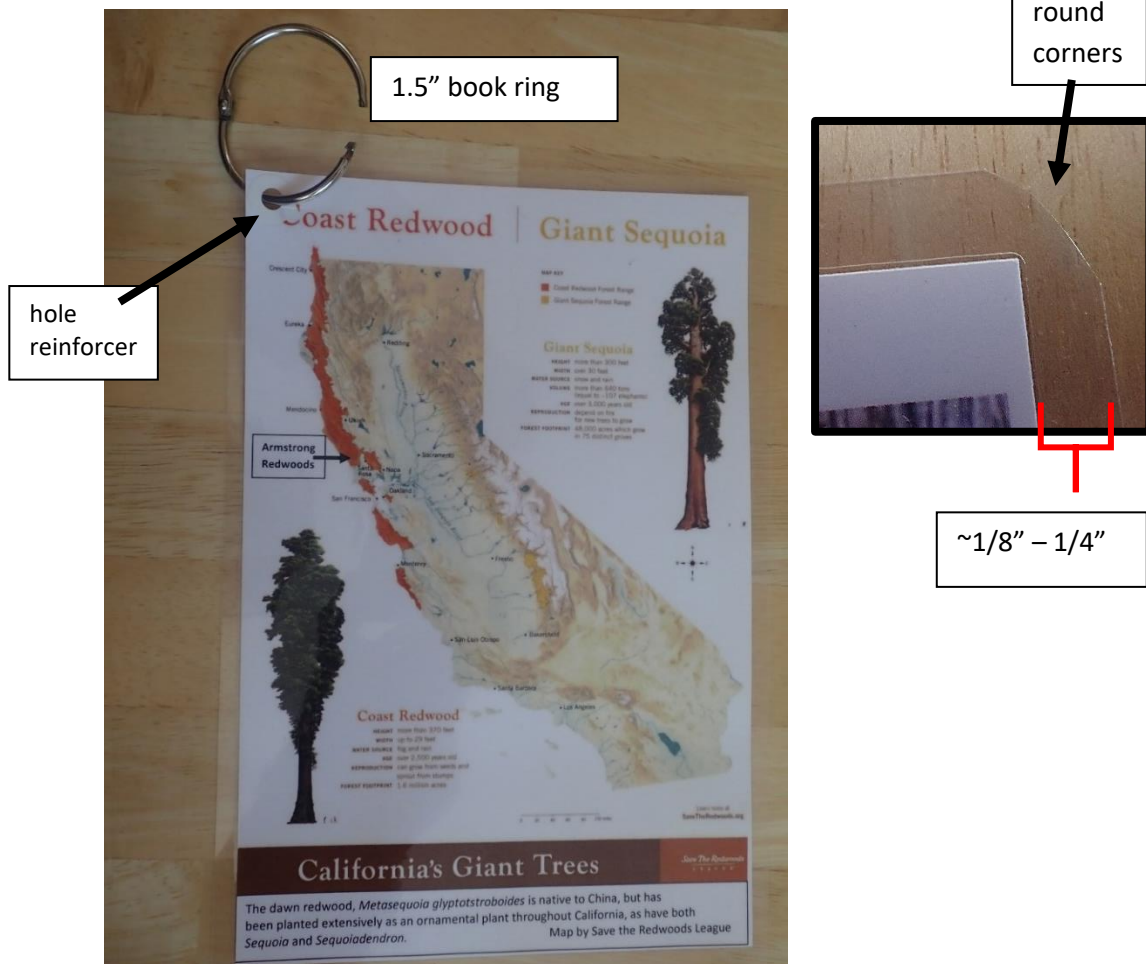


Carry Cards - A Tool for Docents

“Carry Cards” are 6”x9” images that show things such as maps and photographs of things that aren’t visible at Armstrong Woods or Pomo Canyon but that may be of interest to visitors. They are intended to be glued back-to-back, laminated, “bound” with book rings, and carried by docents as they conduct their tours or lessons.

Laminating and Binding Cards:

1. Print the cards; cut to size (6”x9”).
2. Glue the information to the back of the photo.
3. Punch a hole in the upper left corner. Leave at least 1/4” of paper around the hole.
4. Add a hole reinforcer. (Clear reinforcers look better but are harder to attach than white.)
5. Laminate.
6. Cut so that there is a 1/8” – 1/4” margin of laminating material all around the paper.
7. Round the corners.
8. Punch again and use a book ring to keep them together in order.



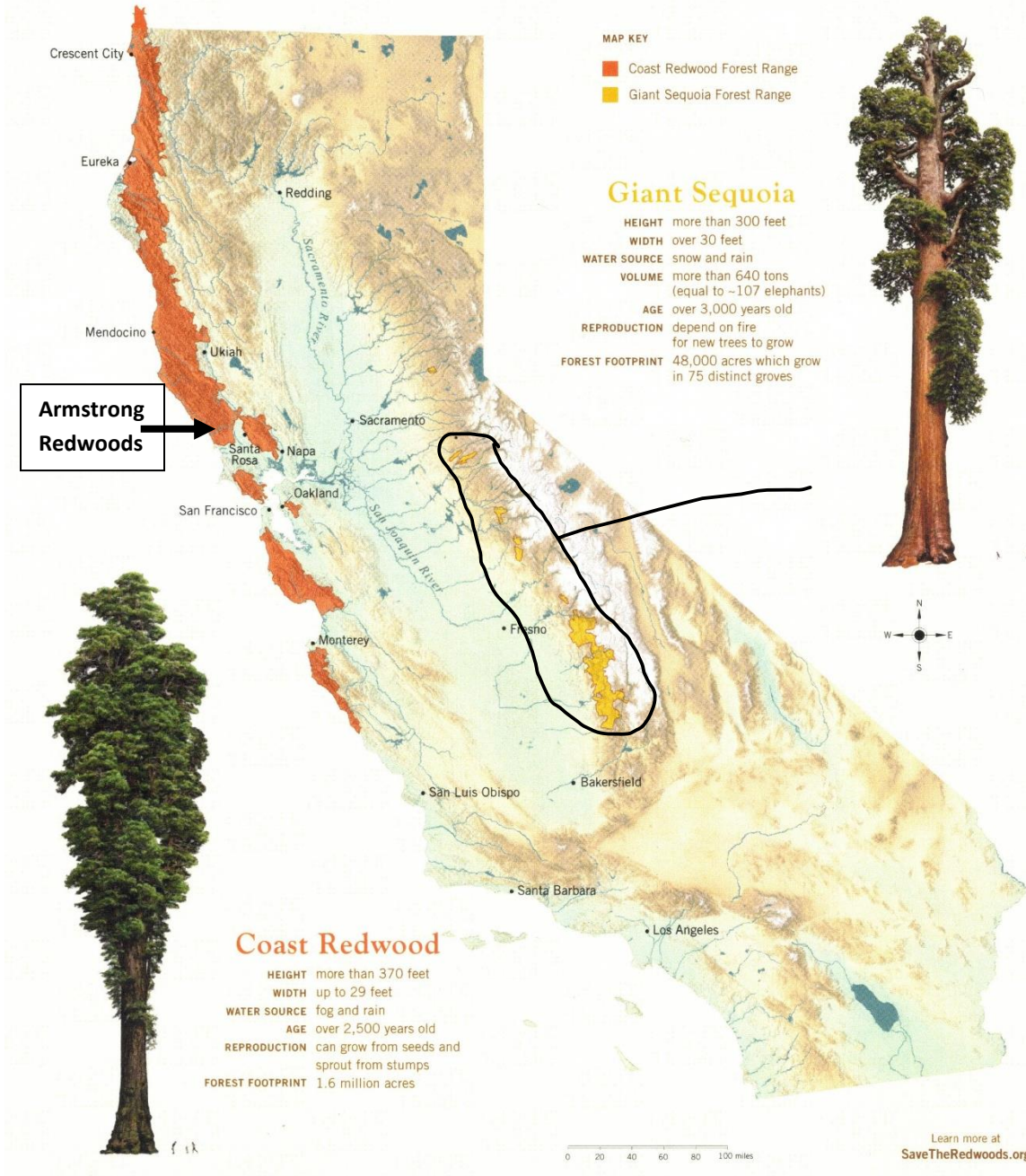
**Carry Cards:
two-sided**

- 1/2: Coast Redwood and Giant Sequoia Map / Fossil Redwoods Map
- 3/4: Redwood Leaf and Cone Anatomy / Trunk Anatomy
- 5/6: Bark and Resin / Douglas-fir Cone and Leaves
- 7/8: General Sherman Tree / Giant Sequoia Cone and Leaves
- 9/10: Dawn Redwood / Dawn Redwood Cone and Leaves
- 11/12: Fog Drip / Natural Pruning
- 13/14: Springboard Notches at Armstrong Woods / 32' Whipsaw
- 15/16: Springboards and Removing Bark for Exhibition? / Flaring
- 17/18: Springboard Use / Modern Springboard Use and Felling
- 19/20: Springboard at Sturgeon's Mill / Large Tree Cut in Guerneville
- 21/22: Tree Cut at Willow Creek / Logging for Duncans' Mills
- 23/24: Logged Hillside near Guerneville / Parson Jones and Statistics
- 25/26: Broken Top Tree / Col. Armstrong
- 27/28: Logging Destruction in 1930's-1940's / Native American Uses
- 29/30: Burl Poaching / Woodpeckers
- 31/32: Insects that Feed On Redwood / One-Log Truck Load
- 33/34: Modern Truck Load / PALCO Mill
- 35/36: Erosion Control Efforts in Armstrong Woods / Guerneville Floods
- 37/38: Dance Performance in Redwood Theater / Korbel Winery (near river)
- 39/40: Walbridge Fire: map and Firefighters
- 41/42: Bullfrog Pond campground damage and new growth after fire

CC-1

Coast Redwood

Giant Sequoia

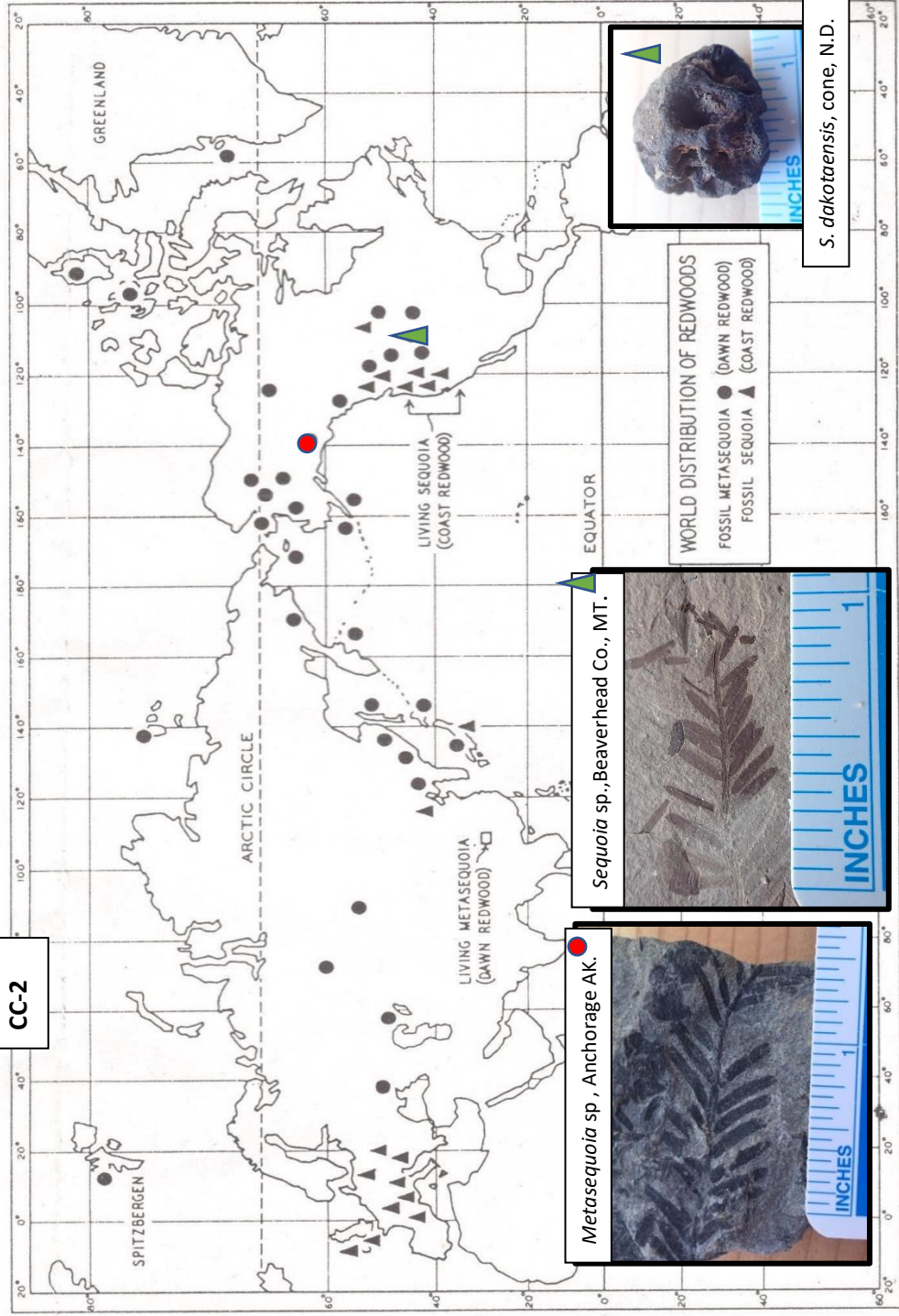


California's Giant Trees

Save The Redwoods LEAGUE

The dawn redwood, *Metasequoia glyptotstroboides* is native to China, but has been planted extensively as an ornamental plant throughout California, as have both *Sequoia* and *Sequoiadendron*. Map by Save the Redwoods League

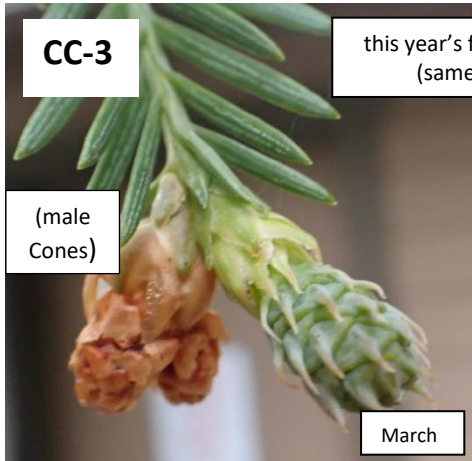
Map copyright by Save-the-Redwoods League.



About 60-50 million years ago, both *Sequoia* and *Metasequoia* were widely distributed in the northern latitudes. Since then, climate change has reduced their range. Fossils are common in the northwestern U.S. images by M. Roa



Last year's female cone



CC-3

(male Cones)

this year's female cone (same cone)

March



June



Top of coast redwood

All of giant Sequoia

"Scaly" leaves (needles)



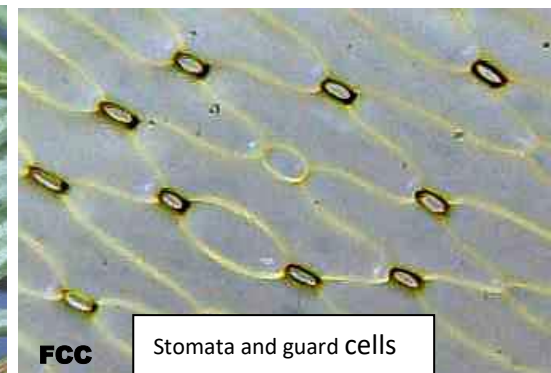
Last year's male cones in December



This year's male Cones in December



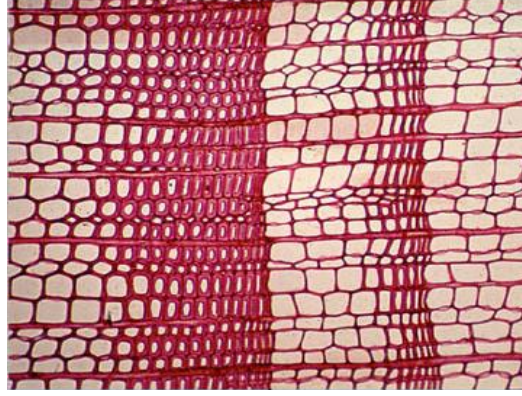
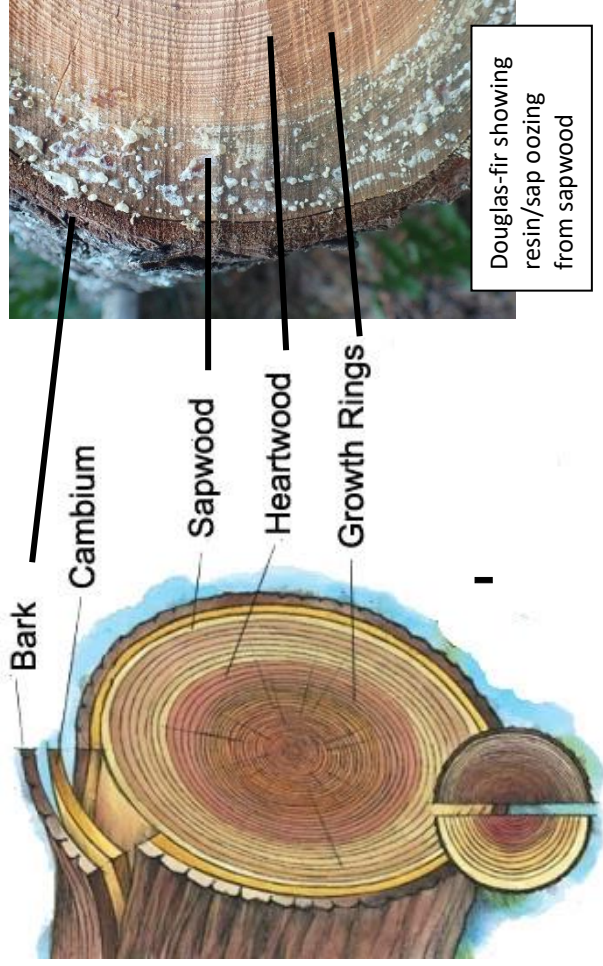
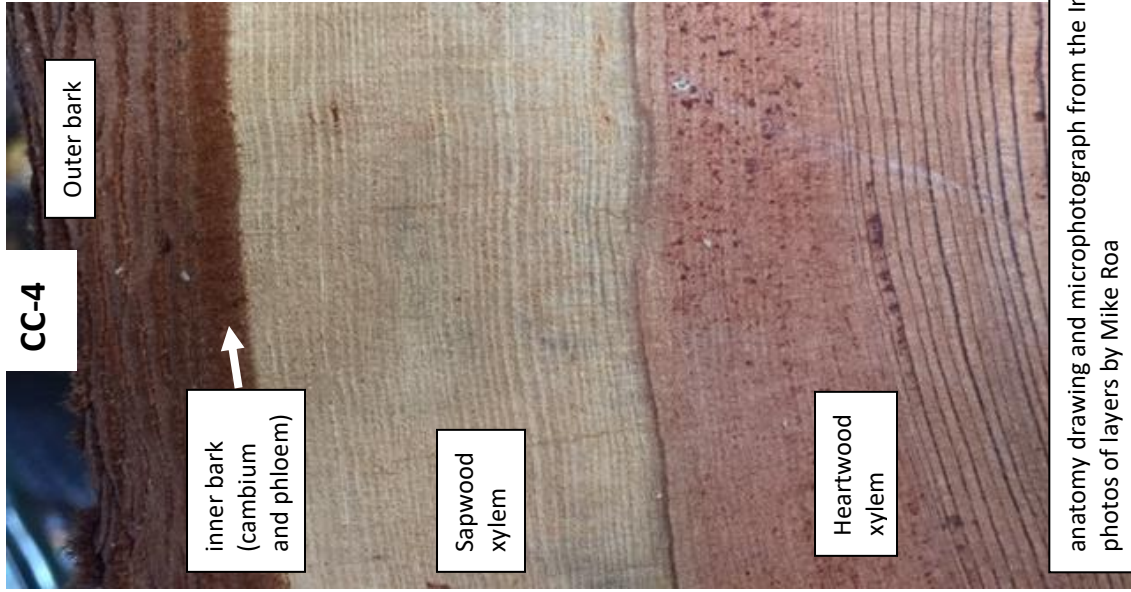
"stomatal bloom"



FCC

Stomata and guard cells

stomata image (lower right) from Flickr Community Commons. All others by Mike Roa



"Late" wood: Fall, winter (less sunlight)

- ✓ small cells
- ✓ thick cell walls

so darker color

"Early" (or spring) wood: spring, summer

- ✓ large cells
- ✓ thin cell walls

so light color



18" furrow, so bark at least 20" thick!

CC-5



Resin/pitch from phloem:
cambium interface.
Note edge of sapwood.

sapwood

heartwood



More common 10" thick bark and 3" sapwood

All images by Mike Roa

CC-6



Douglas-fir
(*Pseudotsuga mensiesii*)
leaves, cone, seeds life size



Douglas-fir bark



Coast Redwood bark



Pollinate cones

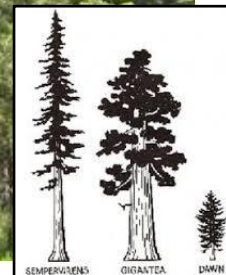
All images by Mike Roa

CC-7



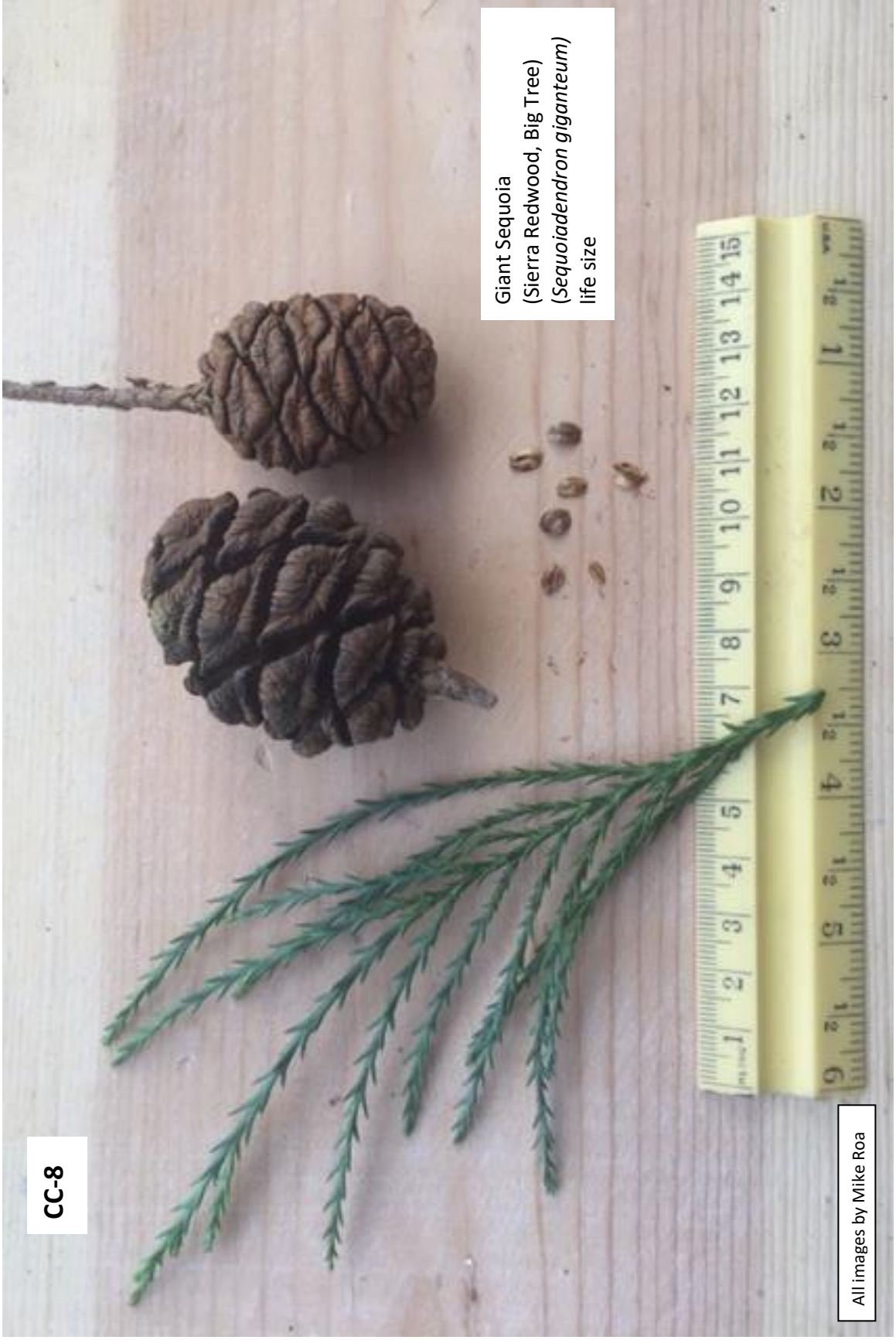
Photo from FLIKR Community Commons drawings from Save the Redwoods League

FCC



The General Sherman Tree, in Sequoia National Park, is the most massive living thing on Earth. It is about 2,200 years old, and contains about 54,000 cubic feet of wood. It adds about 50 cubic feet of wood per year even though it grows about a millimeter per year in radius. That's a LOT of sequestered carbon! Note the person in the red shirt near the base.

CC-8



Giant Sequoia
(Sierra Redwood, Big Tree)
(*Sequoiadendron giganteum*)
life size

All images by Mike Roa

CC-9



FCC



FCC



FCC



FCC

The Dawn Redwood (*Metasequoia glyptostroboides*) is deciduous...It loses its leaves in winter.

photos from FLIKR
Community Commons
tree drawings from Save the Redwoods League

CC-10



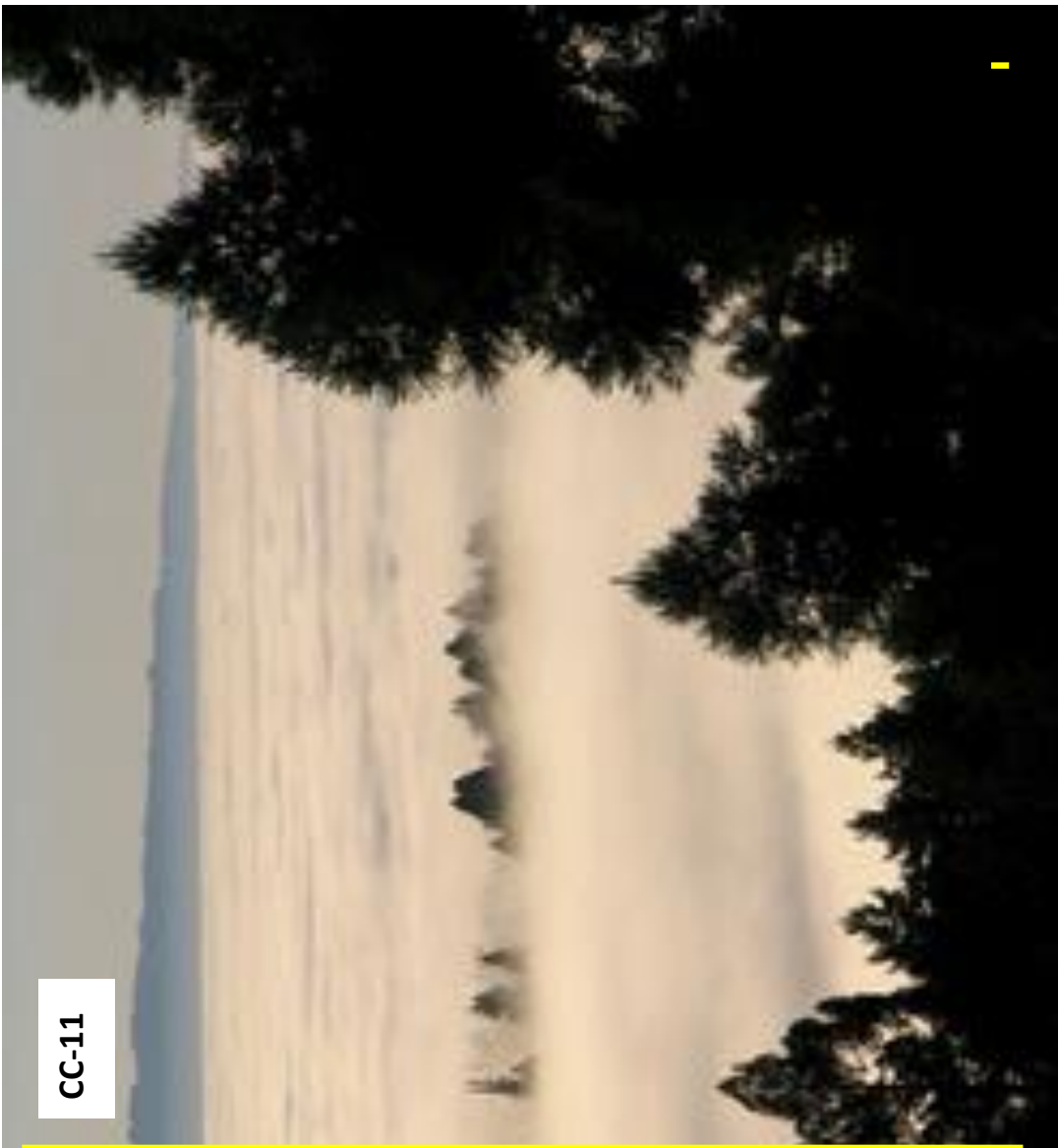
Dawn Redwood
(*Metasequoia glyptostroboides*)
life size

All images by Mike Roa

MR



CC-11



drops on needles by Mike Roa. fog image from the Internet

CC-12

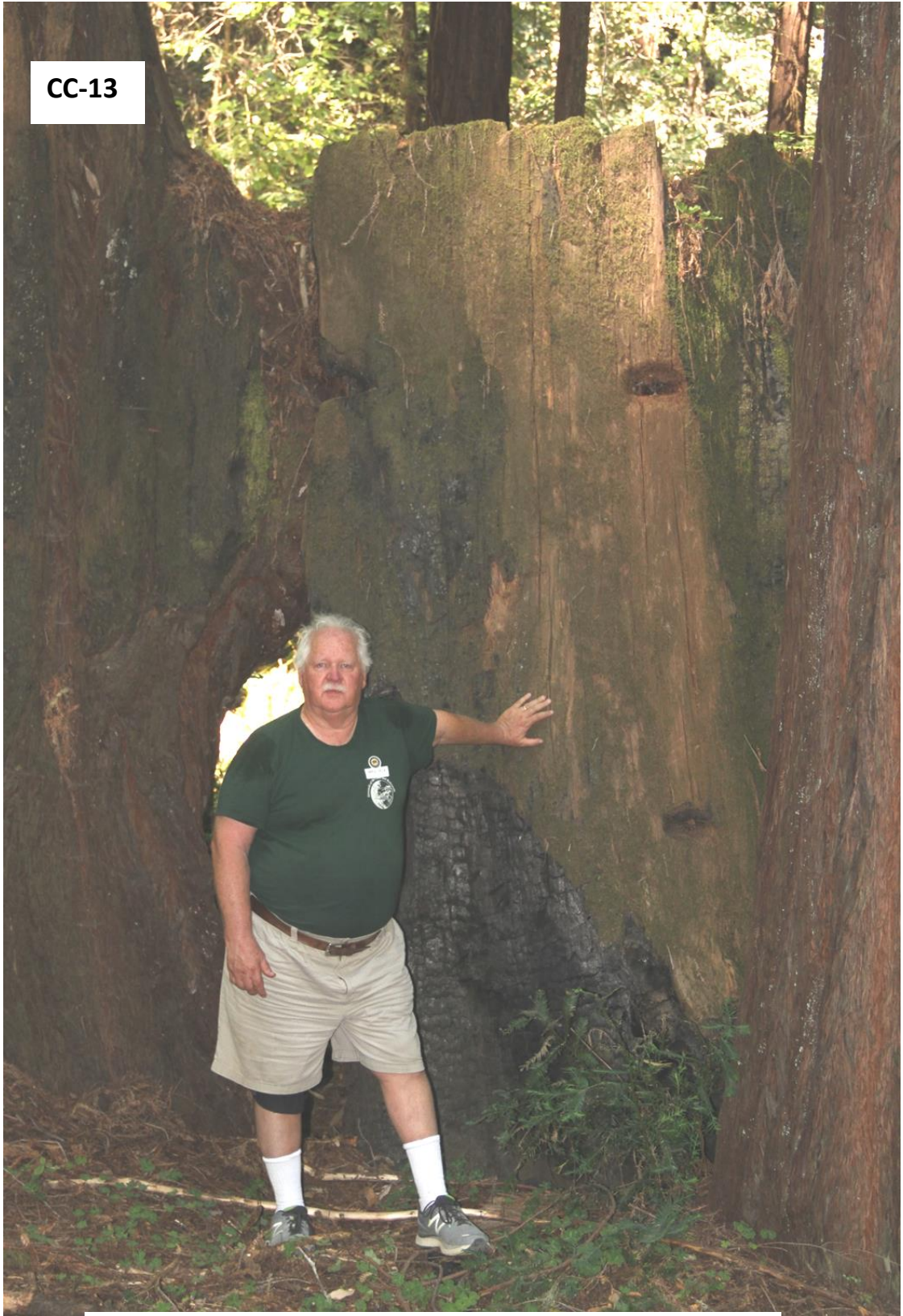
Image by Mike Roa



The tallest tree east of the Mississippi is a white pine that is less than 190' tall.

FOUNDERS TREE	
HEIGHT	346.1 FT
DIAMETER	12.7 FT
CIRCUMFERENCE	40.0 FT
HEIGHT TO LOWER LIMB	190.4 FT

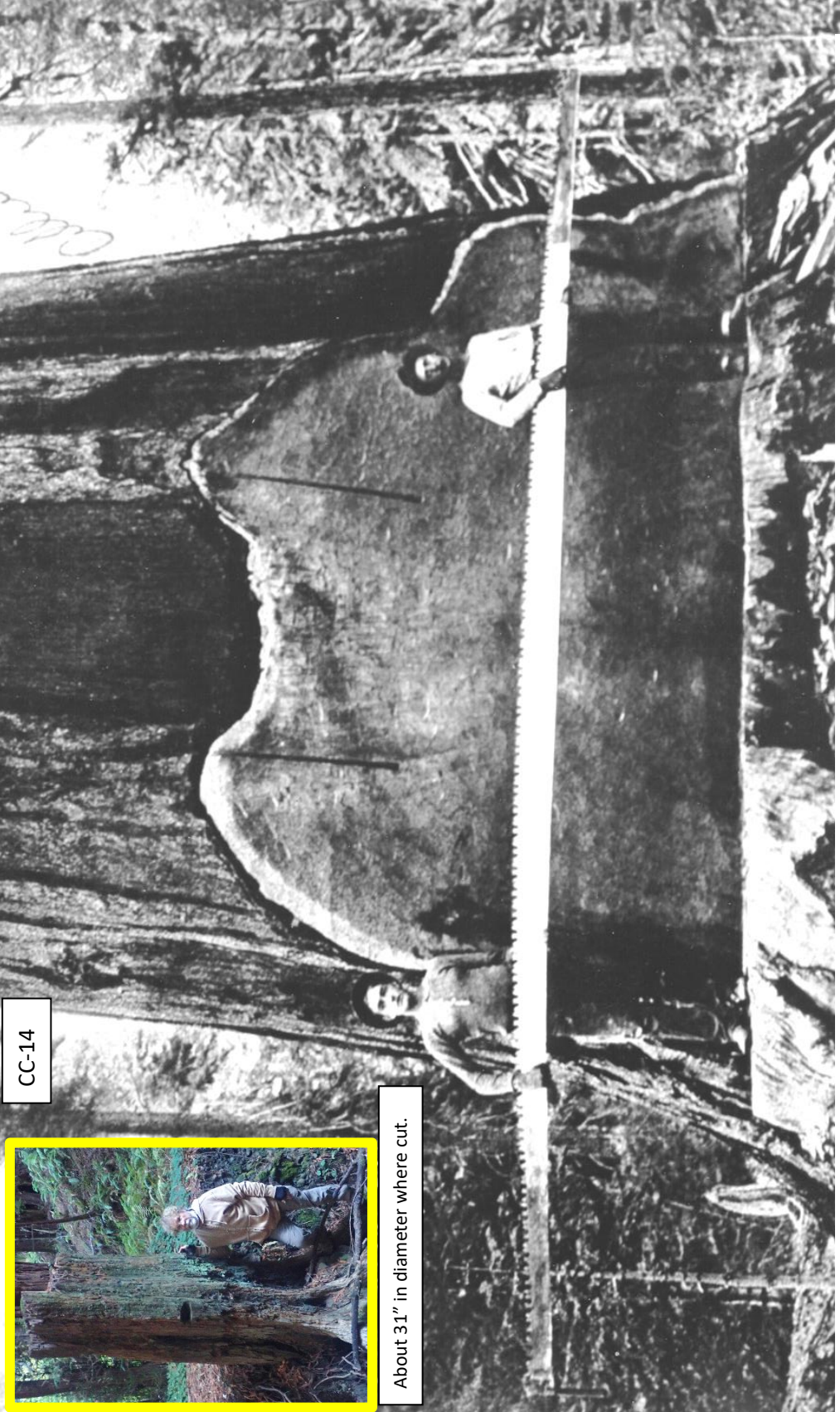
CC-13



A stump in Armstrong Woods, showing notches from springboards.
Cut about 12' above ground! image by Mike Roa



About 31" in diameter where cut.



CC-14

32' Whipsaw. Note the amount of wood wasted when they made the cut. (courtesy of Pacific Lumber Co., from Redwood Ed) insert by Mike Roa

CC-15

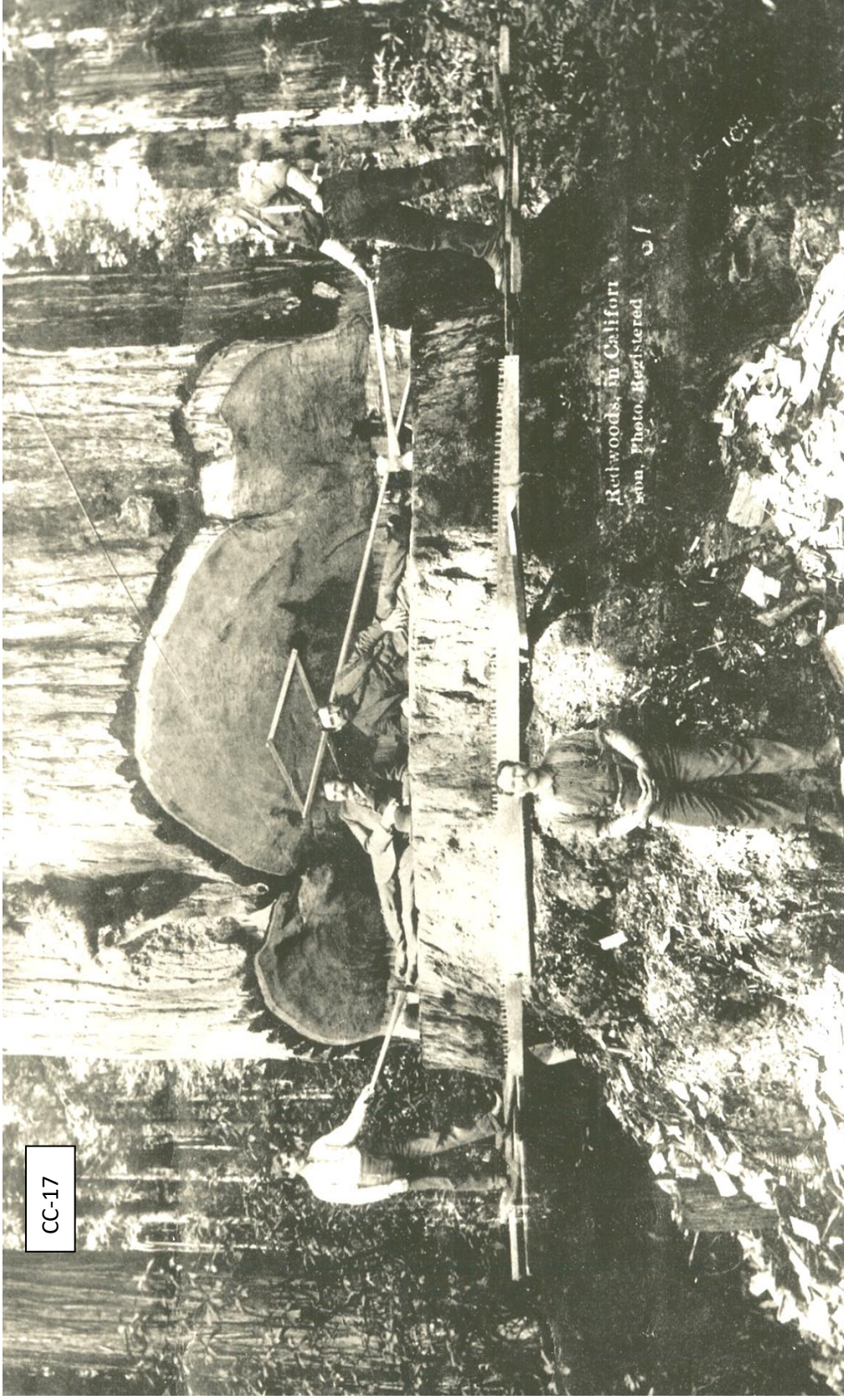


Springboards were used to get above the base of the tree, which might be:

- ✓ flared out (“butt swell”) which would require a lot of sawing for not much lumber
- ✓ compressed so that the grain was wavy (ribbon wood), which isn’t good for lumber
- ✓ compressed so much that it would sink in a river or mill pond

In this case, they may be removing slabs of bark to reconstruct for an exhibit somewhere.

(Photo courtesy Humboldt State University, from *Redwood Ed.*)



CC-17

Note that the spring boards are inserted 5-6' above the widely flared base of the tree. Huge pile of chips...Over 30% of the wood was sometimes left in the woods because of defects, shattering, or as branches and small trees Note the long-handled axes needed for large trees, and the whipsaw. Also gunner stick. If the men are about 6' tall, what is the diameter of the tree? (16-20' @ base of the cut)



The modern chain saw enables faster cutting with less waste.

(photo from *Redwood Ed*,
courtesy Mendocino Redwood
Company)



CC 18



Modern logging techniques are much less wasteful than in the 1800s, when over 30% of the wood in felled trees might be left in the forest as unusable branches, wood that was less than prime, and shattered trunks. Compare the amount of wood removed in the undercut in the middle picture to the wood removed in the old-time logging photos. Note the use of a hydraulic system to control the tree's fall, and the continued use of springboards. (photos from *High Climbers and Tree Fallers*, by Gerald Beranek. Used with permission of the author.)



CC-19

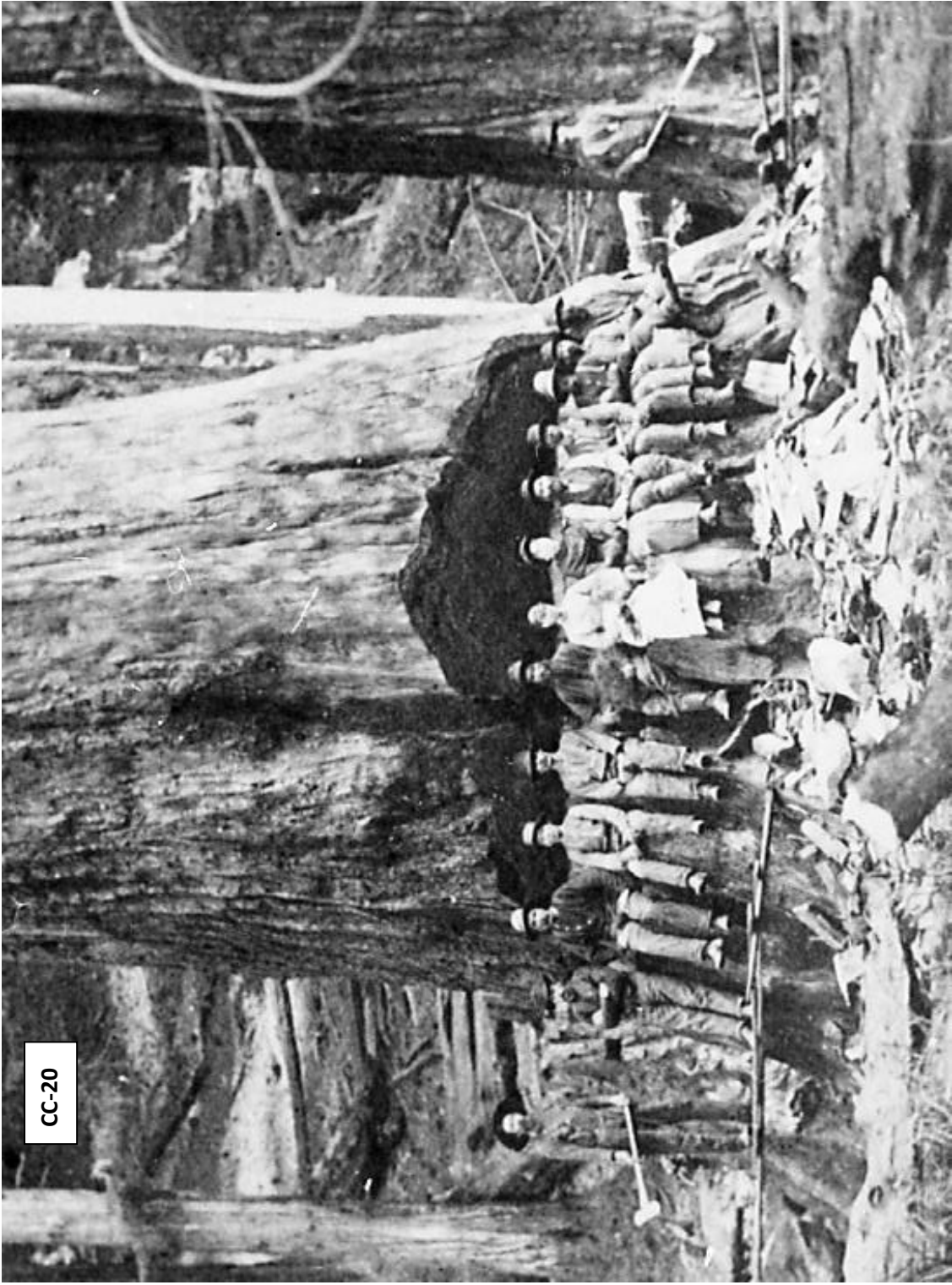


The end of a spring board. The lip on the metal tip digs into the wood above when pressure is put on the springboard.

Bob Sturgeon demonstrating the use of gunning stick to "aim" a tree. Sturgeon's Mill, in Sebastopol, is a restored steam-powered sawmill. They fire it up and give tours a few times a year, and have tours for classes.

All images by Mike Roa

CC-20



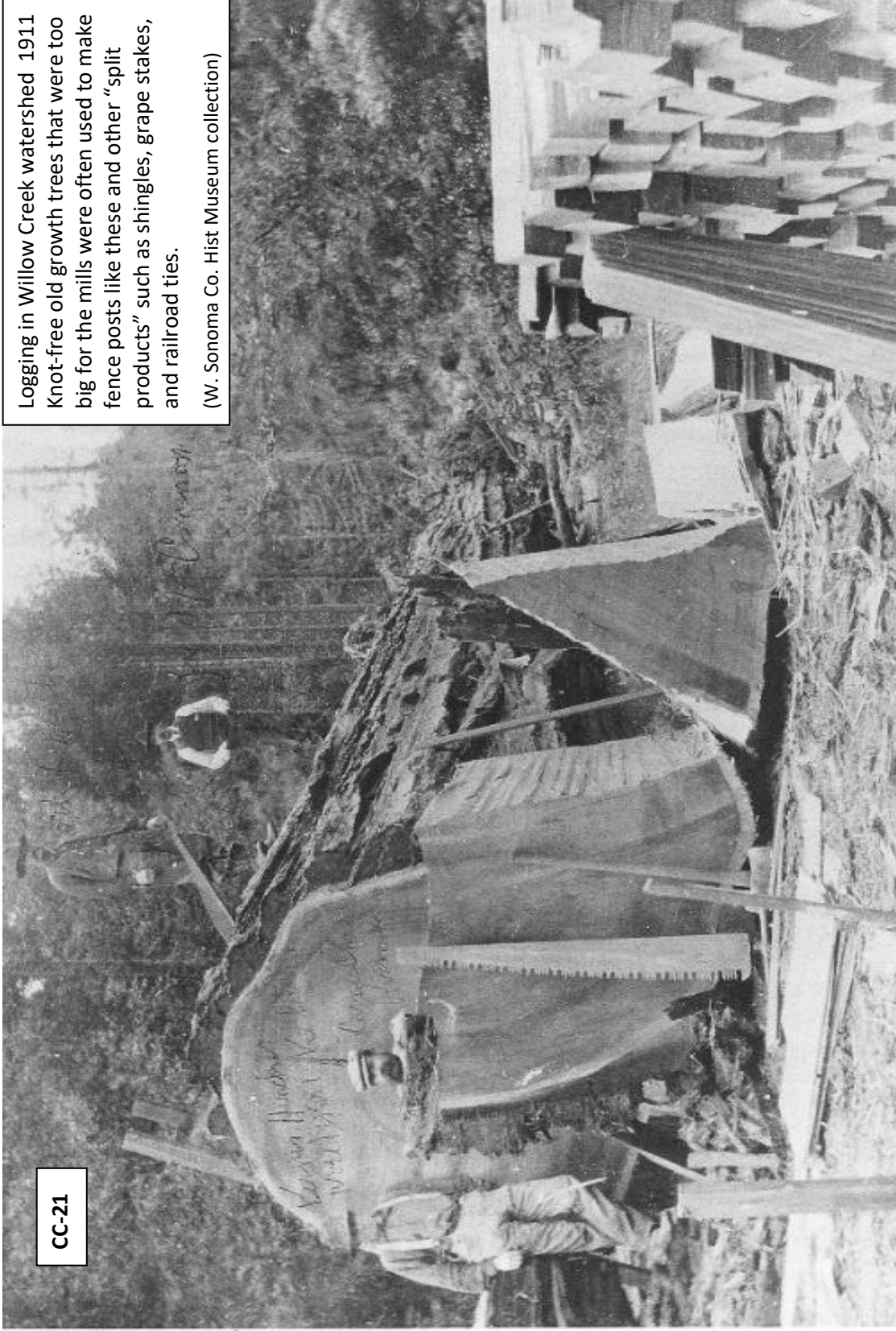
Tree cut in
Guerneville,
1882.

If shoulder
width was
18", the
tree would
have had a
diameter of
about 18'!

Note spring
boards and
waste wood
at the base.

source:
Sonoma Co.
Library
collection.

CC-21



Logging in Willow Creek watershed 1911
Knot-free old growth trees that were too
big for the mills were often used to make
fence posts like these and other "split
products" such as shingles, grape stakes,
and railroad ties.
(W. Sonoma Co. Hist Museum collection)



CC-22

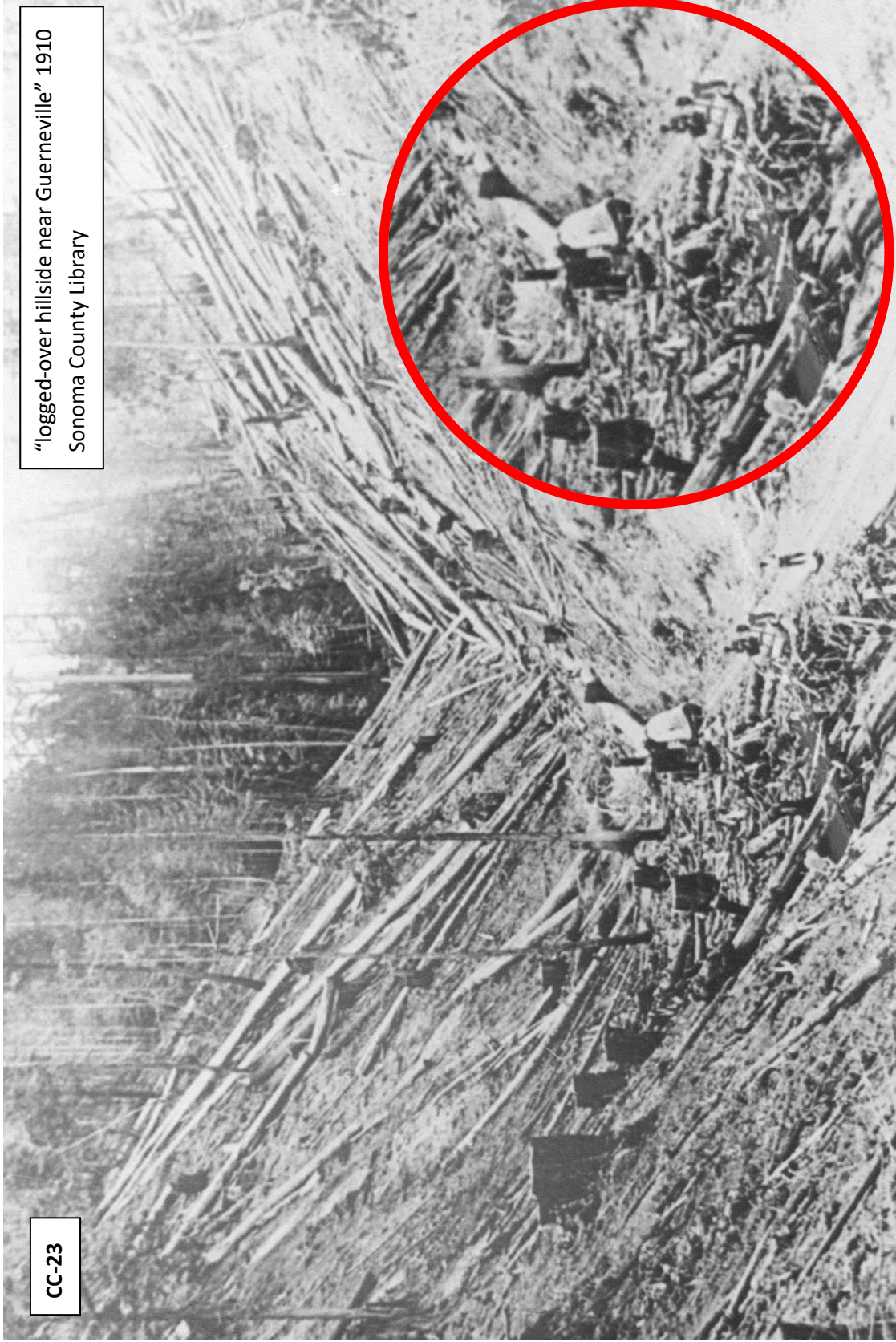
Logging for Duncans Mills Dolbeer Donkey Above 1908 below: 1899
Note devastation not only of hillsides, but also of creek bed.



source: Sonoma County Library

CC-23

"logged-over hillside near Guerneville" 1910
Sonoma County Library



Old Growth (Parson Jones Tree)

14' x 310' = approx 25,000 board feet

CC-24

It would be high quality, much clear. In 2019 clear heart redwood sold for about \$4.40 per board foot. (\$110,000 for the 25,000 board feet.) In 2021 it was up to over \$11 per board foot! 25,000 board feet @ \$11 = \$275,000!

A house takes about 6.5 board feet per square foot of house.
I was raised in an 1100 square foot house = 7150 board feet.
Parson Jones would provide enough for 3.5 of those houses.

Second Growth:

3' x 180' tree would have about 1500 board feet of lumber
a mill might pay \$1800 for it delivered
might cost \$400 to log and deliver, so \$1400 profit to seller

	for	<u>wholesale</u>	<u>retail</u>
construction common		\$1.50?	\$1.80 per board foot
construction heart		\$2.50	\$2.75 per board foot

if above tree 60% con common, 40% con heart

900 bd ft con common	wholesale: \$1,350	retail for \$1,620
600 bd ft con heart	wholesale <u>\$1,500</u>	retail: <u>\$1,650</u>
	\$2,850	\$3,270

Measured 10/ 2019

Both trees have many bumps/burls and irregularities, so measuring only a few inches higher or lower makes a big difference.

Parson Jones diam:

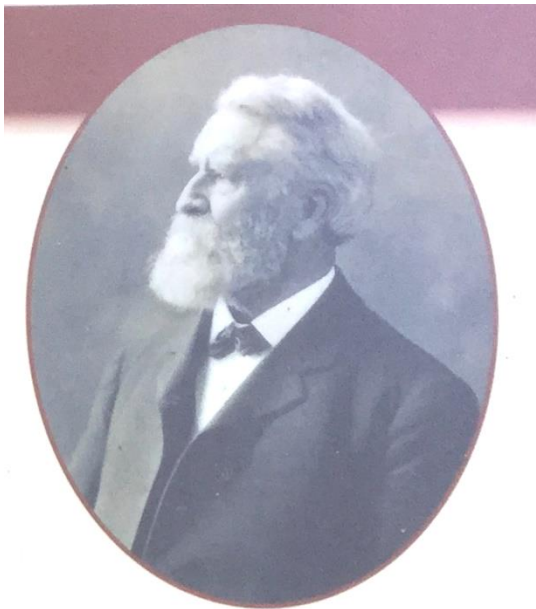
(Sign says 13.8')
At base: ~16.9'
DBH: ~ 13.3'

(I estimate the diameter of the low stump behind the bench to have been about 17.5' at the base.)

(About 100 paces up the trail there's another family circle. I estimate that the diameter at the base was about 17.5' too)

Armstrong diam:

(Sign says 14.6')
At base: ~14.6'
DBH: ~12.4'



"PARSON" JONES
Rev. William Ladd Jones
1827-1908

The Reverend William Ladd Jones, known as Parson Jones, was a missionary minister for the Congregational Church. He served in the Sierra goldfields, in the redwoods of Eureka, and in the San Francisco Bay Area. Later he became a President of Oahu College, now the Punahou School, in Honolulu, Hawaii. Eventually he was pastor at the First Congregational Church in Cloverdale. For many years he and his wife were next door neighbors and good friends of Col. James Armstrong and his two daughters. William's wife, Anne, and Lizzie Armstrong, the eldest daughter, were best friends.

William retired to Southern Ca. in 1897, and following the death of his first wife, and later his friend James Armstrong, he returned to Cloverdale. In 1901, at the age of 73, he married 50-year-old Lizzie Armstrong. Their made their home in Guerneville, adjacent the park, and named this redwood tree the Parson Jones Tree in his honor. William died from a fall in his home in 1908.

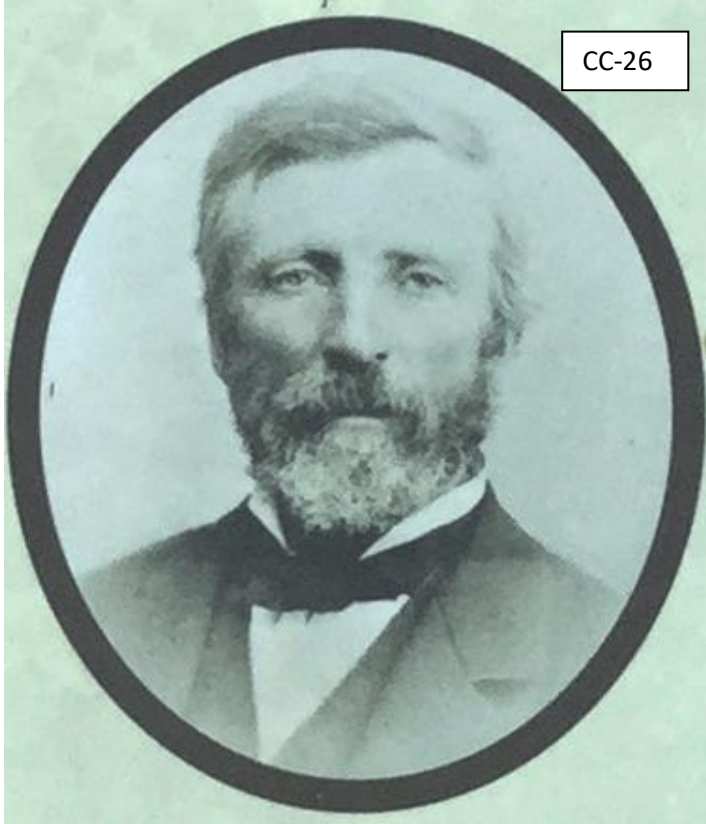


CC-25

All images by Mike Roa



This tree's top broke off, probably in a wind storm. At least two new "trunks" have regrown since then.



CC-26

Colonel James B. Armstrong came to California from Ohio in 1874 as a land investor. Among other ventures, he logged and had a lumber mill north of Guerneville (a.k.a. Stumptown). He bought land in these forests, eventually developing a deep appreciation for the redwoods. Witnessing the alarming rate of destruction from logging, he and his family became champions and local pioneers of preservation values. He devoted the later years of his life to saving this redwood grove for future generations. After passing away in 1900, his family and friends continued those early and important preservation efforts.

The eldest child of James Armstrong, Lizzie Armstrong Jones assisted the Colonel in many of his land dealings. In 1898 she inherited Armstrong Woods from her sister, and together with her husband, Parson Jones, family friends, and fellow landowner Harrison LeBaron, she worked for years to make this redwood grove public property.

Sonoma County purchased Armstrong Woods in 1917 and the grove became part of the State Park system in 1934.





Early logging (1930's – 1940's??) Note:

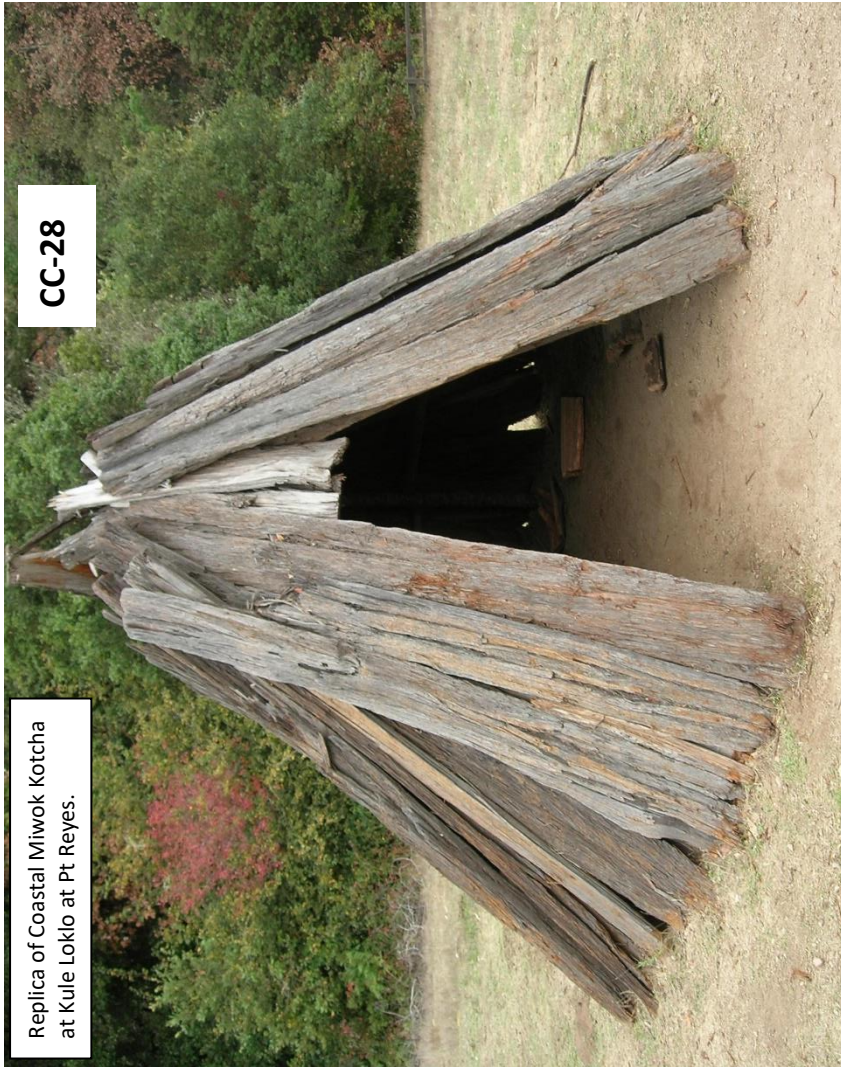
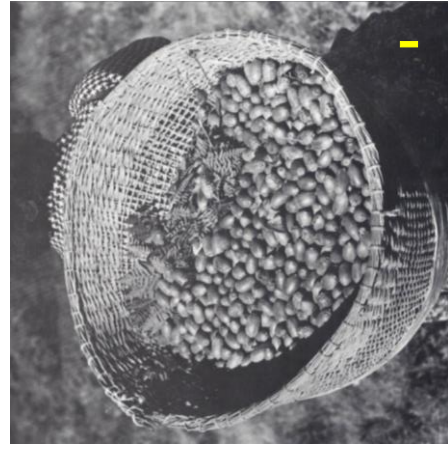
Top photo: narrow gauge railroad system, devastation not only of trees but soil

(Courtesy Humboldt State U., from *Redwood Ed*)

Bottom: size of logs (see man on 4th log); recovery has begun... see small trees re-growing

(Courtesy Pacific Lumber Co., from *Redwood Ed*)





Replica of Coastal Miwok Kotcha at Kule Loklo at Pt Reyes.

CC-28

Top right: Cradle Basket including hazelnut sprouts. By Elsie Allen.

tanoak acorns (Beautiful Tree: *she-chik kele* in Pomo)



Shattered redwood at Humboldt Redwoods St. Pk. "lumber yard!"

acorns in basket from the Internet. other images by Mike Roa

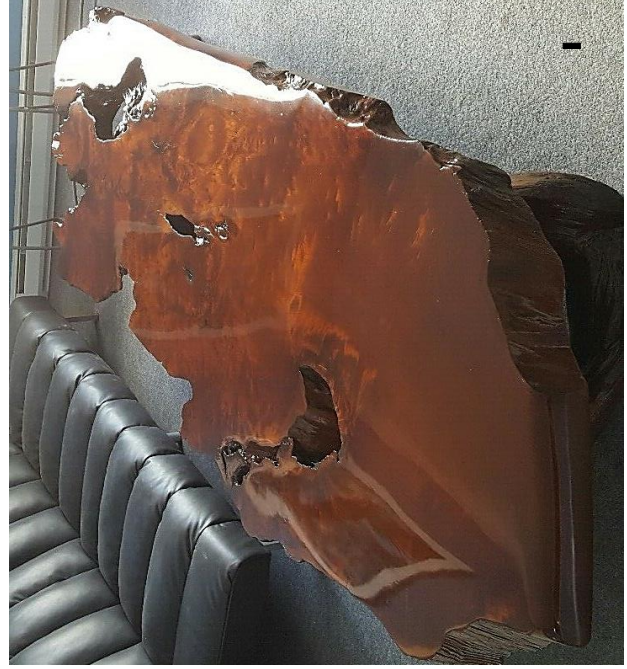


CC-29

Burl poaching in Redwood State and National Parks.
Note that they took burls from the base and up in the tree.



Redwood burl slab
for sale on the
internet in July,
2020 for \$2850 by
Redwood Burl, Inc.,
Arcata



R" 1950s" burl
coffee table for
sale on eBay for
\$13,500 in July,
2020

All images from the Internet



CC-30

FCC



FCC



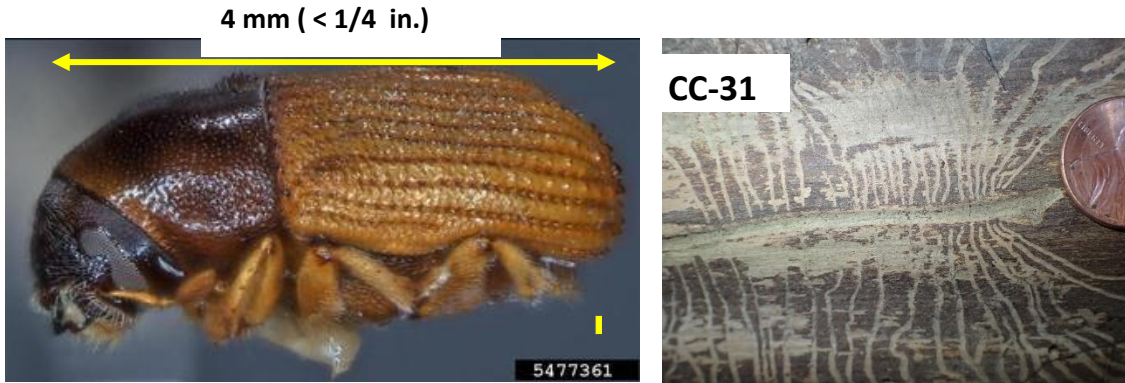
IN

Acorn woodpeckers will stash acorns in walls of buildings or even bluebird next boxes!

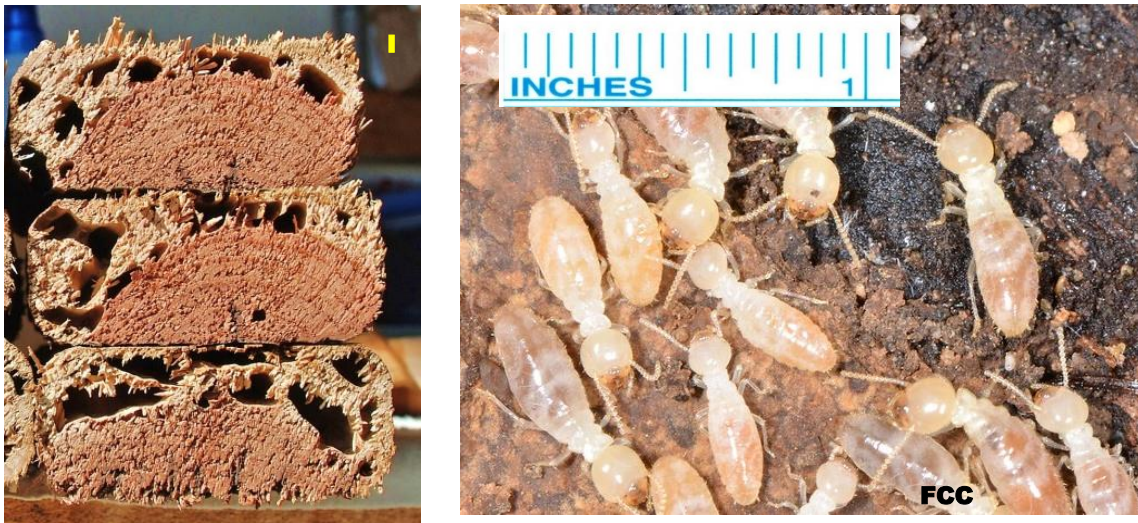


FCC

birdbox photo from the Internet. all other photos from FLIKR Community Commons



Redwood Bark Beetle *Phloeosinus sequoia*



Termites and termite damage to redwood lumber



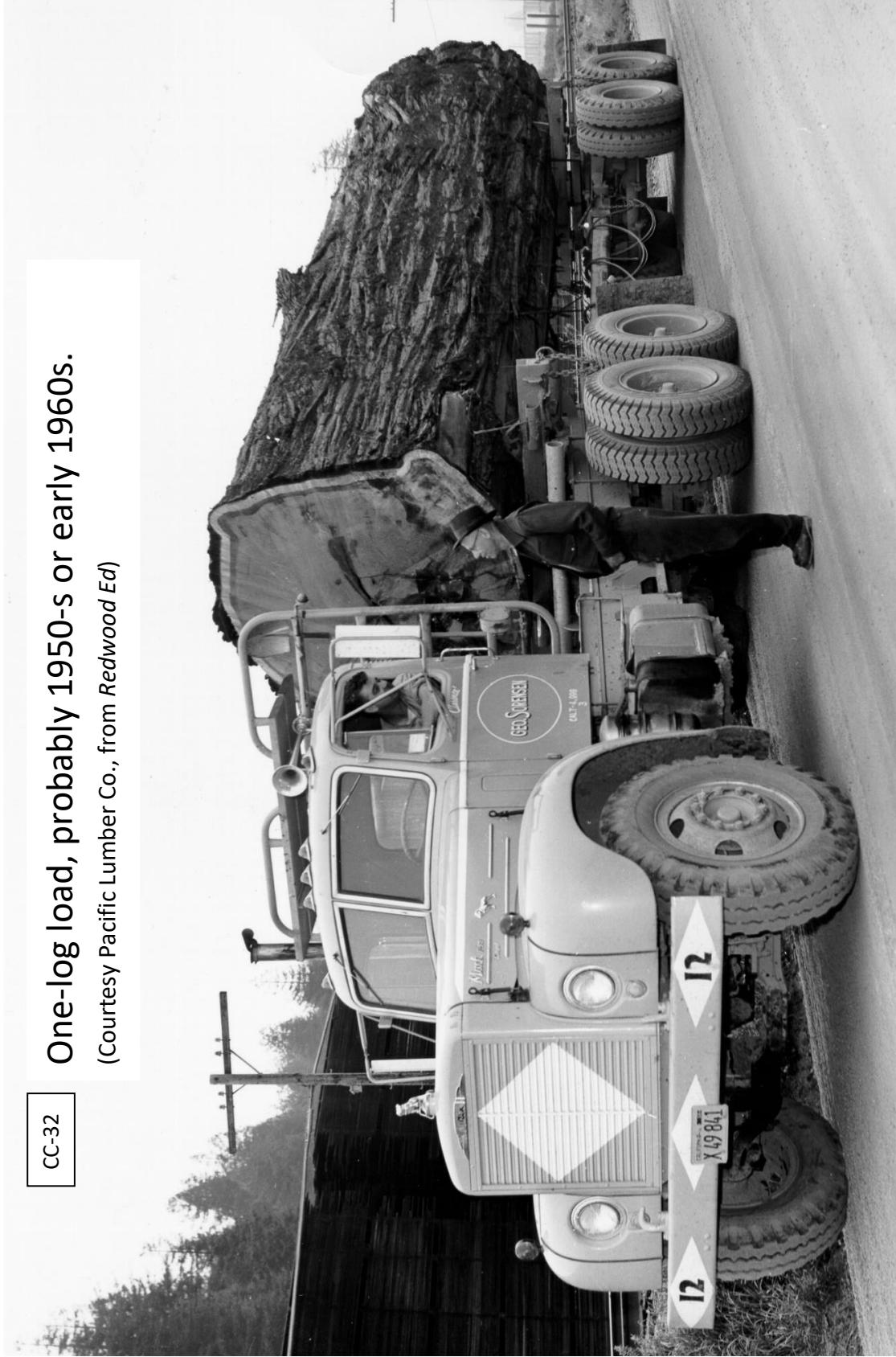
long-horned (round-headed) wood boring beetle. (Spined Wood Borer)
 The Spined Wood Borer is one of several long-horned wood boring beetles that will feed on coast redwoods.
 Don't know whether it is the beetle whose larvae made the holes in the wood pictured.

Upper and middle left from the Internet	termites from FLIKR Community Commons
upper and lower right by Mike Roa	lower left from iNaturalist by W. Mason

CC-32

One-log load, probably 1950-s or early 1960s.

(Courtesy Pacific Lumber Co., from *Redwood Ed*)





Typical load of redwood logs in 2021.

Photo taken at the Mendocino-Humboldt Redwood Company's mill at Scotia...formerly the Pacific Lumber Company photo by

CC-34



Logs at Pacific Lumber Company (PALCO) (now Humboldt Redwood Company) Average size probably 2-5' diameter
image by Mike Roa



CC-35

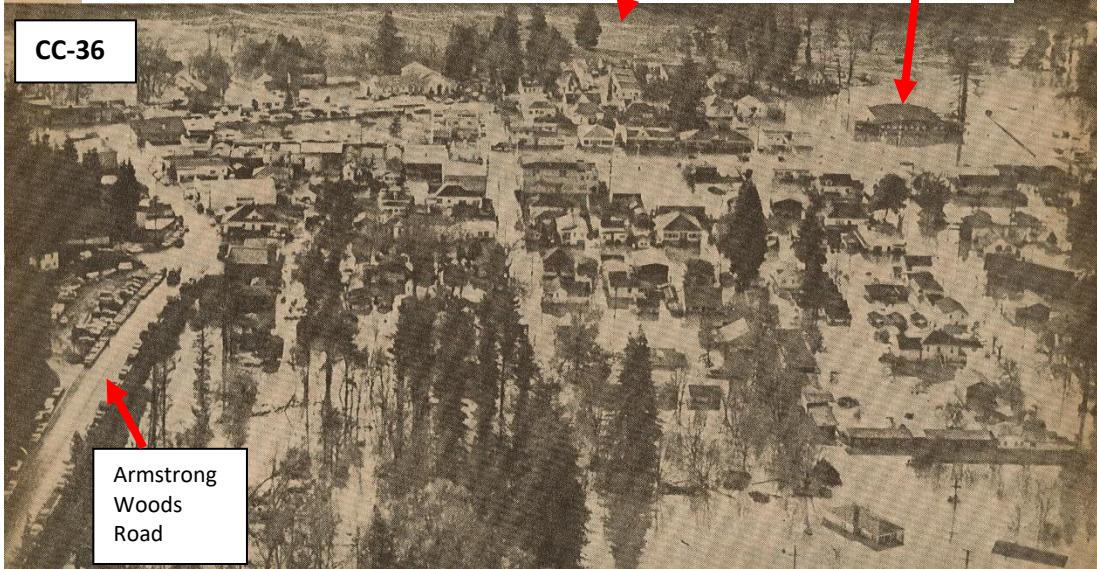
photo: by Mike Roa

Logs, bags of concrete, and concrete slabs were used to try to control the flow of Fife Creek so that it wouldn't undercut the road and trees. (after 1964 northern Ca floods) Unfortunately, such creek modification damages fish habitat.

Guerneville, December 23, 1964

Russian River - Crest: 47.5'

Safeway



According to an article in the San Jose Mercury, the Russian River flooded 38 times between 1940 and 2019. That's almost every other year!

Left: 1879
note man

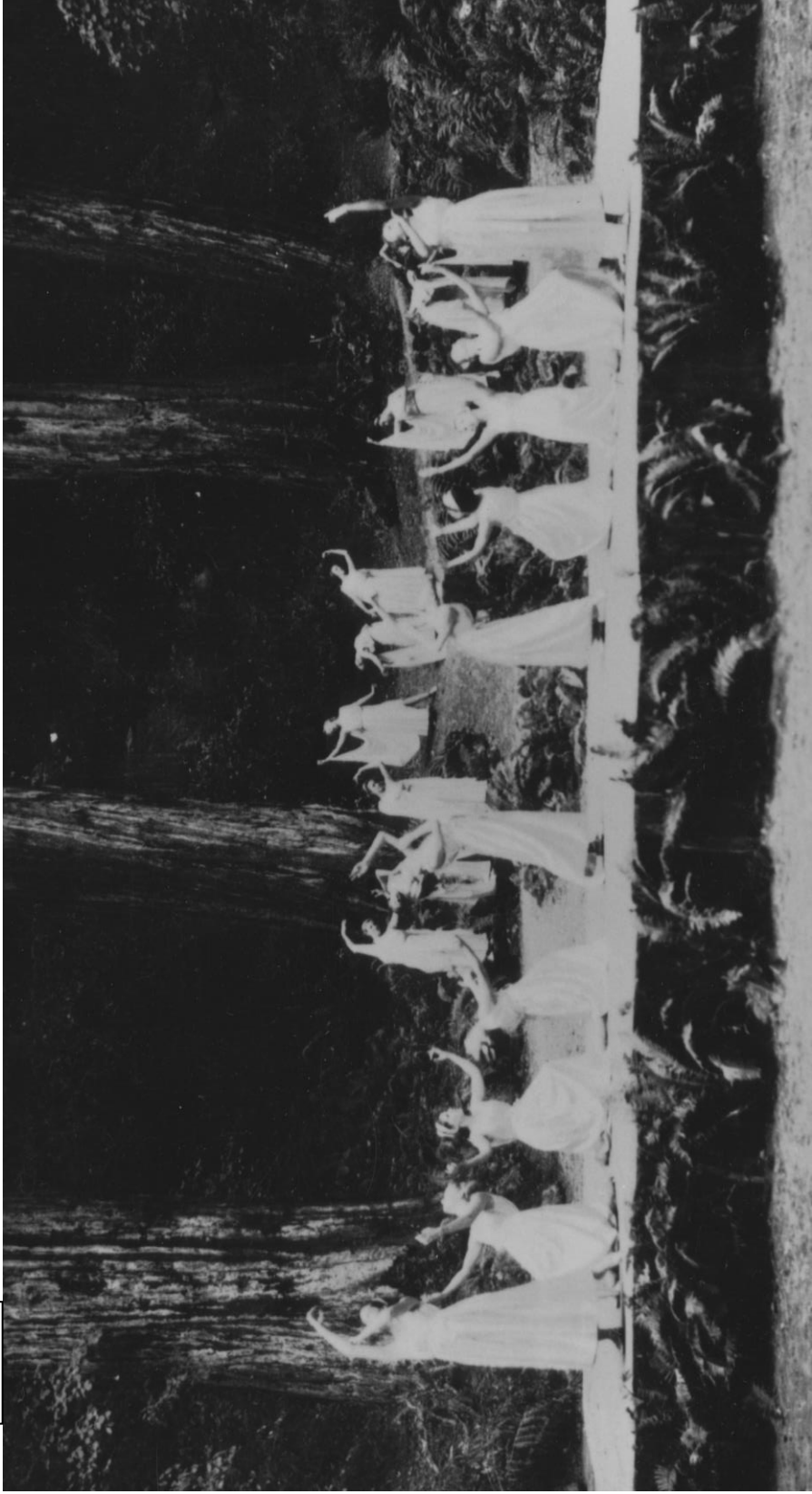


1986



2019

CC-37



Dance performance at Redwood Theater, 1935

CC-39



CC-38

Korbel Winery
and vineyards

Russian River

Fragmentation is a major threat to redwood ecosystems. Note not only fragmentation but also the proximity of the exposed soil to the Russian River. It is a source of silt when not planted and chemicals when planted.

Image from Google Maps



Between August 17 and October 20, 2020. The Walbridge Fire burned more than 55,000 Acres. More than 150 homes were destroyed. Along with hundreds of other fires, the fire was started by “dry lightning.”

Approximately 3800 acres, or 64% of Austin Creek State Recreation Area were burned, including the Bullfrog Pond Campground.

Approximately 510 acres, or 68% of Armstrong Redwoods State Natural Reserve were burned.

Streams in the burned area include salmon- and steelhead bearing tributaries. Studies to determine the ultimate effect on salmonids are ongoing.

See also Feature Card 23a.

CC-40



CC-41 Top: Bullfrog Pond Campground shortly after the Walbridge Fire



The Walbridge Fire burned off the duff, providing a rare opportunity for redwood seeds to germinate.
Photos taken spring, 2022
By Justin Lindenberg



CC-42



Tanoak sprouting from root crown, April, 2021



Bay Laurel sprouting from root crown, April, 2021



Sword fern and redwood sorrel sprouting from rhizomes, April, 2021. Often, only the fern fronds burned and they also regrow from the root crowns.



Ca. hazelnut sprouting from root crown, July, 2022. Native Americans valued the young sprouts for use in basketry.

C.C. 43: Post Fire Seedlings and Mast Year Cones and Seeds



Above: "bumper crop" of cones and seeds in Sept., 2022. (A "mast year")



Redwood seedlings at Pond Farm student camp in May, 2022, approx. 21 mo.s after the Walbridge Fire. Note that there were thousands of seedlings, but most died.

Photos by Mike Roa

**C.C. 44 Irish Shamrock *Trifolium dubium* (a.k.a. Lesser Hop Trefoil)
(*Trifolium* is the genus of clovers; the Irish Shamrock
is actually a type of clover.)**



Note the difference between the Irish Shamrock flower (upper right) and the flowers of *Oxalis* (below). Some species of *Oxalis* are sometimes called “shamrocks”.



Redwood Sorrel
Oxalis oregana



Pink Shamrock
O. debilis



False Shamrock
O. triangularis

Credits: From iNaturalist: large image: Mefisher;; upper right: Andra Maagmeester ;
bottom row center: Marcus T.; bottom right: elacroix-corigan
Bottom row: Left: Mike Roa