

Forest Management Dilemmas

National Science Education Standards

- ✱ Standard C: *Life Sciences* — Populations and ecosystems.
- ✱ Standard F: *Science in Personal and Social Perspectives* — Populations, resources, and environments.
- ✱ Standard F: *Science in Personal and Social Perspectives* — Natural hazards.
- ✱ Standard F: *Science in Personal and Social Perspectives* — Risks and benefits.



OVERVIEW

Students model decision-making by beginning with little information on an issue; then researching the issue; and finally, reconsidering their decisions.

OBJECTIVES

Students will:

1. Explain why decisions about forest management are often difficult.
2. Describe how to become informed on forest management issues.

SUBJECTS

Science, Social Studies, Language Arts

VOCABULARY

Dilemma, epidemic, logging slash, management, goal, mandate, multipleuse, pitch, resin, seral stage, stands, suppression

TIME

3-50 minute class periods over several days

MATERIALS

Large cards labeled “YES” and “NO,”; Dilemma Background Sheets (*following pages*), newspaper and magazine articles on the specific issues.

OPTIONAL: masking tape.

BACKGROUND

Just as forests are complex, so is the process of managing them. The purpose of this activity is to encourage **students to obtain information before forming an opinion** and to acquaint themselves with current forest issues. Teachers should stress that there is NO right or wrong opinion about these **dilemmas**.

Opinions about the issues using logic, emotion, or philosophy are valid as long as they are supported by accurate information.

Healthy forests make for a healthy nation. Yet today, many of the nation's forests are threatened by a range of issues. Although logging on National Forests has been a key area of conflict in the past, today the challenges of maintaining healthy forests are different. In 2002, the Forest Service identified four 'threats' that imperil the nation's precious National Forests. Keeping America's forests and grasslands healthy requires restoring and rehabilitating damaged areas to: (1) prevent severe wildfires, (2) stop the introduction, establishment, and spread of invasive species, (3) reduce the conversion of forest and grasslands that leads to fragmentation of rural landscapes through subdivision, and (4) manage impacts of motorized recreation vehicles by restricting use to designated roads and trails. For more information about these issues, visit the Forest Service website at <http://www.fs.fed.us/projects/four-threats/index.shtml>.

Fire and Fuels

Rehabilitation and restoration treatment priorities are highest where risks are greatest. Estimates are that high priority treatment areas cover 397 million acres across all ownerships, public and private, an area three times the size of France.

Invasive Species

Of 2,000 nonnative plants found in the United States, 400 are invasive species. The U.S. spends \$13 billion per year to prevent and contain the spread of invasives. For all invasives combined, the price tag is \$138 billion per year in total economic damages and associated control costs. In addition to nonnative plants, 70 million acres of forest in all ownerships (public and private landholdings) are at serious risk of being wiped out by 26 different insects and diseases (e.g., gypsy moth, hemlock woolly adelgid, dogwood anthracnose – the list goes on).

Loss of Open Space

More than 21.8 million acres of open space were lost to development between 1982 and 1997, about 4,000 acres per day, 3 acres a minute. Of this loss, close to 10.3 million acres are in forestland. It continues today.

Unmanaged Recreation

Increasing use of the national forests for outdoor activities prompts the need to manage these forms of recreation, including the use of off-highway vehicles (OHVs). OHV ownership has grown from 5 million in 1972 to 36 million in 2002. Depending on the site, unmanaged OHV use in the national forest can have serious impact on the land, among them: (1) damage to wetlands and wetland species, (2) severe soil erosion, and (3) spread of invasive species.

ACTIVITY

1. Tell students that just as forests are complex, so is the process of managing them. As citizen students they will be asked to form an opinion about several current forest issues.

2. Stress that there is NO right or wrong opinion about these **dilemmas**.

3. Explain to them that opinions about the issues using logic, emotion, or philosophy are valid as long as they are supported by accurate information.

4. Place the “YES” card at one end of the room and the “NO” card at the other. Ask students to imagine a line on the floor connecting these two cards, or put masking tape on the floor.

5. Tell the students that after you read aloud the following forest dilemmas, they are to stand along the imaginary line in a place that reflects their opinion – before they know anything more about the issue. The closer to the end of the line they stand, the more they agree with the decision card at that end.

DILEMMA 1:

Fires are an important, natural ingredient of the boreal forest ecosystem in Interior Alaska. Forest fires can also threaten human lives, properties, and marketable timber and reduce the amount of habitat for wildlife needing old-growth forests.

Your question: Should forest fires in the boreal forest be put out whenever possible?

DILEMMA 2:

To be profitable, the timber industry must have access to large areas of commercially valuable trees. The most profitable is old-

growth forests on public lands such as the Tongass National Forest in Southeast Alaska. Other parties say that Alaska’s oldgrowth forests are more valuable for fish and wildlife habitat, watershed protection, subsistence, scenic beauty, and recreation.

Your question: Should the timber industry continue to log public old-growth forests in Alaska?

6. Draw a bar graph of this “uninformed” class opinion. Repeat for each dilemma.

7. Divide the class into two or four groups to further examine these issues. Assign each group one of the dilemmas and ask them to find more information about the issue.

8. Ask them to find articles from newspapers, magazines, and the internet; read the “Dilemma Background” information sheets (*following pages*); and contact experts and representatives of various groups concerned about the issue.

9. They could invite these experts to come to class to speak or be interviewed by students. They could obtain brochures, reports, or other information from these individuals. Stress the importance of contacting experts and representatives of groups with different views on their dilemma.

10. Ask each group to divide in half. One subgroup will evaluate the YES position, and one group will evaluate the NO position. **Their evaluations should** be structured in terms of both positive and negative consequences.

11. Present each dilemma to the class again, but before students choose their places along the decision line, ask the group examining that issue to present its findings. Each group should present the positive and negative consequences of the decision assigned to them.

ACTIVITY (continued)

12. After the consequences of the positions have been presented, have the entire class (including the study group) find places along the line that best describe their opinions about the dilemma.

13. Draw another bar graph, this time of “informed” student opinions. Repeat for each issue.

14. Compare the bar graphs of the “uninformed” and “informed” student opinions: Did the students’ opinions about these forest management issues change after they learned more about the issues? Ask how many students changed their personal opinions in either direction. Discuss the importance of becoming informed about all sides of an issue before making a decision or forming an opinion.

15. Read aloud “What is being done?” for each issue if the students did not find experts to give the current status. (*Keep in mind that the information provided with this activity is only up-to-date as of this publication. Changes may have occurred since that time.*) How do the decisions made by the government, with public input, compare to the opinions of the class?

16. Discuss the importance of public participation in decision-making through voting, attending and testifying at hearings, becoming a representative on an advisory board, letters-to-the-editor, or other methods. What are the values of having a variety of people express their opinions? Are opinions based on facts more convincing than opinions based on misinformation? Discuss the responsibility for becoming informed that comes with our right to participate in decision-making.

EXTENSIONS

For older students: Attend a public hearing on a forestor wildlife-related issue. Ask students to select one individual that they will focus on during the hearing. Students record the testimony of that person and any responses made towards their comments. Students then introduce themselves to the person they observed, explain their assignment and ask to talk with them then or at a later date.

Students meet (*by phone or in person*) to clarify any questions they have and to learn more about the person’s experience and opinions. Students write up a summary including a profile of the person, their perspectives, and position on the issue. Papers are presented in class with a discussion to follow.

ASSESSMENT

Evaluation in this activity is based on students’ roleplaying rather than expressing their personal opinions.

1. Given a new forest management dilemma, students write a paragraph describing their initial opinion of how it should be handled, and what resources they would use to become betterinformed about the issue.

2. Students write or demonstrate why it is important to become well-informed on an issue before defending an opinion.

CREDIT

This activity is adapted with permission from the Alaska Wildlife Curriculum (AWC). AWC is a program of the Alaska Department of Fish and Game. Go to <http://www.wildlife.alaska.gov/education/wilded/awc.cfm> or <http://www.adfg.state.ak.us/> for more information about this award-winning environmental education curriculum.

FOREST DILEMMA 1

Boreal Forest Fires—Background

QUESTION: Should all forest fires in the boreal forest be put out, or should some be allowed to burn?

PAST: Lightning-caused fires are thought to have occurred in the boreal forest since the last ice age, 10,000 years ago. In addition, humans have both accidentally and purposefully caused forest fires since arriving in the boreal forest.

RECENT: We set fire to small areas of forests to clear land for homes, mining, and livestock pastures. Under dry, windy conditions, fires can easily escape control and spread. Some scientists estimate that from 1900-1940, 1.5 to 2.5 million acres of boreal forest burned each year in Alaska. From 1940-1969, about 1 million acres of forest burned each year. During the 1970s the number of acres burned per season varied from less than 8,000 to 2.2 million acres.

CURRENT DATA: Due, in part, to fire control efforts, fewer acres have burned in recent years. (For fire records from 1990 to the present, refer to the Alaska Department of Natural Resources, Division of Forestry website <www.dnr.state.ak.us/forestry/> and search “fire management programs” for “annual fire season statistics.”)

SMOKEY THE BEAR: Until about 1970, forest fires were believed to be bad. The Smokey the Bear campaign successfully created a fear of fires. People thought all fires threatened human life and property and destroyed commercial timber and wildlife habitat.

TRUE CONFESSIONS: Forest fires do kill trees, burning timber that might have been logged. Some forest fires change watersheds, kill wildlife, and endanger human life or property. Forest fires that burn in mature and old-growth forests can reduce that habitat for certain wildlife. But is fire so bad that we should suppress it? Read on

DETECTIVE WORK: Researchers studying boreal forest ecosystems now have proved that forest fires are a natural ingredient in this northern forest. Fires help recycle minerals and in some locations improve water drainage and soil fertility.

Alaska fires leap and dance across a forest, burning some trees to charcoal and barely touching others. That creates a greater mixture of forest habitats than before the fire. Although some boreal forest wildlife need mature or old-growth forest sites, other species find better living conditions in shrub thickets and young forests.

ANIMAL PREFERENCES: Moose and snowshoe hares love the abundant shrubs and saplings that fires foster. Fires create openings in the forest needed by some sparrows, owls, hawks, swallows, and other birds. Trees killed by fire provide homes for woodboring insects and the woodpeckers that eat them.

Lynx and others may survive best in areas with a mixture of **successional stages**.

Some wildlife, however, require mature and climax stages of forest to survive. Flying squirrels, spruce grouse, crossbills, goshawks, and boreal owls do poorly after fire because fire removes their nesting habitat and food sources.

DISAPPEARING FORESTS: Old-growth forest sites are becoming less abundant because: (1) They are the most profitable forests to log. (2) Many exist on prime land where people want to live, so they are cut to make way for roads and houses. (3) If there is a fire, mature forests are much more likely to burn than younger forests with less fuel to burn.

Allowing old-growth forests to burn and harvesting trees from other mature forest sites could eventually lead to a shortage of old-growth and mature forest habitat. Wildlife that depends on this habitat would have no where to go.

FOREST DILEMMA 1

Boreal Forest Fires—Background continued

QUESTION: Should all forest fires in the boreal forest be put out, or should some be allowed to burn?

WHO FIGHTS FIRES? WHO PAYS? The federal Bureau of Land Management, USDA Forest Service, and Alaska Department of Natural Resources work together to detect, monitor, and control forest fires in Alaska. The ability of these agencies to do this work is limited in part by the amount of money they receive.

Current federal and state budgets are not large enough to allow these agencies to control all fires in the boreal forest. The costs of fire-control programs are ultimately paid by taxpayers, either through higher taxes, or reductions in other government services

HUMAN-CAUSED FIRES: Some, but not all forest fires, threaten human lives and property. Human-caused fires are more common along Alaska's road systems and near human habitations. That makes them more often a threat to people and property than lightning-caused fires.

SMOKEY AIR: Smoke from forest fires can interrupt aircraft flights and the travel plans of residents and tourists. Smoke can cause health hazards for persons with breathing difficulties downwind of large fires.

PILES OF FUEL: Some foresters and fire scientists worry when fires are prevented. They fear we may be creating a stockpile of dead wood, branches, and undecayed material that will feed an even bigger fire. They say it may be wise to allow more natural fires to burn to prevent the buildup of fuel.

WHAT A MESS: Fire **suppression** efforts include cutting fire lines and trails, applying fire retarding chemicals, and pumping water from streams and lakes to spray on the fire. Sometimes these actions cause more damage to lands, vegetation, and watersheds than uncontrolled forest fires. Concern has prompted some rehabilitation efforts. Fire fighting groups work after a fire to help restore some areas damaged by fire suppression activities.

SOMEONE HAS TO FIGHT: Fire fighting is dangerous, exhausting, sporadic, and seasonal. At times it's one of the few jobs in the village. Several Alaskan villages have contributed members to "Hot Shot" fire suppression crews that fly to fires here and in the Lower 48. Where fire crews are stationed, others gain income from selling goods and services to them and their agencies.



FOREST DILEMMA 1

Boreal Forest Fires—Background

What is Being Done?

LET'S COOPERATE: In the late 1970s, state, federal, and private land managers joined to form the Alaska Interagency Fire Management Council. This organization plans cooperative fire fighting throughout Alaska. The council treats fire as a natural force with both beneficial and potentially harmful effects.

THERE'S A PLAN: Members wrote the Alaska Interagency Fire Management Plan. The plan sets a priority for fire fighting work. All lands in Alaska have been given one of four fire protection categories. The categories range from an all-out attack when human lives, property, or valuable resources are in danger to allowing a carefully watched fire to burn if no danger is involved.

Four categories of fire management

1. **Critical Protection Areas:** In areas where human lives or homes are affected, all fires will be immediately and continuously suppressed to minimize loss of life and damage to property.

2. **Full Protection Areas:** Fires occurring on sites with commercially valuable timber stands, historic structures, or other valuable resources, but where people and homes are absent, will be immediately and aggressively suppressed to limit the number of acres lost.

3. **Modified Action:** Fires that occur in uninhabited areas and where valuable timber (or other types of resources) are absent will be monitored, but efforts will depend upon a comparison of the costs of fire suppression versus the potential number of acres that will burn.

Greater efforts to control fires in these areas will be made when the risk of large, hot fires is high. Less effort will take place during cool, wet seasons when fires are unlikely to spread. After mid-July, the policy for these lands changes and they are treated like Limited Action sites.

4. **Limited Action:** Fires will be monitored but allowed to burn in areas where natural fires are considered beneficial, or where the costs of fighting the fire are greater than the potential fire damage. Suppression efforts will be made only to limit such fires to the designated area, or to protect critical sites within the limited action area.

CONTROLLED FIRES: Even when there are no wild fires, the fire managers work to contain potential fires in safe areas. They will deliberately start a "controlled" fire.

They select a day when weather and fuel (flammable forest debris) conditions are adequate for a burn, but when a fire is unlikely to burn too severely. They make sure firefighters are ready just in case. Then they set the fire, careful to keep it in the desired area. This method is currently being used on an experimental basis to improve habitat for moose which like to eat the tender young branches that grow after fires.

FOREST DILEMMA 2

Old Growth Management—Background

QUESTION: Should the timber industry continue to log public old-growth forests in Southeast Alaska?

ALASKA CHALLENGES:

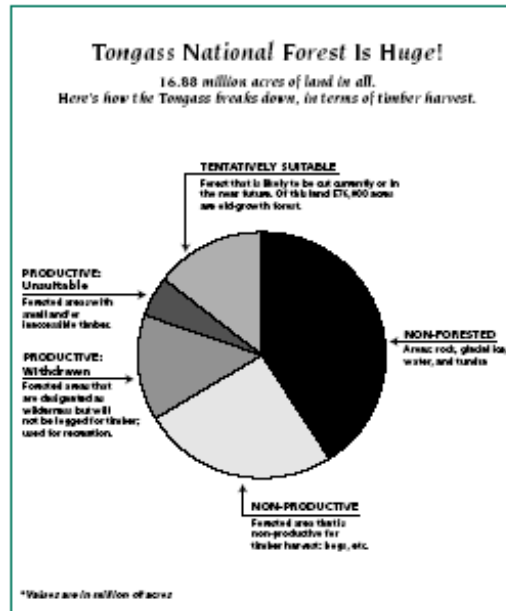
Harvesting timber in Alaska has always been more costly than in the more productive forests of the Pacific Northwest. The cost of doing business rises with our difficult weather; remote locations of commercially valuable timber stands; lack of roads and expense of building them; and the high cost of labor, equipment, and services.

INTERNATIONAL

MARKET: To date, the majority of Southeast timber products has been sold and exported to Japan or other Asian markets because domestic markets buy cheaper supplies from Lower 48 forests. International timber markets change, based on the global economy, making logging a bit of a gamble.

RESEARCH ALL VIEWPOINTS: The issues surrounding timber harvest in the Tongass are clouded by differing viewpoints and differing values. The story you hear depends on the storytellers' experience, values, and knowledge. Research as many as viewpoints possible before you make your own decision.

FORESTS OF TIME: In Southeast Alaska most of the unharvested coastal forest is old-growth. This forest type is the climax stage of **succession**. It includes live trees of a variety of ages, from seedlings to 600-year or older giants, as well as standing and fallen dead trees. Over 200 years are required for oldgrowth forest to develop after disturbance.



HARVEST VALUES:

Oldgrowth forests vary from scrub stands of noncommercial-quality timber to lots of large trees of great economic value. Noncommercial forests are those with small, widely-spaced trees of little profit to harvest.

“Low-volume” old-growth forests have small or widely-spaced trees which could yield some profit if harvested. The expense of cutting such stands may be greater than the market price of wood obtained, however.

Noncommercial and low-volume old-growth stands grow mainly at high elevations and in poorly drained soils. “High-volume” old-growth forests have huge trees up to 8 feet in diameter and 200 feet tall. Most highvolume stands grow on well-drained soils at low elevations and along rivers that drain watersheds.

LOCAL PROCESSING: National Forest lumber cannot, by law, be shipped out of state without being squared off. **Cant** is minimal processing. Timber from the Tongass National Forest must be milled by Alaska companies prior to export. Cant exports were primarily used for pulp production.

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FOREST DILEMMA 2

Old Growth Management—Background

QUESTION: Should the timber industry continue to log public old-growth forests in Southeast Alaska?

GOOD GROWING: Easily accessible, high-volume old-growth timber stands provide the most wood at the least cost for the timber industry. The land under these trees has the best environmental conditions for growing new trees. Forest planners predict that a new crop of marketable trees could be harvested from these sites in 100 to 120 years. (*To grow commercially harvestable trees on poorer quality sites would require more time.*)

Forest managers say that management of high-volume sites for wood production would provide a continual supply of wood for harvest along with logging industry jobs and income for Alaska. Some people believe that this use of the land with high-volume old-growth forest is the best use and say all high-volume sites should be managed for production of wood.

OLD-GROWTH SUPPLY: High-volume old-growth stands suitable for harvest are a relatively small portion of Tongass National Forest. About 2.4 million acres (*14% of the total Tongass*) are classified as tentatively suitable for timber harvest. Of that, 576,000 acres or 20% is old-growth forest.

WILDLIFE NEEDS: Biologists who have studied the wildlife of coastal old-growth forests say that harvest of high-volume old-growth stands and the proposed second logging 100 to 120 years later could mean long-term or permanent loss of habitat for those species of wildlife that need high-volume old-growth forest stands.

The dense shrub thickets and second growth forest that grow back after logging an old-growth forest are quite different from the original old-growth forest. These stands provide relatively poor habitat for many wildlife species that use or depend on old-growth forests.

CONCERN FOR DEER: Biologists from the Alaska Department of Fish and Game (ADF&G) predict that management of high-volume old-growth sites for wood production will lead to a substantial decline in the number of Sitka black-tailed deer on logged lands throughout Southeast Alaska. Deep snows prevent deer from reaching foods in young clear-cuts during winter. Second growth forests provide very little food for deer at any time of year.

EAGLE FUTURE: Bald eagle nest-trees and trees within 300 feet of a nest-tree are officially protected during logging on public lands. Despite the buffer, US Fish and Wildlife Service biologists predict that harvest of high-volume old-growth forest is likely to cause a decline in Southeastern Alaska's bald eagle population for two reasons:

- (1) Trees in the buffer zone and the nest trees as well often blow down in wind storms once the surrounding forest is harvested.
- (2) Eagles depend on fish populations that may be harmed by timber harvest.

CONCERN FOR FISH: High-volume old-growth trees grow along many of the fish-rearing streams in Southeast Alaska. ADF&G fishery biologists admit that the effects of timber harvest are complex and vary from stream to stream, but warn that salmon and trout populations may decline if too much timber harvest occurs along streams or in watersheds that feed into fish-rearing streams.

Harvest of high-volume old-growth forest along streams often changes water temperatures, stream flow, silt loads, and productivity. These changes, in turn, can affect the reproduction and survival of fish.

continued

FOREST DILEMMA 2

Old Growth Management—Background

QUESTION: Should the timber industry continue to log public old-growth forests in Southeast Alaska?

SIZE AND BUFFERS: Some studies have shown that *small* clear-cuts along streams may increase productivity of the stream and the survival of fish fry. The detrimental effects of clear-cutting on fish habitat may be reduced by leaving buffer strips of forest along the stream — if the buffer strips are wide and stable enough to prevent the wind from uprooting trees during a storm.

In summary, the effects of timber harvest on fish spawning and rearing habitat are uncertain. The impacts depend on how much forest is harvested in each watershed, how it is harvested, and other variables.

NO SNAGS: The absence of **snags** (*large dead trees*) in second growth forests will reduce populations of cavity-nesting animals like woodpeckers, chickadees, swallows, owls, and flying squirrels.

Even if snags are retained during timber harvest, they eventually decay and fall or are blown down. New large snags will not be created if second growth forests are repeatedly harvested when the trees are 100 to 120 years old.

VARIED WILDLIFE: Research on winter songbirds, river otters, Vancouver Canada geese, mountain goats, and brown bears indicate that these wildlife use old-growth stands in some areas of coastal forest. The impact of old-growth logging on these species is unclear.

TESTING: Some biologists argue that some wildlife may adapt to the changes after logging. They suggest we can modify logging methods and manage second growth forests in ways that reduce

the negative impacts on wildlife that depend on old-growth forests. Tests are underway to see the effects of retaining snags, thinning second growth stands, clearing of slash, and other forest management techniques. So far, none of these methods has proven effective or affordable.

SCENIC CONCERNS: The scenic value of various aged forests has not been thoroughly investigated. Some people argue that the scenic value of Southeast Alaska wilderness will be significantly reduced by timber harvest and its potential to reduce wildlife populations. They predict extensive timber harvest in the coastal forest will cause a decline in tourism, fishing, and guiding. Other people argue that tourists do not notice or may enjoy the scenic variation of old-growth, clearcuts, and second growth. They predict that timber harvest will not affect tourism.

IN THE BALANCE: Some foresters agree that extensive harvest of old-growth will reduce the number of deer. They argue that we have enough deer in Southeastern Alaska even at lower population levels. These foresters say we must balance our desire for high deer populations with our desire for jobs and timber. The public must help resource managers choose how to balance competing uses of the forest.

IN SUMMARY: Old-growth forests are unique ecosystems that provide habitat for a variety of plant and animal species. They have aesthetic, recreational, subsistence, and economic value to humans. It is challenging to manage public forest lands to meet the variety of public interests while maintaining a long-term, ecologically healthy forest.



FOREST DILEMMA 2

Old Growth Management

What is Being Done?

A TIME OF CHANGE: Changes in the timber industry, markets, social values of the forest, and the Tongass Land and Resource Management Plan have lead the Forest Service to study techniques to find alternative harvesting methods that avoid clear cuts and retain some trees.

LOGGING HISTORY: The Forest Service established long-term timber sale contracts in the 1950s to help stabilize the economy of Southeast Alaska that shifted seasonally with the fish industry and was declining in the mining industry. The 50-year contracts attracted investment for pulp mills and year-round timber enterprises.

MILLS CLOSE: The requirements for timber harvest to satisfy these long-term contracts came to an end in the 1990s when the pulp mills closed in Ketchikan and Sitka.

CURRENT SALES: The Tongass prepares timber sales that allow loggers to harvest a yearly average about 220 million board feet of timber. Many sales are designed so they can be sold to small, local enterprises in Southeast Alaska. The local timber industry is diversifying so it can provide employment for additional local wood processing and take advantage of markets for specialty wood products.

RETHINKING: The Alaska Region of the Forest Service is changing the way it prepares timber sales for several reasons.

- (1) It is learning more about fish and wildlife habitat needs in the forests.
- (2) Foresters have also increased their knowledge of how trees grow in Southeast.
- (3) And the agency is responding to concerned public who say they oppose timber harvesting, particularly clear-cutting.

