

Eagle Creek Watershed Timber Sale

Background on Timber Harvesting

California harvests over fifteen billion dollars worth of wood and paper products each year. The forestry and paper industries provide jobs to over 74,000 people. People use timber to build houses and make paper products.

There are many different ways to cut down trees. Clearcutting involves cutting down all the trees in an area. Sometimes, individual trees may be removed out of a larger forest. How harvesting affects natural systems depends on which methods are used. All methods involve removing trees from the natural system. This can remove a food source or nesting site for different species.

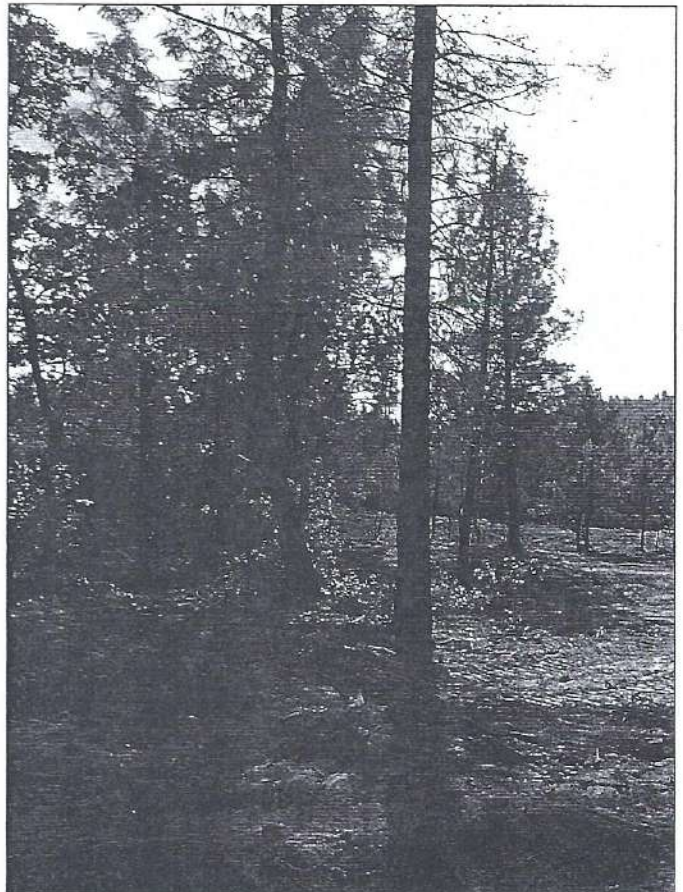
Removing trees can have an effect on how fires burn in a forest. In California, people have tried to stop fires from burning for many years. This had led to some forests becoming thick and dense. When forest fires occur, they burn hotter than before. Some plants and animals cannot survive the extra heat. Hot fires also lead to more soil erosion. Removing some of the trees takes out some of the extra fuel. This may make fires less hazardous.

Most harvesting methods open up space to light. This allows plants that need light to grow well. Plants that require shade will not grow in these opened areas, at least not until time passes and new plants grow that can provide shade. What herbivores live in these sites varies depending on which plants grow there. For example, deer may find more food in open spaces.

When trees are cut, logging debris is sometimes left behind. This is material, such as

limbs or stems, that cannot be used as timber. This debris returns nutrients to the soil, which allows new plants to grow. It also can provide sites for nesting and shelter for some animals.

Logging equipment and trucks use fossil fuels for energy. Burning these fuels produces greenhouse gases like carbon dioxide. These gases may cause a change in climate on Earth. Climate change may affect many species and ecosystems on Earth. New plants that grow in logged areas can absorb more carbon. This may help reduce the amount of greenhouse gases in the atmosphere.



Forest thinning

Logging trucks have other effects. They compact the soil of the area. Roots of many plants cannot grow well in compacted soil. Trucks also require roads. Road construction can break up habitats, preventing animals from using their full hunting or breeding range. Some get killed crossing the roads. Road construction can also produce erosion. This creates sediments that fall into nearby streams. Sediments can harm fish such as salmon and other aquatic life. Keeping logging away from streams can prevent this problem.

What Is There Now

The Eagle Creek watershed is part of the North Coast National Forest. The lower part of the watershed includes land that was logged about 75 years ago. There are now many large trees growing there. These trees are valuable for lumber. In the upper part of the watershed, the forest is an old growth forest. This means there was never logging in that area. The trees are very old and very large. People have not changed this ecosystem much. Deer, bobcats, black bears, and trout are common in Eagle Creek watershed. Some backpackers think there may even be wolverines living in the area.

The Proposed Change

The California Timber Company wants to cut down trees in the watershed. The company would sell the trees for lumber. It will pay the U.S. Forest Service for the rights to log the land. California Timber Company will cut select trees from the forest. Some will be old growth trees. They will not clear the land completely.

Some Points in Favor of the Proposed Change

Californians use a lot of lumber every year. They need lumber to build houses, offices, schools, and community centers. The California Timber Company will help meet that need. The company says it can cut the trees without harming the natural environment. They will plant trees to replace the ones they cut. The U.S. Forest Service manages the North Coast National Forest carefully. Even with past logging, the area is home to many kinds of animals. The local towns will benefit from new jobs. Logging can help prevent forest fires.

Some Points Against the Proposed Change

There is very little old growth forest left in California. Several kinds of plants and animals can only live in old growth forests. Wolverines are one of these animals. The wolverine is one of the rarest mammals in California. If wolverines do live in this forest, it is very important to protect the habitat from logging. People need lumber but they can cut trees from areas like the lower watershed. Logging has already affected the natural systems there.

7

Part 1: Timber Harvesting 1
Visual Aid

VA #7 Part 1: Timber Harvesting 1

Byproduct or change to natural system caused by human practice	Is this a byproduct (B) or a change (C)?	Effects on the natural system
<p><i>Logging debris (unused stems and limbs)</i></p> <hr/> <hr/>	<p><i>B</i></p> <hr/>	<p><i>It returns nutrients to the soil, allowing new plants to grow. It can also provide shelter and nesting sites.</i></p> <hr/> <hr/>
<p><i>Eroded soil that goes into streams (if harvesting and road building takes place near a stream)</i></p> <hr/> <hr/>	<p><i>B</i></p> <hr/>	<p><i>Sediment changes water quality in streams. This can harm fish and other aquatic life.</i></p> <hr/> <hr/>
<p><i>Old trees are removed</i></p> <hr/> <hr/>	<p><i>C</i></p> <hr/>	<p><i>It can remove habitat from animals that live or eat food from old trees. It reduces fuel in forests so that wildfires are not too hot and thus do not cause as much soil erosion and harm plants and animals.</i></p> <hr/> <hr/>

VA #8 Part 1: Timber Harvesting 2

Byproduct or change to natural system caused by human practice	Is this a byproduct (B) or a change (C)?	Effects on the natural system
<p><i>More light reaches forest floor</i></p> <hr/> <hr/> <hr/>	C	<p><i>Plants that need light will grow well.</i></p> <hr/> <p><i>Plants that need shade will not grow well.</i></p> <hr/> <p><i>The mix of herbivores will change depending on which plants grow there.</i></p> <hr/> <p><i>Animals that need plants for protection will move away until more plants grow.</i></p> <hr/>
<p><i>Compacted soil as harvesting equipment moves around</i></p> <hr/> <hr/> <hr/>	C	<p><i>The roots of many plants cannot grow well in compacted soil.</i></p> <hr/> <hr/> <hr/>
<p><i>Roads are built</i></p> <hr/> <hr/> <hr/>	C	<p><i>Roads can divide habitat, preventing wildlife breeding. It can make it harder for certain species to have enough range to hunt. Some animals get killed crossing roads.</i></p> <hr/> <hr/> <hr/>

9

Part 2: Timber Harvesting
Visual Aid

VA #9 Part 2: Timber Harvesting

What is your recommendation regarding your scenario? Why?

Example: I recommend the timber harvesting be allowed. This will reduce fire risks to the area, protecting many species. It will also supply employment to people. Harvesting should only be allowed if it stays away from water resources, because species in streams can be harmed by sediment that comes from harvesting and road building. Foresters should also avoid compacting the soil as much as possible.

Swift River Gravel Company Expansion

Background on Gravel Mining

About 100 million metric tons of gravel are mined in California each year. Much of this mining is in-stream, which means gravel is directly removed from a riverbed.

When gravel is removed from a riverbed, this changes the flow of the river. The streambed becomes wider and shallower, which causes the water to get warmer. Warmer temperatures can harm some organisms. The mined river often flows straighter, which can threaten plants that grow on the edges of the river. Animals that rely on these plants for shelter or food are also affected.

Salmon lift up small gravel with their tails and lay their eggs beneath the rocks. When gravel is removed from the riverbed, larger rocks still remain. Salmon cannot lift the larger rocks and may have no place to lay their eggs.

Normally, small gravel and sand flow downstream to the oceans. This sediment usually builds up on beaches, helping to prevent erosion. If the sediment does not flow out of the river, beaches on the coast erode. This can threaten species that live there. It can also threaten people's houses and other buildings on the coast.



Migrating salmon

Gravel mining involves dredges and heavy hauling trucks. These machines burn fossil fuels to get energy. The burning produces greenhouse gases. These gases may cause a change in climate on Earth. Climate change may affect many species and ecosystems on Earth.

Some mining companies are looking at ways to restore habitats after they remove gravel. They may build pools and side channels to help species that need protected habitat.

What Is There Now

The Swift River Gravel Company owns land near the Swift River. They have mined gravel there for over 40 years. Now, they are running out of gravel. The company owns another site that includes another part of the river. The river runs all year long. It is an important habitat for salmon and trout. These fish lay their eggs under small pieces of gravel in the river. The number of salmon has dropped dramatically in recent years.

The Proposed Change

The Swift River Gravel Company wants to start mining on their new site. They plan to mine in the river so they can continue to stay in business.

Some Points in Favor of the Proposed Change

Gravel is used to make concrete. Builders use concrete for buildings, roads, and many other projects. It is a necessary part of modern society. Gravel must be mined somewhere. Swift River Gravel Company has owned this land for a long time. They have always planned to mine gravel at this site. It is not fair to the company to stop them after they paid for the land. Current laws limit the amount and type of gravel mining. Swift River Gravel Company is within the laws controlling their new site. If Swift River goes out of business, 75 people will lose their jobs.

Some Points Against the Proposed Change

Some say mining laws do not go far enough. Even when companies follow the laws, mining creates noise and pollution. People living near the existing gravel pit are tired of the noise and danger caused by gravel trucks. They want to see the mine closed. They are worried about the effects of the new gravel mine on the river.

Roberts Mining Company Expansion

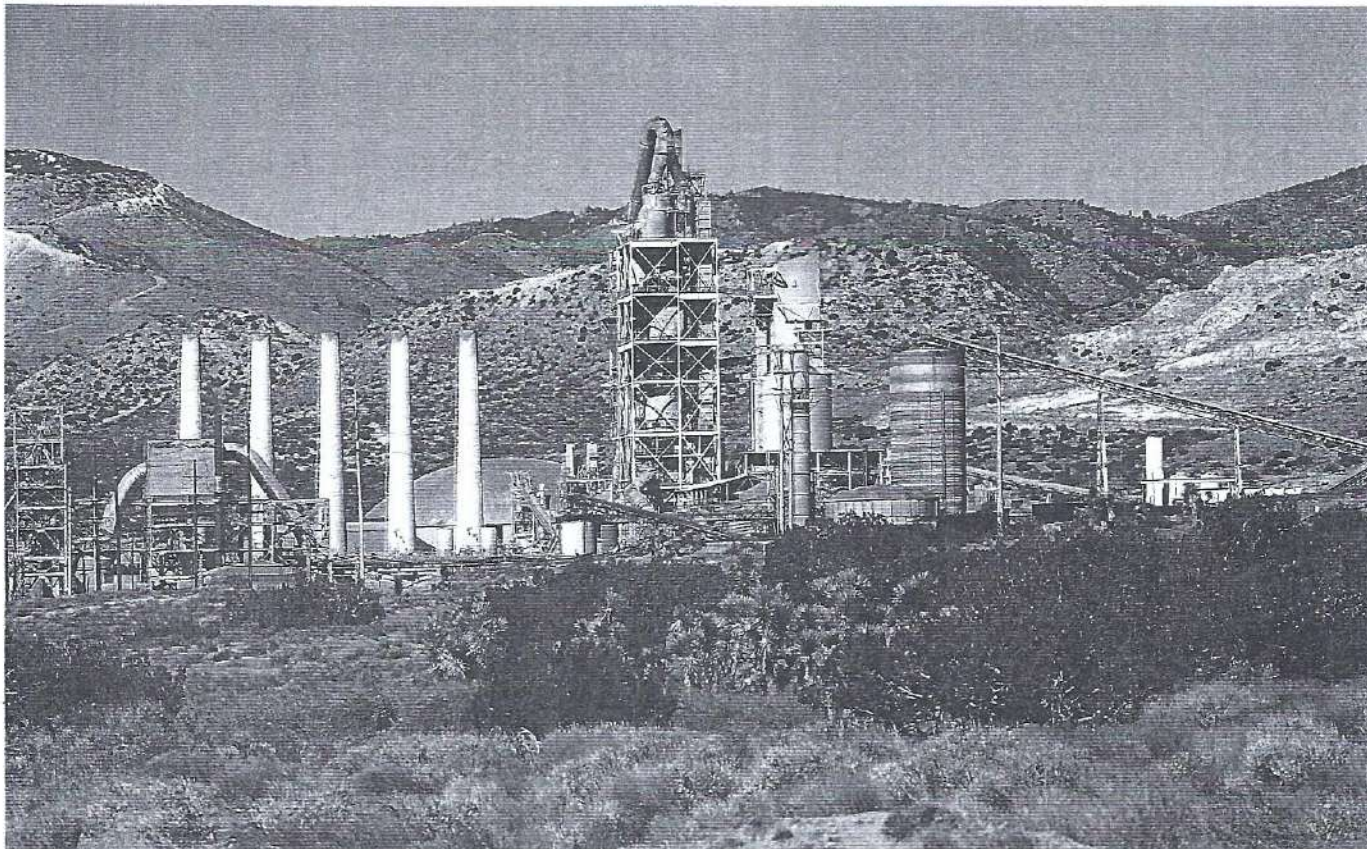
Background on Mineral Mining

Thirty-four different minerals are mined in the Southern California desert. The mining industry employs 20,000 people. It earns about two billion dollars per year.

Many minerals are mined from open pits in the ground. Miners dig up the land, killing or removing the plants and animals that live there. The mining process involves a lot of energy. Processing plants and hauling trucks burn fossil fuels to make energy. The burning produces greenhouse gases. These gases may cause a change in climate on Earth. Climate change may affect many species and ecosystems

on Earth. Processing plants also need large amounts of water. Deserts do not have much water, so using precious water resources may cause some species to die.

Hauling trucks produce other gases. They make sulfur dioxide, which can cause acid rain. Acid rain is harmful to many species of plants. It also harms aquatic animals when it builds up in rivers and streams. Trucks also produce nitrogen oxide, which becomes smog. Smog is a kind of air pollution that is harmful to human health. Some mining companies are trying to use different kinds of trucks that use less energy and produce less air pollution.



Desert mining and manufacturing

All the digging involved in mining creates dust. This can cause breathing problems for people. To prevent dust, mining companies spray lots of water on their mining sites. This uses up more of the desert's water supply.

When mining companies have finished digging, they may try to restore some of the habitat they removed. Some companies grow native plants in greenhouses. They replant them after the mining is completed. Mining minerals, like borax, causes much fewer changes to the environment than mining other substances, such as coal or gold.

What Is There Now

The Roberts Mining Company owns land in the Southern California desert. They mine several types of minerals. Their property is next to federal land. Campers, horseback riders, and off-road vehicle drivers enjoy using these public lands. Coyotes, bobcats, and foxes live in the area. So do desert tortoises, skunks, and rattlesnakes. The rare desert orchid is one of many kinds of desert plants that live there, too.

The Proposed Change

The Roberts Mining Company wants to purchase mining rights on the federal land. They believe there are valuable minerals under the land. When they begin mining, they would fence off the area because it would not be safe for people to use the land for recreation.

Some Points in Favor of the Proposed Change

People use minerals every day. Many products depend on minerals. If people are going to have cars, computers, and DVD players, mining is necessary. The Roberts Mining Company has run the mines next to this land for a long time. They rarely have accidents. They do their best to limit environmental effects. The mines do not last forever. In about 50 years, the government can reopen the land for public use. Considering how important minerals are to society, this is a small price to pay.

Some Points Against the Proposed Change

The federal government owns this land. It is public property. The public should be able to use it. The Roberts Mining Company will keep people off the land. They will make money on land they do not own. In addition, mining will disrupt the land. The plants and animals living there probably will not survive the mining operation. People should conserve more rather than mine more.

Allied Grains Rice Farm Expansion

Background on Rice Farming

Rice farming in California produces 3.2 billion pounds of rice each year. To protect their rice from weeds and pests, farms flood their fields while the rice is growing. They also flood them in the winter. This creates a new kind of wetland for eight months of the year. This wetland is used by many different kinds of birds.

Flooding requires farmers to use large amounts of water from nearby rivers. These rivers need irrigation canals and dams built on them to control the flooding. Such structures can block salmon from swimming up the river to spawn. Sometimes the salmon even stray into irrigation drains.

Rice farmers use fertilizers to help their rice grow. Some fertilizer washes into the river. When fertilizers enter rivers, more algae grow, and there may be less dissolved oxygen for fish to breath. Farmers also use herbicides and pesticides that can harm fish and aquatic life. Farmers have worked hard to reduce the effects of these chemicals on natural systems.

When farmers harvest rice, straw is left behind. Many rice farmers burn the straw to get rid of it. This creates air pollution that can harm many species, including humans. Other farmers leave the straw to decompose. Not every grain of rice gets harvested. Some is left on the ground. This rice provides food for birds and other animals.



Rice field

What Is There Now

The Silver River runs through the fields of central California. In winter and spring, the river often floods. This turns the fields into wetlands. Ten to twelve million birds, such as ducks, geese, shorebirds, and wading birds, use wetlands like these each year.

Bob Williams owns the land. It has been in his family for generations. Long ago, they built levees to keep the river from flooding the land. They used the land for farming. It has not been a wetland for many years.

The Proposed Change

Allied Grains Corporation wants to purchase the land from Bob Williams. The large farming company plans to plant rice here.

Some Points in Favor of the Proposed Change

Some say, this land is not being used productively. Planting rice will make the land useful. California has some of the best rice-growing fields in the world. Rice farming provides jobs, as well as rice to eat. In the 1880s, California had 4 million acres of wetlands. Today, it has less than 300,000 acres. Rice farming helps create new wetland habitats to support migrating birds and other waterfowl that have lost their wetlands. Rice farming releases fewer chemicals into nearby rivers than many other kinds of farming.

Some Points Against the Proposed Change

Rice farming requires a lot of water. The farming company has to keep the rice fields wet all year round. To do this, the company must take water from the river. This affects the entire river ecosystem, especially during the summer dry season. Any pesticides or fertilizers used by Allied Grains easily could end up in the river and cause chemical pollution of the land and water.

Name: _____

Part 1: Other Human Practices (1 point per cell; 18 total)

Instructions: Use information from one of the other readings: **Gravel Mining** (Student Edition, pages 13–14), **Mineral Mining** (Student Edition, pages 15–16), or **Rice Farming** (Student Edition, pages 17–18), to complete the chart below and on the next page.

Which human practice did you read about? _____

Byproduct or change to natural system caused by human practice	Is this a byproduct (B) or a change (C)?	Effects on the natural system
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Name: _____

Part 1: Other Human Practices (continued)

Byproduct or change to natural system caused by human practice	Is this a byproduct (B) or a change (C)?	Effects on the natural system
_____ _____ _____	_____	_____ _____ _____ _____
_____ _____ _____ _____	_____	_____ _____ _____ _____ _____

Part 2: Other Human Practices

Instructions: Answer the following question in the space provided.

What is your recommendation regarding your scenario? Why? (4 points)

Name: _____

- 9. At each trophic level, less energy is available to the organisms than was available at lower levels. This is because _____
 - a. most organisms are wasteful
 - b. organisms use energy in the process of living
 - c. most organisms try to conserve energy
 - d. organisms store energy rather than pass it on

- 10. A commonly used estimate of the amount of energy available to the next trophic level in a food chain is about _____
 - a. 1%
 - b. 10%
 - c. 50%
 - d. 90%

- 11. In a food pyramid, which of the following would be considered a primary consumer?
 - a. bobcat
 - b. bacteria
 - c. vulture
 - d. rabbit

- 12. In a food pyramid, which of the following would be considered a secondary consumer?
 - a. mouse
 - b. deer
 - c. worm
 - d. hawk

- 13. In a food pyramid, humans are _____
 - a. producers
 - b. consumers
 - c. scavengers
 - d. decomposers

Instructions: Read and complete the tasks in the spaces provided.

- 14. Tell how energy from the Sun enables a top carnivore such as a mountain lion to live. Show your understanding of the following terms as you use them in your answer. (5 points)

producer	photosynthesis	consumer	herbivore	carnivore
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Name: _____

18. Choose a resource you have studied that humans get from natural systems. Think about the process of getting and using this resource. What are two examples of ways that humans decide to get this resource that could affect an ecosystem? (4 points)

19. Could the consumption of the resource you mentioned in question 18 affect the food web/energy pyramid in an ecosystem? Explain why or why not. (4 points)
