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.