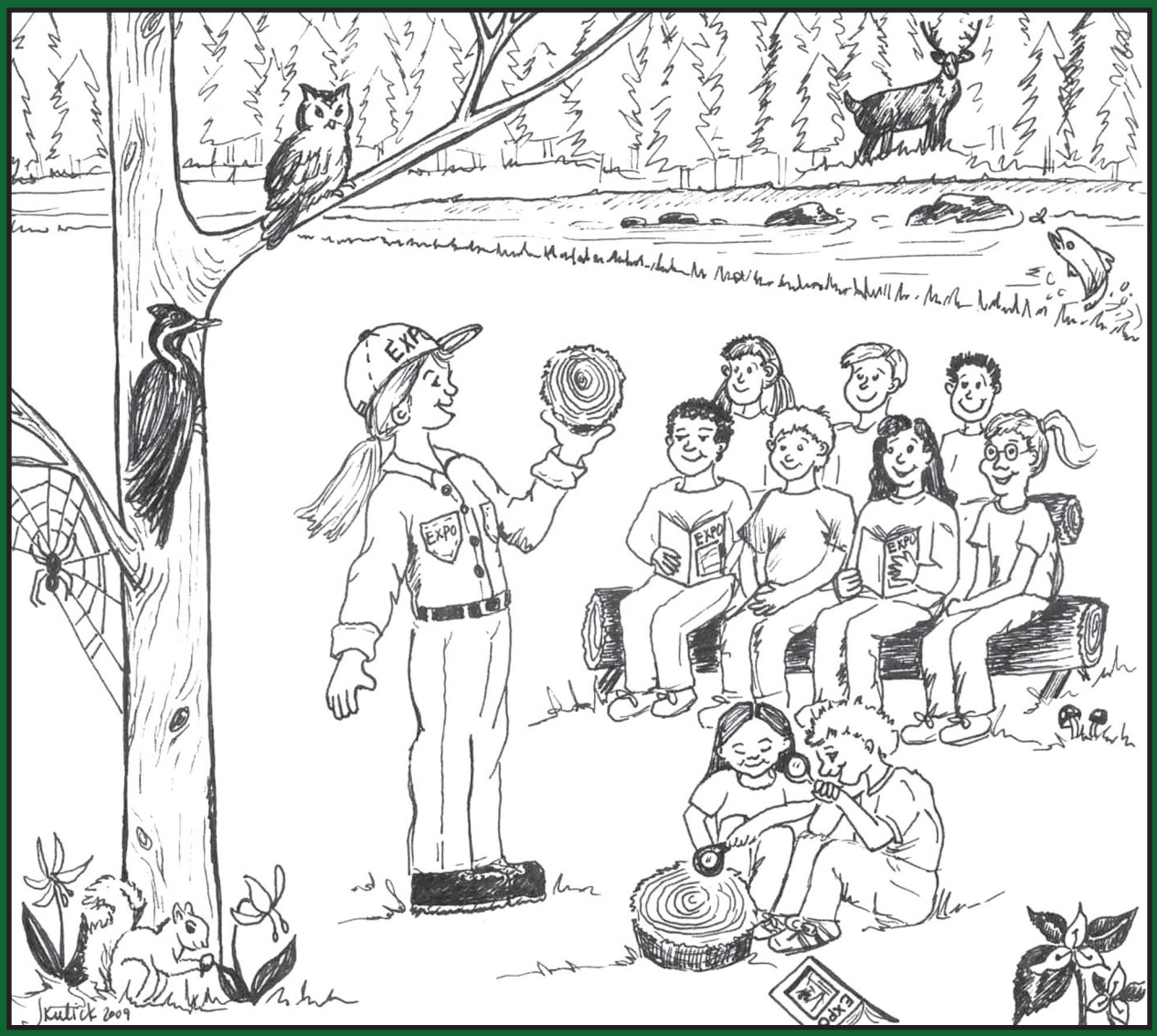
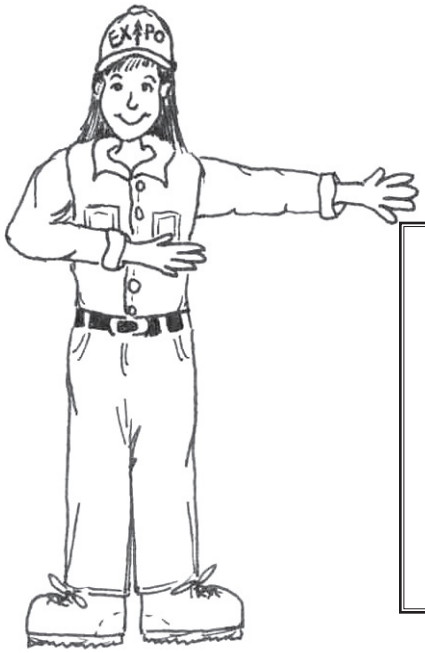
Flathead Family Forestry Expo

FORESTRY TOUR





Flathead Family Forestry Expo Forestry Tour 1989 - 2009

ORIGINAL WORKBOOK DEVELOPED FOR:
DOUGLAS COUNTY EXTENSION SERVICE
ROSEBURG, OR

ADAPTED BY THE FLATHEAD FAMILY FORESTRY EXPO COMMITTEE
FOR LOCAL USE

2009 EDITION

TABLE OF CONTENTS

INTRODUCTION

This workbook and the Family Forestry Expo focus on humans and how they are dependent, now and for future generations on the forest and its resources. The goal of the Family Forestry Expo is to present complete and unbiased information to students and families in our community about the role of Northwest Montana forests and the multiple opportunities and resources they provide in our everyday life.

The topics found in this workbook cover different aspects of a forest and its importance to people. Keep in mind that people, forests, and all other parts of the environment are dependent on one another. Each affects the other and everything works together as a system.

FORESTS AND US

Many people think of forests as only trees. Trees are just one part of the forest. Forest communities include other plants such as shrubs, wildflowers and grasses. Forests also include insects, fish, birds, and other animals that depend on the forest. Forests are affected by natural features such as soil, rainfall, sunlight, temperature, and elevation. All these things interact to make up a forest ecosystem.

Forests don't stay the same - they are always changing. Forests are affected by natural processes such as fire, wind, floods, insects and diseases. Plants grow and then die. Some live for weeks, while others live for centuries. Across a large area, the forest includes a patchwork of grasslands, open areas with mainly young trees, older dense forests, and everything in between. Streams and ponds are scattered through the forest. This variety of habitat helps support a wide variety of plant and wildlife species. Animal communities change over time as the vegetation changes.

Forests are also influenced by people, and have been for many generations. Native Americans used the forest, and harvested trees, fruits, and berries. Sometimes they used fire to help them hunt for food. Native Americans used fish and wildlife for food. Hides from the animals were used for clothes and to build lodges. Forests also contained spiritual and cultural sites important to native people.

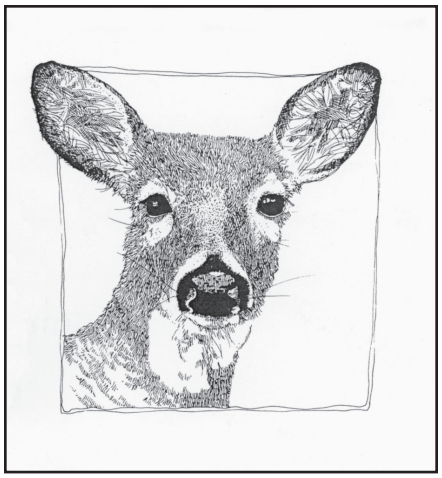
Today people still depend on our forests for many things. We hunt and fish in the forest. Forests provide clean water, places for hiking, camping and other recreation. Forests provide trees for lumber to build our homes, wood chips to make paper to print books, and many other manufactured products. Forests also provide jobs related to using our forest and recreating in the forest.

Across the large forest landscape there is room for these many uses. To manage a forest means that people will decide what will happen to the plants, animals, water and soil. Forests can be managed in many different ways, depending on what the land owners want.

For example, National Forests have some areas designated as wilderness where only natural changes are desired and people choose to have little influence. Other areas are designated for multiple use. Montana State forests are managed to provide funds for our schools. Wildlife refuges are managed to provide habitat for specific species of birds or animals. In Western Montana, timber companies such as Stoltze and Plum Creek also own forest lands which they manage to provide timber to their sawmills and benefit their companies. Areas like Glacier Park are managed for their natural beauty and to provide recreational opportunities. Private landowners may want their forest managed for wildlife, or scenery, or some other purpose.

Each owner determines what sort of management they want to match their idea of what the forest should be now and into the future. For public lands, YOU and all other citizens are the landowners. There are often competing/conflicting demands for the forest, because different people want different things.

Forests will change with or without forest management. Careful forest management can help provide products from the forest and still maintain the forest's many other values. There are many different tools for forest management, including selective logging, human-ignited prescribed fire, and clearing of forest vegetation for other uses such as homes.



The opportunities and limitations of a particular forest area, as well as the owner's wishes, must work together to determine the best management plan for a forest. Management activities for a warm dry ponderosa pine forest may not work in a spruce or lodgepole pine forest. Management activities must be matched to the plants and animals in each forest ecosystem.

There are many challenges facing forest managers today. Because forests are complex, forest management is also complex. Fire is one of the biggest challenges.

Increasing numbers of people are making their homes in or near the forest, in the area called the Wildland Urban Interface. Fire is a natural part of the forest. Today, some large wildfires are having negative effects, such as creating poor air quality and threatening homes and human activities.

We have learned that keeping fire out of the forests can also have unwanted effects. Fuels are allowed to build up, and can result in a much hotter or larger fire when areas do burn. Keeping fire out of the forests can affect many parts of the forest community. For example, many older whitebark pine stands in northwest Montana are dead or dying. Whitebark seedlings need bare soil to grow. Keeping fire out of the forest has prevented whitebark seedlings from growing in many areas. This in turn affects the birds, squirrels and bears which eat and distribute the pine nuts. Forest managers have learned that they must try to strike a balance in living with fire and still protecting important resources.

In the last decade Western Montana has had generally milder winters and hotter dryer summers. Our climate is changing, but predictions are not clear as to what weather patterns will be over the next century. While it will likely be warmer, will it be wetter in the winter or dryer in the summer or both? How will that affect forest plants and animals? Many trees can live for more than a century – so future climate change has the potential to affect the forest communities that are here today. We will want our forests to be able to adapt and be healthy through these potential changes. How will forest managers do that? We are still learning the answers to that question.

Humans depend upon the forest, now and in the future. A growing population increases the human demands on the forest. This workbook should help provide a basic understanding of some important parts of the forest environment and the opportunities and resources the forests provide us in our every day lives. It is everyone's responsibility to be responsible in the forest.

FIRST PEOPLE IN THE FOREST

NATIVE AMERICAN ADAPTATIONS

People have been a part of forest ecosystems for thousands of years and many of their basic needs have been met by use of the forest.

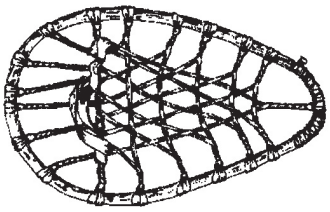
List four of your basic needs for survival:

_____ _____

_____ _____

How have Native Americans fulfilled basic needs in the past and today? How did the Native Americans use the forest resources? Native American tribes adapted to forest environments and used fire to maintain forest environments necessary for their survival. By setting planned fires, they maintained open stands of land to allow for better hunting, travel, grass and food production.

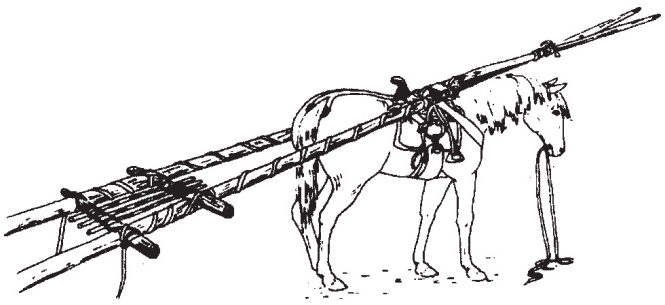
There are several Native American tribes whose members live in northwest Montana today. Those living closest to the Flathead Valley include the Confederated Salish and Kootenai Tribes, and the Blackfeet Nation.



Snowshoe

The Blackfeet Nation

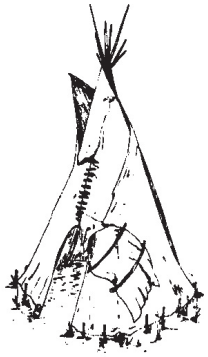
The Blackfeet are of the Great Plains cultures (east of the Continental Divide). People of the Plains cultures followed a hunting and gathering cycle. They were heavily dependent upon the buffalo herds for their livelihood, and therefore, they were much more nomadic and mobile than their western neighbors. They tended to camp in the same locations at certain times of the year, but seldom constructed permanent lodges. Their skin lodges were put up and taken down in a matter of minutes and could be readily moved through a cycle of camps.



Travois

Tule Mat

LODGES



Bison Hide

For food, the Blackfeet were dependent upon buffalo, limited use of roots and berries with virtually no fishing and no agriculture other than raising tobacco. For transportation in historic times, they used the travois (see drawing opposite), either behind dogs or later, horses.

They had a highly developed use of buffalo and deer skins in the crafting of clothing, lodges, and other household items. Heavier items made of wood, stone and bone were less common because of the need to travel light.

The Confederated Salish and Kootenai Tribes

Confederation of these tribes occurred under the Hellgate Treaty of 1855. In general, for these tribes, early spring food for survival focused on the digging of bitterroot, camas, wild carrots and onions, and other roots and bulbs. They also gathered moss, berries, medicinal plants and herbs as they came into season.

The late fall was a time for drying and preserving meats and plants and processing hides for various uses. Fishing was also a major food source for some people. Whitefish and bull trout were important fish resources. Fishing gear of all types was made from forest resources (see illustration). Game animals included caribou, moose, elk, deer, mountain sheep, bison, and smaller game animals such as grouse, rabbit, and others.

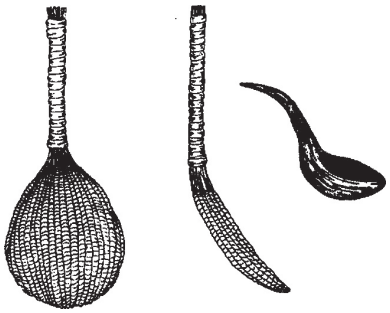
Fishing Gear

Bark Covered Canoe

How do you think an elder family or community member would have used the forest during their lives?

WAYS OF THINKING ABOUT FOREST USE: AN INDIAN PERSPECTIVE

While there are many cultural differences between tribes, there is a sense that all Indians know about a way of life that is respectful of and in tune with the environment. Living according to this way of life means understanding that we are a species sharing the Earth with other equally important species. In this way of viewing the world, all things on Earth have a spirit nature, interdependent with everything else, be it a human, grizzly bear, mosquito, tree or rock. In interdependence we use, consume, and learn from each other.



Cooking Spoons: Basketry and Horn

Talking with Native American people today, we can learn a lot about traditional uses of the forest in past generations. We can also find out how Indians are using the forest today, perhaps in ways that have endured over hundreds of thousands of years.

Stone blades were set into wood or antler

Be aware that there is no such thing as a single "Indian" culture. There were hundred of Indian nations and languages in North America at the time of EuroAmerican contact. Today, Indian people can be as diverse in their views of an issue as is American society in general.

WHAT IS ARCHAEOLOGY?

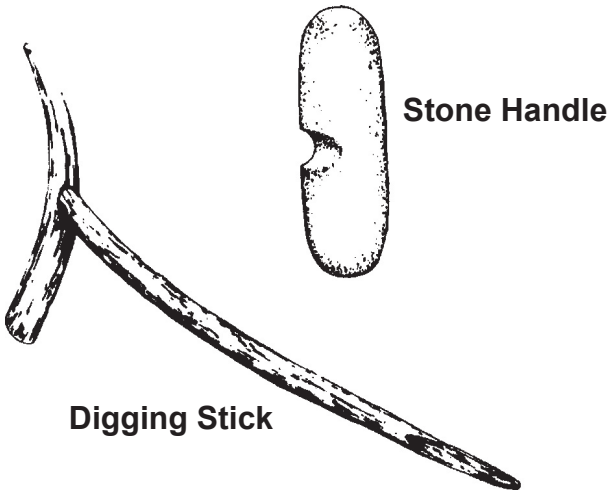
Another way we can learn about forest use in the past is through archaeology. Archaeology is the scientific study of past human culture, technology and behavior based on the analysis of remains that people have left behind. Archaeology promotes multicultural understanding through an attitude of respect for present and past human populations and their way of life. Archaeology makes us aware of the need to protect and preserve archaeological sites. When archaeologists find and study artifacts (objects made by people, such as stone tools), they can determine when and how people used the forest. For example, a campsite may show remains of animals and plants, as well as tools.

What artifacts would an archaeologist find from your home to provide information on the culture, technology and behavior of your family?

Archaeologists also study how the forest has changed over time. By analyzing trees, they can determine how fires have changed the forest and even whether humans used fire to manage the forest.

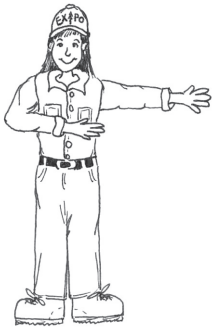
Protecting Archaeological Sites: How and Why?

Vast areas of public lands include thousands of archaeological sites that tell us about past people and forests. These sites must be protected from disturbance that can be caused by our present day uses of the forest such as road building, timber harvest and the development of recreational facilities. Illegal vandalism and looting can destroy the links to the past that archaeological sites contain.



You can help by reporting any artifacts you find on public lands to the archaeologist working in each National Forest, to the staff of a local Forest Ranger District, or the Department of Natural Resources and Conservation office. Ask your friends to do the same!

FIRST PEOPLE IN THE FOREST NOTES



FIRE IN THE FOREST

Do you think it is possible for forest fires to have positive effects in the forest?

_____

After you are finished reading this chapter, come back and answer this question again. Did your answer change after reading the chapter? _____

Fire has always been a major agent of change in Northern Rocky Mountain Forests. Climate and soils in much of western Montana allow trees to grow about twice as fast as they decompose and return to the soil each year. Forest fires recycle the vegetation and create conditions for a new cycle of plants and animals to grow. When foresters intentionally start fires to achieve desired conditions, such as removing fuel, improving habitat for wildlife or seedbed preparation, it is called prescribed burning. Fires started accidentally or by lightning are called wildfires. Wildfires play an important ecological role but they can also be dangerous to people and things we value.

When you hear the word "Forest Fire!" you imagine leaping flames, fleeing wildlife, and charred remains of standing trees. Smokey Bear's TV advertisements warn that "Only You Can Prevent Wildfires." Smokey's message really helps prevent unwanted fires, but only tells part of the story. We want to prevent fires that will damage valuable resources, destroy wildlife habitat or our homes. But, some fires are necessary and healthy for a forest. Used carefully, fire has become an important tool for taking care of our forests.

GROUND-TO-CROWN FIRES

There are many different types of forest fires. Some are big, others are small. Some burn extremely hot, while others burn more coolly. Fires burn differently depending upon the amount of fuel the fire can reach. The weather also affects how fires burn. Weather factors include moisture, wind and temperature. The natural features of the land, including its steepness, also change how a fire behaves. Some forest areas only burn once every 100 years or more! These forests have large amounts of fuel because dead logs, branches, and leaves pile up, and young trees and other vegetation crowd into the area during the long period of time between fires. Fires in these forests can burn large areas and burn very hot. A forest can look black and desolate after a hot fire. Most trees will be blackened, the branches will be gone, and many shrubs and small trees will be dead. However, this is nature's way of starting the forests over again.

Are there any areas near your home affected by forest fires?

_____

_____

A fire that is TOO HOT can strip the soil of its protective layer called "duff". These fires can be destructive, and it takes a long time for the forest to recover. Foresters try to prevent fires that will damage the forest or the soil.

Other forests burn every 5-25 years and have smaller amounts of fuel, so the fire burns relatively cool and stays on the ground. Many trees will still be alive and green after this kind of fire, though their trunks may be a little black. Some young trees will survive, but many will be removed by the fire. Some shrubs will still be alive, but might have temporarily lost their leaves. This is nature's way of maintaining these types of forests in a healthy condition.

Compare a forest after a cooler, ground fire passes through it to when a fire that is TOO hot passes through it.

FIRE TRIGGERS NEW LIFE

Fire is nature's way of managing the forest. When a fire burns, it doesn't burn everything. It burns some areas, while leaving some areas green and still supporting a wide variety of plants and animals.

A fire changes plant material into ash, which contains important nutrients and minerals such as Phosphorous, Calcium, Potassium, and Nitrogen. These are the vitamins a forest needs to grow. When it rains, the nutrient-rich ash soaks into the soil. Some plants quickly flourish in the burned area. These plants grow rapidly on sun-warmed soils rich in nutrients.

Along with releasing nutrients into the soil, a fire can increase the amount of sunlight and moisture available to these plants by removing others. Wildflowers, grasses and other plants come in first, but are eventually shaded out by shrubs and young trees. This is called plant succession and this is how forests change, by new species growing and replacing other plants.

Name three good effects of fire.

FORESTERS IMITATE NATURE'S WAY

Foresters use fire carefully to take advantage of its good points, while limiting its bad points. This is called controlled burning, and it is an important part of taking care of the forest. But don't forget UNCONTROLLED fires can be destructive to people, animals, and the forest. We don't want to cause a fire that will damage the forest, the wildlife, or people's property. Don't play with fire. It's serious business!

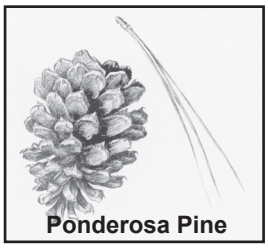
FIRE PLANTS AND FIRE-LOVING SEEDS

Fire Plants

Fires have been going on in forests for thousands of years, and many plants have adapted in order to survive. Some plants, like fireweed, grow only on open sites and will disappear from forests that do not burn.

Wildflowers

After a fire, plants spread out into the newly opened areas to take advantage of increased sunlight, moisture and nutrients. These plants include pink Fireweed, yellow Arnica and purple Lupine; flowers that often burst into flower at the same time.



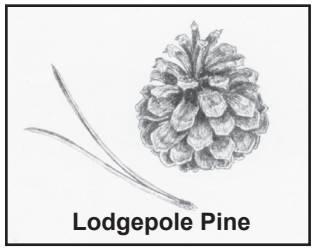
Ponderosa Pine

Fire and Trees

Certain kinds of trees have special characteristics that help them survive lower intensity fires. Fire resistant trees such as ponderosa pine and western larch have a thick layer of bark that can withstand a cool fire. In the past, Montana's Ponderosa Pine stands burned every 5-25 years. These frequent fires produced open, park-like forests.

Fire-loving Seeds

Lodgepole pine trees produce two kinds of cones. Some Lodgepole pine cones open each fall and release their seeds, but others remain closed until heated by a fire. The seeds in these cones can survive for 50 years or more. Lodgepole pine is adapted to grow in openings created by a hot fire.

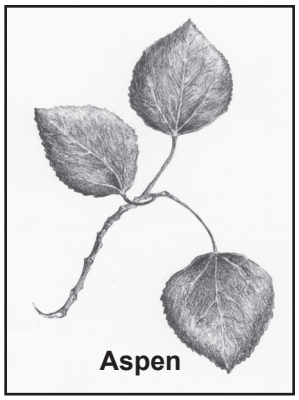


Lodgepole Pine

FIRE CREATES WILDLIFE HABITAT

Animals also take advantage of changes caused in the forest by fires. Fire stimulates lush new plant growth which plant-eating animals really like. Many kinds of wildlife prefer open or shrubby areas for feeding.

Wildlife managers use controlled burning as a tool to stimulate shrub growth on winter game ranges. After a fire, elk and deer foods such as aspen, serviceberry, mountain maple, and ceanothus shrubs re-sprout with renewed vigor. These shrubs provide a food source high in protein that remains available throughout the winter.



Aspen

Fires encourage new growth of huckleberries and chokecherries which are favorite foods of black and grizzly bears. A lot of berries in the fall can be a very important factor in the winter survival of bears.

Birds also take advantage of the lush plant growth and seeds found on burned-over areas. A few years after a fire, forest visitors might see ruffed grouse nipping off aspen leaf buds or hummingbirds sipping wildflower nectar. Insects attracted by the new plant growth give other birds an abundance of food.

Seed-eating birds such as grosbeaks, juncos, and sparrows gather in large flocks to feed on the large supply of seeds. Chipmunks and deer mice feed on seeds and succulent wildflowers.

How do foresters use fire to benefit the forest?

_____

_____

Snags Benefit Small Animals

Fires create standing dead trees, called "snags". Snags are used by a wide variety of animals. Many birds nest only in snags. Woodpeckers drill out nesting holes in snags. Other birds and mammals, such as bluebirds and flying squirrels, use old woodpecker holes for nests and roost sites

In some forests, beetles will often attack the remaining live trees which have been weakened by fire. Woodpeckers feed on the beetle eggs and larvae hidden beneath the bark. Black-backed and three-toed woodpeckers depend on wood-boring larvae for food and, therefore use burned areas more than other forest areas.

Does fire actually create homes for some animals?

_____

FIRE AS A MANAGEMENT TOOL

Foresters recognize both the values and dangers of fire. They put out fires when commercial timber, critical resources, private property or people are threatened, but use fires carefully to mimic its natural benefits to the forest. Wilderness and park managers use fires caused by lightning to benefit the natural environment of parks and wilderness areas. Managing wilderness fires is a careful balance between deciding when a fire is beneficial to the ecosystem and when it is a threat to lives and private property due to burning conditions and forest fuels. Fire has always been an agent of change in the western forests. We have learned that we can not stop all fires. We need to be smart and learn how to live with fire. One way to do this is to be sure our homes in the woods are fire safe, like having a fire resistant roof and not stacking firewood up against the house.

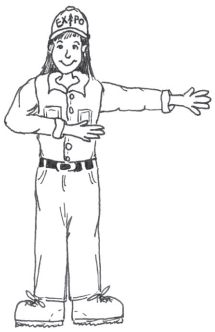
Western Montana has had increasingly milder winters and hotter, dryer summers. As our climate changes the forest and trees will inevitably be affected. Climate change can increase the effect of droughts which can then cause fires that may potentially be larger and last longer. Many trees can live for more than a century – so further climate change has the potential to affect the forest communities that are here today.

During the field trip, additional information on the role of fire in the forest will be discussed, AND remember, UNCONTROLLED fires can damage our important natural resources and threaten lives and property. **"Only you can prevent wildfires!"**

What steps can you take to prevent unwanted fires while camping in the forest?

_____

FIRE IN THE FOREST NOTES



FOREST WILDLIFE

Animals are a part of the forest ecosystem, dependent on the many different types of vegetation and patterns of vegetation in the forest for their habitat. Some animals range over large areas and need certain vegetation types for cover, food, and reproduction. Other animals have some very specific habitat requirements.

What do you need to survive that forest wildlife would also need?

_____

_____

Animals are also dependent on people — to protect and manage needed habitat. Many animal species are managed to help maintain a healthy and sustainable habitat. Managers use techniques which include hunting to help balance animal populations that may have been affected by human and natural causes.

The forests of western Montana are home for over 600 species of wildlife ranging from the birds that fly overhead, to the large mammals that roam the surface, to the small mammals, reptiles, and amphibians that live in the soil. And this doesn't even include thousands of species of insects, spiders, and other tiny, non-backboned creatures. Each and every species is an important part of forest life.

Can you name 5 animals you have seen in the forest?

_____

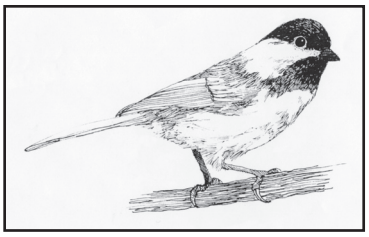
_____

The species of plants and animals you see occupying any forest today are the result of millions of years of the natural give-and-take process called evolution. The forest would be a much different place without them.

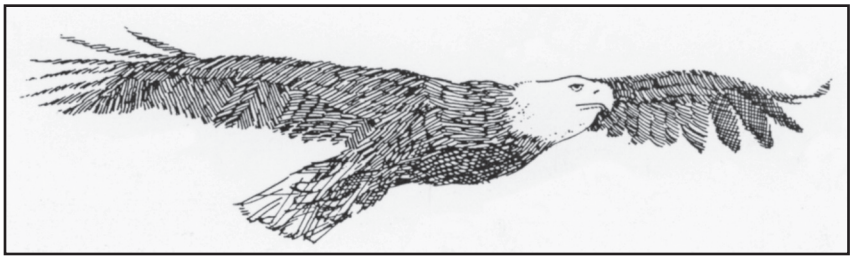
It's easy to see the value of large mammals like elk, deer, and bear, or some of the more famous birds like eagles, hawks, and owls. But what about the lesser known animals like mice, frogs, salamanders, and small birds that inhabit the forest? Although these may be smaller in size, they're large in number; and they're vital to life in the forest. Many of these smaller animals are the ones we may see on our hikes or picnics, and are interesting to observe.

Some Roles Played By Small Animals

- Help keep tree-harming insects under control
- Enrich the soil layers by decomposing plant and animal matter
- Help get air and water into the soil to aid tree growth
- Pollinate many of our plants enabling them to reproduce



When foresters think of managing a forest, they consider all types of wildlife and animal life, as well as trees. Regardless of the type of animal we're thinking about, all animals need food, water, and shelter (protection from predators and extreme weather) in order to survive. However, it's important to realize that not all animals need the same food, water, and shelter, and that each goes about getting these in their own way. The place an animal lives, and uses for food, water and shelter, is called its habitat. The way each animal goes about getting the items it needs for survival, and the role the animal plays in its habitat, is called its niche.



Animals, of course, eat different foods. Herbivores, like deer and elk, eat only plants. Carnivores, like hawks and wolves, eat only other animals. Omnivores, like bears and mice, eat both plants and animals. Decomposers, such as fungi and bacteria, eat decaying plants and animals and cycle these back into the basic elements plants need to grow. Within each of these categories there are even more breakdowns. Some carnivores eat only large mammals; others eat only small mammals; some eat only flying insects; while others only eat insects that crawl. So you see, each species has a well-defined food source.

Can you list another herbivore:_____ carnivore:_____

The same idea is true for protection or shelter. Large carnivores, like mountain lions, need little or no protection from natural predators. And they only need protection from the weather during the coldest winter months and the hottest summer days. This leaves them free to roam about the forest during most parts of the year. On the other hand, herbivores and small omnivores like deer, mice, and birds need almost constant protection. They must move continuously or always be wary in their search for food and water.

All animals need water, but of course they need it in vastly different amounts. Some need water several times a day. Others can go for several days, or even longer, without water. Some animals need to go to lakes or streams for water, while others get enough from the food they eat or from the nightly dew.

The fact that animals have different needs means that they need different types of habitats in order to survive. When we think of forest animals we must realize that no one type of forest is good for all types of animals. For example, if all our forests were dark, old-growth forests, deer and elk would be unable to find the shrubby plants and grasses they need to survive. On the other hand, if all our forests were young and vigorous, many of the birds that nest in the cavities of standing dead trees would disappear.

If we converted all our forests to conifers, we'd probably lose the beaver that eat the alder and willows along the streams, and many of the birds and small mammals that depend on deciduous trees. So you see, it's important that each of our forests is composed of a variety of different habitats. Nature takes care of this diversity of needs with a large number of habitats in a natural forest.

When people begin to work in and manage forests, natural processes are used as guidelines. Foresters (and you) must be aware of habitats during management operations; they're careful not to eliminate habitats unknowingly; and they do what they can to encourage different habitats within the forest. Keep this in mind when you are out with your family cutting firewood or helping with other projects in the forest. Here are a number of things we can all do to preserve a diversity of habitats when working in or managing a forest:

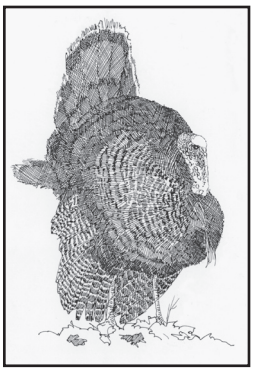
- When harvesting (even firewood!), leave some standing dead trees for cavity dwellers to nest in.
- When working in and managing a forest, leave some rotten logs in place for enriching the soil and for the insects, amphibians, and small mammals that depend on them for shelter and food.
- Remember most birds are protected by federal or state law. This includes eggs, nests and parts of birds. When nests are found, plan to avoid them as much as possible.
- Plant, or encourage native plants, that are good food supplies for wildlife.
- Leave some areas natural and undisturbed. Nature is a much better provider of necessary habitats than we are.

If you were a forest manager, name 3 things you could do to encourage different types of animals to live in your forest.

_____

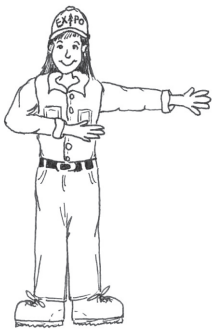
_____

_____



Foresters and wildlife specialists are currently doing all these things, and much more, to insure that Montana's wildlife will be around for future generations to see. This includes investigating the changes in Montana's climate. Rapid changes in temperature and precipitation can affect the forest and upset the delicate balance of animals with their habitat.

FIRE IN THE FOREST NOTES



FISH AND STREAMS OF THE FLATHEAD VALLEY

Flathead Lake is one of the most scenic spots in the west. Situated in the heart of the 100 mile-long Flathead Valley, it is the largest natural body of fresh water between the Mississippi River and the Pacific Ocean. Twenty-eight miles long, Flathead Lake is part of the 6 million acre Flathead watershed.

The North, Middle, and South forks of the Flathead River are the major tributaries or rivers that flow into Flathead Lake. Three other important tributaries, the Stillwater, Whitefish, and Swan Rivers, are also part of the Flathead watershed.

A major portion of the Flathead drainage lies within pristine areas such as Glacier National Park and the Bob Marshall and Great Bear Wilderness Areas. The rest of the watershed is subject to a wide range of human activities and use. The largest amount of spawning and rearing habitat for westslope cutthroat and bull trout is located on these multiple use lands.

FISHERIES

A favorite past time for many people is fishing. There are hundreds of miles of streams and numerous lakes in which to pursue this activity. Where do you like to spend the day trying to catch that big one?

There are 22 different kinds (species) of fish in the Flathead watershed. Twelve of these different species are game fish, the kind that anglers try to catch.

GAME FISH TRANSPLANTED FROM OTHER AREAS:

lake trout	grayling	northern pike
rainbow trout	kokanee salmon	largemouth bass
lake whitefish	Yellowstone cutthroat trout	brook trout

NATIVE GAME FISH IN THE FLATHEAD DRAINAGE:

westslope cutthroat trout	bull trout mountain	whitefish

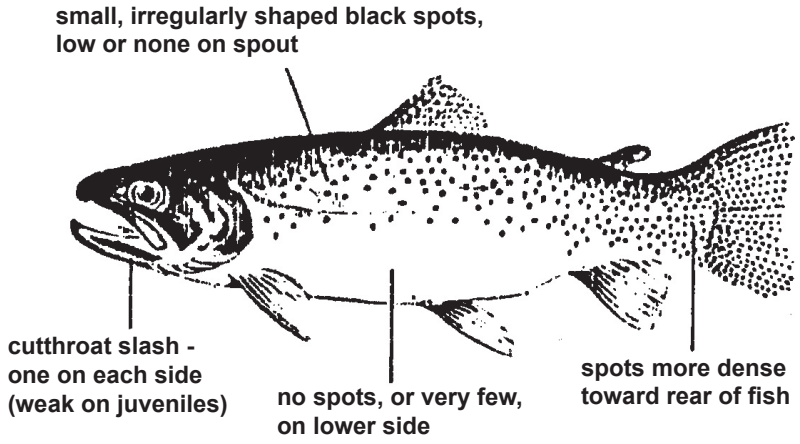
If any of these native species are lost from the Flathead system, it would mean a major loss to the species world-wide. The Flathead River system is one of the last strongholds in the world for both westslope cutthroat and bull trout.

Fish have three distinct life history patterns. Resident fish live their entire life in a short section of a stream. The second type of fish, fluvial fish, are born in small creeks, but swim down stream to a larger stream or river to spend most of their life. These fish generally grow to a larger size than the resident fish. The third type of fish are born in small streams, and then swim downstream in the larger rivers to Flathead Lake where they feed and grow for 1 to 4 years. These fish are known as adfluvial fish. Adfluvial fish reach even larger sizes.

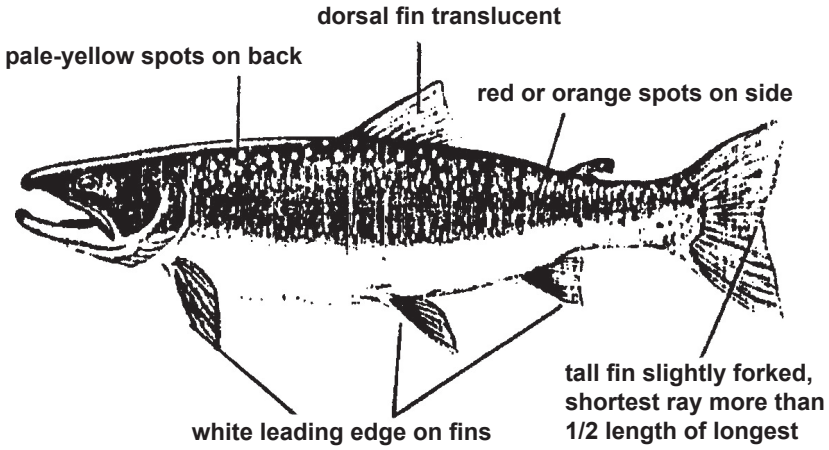
In Flathead Lake, adult cutthroat trout range in size between 14 to 22 inches. Adult bull trout can grow to over 36 inches long and weigh more than 20 pounds. These adult adfluvial fish return to the small streams to spawn and the life cycle begins again. Unlike salmon, the trout do not die after they spawn.

_____ fish are born in small streams, spend part of their life in Flathead lake and return to the small streams to spawn.

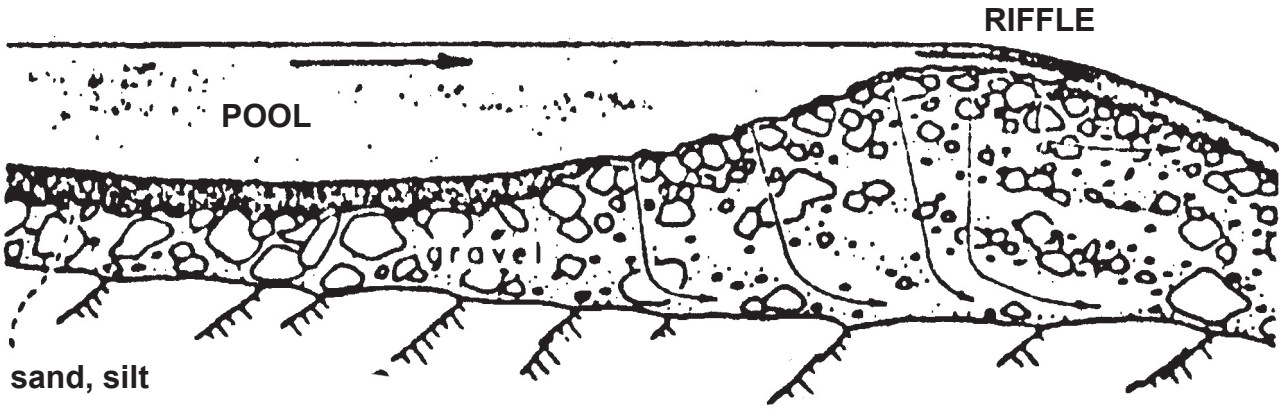
WESTSLOPE CUTTHROAT TROUT
Oncorhynchus' clarki lewisi
(A subspecies of Cutthroat Trout)



BULL TROUT
Salvelinus confluentas

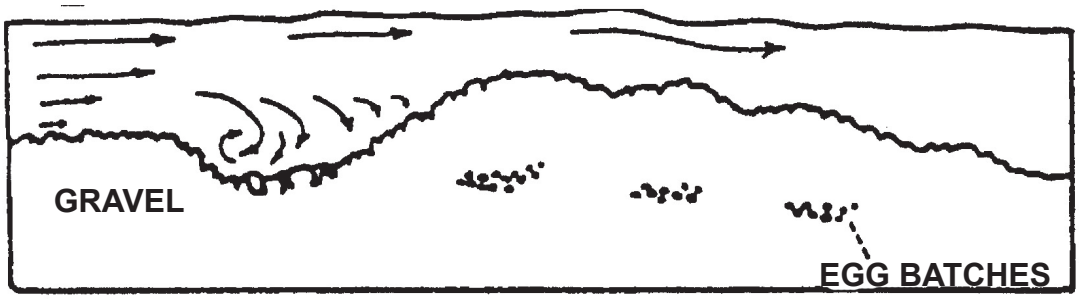


The spawning site is often at the tail (of downstream end) of a pool. It is at these locations that water can move downward into the gravel. This brings oxygen (in the water) into the gravel also.



In the picture below, the female trout "flails" (stirs up) the stream bed with the side of her body and tail, creating a pit or redd. Her movements, plus the movement of the water, help to dig the redd. Eggs are laid in the redd and fertilized by the male trout. The eggs are slightly heavier than water and are held in the bottom of the redd by the swirling of the current.

Then, the female moves upstream and repeats the pit digging process. As she does this, the eggs she just laid are covered with clean gravels which drift back in the stream current from the redd (see the picture below). A second batch of eggs is deposited in the second pit and the process is repeated until all her eggs are laid. The eggs remain in the gravel until they hatch. This takes one month for cutthroat trout and sometimes as long as 4 months for bull trout. At hatching time the young trout will start to come out of the gravel.



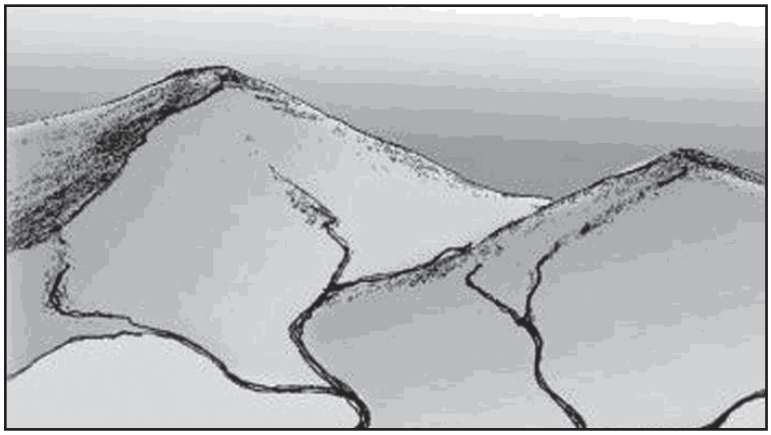
When we build roads for timber sales, foresters and fisheries biologists work together to make sure that sediments are not increased in our streams. The spawning gravels have to remain free of too much sediment or the fish eggs can smother.

It is important to manage small mountain streams and rivers with care.

Why is it important that we keep sediment out of spawning streams?

RIPARIAN AREAS

In winter, water is stored as snow. Come spring, the snow melts and flows away along streams. Small, tributary streams flow together and form bigger streams and rivers. Think about what a maple tree looks like in the winter without its leaves. The small twigs and branches are like the small streams, they connect to the bigger branches. The bigger branches, the larger streams, then connect to the tree trunk like tributaries flowing into a river. The streams work as a system to move water down across the land.

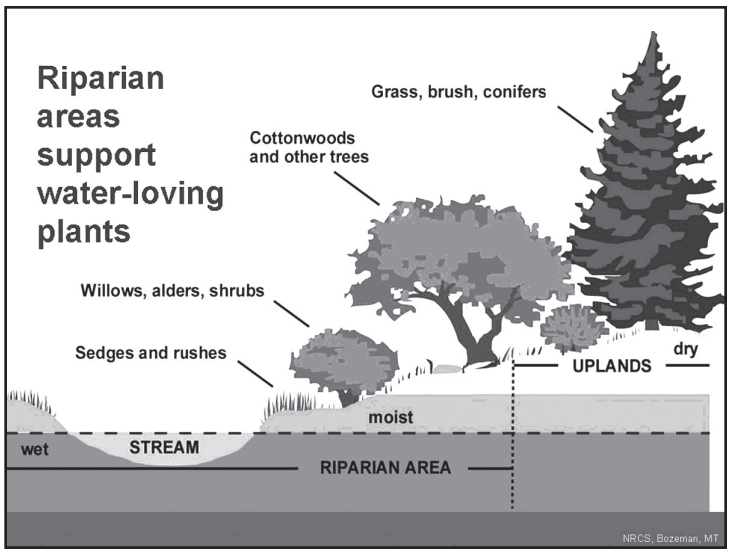


Tributary streams flow out of the high country to form larger streams. The riparian area surrounds all the streams, forming a system.

The land next to a stream is called the riparian area. Water floods out onto the riparian area when there is more water than the stream can hold. The ground soaks up this water like a sponge. Some of the water moves back to the stream through the soil. This water helps keep streams flowing all year round.

Floods trigger new life because the wet soil allows new seeds to sprout. Most plants that live in riparian zones need lots of water to survive. Plants that need the most water grow close to the stream and plants that need less water grow farther away. With so much water, plants grow thick and strong. The roots of the plants are big and strong too. The roots hold the soil in place so it doesn't erode (wash away) in a flood. That keeps the soil out of the water and the water stays cleaner.

The land next to a stream is called a_____.



The riparian area extends from the water's edge to the upland. The plants within it are water loving, like willow, alder and birch.

A thick layer builds up on the ground under the riparian plants. It is made up of decaying leaves, twigs, bugs, feathers, etc. This layer of material (called litter or duff) protects the soil from erosion by slowing water down. Water that flows into the riparian area often carries soil that was washed away from disturbed land higher up hill. It may have pollutants in it too. The litter filters out soil and some of the pollutants. As the water soaks into the riparian area, the materials it carried are left behind.

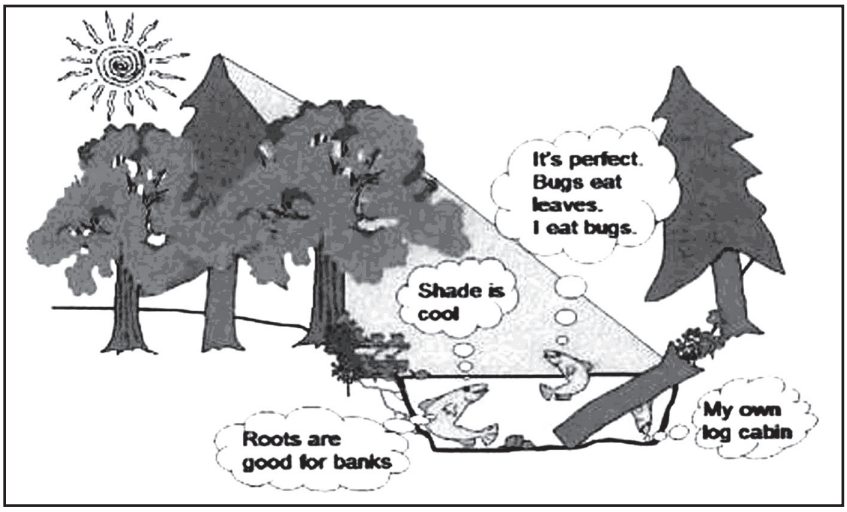
Many trees like to grow in riparian areas. The trees shade the water and keep it cool. This is good for fish. Bugs fall off the branches into the water to feed fish. Sometimes, parts of trees fall into the water. This gives fish and other aquatic animals good places to hide. The water slows down when it has to move around the logs. Slow water does not erode as much as fast water, so the water stays cleaner. Fish and other aquatic creatures like clean water. So do we!

List three reasons why plants and trees growing in riparian areas are important.

_____

_____

_____



With so many plants growing in the riparian area, it is a good place for wildlife. There is plenty to eat and drink, and places to hide. Riparian areas are often cool and shady during the hottest part of the year. They provide good fish and wildlife habitat.

The stream, its tributaries and its riparian all form a system. Water from the stream system creates the riparian area, and the riparian area protects the stream system. Foresters and other land managers work together to protect the riparian area when timber harvest or other activities occur near streams and rivers. They follow Best Management Practices, the Streamside Management Zone Law and other laws created to make sure riparian plants are kept in place to reduce erosion.

Here are two examples of what we can do to protect riparian areas by following Best Management Practices and Streamside Management Zone Law:

- Adults should avoid operating machinery or falling logs into wetlands and river bottoms that provide valuable habitat for water birds, fish, reptiles, and amphibians.
- When building roads or harvesting trees, workers need to be careful that disturbed soil won't run into streams during spring snow melt. This keeps the water clean.

At the Family Forestry Expo you'll learn more about how scientists, foresters and others work together to take care of riparian areas.

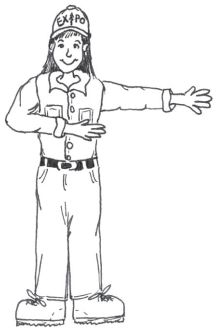
What would happen if fire removed all the riparian vegetation? And what are some things we could do if that happened?

_____

_____

_____

FISH AND STREAMS OF THE FLATHEAD VALLEY NOTES



FOREST PLANTS

Everything alive on this planet depends on plants. Think about it. What do you like to eat? Pizza? **List ten items you might find on a pizza:**

Pizza Item	Label P, A, or D	Pizza Item	Label P, A, or D
1.		6.	
2.		7.	
3.		8.	
4.		9.	
5.		10.	

Now label each item as follows:
P = comes directly from a plant
A = comes from an animal that ate a plant to survive
D = comes from a fungi that decomposes green plant material to survive.

Did the label above for D confuse you a little bit? Fungi break down and get nutrients from digested organic matter, such as a dead plant, in the soil. Fungi are not an animal or a plant. They are some of the soil decomposer organisms and don't contain chlorophyll like green plants, so they can't make their own food like plants. You only see part of the fungi or mushroom above the ground, the rest is below the ground.

If you listed all edible items (meaning you'd actually eat them), you could not find anything that either wasn't a plant or dependent upon plant growth. How is this possible? Because of an amazing process called photosynthesis. We'll explore this incredible feat later on in this chapter, but first, let's look at the big picture.

BIODIVERSITY

Bio means life, and ***diversity*** means having differences, so together they mean different kinds of life. This is a key concept for our healthy planet. Every bit of life on this earth has a role it plays in relation to other types of life.

In different parts of the world, with different weather and land patterns, plant and animal communities have formed and changed over time in relation to one another. Even though the various communities are each unique, many of the functions performed are similar.

For instance, grasslands are low elevation plant communities where the land is flat and open, and the summers are warm and dry. There will be lots of insects there: using the plants for food, home, or just a place to hang out. A bee will help pollinate a flower (this is part of seed production).

A grasshopper will chew on some leaves, and then become a meal for a shrew, a small mammal. A hawk can eat the shrew. When the hawk dies, its body will decompose in the soil and nourish grass for an antelope. The connections are many and complex.

Think about our mountain valley community here in western Montana. What are some connections between plants and animals?

_____

_____

Here is a list of some functions of plants:

- The world's source of food
- Store and purify water
- Hold soil to prevent erosion and storm damage
- Stabilize weather patterns
- Provide oxygen to our atmosphere and take in carbon dioxide
- Medicine
- Shelter for animals and humans
- Clothing

The Salish, Kootenai and Blackfeet Tribes have used plants for centuries to fulfill basic needs, such as use for food, clothing, shelter and medicine. Some of these plants are still is use today. In addition to all the useful functions of plants, there is of course, the incredible, awesome, inspiring beauty of plants and their flowers. In so many ways, besides being absolutely necessary, plants add to the quality of our lives.

NATIVES, NON-NATIVES, AND WEEDS

A ***native plant*** is one that occurs naturally without any evidence of having been brought in to an area by humans. Native communities of plants and animals have been together for a long period of time and have developed a balanced relationship.

Non-native plants are plants that come from somewhere else. When they cause problems for other plants, animals, or humans, we call them weeds.

Weedy plants are often opportunistic, which means they can show up like a big bully and take over an area. They may crowd out the native plants for water, space and sunshine. Often animals, either wild or livestock, don't like to eat them. There may be no local bugs in the area to keep their population in balance. Remember, plant and animal communities evolved together over time, and when you suddenly throw something new into the mix, it can throw off that balance.

Fighting weeds happens on many levels. Foresters tackle the problem in wild areas. Cities have laws against letting weeds spread. You may have a garden that needs attention so the plants you want to grow are able to do so.

Spotted knapweed, a problem weed we have here in the Flathead, actually gives off a chemical that prohibits other plants from growing near it. It can only spread by seed, so if you see it, pull it up! But be sure to wear gloves; it can give you a burning rash if it touches your skin.

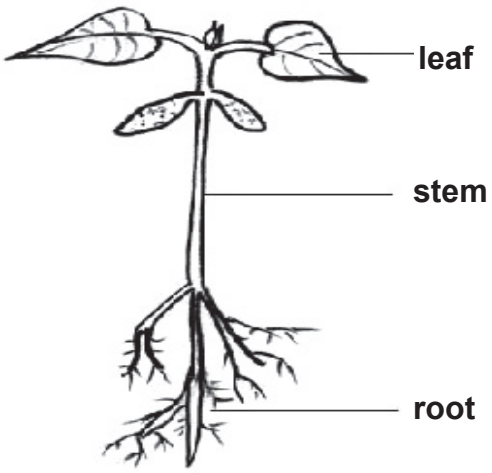
To distinguish non-native from native plants, and to study plant communities, it is important to be able to identify plants. How do you identify plants? Before we explore that, let's look at some basics:

PLANT PARTS AND FUNCTIONS

ROOTS anchor the plant, store food, and absorb water and nutrients from the soil. There are billions of tiny root hairs on a single plant. If you've ever flown over an area where a river system has many branching parts, you've seen a similar pattern.

STEMS provide support and are the transportation system of plants. Water and nutrients go up, and food goes down.

FLOWERS and ***PINE CONES*** are part of the reproductive system. They both produce seeds.



INTERESTING FACT : The oldest seed ever known to sprout was 1,288 years old. It was a Chinese lotus that had a tough shell and had been buried in a dry lake bed.

LEAVES are food factories. ***PHOTOSYNTHESIS***, which means "to put together with light," is the process that creates food. A green chemical in a leaf, chlorophyll, combines with carbon dioxide (from the air) and water (from the roots) to make a form of sugar. The energy needed to fuel this process comes from the sun. The plant then changes the sugar to a starch and stores it in all parts of the plant. Oxygen is also formed in this process; some is kept for the plant, some is released (thankfully) into our atmosphere.

This is an incredibly complex process, and one that all life on this planet is dependent upon.

PLANT IDENTIFICATION

When scientists and others want to talk about plants, they must have a way of communicating clearly. For this reason, there is a system of organizing, or classifying, plants and plant groups.

A plant may have more than one common name, but scientists have a way of giving each plant its own name (using two scientific words) so they can always know they are talking about the same thing. For instance, a dogtooth violet, and a glacier lily, are both common names for the same plant -

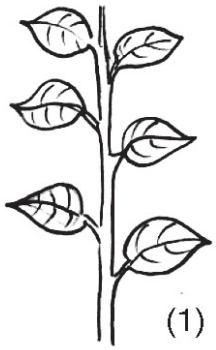
Erythronium grandiflorum. You will see this yellow beauty as the snow is melting on mountain trails. Grizzly bears like to eat its bulbs.

There are also special words (terminology) to help identify specific plant parts. A plant key is a tool for identifying plants using words and pictures, based on plant parts.

Try this: Below are six terms for leaves, with six examples. Can you match them? Put the letter of the term next to the picture you think may be the right illustration.

A. alternate leaves
B. opposite leaves
C. simple leaf
D. compound leaf
E. lobed leaf
F. toothed leaf

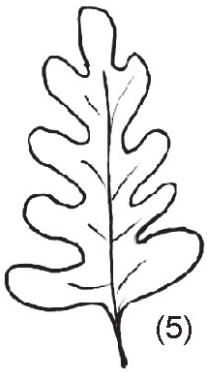
Now explore the right answers (see bottom of page) and see if they make sense to you. How did you do?


(1)


(2)


(3)


(4)


(5)


(6)

Answers: 1) A 2) D 3) B 4) C 5) E 6) F

A good flower field guide will give you pictures, descriptions, common and scientific names, information about where a plant is found and how it may be used by animals and humans. It will also have a glossary with labeled pictures to help you identify plant parts, such as leaves that are "lanceolate" (looks kind of like a lance or knife blade) or "palmate" (spread your hand out, only make your thumb the same size).

Lanceolate

Palmate

Once you can identify different parts of a plant, you can begin organizing plants into different groups, or families. For instance, if you've ever grown peas in your garden, you know what the pods look like. Most members of the Pea Family (scientific name: Fabaceae) will have pods, along with compound leaves, and butterfly-like flowers with "wings" and a "keel" and a "banner" (All words to describe the parts of the flower. What kind of picture do they bring to your mind?).

Banner

Pods

Wing

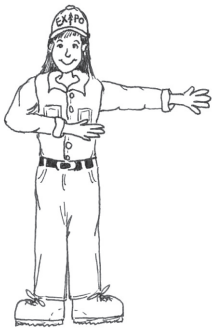
Compound

When you attend the Forestry Expo, you will learn how to use a plant key and identify some of our native plants.

Exploring plants in the area you live and in places you travel can become a lifelong pleasure. Every season you can look for the return of old friends, and continually learn about new ones.

As the climate in Montana changes, so may the plants and the locations where they live. Rapid changes in temperature and precipitation can affect the survival of some plants and upset the delicate balance of plants within the ecosystem.

FOREST PLANTS NOTES



TREE IDENTIFICATION

We know that trees are the dominant plants in a forest ecosystem. Tree species have evolved to grow in a wide range of climate, elevation and soil conditions. Some trees will grow in a warm dry environment while others require cool wet conditions.

Trees come in many different shapes, sizes, and types. In the entire world there are over 250,000 different kinds! Luckily for us, there are over 20 commonly found trees in the Flathead Valley. Of these, you will see 10 to 15 on the Forestry Expo Tour.

Can you name some common trees you have seen in the forest?

_____

_____

_____

SOME AMAZING FACTS ABOUT TREES!

Trees are the largest plants in the world and live the longest! Some western larch in Montana are more than 1,000 years old! About ¼ of Montana's land is covered with trees! Each kind of tree provides some special benefits.

Montana forests contain many different kinds of trees and shrubs. A lodgepole pine stand that seems to be all one kind of tree is likely to have alder or huckleberry growing along a stream, and spruce in moist, shady spots. In order to know which trees are good for making lumber, which help prevent erosion, which put nutrients back into the soil, which have fruit or bark that animals like to eat, or which make the best firewood, we first have to be able to tell the difference between the different types of trees.

Each kind of tree has several characteristics that helps identify it; leaves, bark, fruit, buds, and general shape are most commonly used. Luckily, after you have practiced looking at trees you won't have to look at all these characteristics, one or two will be enough.

In order to help us think about trees, we often group them into two categories; we put trees that look the same or have some of the same characteristics into the same category. You have probably heard some of the terms conifer, broadleaf, hardwood, softwood, evergreen, and deciduous before and perhaps you have been confused. Let's try to straighten out some of that confusion.

EVERGREEN AND DECIDUOUS

"Evergreen" refers to trees that normally retain most of their foliage (needles) through the winter. Such trees, however, do not retain all of their needles forever. For example, ponderosa pine drops needles each year that are three to five years old. Most evergreens have needles for leaves, like Douglas-fir. A deciduous tree, on the other hand, drops its leaves in the winter. Most deciduous trees have broad, flat leaves, like aspen and cottonwood.

CONIFER AND BROADLEAF

Conifers are cone-bearing trees that generally have slender needles for leaves (like the pines and firs). Conifers are usually evergreens though some conifers can be deciduous (larch is an example of a deciduous conifer that drops all of its needles every fall). Broadleaf trees generally have large, flat leaves (like birch or aspen) rather than needles. Broadleaf trees are usually deciduous.

HARDWOOD AND SOFTWOOD

As you would guess, these terms refer to the hardness of the wood of a tree. In general, "hardwood" is a term used to describe broad-leafed trees; while ‘’softwood’ is used to describe conifers.

Now let's see how some of the characteristics and terms just listed can help us identify trees.

Can you list the group of trees each of these leaves/needles belong to? (evergreen, deciduous, conifer, broadleaf, hardwood or softwood.) They can fit into more than one group.

GRAND FIR

_____

PAPER BIRCH

_____

LODGEPOLE PINE

_____

LEAVES

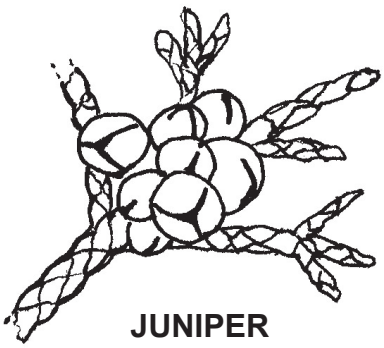
One of the first things you will notice about a tree are its leaves or needles (whether it's a conifer or broadleaf). Leaves have distinctive sizes, shapes, and colors that help us in identifying trees.

They also have different textures. Some feel rough or hairy while others feel smooth. Some are thick and leathery while others are paper thin. Some smell sweet when crushed, while others have an unpleasant odor.

Needles also come in many shapes and sizes. Some are long and slender, while others are short and flat. Some occur in small bundles (pines for example), while others occur singly (like the firs). Some are sharp and pointed (like the spruces), while others have blunt, rounded tips (like the firs).

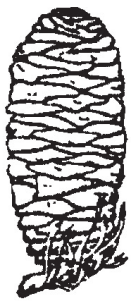
FRUIT

Fruit can also help you identify trees. Just as you can tell a cherry tree from an apple tree by its fruit, you can learn to identify many forest trees by the shapes and sizes of their fruits. Some examples are the cones of pines and the berries of junipers. If you look at the size, shape, color, and texture of a tree's fruit, you will often be able to tell what kind of tree it is just from the fruit.



JUNIPER

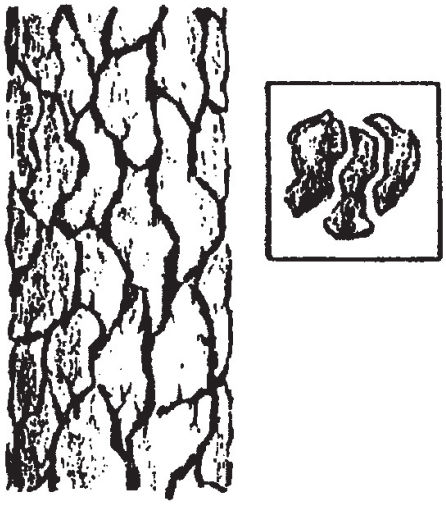
DOUGLAS FIR



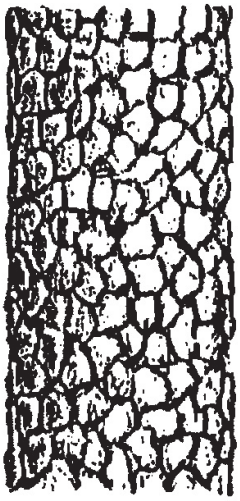
TRUE FIR

BARK

The bark of trees can best be described by color and pattern. For example, it may be smooth and white, brown and blocky, or black and ridged. Some, like western red cedar, may be quite stringy; while others, like ponderosa pine, are plate-like and flaky. Once you get to know different types of bark, you can use that knowledge often to help identify trees.



PONDEROSA PINE



WESTERN WHITE PINE

Other characteristics such as twigs, buds, and flowers can help you identify trees, and you will use them more and more as you get to know more about trees. But for now, if you concentrate on looking at leaves, fruit, and bark, you will be able to identify most of the trees you run into!

LET'S IDENTIFY SOME TREES!!

BLACK COTTONWOOD (*Populus trichocarpa*)

STICKY FRAGRANT BUDS

Black cottonwood is the largest hardwood growing in the Northwest, often reaching 150 feet tall along the rivers and streams. Cottonwood gets its name from the white, fluffy, windblown seed tufts that fill the air in spring.

Leaves: 3-6 inches long, pear-shape, shiny green on top, silvery-white on bottom. Edges are smooth or finely saw-toothed. The pointed buds are filled with sweet-smelling sap that perfumes the air in spring.

Fruit: 4-inch long, grape-like bunches of capsules.

Look for:
- **leaves green on top, white underneath**
- **cotton-tufted seeds**

Bark: Smooth and gray on young trees, dark gray and deeply furrowed on older trees.

The wood is used primarily for making paper, but is also used for plywood and the curled wood shavings are often used for packaging fragile items. The tree itself was particularly important to the early pioneers, because for thousands of miles across the prairies it was the only shade tree to be found!

DOUGLAS-FIR (*Pseudotsuga Menziesii)*

The Rocky Mountain Douglas-fir is native throughout western Montana. Along with ponderosa pine and lodgepole pine, it is the tree you will see most often.

Leaves (needles): 3/4 - 1 1/4 inch long, single, attached to twig with a tiny stem, pointed but not sharp, soft to touch. Shake hands with a branch of the "friendly fir." Buds are pointed, reddish-brown and shiny.

Fruit (cones): 2-3 inches long with 3-pointed bracts ("pitchforks") that stick out between the scales. They look like the hind feet and tail of a mouse diving into the cone.

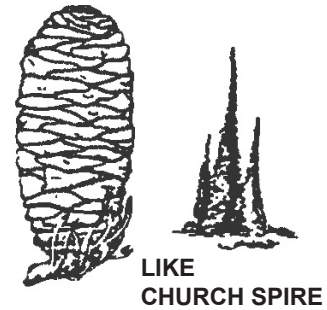
Bark: smooth, gray-brown with resin blisters on young trees. Thick, reddish-brown, deeply grooved and cork-like texture on older trees.

Douglas-fir is one of the most important commercial trees in western Montana, and is used for Christmas trees and for making lumber and plywood.

Look for:
- **pitchforks on cones**
- **shiny, pointed buds**

THE TRUE FIRS (*Abies spp.*)

There are six true firs; two are native to western Montana. These are subalpine fir and grand fir. Both of them have tops that are dense and pointed and look like church spires.



Needles: 1/2 - 2 inches long, single, stemless, thick, dark green with rounded tips; when a needle drops off it leaves a tiny circular scar on the twig.

Cones: 2-4 inches long, grow upright on the top branches. Do not fall in one piece — scales fall off one-by-one leaving the cone core standing on the branch.

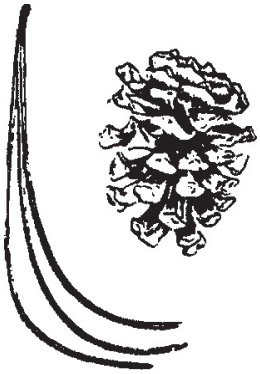
Bark: Thin, smooth, gray-brown with resin blisters on young trees. Red-brown, rough or cracked on older trees.

Look for:
- **upright cones**
- **church spires**
- **stemless needles**

These characteristics are used to distinguish a "true fir" from other species that closely resemble them (like the Douglas-fir). The Flathead Family Forestry Expo area is a good place to find both of Montana's true firs growing together.

Both of the true firs are used to make lumber, plywood, paper and used for Christmas trees.

PONDEROSA PINE (*Pinus ponderosa*)



Ponderosa pine is Montana's state tree. Older trees are often called "yellow pine" because of the bark color. Young trees are sometimes called "bull pine."

Needles: 5-11 inches long in bundles of 3 needles.

Cones: 3-6 inches long, egg-shaped, with sharp prickles on the scales.

Bark: Dark on young trees. Older trees are yellow-brown to cinnamon-red, thick with scaly plates that look like jigsaw puzzle pieces. Smells like vanilla!

Look for:
- **long needles 5"-11"**
- **needles in bunches of 3**

Ponderosa pine forests are so beautiful that they form the setting for a large number of TV programs and movies (giving rise to the name "photogenic pine"), and are extremely valuable for recreation areas. The wood is used primarily for making lumber and plywood.

WESTERN RED CEDAR (*Thuja Plicata*)

Look for:
- **butterflies on needles**
- **stringy, red bark**

Western red cedar grows well in shade and can live for more than 1000 years!

Leaves: scale-like, overlapping in pairs. The branchlets are flattened as if pressed on an ironing board. The underside looks like butterflies outlined in white.

Cones: 1/2 inch long, in clusters and turned upward on the branch.

Bark: Thin, stringy or fibrous, reddish-brown on young stems, grey-brown on older trunks.

The wood is soft and easily worked. It contains strong-smelling natural oils that make it burn easily, protect it from insects, and act as a preservative.

Cedar was used by the Native Americans to make canoes and houses. Today, the most important uses of the wood are for fence posts, siding, and roofing materials like shingles and shakes.

WESTERN WHITE PINE (*Pinus monticola*)

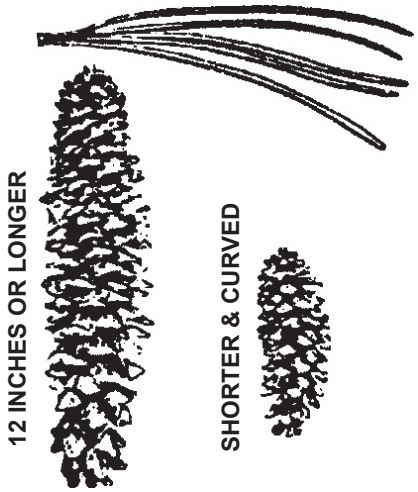
White pine is a tall, straight tree that is not very common in the Flathead Valley.

Needles: 2-4 inches long in bundles of 5.

Cones: 5-12 inches long — the largest of any Montana conifers.

Bark: Dark grey, broken into small squares making a pattern like tiles.

White pine has light, soft, easily-worked wood of high value. The western white pine is expensive wood used for finish work such as window sills, door trims, cabinet work, and novelties.



Look for:
- **needles in 5's**
- **large cone size**

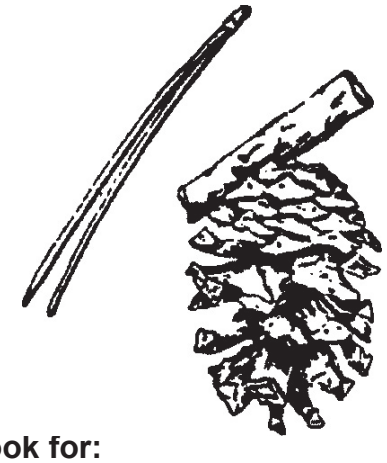
LODGEPOLE PINE (*Pinus contorta*)

Lodgepole pine often grows in dense thickets, with trees about 80 to 100 feet tall.

Needles: 1-3 inches long in bundles of 2's.

Cones: 1-2 inches long, armed with sharp prickles on the scales. Often hang on the tree for many years after they mature.

Bark: Black to reddish-brown, thin and scaly.

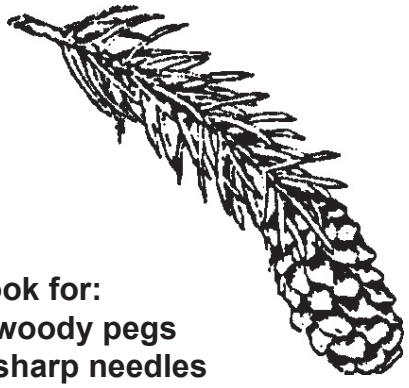


Look for:
- **needles in 2's**
- **small, egg-shaped cones**

The wood is used for posts, poles, house logs, lumber, and paper. Native Americans used the tall, straight form of this tree to make their tepees and lodges, giving rise to the name lodgepole. The tepee pole was also used to make a travois to help pull their materials when traveling either behind dogs or later, horses (see page 1).

THE SPRUCES (*Picea spp.*)

One of the spruces, the Engleman spruce is found in the high parts of the mountainous regions of Montana. It also grows at lower elevations that have cold winters and cool summers.



Look for:
- **woody pegs**
- **sharp needles**

Needles: 1 inch long. Stiff and prickly. Each one is on a tiny woody stem (peg). Shake hands with "spiny spruce" to feel the difference from the soft-needled "friendly fir."

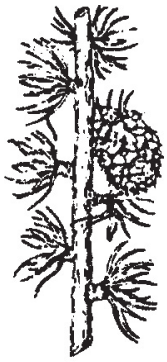
Cones: 2 inches long with papery scales. Hang down from branch.

Bark: Reddish-brown, thin and scaly.

The soft, white wood of spruce is used mainly for lumber.

WESTERN LARCH (*Larix occidentalis*)

Western larch is Montana's only deciduous conifer. Larch is easy to recognize in the fall because its needles turn bright yellow and drop to the ground. In the spring, larch blossoms out in new spring clothes of light green.



BARE IN WINTER

Needles: 1/2 - 1 1/2 inches long in clusters of 14-30. Each cluster looks like a little bush growing from a spur-like twig that looks like a tiny barrel.

Cones: 1 -1 1/2 inches long with single-pointed bracts that stick out like snake tongues.

Bark: Reddish-brown with flat plates on older trees. Similar to ponderosa pine.

Look for:

- **needles in bunches**
- **barrels on twigs**

Western larch grows throughout western Montana. Its wood is used for lumber, plywood, posts, poles, mine timbers, and cross ties.

PACIFIC YEW (*Taxus brevifolia*)

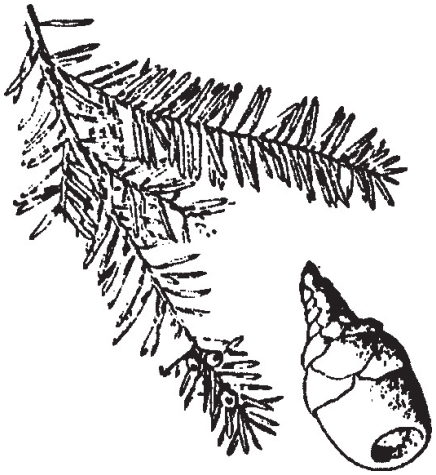
In Western Montana, the Pacific yew is a shrub or small tree rarely over 15 feet tall. It grows in moist soil and withstands shade. Illness and death among cattle have been attributed to eating the foliage of this plant in large quantities.

Leaves: 1/2 - 1 inch long, single, flat, pointed, green on top and paler on bottom: tapered into a short stalk at the base.

Cones: Single-seeded of a hard, bony seed surrounded by fleshy tissue that is green when young and red when mature; looks like a berry.

Bark: Very thick, scaly, dark purple-brown.

Pacific yew bark contains taxol, a cancer fighting agent. The bark from larger yew trees is being collected to aid in the fight against certain types of cancer. This discovery serves to emphasize the importance of all plant life. Pacific yew, once thought of as only a "weed" species, is now being used for the benefit of humankind.



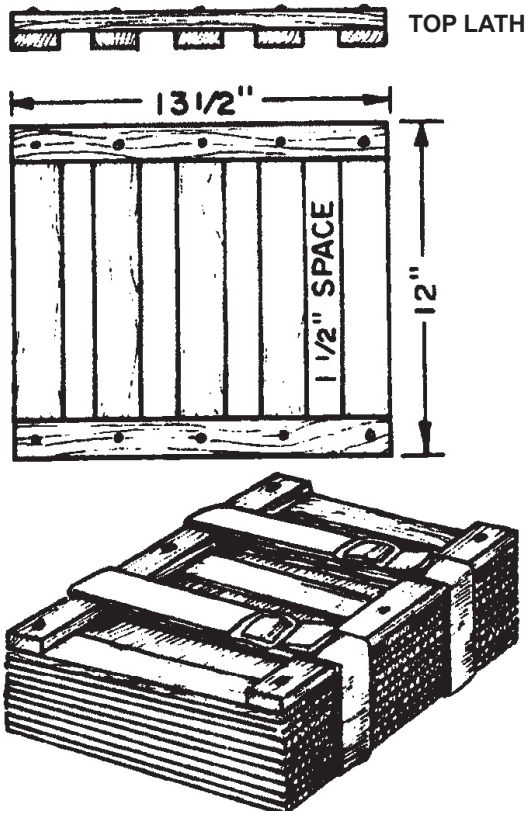
Look for:

- **scarlet (red) cones**
- **thin, scaly purple-brown bark**

How to Build A Plant Press

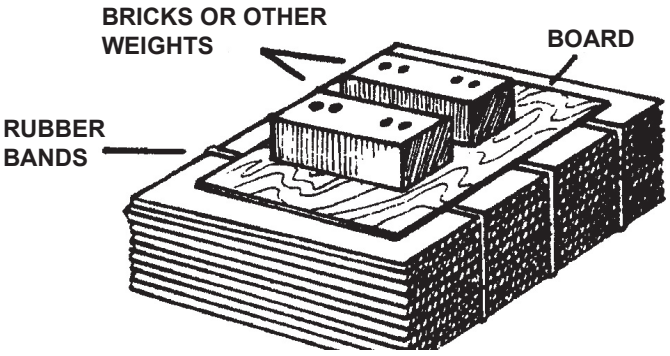
A small plant press can be made with an old phone book with cardboard covers added. The most important thing is to add weight on top to keep the press flat. You can put the leaves between newspaper weighted down by books, but here are two more efficient ways to build a plant press:

WOODEN PLANT PRESS

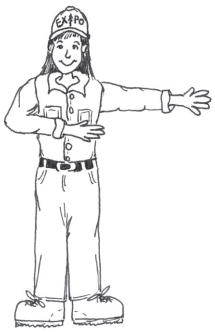


CARDBOARD PLANT PRESS

The cardboard press is essentially the same as the wooden one, except for the frames. A piece of 3/8 inch plywood serves well as a platform for the weights. Be sure to use enough weight. 50 pounds is recommended for a full size press.



TREE IDENTIFICATION NOTES



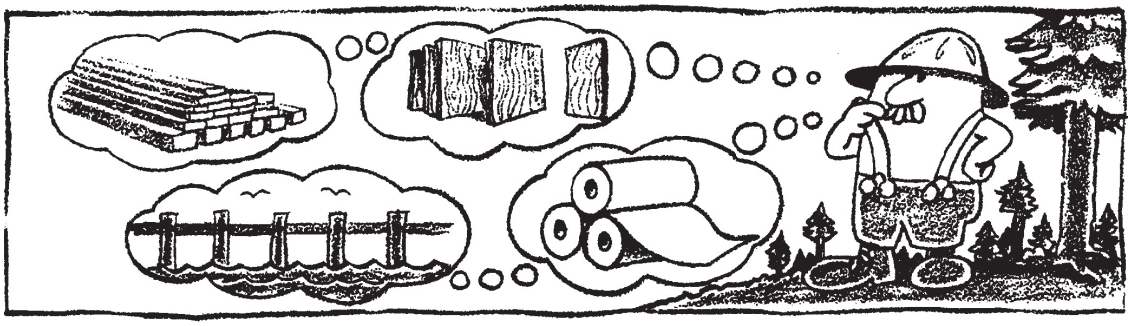
FOREST PRODUCTS

Forests and products that come from forests, are important to the people of Montana. About one quarter (22%) of our state is forested. If the total area of Montana is 146, 047 square miles, can you calculate how many square miles are forested?_____
Our forests and their components that are used for wood products, recreation, wildlife and wilderness provide for a large amount of our valley's economy.

If you started to list all the things we get from Montana's forests, chances are you would begin your list with things that look like the trees they come from. For example, lumber, plywood, utility poles, and firewood can come from Montana's forests. Then you would start to think of other things like huckleberries, Christmas trees, paper, pencils and particleboard. Finally, if you thought long enough and did some work in the library, you might lengthen your list to include things like plastics, cellophane, medicines, and camera film.

Can you list 5 items in your home or classroom that are made from wood?

_____



But we get a lot of things from our forests that are not made of wood, like jobs, for instance. Many people in Montana earn their living making and using forest products. Loggers, truck drivers, mill workers, carpenters and outfitters are only a few. In fact, forestry is one of the Flathead Valley's important industries.

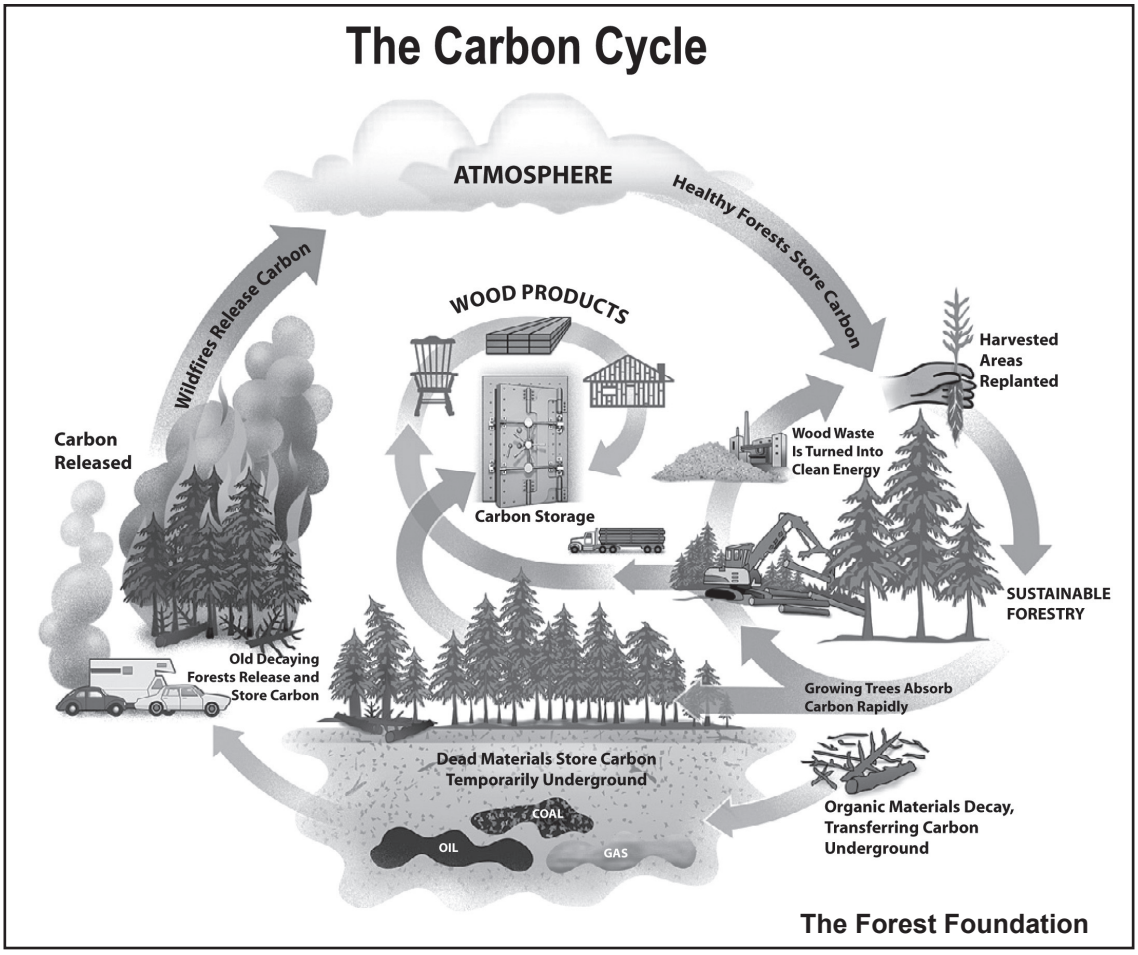
Do you know someone whose job depends on the forest? _____

Can you list 3 jobs that depend on forests or forest products?

_____

Clean water is also an important forest product. Many towns and cities own large areas of forest just to have clean water for the people who live there. Forests are like giant sponges, capturing both rain and snow, and slowly releasing it to rivers and streams, or storing it in vast underground reservoirs. Do forests help to provide the water in your town?

Forests also give us clean air. Growing plants take in carbon dioxide that animals (including people) breathe out. They give off oxygen that animals need to live. They also absorb carbon dioxide and other pollutants. Forests absorb carbon dioxide during photosynthesis, storing carbon above and below ground.



Forests also help modify the environment around us. They keep temperatures lower during the day, and higher at night. They help absorb noise and fill our vision with different landscapes. This may not seem too important if you live in a small town, but if you lived in Los Angeles, Chicago, or New York you would really appreciate having healthy trees and forests in your communities.

Wildlife, being a living resource in our forests, can also be a valuable product. People hunt deer, birds, and elk and also enjoy fishing in the lakes and rivers of our forests. Just viewing our wildlife is valuable.

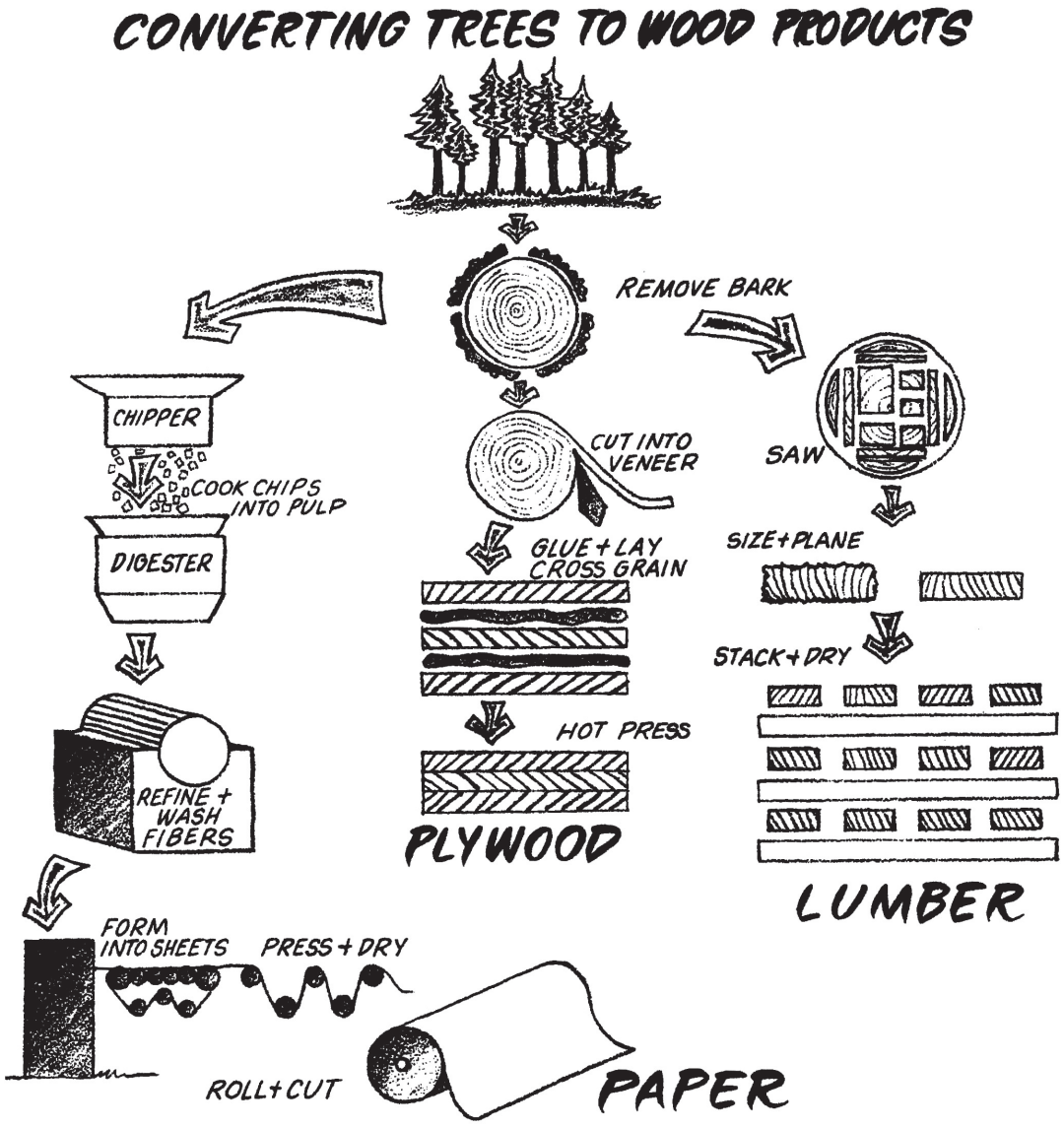
Plants and animals in a forest give us much more than wood, meat and recreation. They provide solitude, beauty, and even spiritual wonderment. Have you ever paused beside a forest stream, sat quietly and just looked and listened for a while? The natural beauty of forests inspires people everywhere. Cities, states and the federal government have all set aside large forest areas, like parks and wilderness areas, just so people will have natural forest environments to enjoy. What do you like to do in a forest?_____

What forest is located closest to your home? _____

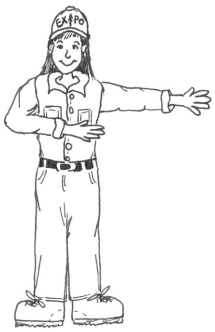
Of course, if forests are to continue providing us with all these products, we must be extremely careful in how we treat them. We need to be careful with fire, replant trees when we cut them, and try to get the most out of every tree we harvest.

When foresters and people in the forest industry cut a tree, they try to use as much of that tree as possible. They call it "whole tree utilization." The trunk is used for many of the major products we normally think of (lumber, veneer, plywood, etc.). The bark is valuable as a replacement fuel for gas and oil. Glacier High School is a part of the "Fuel for Schools and Beyond" Program and uses a biomass heating system that can burn waste wood. Bark is also used for bark mulch, and in the manufacture of plastics, glues, waxes, and cork. Branches, and other pieces of wood too small to produce lumber or veneer, are often chipped and used for making particleboard and paper. In many cases, particularly in the southern United States, even roots are chipped and used for particleboard and paper! Leaves/needles, although they probably could be used to make a number of products, are usually left in the forest to decay and return nutrients to the soil.

So you see, forests provide us with a great many products in our daily lives. On the forestry tour with your school, you will see many of the products that come directly from trees. But don't forget to consider the other forest products like clean air, clean water, healthy recreation, solitude and wilderness. They are every bit as important to our daily lives as lumber, plywood and paper!



FOREST PRODUCTS NOTES



FOREST LAND MANAGEMENT

Montana's forests are always naturally changing. The change may be very gradual, as each plant goes through its own cycle of life. Or change can happen very quickly over large areas due to factors like fire, insects and disesase. Forest managers work to balance the natural changing forest with people's needs.

When you get to the Forestry Expo site on your field trip, look around and observe the forest. Here are a few questions to think about when you arrive. What kinds and sizes of trees do you see? Are they crowded close together or far apart? What other plants do you see? Do you notice signs that wildlife have been here?

Imagine that you owned the forest at the Forestry Expo site. How would you manage the forest? Do you want to make money from a timber sale? Maybe you want to see wildlife, hike through the trees or remove non-native plants or weeds. Often we want many things from a forest and it is a forester's job to blend all of this into the best management plan.

Can you name at least three activities that can occur in a managed forest?

_____

_____

Once a forester understands both the forest and the desires of the landowner, they can begin to choose an appropriate plan for management. Because trees live a century or more, foresters need to think well into the future – if I take this action, what will the forest look like in 10 years, in 50 or 100 years? Foresters must plan activities and perform operations such as harvesting large trees, thinning smaller trees and starting new trees from seeds. Their choices will shape how the new forest will look. They may choose to use prescribed fire as the best tool to improve wildlife habitat, reduce fuels for fires or prepare seedbeds for future trees. They may choose thinning trees as the best tool to reduce fuels around homes and protect communities from fire.

Management actions are chosen carefully using Best Management Practices. These are guidelines designed to minimize the impact of man's activities on the land. An example of a best management practice is to work carefully around streams to ensure the protection of water quality and quantity. Another example is the location of logging roads away from streams and important wildlife sites. These different activities done in the woods by foresters, landowners or caretakers are referred to as forest management.

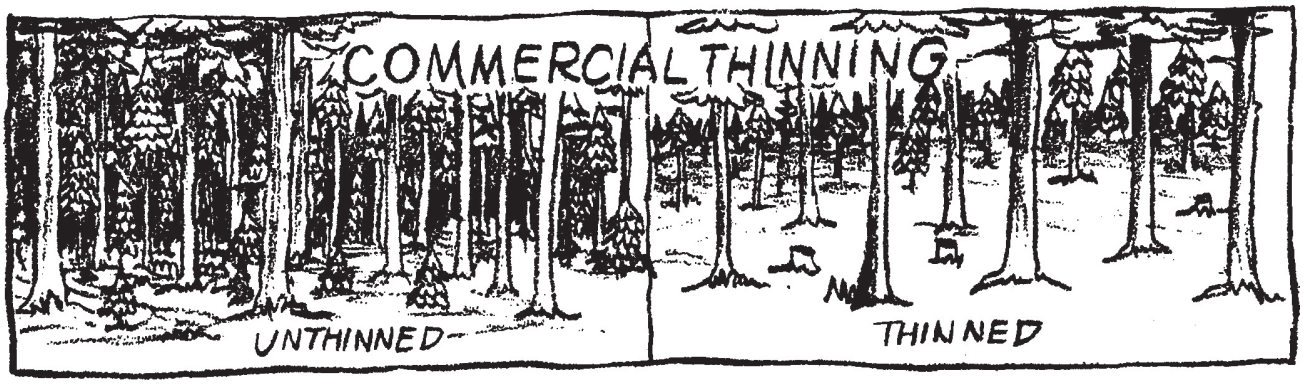
In simple terms, forest management is what people do to the forest. In some cases this means doing very little, as with wilderness areas where the goal is to keep it wild. In other cases, it means intensively managing the forest for timber production, wildlife habitat or clean water. Trees are cut to meet many of these goals, as well as providing people with boards to build homes and furniture.

Since the forest is a renewable resource, well-managed forests won't run out of trees. Trees grow and continue to provide wood, wildlife habitat and water. Trees require the sun's energy, nutrients in the soil and water to make wood. By using wood to build homes, we reduce the need for materials that require energy from fossil fuels to make, such as concrete and steel. The forest manager attempts to work with nature to produce the goods and services that you and I want and need from the forest for our daily lives.

To help understand forest management, let's look at some common management practices.

THINNING

If you happen to have a maple or elm tree in your front yard, chances are you've noticed the ground around the tree covered with seeds every spring. In nature, only a few of the seeds that fall actually take root and grow into seedlings. Of these seedlings, only a few will grow into saplings. Even fewer will grow into mature trees. What happened to all those seedlings that didn't make it? Some were eaten by animals or attacked by insects, some couldn't get enough moisture or nutrients, some may have been killed by very cold or harsh weather, and some just couldn't get enough sun because of their larger plant neighbors. This reduction in the number of trees as a stand grows older is called thinning.



A very good example of this can be found here in the Flathead. Lodgepole pine trees are common in this area. When a lodgepole pine forest reaches age 80, the trees gradually get weaker. Bark beetles, insects that attack stressed trees, realize the trees are weak and burrow under the bark to lay their eggs. When enough beetles attack a tree, it will be killed. The result of bark beetles just trying to reproduce can be many acres of dead trees which become a fire hazard. Managers may choose to harvest lodgepole pine before this happens.

Thinning is a natural process that occurs in every forest, and it is a good thing it does! Can you imagine what it would be like if every seed from that maple or elm in your front yard grew into a mature tree? There would be no room for anything else! Fortunately, not all the trees can survive because there isn't enough water, nutrients, or light for all of them.

Have you ever tried to walk through a "dog-hair" thicket of lodgepole pine – named because the trees are as thick as the hair on a dog? Do you think any of those trees will ever grow into a large tree? Why or why not?

_____

_____

Sometimes we help nature along by thinning the forest. In a managed forest, foresters will remove some trees to give the best growing trees more sunlight, water and nutrients. This makes a healthy, productive forest with faster growing trees. Thinning can also be an effective tool in reducing the fire risk by lowering the amount of fuels in the forest. This can help protect homes and communities. Thinning can improve wildlife habitat, increase the amount of water that flows into streams, create a better camping site, while also providing our local sawmills with logs to make plywood, paper and boards for everyone.

Can you think of and list some other products and uses of the forest?

_____

_____

Foresters may thin a stand of trees several times before the final harvest. The first thinning is likely to occur when the limbs of the trees begin to touch one another – perhaps at about 10-15 years of age and 5-15 feet tall. Because the trees are too small to be made into boards and sold, this is called a precommercial thin. The cut trees are left to decay and return important nutrients to the soil, or the trees may be chipped into small pieces and burned in a furnace to heat a school. When the stand is 30-50 years old and the crowns again begin to touch one another, a second thinning may be done. This will be a commercial thin because some of the trees can be removed and sold as posts or pulp logs. There may be several commercial thins during the life of a stand, each one giving the remaining trees more room to grow and less competition for moisture, light and nutrients. Following a commercial thinning, tree tops and branches are often piled and burned to reduce the risk of fire and prepare the site for new seedlings.

As you can see, thinning is really trying to mimic what nature does – just at a faster pace. Each forest has a limited amount of water, nutrients and sunlight available, so we must channel these elements into the trees that we want to have for needs in the future.

HARVESTING

As the trees in a forest age and grow larger, the competition for water, sunlight and nutrients becomes greater, and the trees begin to grow slower. The branches of individual trees begin to grow together with neighboring trees and less sunlight reaches the forest floor. At times the tree canopies are so dense it is almost dark in the understory. The older, slower-growing trees have less vigor and can be at risk of an insect or disease attack.

If a forest is being managed to produce timber, the best treatment may be to remove most of the mature trees and let a new, vigorous, fast-growing forest replace them. This is called a regeneration harvest. Regeneration means to renew or restore, so the forest is being renewed with young, vigorous trees. In this type of management, most of the trees are removed and utilized, and the area is then prepared for a new forest. The new forest will have trees that are all the same age. The new trees will either be planted, or more likely sprout from seeds of healthy trees that were left just for that purpose. A regeneration harvest is one way of creating openings in the forest for use by deer and elk.

There are three common types of a regeneration harvest.

• ***Clearcutting***: This is a harvest where all or almost all mature trees are removed and the site is then prepared for growing a new forest. In Western Montana this type of harvest is most often used in lodgepole pine or spruce/fir forests.

• ***Seed tree harvest:*** This is a harvest where a few large healthy trees are left to provide seed for the next forest. Following a seed tree harvest, only 5 – 15 trees per acre are left. This type of harvest is generally used in forests containing a mix of tree species. Often ponderosa pine, larch and Douglas-fir are kept as seed trees to help establish the next forest.

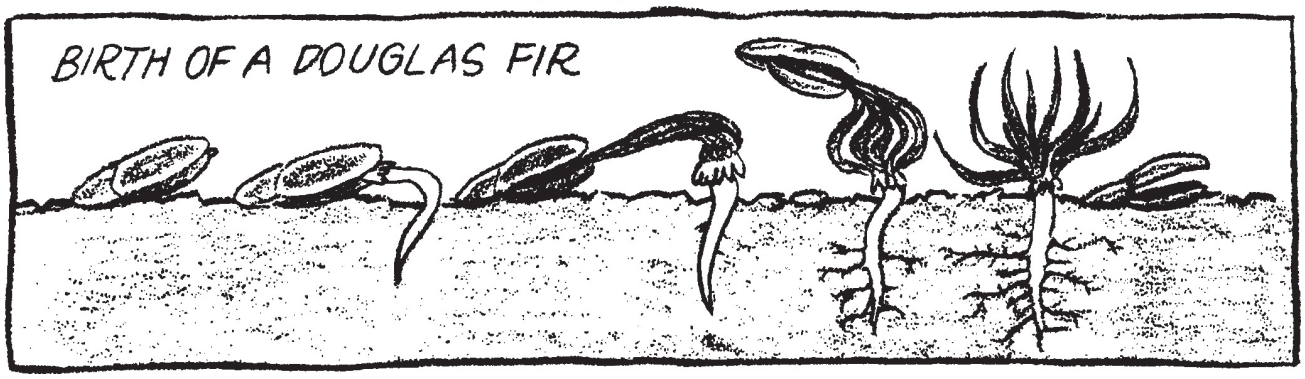
• ***Shelterwood harvest***: In this approach the majority of the trees are removed. Enough trees are left (15 – 30 trees per acre) to provide both seed and shade for a new forest to start. This type of harvest works best on dry, harsh sites where young trees and snags will have a difficult time growing without some shade.

In all types of timber harvests, trees are left around streams to protect water quality and fish. Patches of young trees and dead snags are also left for birds and mammals.

REFORESTATION

When a forest looses trees, either from fire, wind, insects, or timber harvest, how does it grow back, or reforest? For the answer let's look at a typical conifer forest that you would find in Western Montana.

In nature, conifers reproduce almost entirely from seeds that grow in cones high in the tops of the trees. In late summer (around the time you are heading back to school) these cones open, scattering their seeds across the ground. The seeds lay in the soil over winter, and in the spring many will germinate and begin to grow.



The seedlings that sprout from these seeds have certain needs that must be met if they are going to survive. Just as you need food, shelter, and clothing, small seedlings need sunlight, moisture, nutrients, protection from animals, and protection from extreme temperatures in order to grow into healthy trees. For example, western larch seeds prefer open, bare soil with lots of sunlight. In this environment, the seedlings won't be shaded or crowded by neighboring trees, and they will be able to get their roots deep into the rich soil. Other trees, such as spruce or cedar, prefer to grow under bigger trees in shady spots. Trees aren't that different from people – some of us like the cooler climate that Montana offers and other people like the dry desert of Arizona to make their home.

Of course a seed can't choose where it's going to fall – it just falls! Once on the ground it has to make the best of the situation. If it lands on top of a rock or in the middle of a stream, it's not likely to grow. However, if it lands where it gets the right amount of sunlight, moisture and nutrients, up it grows!

Nature furnishes seedbeds, places for seeds to grow, through events such as wildfires or severe windstorms. Both of these actions reduce shade and expose bare soil. If the timing is right between when the soil is disturbed and when seeds are released from the ripe cones, a new forest will begin to grow.

This is a good method for starting a new forest. However, lots of events can happen that slow down the process. If the seeds don't fall when the ground is ready, weeds and brush may take over the area. Many of the seeds that land on good growing spots are likely to be eaten by birds, mice or other small animals that live in the area. For a new forest to start growing, many things have to happen just right.

How might nature prepare a western Montana forest for seeding?

_____

_____

_____

REGENERATION

Foresters have different ways to regenerate the forest. Let's look at some of these methods.

Natural regeneration, or letting nature reproduce itself, is one method. Local trees are well adapted to local soil, weather conditions, and insect activity. Often the healthiest and best adapted trees produce the most seed, which means the seedlings should also be well adapted.

A second method of starting a new forest is planting. Planting trees grown in a nursery allows foresters to choose the desired tree species. Planting small trees works best in locations where grass and weeds will not rob the seedling of sunlight and moisture.

We want to use the seeds from the best growing trees to get the best seedlings. What makes a tree a "best tree?" The shape, growth rate, and resistance to disease and insects all help, and these are inherited from the parent tree. If the parent trees are the "best", the seedlings should be, too. So whether we are leaving the "best trees" on the site to produce seed, or taking seed from the "best trees" in the forest and growing seedlings in a nursery to plant, we will be growing excellent trees for the future!

Can you name at least two advantages that planting trees has over letting them grow back naturally?

_____

Name at least two advantages that natural trees have over planted trees.

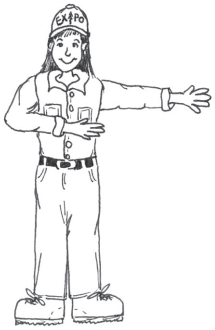
_____

_____

_____

With care, forests are a renewable resource that can be managed through many lifetimes to meet needs for the future. On the forestry tour you will meet forest managers who have different ideas and opinions about management of the forest. You will be able to ask questions about the different management activities that help ensure Montana's forests will continue to provide us with lumber, clean water, hunting, fishing, grazing, wildlife, solitude and recreation that we need for the future.

FOREST LAND MANAGEMENT NOTES



FOREST RECREATION

Playing... What we do in our free time... Not working! Having fun!... Something we choose to do. These are all ideas about recreation. What does it mean to you? Riding your bike? Playing catch? Reading your favorite book? What about forest recreation? Do you like to camp, hike, ski, and hunt or pick huckleberries?

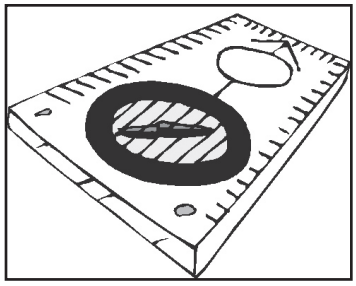
Forests provide many recreational opportunities and experiences. You might stay in a campground with a paved road, an outhouse and a picnic table. Or, you might backpack into an area without roads, choosing your own place to camp and sitting on a log or rock to eat dinner.

At Expo you'll explore how the different parts of a forest are connected, including how we enjoy forests through outdoor activities. Read ahead to discover more about forest recreation and learn ways you can protect forests when out camping, hiking, picnicking or doing any other outdoor activity.

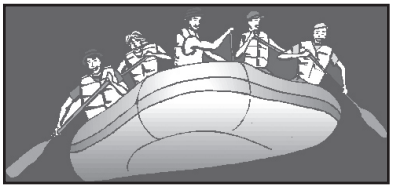
FAMILY FOREST ADVENTURES

Planning for adventure

"Jenn!" I stopped and turned as Jamie ran to catch up. "I had fun today," she said, still out of breath from running. ''Yeah, I'm glad Ms. Robin took our class to the Forestry Expo." We had spent the day learning about forests and now I was headed home. Dad, Mom, my brother, David and I were getting together before dinner to talk about our family vacations. Dad was excited about exploring the forests around the Flathead Valley.



"OK gang," he announced. "The maps, brochures and trail guides came in the mail today. Let's take a look. Pull up your bean bag, Jenn." Mom always collected travel information to help us prepare for our adventures. From the Expo I knew it was important to plan your trip by looking at what to bring and deciding about when and where you are going. Jamie told me about how her family once drove 3 hours to a campground and, when they arrived, found it was closed for repairs.



Our family met in the living room every night for a week, planning our trips. We mapped out different activities and experiences that we would enjoy during each season. Our year schedule included a spring picnic, summer motorcycle rides with our cousins, a river raft trip, a wilderness horse pack trip, a fall hunting trip and a winter weekend at Gran and Grandpa's cabin.

Coke Can, Watermelon Picnic

We began our forest discovery with a picnic the day after school let out for the summer. We walked along the nature trail. I pointed out the glacier lilies and other wildflowers to Mom. Flowers weren't the only things we found along the trial. I picked up an old Coke can and put it into my pack to bring out to the car. We made sure all our trash was picked up, including David's watermelon rind that he wanted to leave for the squirrel.

Hillside Shortcut

Later in the summer, my Aunt Tracy and two cousins, John and Amy, brought their motorcycles for us to use one weekend. Back in Washington, my cousins belong to a club called the Explorers. John gave us lessons on how to properly use the machines and made sure we wore safety gear, like gloves and helmets. We took the motorcycles to a riding area open to motorcycle use and rode to the top of a ridge. We stopped to look at Flathead Lake far below us. What a view!

"Amy, watch out!" John hollered at Amy as a motorcyclist zoomed past her, cutting sharply off the trail and riding up the steep hillside. The tire tracks left deep ruts in the soft dirt on the hillside. "That's a good example of what NOT to do," said John. "Look at all the plants the bike tore up. If everyone takes that new shortcut, pretty soon there won't be any plants on the hill and water will wash the soil away." "That's called soil erosion, right?" I asked. "Yes," said John.

I remembered talking about soil erosion in Ms. Robin's class. John told us more about the "Tread Lightly and Leave No Trace" skills he learned in the Explorers Club to minimize their impact on the environment. It was a good review of what I learned at Expo and helped prepare us for our next adventures.

Wet and Wild Ride

Brr! The water was cold! David threw a bucket of water on me as our raft floated along a calm stretch of water. Our river guide yelled, "Everyone hang on! We're coming to the Bonecrusher rapids!" Whoosh! Water sprayed in our faces. Once out of the rapids, we floated by cottonwood trees and rock walls then stopped on a sandbar to eat lunch. Our guide took a portable stove from the raft to heat water for hot cocoa. He pointed out an old campfire on the shore with a half burned aluminum can. Black rocks and wood left a scar on the sand. Our guide took apart the fire pit, tossing the rocks in the water and scattering the wood in the bushes, well away from the beach and placing the aluminum can into a bag with our trash. He said that using a stove was easier and cleaner than building a fire and leaving your trash in the campfire ring. This would also help us not leave any signs of our visit. At Expo, I also had learned how to make a campfire without leaving black rocks and charred wood.

When we were done with lunch, the guide used the leftover hot water to wash our dirty cups and silverware. David asked why he didn't just wash everything in the river. I rolled my eyes and said, "BECAUSE, we don't want to pollute the river!" I told him about using biodegradable soap and washing items away from the water to protect the fish and other animals that use the water, including us.

Backcountry Wilderness

"Whoa Cinnamon!" I stopped my horse, slid out of the saddle and tied Cinnamon to the hitchline. I watched our outfitter, Ray, put up the line, which was tied between two trees. "I saw a hitchline being used at the Forestry Expo", I said." We learned that using the line is better than tying your horse to a tree." "That's right, Jenn. Remember seeing the tree at our lunch stop?" I remembered. The soil around the tree was bare, with no grass or plants, and there were deep holes by the roots where a horse had stomped and pawed. The tree didn't look very healthy.

Dad and I spent a week horse packing in the Bob Marshall Wilderness. We only saw two other groups all week, two backpackers and a family using llamas to pack gear. At night, Ray told exciting stories about the early mountain explorers. We felt like explorers ourselves, discovering a new area before there were roads, televisions and phones.

"Jenn!" Dad called out from the trail. It was hard to see him through the trees. As he got closer to camp, he asked, "Do you want to go fishing?" "Sure!" We picked up our poles and headed to the lake. While finding a good place to throw in my line, I noticed an old campsite on the lakeshore with hard packed soil and no plants. You could see where water and soil ran into the lake when it rained. I thought about the hillside shortcut the motorcyclist took.

Riding into camp for our last night, Ray pointed out a fresh grizzly bear track and pile of scat. It was exciting and scary to know the bear had walked down the trail ahead of us. Now I knew why Ray wouldn't let me keep my gum and candy bars in the tent. He kept all our food, trash and horse pellets in special containers that a bear or any animal would not be able to get into. Ray stored the containers by the cook tent, well away from where we slept. We certainly didn't want bear visitors in our camp!

I learned at Expo we could also hang our smelly items in a strong tree, at least 10 feet off the ground and at least 4 feet from the trunk. This way, we protected ourselves and protected the bear. Bears that get into human food often have to be removed from their own forest home.

Fall Hunt

Mom and I enjoyed walking quietly through the forest, hunting for white-tailed deer. We walked through dense wooded forest and open meadow areas, and open areas of trees and brush, and had lunch in a spot that had burned in a fire. We watched a woodpecker peck at a large dead tree and noticed deer beds and scat near the edge of the burned area, but no deer. After lunch, I needed to use the bathroom and here we were in the middle of a forest! Mom handed me the trowel (a small type of shovel) and toilet paper. From the Expo and our horse pack trip, I knew what to do. I found a spot away from the trail and creek and like my cat Max, dug a hole using the trowel to bury my toilet paper and waste. Good thing Mom remembered the TP!

"When Mom and I returned from our overnight hunting trip, we cleaned our camping gear. "Here Jenn, help me brush off the tent." We made sure to pick off all the spotted knapweed seeds and flower parts that clung to our clothes and equipment. The purple non-native flowered plant was all over the secret hunting area Mom's friend Fran had recommended. You could see how the plant had taken over the native plants. I told Fran about the spotted knapweed and everything else we saw on our trip. She told us to report the weeds to our local Forest Officer. Mom and I had fun, but both of us were looking forward to our weekend with Gran and Grandpa.

Winter Weekend

Wow! What a great weekend! Gran and Grandpa invited Mom, Dad, David and me to spend a winter weekend at a forest cabin. Grandpa and Dad made sure we had all the right safety gear in case of avalanches like a shovel and avalanche transceiver. "Hey Dad, hold up!" I started my snowmobile and headed out with Dad and David. We stopped now and then to check out fresh animal tracks. I brought along a guide book and tried to match the tracks in the snow with what I saw in the book. I was putting the book in my pack when I noticed Dad up ahead at the side of the trail, talking with two cross country skiers. These skiers had spotted an elk earlier in the day along this same trail. Ah ha! I was right! The tracks were from an elk.

Once the skiers passed, we restarted our machines and continued up the trail to the closed gate. After seeing more elk tracks past the gate, David looked at the map to find another open snowmobile route. "Dad, why do they have a gate here," I asked. "The gate is there to help protect animals so we don't bother them. Remember how you felt when David jumped out of your closet and scared you? We don't want our machines to scare the elk. The snow makes it harder for them to get away from us." We turned around and headed to another snowmobile route.

Movin' On

That brings us to the end of our family forest adventures. The whole family had fun exploring our forests and experiencing different activities during each season. Once a week, Jenn takes out the photo scrapbook of our trips. The scrapbook is a fun reminder of our spring picnic, motorcycle rides with our cousins, the river raft trip, my time spent in the backcountry with Cinnamon, the fall deer hunt and the winter weekend at the cabin. I'll ask Mom and Dad about our family visiting Expo again this year. Who knows maybe we'll learn something new about our forests and be able to plan even more forest adventures!

MYSTERY MESSAGE

Solve the mystery message to find out how you can protect a forest when out camping, hiking, picnicking or doing any other outdoor activity. From the word list, pick a phrase or word that best fits the blank in each sentence. Each phrase is assigned a letter. Write the letter in the blank, then find the mystery message by matching the letters in the blanks with the sentence numbers. The first one is done for you.

P = be prepared
R = area information
S = plants and soil
V = campstove
O = tent
N = weed seeds
C = bother
T = trail and lakeshore
A = cathole
I = biodegradable soap
K = water
L = hitchline
E = pack out

1. For a fun and safe trip P (be prepared) for a forest visit.

2. Plan ahead for your forest visit by collecting _____, like a good map, and considering what to bring and where to go.

3. Whether hiking, horseback riding, biking or using your ATV, staying on the trail protects _____ .

4. You are on an overnight backpack trip with your family and it is time to choose a campsite. You suggest a spot away from the _____ so as not to bother other people and protect the fragile shoreline.

5. When nature calls and there is not an outhouse in sight, use a _____ to bury your waste.

6. Remember to dig your cathole away from _____ and the trail.

7. It's time for dinner. Instead of building a fire to cook your food, use a portable _____.

8. Help prevent water pollution by cleaning those dirty dishes away from water sources and using small amounts of _____.

9. With a great sense of smell, a bear may sniff out your beef stew or candy bar, so remember to keep all food out of your _____ .

10. While on a snowmobile ride, you see fresh deer tracks. Knowing the noise from your machine might _____ the deer, you don't follow the tracks.

11. Using a_____is one way to tie up your horse without damaging a tree.

12. Clean your shoes and camping gear after each trip to prevent carrying _____ to your next campsite.

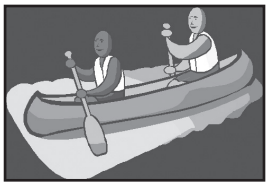
13. Before leaving your camp or picnic site, look around. Pick up and _____ all trash, (even those peanut shells and orange peels.)

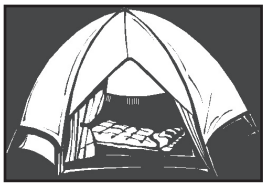
P														
1	2	5	10	4	8	10	13		11	13	5	7	13	

12	9		4	2	5	10	13		3	6	8	11	11	3

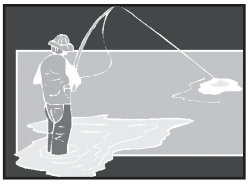
RECREATION

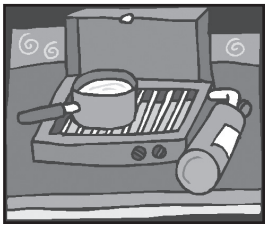
How many forest activities can you find in the puzzle below? Can you think of any others???





M C R O S S C O U N T R Y S K I I N G H
T O U V A S Y O T G L M N P A S I L N U
H L U S B E F G N P Y O N A Z W U X I C
C A G N E K D I B P A H U Y K M I O H K
J H H F T J K N O C L J M B N A P H S L
D P F I B A C K P A C K I N G I P H I E
B E G I Y D I M G K J S T O C O I O F B
D O H A K C L N I H R I V N V R Q R V E
E N K F J G I H B Z Q L I W K H S S V R
L B E G I K G G Y I K C X P G M T E W R
K E F V I F F A D W K C W L P T E B I Y
D M L H A X Y Z E I J I Z Y X N R A J P
S C B T Z X W V N V C B N M O C C C L I
S W I M M I N G Y S M A A G P L D K K C
B I A Z Y Q Q U T V Q I N N K I Z R M K
R L U T S P R X S R P I M O J M A I O I
A D Z Y O R W K W M L S L I E B Y D N N
Q L A N X B J X L I O R N O H I B I Q G
D I M L V I L M B T N M C K G N N N R N
P F K V W R N O Q T P Q J F G G X G S I
E E W X V D M P R S G Q I R N N W U V L
O V Y J U W E O V V F H T N I I V U W E
F I T Z O A S D Y U X H U S T P B T T E
N E A N C T Y T V W U J K D A M R S U H
G W S K B C Q R D N I V W C O A T O W W
M I A J F H C Z T Y Z P X C L C P S V R
H N O D B I Y I Z G H E B N F I H X B U
L G H A Z N N F E X L O M F E G Y R C O
I C B E G G N I T A O B A G D H Q Z A F



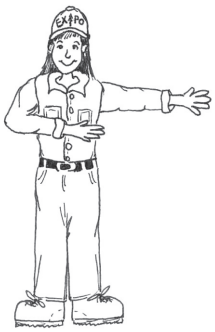


FISHING
HIKING
SNOWMOBILING
WILDLIFE VIEWING
FLOATING
MTN CLIMBING
BACKPACKING

PICNICKING
HUNTING
MOUNTAIN BIKING
SWIMMING
BOATING
CANOEING
FOUR WHEELING

HUCKLEBERRY PICKING
HORSEBACK RIDING
BIRD WATCHING
CAMPING
CROSSCOUNTRY SKIING
KAYAKING

FOREST RECREATION NOTES



GLOSSARY

adaptation the process of making adjustments to the environment.
adfluvial fish fish which are born in small streams, then swim downstream in larger rivers to a lake where they live for 1-4 years, after which they return to the small stream to spawn.
amphibian an animal (such as a frog) that usually lives in the water when it's born, breathing through gills, and living on land, breathing through lungs and moist skin, as an adult.
archeology the study of the life and culture of ancient peoples.
artifact any object of human work, typically a simple tool or ornament produced by past human workmanship.
avalanche receiver an electronic device worn on the body to help find a person buried by an avalanche.

Best Management Practices these guidelines for road building, timber harvesting and other forest operations are designed to keep streams and lakes clean.
biodegradable a substance that can be broken down by microorganisms into simple compounds such as carbon dioxide and water.
bract a leaflike plant part usually found at the base of a flower or flowering part of plant.
broadleaf a plant with widebladed lives such as an oak or maple.

canopy the forest layer formed by leaves and branches of trees or shrubs. There may be several canopy layers.
carnivore an animal that kills other animals for food.
conifer a plant that bears its seeds in cones.
conservation the use of natural resources in a way that assures their continuing availability to future generations.
controlled fire (see prescribed fire).
Confederation the act of forming an alliance.
crown a tree's top, where most of the leaves and above-ground buds are formed.

deciduous a plant that periodically loses all its leaves, usually in the autumn.
decomposer an organism that feeds on dead material and causes its mechanical or chemical breakdown.
duff (or litter) the layer of partially decomposed organic matter underneath the litter layer of the forest floor.

ecology the study of the relations of living things to one another and to their environment.
ecosystem all living organisms in an area and their physical environment interacting.
environment the total of all surroundings-air, water, vegetation, human elements, wildlife.
erosion a process by which wind and water remove earth or rock from a land surface.
evergreen a plant that does not lose all of its leaves at one time.

fluvial fish fish which are born in small creeks, but swim downstream to a larger stream or river to spend most of their lives.
forbs low growing plants (weeds and herbs, but not grasses).
forester a person who studies forests and is concerned with their management, use and enjoyment. A person trained in forestry.

forestry the principles and practices used in the management, use and enjoyment of forests. Forestry includes a broad range of activities like managing timber, fish, wildlife, range, watersheds and recreation.
forest management the practical application of scientific, economic and social principles to the administration of a forest.
fossil fuel coal, oil and other energy sources that formed over millions of years from the remains of ancient plants and animals.
fuel the living and dead vegetation that can be burned in a wildland fire. Fuel includes dead woody material, leaves of trees and shrubs, litter, duff, grasses and other plants.
fungi also called mushroom, organism that is neither plant or animal, does not contain chlorophyll, decomposes organic matter for food.

germinate to begin to grow, to sprout.

habitat the place an animal lives, providing food, water, shelter, and space.
harvest the gathering of plants, animals and other renewable natural resources.
herbivore an animal that eats plants only.

interdependence mutual dependence on another species or organism.

mammal warm-blooded, vertebrate animal (having a backbone), usually having fur or hair, females nurse young.
multiple use a system of management in which lands and water are used for a variety of purposes which are intended to be compatible.

native plant a plant that occurs naturally without any evidence of being brought in to an area by humans.
nomadic a member of a group of people who have no fixed home and move according to the seasons from place to place in search of food and water.
non-native plant plants that have been brought into an area from somewhere else.
niche the role or function played by an organism in an ecosystem: the organism's food preferences, requirements for shelter, special behaviors, etc.
nutrients in forestry, this refers to minerals in the soil that help provide food for plants to grow.

old-growth forests of trees hundreds or thousands of years old, usually with large trees, many snags, broken tops, and accumulations of decaying wood.
omnivore an animal that eats both plants and animals.
organism an living thing.

photosynthesis "to put together with light" a process where plants use sunlight for energy to produce food from water, CO2 and chlorophyll.
plant succession the orderly, gradual, and continuous replacement of one plant by another.
pollinate the transfer of pollen from the male part of the plant (anther) to the female portion of the plant (stigma).
pollutant a harmful substance released to the air or water or land, that causes the environment to become dirty, impure, or unhealthy.

predator an animal that hurts, kills, and feeds on other animals.
prescribed fire a resource management technique where fire is deliberately set and is controlled to a specific area.
prey animals that are killed and eaten by other animals.

redd a pit in a streambed, created by fish, in which they lay their eggs.
reforestation the renewal of forest cover by natural regeneration or the planting of seeds or seedlings.
regeneration renewal of a tree crop by natural or artificial means.
renewable resource a naturally occurring raw material or form of energy which has the capacity to replenish itself through ecological cycles and sound management practices. The sun, wind, falling water and trees are examples of renewable resources.
reptile an animal (such as a snake) that is air breathing and skin is covered in scales.
resident fish fish that live their lives in a short section of a stream.
resin a semi-solid substance secreted in the sap of some plants and trees.
resource a portion of the environment upon which people see as being available for use.
riparian zone the area along the banks of a river, stream, or lake.

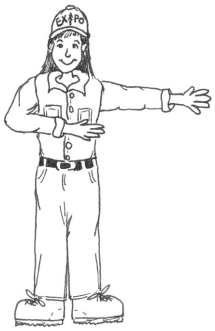
sapling a young tree.
scat droppings of a wild animal, fecal material.
sediments material suspended in water or that settles to the bottom of water.
seedbed a bed of soil prepared for planting seeds.
snag a standing dead tree from which the leaves and most of the branches have fallen.
spawning the act of producing or depositing eggs, usually referring to fish.
species a population of individuals that are more or less alike and that are able to breed and produce fertile offspring.
Streamside Management Zone a "green zone" along a stream, lake or spring (25-feet beyond the high-water mark); it has spongy soils and dense vegetation which acts as filters to keep sediment out of the stream, lake or spring.
succulent full of juice or sap.

thinning to reduce, by natural or artificial means, the number of trees in a stand.
travois a transport device, consisting of two poles joined by a frame and usually drawn by a dog or a horse.
tributary a stream or river flowing into a stream or river

watershed the land that water flows across or under on its way to a stream, river, or lake.
wilderness area an area established by the federal government to be managed and preserved in an essentially untouched condition. Wilderness areas are open to some recreation activities. Use of machinery, mining, logging and many other commercial activities are generally not allowed.
wildfire any fire that is not intentionally set as a controlled or prescribed fire (often started by lightening or human carelessness).
wood product an item made from the wood of a tree like lumber for building, furniture or cabinets.

understory the plants and shrubs growing underneath the main canopy of a forest.

YOUR GLOSSARY



Add additional words or definitions that you have learned through the Family Forestry Expo!