

Monterey & Ponderosa Pine



By Fisher Frost

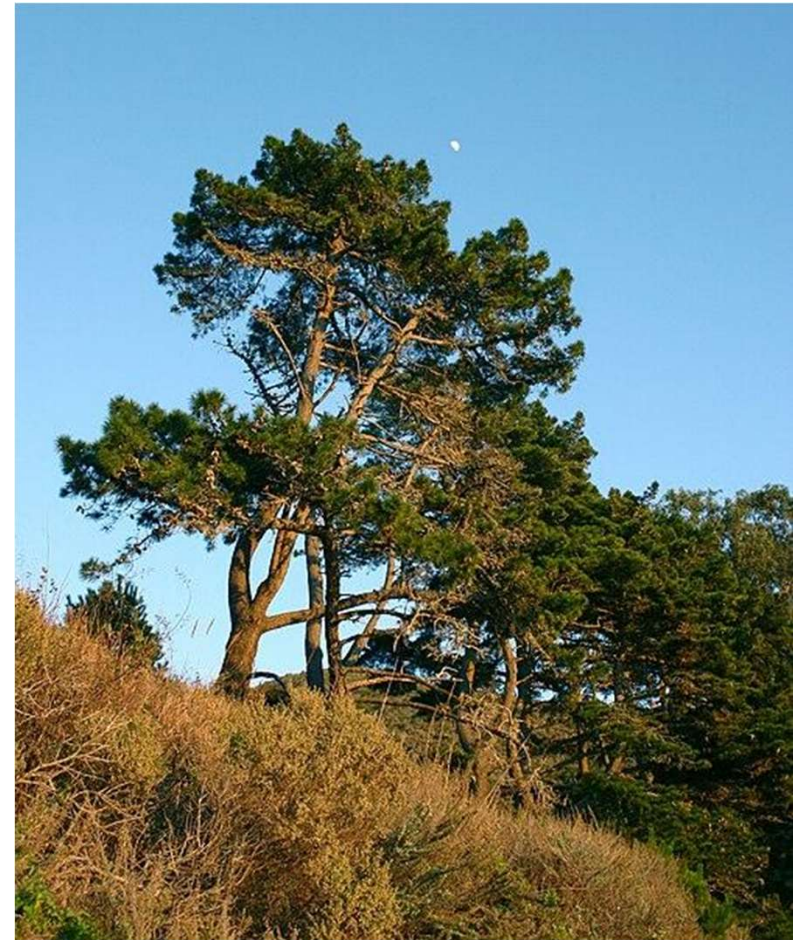
04/29/2026



Pinus radiata

Monterey Pine- Pinaceae *Pinus radiata*

- Most widely planted timber tree in the world
- Native to central California Coast
- Endangered species in native areas
- Named for native area and radial markings on cone scales



Pinus radiata

Morphology

- Needles
 - Fascicles of 3
 - Measure 3-6 inches in length
- Cones
 - Serotinous
 - Ovoid shaped
 - 3-7 inches in length and width
 - Produced annually
- Bark
 - Deeply furrowed
 - Grey to brown color



Pinus radiata

Native/Non-Native Range

- Native to 4 counties in California
 - North to South range ~130 miles
 - Rarely found further than 7 miles from the sea
 - Close relatives found on 2 islands in Mexico's territory
- Exported Globally for pine plantations
 - Plantations Include Europe, Africa, South America, New Zealand, and Australia



- The native range of Monterey pine.

Pinus radiata

Timber production

- Grow 4-8 ft a year in good conditions
- Harvested between 20-40 years of age
- 3-5 ft in diameter
- 100-150 ft in height



Pinus radiata

Conservation efforts

- Endangered Species in native range due to:
 - Lack of fire
 - Urbanization
 - Pollution
 - Diseases and pests

Plagued by pitch canker and dwarf mistletoe

- Pitch canker spread by beetles



Ponderosa pine- Pinaceae *Pinus ponderosa*

- Most widely distributed pine in North America
- Also known as “western yellow pine” for its occasional yellow bark
- State tree of Montana
- Used in timber industry in western U.S.
- Specific epithet means large
 - Long-lived and tall
 - Oldest recorded 907 years old
 - Tallest recorded 273 ft



Pinus ponderosa

Morphology

- Bark
 - Broad, red plates; occasionally yellow
 - Bark thickness up to 6 inches

- Needles 5-10 inches long
 - 2-3 needles per fascicle

- Cones 3-6 inches long
 - Armed umbos
 - Conical shape



Pinus ponderosa

Range

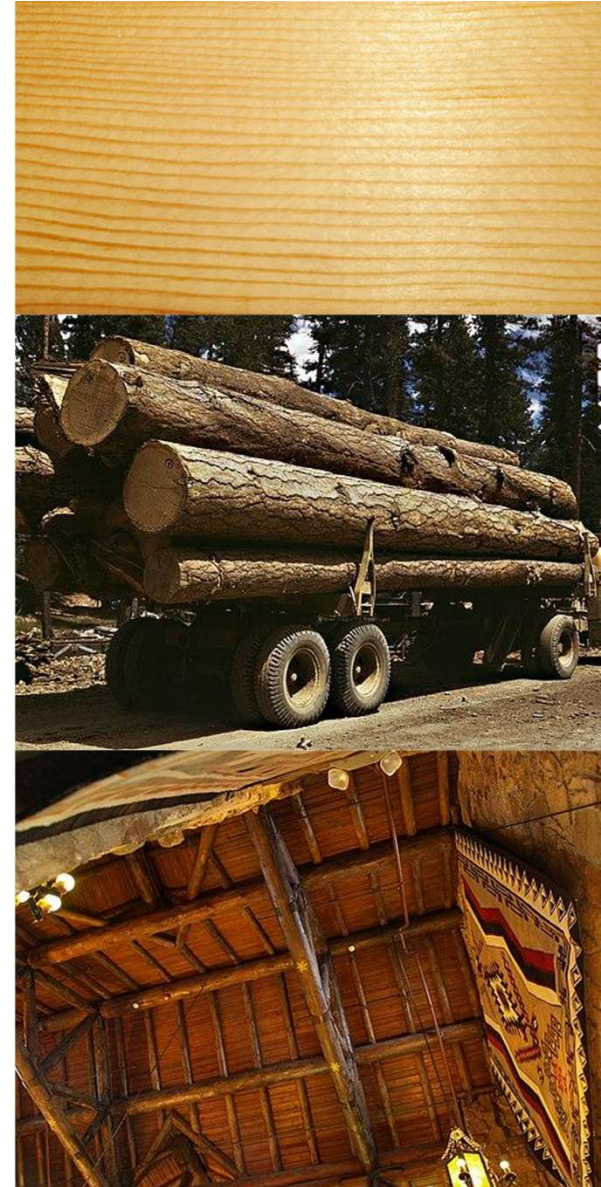
- As far north as British Columbia, Canada
- As far south as Durango, Mexico
- Present in every western U.S. state
- Longest contiguous ponderosa forest covers 2.6 million acres from NM to AZ



Pinus ponderosa

Timber

- Harvested from old-growth forests and plantations
- Durable, rot resistant
- Used for structural and engineered wood products
 - Structural beams
 - Log cabins
 - CLT



Pinus ponderosa

Diseases

- Dwarf mistletoe
- Elytroderma needle cast
- Blue Stained Fungus
 - Spread by mountain pine beetle



Similarities

- Both do well with fire
 - *radiata* require fire with serotinous cones
 - *ponderosa* fire adapted with thick bark

- Both are important timber species
 - *radiata* more so internationally
 - *ponderosa* domestically

Quiz!!

Situation: You find yourself on the central California coast, the native range of both *Pinus ponderosa* and *Pinus radiata* with your family. Your grandma knows you study forestry and wants to see if you actually learn anything practical at school. What are three ways to differentiate the trees?

- a. The cone; ponderosa pine has armed umbos
- b. Monterey pine has dark colored bark and deep furrows, while ponderosa pine has large red or yellow plates
- c. A and B are both correct
- d. Make something up, grandma most likely cannot fact check with google

Cited Sources

https://www.srs.fs.usda.gov/pubs/misc/ag_654/volume_1/pinus/radiata.htm

<https://canopy.org/blog/tree-spotlight-monterey-pine/montereypineneedle/>

<https://www.wood-database.com/radiata-pine/#pics>

<https://forestry.com/lumber/pine-lumber/radiata-pine-lumber/>

https://www.conifers.org/pi/Pinus_radiata.php

<https://davesgarden.com/guides/articles/view/3896>

<https://landscapeplants.oregonstate.edu/pinus-ponderosa-ponderosa-pine>

https://en.wikipedia.org/wiki/Pinus_ponderosa

https://shop.arborday.org/ponderosa-pine?srsltid=AfmBOocavZowKaFpG6S9X_ZJbk3HN0TBZ0YKdnxm1oatCTU9ukxpSZL

https://www.conifers.org/~conifers/pi/Pinus_ponderosa_ponderosa.php

<https://forests.org/foresters-blog-mountain-pine-beetle/>

Thank you!

Virginia pine Pinaceae *Pinus virginiana*
Sonderegger pine Pinaceae *Pinus x sondereggeri*

Jackson Jones

FORS 2319

Virginia pine-Pinus virginiana first facts

- Known as scrub pine or a forest weed
- Sawtimber and key pulp wood tree
- On the smaller side of pines
- Pioneer species
- Outperforms others on bad soil
- 70 feet tall



Virginia pine-Pinus Identification

- Cones 1.5-2.5 inch long
- Cones have sharp prickly umbo
- Needles are 1.5 - 3 inches very small
- Powdery white covering on young twigs
- Greenish purple young twigs
- Bark thin scaly plates with cinnamon patches
- Has low dead partially attached branch stubs
- Needles twist in pairs



Virginia pine-*Pinus virginiana* Ecology

- Pioneer species on burn sites, fields abandoned land.
- Does better than loblolly on bad soil
- Prefers well drained acidic soil
- Clay loamy sandy soil
- Shade intolerant



Virginia pine-*Pinus virginiana* Native range

- Found in pockets of Ohio Indiana Tennessee
- Piedmont and lower mountains
- Mid East coast range
- Elevation range 50-2500 ft



Virginia pine-*Pinus virginiana* Silvics & Growth

- Up to 5050 cubic ft of wood per acre (age 70)
- 50-80ft tall at age 50
- Shallow roots
- Resinous self pruning branches



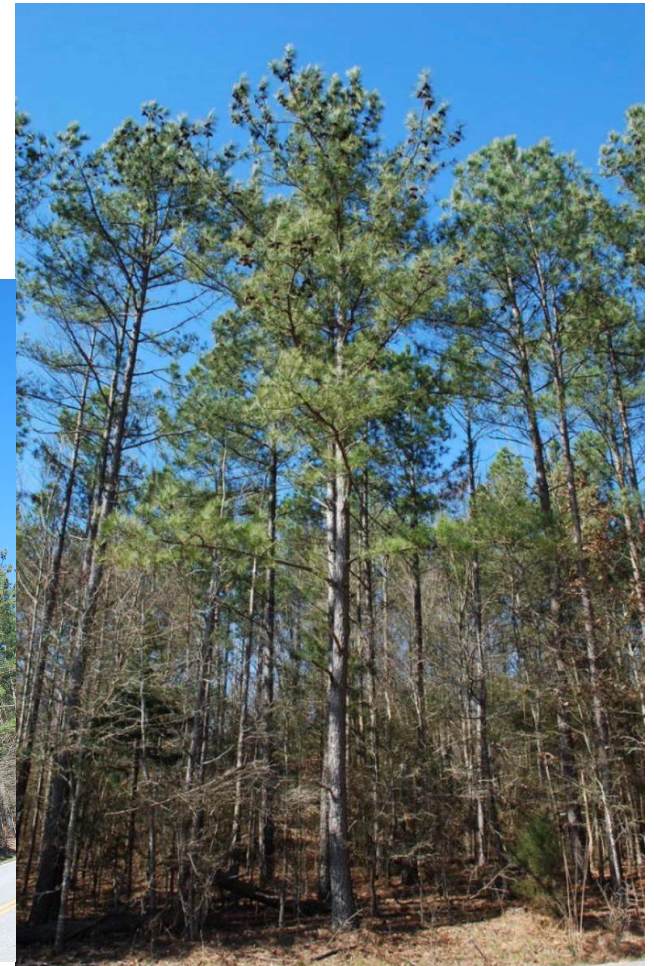
Virginia pine-Pinus Virginiana Historical uses

- Previously top chopped to make Christmas trees
- Lumber on abandoned land
- Reclaims strip mines and spoil banks
- Creates fast pulp wood on bad sites
- Wildlife-Quail Deer Woodpeckers



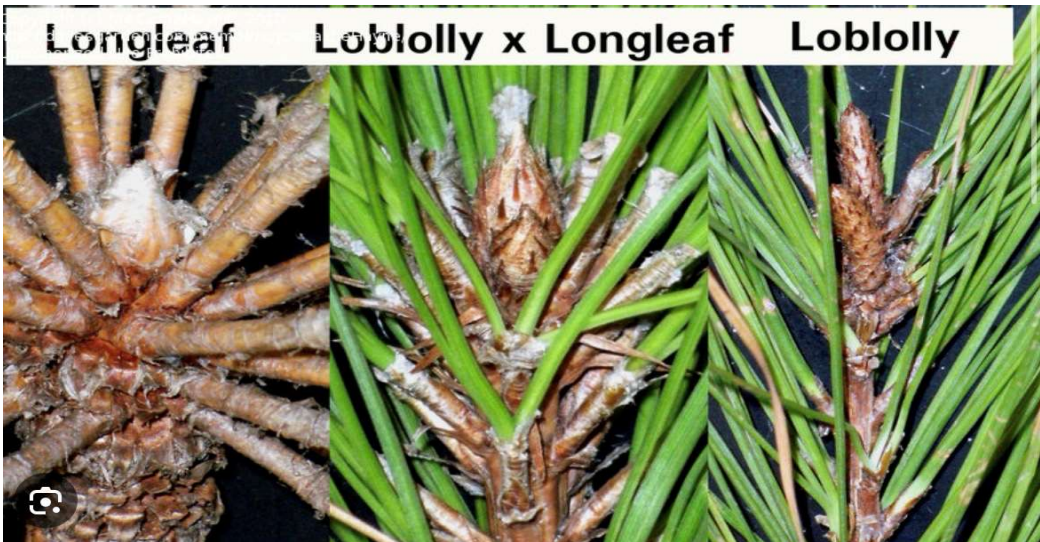
Sonderegger pine *Pinus x sondereggeri*-first facts

- Hybrid between loblolly and longleaf pine!
- Only named southern pine hybrid
- Typical name “bastard pine”



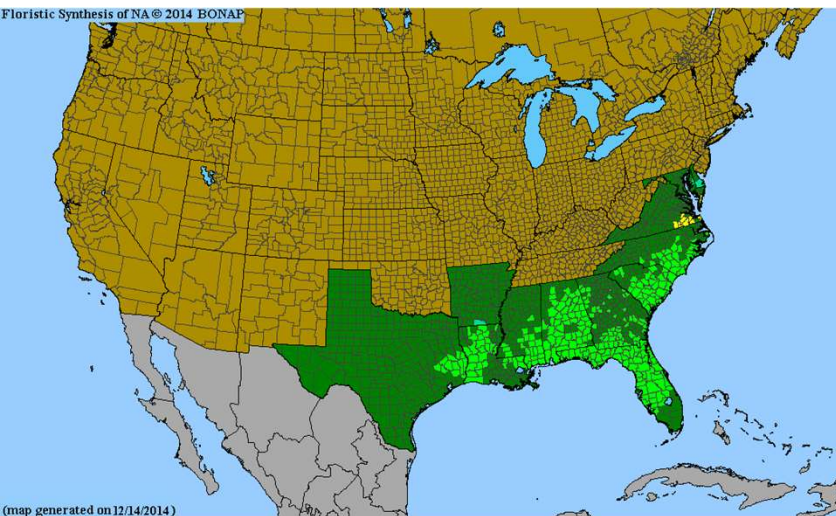
Sonderegger pine *Pinus x sondereggeri*-ID

- Needles resemble loblolly
- Form resembles longleaf pine
- No grass stage like longleaf!
- Early stem elongation
- Brown terminal bud-key ID point
- Looks more like long leaf from distance

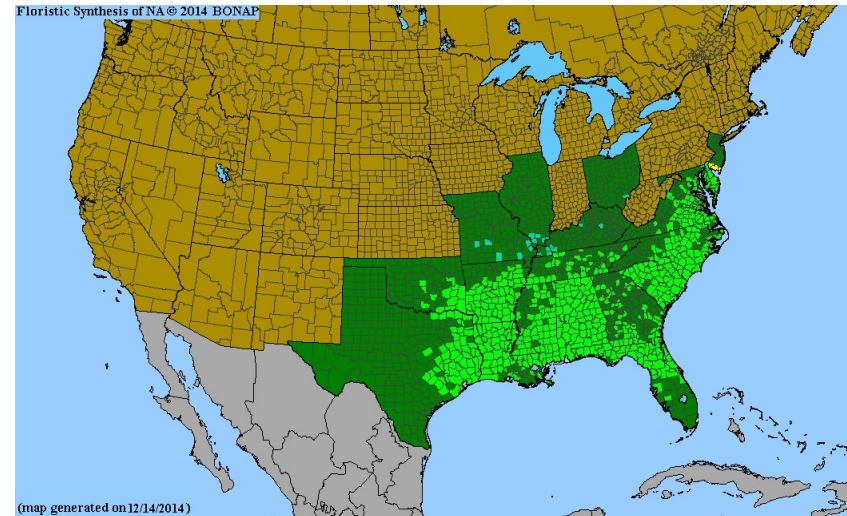


Sonderegger pine *Pinus x sondereggeri*-range

- Appears naturally where both parents reside
- The overlap of loblolly and longleaf range
- Key in North Carolina Louisiana Texas
- Prefers costal plain hybrid zones



< Longleaf
Loblolly >



Sonderegger pine *Pinus x sondereggeri*- Ecology

- Prefers costal plains and disturbed sites
- Pioneer behavior like its loblolly parent
- Not rust resistant like long leaf
- Wildlife use-habitat for small animals



Sonderegger pine *Pinus x sondereggeri-silvics*

- Faster early growth then long leaf
- Early stem elongation
- Wide range of phenotypes
- Phenotypes can look like either parent
- Wood properties are similar to parent species(sawtimber)



Sonderegger pine *Pinus x sondereggeri*-use cases and issues

- Not preferred for high quality timber
- Mislabeled as longleaf pine in nursery's often



Sonderegger pine *Pinus x sondereggeri*- History

- Only scientifically named southern pine hybrid
- H.H Chapman named it after original finder V.H Sonderegger
- H.H Chapman disses V.H Sonderegger with name



V.H. Sonderegger, a native of Winnfield, Louisiana, served as state forester during two difficult economic times.

**Douglas-fir (*Pseudotsuga
menziesii*)**
**Bigcone Douglas-fir
(*Pseudotsuga macrocarpa*)**

Presented by: Catheline Moreno
Course: FORS 2319 – Dendrology **Date:** April 29th, 2026



Douglas-fir

- Most economically important conifers in North America
- Dominant species in the Pacific Northwest forests
- Not a true fir- belongs to the genus *Pseudotsuga*



Douglas-fir- *Pseudotsuga menziesii*

Identification

- **Needles:** Flat, soft 2-3 cm, spiral arrangement, sweet/citrus smell when crushed
- **Buds:** sharp pointed, reddish brown, resinless (key ID in winter)
- **Cones:** Downward hanging, 3- pointed bracts that look like mouse tails and feet
- **Bark:** Thick, deeply furrowed with age, provides moderate fire resistance
- **Form:** tall straight trunk, narrow crown in dense stands, broader canopy in open areas



Douglas-fir- *Pseudotsuga menziesii*

Range

- Widespread across western North America
- Extends from British Columbia down into Mexico
- Grows in low elevations up to high mountain slopes
- Thrives in cool, moist climates but tolerates a wide conditions



Douglas-fir- *Pseudotsuga menziesii*

Ecology

Shade tolerance: intermediate-
regenerates under partial canopy

Fire:

- Mature trees have thick bark that provides moderate fire resistance

- Young trees are more vulnerable

Climate: Prefers cool, moist winters and dry summers

Soils: Best on deep, well-drained soils

Successional role: Long-lived species that dominates mature forests



Douglas-fir- *Pseudotsuga menziesii*

Silvics

Regeneration:

- Produces abundant seed crops every few years
- Wind-dispersed seeds travel long distances

Growth: Fast-growing and highly competitive

Longevity: Can live 500–1,000+ years

Management:

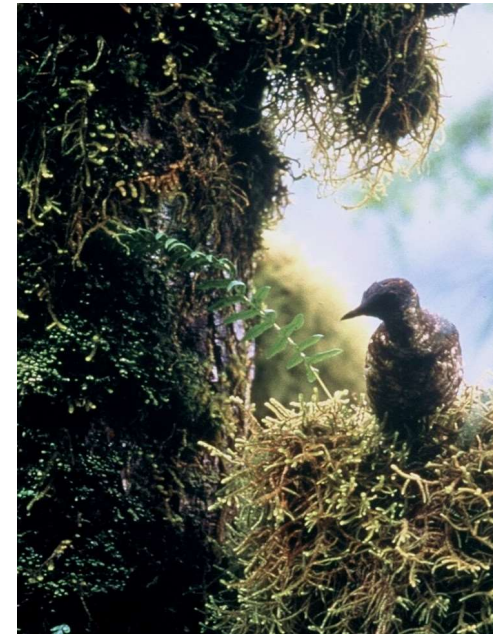
- Commonly managed with thinning and planting
- Major commercial forestry species(\$\$)



Douglas-fir- *Pseudotsuga menziesii*

Wildlife uses

- Seeds eaten by squirrels, chipmunks, crossbills, chickadees
- Dense stands provide cover for deer and elk
- Old-growth stands are essential habitat for:
 - Northern spotted owl
 - Marbled murrelet
- Snags used by woodpeckers and cavity nesters



Douglas-fir- *Pseudotsuga menziesii*

Timber and Human Uses

One of the strongest and most versatile softwoods

Used for:

- Construction lumber
- Plywood
- Beams and trusses
- Utility poles
- Flooring



Douglas-fir- *Pseudotsuga menziesii*

Cultural Significance



Native Folklore- “Mice in the cones”

Indigenous stories describe the cone bracts as mice hiding inside the cone to escape a forest fire



Douglas-fir- *Pseudotsuga menziesii*

Champion Trees

Worlds Largest by Volume: Red Creek Fir

Located: British Columbia, Canada

14 ft diameter

Considered the world's largest Douglas-fir

Tallest Known Living Tree: Doerner Fir

Located in Coos County, Oregon

327 ft tall

Red Creek Fir



Doerner Fir



Douglas-fir- *Pseudotsuga menziesii*

Bigcone Douglas-fir

- Endemic to southern California
- Known as the most fire-resistant conifer in the world
- Produces the one of the largest cones of any conifer in North America



Bigcone Douglas-fir- *Pseudotsuga macrocarpa*

Identification



Cones: Large (6–8 in), heavy, and woody

Thick scales with blunt tips, bracts are small compared to Douglas-fir

Cones remain on the tree for years

Needles: Stiff, thick, bluish-green

Spirally arranged

Shorter and stouter than Douglas-fir needles

Bark: Extremely thick, deeply plated, and corky

Provides insulation during high-intensity fires

Form: Irregular or gnarled due to repeated fire damage

Branches are thick and widely spaced

Mature trees have a rugged, “battle-scarred” appearance.

Bigcone Douglas-fir- *Pseudotsuga macrocarpa*

Range

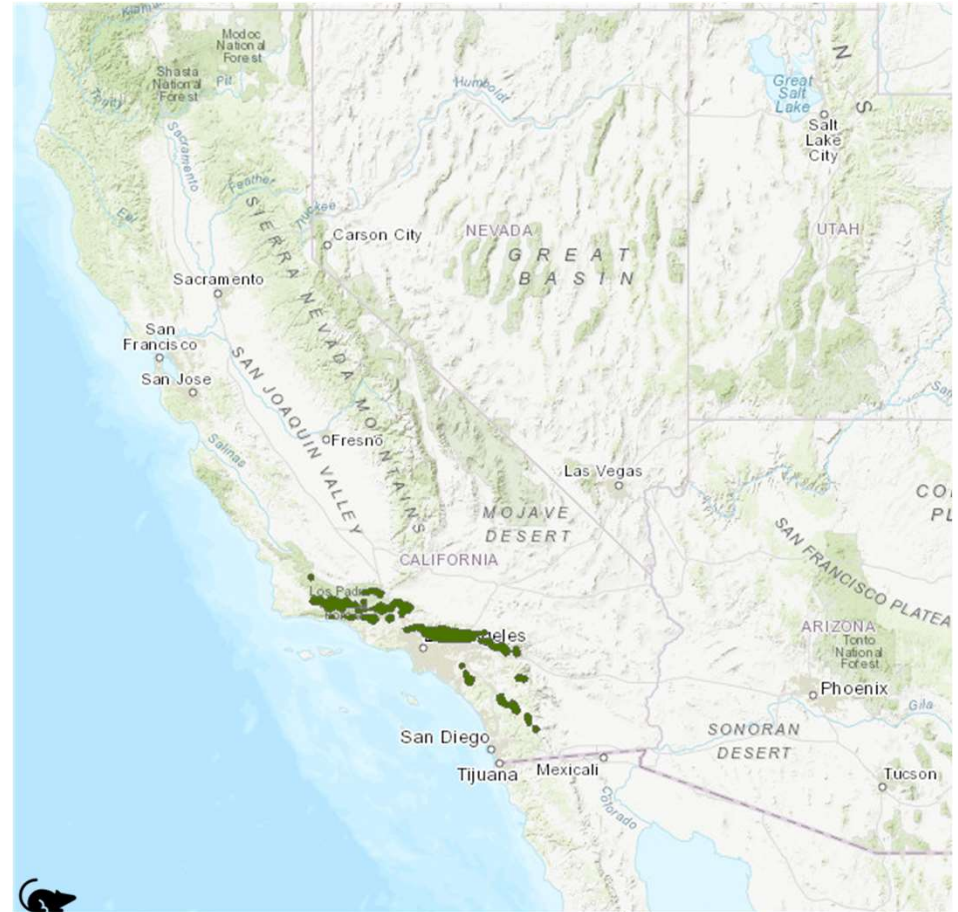
Found only in: Transverse Ranges (San Gabriel, San Bernardino, Santa Monica Mountains)

Peninsular Ranges (San Jacinto, Santa Ana Mountains)

Elevation range: 2,000–7,000 ft.

Habitat: steep, rocky slopes, Mediterranean climate (hot dry summers, cool wet winters)

Vulnerability: Limited range makes it sensitive to climate change and large fires



Bigcone Douglas-fir- *Pseudotsuga macrocarpa*

Ecology

Fire Ecology: Survives complete crown scorch

Protected buds beneath thick bark allow resprouting

Branches re-leaf after being burned

Drought Adaptation: Thick bark reduces water loss

Deep roots access moisture in rocky soils

Shade Tolerance: Low to intermediate- prefers open, sunny slopes.

Role in Ecosystem:

- Stabilizes steep slopes
- Provides structure in chaparral–forest transition zones



Bigcone Douglas-fir- *Pseudotsuga macrocarpa*

Wildlife uses

- Seeds eaten by small mammals
- Nesting habitat for birds in rugged terrain
- Large branches provide perches and cover for raptors.



Bigcone Douglas-fir- *Pseudotsuga macrocarpa*

Uses

Timber: Not commercially valuable (coarse, knotty wood)

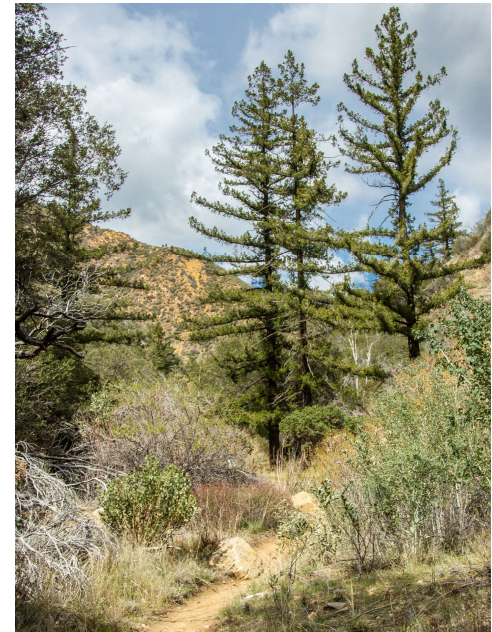
Firewood: Occasionally used locally

Ecological Value:

- Provides slope stability
- Fire resilience
- Habitat structure

Scientific Interest:

- Studied for extreme fire adaptations
- Used in ecological restoration projects.



Bigcone Douglas-fir- *Pseudotsuga macrocarpa*

Bigcone Douglas-fir Champion Tree

Known as: Old Glory

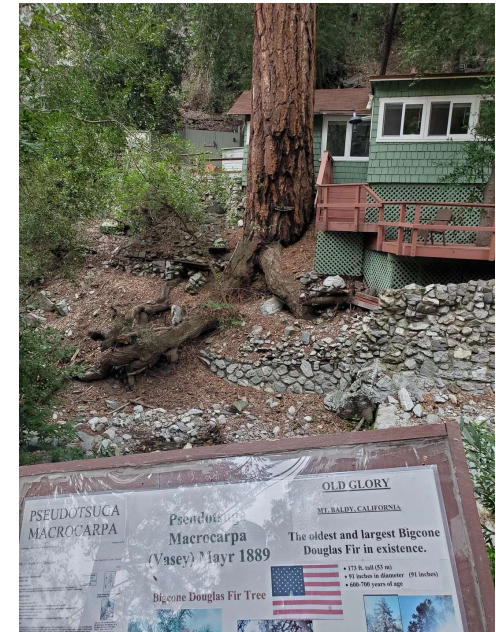
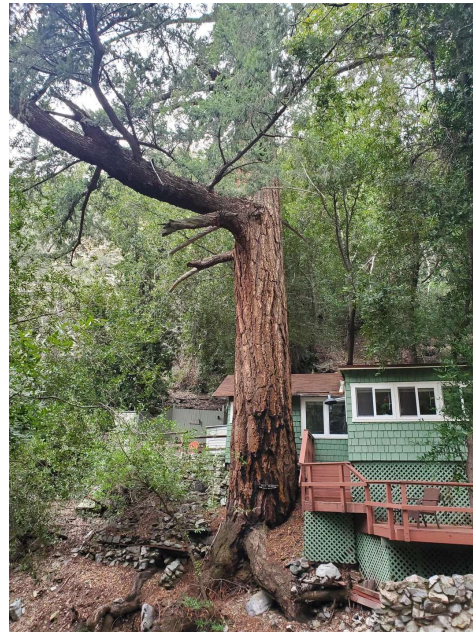
Located: San Gabriel Mountains,
near Baldy Village, California

Age: estimated 700 yrs old

Circumference: 269in (22.4 ft)

Height: 173 ft

Crown spread: 94 ft



Bigcone Douglas-fir- *Pseudotsuga macrocarpa*

Douglas-fir vs. Bigcone Douglas-fir Key Differences

Douglas-fir

- Widespread across western North America
- Major timber species (\$\$)
- Intermediate fire resistance
- Important wildlife habitat
- Famous “mice in the cones”

Bigcone Douglas-fir

- Endemic to Southern California
- Most fire-resistant conifer
- Largest cones in North America
- Ecologically important for slope stability
- Limited range - vulnerable to climate change

Questions?



Quaking Aspen & Downy Serviceberry

Whitney Stansell

Quaking Aspen- (*Populus tremuloides*)

- Hardy, fast-growing, short-lived pioneer species
- Intolerant of shade, existing in large colonies, spreading by root suckers
- Grows on a wide variety of soils, but does best on well-drained sites especially on disturbed



Quaking Aspen- (*Populus tremuloides*)

- Managed primarily through even-aged silviculture
- Regeneration typically requires clear-cutting to remove the overstory. This helps stimulate root suckering and reduces apical dominance.
- The root system allows for rapid restocking
- Clones are susceptible to disease and rot damage.



Quaking Aspen- (*Populus tremuloides*)

- Leaves- Alternate & simple, heart-shaped leaves, finely toothed with flattened petiole
- Twigs & Buds- Twigs are slender, reddish brown with a waxy film
- Bark- Initially smooth, gets furrows as it ages, yellowish white
- Form- 30-40ft tall upright growing habit in dense thickets



Quaking Aspen- (*Populus tremuloides*)

- Range- Wide distribution across North America
- United States: Most dominant in Utah called PANDO (I spread) of a single clonal tree, roughly 47,000. In Colorado they roughly cover 5 million acres



Quaking Aspen- (*Populus tremuloides*)

- Wildlife- provides food from the bark and buds through the summer
- Commercial- wood is light, soft, with little shrinkage
- Environmental- used for land reclamation



Quaking Aspen- (*Populus tremuloides*)

- Ecological issues in the Western United States
- Causing severe over browsing that threatens the regeneration of Aspen forest
- Feed on young shoots, bark, and leaves during the winter
- Leading to a decline including the PANDO forest
- Land managers are using fencing to protect young Aspen



Downy Serviceberry- (*Amelanchier arborea*)

- Early to mid succession, often first to bloom, earning the name “Shade bush,” coinciding with shad fish runs in Atlantic rivers
- Versatile in both shady and sunny conditions, commonly an understory tree
- Grows in a wide range, including dry rocky slopes, ridges, riverbanks, and edges of woods. Prefers well-drained sites



Downy Serviceberry- (*Amelanchier arborea*)

- Leaves- Alternate and simple, ovate shape, finely serrated, and pinnately veined. When young the underside is covered in white “Downy” hairs with a cordate base
- Twigs & Buds- Slender and reddish brown, buds are long and pointed, resembling a “Cigar” with the buds being pastel



Downy Serviceberry- (*Amelanchier arborea*)

- Flowers- Showy white flowers
- Bark- Ash gray with dark vertical stripes or referred to as stretch marks
- Form- Small tree 40ft with narrow crown



Downy Serviceberry- (*Amelanchier arborea*)

- Range- Native to North America, covers most of Eastern United States and Southern Canada
- United States- High concentration in the Ozark region



Downy Serviceberry- (*Amelanchier arborea*)

- Wildlife- Valuable for its biodiversity, with the fruit having an almond-like flavor that many species eat
- Can be consumed also called juneberry
- Commercial- Wood is heavy, hard, and close-grained. Historically used for tool handles and fishing rods.
- Ornamental- White flowers and bright red-orange fall colors for landscapes





Dendrology

FORS 2319



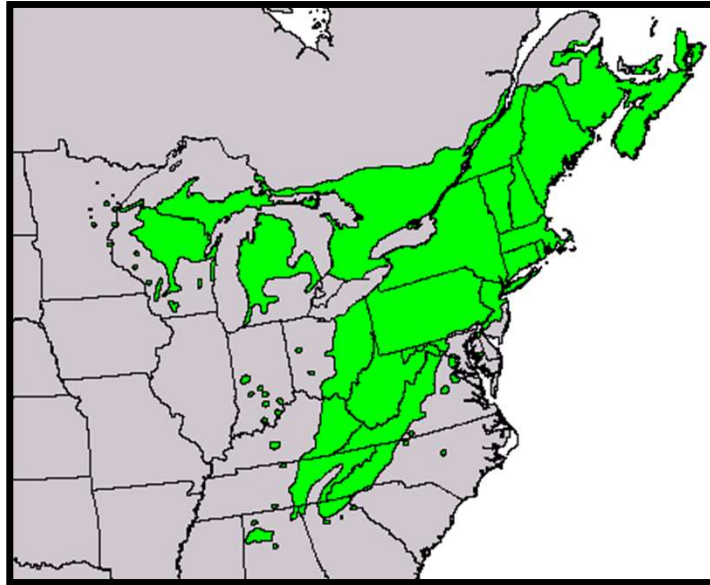
Instructor: Dr. Jeremy Stovall

Eastern and Western Hemlocks



Eastern Hemlock

Pinaceae *Tsuga canadensis*



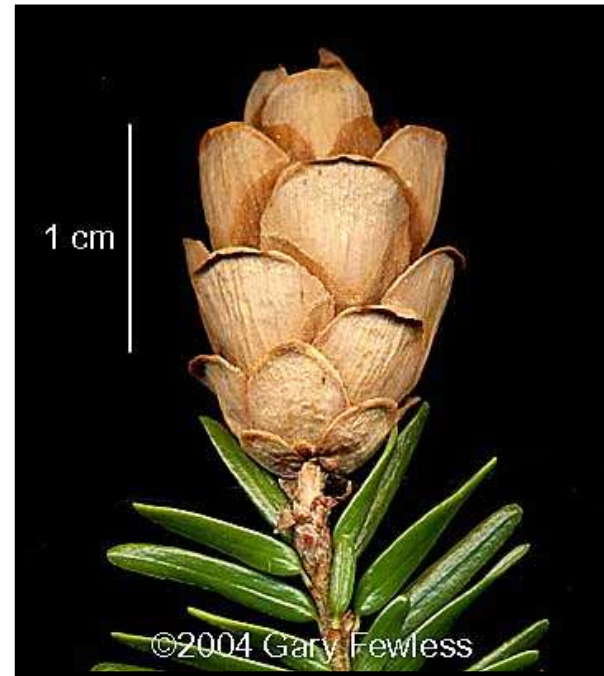
Eastern Hemlock

Pinaceae *Tsuga canadensis*



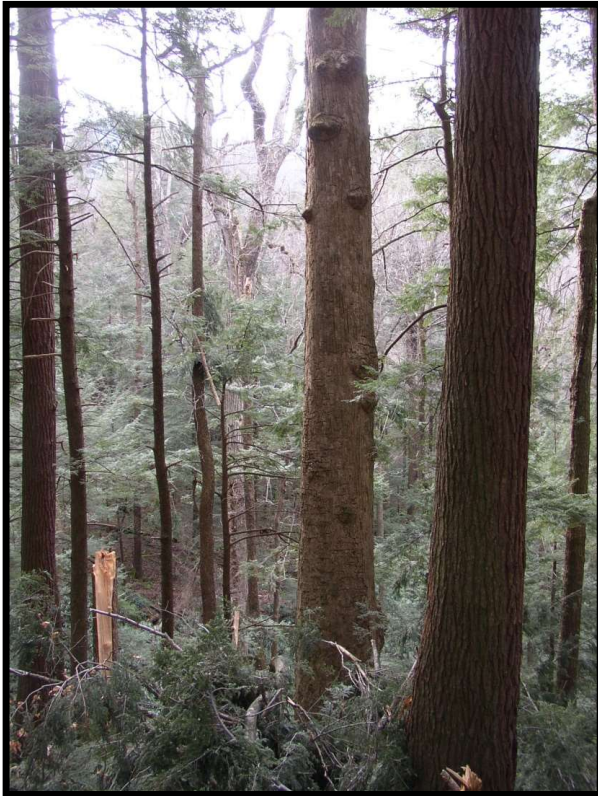
Eastern Hemlock

Pinaceae *Tsuga canadensis*



Eastern Hemlock

Pinaceae *Tsuga canadensis*



Eastern Hemlock

Pinaceae *Tsuga canadensis*

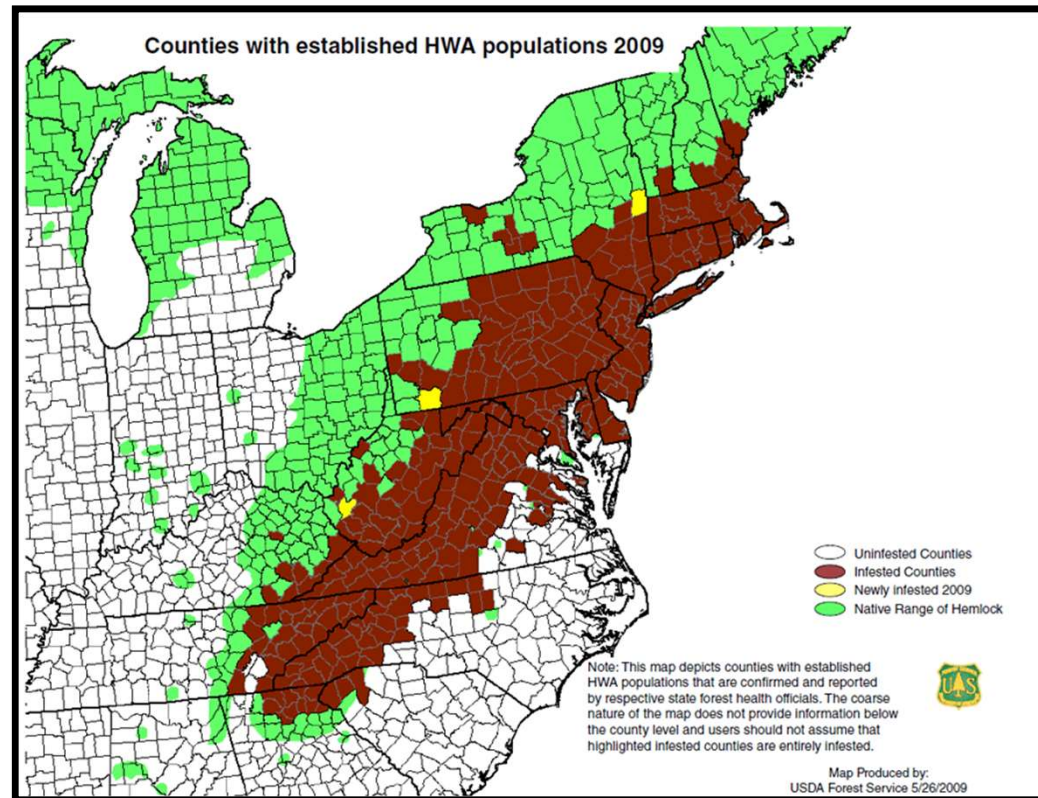
HEMLOCK WOOLY ADELGID

- Found in 1951 in VA, in 16 states by 2005
- Parthenogenetic: All are female
- “Wool” ovisac protects adelgid & eggs
- Two generations / year
- Feed on starches in twig



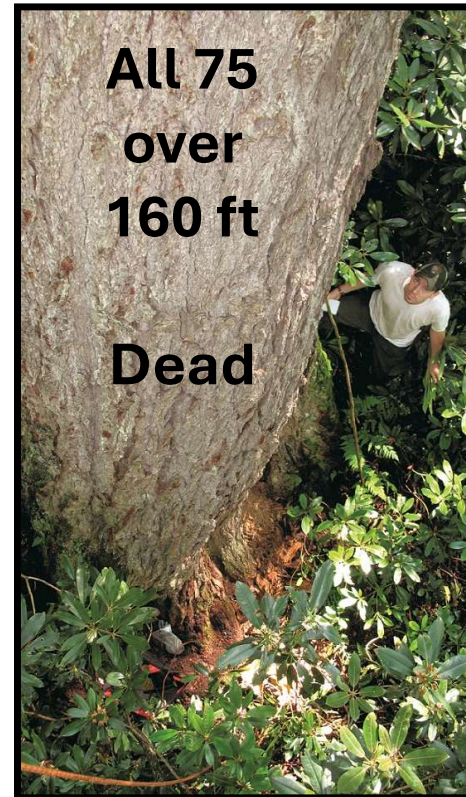
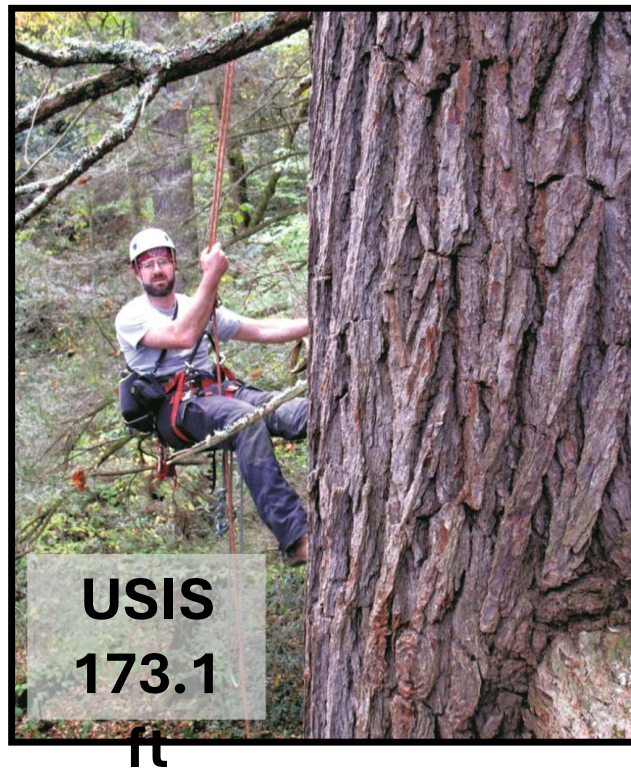
Eastern Hemlock

Pinaceae *Tsuga canadensis*



Eastern Hemlock

Pinaceae *Tsuga canadensis*



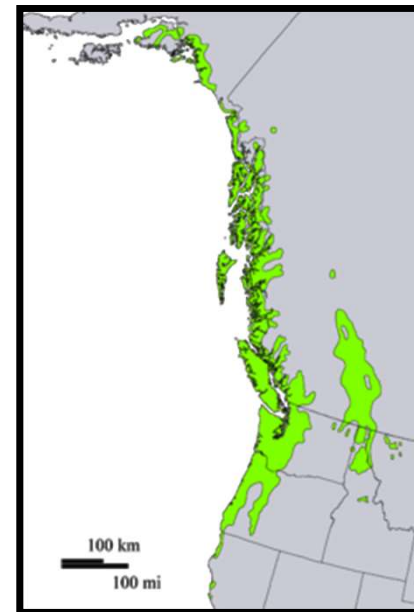
Eastern Hemlock

Pinaceae *Tsuga canadensis*



Western Hemlock

Pinaceae *Tsuga heterophylla*



Western Hemlock

Pinaceae *Tsuga heterophylla*



Western Hemlock

Pinaceae *Tsuga heterophylla*

SAF Cover Type	Pacific Coast	Rocky Mountains
202 White Spruce-Paper Birch	x	
205 Mountain Hemlock	x	x
206 Engelmann Spruce-Subalpine Fir		x
210 Interior Douglas-Fir		x
212 Western Larch		x
213 Grand Fir		x
215 Western White Pine		x
218 Lodgepole Pine	x	x
221 Red Alder	x	
222 Black Cottonwood-Willow	x	
223 Sitka Spruce	x	
224 Western Hemlock	x	x
225 Western Hemlock-Sitka Spruce	x	
226 Coastal True Fir-Hemlock	x	
227 Western Redcedar-Western Hemlock	x	x
228 Western Redcedar	x	
229 Pacific Douglas-Fir	x	
230 Douglas-Fir-Western Hemlock	x	x
231 Port Orford-Cedar	x	
232 Redwood	x	



- Can outgrow Doug-fir and Sitka spruce
 - Greater stocking due to shade tolerance
 - Approx 25-40% greater yields
- Valuable timber for poles, lumber, etc.

Western Hemlock

Pinaceae *Tsuga heterophylla*

- Fully Stocked Stand
 - 100 years old
 - 192 feet tall
 - 23 inches DBH
 - 121 trees per acre
 - 363 ft² per acre
 - 850 tons per acre



Western Hemlock

Pinaceae *Tsuga heterophylla*

National Champion
Quisitis Point
Pacific Rim NP, BC

180 feet tall
8.5 feet DBH
66 foot crown spread

