Appendix I
CALIFORNIA STATE CONTENT STANDARDS and ENVIRONMENTAL PRINCIPLES AND CONCEPTS

California State Standards

Field trips and activities can help students achieve California State Content Standards in many content areas. Listed below, in abbreviated form, are some of the Content Standards from grades 4-7 that can be at least partially taught either through field trips to redwood forests or through the activities in Redwood Ed. For the complete standards, go to the California Department of Education's web site:

www.cde.ca.gov/be/st/ss

Environmental Principles and Concepts

Following the Content Standards, California's Environmental Principles and Concepts (EP&C) are given. The Environmental Principles and Concepts examine the interactions and interdependence of human societies and natural systems. The nature of these interactions is summarized in the Environmental Principles and Concepts.

These principles and concepts are not intended to be another layer of standards imposed upon teachers. Rather, they are intended to provide guidelines and support for incorporating environmental education into all subject matter areas. Many of California's State Content Standards can be taught from an environmental perspective; the EP&C are intended to assist with that. As Redwood Ed is being written, an Environmental Education Model Curriculum is being developed. For information on the Model Curriculum or on the principles and concepts, contact:

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Curriculum Content Standards Addressed in *Redwood Ed*

To save space, these Content Standards on the following pages are listed in abbreviated, paraphrased form.

**Grade Four**

**Science Content Standards**

**Life Sciences Standard Set 2:** All organisms need energy and matter to live and grow.
- 2.a: Plants…primary source of matter and energy…food chains
- 2.b: Producers and consumers (herbivores, carnivores, omnivores, decomposers)
- 2.c: Decomposers recycle matter.

**Life Sciences Standard Set 3:** Living organisms depend on one another and their environment.
- 3.a: Ecosystems are characterized by living and non-living components.
- 3.b: In any environment, some survive well, some less well, and some don't survive.
- 3.c: Animals depend on plants for food and shelter.
- 3.d: Most microorganisms do not cause disease and many are beneficial.

**Investigation and Experimentation Standard Set 6:** Students ask meaningful questions and conduct careful investigations.
- 6.a: Observations and inferences
- 6.b: Measure and estimate
- 6.c: Formulate predictions…cause and effect relationships
- 6.d: Conduct multiple trials and draw conclusions
- 6.e: Construct and interpret graphs from measurements
- 6.f: Follow written instructions for a scientific investigation

**History-Social Science Content Standards**

**Standard Set 4.1:** Physical and human geographic features define places and regions
- 4.1.3: Describe how physical environment affects human activity
- 4.1.4: Explain affects of Pacific Ocean, rivers, valleys…on growth of towns

**Standard Set 4.2:** Describe…life…of people of California from pre-Columbian societies…
- 4.2.1: Discuss how California Indians depended on, adapted to, and modified the environment
- 4.2.5: Describe the daily lives of the people, native and nonnative…

**Standard Set 4.3:** Explain the economic, social, and political life…through the Gold Rush…
- 4.3.1: Identify the locations of settlements…including Fort Ross
- 4.3.3: Analyze effects of the Gold Rush on…the physical environment

**Standard Set 4.4:** Trace transformation of …California economy…
- 4.4.2: Explain how the Gold Rush transformed the economy…including products produced and consumed
- 4.4.5: Discuss the effects of the Great Depression, Dust Bowl, and World War II
**English-Language Arts Content Standards**

**Reading Standard Set**
- 1.3: Use knowledge of root words to determine meanings
- 1.4: Analyze complex words with Latin and Greek Roots

**Writing Standard Set**
- 2.3: Write information reports

**Written and Oral English Language Conventions Standard Set**
- 2.2.4: Recite brief poems

**Listening and Speaking Standard Set**
- 1.0: Listening and speaking strategies
- 2.0: Speaking applications

**Mathematics Content Standards**

**Number Sense Standard Set**
- 3.0: Solve problems involving addition, subtraction, multiplication, and division

**Measurement and Geometry Standard Set**
- 1.0: Understanding perimeter and area

**Statistics, Data Analysis, and Probability Standard Set**
- 1.0: Organize, represent, and interpret numerical data

**Grade Five**

**Science Content Standards**

**Life Sciences Standard Set 2:** Plants and animals have structures for various life processes.
- 2.a: Specialized structures to support the transportation of materials
- 2.e: Sugar, water, and minerals transported in a vascular plant
- 2.f: Plants use CO₂ and energy from sunlight to build molecules and release oxygen
- 2.g: Cells break down sugar to obtain energy, releasing CO₂ and water (cellular respiration)

**Earth Sciences Standard Set 3:** Water moves between oceans and land via evaporation and condensation.
- 3.b: Water evaporates to form water vapor, can form liquid or ice.
- 3.c: Water vapor moves and can form fog, dew, rain, hail, sleet, or snow
- 3.d: Fresh water is limited
- 3.e: Students know the source of the water used in their communities

**Earth Sciences Standard Set 4:** Energy from the sun heats Earth unevenly, resulting in changing weather.
- 4.b: Influence of ocean on weather
Investigation and Experimentation Standard Set 6: Students ask meaningful questions and conduct careful investigations.
  o 6.a: Classify objects
  o 6.b: Develop a testable question
  o 6.c: Plan and conduct simple investigation
  o 6.d: Use of variables
  o 6.f: Selection and use of appropriate tools
  o 6.g: Make and interpret graphic representations of data
  o 6.h: Draw conclusions from evidence
  o 6.i: Write a report...

History-Social Science Content Standards

Standard Set 5.1: Describe major pre-Columbian settlements, including American Indians of the Pacific Northwest
  o 5.1.1: Describe how geography and climate influenced ...various nations

Standard Set 5.8: Trace colonization...and settlement patterns...with emphasis on ...economic incentives, effects of the physical...geography
  o 5.8.2: major geographical features of California

English-Language Arts Content Standards

Reading Standard Set
  o 1.2: Use word origins to determine the meaning of unknown words
  o 1.4: Know...derived roots...from Greek and Latin.

Writing Standard Set
  o 2.3: Write research reports

Listening and Speaking Standard Set
  o 1.1: Ask questions that seek information
  o 1.2: Interpret a speaker's verbal and nonverbal messages, purposes, and perspectives
  o 1.3: Make inferences or draw conclusions based on an oral report

Listening and Speaking Standard Set
  o 1.0: Listening and speaking strategies
  o 2.0: Speaking applications

Mathematics Content Standards

Number Sense Standard Set
  o 1.0: Computation, rounding, percents, decimals, fractions
  o 2.0: Calculating and solving problems, including fractions and decimals

Measurement and Geometry Standard Set
  o 1.0: Computing volumes and areas

Statistics, Data Analysis, and Probability Standard Set
  o 1.0: Display, analyze, compare, and interpret data sets, including graphing
Grade Six

Science Content Standards
Earth Science Standard Set 2: Topography is reshaped by weathering and transportation of sediment.
  o 2.a: Water running downhill shapes landscape
  o 2.b: Rivers and streams erode soil, transport sediment, change contour, and flood in natural and recurring patterns
  o 2.d: Landslides and floods change human and wildlife habitats

Ecology (Life Sciences) Standard Set 5: Organisms exchange energy and nutrients among themselves and with the environment.
  o 5.a: Energy enters ecosystems as sunlight...food webs
  o 5.b: Matter transferred between organisms and physical environment in food webs
  o 5.c: Populations can be categorized by the functions they serve in an ecosystem
  o 5.d: Different kinds of organisms may play similar ecological roles in similar biomes
  o 5.e: Numbers and types of organisms in an ecosystem depend on abiotic factors

Investigation and Experimentation Standard Set 7: Students ask meaningful questions and conduct careful investigations.
  o 7.a: Develop a hypothesis
  o 7.b: Select and use tools to perform tests
  o 7.c: Construct graphs
  o 7.d: Communicate in written and oral presentations
  o 7.e: Recognize whether evidence is consistent with a proposed explanation
  o 7.f: Read topographic and geologic maps
  o 7.g: Interpret events by sequence and time
  o 7.h: Identify changes in natural phenomena over time

Social Studies Content Standards
Standard Set 6.1: Describe what is known through archaeological studies...
  o 6.1.1: Describe the hunter-gatherer societies
  o 6.1.2: Identify locations of communities and how humans adapted
  o 6.1.3: Discuss...human modifications of the physical environment

English-Language Arts Content Standards
Writing Standard Set
  o 1.4: Use electronic text to locate information
  o 1.5: Compose documents...using word processing skills
  o 2.3: Write research reports

Listening and Speaking Standard Set
  o 1.0: Listening and speaking strategies
  o 2.0: Speaking applications

Mathematics Content Standards
Number Sense Standard Set
  o 1.0: Solving problems using fractions, ratios, proportions, and percentages
  o 2.0: Calculate and solve problems
Measurement and Geometry Standard Set
  o 1.0: Measurement of plane and solid shapes, including the use of pi

Statistics, Data Analysis, and Probability Standard Set
  o 2.0: Use data samples...including bias and validity

Grade Seven

Science Content Standards
Life Science...Evolution Standard Set 3: Biological evolution accounts for diversity.
  o 3.1: Both genetic variation and environmental factors cause evolution and diversity
  o 3.4: Classification
  o 3.5: Extinction from environmental changes

Life Science...Structure and Function in Living Systems Standard Set 5: Anatomy and physiology
  o 5.b: Organisms depend on properly functioning organs and organ systems
  o 5.f: Reproductive structures and processes in flowering plants

Investigation and Experimentation Standard Set 7: Students ask meaningful questions and conduct careful investigations.
  o 7.a: Use tools to perform tests, collect data, and display data
  o 7.b: Use variety of resources, including World Wide Web, to collect data
  o 7.c: Communicate connections among hypotheses, concepts, tests, data, and conclusions
  o 7.d: Construct scale models, maps, and diagrams to communicate knowledge
  o 7.e: Communicate steps and results of investigation in written and oral presentations

English-Language Arts Content Standards
Reading Standard Set
  o 1.2: Use knowledge of Greek, Latin, and Anglo-Saxon roots and affixes

Writing Standard Set
  o 1.4: Research and Technology...questioning, developing ideas
  o 1.5: Citing sources
  o 1.6: Creating documents using word-processing skills
  o 1.7: Revising
  o 2.3: Write research reports

English Listening and Speaking Standard Set
  o 1.0: Listening and speaking strategies
  o 2.0: Speaking applications

Mathematics Content Standards
Number Sense Standard Set
  o 1.0: Properties of rational numbers, including calculating percentages

Mathematical Reasoning Standard Set
  o 2.0: Using estimation
California's Environmental Principles and Concepts

**Principle I**
The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services. As a basis for understanding this principle:

**Concept a.** Students need to know that the goods produced by natural systems are essential to human life and the functioning of our economics and cultures.

**Concept b.** Students need to know that the ecosystem services provided by natural systems are essential to human life and to the functioning of our economies and cultures.

**Concept c.** Students need to know that the quality, quantity and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems.

**Principle II**
The long-term functioning and health of terrestrial, freshwater, coastal and marine ecosystems are influenced by their relationships with human societies. As a basis for understanding this principle:

**Concept a.** Students need to know that direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.

**Concept b.** Students need to know that methods used to extract, harvest, transport and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

**Concept c.** Students need to know that the expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.

**Concept d.** Students need to know that the legal, economic and political systems that govern the use and management of natural systems directly influence the geographic extent, composition, biological diversity, and viability of natural systems.
Principle III
Natural systems proceed through cycles that humans depend upon, benefit from and can alter. As a basis for understanding this principle:

Concept a. Students need to know that natural systems proceed through cycles and processes that are required for their functioning.

Concept b. Students need to know that human practices depend upon and benefit from the cycles and processes that operate within natural systems.

Concept c. Students need to know that human practices can alter the cycles and processes that operate within natural systems.

Principle IV
The exchange of matter between natural systems and human societies affects the long-term functioning of both. As a basis for understanding this principle:

Concept a. Students need to know that the effects of human activities on natural systems are directly related to the quantities of resources consumed and to the quantity and characteristics of the resulting byproducts.

Concept b. Students need to know that the byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental to their effect.

Concept c. Students need to know that the capacity of natural systems to adjust to human-caused alterations depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of the byproducts.

Principle V
Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes. As a basis for understanding this principle:

Concept a. Students need to know the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions.

Concept b. Students need to know the process of making decisions about resources and natural systems, and how the assessment of social, economic, political, and environmental factors has changed over time.
Appendix II
GLOSSARY

**Abiotic factor:** non-living factor or part of an environment such as air, water, rocks, or sunlight

**Adaptation:** a characteristic such as a body part or behavior that helps an organism survive

**Adhesion:** sticking together, as water molecules might adhere to or exhibit adhesion to a xylem cell wall

**Alluvial flat:** a place where sand, gravel, and silt have been deposited by moving water to form a flat area

**Aquifer:** an underground area such as a buried river bed where there is porous rock that contains water

**Back cut:** the second cut made when felling a tree; the cut that actually causes the tree to fall (see undercut)

**Biodiversity (biological diversity):** the variety of species of organisms in an ecosystem

**Biological integrity:** a biological system's wholeness or completeness, including not only the variety of species (biodiversity), but also the functioning of biological processes

**Biomass:** the total mass (weight) of living matter in a place

**Biotic factor:** living factor or part of an environment such as plants, animals, and bacteria

**Blowdown:** trees or other plants blown over by wind

**Bole:** tree trunk, especially the portion that is large enough to be used for lumber

**Buck:** to cut up a log or bole into pieces of a desired length

**Bud collar:** area around the base of a tree where buds that can sprout new trees or branches form

**Burl:** a woody swelling on a tree, especially a redwood tree, containing buds that can grow branches or new trees

**Cabling:** using cables to move logs in the timber harvesting process
Cambium: a thin layer of cells just inside/under the bark of a tree. The cambium produces the xylem and phloem cells that conduct materials up and down and form the wood of a tree.

Canopy: a forest layer or cover formed by the branches and leaves

Capillary action: movement of a liquid such as water upwards through small tubes or plant cells

Carbon dioxide (CO₂): chemical used by plants in photosynthesis and produced by plant and animal cells during the process of cellular respiration

Carnivore: animal that primarily eats meat

Carrying capacity: the maximum number of individuals of a species that can survive and reproduce (live) in a particular place or ecosystem on a long-term basis

Caterpillar: a type of vehicle equipped on each side with a continuous roller belt over cogged wheels; especially useful in muddy or steep terrain

Chimney tree: a tree that has been hollowed by fire and decay but is still standing.

Christmas tree: see fire column

Clear-cut: a method of harvesting trees in which all (or nearly all) of the trees in a given area are cut (see also selective logging)

Climax community: a relatively stable, long-lasting community of plants and animals achieved after the plants and animals in a place have gone through a series of succession stages

Clone: an organism so produced by cloning

Cloning: to produce new individuals from a single individual by cuttings, fission or some other asexual method

Cohesion: sticking together of molecules of the same type, as water molecules tend to be attracted to each other and stick together

Community: all of the organisms in a particular habitat

Conifer: a tree such as a redwood, pine, fir, or spruce that reproduces through the production of cones (as opposed to flowers and fruits)
Controlled burn: intentional burning of an area, usually to remove brush, slash, or unwanted species of plants – syn. prescribed burn

Conservation: the wise use of resources to provide the most good for the most people

Consumer: an organism that obtains the energy and materials that it needs from other organisms (see producer)

Cross-cut saw: a saw made to cut across the grain, as one used to fell a tree

Cycle: a repeating process such as the water cycle, nitrogen cycle, or a life cycle

Damping off (from fungus): death of seeds or seedlings DUE to fungus

Deciduous: a plant that loses its leaves, especially in the winter (see evergreen)

Decompose: to break down chemically; to rot

Decomposer: an organism that obtains nutrients and energy by breaking down dead organisms mechanically or chemically; primarily fungi and bacteria

Decomposition: the act of decomposing

Detritivore: an organism that eats dead organisms; a scavenger

Drag saw: a type of gas powered saw used to cut down trees in the 1930s and 1940s

Duff: decaying organic matter on the forest floor

Ecology: the study of living things and their environment

Ecosystem: organisms and their environment

Endemic: native to a particular place, naturally occurring

Evergreen: a tree that doesn't lose its leaves in the winter (see deciduous)

Environmentalism: caring about the environment and taking action to protect or conserve it; the meaning of "protect or conserve" is different for different people

Epiphyte: a plant that grows on another plant

Exotic species: a species that has been introduced into a non-native environment

Fall(ing): to cut a tree down
Fell(ing): to cut a tree down

Fire column tree: a tree whose branches have been burned off by a fire but that survived and has sprouted new branches

Fog drip: precipitation formed by fog condensing on leaves or other material

Food chain: the transfer of energy and materials (food) from one organism to another in a series of steps; a food chain is a portion of a food web

Food web: the transfer of energy and materials (food) among the organisms in a community; a food web is more complex but more realistic than a food chain

Geotropism: growth in response to the Earth's gravity. Positive geotropism is growth towards the earth; negative is growth away from the earth. Thus, roots exhibit positive geotropism while stems exhibit negative geotropism.

Girdle: to cut through the bark and cambium of a tree, killing it

Global warming: an increase in the average temperature of the Earth's atmosphere. Certain chemicals, called greenhouse gasses, tend to increase global warming by trapping heat energy that would otherwise be radiated out into space. An example of a greenhouse gas is carbon dioxide.

Goosepen: a hollow in the base of a redwood tree, generally caused by fires

Greenhouse effect: see global warming

Greenhouse gas: a gas, such as carbon dioxide, that tends to trap heat energy. See global warming.

Gulch(ing): former logging practice of dragging logs downhill to a landing where they could be loaded onto rail cars or transported by water to a mill

Habitat: an area where an animal or plant lives

Hardwood: a deciduous or broad leaf tree, such as an oak or madrone, or the wood from such a tree. (The wood isn't necessarily any harder than the wood of a softwood such as fir or redwood.)

Heartwood: the no longer living center part of a tree stem. It is generally darker and harder than the outer sapwood. The heartwood provides support for the tree.

Herbaceous: a plant with a soft stem, as opposed to a woody stem

Herbivore: an animal that eats mostly plants
High-lead cabling: see skyline cabling

Humus: decomposed or decomposing material in the top section of the soil

Hypha (pl. hyphae): thread-like part of a fungus or mold

Introduced species: an exotic species; one that has been brought to a habitat that is not its natural habitat

Invasive species: a type of plant or animal that is introduced into a habitat and tends to take over, out-competing native species.

Landing: site where logs are stored until loaded onto trucks, train cars, or otherwise moved to the mill

Law of Conservation of Matter: the scientific "law" stating that matter or mass can neither be created nor destroyed

Lichen: an organism formed by a fungus and a photosynthetic organism such as an alga

Limiting factor: whatever retards or causes a population's growth to stop. It may be too much of something like shade, heat, predators, or disease, or it may be too little of something like food, sunlight, water, or soil nutrients.

Litter: fallen leaves and small branches on the forest floor

Management: making choices as to what happens to an ecosystem, with specific goals in mind

Microhabitat: a small habitat, or a habitat within a habitat. Examples might include a rotting log in a forest, or the ground under the rotting log, or the bark of a tree, or the forest canopy.

Milling: cutting of logs into boards

Misery whip: see whipsaw

Monoculture: growth one plant species in an area, especially for several growth cycles

Mutualism: a relationship between organisms in which both benefit

Mycorrhiza, (pl. mycorrhizae): a mutualistic relationship between the root of a plant such as a redwood tree and the hyphae of a fungus
**Natural pruning:** the dieing and breaking off of lower branches as branches above shade them

**Niche:** the ecological role of an organism

**Old-growth:** a forest or stand of trees with characteristics of forests before the coming of Europeans. See Section I, Chapter 2 for a discussion of old-growth and related terms. Old-growth forests and stands of trees include trees of varying ages.

**Omnivore:** an organism that feeds on both plants and animals for a substantial part of its diet

**Overpopulation:** a condition in which an organism’s population has exceeded the carrying capacity of its environment

**Overstory:** see canopy

**Phloem:** plant tissue that transports nutrients from the leaves or needles to other parts of the plant; found between the bark and the cambium

**Photosynthesis:** process by which plants and algae use water, carbon dioxide, and light energy to form sugars and oxygen, storing energy in the sugars or starches for eventual use in cellular respiration

**Phototropism:** plant growth response to light. A positive phototropism is growth towards the light, as exhibited by leaves and branches; a negative phototropism is growth away from the light, as exhibited by roots.

**Pioneer species:** the first species of plants to start growing on bare rock or bare ground

**Population:** the number of a particular type of organism in a particular place at a particular time, or the organisms themselves

**Prairie:** a grassland; in the redwoods, usually a grassy hilltop or large grassy opening

**Prescribed burn:** intentional human-caused fire set for a specific reason such as to reduce the amount of fuel or to remove undesired types of plants – syn controlled burn

**Preservation:** managing the land so that it remains, as much as possible, in a more or less natural state

**Producer:** an organism that builds complex chemicals from simple chemicals, usually through photosynthesis; usually plants or algae
Protista: kingdom of organisms with true cells but that aren't plants, animals, or fungi, includes the algae and some animal-like protists called "protozoans"

Pyramid of numbers: a diagram showing the numbers of different kinds of organisms at different trophic levels. It is pyramid shaped because an ecosystem will support many more plants (first trophic level organisms) than top carnivores.

Reiterated trunk: a tree-like growth from a large limb or a fallen tree

Reiteration: see reiterated trunk

Release: rapid growth in diameter and height, usually exhibited after the canopy opens in a stand of trees resulting in more sunlight, nutrients, and water being available to the remaining trees; opposite of suppression

Respiration (cellular respiration): chemical process in which a cell uses sugar or starch and oxygen to release energy, producing carbon dioxide and water as byproducts

Riparian: stream-side

Root hair: tiny projection from the outer layers of roots, site of most water and nutrient absorption in most plants

Root-pull pit: pit formed in the ground when the roots of a fallen tree pull soil with them

Salmonid: a member of the salmon and trout family of fish

Sapwood: wood that carries water and nutrients for the tree. The sapwood is generally lighter in color than the heartwood, and includes xylem and phloem.

Scavenger: an animal that primarily eats dead organisms; a detritivore

Schooner: a type of sailing ship with two or more masts

Second growth: trees that grow after an area's first logging

Seed: the embryo of a plant, encased in a protective covering and surrounded by a food supply

Selective logging: logging by removing only a portion of the trees in a stand, as opposed to clear-cut logging

Sere: the series of communities in a successional sequence

Skid trail: path formed by or for moving logs to a landing
Skyline (sky-lead) cabling: the use of cables to move logs by suspending them from spar trees or other devices so that one or both ends of the log are off the ground

Slash: branches, tree tops, broken trees, brush, and other plant "waste" from a logging operation

Slump jumble: an area where a hillside has slid downhill, forming a "jumble" of disturbed soil and plants

Snag: large dead tree; provides habitat for various species such as some birds and bats

Softwood: cone-bearing tree or the wood thereof; not necessarily any softer than "hardwood"

Spar tree: tree to which cables are attached for moving logs to a landing

Spawn: the act of producing or depositing eggs, especially by fish

Species: a group of similar organisms that can breed and produce fertile offspring

Spike top tree: a tree whose top branches have died, resulting in a spike-like top without branches.

Spore: an asexual reproductive body of certain organisms such as fungi, algae, or bacteria

Springboard: a board once used by loggers to stand on while cutting a tree several feet above the ground

Stand: a group of plants, especially trees

Stewardship: caring for the land or environment

Stump sprout: a tree growing from the stump of a tree that has broken or been cut

Subcanopy: a region of branches and leaves forming a layer distinct from and below the canopy

Succession: a series of different organisms dominating a community in a particular place over a long period of time

Suppression: a slowing down in growth, usually caused by shading produced as a stand's canopy grows together shutting out the sunlight; opposite of release
**Surface Tension:** the tendency of water molecules to stick to each other, especially at the surface of the water

**Sustained yield:** a method of forest management in which, over a period of time, less wood is harvested than grows in an area

**Swamp(ing):** moving logs to a landing, especially in the 1800s

**Tannin:** a type of acidic chemical found in the wood and bark of trees such as redwood, oak, and tanoak. Tannins give wood a red or brown color and provide resistance to rot and insects.

**Tap root:** in some plant species, the main central root that grows downward and usually has lateral roots growing outward from it

**Taxonomy:** the science of classifying organisms based on their evolutionary relationships

**Third growth:** trees that regrow after a group of second growth trees have been harvested

**Timber Harvest Plan (THP):** a multi-faceted plan submitted to a governing agency such as the California Department of Forestry and Fire Protection prior to harvesting trees. A THP provides information describing how the harvest will be conducted, with the intention of maintaining wood supply while reducing environmental and social problems that might be caused by the cutting of trees.

**Transpiration:** the loss of water through a plant's leaves

**Treefall:** one or more trees falling for any of a variety of reasons such as wind, undercutting of a river bank, death of roots, or other reasons

**Trophic Level:** the step in a food chain or food web at which an organism functions

**Tropism:** a growth response of a plant to an environmental condition such as light or gravity

**Undercut:** the first of two cuts made when falling a tree. The undercut determines the direction in which the tree will fall. (see back cut)

**Understory:** plants that grow below the canopy or subcanopy layers in a forest

**Urbanized:** having characteristics of an urban or city environment
**Vascular system:** cellular system that enables an organism to move fluids throughout itself. In mammals, the vascular system includes the heart and blood vessels. In plants, the vascular system consists of the xylem and phloem tissues and the vascular cambium, which produces the xylem and cambium.

**Vascular tissue:** tissues such as the xylem and cambium which are responsible for moving fluid throughout an organism. See vascular system.

**Waterbar:** a structure such as a ridge of soil and gravel built into a road or skid trail with the intention of diverting water to the side to reduce erosion

**Watershed:** the land area drained by streams as they bring water and sediments to rivers or the ocean

**Whipsaw:** a long cross-cut saw once used to buck or cut logs into shorter lengths or for felling a large tree. See misery whip.

**Windthrow (windfall):** the knocking over of trees by the wind

**Xylem:** plant tissue that carries water and minerals upward to the leaves of a plant; found inside of the cambium; primary component of wood

**Yarding:** bringing logs to a landing area called a yard where they are stored until they are loaded onto a truck, train, or in some other way conveyed to the sawmill

**Young growth:** trees that have regrown after an area has been logged, burned, or otherwise had trees removed
Appendix III
ORGANIZATIONS AND AGENCIES

Contacts

The following contacts might also be willing and able to have a guest speaker come to your classroom before or after the trip. Available internet addresses are provided. Addresses may change. Perform an Internet search for the organization if the Internet address below is no longer valid.

Some timber resource companies and sawmills will provide tours of their facilities. Check the yellow pages in the area where you will visit.

Some users of forest products might provide tours or guest speakers. Check the yellow pages for lumber yards, cabinet, furniture, and door manufacturers, and artists.

Fish hatcheries often provide tours.

<table>
<thead>
<tr>
<th>Redwood State &amp; National Parks and State Park Cooperating Associations</th>
<th><a href="http://www.parks.ca.gov">www.parks.ca.gov</a></th>
<th>FAX 707-247-3300</th>
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<tbody>
<tr>
<td>(North to South)</td>
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<tr>
<td>Richardson Grove Interpretive Association</td>
<td>1600 U.S. Highway 101 #8 Garberville, Ca. 95542</td>
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<tr>
<td>Richardson Grove State Park</td>
<td></td>
<td>(707) 247-3318</td>
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<tr>
<td>Sinkyone Wilderness State Park</td>
<td>P.O. Box 245 Whitethorn, CA 95489</td>
<td>707-986-7711</td>
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<tr>
<td>Standish - Hickey State Recreation Area</td>
<td>69350 U.S. Hwy. 101, Box #2 Leggett, CA 95455</td>
<td>(707) 925-6482</td>
</tr>
<tr>
<td>Smithe Redwoods State Reserve</td>
<td></td>
<td>(707) 247-3318</td>
</tr>
<tr>
<td>North Coast Redwood Interpretive Association</td>
<td>127011 Newton B Drury Parkway Orick, CA 95555</td>
<td>(707) 464-6101 Ext. 5300</td>
</tr>
<tr>
<td>Del Norte Coast Redwoods State Park</td>
<td></td>
<td>(707) 464-6101 Ext. 5112</td>
</tr>
<tr>
<td>Jedediah Smith Redwoods State Park</td>
<td></td>
<td>(707) 464-6101 Ext. 5112</td>
</tr>
</tbody>
</table>

Organizations and Agencies

Contact

Richardson Grove Interpretive Association
1600 U.S. Highway 101 #8
Garberville, Ca. 95542
FAX 707-247-3300

Richardson Grove State Park
(707) 247-3318

Sinkyone Wilderness State Park
P.O. Box 245
Whitethorn, CA 95489
707-986-7711

Sinkyone Wilderness State Park
P.O. Box 245
Whitethorn, CA 95489
707-986-7711

Standish - Hickey State Recreation Area
69350 U.S. Hwy. 101, Box #2
Leggett, CA 95455
(707) 925-6482

Smithe Redwoods State Reserve
(707) 247-3318

North Coast Redwood Interpretive Association
northcoastredwood@jeffnet.org
127011 Newton B Drury Parkway
Orick, CA 95555
(707) 464-6101 Ext. 5300

Del Norte Coast Redwoods State Park
(707) 464-6101 Ext. 5112
(707) 464-6101 Ext. 5101

Jedediah Smith Redwoods State Park
(707) 464-6101 Ext. 5112
(707) 464-6101 Ext. 5101
<table>
<thead>
<tr>
<th>Location</th>
<th>Address</th>
<th>Phone Numbers</th>
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<tr>
<td>Prairie Creek Redwoods State Park</td>
<td></td>
<td>(707) 464-6101 Ext. 5301 (707) 464-6101 Ext. 5101</td>
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<tr>
<td>Humboldt Redwoods Interpretive Association</td>
<td>P.O. Box 276 Weott, CA 95571</td>
<td>(707) 946-2263</td>
</tr>
<tr>
<td>Humboldt Redwoods State Park</td>
<td></td>
<td>707) 946-2409</td>
</tr>
<tr>
<td>Grizzly Creek Redwoods State Park</td>
<td></td>
<td>(707) 777-3683 (707) 946-2409</td>
</tr>
<tr>
<td>Redwood National and State Parks</td>
<td>1111 Second Street Crescent City, California 95531</td>
<td>(707) 465-7391 – For School Programs</td>
</tr>
<tr>
<td>Mendocino Area Parks Association</td>
<td>Box 1387 Mendocino, CA 95460</td>
<td>(707) 937-5397 FAX (707) 937-3845</td>
</tr>
<tr>
<td>Mendocino Headlands State Park</td>
<td></td>
<td>(707) 937-5804</td>
</tr>
<tr>
<td>Navarro River Redwoods State Park</td>
<td></td>
<td>(707) 895-3141</td>
</tr>
<tr>
<td>Hendy Woods State Park</td>
<td></td>
<td>(707) 895-3141</td>
</tr>
<tr>
<td>Van Damme State Park</td>
<td></td>
<td>(707) 937-5804</td>
</tr>
<tr>
<td>Stewards of the Coast and Redwoods</td>
<td>PO Box 2 Duncans Mills, CA 95430</td>
<td>(707) 869-9177 FAX (707) 869-8252 EMAIL: <a href="mailto:stewards@mcn.org">stewards@mcn.org</a></td>
</tr>
<tr>
<td>Armstrong Redwoods State Reserve</td>
<td>17000 Armstrong Woods Road Guerneville, CA 95446</td>
<td>(707) 869-9177 FAX (707) 869-8252 EMAIL: <a href="mailto:stewards@mcn.org">stewards@mcn.org</a></td>
</tr>
<tr>
<td>Sonoma Coast State Beach Willow Creek Watershed (Pomo Canyon Campground)</td>
<td>3085 Highway One Bodega Bay</td>
<td>(707) 869-9177 FAX (707) 869-8252 EMAIL: <a href="mailto:stewards@mcn.org">stewards@mcn.org</a></td>
</tr>
<tr>
<td>Marin State Park Association</td>
<td>P.O. Box 2333 Novato, CA 94948</td>
<td>(707) 769-5665</td>
</tr>
<tr>
<td>Samuel P. Taylor State Park</td>
<td>P.O. Box 251 Lagunitas, CA 94938</td>
<td>(415) 488-9897</td>
</tr>
<tr>
<td>Friends of Santa Cruz State Parks</td>
<td><a href="http://www.scparkfriends.org">www.scparkfriends.org</a> 144 School Street Santa Cruz, CA 95060</td>
<td>(831) 429-1840 FAX (831) 429-6748</td>
</tr>
<tr>
<td>Forest of Nisene Marks State Park</td>
<td></td>
<td>(831) 763-7063</td>
</tr>
<tr>
<td>Mountain Parks Foundation</td>
<td><a href="http://www.mountainparks.org">www.mountainparks.org</a> 525 North Big Trees Park Road Felton, CA 95018</td>
<td>(831) 335-3174 FAX (831) 335-4295</td>
</tr>
<tr>
<td>Henry Cowell Redwoods State Park</td>
<td></td>
<td>(831) 335-7077</td>
</tr>
<tr>
<td>Waddell Creek Association</td>
<td>3600 Highway 1 Davenport CA 95017</td>
<td>(831) 427-2288</td>
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Forest Products Industry Websites

<table>
<thead>
<tr>
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<tr>
<td>American Forest &amp; Paper Association</td>
<td><a href="http://www.afandpa.com">www.afandpa.com</a></td>
</tr>
<tr>
<td>American Forests</td>
<td><a href="http://www.amfor.org">www.amfor.org</a></td>
</tr>
<tr>
<td>California Forest Products Commission</td>
<td><a href="http://www.calforests.org">www.calforests.org</a></td>
</tr>
<tr>
<td>California Forestry Association</td>
<td><a href="http://www.foresthealth.org">www.foresthealth.org</a></td>
</tr>
<tr>
<td>California Licensed Foresters Association</td>
<td><a href="http://www.clfa.org">www.clfa.org</a></td>
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<tr>
<td>California Redwood Association</td>
<td><a href="http://www.calredwood.org">www.calredwood.org</a></td>
</tr>
<tr>
<td>Forest Products Society</td>
<td><a href="http://www.forestprod.org">www.forestprod.org</a></td>
</tr>
<tr>
<td>Forest Foundation</td>
<td><a href="http://www.calforestfoundation.org">www.calforestfoundation.org</a></td>
</tr>
<tr>
<td>Forestworld</td>
<td><a href="http://www.forestworld.org">www.forestworld.org</a></td>
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<tr>
<td>Steve Shook's Directory of Forest Products, Wood Science, and Marketing</td>
<td><a href="http://www.forestdirectory.com">www.forestdirectory.com</a></td>
</tr>
<tr>
<td>The Agricultural Network</td>
<td><a href="http://www.growwithcare.com">www.growwithcare.com</a></td>
</tr>
<tr>
<td>Western Wood Products Association</td>
<td><a href="http://www.wepa.org">www.wepa.org</a></td>
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Other Non-governmental Redwood Organizations

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<tr>
<td>Mendocino Environmental Center</td>
<td><a href="http://www.mecgrassroots.org">www.mecgrassroots.org</a></td>
</tr>
<tr>
<td>Save-the-Redwoods league</td>
<td><a href="http://www.savetheredwoods.org">www.savetheredwoods.org</a></td>
</tr>
<tr>
<td>Sempervirens Fund</td>
<td><a href="http://www.sempervirens.org">www.sempervirens.org</a></td>
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</table>
The following have training and/or curriculum and other materials for teachers.

<table>
<thead>
<tr>
<th>Program Name</th>
<th>Description and Resources</th>
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<tbody>
<tr>
<td>Adopt a Creek</td>
<td>Classroom and field curriculum &amp; activities</td>
</tr>
<tr>
<td>Adopt a Stream</td>
<td>Classroom and field curriculum &amp; activities</td>
</tr>
<tr>
<td>Cal Alive</td>
<td>CD-based curriculum</td>
</tr>
<tr>
<td>California Classroom Aquarium Education Project (C.A.E.P.)</td>
<td>Curriculum based on raising salmonids in the classroom</td>
</tr>
<tr>
<td>California Foundation for Agriculture in the Classroom</td>
<td>Curriculum on all types of agriculture</td>
</tr>
<tr>
<td>Earthwater (previously - Adopt a Watershed)</td>
<td>Classroom and field curriculum &amp; activities</td>
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<tr>
<td>Food, Land, and People</td>
<td>Resources for learning</td>
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<tr>
<td>Forest Foundation</td>
<td>Free materials</td>
</tr>
<tr>
<td>Incense Cedar Institute</td>
<td>Information and kit on how pencils are made</td>
</tr>
<tr>
<td>International Paper</td>
<td>Posters, teacher’s guides, booklet</td>
</tr>
<tr>
<td>National Parks Service</td>
<td>Curriculum</td>
</tr>
<tr>
<td>Project Learning Tree</td>
<td>Environmental Ed curriculum</td>
</tr>
<tr>
<td>Project WILD</td>
<td>Wildlife curriculum</td>
</tr>
<tr>
<td>Project WILD Aquatic</td>
<td>Aquatic life curriculum</td>
</tr>
<tr>
<td>Project WET</td>
<td>Curriculum on water</td>
</tr>
<tr>
<td>Save Our Streams program of the Izaak Walton League</td>
<td>Stream conservation curriculum</td>
</tr>
<tr>
<td>Society of American Foresters</td>
<td>Forestry Institute for Teachers</td>
</tr>
<tr>
<td>Talk About Trees</td>
<td>Classroom talks</td>
</tr>
<tr>
<td>Temperate Forest Foundation</td>
<td>Videos and some materials for sale</td>
</tr>
<tr>
<td>Woodlinks</td>
<td>Forest careers kit</td>
</tr>
</tbody>
</table>

The Forestry Institute for Teachers (F.I.T.) is a week-long training opportunity offered to teachers at various locations around the state, including Humboldt State University in Arcata. Participants learn about forest ecosystems and resource management. Field trips to various related sites, presentations by experts in the field, and working with fellow teachers make F.I.T. a great learning experience. Participants receive training and resources from Project Learning Tree, Project WILD, and numerous other resources. F.I.T. is not only free, but teachers who submit curriculum materials afterwards also receive a stipend! For information, go to:

www.forestryinstitute.org

or perform an Internet search for Forestry Institute for Teachers.

Each year the redwood resource industry sponsors a "Redwood Logging Conference." Partly trade show and partly educational opportunity, teachers can bring classes and/or obtain materials to use in the classroom. Perform an Internet search for "Redwood Logging Conference."

The following organizations may be of interest:

<table>
<thead>
<tr>
<th>Organization</th>
<th>Website</th>
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<tbody>
<tr>
<td>American Forest Foundation</td>
<td><a href="http://www.forestfoundation.org">www.forestfoundation.org</a></td>
</tr>
<tr>
<td>American Forests/Global ReLeaf</td>
<td><a href="http://www.amfor.org">www.amfor.org</a></td>
</tr>
<tr>
<td>American Pulpwood Association</td>
<td><a href="http://www.apulpa.org">www.apulpa.org</a></td>
</tr>
<tr>
<td>California Academy of Sciences</td>
<td><a href="http://www.calacademy.org">www.calacademy.org</a></td>
</tr>
<tr>
<td>California Community Forests Foundation</td>
<td><a href="http://www.caltrees.org">www.caltrees.org</a></td>
</tr>
<tr>
<td>Coastal Watershed Council</td>
<td><a href="http://www.coastal-watershed.org">www.coastal-watershed.org</a></td>
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<tr>
<td>Conservation Foundation</td>
<td><a href="http://www.conservationfund.org">www.conservationfund.org</a></td>
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<tr>
<td>Council for Environmental Education</td>
<td><a href="http://www.c-e-e.org">www.c-e-e.org</a></td>
</tr>
<tr>
<td>California Regional Environmental Community (CREEC) Network</td>
<td><a href="http://www.creec.org">www.creec.org</a></td>
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<tr>
<td>Defenders of Wildlife</td>
<td><a href="http://www.defenders.org">www.defenders.org</a></td>
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<tr>
<td>Ecology Action</td>
<td><a href="http://www.ecoact.org">www.ecoact.org</a></td>
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<tr>
<td>Environmental Education Network</td>
<td><a href="http://www.eelink.net">www.eelink.net</a></td>
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<td>Environmental Protection Information Center (EPIC)</td>
<td><a href="http://www.wildcalifornia.org">www.wildcalifornia.org</a></td>
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<td>Forest History Society</td>
<td><a href="http://www.lib.duke.edu/forest">www.lib.duke.edu/forest</a></td>
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<tr>
<td>Forests Forever</td>
<td><a href="http://www.forestsforever.org">www.forestsforever.org</a></td>
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<tr>
<td>Forestry Conservation Portal</td>
<td><a href="http://www.forests.org">www.forests.org</a></td>
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<tr>
<td>Friends of the Earth</td>
<td><a href="http://www.foe.org">www.foe.org</a></td>
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<tr>
<td>Izaac Walton League</td>
<td><a href="http://www.iwla.org">www.iwla.org</a></td>
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<td>Mattole Restoration Council</td>
<td><a href="http://www.mattole.org">www.mattole.org</a></td>
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<td>Mendocino Environmental Center</td>
<td><a href="http://www.mecgrassroots.org">www.mecgrassroots.org</a></td>
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<tr>
<td>National Arbor Day Foundation</td>
<td><a href="http://www.arborday.org">www.arborday.org</a></td>
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<td>Website</td>
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<tr>
<td>National Audubon Society</td>
<td><a href="http://www.audubon.org">www.audubon.org</a></td>
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<tr>
<td>National Wildlife Federation</td>
<td><a href="http://www.nwf.org">www.nwf.org</a></td>
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<tr>
<td>Native Forest Council</td>
<td><a href="http://www.forestcouncil.org">www.forestcouncil.org</a></td>
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<td>Natural Resources Conservation Service</td>
<td><a href="http://www.nrcs.usda.gov">www.nrcs.usda.gov</a></td>
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<tr>
<td>Natural Resources Defense Council</td>
<td><a href="http://www.nrdc.org">www.nrdc.org</a></td>
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<td>North American Association for Environmental Education</td>
<td><a href="http://www.naaee.org">www.naaee.org</a></td>
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<tr>
<td>North Coast Environmental Center</td>
<td><a href="http://www.yournec.org">www.yournec.org</a></td>
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<tr>
<td>Pacific Rivers Council</td>
<td><a href="http://www.pacrivers.org">www.pacrivers.org</a></td>
</tr>
<tr>
<td>Planning and Conservation League</td>
<td><a href="http://www.pcl.org">www.pcl.org</a></td>
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<tr>
<td>Plant Conservation Alliance</td>
<td><a href="http://www.nps.gov/plants">www.nps.gov/plants</a></td>
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<tr>
<td>Resources for the Future</td>
<td><a href="http://www.rff.org">www.rff.org</a></td>
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<tr>
<td>Sierra Club</td>
<td><a href="http://www.sierraclub.org">www.sierraclub.org</a></td>
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<tr>
<td>Save-the-Redwoods League</td>
<td><a href="http://www.savetheredwoods.org">www.savetheredwoods.org</a></td>
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<tr>
<td>Society for Ecological Restoration</td>
<td><a href="http://www.ser.org">www.ser.org</a></td>
</tr>
<tr>
<td>Soil and Water Conservation Society of America</td>
<td><a href="http://www.swcs.org">www.swcs.org</a></td>
</tr>
<tr>
<td>Student Conservation Association</td>
<td><a href="http://www.thescba.org">www.thescba.org</a></td>
</tr>
<tr>
<td>The Nature Conservancy</td>
<td><a href="http://www.tnc.org">www.tnc.org</a></td>
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<tr>
<td>The Wilderness Society</td>
<td><a href="http://www.wilderness.org">www.wilderness.org</a></td>
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<tr>
<td>Trees Foundation</td>
<td><a href="http://www.treesfoundation.org">www.treesfoundation.org</a></td>
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<tr>
<td>Wildlands Restoration Team</td>
<td><a href="http://www.wildwork.org">www.wildwork.org</a></td>
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<tr>
<td>Wildlife Conservation Society</td>
<td><a href="http://www.wcs.org">www.wcs.org</a></td>
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<tr>
<td>World Forestry Center</td>
<td><a href="http://www.worldforestry.org">www.worldforestry.org</a></td>
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<tr>
<td>World Resources Institute</td>
<td><a href="http://www.wri.org">www.wri.org</a></td>
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**Government Agencies:**

**California:**

<table>
<thead>
<tr>
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<tr>
<td>California Department of Conservation</td>
<td><a href="http://www.consrv.ca.gov">www.consrv.ca.gov</a></td>
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<tr>
<td>California Department of Education</td>
<td><a href="http://www.cde.ca.gov">www.cde.ca.gov</a></td>
</tr>
<tr>
<td>California Department of Fish and Game</td>
<td><a href="http://www.dfg.ca.gov">www.dfg.ca.gov</a></td>
</tr>
<tr>
<td>California Department of Forestry and Fire Protection</td>
<td><a href="http://www.fire.ca.gov">www.fire.ca.gov</a></td>
</tr>
<tr>
<td>California Department of Parks and Recreation</td>
<td><a href="http://www.parks.ca.gov">www.parks.ca.gov</a></td>
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<tr>
<td>California Department of Water Resources</td>
<td><a href="http://www.water.ca.gov">www.water.ca.gov</a></td>
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**Federal:**

<table>
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<tr>
<td>National Park Service</td>
<td><a href="http://www.nps.gov">www.nps.gov</a></td>
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<tr>
<td>U.S. Environmental Protection Agency</td>
<td>Region 9: <a href="http://www.epa.gov/region09">www.epa.gov/region09</a></td>
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<tr>
<td>U.S. Fish and Wildlife Service</td>
<td><a href="http://www.fws.gov">www.fws.gov</a></td>
</tr>
<tr>
<td>U.S. Department of Agriculture, Forest Service: Pacific</td>
<td><a href="http://www.fs.fed.us/r5">www.fs.fed.us/r5</a></td>
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<tr>
<td>Southwest Region (Region 5)</td>
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Appendix IV
SOURCES OF MATERIALS

Books

There are, of course, many excellent sources of books.

- Many redwood parks have visitor centers where books and other resources can be purchased. Be sure to check them out when you do your pre-trip visit.

- Towns in the redwood region often have book stores with a good selection of natural history books.

- One can often find great bargains on Internet sources such as Amazon and eBay

- You might want to join with other teachers or even other schools to create a library of science resource materials.

- Public libraries often appreciate requests from teachers so that they can spend their limited budgets on books that will be used.

- The National Science Teachers Association and the National Association of Biology Teachers are a source of science education resources:
  
  www.nsta.org       www.nabt.org

- Acorn Naturalists: A source for natural history books and other materials, including videos and hands-on materials.
  
  www.acornnaturalists.com

Top 10

There are many wonderful books that are useful in learning about the coast redwoods. Listed below are some of those that I think would provide a great foundation for a coast redwood library. I'm sure that I've left out some great resources.


Henson, Paul and Donald Usner. *The Natural History of Big Sur*. Berkeley, CA: University of California Press, 1993. (Although written for Big Sur, this nicely illustrated book includes information on many organisms found throughout the redwood region.)


Nature Finder Guides by the Nature Study Guild of Berkeley, CA, including:
- *Pacific Coast Berry Finder* by Glenn Keator
- *Pacific Coast Bird Finder* by Roger Lederer
- *Pacific Coast Fern Finder* by Glenn Keator and Ruth Hardy
- *Pacific Coast Mammals* by Ron Russo
- *Pacific Coast Tree Finder* by Tom Watts
- *Redwood Region Flower Finder* by Phoebe Watts


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**For young redwood sprouts**


McKinney, Barbara. *A Drop Around the World*. Nevada City, CA: Dawn Publications, 1998. (Shows water in many different settings around the world with rhyming descriptions. Not exactly presented as the water cycle, but could easily be used to teach the water cycle. Ages 5 to 12.)


**Forestry Education Materials**

**Programs and Materials:**

<table>
<thead>
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<th>Forestry Education Materials</th>
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<td>Calif. Foundation for Agriculture in the Classroom</td>
<td><a href="http://www.cfaitc.org">www.cfaitc.org</a></td>
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<td>Food, Land and People:</td>
<td><a href="http://www.foodlandpeople.org">www.foodlandpeople.org</a></td>
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<tr>
<td>Forest Foundation: (also see &quot;Freebies&quot; below):</td>
<td><a href="http://www.calforestfoundation.org">www.calforestfoundation.org</a></td>
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<tr>
<td>Incense Cedar Institute:</td>
<td><a href="http://www.pencils.com">www.pencils.com</a></td>
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<td>International Paper:</td>
<td><a href="http://www.internationalpaper.com">www.internationalpaper.com</a></td>
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<td>Project Learning Tree:</td>
<td><a href="http://www.plt.org">www.plt.org</a></td>
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<td>Society of American Foresters:</td>
<td><a href="http://www.safnet.org">www.safnet.org</a></td>
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<tr>
<td>Talk About Trees:</td>
<td><a href="http://www.talkabouttrees.org">www.talkabouttrees.org</a></td>
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<tr>
<td>Temperate Forest Foundation</td>
<td><a href="http://www.forestinfo.org">www.forestinfo.org</a></td>
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<td>Woodlinks:</td>
<td><a href="http://www.woodlinks.org">www.woodlinks.org</a></td>
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“Tree cookies,” (sections of trees or branches showing growth rings and various growth patterns) can be purchased from several of the suppliers listed on page 404. Another source is Tom Catchpole. For price information and an order form, send an email to him at: <treecookies@netptc.net>. For large or custom orders, telephone him at (559) 855-2194.

Forestry equipment such as forester’s tapes for measuring diameter and increment borers for determining age and growth rates can be purchased from several companies. Perform an Internet search for "forestry supplies and equipment."

Forestry and Wood Products Related Web Sites:

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<th>Organization</th>
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<tr>
<td>American Forest and Paper Association</td>
<td><a href="http://www.afandpa.com">www.afandpa.com</a></td>
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<td>American Forests</td>
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<td>California Forest Products Commission</td>
<td><a href="http://www.calfores.ts.org">www.calfores.ts.org</a></td>
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<td>California Forestry Association</td>
<td><a href="http://www.foresthealth.org">www.foresthealth.org</a></td>
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<tr>
<td>California Licensed Foresters Association</td>
<td><a href="http://www.cfia.org">www.cfia.org</a></td>
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<td>California Redwood Association</td>
<td><a href="http://www.calredwood.org">www.calredwood.org</a></td>
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<tr>
<td>California Department of Forestry and Fire Protection</td>
<td><a href="http://www.fire.ca.gov">www.fire.ca.gov</a></td>
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<td>Forest Products Society</td>
<td><a href="http://www.forestprod.org">www.forestprod.org</a></td>
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<td>Forestworld:</td>
<td><a href="http://www.forestworld.com">www.forestworld.com</a></td>
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<td>Incense Cedar Institute</td>
<td><a href="http://www.pencils.com">www.pencils.com</a></td>
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<tr>
<td>The Agricultural Network</td>
<td><a href="http://www.growwithcare.com">www.growwithcare.com</a></td>
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<tr>
<td>U.S. D.A. Forest Service</td>
<td><a href="http://www.fs.fed.us">www.fs.fed.us</a></td>
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<tr>
<td>Western Wood Products Association</td>
<td><a href="http://www.wwpa.org">www.wwpa.org</a></td>
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General Science Education Materials

The list below is not complete, but it includes most major science supply companies. For more, perform an Internet search for "science supply houses."

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<tr>
<td>Arbor Scientific</td>
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<td>Carolina Supply</td>
<td><a href="http://www.carolina.com">www.carolina.com</a></td>
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<tr>
<td>Delta Education</td>
<td><a href="http://www.delta-education.com">www.delta-education.com</a></td>
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<tr>
<td>Edmund Scientific</td>
<td><a href="http://www.scientificsonline.com">www.scientificsonline.com</a></td>
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<tr>
<td>Fisher Scientific</td>
<td><a href="http://www.fischersci.com">www.fischersci.com</a></td>
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<td>Flinn Scientific</td>
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<td>NASCO</td>
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<td>Sargent-Welch</td>
<td><a href="http://www.sargentwelch.com">www.sargentwelch.com</a></td>
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<tr>
<td>Science Kit and Boreal Laboratories</td>
<td><a href="http://www.sciencekit.com">www.sciencekit.com</a></td>
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<tr>
<td>Wards Natural Science</td>
<td><a href="http://www.wardsci.com">www.wardsci.com</a></td>
</tr>
</tbody>
</table>
Freebies

Bearss, Edwin. *History Basic Data Redwood National Park*. Washington, D.C.: National Park Service, Division of History, Office of Archaeology and Historic Preservation, 1969 (reprinted 1982). (This is an excellent resource for anyone who is interested not only in park history but the history of the Humboldt and Del Norte County region. It is out of print, but is available online. The entire document is about 500 pages long. About half is writing and half old documents, maps, and photos.) Use a search engine to find the title or go to:

www.cr.nps.gov/history/online_books/redw

The *Big Creek Lumber Company* has produced a very nice booklet titled *What’s Happening in Our Redwood Forest? – The Santa Cruz Mountain Redwood Story*. Contact them at:

janetw@big-creek.com or phone: 831-457-5023

The *California Redwood Association* has a CD on uses of redwood:

www.info@calredwood.org or phone: 888-CALREDWOOD

The *Forest Foundation* has variety of materials available, including video tapes, curriculum packets, and posters with titles such as *Forest Management Practices, Forests are Important to All of Us, The Most Common Trees in California Forests, and The Forest Cycle*. They also have a booklet titled *A Guide to California’s Wildlife on Private Forestlands*.

www.calforestfoundation.org or phone: 1-866-241-TREE

Better than free! The *Forestry Institute for Teachers (F.I.T.*) will pay teachers a stipend for participating in the week-long institute and completing a curriculum development project. These institutes are offered during the summer at several sites around the state, including Humboldt State University. For information, go to:

www.forestryinstitute.org or phone: 800-738-TREE

The *Muir Woods National Monument* has a CD of education programs, grades K-5. The lessons and activities can also be downloaded. The CD includes photos of many plants and animals found in the redwood forest.

www.nps.gov/muwo or phone: 415-388-0107
Project Learning Tree publishes a *Pre K-8 Environmental Education Guide* that includes nearly 100 activities as well as very useful appendices. To obtain the guide, one must participate in a very enjoyable teacher training workshop. The California P.L.T. Coordinator can be reached at:

Kay.Antunez@fire.ca.gov or phone: 916-653-7958

The *Redwood National and State Parks* has an information packet that includes maps and a variety of fact sheets on the various communities found within the parks. The packet is published in conjunction with the Save-the-Redwoods League and the Redwood Park Association. The NPS web site also has quite a lot of information at:

http://www.redwood.national-park.com/info

Contact information:
- headquarters: 1111 Second Street, Crescent City, 95531
- phone: 707-464-6101
- email: REDW_INFORMATION@nps.gov
- homepage: www.nps.gov/redw/

The *Save-the-Redwoods League* has some information on their web site as well as an education grant program (The League helped fund the creation of *Redwood Ed.*). They also have several inexpensive publications:

http://www.savetheredwoods.org or phone: 415-362-2352

The *Sempervirens Fund* primarily seeks to purchase redwood forest land for preservation, but their web site does have some information, and they provide opportunities for involvement.

http://www.sempervirens.org or phone: 650-968-4509

The United States Environmental Protection Agency has produced *Climate Change, Wildlife, and Wildlands: A Toolkit for Teachers and Interpreters*. This free kit includes a CD, video tape, a wheel for determining CO₂ production and ways to reduce it, and cards depicting ways that wildlife are affected by global warming, and other classroom resources. A revised version should be available in 2008.

www.epa.gov/globalwarming or phone: 202-564-3482 or 304-535-6057

The United States Forest Service has a series of posters including such topics as: fire's role in nature, leaves, birds, fungi, animal babies, birds nests and eggs, insects, state trees, reptiles, butterflies, edible forest plants, animal tracks, fish, and others. They are distributed in conjunction with the National Association of State Foresters. Contact your nearest U.S.D.A. – Forest Service or California Department of Forestry and Fire Protection office.
Appendix V
RESOURCES CITED OR USED IN REDWOOD ED

INTRODUCTION


Section I: NATURAL HISTORY OF THE REDWOODS

Adams, Kramer. The Redwoods. New York, NY: Popular Library, 1969 (?). (This small volume contains lots of information presented in an easy to read style. I would say that the main point that the author tries to make is that harvesting of redwoods in a responsible manner is good conservation, i.e., the best use of the resource. This book is out of print, but can be found at Internet sites.)

Aesop's Fables: Illustrated Junior Library. New York, NY: Grosset and Dunlap, Inc., 1947. (This collection of Aesop's fables tells the stories in simple language accompanied by simple illustrations. Other, more recent, volumes may include other fables, more interesting illustrations, and the stories may have different titles.)

Barbour, Michael et al. Coast Redwood: A Natural and Cultural History. Los Olivos, CA: Cachuma Press, 2001. (Excellent, well written, well illustrated comprehensive resource. This is the main resource used for both the natural history and human history sections of Redwood Ed. A must-have for people who want to understand the coast redwoods! Not as heavy on the science as Noss’ The Redwood Forest.)

Becking, Rudolf. Pocket Flora of the Redwood Forest. Covelo, CA: Island Press, 1982. (Excellent resource for those who would like to learn to identify plants of the redwood region. Includes a section on plant identification and the use of key, a key to the families of plants, and keys and descriptions for many genera and species.)


Deem, Adam. *A Guide to California’s Wildlife on Private Forestlands*. Auburn, CA: The California Forest Foundation, 2006. (This publication, as well as other resources, is available for free to teachers. It includes photographs and other information about many different animals, broken down by types of forests...a very useful resource!)


http://darn.ucop.edu/ihrmp/sodsymp/poster/poster32.html


Fritz, Emanuel. *Story Told by a Fallen Redwood*. San Francisco, CA: Save-the-Redwoods League, 1995. (Very interesting booklet describing the information that can be gleaned from studying tree rings and other characteristics of a fallen redwood in Richardson Grove State Park in Humboldt County. Nicely illustrated. Good companion to some of the activities in *Redwood Ed.*)


Hauser, Susan Carol. *Outwitting Ticks: The Prevention and Treatment of Lyme Disease and Ailments Caused by Ticks, Scorpions, Spiders, and Mites*. New York, NY: The Lyons Press, 2001. (Very informative book about ticks (and tick-borne diseases) and other relatives such as the black widow spider, brown recluse spiders, scorpions, and others.)


Hensen, Paul and Donald Usner. *The Natural History of Big Sur*. Berkeley, CA: University of California Press, 1993. (A well illustrated guide to not only the redwoods, but also the coast, chaparral, and oak woodlands of the Big Sur region.)


Integrated Taxonomic Information System (<www.itis.usda.gov>) This is a web site where one can check common and scientific names to find out the currently accepted names of organisms.

*Invasive Weeds of Marin & Sonoma Counties*. Santa Rosa, CA: Sonoma County Agricultural Commissioner, 2003 (and others). (This brochure is well illustrated with photographs of common invasive species found throughout the redwood region. More information can be obtained at: <www.marinsonomaweedmanagement.org>)


Khosla, Maya. *Web of Water: Life in Redwood Creek*. San Francisco, CA: Golden Gate National Parks Association, 1997. (This beautifully illustrated book describes life in Muir Woods' Redwood Creek. Many different plants and animals found in creeks throughout the redwood region are illustrated, and the scientific information is mixed with beautifully written prose.)


MacDonald, Jim and Jeff Obirek. *Grades K-5 Education Programs: Into the Redwood Forest*. Mill Valley, CA: Muir Woods National Monument, National Parks Service, 2003. (This CD, which can be obtained for free, includes lessons, information, and photographs that can be used for teaching about redwoods anywhere.)

Merrian, C. Hart. *Indian Names for Plants and Animals Among Californian and Other Western North American Tribes*. Socorro, N.M.: Ballena Press, 1979. (This book provides the names of many plants and animals in several different Native American languages.)

Miller, Dan. *Life History and Ecological Guide to the Coast Redwood, Sequoia sempervirens*. Aptos, CA: self-published, 2005. (Written primarily for use in the Forest of Nisene Marks State Park, this resource provides a wealth of information that is applicable throughout the redwood region.)


Moore, Ken. *A Plague of Plants: Controlling Invasive Plants in Santa Cruz County*. Santa Cruz, CA: Wildlands Restoration Team, 2002. (A booklet describing over 2 dozen invasive species, how to remove them, how to dispose of them, and follow-up procedures. Available online at: < www.wildwork.org >)

Munz, Philip and David Keck. *California Flora*. Berkeley, CA: University of California Press, 1965. (This is a commonly used "key" for California plants.)

Osburn, Verne and Phillip Lowell. *Review of Redwood Harvesting*. Sacramento, CA: California Division of Forestry (now California Department of Forestry and Fire Protection), 1972. (Uses before and after pictures to make the case for clear cutting in the redwood forests. Updated in 1990…see Lowell)


Save-the-Redwoods League. Staff provided input, especially on Section I, the Natural History of the Redwoods. 114 Sansome Street, Room 1200, San Francisco, Ca 94104.


*The Tall Trees: Portraits of California's Redwood Parks, Preserves, and Visitor Attractions*. Fortuna, Ca: FVN Corporation, 2001. (Beautiful photographs and fine drawings of sites to see in the coast redwood region. Includes both natural and human "attractions.")


Section II: HUMAN HISTORY OF THE REDWOODS

PRINT RESOURCES:

Adams, Kramer. The Redwoods. New York, NY: Popular Library, 1969 (?). (This small volume contains lots of information presented in an easy to read style. I would say that the main point that the author tries to make is that harvesting of redwoods in a responsible manner is good conservation, i.e., the best use of the resource. This book is out of print, but can be found at Internet sites.)

American Forest Foundation. Project Learning Tree: Environmental Education Pre k-8 Activity Guide. Washington, D.C.: American Forest Foundation, 2006. (This guide provides 96 activities with extensive cross-referencing and wonderful appendices. I recommend that any teacher who is interested in teaching about trees (or nature in general) participate in not only the Project Learning Tree training but also the Project WILD and WILD Aquatic trainings. See the resources section.)


Andrews, Ralph W. Redwood Classic. New York, NY: Bonanza Books/Crown Publishers, 1958. (Chock full of primary resources such as newspaper accounts, magazine articles, and old photographs. While many of the illustrations are not very clear, it makes very interesting reading about both coast redwoods and the giant sequoia of the Sierra)


Barbour, Michael et al. Coast Redwood: A Natural and Cultural History. Los Olivos, CA: Cachuma Press, 2001. (Excellent, well written, well illustrated comprehensive resource. Must-have for people who want to understand the coast redwoods! Not as heavy on the science as Noss' The Redwood Forest.)
Bearss, Edwin. *History Basic Data Redwood National Park*. Washington, D.C.: National park Service, Division of History, Office of Archaeology and Historic Preservation, 1969 (reprinted 1982). (This is an excellent resource for one who is interested not only in park history but the history of the Humboldt and Del Norte County region. It is out of print, but is available online. The entire document is about 500 pages long. About half is writing and half old documents, maps, and photos.) Use a search engine to find the title or go to:

www.cr.nps.gov/history/online_books/redw


*Caspar Creek Experimental Watershed*. Pacific Southwest Research Station. Information available on the Internet at:

http:www.fs.fed.us/psw/ef/caspar_creek


Dr. Seuss (Theodor Seuss Geisel). The Lorax. New York, NY: Random House, 1971. (An Internet search will provide a variety of Lorax-related information, including Earth Day activities, and a game called "The Lorax’s Save the Trees Game."

www.seussville.com/games/Lorax

There is also a video of the book. As noted in Redwood Ed, be aware of the community’s sensitivities, and that the book is about waste and greed, not about bashing all timber harvesting. In fact, the book ends on positive note of hope, promoting individual involvement in protecting the environment.)


Hackett, Steven. "The North Coast Region of California Economic And Demographic Trends and Outlook." Panel Presentation for the California Employment Development Department, Sacramento, CA: May, 2006. (Professor Hackett provided me with a copy of his Power Point slide presentation. He is a professor at Humboldt State University.)

Hartzog, George. *The Redwoods: A National Opportunity for Conservation and Alternatives for Action*. San Francisco, CA: National Park Service, Western Regional Office, 1964. (Hartzog was the Director of the NPS when this interesting booklet was published. This is a report on the 1963-64 National Geographic-funded study that eventually led to the creation of the Redwood National Park. The chapter titles include: The Study, The Redwoods, The Situation, The Opportunities, and Economic Values.)

Havel, Eric. *Redwoods Resource Folder*. Oakland, CA: Chabot Space and Science Center, 2006. (This is a packet of resources put together for teachers who want to educate their students about the redwoods, with special emphasis on the East Bay area. Mostly copies of publications from other groups. A very useful resource, the creation of which was supported by the Save-the-Redwoods League.)


Holland, I.I. et al. *Forests and Forestry*. Danville, IL: Interstate Publishers, Inc., 1990. (A text for "...teachers and students of agriculture and forestry as well as forest landowners," it takes the viewpoint of forests as crops.)

Hyde, Philip and Francois Leydet. *The Last Redwoods*. San Francisco, CA: the Sierra Club, 1963. (This large format book was published as a call to arms for the creation of a Redwood National Park. Many beautiful pictures along with pictures of the effects of logging in the redwoods.)


Lightfoot, Kent. *Indians, Missionaries, and Merchants*. Berkeley, CA: University of California Press, 2005. (Historical information, including many comparisons between the ways the Russians and the Spanish interacted with the Native Americans in California.)


McGrath, Kathy. Internet correspondence. (As of May, 2006, Kathy McGrath was the Division Chief, Resource Management, for the California Department of Forestry and Fire Protection in Fortuna, CA. I asked her about the typical numbers of active THPs and violations. <Kathy.McGrath@fire.ca.gov>
McWilliams, Bruce (researcher). *The Forest Products Industries in California: Their Impact on the State Economy*. Oakland, CA: Regents of the University of California, 1994. (Lots of data, most presented in graphs and tables. Publication # CNR002)


Osburn, Verne and Phillip Lowell. *Review of Redwood Harvesting*. Sacramento, CA: California Division of Forestry (now California Department of Forestry and Fire Protection), 1972. (Uses before and after pictures to make the case for clear cutting in the redwood forests. Updated in 1990…see Lowell)

Oswald, Daniel. *The Timber Resources of Humboldt County*. Portland, OR: Pacific Northwest Forest and Range Experiment Station, 1968. (A booklet with lots of information and statistics about Humboldt County timber industry in the late 1960's.)


Passoff, Peter. *Managing Your Redwood Forest: An Owner's Manual for the Nineties*. Davis, CA: University of California, Cooperative Extension, Division of Agriculture and Natural Resources, 1993. (Written for the forest landowner who is considering logging or how to otherwise manage his or her property. Includes discussion of uses other than logging, but emphasis is on potential logging.)


Redwood Ecology Teacher’s Guide. Duncans Mills, CA: California State Parks/Russian River Sector and the Stewards of the Coast and Redwoods, 2006. (Although this Teacher’s Guide was written for the Armstrong Redwoods State Reserve and Austin Creek State Recreation Area, it provides quite a bit of information that is useful for in any redwood area, much of which is included in this guide.)

The Redwood Forester, Volume II, Number One. Samoa, CA: Humboldt Redwood Reforestation Association, circa 1933?. (A booklet describing reforestation efforts in the 1920s-1930s, including a variety of information on redwoods and logging. I found the booklet in the library of the Save-the-Redwoods League. It references a May, 1899 National Geographic Magazine article on the redwoods.)

Rodes, Barbara and Rice Odell. A Dictionary of Environmental Quotations. Baltimore, MD: Johns Hopkins University Press, 1992. (An excellent collection of quotations categorized into 143 categories ranging from Acid Rain to Zoos, indexed by author and subject.)


http://www.snopes.com/quotes/quotes.asp#reagan (This URL provides contextual information about the famous Ronald Reagan (supposed) quote about "You've seen one redwood, you've seen them all.")

Stewart, William. "California's Redwoods at a Crossroads" California Forests, Summer, 2004 (Volume 8, Number 2). Sacramento, CA: California Forestry Association. (This issue focuses on the fragmentation of forest land. California Forests is published by the California Forestry Association. Each issue focuses on a particular aspect of the forest products industry. Phone number: 916-444-6592. email: < cfa@foresthealth.org >)

http://nwis.waterdata.usgs.gov/ca/nwis/peak


Thompson, Richard and Dicus, Christopher. The Impact of California’s Changing Environmental Regulations on Timber Harvest Planning Costs. San Luis Obispo, CA: California Polytechnic State University, 2005. (A study done by the California Institute for the Study of Specialty Crops and funded by the Forest Foundation.)


We Care for the Forests. Auburn, CA: California Forest Products Commission, 2003. (The Commission produces a variety of resources for teachers, including a series of lesson plans and free loan videos. See resources section for contact information.)


Western Wood Products Association. 2002 Statistical Yearbook of the Western Lumber Industry. Portland, OR: Western Wood Products Association, 2002. (Annual compilation of data. Unfortunately the Western Wood Products Association doesn’t make its data available online, and won’t lend past volumes, so it’s hard (or expensive) to obtain older data. (They started publishing the yearbooks in 1947.) Each issue includes a summary of the findings and then lots of data presented in tables.)

Western Wood Products Association. 2004 Statistical Yearbook of the Western Lumber Industry. Portland, OR: Western Wood Products Association, 2004. (Annual compilation of data. Unfortunately the Western Wood Products Association doesn’t make its data available online, and won’t lend past volumes, so it’s hard (or expensive) to obtain older data. (They started publishing the yearbooks in 1947.) Each issue includes a summary of the findings and then lots of data presented in tables.)


Wood, L.K. *The Discovery of Humboldt Bay – A Narration*. This publication was found in the Sonoma County Library. It had no date or publisher indicated, but the portions of Wood's accounts of the Josiah Gregg trip through the redwoods are found in other publications.


Yocom, Charles and Raymond Dasmann. *The Pacific Coastal Wildlife Region*. San Martin, CA: Naturegraph Company, 1957. (A good basic guide to the plants and animals living along the coasts of Washington, Oregon, and northern California to Monterey. Includes drawings and descriptions of most common plants and animals, and species lists. Part of a series of similar booklets by the Naturegraph Publishing Company.)


**NON-PRINT RESOURCES**

*Redwood: The Natural Choice*. Novato, CA: California Redwood Association, date not given. (Promotional C.D. that includes information on redwoods, decking, and other uses of the lumber.)
WORKS CITED: SECTION III: FIELD TRIPS


Roa, Michael. *A Guide to the Side of the Sea*. Sacramento, CA: California State Parks Department, 2004. (Written to provide a resource for teachers who want to bring students to visit the rocky coast of northern California, including the redwood region. Available for free online, on a CD, and in paper format.)

Council for Environmental Education. *Project WILD K-12 Activity Guide*. Houston, TX: Project WILD, 1992. (Similar to *Project Learning Tree*, this is a collection over 110 activities for classroom and field, with many appendices and cross-references.)

WORKS CITED: SECTION IV: ACTIVITIES AND LESSONS


www.plt.org/cms/pages/21_21_43.html

www.pit.org/cms/pages/21_21_43.html


www.plt.org/cms/pages/21_21_43.html


www.plt.org/cms/pages/21_21_43.html

California State Board of Equalization, Timber Tax division. Sacramento, CA. (This agency compiles statistics on timber harvests, among other things.)

Copeland, Willis (Project Director). *Creek Watchers: Exploring the Worlds of Creeks and Streams*. Santa Barbara, CA: California Aquatic Science Education Consortium, University of California – Santa Barbara, undated. (A good collection of activities for creek studies.)


Council for Environmental Education. *Project WILD*. Houston, TX: Council for Environmental Education, 2005. (Similar to *Project WILD-Aquatic* and *Project Learning Tree*, this is a collection of water related activities. < www.projectwild.org >)

Council for Environmental Education. *Project WILD-Aquatic*. Houston, TX: Council for Environmental Education, 2005. (Similar to *Project WILD* and *Project Learning Tree*, this is a collection of water related activities.)

www.projectwild.org
Creating Coastal Stewardship Through Science. Point Reyes Station, CA: Point Reyes National Seashore, undated. (Good collection of activities, including field trip suggestions.)


Firehock, Karen. Hands-On Save Our Streams. Gaithersburg, MD: Izaak Walton League of America, 1995. (As the name implies, activities for stream study.)

Guiney, Miriam. Redwood Parks Activity Book. Cincinnati, OH: Creative Company, 1994. (This book has a variety of activities such as coloring, games, scrambles, etc. Suitable for younger children.)

Hone, Elizabeth et al. A Sourcebook for Elementary Science. Sacramento, CA: California Department of Education, 1967. (This out-of-print book, along with the secondary Sourcebook for Physical Science and Sourcebook for Biological Science, are excellent resources with background information and hundreds of useful demonstrations and activities. School libraries, district resource centers, or experienced teachers may have copies.)


Kids in Creeks: An Interdisciplinary Creek Exploration Program. Richmond, CA: The Watershed Project (formerly Aquatic Outreach Institute), 2000. (The Watershed Project offers teacher education workshops, community workshops, community projects, and restoration projects in the San Francisco Bay Area. Kids in Creeks is one of their educational projects.)

*Litter Critters*. Berkeley, CA: Outdoor Biology Instructional Strategies (OBIS), Lawrence Hall of Science, 1982. (OBIS is a collection of activities for teaching/learning about Biology.)


MacDonald, Jim. *Into the Forest*. Mill Valley, CA: Muir Woods National Monument, undated. (This is a guide intended as a resource for teachers who plan to bring students in grades 3-5 to visit Muir Woods National Monument. It is a CD with lessons, field trip suggestions, and images that would be useful for anybody planning a field trip to a redwood forest.)


*Outdoor Biology Instructional Strategies (OBIS)*. Berkeley, CA: Lawrence Hall of Science, 1982. (OBIS is a series of hands-on activities for studying biology.)

www.plt.org


www.plt.org

Roa, Michael. Environmental Science Activities Kit. San Francisco, CA: John Wiley & Sons, 1993. (This is a collection of activities that can be used to teach about a wide variety of environmental issues, including ways to work towards solutions. Some of the activities in this guide are adapted from this book.)

Roa, Michael. A Guide to the Side of the Sea. Sacramento, CA: California State Parks Department, 2004. (Written to provide a resource for teachers who want to bring students to visit the rocky coast of northern California, including the redwood region. Available for free online, on a CD, and in paper format.)


Shinkle, Jill. Creek Watchers: Exploring the Worlds of Creeks & Streams. Santa Barbara, CA: California Aquatic Science Education Consortium, University of California, Santa Barbara, undated. (Collection of 10 well written activities.)


Stall, Chris. Animal Tracks of Northern California. Seattle, WA: The Mountaineers, 1989. (Drawings of tracks of 122 mammals, reptiles, amphibians, birds, and invertebrates. Also includes natural history information on the organisms.)
Trees & Leaves: CD-Rom & Book. Mineola, NY: Dover Publications, 2004. (This CD has 399 "permission-free" drawings of a wide variety of trees, leaves, and fruits.)

United States Environmental Protection Agency. Climate Change, Wildlife, and Wildlands: A Toolkit for Teachers and Interpreters. Washington, D.C.: U.S. Environmental Protection Agency, 2001. (This free kit includes a CD, video tape, a wheel for determining CO₂ production and ways to reduce it, and cards depicting ways that wildlife are affected by climate change and global warming. The kit is being updated and should be available again sometime in 2008.)

United States Geological Survey: <http://nwis.waterdata.usgs.gov/nwis/peak/> (This site gives statistics on stream flow rates for thousands of streams in the U.S.)

The Watercourse and the Council for Environmental Education. Project WET: Water Education for Teachers. Bozeman, MT: Project WET, 1995. (This excellent and extensive guide provides over 80 activities about water and its importance.)


Weaver, Harriet. Redwoods: A Teaching Unit for Upper Elementary Grades. Novato, CA: California Redwood Association, 1972. (Now out of print, this is a good resource that provides both background information and activities.)

ILLUSTRATIONS

Drawings:

Most of the illustrations in Redwood Ed were drawn for the Redwood Ed project by Faith Rumm. (rummstudio@earthlink.net) Her drawings include the following figures: 7-10, 17-68, 91, 108-122, 124, 127

Daniel J. Miller graciously allowed us to use illustrations from his Life History and Ecological Guide to the Coast Redwood, Sequoia sempervirens, and he also made some drawings specifically for Redwood Ed. Dan's drawings include the following figures: 2-4, 11-14, 16

Alexander O'Neill Roa drew the Redwood Ed Teaching Idea and Caution icons.

Figure 123 is from Trees & Leaves: CD-ROM & Book, Dover Publications, Inc.

Figures 125 and 126 were drawn by Michael Roa

Photograph Credits:

California Redwood Association, Novato, California: Figures 75, 89

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