

Chapter 3

Environmental Concerns...conservation, sustainable management

As the human population increases, technology changes, people's expectations change, and the human impact on all ecosystems increases. Even Antarctica has been impacted by tourism and, apparently, by global warming and ozone depletion. Tropical rainforests are being logged, endangering many species of plants and animals even while the "ecotourism" business continues to grow. The fastest growing area in the U.S. is greater Las Vegas, where the water supply is far from adequate to meet the needs of the ever-increasing demand. Environmental concerns are important in the redwood region, too. Even though people have caused environmental problems, people have also taken steps to protect and conserve the environment.

Many of those concerns have been mentioned earlier in this section, and some are discussed in Section II: Human History of the Redwoods. Some of the environmental issues of the redwood region are summarized in the upcoming table.

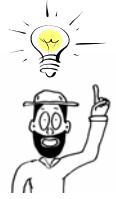
One value of field trips to natural areas such as redwood parks or forests is the increased level of environmental awareness and concern that students can develop through exposure to interesting ecosystems. While it is important not to overwhelm students with bad news about the environment, it is also important that they become aware of environmental concerns. When teaching students about environmental issues, it is essential to also teach them about ways that problems can be addressed. An important part of that is to help them to understand that there are at least two sides to every issue, and that people have learned ways to minimize or reduce negative impacts on the environment. In some cases, people are working to help areas recover from previous damage.

Students need to visit natural ecosystems to fully appreciate their beauty and importance. Merely learning about the plants and animals is not enough, though. Students should come away with not only an appreciation, but a desire and willingness to try to protect, improve, and conserve their environment. The teacher's example, not only while on a field trip, but especially in day-to-day classroom life, can be very powerful.

Discussions of "needs" vs. "wants" are important. So, too, is an understanding of the difference between quality and quantity. It is also important to help students realize the impact of population on the environment.

A detailed discussion of conservation goals and forest management can be found in *The Redwood Forest* (Noss, 2000).

Teaching Idea



Several of Aesop's Fables can be useful in such understandings. Read (or have students read) and discuss such fables as:

- *The Lioness (Quality is more important than quantity.)*
- *The Two Frogs (Think before acting.)*
- *The Two Crabs (Example is the best teacher.)*
- *The Ant and the Grasshopper (Planning ahead and conserving resources are important.)*
- *The Goose with the Golden Eggs (Conserve resources for future use.)*
- *The Crow and the Pitcher (Necessity is the mother of invention.)*
- *The Sick Lion (Don't believe everything that you hear.)*
- *The Mule (Every truth has two sides.)*
- *The Oak and the Reed (It is better to bend than to break.)*

The table of environmental issues (below) could just as well have been placed in the Human History section of *Redwood Ed*. It is placed here because of the close connection between the environmental issues and the ecological concepts discussed in this section.

Environmental Issues of the Redwood Region

Environmental Issue	What's the problem?	What can I do about it?
Lack of environmental literacy and a land stewardship ethic in both the general population and legislators	Unless people both understand the environment and care about taking care of it and using it wisely, the environment will continue to deteriorate. Since there is no "free lunch," it takes an educated and caring populace to be willing to pay the price for environmental protection, whether it is protection of redwood trees, reducing global climate change, or paying for improved sewage treatment.	Education is the key! Not only must the general population be educated, but they must care enough about the environment to influence both legislators and industry.
Lack of information...lack of baseline data	Decisions with lasting implications are made daily. How can information be gathered and interpreted prior to making decisions? Should a given piece of property be acquired for park land, or would the money be better spent on something else? How can this endangered plant or animal be protected? Is this plant or animal truly endangered? Should it be added to the endangered species list? How many of these organisms live here, and how many do we want/need to have? What would be the social or economic impact of this decision? What is the best use of this area?	Students need to comprehend the importance of understanding an issue before making decisions, if possible. If there is a controversy, they need to be willing to understand both (or all) sides of the issue. Students can be encouraged to consider careers in science or social science that may help answer some of the questions associated with decisions about land use and planning.

Environmental Issue	What's the problem?	What can I do about it?
Erosion and siltation of creeks and rivers	<p>Landslides and erosion deposit silt and gravel sediments in creeks and rivers. Silt reduces the ability of salmon and trout to spawn. Sediments can also fill up the stream channel and change the flow of the stream, possibly resulting in flooding or erosion of the stream banks where many of the largest redwoods grow. Undercutting of banks may topple some of the largest redwoods.</p> <p>While natural landslides contribute to siltation of streams, improperly built roads, especially where they cross streams, are an important problem. Modern road building techniques greatly reduce the sedimentation, but old "legacy" roads and stream crossings continue to produce sediments.</p>	<p>Students need to understand the importance of staying on designated trails, not taking shortcuts. This helps reduce erosion. Students can be involved in trail re-routing projects that seek to reduce erosion.</p> <p>Modern forest management practices include efforts to protect streams. Students can be encouraged to consider careers in forestry, civil engineering, or geology so that they can help develop and institute even better practices.</p> <p>Students can participate in tree planting or other revegetation efforts.</p> <p>Students can also be encouraged to become politically active so that appropriate laws and regulations are passed and enforced.</p>
Roads, stream crossings, and cut-over areas left over from earlier logging..."legacy issues"	<p>Earlier logging techniques sometimes provided little, if any, environmental protection. Some of the "legacy" roads, culverts, and cut-over areas continue to result in erosion or other problems years later.</p>	<p>Again, students can consider careers in the natural resource sector where they can work not only to protect ecosystems but also to correct mistakes of the past.</p> <p>Students can be encouraged to continue their education, formally or informally, so that they can become politically active.</p> <p>Students can participate in tree planting or other revegetation efforts.</p>
Compaction of soil	<p>When people walk or drive on soil, especially if it is wet, it may become compacted. Soil compaction reduces the ability of both water and air to get into the soil. When water can't enter the soil, it runs off, causing erosion, while plants' roots are deprived of water. Roots also need air, and compacted soil may not allow enough air to reach the roots. Soil compaction may be a problem in parks and also in areas where heavy equipment drives on improperly designed roads.</p>	<p>In parks, people must learn to stay on designated trails and to respect boundaries such as fences and signs indicating "habitat recovery" areas. Students can be involved with trail re-routing and campsite relocation projects. They also need to learn about the impact of such things as mountain biking, off-road driving, and horses on trails.</p>

Environmental Issue	What's the problem?	What can I do about it?
Short-rotation forestry practices	<p>Whenever forestry (or other) equipment enters a stand of trees, plants are damaged and the soil is disrupted. When plants are damaged and soil disrupted, erosion is likely to follow. Given time, plants can regrow and once again provide protection from erosion. When equipment re-enters an area frequently, however, the plants may not have a chance to recover. Compaction may also increase.</p> <p>One of the main problems with soil erosion is the addition of silt to creeks, which interferes with the spawning of salmonid fishes. After a while (several years), silt can be naturally flushed from the creeks. Frequent additions of silt from soil disruption on the slopes, however, impedes this natural recovery process.</p>	<p>Increasing the time between the entry of heavy equipment into the forest will allow more healing and regrowth of plants that reduce erosion. Careful design of roads and compliance with regulations can also help reduce erosion.</p>
Fragmentation of forest land	<p>Some animals require large uninterrupted forest landscapes. For a variety of reasons, some forest tracts are becoming fragmented. Sometimes this results from roads passing through the forest, but more often it comes from timber harvests or sales of small parcels for development within the forest.</p>	<p>Becoming educated about local land use issues is important, but it is also important that people become politically involved. Land use planning and development must include protection of both parklands and commercial forests.</p>
Urbanization/development	<p>Not only does development of forest areas break up the contiguous forest land, but urban development brings such problems as water runoff from roads and buildings (as opposed to water sinking into the forest floor), loss of habitat for native species, and the introduction of exotic species. Another issue is an urban population that does not understand forest management practices.</p>	<p>Not only is it important to become politically savvy and involved, but one must be willing to make personal choices with regards to such things as where one builds a home.</p>
Overdevelopment in parks, or inappropriate development	<p>For parks, the problem isn't just how many people want to visit. Another issue is what kind of development should be allowed. How much land should be kept in a natural state, how much should be allocated for roads, buildings, sewage treatment, campsites, or trails? Different people, of course have different ideas about what parks should be and what kinds of development are appropriate.</p>	<p>It is important to discuss with students what kinds of values the parks provide, and to help them appreciate those things that can only be found in natural settings. Only by spending time in nature can people appreciate and understand its value. Teachers can help students get beyond fears and discomfort to appreciate the natural world.</p>

Environmental Issue	What's the problem?	What can I do about it?
New park land?	<p>Some maintain that more land should be added to the existing park systems. They maintain that additional land may be required to buffer current parkland, and that an increasing population will place ever more pressure on existing parks. Many parks, for example, have no campsites available on most summer weekends. Some also point out that there are still virgin redwood stands and that much of the second-growth redwood forest has reached impressive size.</p> <p>Others point out that most redwood parks are little used during the rainy season, and that when timber land is removed from production, not only are jobs lost, but so are taxes and payrolls that help local communities. Also, less redwood lumber tends to drive up prices. Furthermore, modern timber companies actively manage the forests to try to prevent wildfires, erosion, and other problems. If they don't do that, the costs for doing so will have to come out of the state or federal budgets, leaving less money available for other needed park projects.</p>	<p>If more park land is to be acquired, or even if the goal is just to maintain and protect current park land, taxpayers need to be willing to support the California Department of Parks and Recreation, the National Park Service, county park departments, and other similar agencies.</p> <p>People who don't experience the parks can't very well appreciate their importance. When teachers bring students to visit parks, it is important to help students understand that the parks need their support, and to encourage parents to visit and support the parks, too.</p>
Limited funds	<p>As noted above, funds for managing public lands are very limited. Should available money be used to acquire new land before it is logged or developed? Should it be used to protect and conserve land already in parks? If new land is to be purchased, which land should it be, should it be developed for public use, and if so, how?</p>	<p>It is important that taxpayers be willing to support the park system. Organizations such as the Save-the-Redwoods League and the Sempervirens Fund raise funds to support the parks, too, and students and parents can be made aware of such groups.</p>
Overcrowding in parks	<p>Some redwood parks, especially those near urban areas, face problems with overuse, primarily in the summer months. Too many visitors cause soil compaction, loss of the peace and quiet that people seek in parks, law enforcement problems, demands for more development, and other environmental issues.</p>	<p>Discussion of why there are rules and regulations in parks can make students more willing to stay on trails, not litter, and otherwise comply with the rules. People who do not visit parks are not very likely to support efforts to purchase more park land or to develop what land is already owned. Encouraging parents and others to visit parks can help create support for parks and the efforts of organizations such as the Save-the-Redwoods League and the Sempervirens Fund.</p>

Environmental Issue	What's the problem?	What can I do about it?
Fires...or lack of fires	<p>Obviously, fires burn plants in the forest. People sometimes forget that fires also can kill animals, and destroy animal habitat and food.</p> <p>Fire is, however, a natural part of the redwood forest community. Redwoods are adapted to surviving periodic fires, and they may depend on them to reduce competition from less fire-resistant species.</p> <p>One problem is that fires have been kept out of the forests for so long, especially in stands that have never been logged, that there has been a buildup of fuel. This large fuel supply, if and when it burns, may be hot enough to damage or even kill redwoods that could have withstood smaller, more frequent, fires.</p>	<p>If fires are to be kept out of parks, some other way needs to be used to clear the understory and reduce accumulation of fuel that might turn a small fire into a conflagration.</p> <p>Students can participate in fuel reduction projects.</p> <p>Fuel reduction by hand is very expensive, as is prescribed/ controlled burning to reduce fuel accumulation. In order for taxpayers to provide funding for such efforts, they must understand the need.</p>
Exotic species	<p>When people think of parks, they generally envision a natural setting with plants and animals that are native to the area. Many non-native (exotic) species have been introduced to the parks and forests of the redwood region, either intentionally or accidentally. Exotic species compete, and often out-compete, with native species for space and other resources. Since natural controls may be lacking for introduced species, they may become a significant problem.</p>	<p>Learning to recognize introduced species and to understand the problems associated with them is the first step. This can be expanded to discussion of efforts to keep agricultural pests out of California and to check their spread within the state.</p> <p>Students can participate in studies of exotic species and in removal projects.</p>
Regulation	<p>California's Forest Practices Act and its concomitant regulations are among the strictest in the nation. Regulations generally cost forest product companies money. Over-regulation may result in companies selling forest land for development rather than maintaining it as working forest land.</p>	<p>Students need to understand that we need to be a balance between regulations intended to protect the long-term interests of the general public and the rights of the property owner or company. They also need to understand that regulations have economic impacts, such as higher prices for products, and jobs created or lost. Students can be encouraged to consider careers in forestry or politics so that they can have an impact on the creation and enforcement of regulations.</p>

Environmental Issue	What's the problem?	What can I do about it?
Taxation	<p>Like regulations, taxes can cause land owners to develop their land rather than maintain it as forest land. Rather than pay taxes on forest land while they wait for the trees to grow to a harvestable size, owners may choose to sell their land for development.</p>	<p>See Regulation above.</p>
Pollution...air, water, solid waste, noise, light	<p>With people comes all sorts of pollution. School buses or cars that bring students to visit parks also bring air pollution and noise. Litter is an issue. How is sewage to be dealt with? Should lights be installed on trails, or would that ruin the after dark park experience?</p>	<p>Students need to understand that their actions have many consequences. Building a culture of caring and respect in the classroom can be extended to the field. Discussion of population issues can help students understand their impact on their environment. Students can develop attitudes and habits such as recycling, being thoughtful and careful, and being willing to put up with some inconvenience for the sake of the environment.</p>
Demand for wood products	<p>As the human population of the world, including California and the rest of the United States, continues to increase, so does the demand for products made from wood and other resources.</p>	<p>Making informed choices is a key. Sometimes redwood may be the best choice because it is a renewable resource. At other times, other materials may be preferable because they will last longer.</p> <p>We should remember "the 3 Rs: reduce, reuse, recycle." We can reduce our use of redwood by selecting other resources, but we should keep in mind that those choices will have their own environmental consequences.</p> <p>We can reuse redwood. Many communities have wood recycling/reusing programs, and it may be possible to find used redwood for sale.</p> <p>We can recycle redwood by using sound wood for other things or by composting rotted wood.</p>