years ago. He would point to the sand dunes telling guests that archaeologist had begun excavations in search of the historic buildings and that strangely carved, ornate, columns had been unearthed. The inhabitants, he would

say, had been annihilated by cannibalistic tribes and the Monterey Cypress, planted from seeds brought from Syria, was the only thing left visible of their civilization ("From Lebanon to Monterey" 1915).

Fanciful Trees. Trees along the seventeen-mile route were given names based on the suggestiveness of their strange forms. The "Ostrich" tree was actually two trees that during their constant battering by the sea had joined together, growing intertwined so that from a distance they appeared to be a large hulking bird. The trees were destroyed during heavy storms in the early 20th century.

The "Ram's Horn" is a tree that bends upward after paralleling the ground so that it looks like a dwarfed tree. Trees can parallel the ground for sixty or more feet before rising to form their green crowns. Another is "The Wrestler," the whitened skeleton, void of bark so that the wind polished grains of wood show, that appears posed like a sculpture of a wrestler. There was also the "Witch Tree," a scant, bare, tree with gnarled, exposed roots. Its branches resembled bony hands gripping a broomstick (Guppy 1925, 14-17). The tree was blown down by a storm in 1964.

The most famous is "The Lone Cypress," standing isolated on Midway Point, a bare rock outcropping nearly completely surrounded by the sea, its bare roots spreading in tangles over the rocks. The sublimity of the single tree standing defiant against the violent ocean has been the subject of numerous paintings, photographs, and writings. In 1990 the tree became the trademark of Pebble Beach, limiting depictions of the tree in commercial uses. Public access is no longer available to the tree, and the tree is maintained by the Pebble Beach Corporation, which has taken efforts to protect the tree. The tree is supported with the addition of wires, and its roots are now protected with a rock planter surrounding its base (Stromberg 2009).

Pebble Beach

The Pebble Beach Company was founded by Samuel Finley Brown Morse, a distant cousin of Samuel Morse, inventor of Morse code. Morse was a manager with the Pacific Improvement Company, the property management branch of Southern Pacific Railroad. In 1919, Morse would found the Del Monte Holdings Company and acquire much of the property own by Pacific Improvement including the Del Monte hotel and surrounding gardens. Soon after purchasing the property he established

the Pebble Beach golf club. Ten years before his death he would put in place easements along the coast and seventeen mile drive that would permanently protect hundreds of acres of forest including the cypress forest. Now the Pebble Beach Open Space Preserve is maintained by the Pebble Beach homeowners association (Pebble Beach Resorts 2009).

THREATS

Cypress Canker

A persistent threat to the natural groves is Cypress Bark Canker (*Coryneum cardinalis*), a fungal disease that was first discovered when it began ravaging ornamental and transplanted cypresses elsewhere in the state. Monterey Cypress was thought to be resistant to most pest and pathogens, leading to their transplant throughout the state and abroad, but unfavorable growing conditions weakened the trees as they grew older, and gradually symptoms of disease and insects began to appear. The fungus infects the growth layer of the tree and if not caught and treated in the early phases of infection, rapidly spreads throughout the tree, killing it. Soon after its discovery, the fungus had infected trees across two thirds of the state. Away from the coast, in drier, hotter climates, Monterey Cypress is particularly susceptible to it (Wagener 1928, 584).

Discovery. The disease was unknown when it first appeared and initially was attributed to bark beetle attacks as they were commonly present in dead trees. An entomologist with the United States Department of Agriculture, J.M. Miller, was the first to conclude the disease was fungal in origin while examining trees at Stanford University and not finding evidence of insect activity. Testing quickly revealed that a previously unknown *Coryneum* fungus was the culprit. The fungal infection causes swelling in the bark, which soon begins to die. The tree secretes heavy amounts of resin around the wound, the most conspicuous sign of infection. The resin attracts additional insects, hastening the death of the weak, wounded tree (Wagener 1928, 584).

Prevention. When the extent and destruction of the epidemic was realized, concern immediately centered on the natural groves and fears that they would contract the fast moving fungus. Fearing that that spores of the fungus were spread by wind or wildlife, the state undertook a massive eradication campaign aimed at preventing the spread of the

fungus and protecting the remaining strands. If caught early, before the infection has spread beyond a few twigs or branches, treatment involved vigorous pruning of infected parts and parts nearby the infected areas. Trees with more advanced infections must be felled and to prevent the spores from spreading infected wood must be burned. As a precaution all of the Monterey Cypress trees within ten miles of the groves were removed and thousands across the state voluntarily removed their ornamental cypresses in an effort to protect the Monterey Cypress in their native habitat. It is hoped that Cypresses in their native habitat, harsh as it is with salt laden air, are more resistant to the fungus and to date no infection has been detected among the native groves, though it remains a concern (Wagener 1928, 584).

Habitat Specialization. Another threat to the trees is the specificity of the land they live on. The trees thrive only in the oceanic zone, and the ocean is wearing away the coastal bluffs they thrive on, restricting their range further. It is likely that their range once extended further into the ocean on land that has been lost to the rising sea and processes of erosion. Because their habitat is on granitic headlands adjacent to the sea, Monterey Cypress has been unable to compete successfully against other trees in the region, making it uncertain if it will extend its range inland as the present headlands are worn away (Jepson 1910, 37).

ECOLOGICAL ASSOCIATIONS

The Monterey Cypress is best recognized by its picturesque, dense, windswept foliage. The twisted thicket of branches does not attract many bird species, the Townsend Warbler (*Dendroica Townsendii*) being the exception, but when fallen, the debris is often used by ground mammals to build nest. Dead and stripped of bark and leaves, the trees attract many more birds. The lichen growing on the trees is another attractive nesting material, often used by birds. The dense branching has a purpose, however, similar to the needles of many coastal pines, the thick fog condenses on the branches and falls to the ground, providing needed water during dry months. Similarly, the lichen also condenses moisture from the atmosphere, and as Lace Lichen (*Ramalina Reticulata*) is dependent on exceptional air quality to flourish, it is an indicator of forest health.

Another species commonly seen growing in association with the Monterey Cypress is the algae *Trentepohlia*. The alga is able to grow and thrive outside of water due to the moisture in the air from fog and sea

spray. In certain lighting conditions the rust colored algae can give the trees the appearance of glowing orange. The color comes from the pigment carotene, a common orange pigment also found in carrots. Neither the lichen nor the algae directly harm the tree; both make their own food and only use the branches for support. Heavy growth of either one, though, can be detrimental to the health of the tree by blocking sunlight from reaching the leaves and thus inhibiting photosynthesis (Johnston 1996, 68).

CONCLUSIONS

For now the Monterey Cypress is protected. Individuals early on recognized the rarity of the species and sought to preserve it. Their habitat was protected, and when disease threatened them, a statewide program, with the full cooperation of citizens, was quickly established to prevent its spread. The example of the Monterey Cypress illustrates several lessons for modern resource management. In some aspects the conservation of the Monterey Cypress was ineffective for the conservation of the environment. Though the trees were protected and admired, they were seldom placed within the context of the forests. Monterey Cypress "forest" was not protected.

Thus, at Point Lobos, while the trees appear to be thriving, they are the most visible component of native vegetation on the peninsula, the forest itself has been inundated by nonnative, invasive species that were introduced in many cases by those who also desired to preserve the trees. The forest floor is non-native grasses, and adjacent to the trees, growing on the bluffs, are non-native coastal plants introduced from around the world. The Del Monte forest is the best example. The trees were valued for their rarity and appearance, becoming a tourist favorite. This appearance and rarity, however, also led to the incorporation of these trees into an artificial landscape that has seen native plants crowded out, and often purposely uprooted, to supplement the showy cypress with equally showy plants from around the world. Only now is the importance of ecology being considered in the ongoing preservation of the Monterey Cypress.

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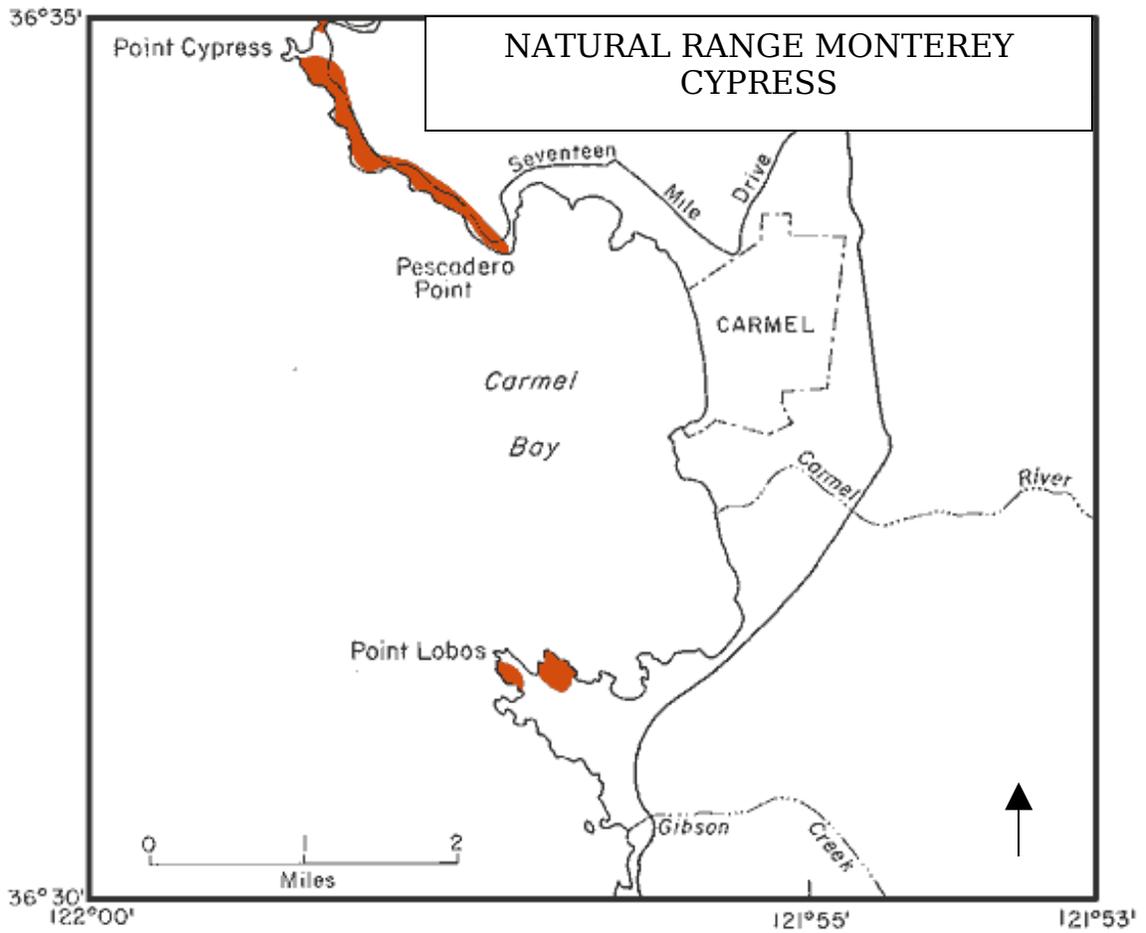


Figure 1: Current Range of Monterey Cypress (Griffin and Critchfield 1972)

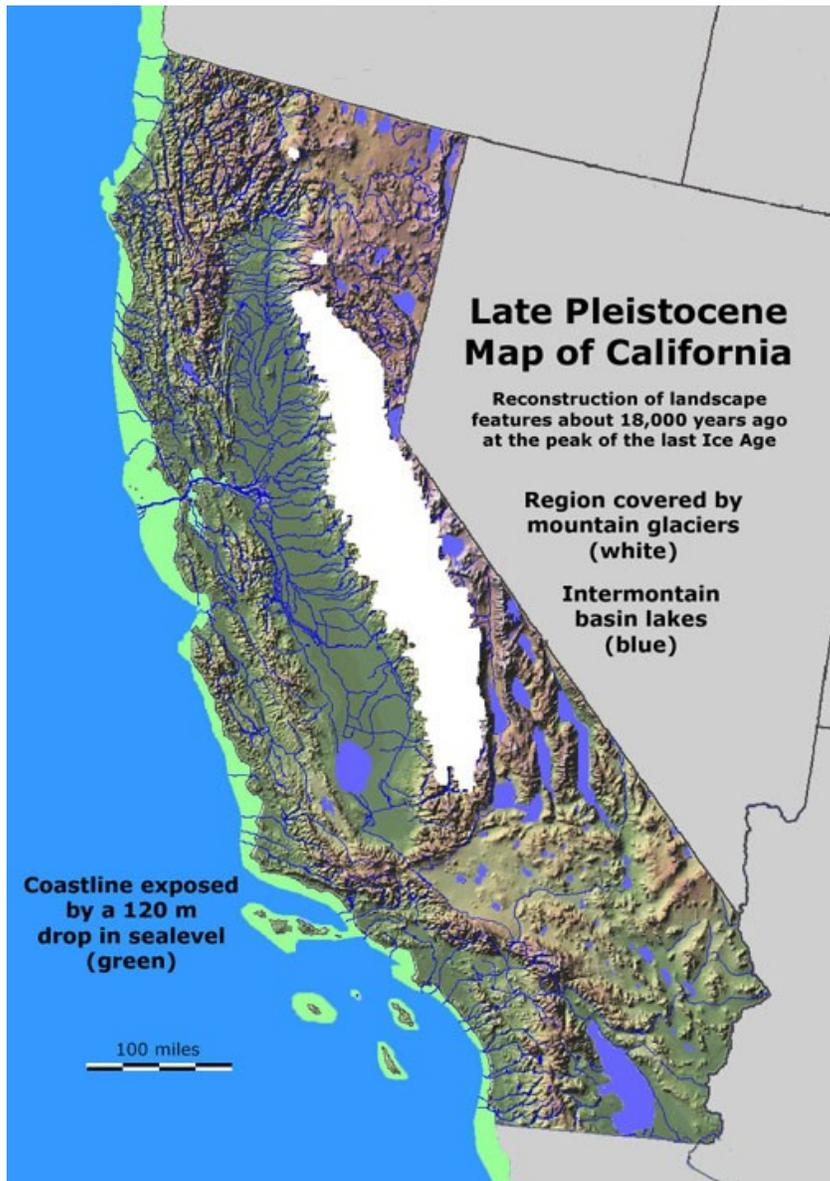


Figure 2: California coastline in the late Pleistocene (United States Geological Service).



Figure 3: The Old Veteran tree (Photo by Author).



Figure 3: The flat-topped form in early development (Photo by Author).



Figure 4: These young trees demonstrate the hedge-like form (Photo by Author).



Figure 5: Branchlets form dense crowns of growth (Photo by Author).

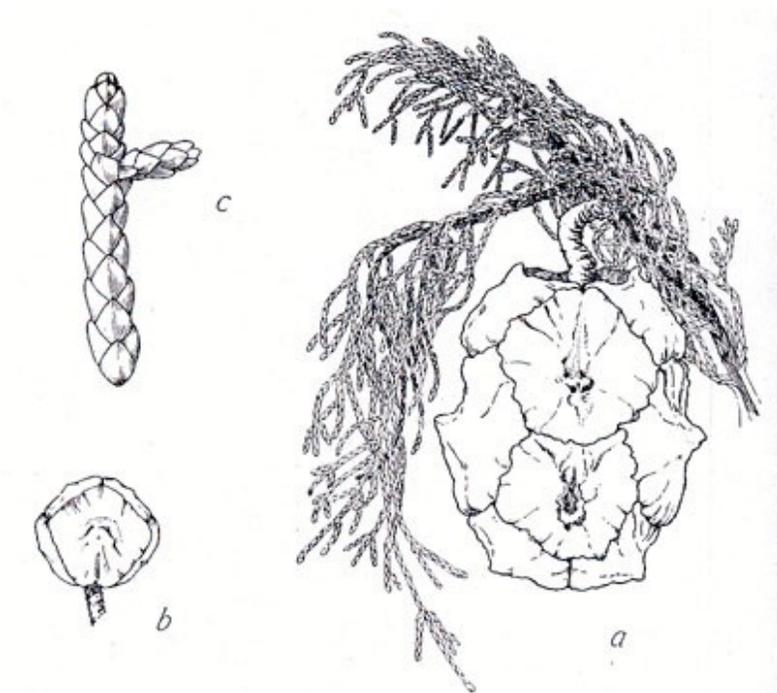


Figure 7: Taxonomical drawing of foliage and cones (Jepson 1909, 119).



Figure 6: Scale-like foliage (Photo by Author).



Figure 7: The trunk of this tree is infected with Cypress Canker (Ensis 2009).



Figure 10: Dead, the wood is remarkably resistant to decay. The skeleton of the tree is an attractive perching site to numerous birds (Photo by Author).

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