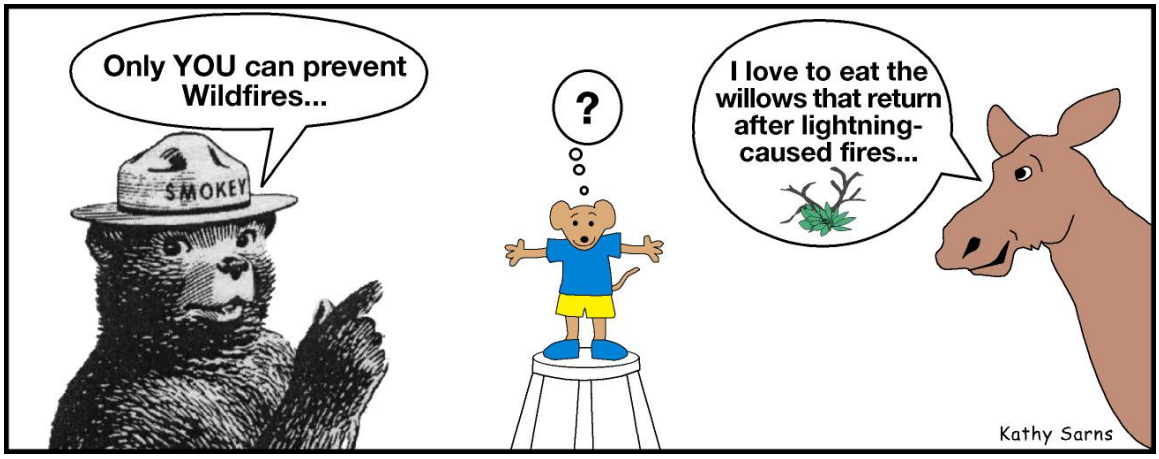
DILEMMAS IN FIRE MANAGEMENT



Grade Level: 6-12
Alaska State Content Standards: LD1, LD2, LD4, LE2, GeoE4, GeoE5, GeoE6, GeoF3, GovG3
Subject: Language Arts, Geography, Government
Skills: Comparison, Description, Evaluation, Generalization, Problem-Solving, Research
Duration: 2-3 class periods
Group Size: 4-6
Setting: indoors

OBJECTIVE
Students discuss current fire management issues and the importance of making informed management decisions.

TEACHING STRATEGY
Students express original opinions on fire management issues and then make informed decisions.

MATERIALS
- Paper and markers
- Index cards – 4 per student
- Forest and Tundra Dilemma Background Information Sheets #1, #2, and #3
- Reference materials including newspaper and magazine articles

TEACHER BACKGROUND:
The following dilemmas are designed to help students identify different types of human perspectives related to fire management issues. They will then formulate opinions about what they think would be the most responsible and appropriate actions to take. There are no "right" or "wrong" answers. Teachers are encouraged to have students do additional research so that decisions are based on the best factual information available

PROCEDURE

Part A. The Original Options

1. Give each student a magic marker and four index cards. Write a number on each card (1-4) corresponding to the opinions listed below. On the board write the following information:

    Opinions:

1. definite NO
2. uncertain NO
3. uncertain YES
4. definite YES

2. Divide the class into groups of 4-6 students. Explain to students that one member of each group will be reading aloud the 3 resource management dilemmas.

3. Each group reader will read aloud each dilemma to the group. Instruct students to think about the dilemma and choose an "opinion number" corresponding to their original opinion. When the group is ready, have students hold up their index cards with the number facing the reader. The group reader asks each student why they chose the opinion they did. For each dilemma, tally the results on paper making bar graphs representing the group's original opinion for each dilemma.

The Three Dilemmas to Read:

1) The intentional, planned use of fire to alter habitat is known as prescribed burning. Resource managers will prescribe burn an area to reduce a build-up of fire fuels or to maintain vegetation to benefit wildlife. Should prescribed fires be started or should nature be allowed to take its course?

2) Spruce bark beetles kill thousands of trees on public forest land. The intentional, planned use of fire to alter habitat is known as prescribed burning. Should the government do prescribed burning in an attempt to stop the spread of the beetles?

3) Some areas in SW Alaska should be categorized as limited action areas where fires are mainly monitored but not fought. The people who live a subsistence lifestyle in this area are very dependent on caribou herds that prefer the lichens that are destroyed by hot fires. Should another level of protection be given those areas to help maintain the reindeer herds that these people are so dependent upon?

Part B. The Informed Decisions

1. Give each group member a copy of the Dilemma Background Information Sheets and reference materials for the dilemmas. You may want to give each group only one dilemma to work on.

2. Groups are to read their Dilemma Background Information Sheets. Students may further research newspaper and magazine articles or talk to local experts and agency people. After considering all the information and sides of the issue, the group will then formulate an informed group decision.

3. Each group presents their findings and their informed decision to the class. The class is encouraged to

ask questions. After each group's presentation, each student in the class makes their own informed decision about the dilemma. Students hold up an index card containing the number corresponding to their decision. The class informed decision is tallied and a new bar graph may be drawn.

Part C: Discussion
Compare the original opinions and informed decisions. Discuss the importance of learning about all sides of an issue before making a decision or forming an opinion. Opinions and decisions are based on available information, which may or may not be complete or accurate. In addition, the media's presentation of an issue may or may not be biased. How can the public get the information they need to make researched decisions?

EVALUATION
Have students write a dilemma of their own, research it, and make an informed decision.

EXTENSION
Rather than researching each dilemma, informed decisions may be formulated after the class has completed some of the other activities in this curriculum, including "Tundra or Boreal Forest Fire Hunt," or "Good or Bad Effects of Fire in the Tundra or Forest -- Who's To Say". Before each of these activities, read the dilemma and take an original opinion vote.

Teachers may wish to substitute other dilemmas for those described here.

FOREST DILEMMA BACKGROUND INFORMATION SHEET #1

The intentional, planned use of fire is known as prescribed burning. Forest managers will prescribe burn an area to reduce a build-up of fire fuels or to maintain vegetation to benefit wildlife. Should prescribed fires be started or should nature be allowed to take its course?

FIRE AS A NATURAL FORCE

Fires burn in a patchwork pattern called a mosaic. This vegetation mosaic results in diverse habitat for wildlife. People benefit from the availability of wildlife whether they hunt, fish, photograph, or simply observe them. When fire is excluded from fire-dependent ecosystems, the ecosystem's diversity, productivity, and stability are reduced.

PRESCRIBED BURING AS A MANAGEMENT TOOL

Research has taught us much about the behavior of fire. By analyzing weather conditions, fuel types, and the topography of an area, a professional fire manager can begin to predict how fast a fire will spread, how high the flames will go, and how intensely the fire will burn the area.

Prescribed burning is the intentional, planned use of fire. It can be used to duplicate the historic cycle of natural fire. The **fire interval** is the length of time that passes between natural fires in a given area. The fire interval for Interior Alaska is as often as every 50-100 years.

Prior to setting a prescribed burn, managers complete a burn plan. These plans consider such things as the purpose of the burn, fuel load of the area, public notification plans, ignition source and patterns, pre-fire surveys, and manpower and equipment needed. Sometimes prescribed burns "escape" and cause damage. This is usually due to an unexpected change in the weather.

Prescribed burning can benefit wildlife. The mosaic patchwork pattern of a fire creates many **edges** between vegetation. These **edges** are often preferred by wildlife for feeding areas and travel corridors. Prescribed burning on lake margins in the fall removes dead vegetation and promotes regrowth of grass and sedge shoots desired by waterfowl for food and nesting materials.

Prescribed burns can be used to create fire breaks. **Fire breaks** are areas where fuels have been removed to stop a fire from spreading. Fire breaks are often used to protect privately owned lands and developed areas from fire.

EFFECTS OF SMOKE

Smoke produced by fires can have a variety of effects on residents and visitors. Long lasting fires can lead to disruption of air service due to smoke density problems and can pose serious aviation safety problems for aircraft. Smoke can interfere with the tourism industry. It can also cause health problems for elderly residents and those with respiratory ailments. For most people, however, smoke is an irritation rather than a health hazard.

FOREST DILEMMA BACKGROUND INFORMATION SHEET #2

Spruce bark beetles kill thousands of trees on public forest land. The intentional, planned use of fire is known as prescribed burning. Should the government do prescribed burning in an attempt to stop the spread of the beetles?

THE EFFECTS OF THE SPRUCE BARK BEETLE

The spruce bark beetle attacks white spruce trees by boring through the bark to feed and breed in the phloem. The phloem is the layer of tissue that transports food manufactured in the tree's leaves to the rest of the tree. If this layer is totally destroyed, the tree dies.

The beetle has infected trees on the Kenai Peninsula and in the Yukon and Kuskokwim Valleys. The beetles are spreading north and are a serious threat to Alaska's forests.

WHAT HAS LED TO THE SPRUCE BARK BEETLE EPIDEMIC?

Small populations of the beetle are always present in white spruce forests, feeding and breeding in dead and dying trees. Under normal conditions, beetle populations are controlled by parasites (such as ichneumon wasps) and predators (such as woodpeckers). However, when conditions are favorable, spruce beetle populations may suddenly increase to epidemic proportions. Conditions that favor beetle reproduction include very dry summers and the presence of many dead or dying trees. When populations reach epidemic size, the beetles begin moving from dead and dying trees into healthy, living trees nearby.

Beetles that attack healthy trees are usually trapped by pitch the tree produces. Patches of resin may be produced on the infected tree's trunk and the needles may turn a yellowish-green, then a reddish-brown color, before falling off.

Many human activities disturb the growing conditions of white spruce, contributing to spruce beetle attacks and epidemics. Timber harvest, land clearings (roads, seismic lines, pipelines, powerlines, or building construction), and fire can injure healthy trees or leave dead wood where beetles can reproduce.

THE SPRUCE BARK BEETLE AND THE BOREAL FOREST ECOSYSTEM

Epidemics of the spruce bark beetle and other insects are a natural phenomenon in the boreal forest. Even in severely affected forest stands, some white spruce are able to survive beetle attacks. The survivors are more vigorous, less attractive to beetles, or are perhaps better able to trap the beetles with their pitch.

Dead and insect-infested spruce trees provide important habitat for certain wildlife species. Woodpeckers feed primarily on bark beetles and other wood-boring insects. They excavate nesting and roosting cavities in diseased trees with rotten interiors. Flying squirrels, boreal and black-capped chickadees, tree and violet-green swallows, and boreal owls require nesting and roosting holes (usually old woodpecker holes) in dead and dying trees in order to raise their young and to survive the winter. Juncos, sparrows, and several thrush species use fallen trees for nesting cover. Small mammals such as voles, squirrels, and hares use fallen trees for important cover from predators.
The decomposition of dead trees returns minerals to the soil where they can be used again by growing plants. Burning dead trees returns minerals to the soil more quickly than does decomposition. When dead trees are removed from the site, so are the minerals.

PREVENTATIVE MEASURES AGAINST THE BARK BEETLE
Some people believe that pesticides should be used to stop the spread of the spruce bark beetle. Others feel that use of chemicals should be avoided since they may adversely affect the entire food chain.

Some forest entomologists (people who study insects and insect-caused diseases) suggest removing old, diseased, and dead trees and harvesting white spruce trees when they reach 150 years of age to reduce or prevent spruce bark beetle epidemics. They also recommend removing slash from logging, wind-damaged trees, and trees killed or injured by fire.

Forest ecologists recognize that healthy forests consist of a variety of tree species and ages. These kinds of forests provide habitat for a variety of bark beetle predators, such as birds, wasps, ants, and spiders. A greater variety of predators may decrease the probability of beetle epidemics.

VARIOUS POLICIES CONCERNING TREE REMOVAL
The Alaska Division of Forestry removes dead, diseased, and dying trees in accessible areas of the Tanana Valley State Forest; the U.S. Forest Service does this in accessible parts of the Chugach National Forest. On lands managed by the U.S. Fish and Wildlife Service, dead, dying, and diseased trees, including those killed by beetles, are left in place to serve as nesting habitat and cover for wildlife. The U.S. Bureau of Land Management encourages harvest of dead, dying, and diseased trees on most accessible forested lands under their jurisdiction.

TUNDRA DILEMMA BACKROUND INFORMATION SHEET # 3

Some areas in SW Alaska should be categorized as limited action areas where fires are mainly monitored but not fought. The people who live a subsistence lifestyle in this area are very dependent on reindeer herds that prefer the lichens that are destroyed by hot fires. Should another level of protection be given those areas to help maintain the reindeer herds that these people are so dependent upon?

PROBLEMS FROM FIRE

There is a problem with establishing some areas of SW Alaska as limited action areas where fires are only monitored unless they threaten lands in other higher valued categories or critical sites within the area. The value of the resources lost during a fire in these areas would be much less than the cost of fighting those fires.

Reindeer herds are kept in this area and support much of the local subsistence economy. Most people agree that the lichens that are burned in very hot fires are a preferred food for caribou and reindeer. These lichens may not revegetate these areas for 15-100 years, depending upon the severity of the burn and the environmental conditions of the area. This does not present a serious problem for caribou that can move to other areas for winter food. The reindeer cannot be moved to a new area so these fires may have a devastating effect on these herds and the people who depend upon them.

ADVANTAGES OF FIRE

Fast shallow burns may increase the lichen cover, especially where thick carpets of mosses have developed. These burns may favor the growth of some lichen species preferred by caribou and reindeer.

Some burns may also increase the early spring plant growth for reindeer and waterfowl. A fire in the Selawik area caused an increase from 21.0 ducks per square mile to 33.3 ducks per square mile the next year.