# BASIC Features Information for A.R. Docents rev. 6.1.23

This document includes photographs and information about many things ("features") that one encounters while walking the trails in Armstrong Redwoods and Pomo Canyon.

The Features Cards are divided into two groups. Docents should become familiar with these **BASIC** Features first. They are the most conspicuous features that visitors will notice. The **ADVANCED** Features Cards. They provide information about many other features in Armstrong Redwoods and Pomo Canyon.

The ADVANCED Features Cards for Armstrong Redwoods and the Pomo Canyon area are another document.

Some features, such as the Parson Jones Tree and Date Round/History Log are found only in Armstrong Redwoods, but Pomo Canyon has many similar features, such as nurse logs, trees sprouting from root crowns, and family circles.

**A caution:** It is good for a docent to have lots of knowledge. We must, however, not yield to the temptation to be just a lecturer…a "sage on the stage." Our purpose is not just to inform. More importantly, our purpose is to help people come to love and understand the habitat and to care for it so that they want to become stewards… caretakers. Your job is not to be a font of knowledge. It is to be someone who helps people develop an appreciation and understanding…a "guide on the side".

And…rather than just telling facts and names, we should be encouraging people to think and wonder. One way to do that is to ask them questions and encourage them to try to figure out answers. Look for ways to help people make a **connection** with the features.

The images and information are laid out in such a way that you can print a page and then cut it into two 5" x 7" sections, glue them back-to-back, and then laminate them so that you can easily carry them with you as you learn about the features.

This is a "living document." It will be updated and revised periodically.

**Credits:**
This document was prepared by Mike Roa, Stewards docent, with help from:

- Leslie Carrow, Rachel Hallaway, and Scott Lawyer, Stewards staff
- Hollis Bewley, Greg Corby, Karen Gebbia, Beth Lamb, and Nina Lowrey, Stewards docents
- Sources of images are indicated on the "cards."

# Armstrong Redwoods and Pomo Canyon Features Cards

These pages show many of the features found along the trails at Armstrong Redwoods. They are intended for docent education. There are many more features illustrated than one would share with any one visitor group, but it is useful for docents to have the information in their mental tool box so that they can share it as appropriate, depending on the ages and interests of visitors.

The grade levels for which we consider the information most appropriate are given to the right of the title (4+, 7+, 9+, ALL, docents only).

Each page has one or more photographs on the top half and some information and possibly more photographs on the lower half. This is so that you can make them into 5” x 7” laminated cards that you can carry with you if you want to.

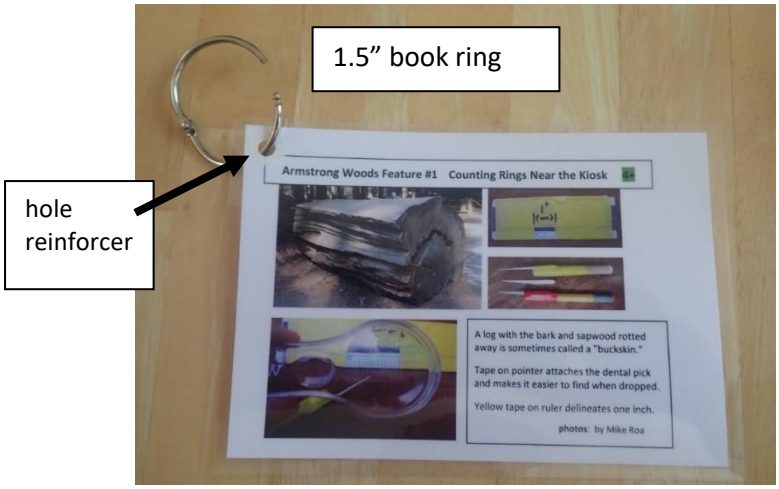
Many of the cards include questions that docents might ask visitors to stimulate their thinking. We have found that asking questions is a much better technique than just telling people facts. Questions engage the visitors more, and enhance learning by requiring them to think, rather than just listening. The questions are in ***bold italics***.

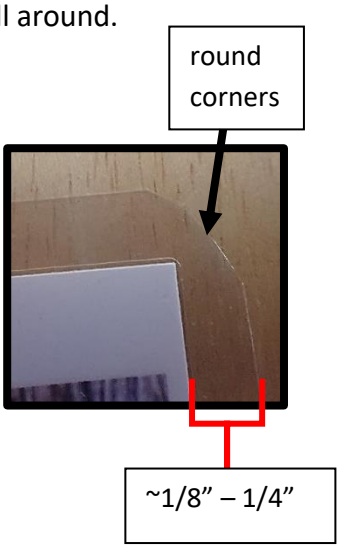
There are separate “sets” for Armstrong Woods and Pomo Canyon.

You can print and laminate whatever “cards” you want to carry with you, if any.

**Laminating and Binding Cards:**

1. Print the cards; cut to size (5”x7”).
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.
7. Round the corners.
8. Punch again and use a book ring to keep them together in order.



# BASIC Features Cards:

**Docents should become familiar with these BASIC features first.**

When you are familiar with these features, you might want to check out the ADVANCED Features Cards, which are a separate document.

Key: The AR at the start of the number indicates that it is a feature in Armstrong Redwoods. PC indicates that it is a feature in the Pomo Canyon area. BF indicates that it is a "basic" feature.

## Basic Features for Armstrong Redwoods

AR BF-1. Living with Fire
AR BF-2. Basal Sprouts from Redwood
AR BF-3. Basal Sprouts from Bay
AR BF-4a. Recently Fallen Tree
AR BF-4b. Recently Fallen Tree along the Pioneer Trail between the Burbank Circle and the Armstrong Nature Trail
AR BF-4c. Recently Fallen Tree near the Armstrong Tree
AR BF-5. Root Pull
AR BF-6. Snags
AR BF-7. Burned Base with Flaring
AR BF-8. Graffiti Log
AR BF-9. Parson Jones Tree
AR BF-10. Date Round (History Log)
AR BF-11. Family Circle at Regeneration Sign (See also Advanced Card # AR AF-5.)
AR BF-12. Goose Pen (Fire Cave)
AR BF-13. Root Mass
AR BF-14. Burbank Circle and Burls
AR BF-15. Tree with Ramp
AR BF-16a. Colonel Armstrong Tree
AR BF-16b. Armstrong Tree and Walbridge Fire
AR BF-17. Forest Theater
AR BF-18. Icicle Tree and Popeye/Monkey Face

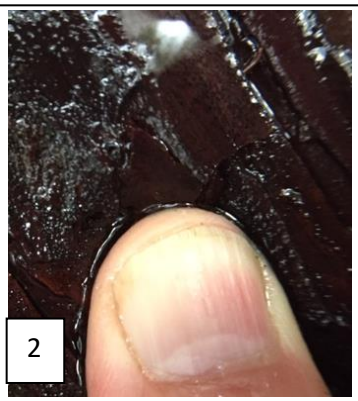
## Basic Features Cards for the Pomo Canyon area

In case you are at Pomo Canyon and want to show features to visitors, here are the basic features for that area. They are in this document after the Armstrong Redwoods Features Cards.

PC BF-1. Stinging Nettle and Poison Oak
PC BF-2. Living With Fire
PC BF-3. Basal Sprouts on Redwoods
PC BF-4. Basal Sprouts on Bay
PC BF-5. Redwood Burls
PC BF-6. Snags
PC BF-7. Hillside Stumps
PC BF-8. Nurse Logs and Nurse Stumps
PC BF-9. Fragile Area Sign
PC BF-10. Family Circles
PC BF-11. Douglas-firs
PC BF-12. Creek Rocks and Erosion

| AR BF-1 | Living With Fire | 7+ |
|---|---|---|


1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3


4


5


6

**photos:** by Mike Roa

Fire is a natural part of the ecosystem, and redwoods have several ways of surviving fires.

**BARK:** a. The bark is fibrous, not very flammable. Tannins in the bark also provide some fire resistance.
b. The bark is usually 3-8" thick, but can be over 12" thick in an old tree. **(1)**
c. Most natural fires would happen during thunder storms. With the storms comes rain. ***Have visitors press hands on redwood bark…notice that it is soft***…. During storms, or very foggy weather, the bark absorbs water like a sponge, which provides some protection against fire. **(2)**
**NOTE: Tell them to press, not to rub the bark. We don't want to rub the bark off!**

If fire is suppressed for too long, fuel accumulates and when a fire does happen, it may burn hot enough to get through the bark, resulting in a fire that can kill redwoods. The wood and brush is the **fuel load. (3)** (Sudden Oak Death thus not only threatens the oak trees but the redwoods and other trees!)

***Ask visitors why they think there is such a fuel load in Armstrong.*** Removing the fuel requires workers and equipment, which is expensive. **Controlled burning is problematic** because of the proximity to Guerneville. There is less of a fuel load in the Pomo Campground because campers have used the wood. But there is lots of down wood on the hillsides away from the campground itself.

Notice that most trees have shed lower branches. **(4)** This is called "**natural pruning"** or **"self-pruning**." ***How does that help trees survive fire?***

a. "Self-pruning" of shaded leaves conserves energy.
b. Trees depend on leaves to provide food via photosynthesis. If a fire burns the leaves in the canopy, the tree will lose its food source.
c. Removing lower branches removes the natural "**fire ladder**" that might allow fire to climb into the canopy. **(5)** If no fire has gone through the area in a long time, dead branches or other more flammable trees such as tanoaks may form a fire ladder that brings fire to the canopy
d. Even if the above-ground part of the tree is killed (or cut or breaks), the roots often survive. Redwoods are able to **sprout** from the root crown or root collar **(**called **stump sprouting. (6)**

**AR BF-2** **Basal Sprouts from Redwood** **4+**

Look around for redwood trees sprouting at the base of other redwoods.

Redwoods can readily sprout from the root crown (root collar), or from a cut tree. If the roots aren't killed, this helps redwoods regrow after a fire. (The photo at the right was taken in Armstrong Woods about 7 months after the Walbridge fire.)

Whether from a root crown or a stump, this is usually called "stump sprouting." Trees that sprout from an above ground stump don't usually survive very long, while those that grow from the root crown/root collar may live for hundreds or thousands of years.

Redwoods are one of the few gymno-sperms that do this readily, but many angiosperms such as bay, tanoak, and fruit trees do.

**photos**: by Mike Roa

**AR BF-3** **Basal Sprouts from Bay** **4+**

***How would you describe the leaves of that tree?***

Notice the sprouts growing from the base of the tree.
That is called **root crown sprouting** or, if the tree has been cut, **stump sprouting**
Bay trees root crown sprout and stump sprout quite readily.

As you walk today, notice that many bay trees bend. ***Why is that?***
Notice also that many of those have branches only on the top side. ***Why?***

Trees grow towards the light, and tend to put more energy into the branches that receive more light. (In a dark forest, it's all about competing for light.)

***Look for green or yellow leaves on the ground.***
***Smush one up between your fingers. Smell your fingers. What do you notice?***

***This is a Bay tree. Have you ever used bay leaves in spaghetti sauce or soup?***
Our Bay trees are of a different but related species.
The Bay is also called Laurel, California Bay, Bay-Laurel, or Pepperwood.

The Native Americans used bay leaves to keep insects from their sleeping areas and granaries. When hunting, they would also smear smashed leaves on their body to disguise their scent so that the prey wouldn't smell them.

**photos:** by Mike Roa

**AR BF-4a** **Recently fallen tree** **7+**

This tree fell in February, 2019, when we had heavy rains and wind.

***What do you think caused it to fall?***

Notice that the roots are not very large, especially for a tree of this size. Notice the young redwood trees sprouting from the root crown…Some roots are still alive!

Redwood roots tend to interlace with those of their neighbors. This helps keep trees from falling in windstorms. (Trees felled by wind are called "windthrow.") But this one grew beside the creek and didn't have supporting neighbors on the creek side.

(Have kids interlock fingers with their neighbors and lean back.)

When loggers cut redwoods for lumber, they do not want them to shatter like this one did. To prevent shattering they will sometimes cut surrounding smaller trees and bushes to create a bed for the tree to fall onto.

Loggers become expert at "aiming" the tree so that it won't hit other trees.

Native Americans would use wood and bark from a shattered tree like this to build a variety of different structures. This would be a lumber yard for them!

**Note:** Other recently fallen trees are on the Pioneer Trail between the Burbank circle and the Icicle Tree and near the Armstrong Tree. See AR Basic Features Cards 4a & 4c

**photo**: by Mike Roa

**AR BF4-b** **Fallen Trees on the Pioneer Nature Trail** **7+**

This fallen redwood is beside the Pioneer Nature Trail, between the Burbank Circle and the Armstrong Trail.

Photo by Mike Roa

**AR BF-4b** **Fallen Tree on the Pioneer Nature Trail** **7+**

The tree on the other side fell in January, 2022, knocking down several other trees in the process.

Note/point out:

- Burn scar and rot at the base
- Young redwoods sprouting from the root crown/base
- Bark and wood that would have been useful to Native Americans.
- That the fallen trees opened up the canopy so that more sunlight light now reaches the forest floor, resulting in a different "microclimate."
- Like the tree shown in the Basic Features Card 4a, these trees were growing beside Fife Creek. As a result, they were probably exposed to more wind than trees in the middle of the forest, and they didn't have other trees with which to entwine their roots for support on the creek side.

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**Note:** Other recently fallen trees are near the start of the Pioneer and near the Armstrong Tree. See AR Basic Features Cards 4a and 4c

**AR BF4-c** **Recently Fallen Trees** **7+**



This tree fell in January, 2023, when we had heavy rains and wind. Actually, two trees fell. They fell across the circular road just south of the Armstrong Tree parking area.

It was a little over 8' in diameter at ground level. Where the docent is standing, it was about 7.5' in diameter. Determining its height was difficult because it hit another tree when it fell, and the top broke off and shattered when it hit the ground. If you look up from the road a bit north of the cut tree, you may be able to see where it hit the other tree. Our best estimate is that it was about 220'-230' tall.

How old was it? We don't have samples from near the base, but we do have samples from both trees about 113 above the base. The samples from the larger tree show that when it fell, it was taking over 80 years to grow an inch in diameter!

To make an accurate estimate of age, we would need samples from the base of the tree or from several points along its bole (trunk). We don't have those. The longest sample we have is from where it was cut to open the road. That 26 cm sample had over 900 rings! But trees generally grow faster when young, and that sample was from the outer portion, so it probably wasn't growing that slowly its whole life. Working with scientists from Cal Poly Humboldt, we have come up with an age of well over 1200 years.

We don't know why it didn't pull up its roots when it fell. Maybe they were too tightly intertwined with neighboring trees or too deeply embedded in the alluvium/soil.

**Note:** Other recently fallen trees are on the Pioneer Trail near its start and between the Burbank circle and the Icicle Tree. See AR Basic Features Cards 4a and 4b

**AR BF-5** **Root Pull from Windthrow** **7+**

The photo above is the tree at the left, viewed from the other side. It was probably blown down by the wind before it was cut. A stump is unlikely to "catch" enough wind to be blown over, and the tree fell towards the top of the valley, so it probably wasn't knocked over by flood waters of Fife Creek.

A tree that is blown down by the wind is called "**wind-throw**." The roots often pull up a lot of dirt with them.

This makes a crater or depression in the ground called a **root pull.**

Root pulls are important because the bare soil provides a good place where many kinds of seeds might start to grow. (But accumulated fallen leaves, called **duff**, inhibit seed germination, much like mulch in a garden bed.)

This is the same root mass shown on the other side. Photo taken in January, 2023.

***Do you see any large plants growing in this root pull? Why not?***

In the winter root pulls may become small ponds where a variety of animals like mosquitoes, salamanders, or frogs might breed.

(I (Mike Roa) <u>think</u> that these winter "ponds" tend to drown any plants such as redwood trees that might start to grow there. Combined with mulch, plant growth is inhibited.)

***Do you recognize the tree growing on top of that stump?*** (California Hazel)

The bole (main trunk) was cut, as were several other apparently wind-thrown trees near the entrance to Armstrong Woods. Compare the straight-through cut of these trees to the stump across the creek seen earlier, which shows undercutting and back-cutting. I think that they were blown down by the wind and the boles were cut while they were on the ground.)

**photos**: by Mike Roa

| AR BF-6 | Snags | ALL |
|---|---|---|

***Do you see any dead trees, or the remains of dead trees? These are called "snags."***

Snags are important to the forest ecosystem because they provide habitat for many different kinds of animals.

Over 600 types of plants and animals have been found to live on snags in the redwood forest!

**photos**: by Mike Roa

**AR BF-7** **Burned Base with Flaring & Old Bench** **7+**

***What happened to this tree?***

A fire, probably in the 1920s, burned through the bark and burned part way into the wood. But it didn't burn enough to kill the tree.

Ever since then, the tree has been recovering and growing scar tissue.

We don't know whether the flaring out at the base (butt swell or butt flare) was there before the fire, or whether it is scar tissue that formed after the fire. It is probably some of both.

***What do you think the log at the base of the tree is?*** *(Armstrong Redwoods Natural RESERVE used to be a PARK, and people could walk wherever they wanted. Now we're trying to protect it more.)*

(Good place to discuss why loggers would cut tree far above base if flared.) (May have been discussed earlier in the walk.)

**photo**: by Mike Roa

**AR BF-8** **Graffiti log** **4+**


***What have people done to this log?***

***Do people come to Armstrong Redwoods, or any other park, to see other peoples' names carved into trees, fences, tables, stumps, logs, or other park Features?***

***Why do you think people carve their initials? Dylan spent a lot of time carving his name rather than enjoying the beauty all around him.***

***Will you ever carve your initials into a log or table in a park? Don't be a Dylan!***

***Notice how smooth the wood is. What happened to the bark?***

The bark has fallen off and decomposed. One might think that the sapwood, without much tannin, would also have rotted away, but apparently it doesn't necessarily rot rapidly because it dries out too fast after the bark comes off.
This is seen on many of the trees that fell or were cut more than just a few years ago.
Logs from which the bark has decomposed are sometimes called "buckskins."

Some of the exterior wood of this log shows the wavy grain (ribbon wood) that, while it is pretty, doesn't make very good lumber, which is why loggers may cut above that wavy wood.

According to the Docent Manual, somewhere the date of 1924 was carved into this log.

From near this log one can see all the way to the top of the Parson Jones Tree.

**photo**: by Mike Roa

**AR BF-9 Parson Jones tree** **4+**


***How tall is the Parson Jones tree?***

***How do you know?***

***Is it really that tall today?***

***What if it was measured 50 years ago?***

***Would it still be the same height?***

***Could it be shorter?***

***How might it have become shorter?***

***What does "diameter" mean?***

***What is the diameter of the Parson Jones tree?***

***Is that really the diameter today?***
***What if it was measured 50 years ago?***

***Would the diameter be different at different heights?***

According to the Docent Manual, this tree and the Armstrong Tree were measured in 1970.

At right: "spike top" trees. The tops probably died back due to drought, but they may recover and start to grow again when conditions improve, or they may break off.

Foresters measure the diameter of trees at 4.5' above ground on the uphill side. This is the "Diameter at Breast Height"(DBH).

Actually, the diameter isn't measured. The circumference (distance around) is measured and divided by pi to get the diameter. (We pretend that the tree is circular.)

We recently measured the circumference of the Parson Jones tree again. We found that the diameter at the base is now about 17', and at 4.5' it is about 13.3', so they probably measured somewhere in between.

Notice black poison oak sap in the cut poison oak vine. Native Americans used it for color when making designs on baskets and for making tattoos.

**photos**: by Mike Roa

**AR BF-10** **Date Round (History Log)** **4+**


Notice the dates marked on this round. It was installed in 1978, I think.

Before somebody took it off, the plate near the center of the log said that the tree germinated in 948.

***How long ago was 948?***

If the tree ring at the center was formed in 948, but this section of the tree was 3' above the ground, did the tree actually germinate in 948?
(No…it germinated before 948.)

**photos**: by Mike Roa

***Notice how close together the rings are on this round.***
***Was the tree growing fast or slowly? Why do you think that?***

One thing that might cause a tree to grow slowly is lack of water or drought.

***Do you think that this tree lived during a thousand-year drought?***

It probably grew slowly because it was in a dark shady forest. In some years it did grow faster than others. Those were probably particularly wet years.

**AR BF-11** **Family Circle (at Regeneration sign )** **4+**

***Notice that these trees are growing around a rotted stump.***

This is called a "**family circle**." The circle of trees sprouted from the root crown (or root collar) of the tree that was cut.

Root crown sprouting, or stump sprouting, is an important way that redwood trees reproduce.

(Discuss why seeds seldom survive to germinate: (1) low fertilization rate because they are wind pollinated, (2) animals eat them, (3) fungus attacks them, and (4) because of the thick duff layer, the roots dry out before they can reach soil.)

But if soil is exposed in a root pull, landslide, fire, or silt from a flood, seeds can germinate.

Since the sprouted trees in the circle all came from the root crown of a previous tree:
***Can they be considered to be that same original tree?*** If so, these trees began their lives when the original tree from which they sprouted began its life. And if that tree sprouted from another tree's roots, it could be considered that same tree…and one might go back several "generations" of sprouted trees. Let's say that the trees in the current family circle ( Call it generation A) are 100 years old. If they sprouted from the root crown of a tree that was 1000 years old (generation B), Generation A could be considered to be 1100 years old. And if Generation B sprouted from a 1000 years old Generation C, Generation A would be 2100 years old. Could you go back even more generations? Might Generation A be 5,000 yrs old?

***Look around…Do you see trees sprouting from the root crowns of living trees?***

**photo**: by Mike Roa

**AR BF-12 Goose pen (fire cave) ALL**

When fire burns through the bark of a tree it sometimes burns some of the wood in the center of the tree, creating a hollow called a “goose pen" or "fire cave.”
(Note: The photo of the burning tree is NOT in Armstrong Redwoods.)

***Why do you think it might be called a goose pen?***

Notice how far up the tree burned, and how much scar tissue has grown to help it heal.

***What might live in a goose pen?*** (spiders, bats)

**NOTE: At the time of this writing, the opening has been fenced off. I presume that is to protect bat habitat.**
**Do not allow people to go into the fire cave.**

**photos**: left by Greg Corby right from U.S. Forest Service (location unknown)

| AR BF-13 | Root Mass | ALL |
|---|---|---|


***What do you think this is?***
***(Roots, which we've seen before in the skull and also at the root pull.)***

**CAUTION**! Kids will often make a bee-line for the roots and start climbing on them. **Have the teacher either give permission or deny it!**

If allowed to climb on the roots, this is a good photo op.

**Tell kids NOT to climb down the back… They should stay on this side of the fence.**

**It would be good to have adults "spot" kids if they climb on the root mass, especially coming down.**

(The stump was moved here from Johnson's Beach on the Russian river.

Root mass of fallen Deyerville Giant in Humboldt Redwoods St. Pk. The man in the picture is over 6' tall.

**photo(s)**: root mass from Johnson's beach by Greg Corby.

Deyerville giant root mass by John Griffith

**AR BF-14** **Burbank Circle and Burls** **7+**

**Burbank Circle:**

***What do you notice about this group of trees?***

***Any ideas what might have caused them to grow in a circle?***

(We don't really know…possible ideas are that it is a family circle, or ceremonial area from Native Americans, or picnic area from when the Armstrong family owned the land.)

**Burls**

***Notice the bump near the base of the large tree.***

A "**burl**" is an abnormal growth. In redwoods, they can occur near the base of the tree or on the trunk. Burls are formed by the repeated formation of buds, sort of like a benign cancer.

Burl wood is very beautiful and some-times people cut down whole trees, including in parks, just to get the burls, from which they make expensive furniture to sell. The burl high in the tree is probably about 4 feet across and might contain over $1000 worth of burl wood. (See Carry Cards.)

***How might cutting a burl off the tree kill the whole tree*?** **(It would be like cutting your skin…allows bacteria and fungi (germs) to enter. Just like a small cut in your skin can become infected, so can a cut through a tree's bark become infected.)**

**photos:** by Mike Roa

| AR BF-15 | Tree with Ramp | ALL |
|---|---|---|

A good place to hug a tree!

And to note how thick the bark is.

The ramp helps protect some of the tree roots from damage from tree lovers!

If people want to hug the tree, remind them not to put their feet on the tree and to be careful not to rub the bark off.

**photo:** by Mike Roa

| AR BF-16a | Colonel Armstrong Tree | ALL |
|---|---|---|



CalFire crew works to save Armstrong Tree during Walbridge Fire, Sept. 2020

**Photos**: left by Greg Corby  right by Brenden O'Neil

**Who was Colonel Armstrong?**

***How tall is the Armstrong Tree?***

***How do you know?***

***Is it really that tall today?***

***What if it was measured 50 years ago? Would it still be the same height?***

***Could it be shorter?***

***How might it have become shorter?***

***What does "diameter" mean?***

***What is the diameter of the Armstrong Tree?***

***Is that really the diameter today?***

***What if it was measured 50 years ago?***

***Where is the diameter measured? At the base? 1'above ground? 10'above?***

## The Walbridge Fire Opened up the Understory

The Walbridge Fire, in August-September, 2020, cleared out a lot of understory that had accumulated since the last fire in 1923. Prior to the coming of settlers in the 1800s, the Native Americans periodically set fires in order to encourage the growth of plants that they desired such as grasses and tanoaks for their seeds and hazelnuts for their young sprouts, which were used in basketry. Fires, either man-made or caused by lightning, would typically have burned through the forest every 5-25 years.

Fire suppression has resulted in overgrowth of oaks, bays, and other plants forming a dense understory, which will provide fuel when the next fire comes through.

Looking north, one can see the open forest floor that is typical of forests that are burned periodically. Looking south, one can see the accumulation of understory plants.

Ask visitors to imagine that they are settlers trying to ride horses or bring their covered wagons through each area. Passage through the overgrown forest would be extremely difficult.

Also point out that the recently burned area to the north has little fuel and few “fire ladder” trees to allow fire to reach the leaves/canopy of the redwoods. The unburned area to the south has lots of fuel, including trees that might allow fire to reach the redwood canopy.

A typical low-intensity fire, such as the one that burned here, doesn’t heat the soil very deep. So root crowns and rhizomes can survive if they are only a few inches below the surface. As visitors walk east towards the picnic area, they should look for sprouts coming from the root crowns of bay, tanoak, and redwood trees

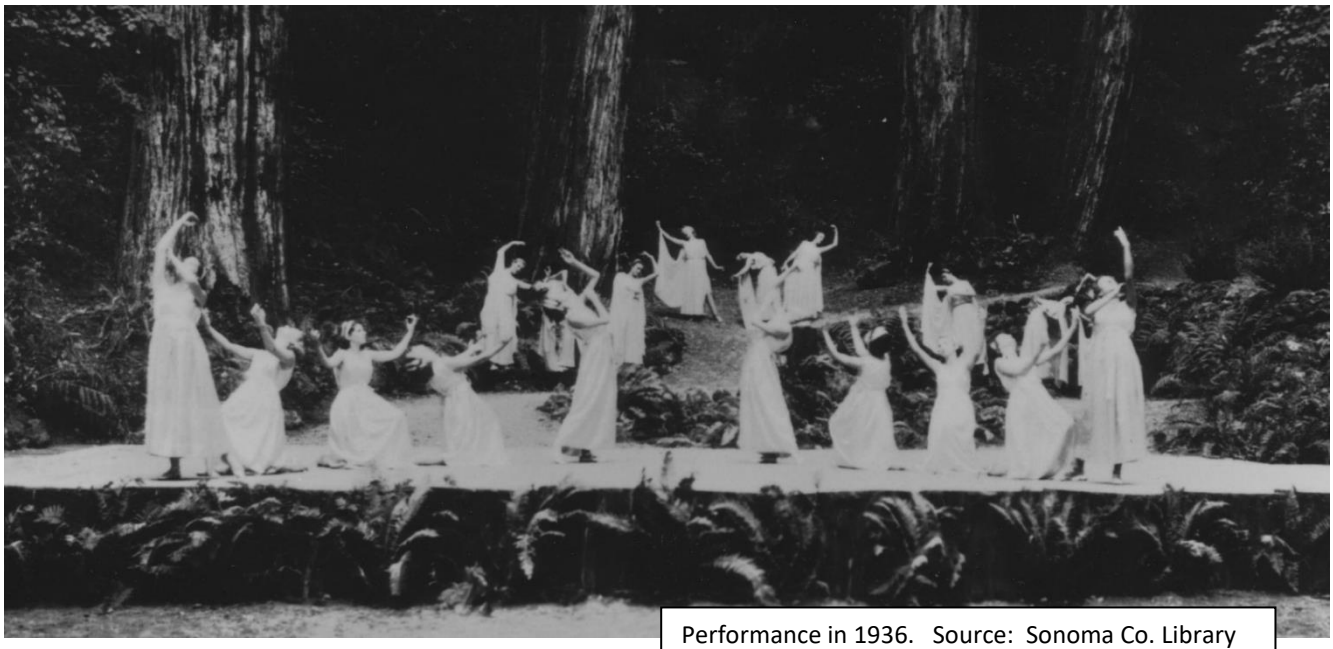
**AR BF 16b** **Armstrong Tree and Fire** **4+**

**Top**: looking north **Bottom**: Looking south

**AR BF-17** **Forest Theater** **ALL**

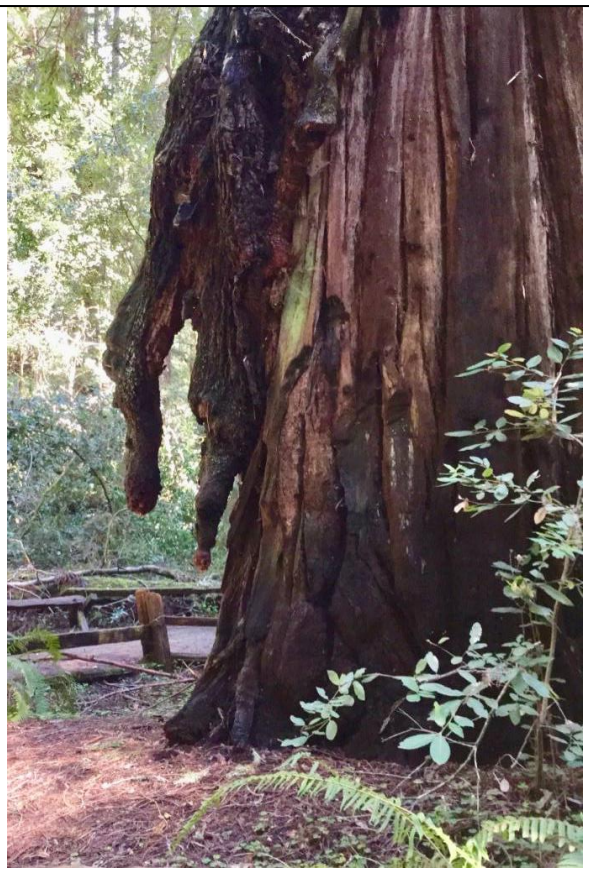
**photo** by Mike Roa

Built 1934-36, the **Forest Theater** was used for musical performances, plays, weddings, and other events in the 1930s. Redwood logs were used as seating until 1951, when benches were installed. Now it is only used for a few occasions each year. ***Why do you think that its use is restricted?***



Performance in 1936. Source: Sonoma Co. Library

| AR BF-18 | Icicle Tree and Popeye | 4+ |
|---|---|---|



Some unusual long, hanging burls have grown on the "**Icicle Tree.”**

***Why is the tree called the Icicle Tree?***

If you look closely, you can see that the burls were cut off by someone who thought that it was more important for them to have the wood than for you to be able to enjoy an undamaged unusual natural burl growth.

In the winter and spring roots grow from the cut burl, but they die back in the summer and fall because they don't reach soil.

***Can you see Popeye? (Or, can you see a monkey face in that tree?)***

***Is "Popeye" a burl?***

**photos:** by Mike Roa drawing from the Internet

# Pomo Canyon Features Information for Docents

rev. 6.30.21

These pages show many of the features found along the trails at Armstrong Woods. They are intended for docent education. There are many more features illustrated than one would share with any one visitor group, but it is useful for docents to have the information in their mental tool box so that they can share it as appropriate, depending on the ages and interests of visitors.

The grade levels for which we consider the information most appropriate are given to the right of the title (4+, 7+, 9+, ALL, docents only).

Each page has one or more photographs on the top half and some information and possibly more photographs on the lower half. This is so that you can make them into 5” x 7” laminated cards that you can carry with you if you want to.

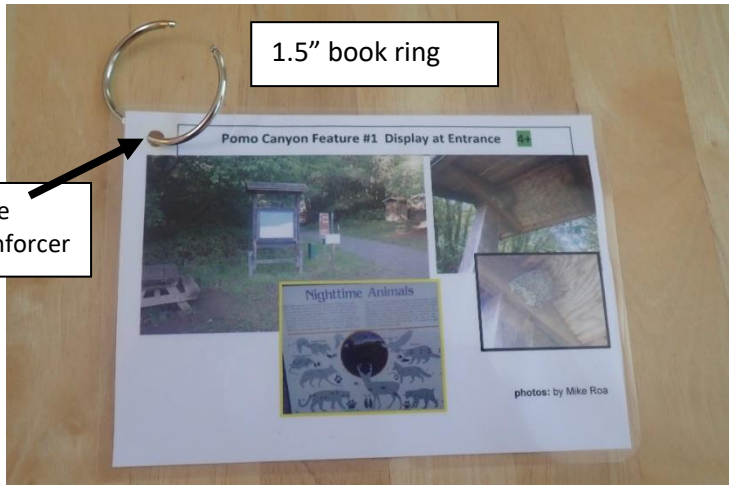
Many of the cards include questions that docents might ask visitors to stimulate their thinking. We have found that asking questions is a much better technique than just telling people facts. Questions engage the visitors more, and enhance learning by requiring them to think, rather than just listening. The questions are in ***bold italics***.

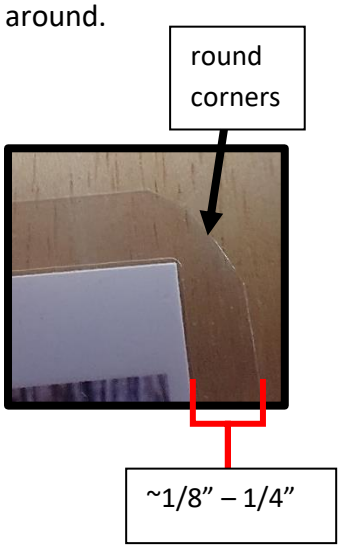
There are separate “sets” for Armstrong Woods and Pomo Canyon.

You can print and laminate whatever “cards” you want to carry with you, if any.

**Laminating and Binding Cards:**

9. Print the cards; cut to size (5”x7”).
10. Glue the information to the back of the photo.
11. Punch a hole in the upper left corner. Leave at least 1/4” of paper around the hole.
12. Add a hole reinforcer. (Clear reinforcers look better but are harder to attach than white.)
13. Laminate.
14. Cut so that there is a 1/8” – 1/4” margin of laminating material all around.
15. Round the corners.
16. Punch again and use a book ring to keep them together in order.



# BASIC Pomo Canyon Features Information:

Here are the **Basic** Features Cards (PC BF-x) for the Pomo Canyon area.

The Pomo Canyon **Advanced** Features Cards (PC AF-x) are in a different document

## BASIC POMO CANYON BASIC FEATURES CARDS:

PC BF-1. Stinging Nettle and Poison Oak
PC BF-2. Living With Fire
PC BF-3. Basal Sprouts on Redwoods
PC BF-4. Basal Sprouts on Bay
PC BF-5. Redwood Burls
PC BF-6. Snags
PC BF-7. Hillside Stumps
PC BF-8. Nurse Logs and Nurse Stumps
PC BF-9. Fragile Area Sign
PC BF-10. Family Circles
PC BF-11. Douglas-firs
PC BF-12. Creek Rocks and Erosion

**PC BF-1** **STINGING NETTLE and POISON OAK** **ALL**

**Stinging Nettle**

right: flowers in late April

right: flowers in late May

Stringing nettle and poison oak are found mostly along the beginning of the Pomo Canyon valley trail. Docents should point them out to visitors.

**Stinging nettle** is found mostly near campsites 11 and 12, but also elsewhere:

- The toothed, hair-covered leaves grow opposite each other around the stem.
- Leaves are soft and fuzzy.
- The stinging hairs, found on both the leaves and stems, contain an irritating chemical.
  The "sting" hurts for a short time and then diminishes, but can be felt for many hours.

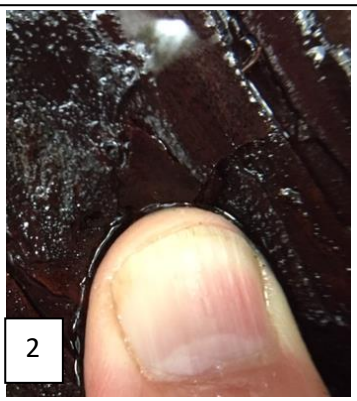
**Poison oak** is found mostly near the entrance.

- "Leaves of three, leave it be."
- The stem also contains the irritating oils, even in the winter when they are leafless.
- The leafless stems often have short side branches jutting out like arms. "Stubby' arms can still do harm."

Photos by Mike Roa

| PC BF-2 | Living With Fire | 7+ |
|---|---|---|


1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3


4


5


6

**photos:** by Mike Roa

Fire is a natural part of the ecosystem, and redwoods have several ways of surviving fires.

**BARK:** a. The bark is fibrous, not very flammable. Tannins in the bark also provide some fire resistance.
b. The bark is usually 3-8" thick, but can be over 12" thick in an old tree. **(1)**
c. Most natural fires would happen during thunder storms. With the storms comes rain. ***Have visitors press hands on redwood bark…notice that it is soft***…. During storms, or very foggy weather, the bark absorbs water like a sponge, which provides some protection against fire. **(2)**
**NOTE: Have them press the bark, not rub it. We don't want to rub the bark off!**

If fire is suppressed for too long, fuel accumulates and when a fire does happen, it may burn hot enough to get through the bark, resulting in a fire that can kill redwoods. The wood and brush is the **fuel load. (3)** (Sudden Oak Death thus not only threatens the oak trees but the redwoods and other trees!)

***Ask visitors why they think there is such a fuel load in Armstrong.*** Removing the fuel requires workers and equipment, which is expensive. **Controlled burning is problematic** because of the proximity to Guerneville. There is less of a fuel load in the Pomo Campground because campers have used the wood. But there is lots of down wood on the hillsides away from the campground itself.

Notice that most trees have shed lower branches. **(4)** This is called "**natural pruning"** or **"self-pruning**." ***How does that help trees survive fire?***

e. "Self-pruning" of shaded leaves conserves energy.
f. Trees depend on leaves to provide food via photosynthesis. If a fire burns the leaves in the canopy, the tree will lose its food source.
g. Removing lower branches removes the natural "**fire ladder**" that might allow fire to climb into the canopy. **(5)** If no fire has gone through the area in a long time, dead branches or other more flammable trees such as tanoaks may form a fire ladder that brings fire to the canopy
h. Even if the above-ground part of the tree is killed (or cut or breaks), the roots often survive. Redwoods are able to **sprout** from the root crown or root collar **(**called **stump sprouting. (6)**

**PC BF-3** **Basal Sprouts from Redwood** **4+**

Look around for redwood trees sprouting at the base of other redwoods.

Redwoods can readily sprout from the root crown (root collar), or from a cut tree. If the roots aren't killed, this helps redwoods regrow after a fire. (The photo at the right was taken in Armstrong Woods about 7 months after the Walbridge fire.)

Whether from a root crown or a stump, this is usually called "stump sprouting." Trees that sprout from the above ground stump don't usually survive very long, while those that grow from the root crown/root collar may live for hundreds or thousands of years.

Redwoods are one of the few gymnosperms that do this readily, but many angiosperms such as bay, tanoak, and fruit trees do.

**photos**: by Mike Roa

**PC BF-4** **Basal Sprouts on Bay** **4+**

***How would you describe the leaves of that tree?***

Notice the sprouts growing from the base of the tree.
That is called **root crown sprouting** or, if the tree has been cut, **stump sprouting**
Bay trees root crown sprout and stump sprout quite readily.

As you walk today, notice that many bay trees bend. ***Why is that?***
Notice also that many of those have branches only on the top side. ***Why?***

Trees grow towards the light, and tend to put more energy into the branches that receive more light. (In a dark forest, it's all about competing for light.)

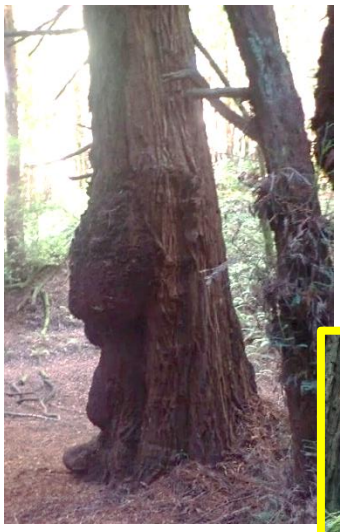
***Look for green or yellow leaves on the ground.***
***Smush one up between your fingers. Smell your fingers. What do you notice?***

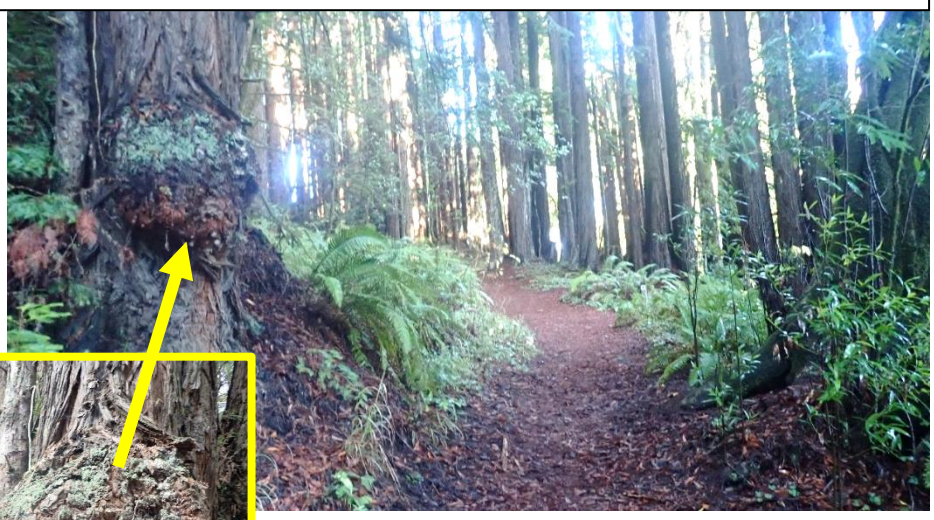
***This is a Bay tree. Have you ever used bay leaves in spaghetti sauce or soup?***
Our Bay trees are of a different but related species.
The Bay is also called Laurel, California Bay, Bay-Laurel, or Pepperwood.

The Native Americans used bay leaves to keep insects from their sleeping areas and granaries. When hunting, they would also smear smashed leaves on their body to disguise their scent so that the prey wouldn't smell them.

**photos:** by Mike Roa

| PC BF-5 | Redwood Burls | 7+ |
|---|---|---|





**Above:**
near where the trail from camp-sites 1-10 comes down

**Above and left**:
Burl on tree at start of trail to campsites 1-10 (Pomo Canyon Trail.)

Bay with root crown sprouts can be seen across the trail.

**photos:** by Mike Roa

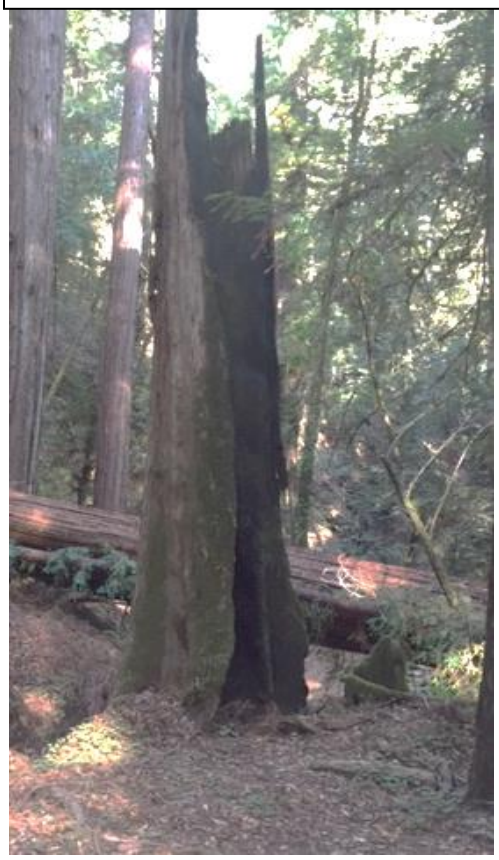
Since Pomo Canyon was apparently first logged in the late 1800s or early 1900s, the oldest trees, which would have had the largest burls, are gone. Some of the second growth trees have good sized burls, though.

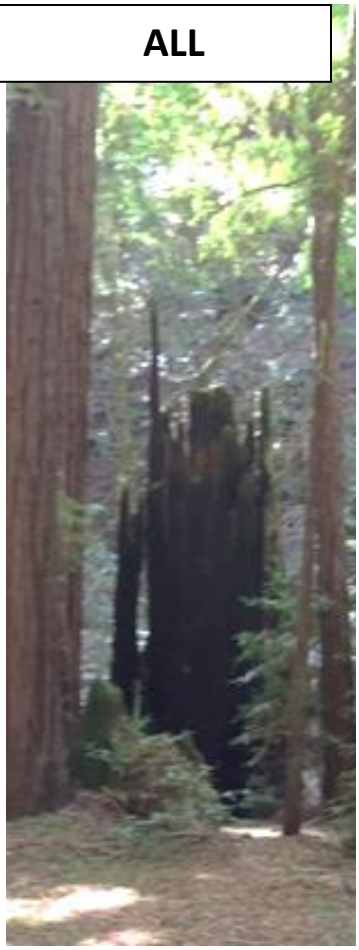
Have students watch for them, and point out redwood branches, and, possibly, roots sprouting from them.

Discuss that there are also buds that form at the root crown, and that wood is also called burl wood (basal burl).

The coast redwood is one of only a few gymnosperms (cone-bearing plans) that readily sprout from the root crown. But many angiosperms, including bay trees, sprout from their root crowns. Bay trees also form burls. Watch for them.

| PC BF-6 | Snags | ALL |
|---|---|---|





***Do you see any dead trees, or the remains of dead trees? These are called "snags."***

Snags are important to the forest ecosystem because they provide habitat for many different kinds of animals.

Over 600 types of plants and animals have been found to live on snags in the redwood forest!

**photos**: by Mike Roa

**PC BF7** **Hillside Stumps** **7+**


**photos:** by Mike Roa

These stumps, found along the trail from campsites 6-9, show the undercut on the uphill side.

***ASK why loggers would want the tree to fall uphill.***

1. If the top of the tree pointed downhill, it would be more likely to slide downhill, possibly hurting someone there or breaking.
2. It wouldn't fall as far before hitting the ground, so it would be less likely to break.

The stumps also show obvious springboard notches.

***Ask whether the trees were cut before or after the fire.***

(The notches are charred, showing that the fire was after they were cut.) (See Carry Cards.)

They also show an accumulation of branches and needles, mostly on the uphill side. When fires came through the area, this fuel caused the fire to burn most intensely on the uphill side. Note that most of the burned out stumps were burned most severely on the uphill side.

## PC BF-8 Nurse Logs & Nurse Stumps 4+

This “nurse log” is on the west side of the trail, just before the fence begins. On it can be found moss, sorrel, and a small bay tree. A trillium may also be seen next to the small bay.

Many stumps at Pomo have huckleberries growing on them. Moss, ferns, sorrel (*Oxalis*), and even redwood and tanoaks also sprout on them.

**ASK *how many different types of plants they see. Have the students describe the plants*.** They can make up names before you tell them the actual names.

***ASK what the log or stump provides.*** (The decaying log acts like a sponge, holding moisture that plants need.)

***ASK how the plants got there.*** (Seeds in animal droppings? Wind-blown seeds?)

The nurse log at the left is across the trail from the campsite 13 sign, between the trail and the creek. It is so covered with plants and so decomposed that it doesn’t look like a log, but it is.

In April, 2021, we identified 7 different kinds of plants on it, including moss; *Equisetum*; 5-finger ferns, sword ferns, wood ferns; *Oxalis*, and Ca. blackberry.

**photos:** by Mike Roa

| PC BF-9 | Fragile Area Sign | ALL |
|---|---|---|


***Ask: Why do you think the fence and signs were put here?***

These areas were heavily used for years because they are level and close to the entrance to the canyon.

Too much use caused trampling of the plants and loss of the duff layer that protects the soil from erosion and roots from compression.

Park managers were concerned that the soil would erode into the creek and that root compression would harm the trees.

**photos:** by Mike Roa

**PC BF-10** **Family Circles** **4+**

root crown sprouting

**photos:** by Mike Roa

***Notice that these trees are growing around a rotted stump.***

This is called a "**family circle**." The circle of trees sprouted from the root crown (or root collar) of the tree that was cut.

Root crown sprouting, or stump sprouting, is an important way that redwood trees reproduce.

(Discuss why seeds seldom survive to germinate: (1) low fertilization rate because they are wind pollinated, (2) animals eat them, (3) fungus attacks them, and (4) because of the thick duff layer, the roots dry out before they can reach soil.)

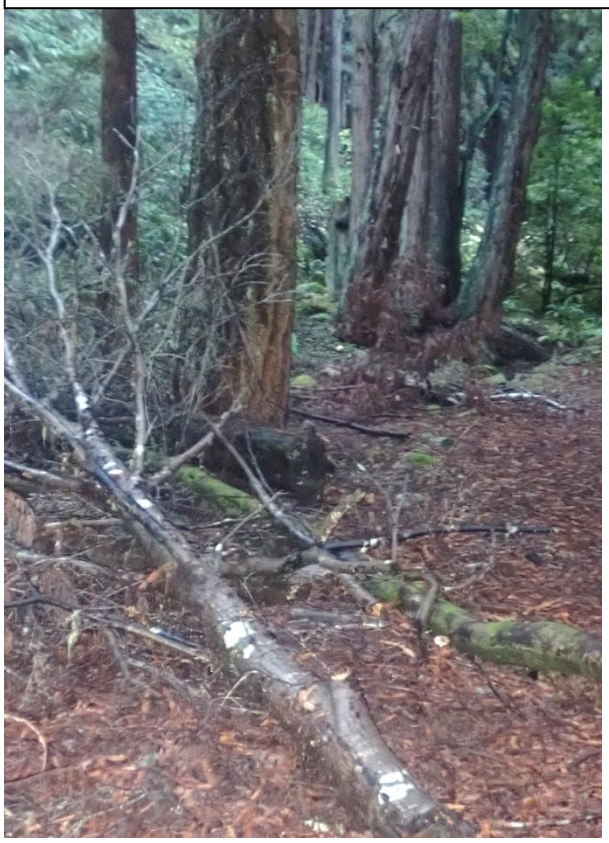
But if soil is exposed in a root pull, landslide, fire, or silt from a flood, seeds can germinate.

Since the sprouted trees in the circle all came from the root crown of a previous tree: ***Can they be considered to be that same original tree?*** If so, these trees began their lives when the original tree from which they sprouted began its life. And if that tree sprouted from another tree's roots, it could be considered that same tree…and one might go back several "generations" of sprouted trees. Let's say that the trees in the current family circle ( Call it Generation A) are 100 years old. If they sprouted from the root crown of a tree that was 1000 years old (Generation B), then Generation A could be considered to be 1100 years old. And if Generation B sprouted from a 1000 years old Generation C., Generation A would be 2100 years old. Could you go back even more generations? Might Generation A be 5,000 years old?

***Look around…Do you see trees sprouting from the root crowns of living trees?***

**photo**: by Mike Roa

**PC BF-11** **Douglas-firs** **7+**



## Douglas-fir by Trail

The fallen tree (lower left) is a young Douglas-fir.

Just beyond it is a larger living Douglas-fir.

Have visitors feel and describe the bark of both the young and mature Douglas-fir and compare it to redwood bark. Also look for cones.

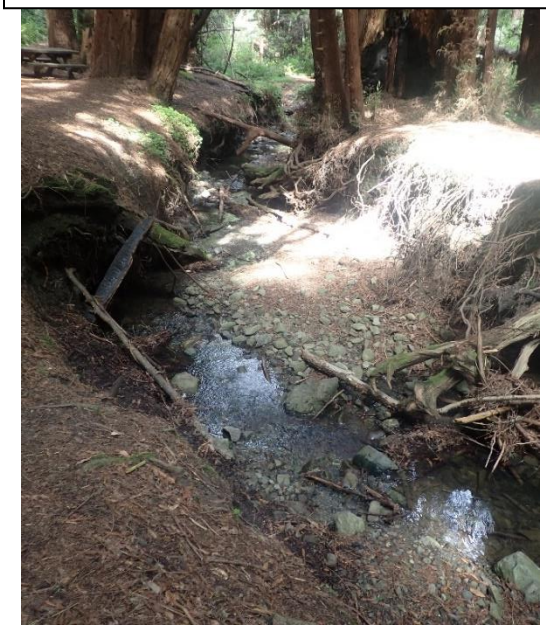
**photos:** by Mike Roa

Have visitors look across the creek.

Point out that there are both redwood and Douglas-fir trees growing on the hillside.

Can they distinguish between them at a distance?

## PC BF-12 Creek Rocks and Erosion 4+




**photos:** by Mike Roa

Campsites 20-21 have a good view of the creek.

Ask students to observe how the creek is cutting into the bank and to look at the rocks embedded in the bank

Also observe the sizes and shapes of the rocks. **Angular** edges indicate that they have not weathered much. **Rounded** edges indicate that tumbling in the stream and other rocks bumping into them have worn themn down.

***Ask: What will happen to the shape and size of the rocks as they are moved downstream by the water, eventually to reach Willow Creek and then on to the Russian River and then on to the ocean?***

Point out that many rocks are exposed in the far bank by the cutting of the creek. Over the centuries, rocks have alternately been deposited and exposed by erosion as the creek as it changed course.