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 mistlet
  - 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

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Thank you!

Virginia pine Pinaceae Pinus virginiana
Sonderegger pine Pinaceae Pinus x sondereggeri

Jackson Jones
FORS 2319

Virginia pine-Pinus virginiana first facts

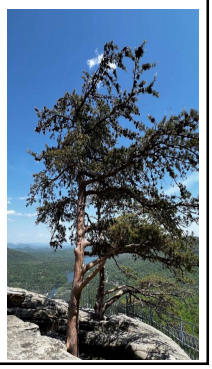
- Known as scrub pine or a forest weed
- Sawtimber and key pulp wood tree
- On the smaller side of pines
- Pioneer species
- Outperforms others on bad soil
- 70 feet tall

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

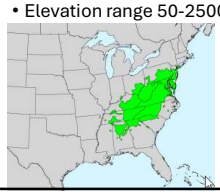
Virginia pine-Pinus virginiana Ecology

- 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

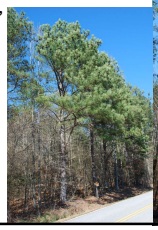
- Up to 5050 cubic ft of wood per acre (age 70)
- 50-80ft tall at age 50
- Shallow roots
- Resinous self pruning branches

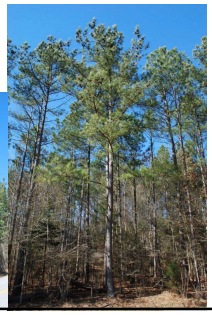
Virginia pine-Pinus Virginiana Historical uses

- 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

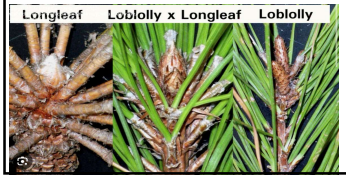
- Hybrid between loblolly and longleaf pine!
- Only named southern pine hybrid
- Typical name “bastard pine”





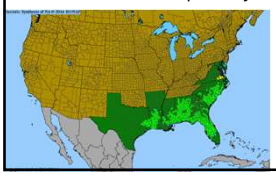
Sonderegger pine Pinus x sondereggeri-ID

- 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

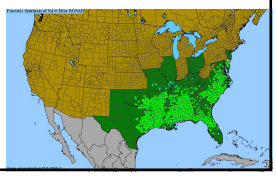


Sonderegger pine Pinus x sondereggeri-range

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

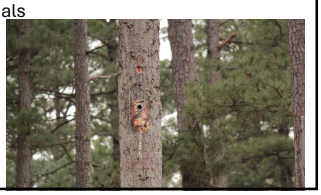


< Longleaf
Loblolly >



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

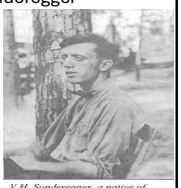
- Faster early growth then long leaf
- Early stem elongation
- Wide range of phenotypes
- Phenotypes can look like either parent
- Wood properties are similar to parent species(sawtimber)

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 Noth 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

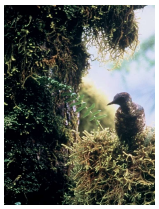
Management:

- 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 mine 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

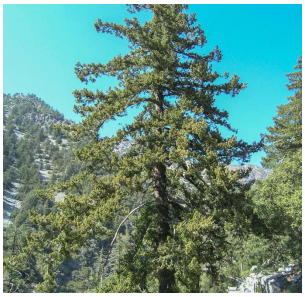
Red Creek Fir

Doerner Fir

Douglas-fir- *Pseudotsuga menziesii*

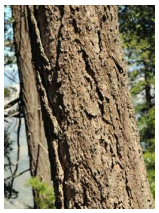
Bigcone Douglas-fir

- 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

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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)

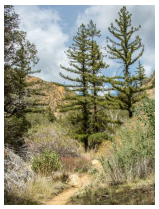
Firewood: Occasionally used locally

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

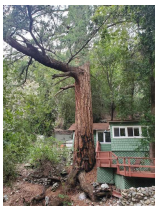
Located: San Gabriel Mountains, near Baldy Village, California

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

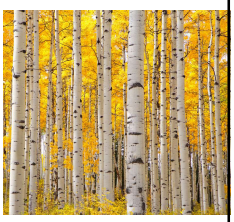
Questions?

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*)

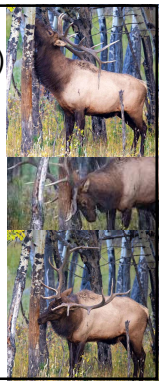
- Range- Wide distribution across North America
- United States: Most dominant in Utah called PANDO (I spread) of a single clonal tree, roughly 47,000. In Colorado they roughly cover 5 million acres

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

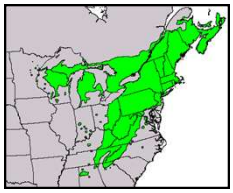
Downy Serviceberry- (*Amelanchier arborea*)

- 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

Eastern Hemlock
Pinaceae *Tsuga canadensis*



Eastern Hemlock
Pinaceae *Tsuga canadensis*

Eastern Hemlock
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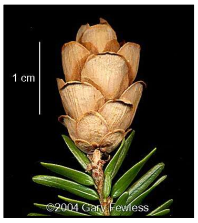
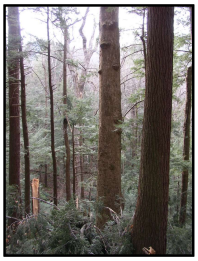


Eastern Hemlock
Pinaceae *Tsuga canadensis*

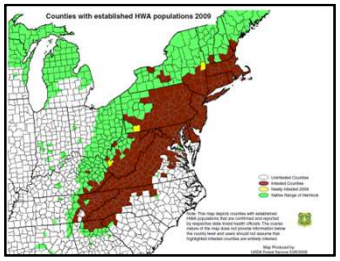


Eastern Hemlock
Pinaceae *Tsuga canadensis*

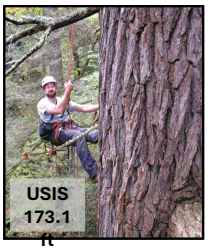
HEMLOCK WOOLY ADELGID

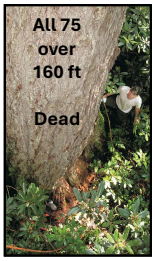
- Found in 1951 in VA, in 16 states by 2005
- Parthenogenetic: All are female
- "Wool" ovisac protects adelgid & eggs
- Two generations / year
- Feed on starches in twig

Eastern Hemlock
Pinaceae *Tsuga canadensis*

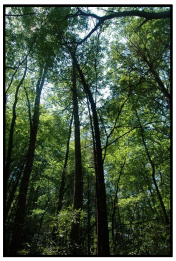


Eastern Hemlock
Pinaceae *Tsuga canadensis*

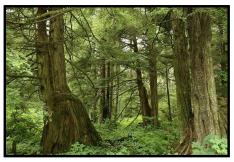




Eastern Hemlock
Pinaceae *Tsuga canadensis*



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 ft^2 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