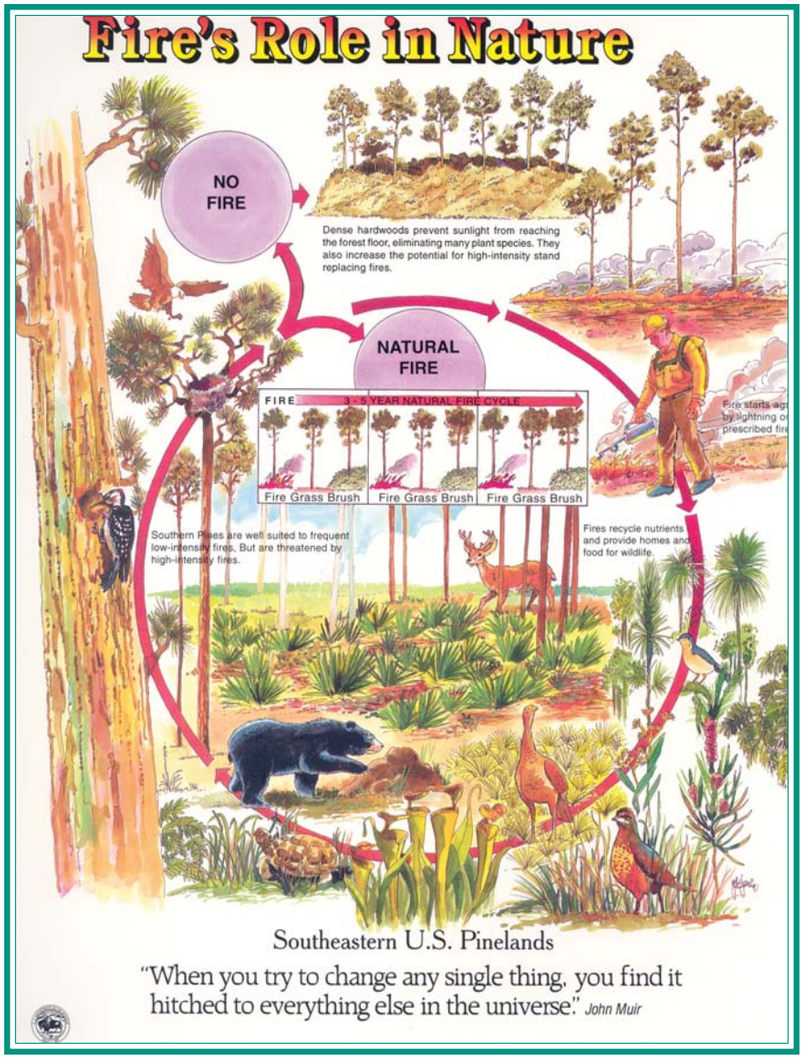
Fire and Water

Fire ecology is the study of wildland fires and their relationships on living and nonliving things in the environment. Fire ecology includes the study of fire dependence, fire regime and fire history.

Some plants need fire to make the environment more suitable for their growth and reproduction. These types of plants are called **fire dependent** species. They benefit from wildland fires.

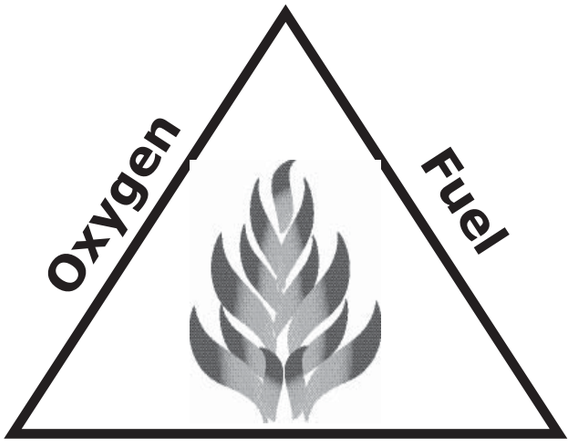
Fire regime is how often fires occur in an area; how intensely the fires usually burn; and the amount of fuel burned by the fires.

Fire history studies how often fire occurs in an area. Today, fire is viewed as a part of the natural environment and is recognized as something necessary for many ecosystems.



How do we know the fire history of an area?
The trees tell us. The rings on the trees that tell us the age of the tree can also tell us how many fires that tree has survived.

The Fire Triangle



Three components must be present before a fire can start: *oxygen, fuel* and *heat*. At least 16 percent oxygen must be present in the air for fires to burn (the air we breathe is 21 percent oxygen.) Fuel is any living or dead material that will burn, such as: dry plants, dry leaves, pine needles, pine trees, grasses and homes. Heat can come from a lightning strike or a person's careless use of fire.

If one part of the fire triangle is removed, then the fire cannot burn. For example, if water is put on the fire, it is cooled — *heat* is removed. If a forest is thinned or trees are removed around homes, *fuel* for fire is also removed. A fire may be prevented or burn less intensely. Smothering flames with dirt removes the *oxygen.*

Fire Behavior

Light Fuel

The ways fuels ignite, flames develop, and fire spreads are determined by three things:

1) quantity and type of fuels available,
2) current weather conditions, and
3) topography (the slope of the hills).

How flammable fuel is depends on:

1) moisture level,
2) the type of fuel, and
3) the amount of the fuels.

The most important of these three is moisture level, but they all determine how fast a fire spreads and how intense (hot) it is. If fuels are close together, a fire may move more quickly and become more intense.

Some things that affect wildfire are winds associated with the passage of "dry" cold fronts. They can help cause severe fire hazard conditions since they are usually very strong and shift the winds in a clockwise direction. At times, a 180-degree change can occur.

Heavy Fuel

A fire that moves up a tree from the ground burns "ladder" fuels such as shrubs, branches and limbs. A fire that stays low and on the ground is called a *surface* fire. A fire that burns beneath the surface is a *ground* fire. These may occur in bogs and other swampy areas with a thick debris layer above the soil. A fire that jumps through the top of the trees is a *crown* fire.

Weather conditions such as wind, temperature and humidity affect the fire. Wind is especially important, since it can add more oxygen. The moisture of the soil and what type of matter is on the surface determines how much the fire affects the soil. Time of year also affects a fire's behavior. In Alabama, the primary fire seasons are Feburary through March and October through November. The least amount of fires are reported in June, July, and August. The two most common causes of wildfires in Alabama are debris burning and arson.

History of Fire

Fire has always been a force in nature. Societies have viewed fire as “bad” or “good” depending on their cultural beliefs, values and lifestyles. American Indians often started fires on the prairies. The native peoples used fire to drive out the game (wild animals) that were hidden in the tall, dead grasses and shrubs. This made it easier to hunt the animals. Fire was also used to clear away possible “hiding places” of their enemies. Sometimes warriors from one tribe would try to “burn out” the camps of another tribe. So fires were also set to remove fuels, to prevent an enemy “burn out.”

Some people of the Southern region used fire to help grow crops. The ancient ones living throughout Virginia and North America would set fire to an area to clear it, and then begin planting their crops.

To the early European farmers of the eastern plains, fire was an enemy. A prairie fire could spread quickly and change direction with just a puff of wind. Fire was “unpredictable.” It could destroy crops and kill livestock caught in its path. In a matter of minutes, settlers could lose all they owned: their house, their food and their way of life. The smoke of a prairie fire on the horizon would strike fear in these settlers.

In mountainous regions, fire was also viewed an enemy. Fire could destroy whole towns. Buildings made of dry timber would burn quickly, and lives and jobs were lost. So it became policy to control and put out (suppress) fires as quickly as possible.

In 1910, raging fires occurred, mostly in the mining regions of Montana and Idaho. These fires became known as “The Big Blowup.” More than three million acres were burned in the Northern Rockies and two million in other parts of the country. Seventy-eight firefighters were killed, and seventy-five percent of the year’s total burned acres were lost in one 36 hour period.

The total cost to the United States Forest Service was more than one million dollars (more than $20 million today). This is why the people who manage the country’s forest decided that the best policy was to put a fire out as quickly as possible. Decades of suppressing fires has resulted in dangerous buildups of fuels. When fires do start, they are often very intense and can cause much damage.

Ed Pulaski

and 45 firefighters became trapped by one of the 1910 raging fires. He guided 45 men into the Nicholson adit (mine tunnel) which was cooled by water running through it. Thirty-nine fire fighters survived. Ed later invented an important tool for fighting fires that is called a Pulaski.

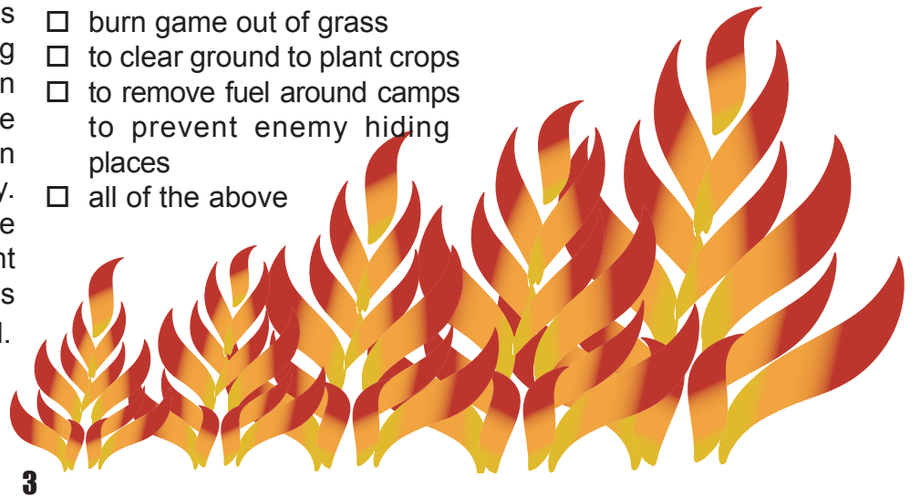
Do you know the answer?

Fire has been used to

- ☐ burn game out of grass
- ☐ to clear ground to plant crops
- ☐ to remove fuel around camps to prevent enemy hiding places
- ☐ all of the above

To suppress a fire means:

- ☐ to add fuel to a fire
- ☐ to stop the fire from burning
- ☐ to set a fire on purpose
- ☐ to add oxygen to a fire



History of Fire in the US

In the late 1800s, there was a debate among foresters about whether all fires should be suppressed or if fire should be used as a tool as in agriculture. The fires of 1910 answered the question for those who made the laws: fires were to be suppressed.

Fire was seen to be detrimental (harmful) to the health of ecosystems. In the 1930s, the policy of both the National Park Service and the United States Forest Service was known as the "10 a.m. rule." Any wildland fire was to be extinguished by 10 a.m. the following day.

Fire lookout towers were built all over North America in the early 1900s. (Sometimes the lookout was on a high ridge, not in a tall tower.) The brave men and women who worked, and sometimes lived, in the lookouts packed in 30 days of provisions at a time. One list of supplies included: 25 pounds flour, sugar, ½ crate of eggs, ½ side of bacon, 5 pound tin of jam, canned fruit and vegetables, condensed milk, potatoes, onions and dry beans. Many times the source of water was a spring a mile or more away from the lookout. The lookouts would carry water back to their camp in a five-gallon canvas water bag each day. Any leftover water was poured into the washtub, and at the end of a week the lookout would have enough water to take a bath and wash the laundry.

A lookout's duties were to report fires, keep rainfall data, temperature data, wind velocity estimates and report on haze. They were given crank telephones and the tools necessary to keep the telephone lines in repair. Trees frequently fell across the lines and made it necessary to put them back up. The telephone line might stretch 15 miles or more. In their shack would be a map oriented to the points of the compass. They used the map to give exact locations of fires.

Today, very little has changed as far as data collected and firefighting equipment. Tools of data collection are more advanced and are much more accurate, and computers are now used. The one big difference in firefighting equipment is air support.

Lookout planes have replaced the lookout towers. Slurry bombers and helicopters drop water and fire retardant materials. Smokejumpers can get to fires more quickly by parachute. Pulaskis are still used by ground crews. These crews still hike in with all their supplies in their backpacks.

List some of the uses of fire.

_____
_____
_____
_____
_____
_____
_____

In which states did "The Big Blowup" fires of 1910 occur? How many acres did it burn?

_____
_____
_____
_____
_____

Hallie M. Daggett was one of the first women hired by the Forest Service as a lookout in 1913. She earned $840 per year and stayed on the job for fifteen years. She did her own hunting, rode a horse for transportation and even trapped.

Smokey Bear

The story of Smokey Bear and how our national forest fire prevention symbol was almost a deer! Walt Disney's motion picture, "Bambi" was produced in 1944 and Disney let the forest fire prevention campaign use his creation on a poster. The "Bambi" poster was a success and proved that using an animal as a fire prevention symbol would work. A fawn could not be used in subsequent campaigns because "Bambi" was on loan from Walt Disney studios for only one year; the Forest Service would need to find an animal that would belong to the Cooperative Forest Fire Prevention Campaign. It was finally decided that the Nation's number one firefighter should be a bear.

Did you know the cartoon Smokey Bear is based upon an actual baby black bear that was found alone, charred, and scared after a devastating wildfire burned through New Mexico?

One spring day in 1950 in the Capitan Mountains of New Mexico, an operator in one of the fire towers to the north of the Capitans spotted smoke and called the location into the nearest ranger station. The first crew discovered a major fire being swept along the ground between the trees, driven by a strong wind. Word spread rapidly and more crews reported to help. Forest Rangers, army soldiers, men from the New Mexico State Game Department, and civilian volunteers worked together to gain control of the raging fire. As soon as they contained the fire to one spot, the wind would push it across the lines. During one of the lulls in firefighting, a report of a lonely bear cub that had been seen wandering near the fireline was reported. The men left him alone because they thought the mother bear might come for him.

Several soldiers were caught directly in the path of the fire storm, barely escaping by laying face down on a rockslide for over an hour until the fire had burned past them. In spite of the experience, the firefighters were safe except for a few scorches and some burned holes in their cloths.

Nearby, the little cub had been caught in the path of the same fire and had not fared as well. He had taken refuge in a tree that was now nothing but a charred smoking snag. His climb had saved his life but left him badly burned on the paws and hind legs. The soldiers removed the little bear cub from the burned tree, but they did not know what to do with him. A rancher, who had been helping the firefighters, agreed to take the cub home. A New Mexico Department of Game and Fish Ranger heard about the cub when he returned to the fire camp and drove to the rancher's home to get the bear. The cub needed veterinary aid and was flown in a small plane to Santa Fe where the burns were treated and bandaged.

The news about the little bear spread swiftly throughout New Mexico. Soon the United Press and Associated Press picked up the story and broadcast it nationwide. Many people wrote or called to inquire about the little bear's progress. The State Game Warden wrote an official letter to the Chief of the Forest Service, presenting the cub to the agency with the understanding that the small bear would be dedicated to a publicity program of fire prevention and conservation. The go-ahead was given to send the bear to Washington, DC, where he found a home at the National Zoo, becoming the living symbol of Smokey Bear.

Fire Prevention Week

Always recognized as the 2nd week in October

The history of Fire Prevention Week has its roots in the Great Chicago Fire, which began on October 8 but continued into and did most damage on October 9, 1871. In just 27 hours, this tragic conflagration killed more than 250 people, left 100,000 homeless, destroyed more than 17,400 structures and burned more than 2,000 acres. While the origin of the fire has never been determined, there has been much speculation over how it began. While the Great Chicago Fire – and its "cow culprit" – was the best known blaze to erupt during this fiery two-day stretch, it wasn't the biggest. That distinction goes to the Peshtigo Fire, the most devastating forest fire in American history. The fire roared through Northeast Wisconsin, burning down 16 towns, killing 1200 people, and scorching 1.2 million acres before it was done.

Historical accounts of the Peshtigo fire say that the blaze began when several railroad workers clearing land for tracks unintentionally started a brush fire. Before long, the fast-moving flames were whipping through the area "like a tornado," survivors said. It was the small town of Peshtigo, Wisconsin that suffered the worst damage. Within an hour, the entire town had been destroyed, and some 800 residents lost their lives.

Wildfires can cause your home to catch on fire. Follow these safety tips to make your home safer!

Inside your parent can:

- Install smoke alarms. Make sure your home is equipped with an ABC fire extinguisher.
- Make sure that the batteries in every smoke alarm are working. Smoke alarms should be tested once a month and batteries replaced once a year, or when the alarm "chirps," warning that the battery is low.
- Every family needs a home fire escape plan. When you make your plan, try to identify two ways out of each room (one way out might be the window, the other could be the door). Make sure that children awake to the sound of the detector!
- Choose a safe place to meet that is appropriate for the type of fire.
- Know the telephone number of your local fire department OR dial 911 as soon as you discover a fire. You may have to call from a cell phone or a neighbor's phone!
- Store gasoline, oily rags and other flammable materials in approved safety cans.
- Teach family members how to use a fire extinguisher (ABC type) and show them where it is kept.

Outside your parents can be ***FIREWISE*** by:

- Removing highly flammable vegetation from natural areas around your home.
- Plant fire-resistive shrubs and trees.
- Stacking firewood at least 30 feet away from any structure.
- Clear a ten-foot area around propane tanks and barbecues.
- Rake leaves, dead limbs and twigs. Clear all flammable vegetation away from your home and out from under decks.
- Keep roof and gutters free of pine needles and leaves.
- Remove vines from home walls and dead branches that extend over the roof.

Contact your local fire department or the Alabama Forestry Commission (334-240-9300) for more fire safety information! Firewise is the latest Wildfire Prevention Program for homes and communities. Find out more about firewise at www.firewise.org.

The Alabama Forestry Commission

Established as a state agency in 1924, the mission of the Alabama Forestry Commission (AFC) is three-fold: to *Protect the Forests* from all harmful agents; to *Service and Help Landowners* to carry out responsible forest management on their property, using professional technical assistance so as to benefit themselves, their land and society; and to *Educate the General Public* about the value of our forests in insuring both a healthy economy and environment. Protecting Alabama's rural areas from wildfire is the number one priority of the Alabama Forestry Commission. Wildfires burn thousands of acres of forestland in our state every year. But through efforts of the Forestry Commission, volunteer fire departments and other cooperators, those wildfires are decreasing. The average size wildfire has steadily decreased during the most recent l0-year period. Wildfires destroyed 28 homes and 114 other structures last year in Alabama. 34 structures were damaged by wildfire during this same period. The AFC reported 4,242 fires burning 50,327 acres. The average size wildfire was 11.9 acres. The AFC uses hand crews, bulldozers, and special helicopters water buckets to control wildfires. Local fire departments assist the AFC in fighting forest fires in Alabama.

Top counties for the size and number of wildfires in Alabama are: Baldwin, Cherokee, Chilton, Cleburne, Conecuh, DeKalb, Elmore, Escambia, Jackson, Jefferson, Macon, Mobile, Shelby, St. Clair, Talladega, Tuscaloosa, Walker, and Washington.

The two most common causes of wildfire in Alabama are escaped debris burning and arson.

Debris Burning

Is it legal to burn in your area? A good way of preventing wildfires from debris burning is to follow the burning permit law of Alabama. It is a good idea to notify the AFC and the local fire department of your plans before starting any camp, rubbish, debris, land clearing or prescribe fire.

Even if it is ok to burn, don't burn on windy days! Burn only yard trash, no household garbage! There are times when no outdoor burning is allowed!

Fire Alert - During a Fire Alert, permits are only issued to individuals with burning experience and above average control equipment.

Drought Emergency - During this time, no outdoor burning is permitted.

Camp Fires

Another way of preventing debris fires is to be careful with campfires. Here are a few camping and campfire rules that are important:

- Clear all flammable vegetation around your campfire for five feet.
- Never leave your campfire unattended, and never leave children alone with a campfire
- Drown your campfires with water and stir the ashes. Make sure it's dead out before leaving

- Place charcoal briquettes from the grill in a metal or fireproof bucket and soak in water.
- Don't throw hot charcoal briquettes on the ground
- Never allow children to play with matches
- Don't park your vehicle on dry grass.

Arson

Arson is the intentional burning of a car, house, forest, or anything of value! It is against the law. To combat the wildfire arson problem, we need to report suspicious activity to the AFC or your local police department. Did you know there is a reward of up to $5,000.00 for information leading to the arrest and conviction of anyone committing a Forestry Related Crime? Timberland arson, timber theft, and illegal dumping on forestlands are all included. A special Arson Hot Line number has been established at 1-800-222-2927. You can even call in as a secret witness.

Did you know?

46 % of Alabama forestland is hardwoods
35% of Alabama forestland is pine
19% of Alabama forestland is a mixture of hardwoods and pine
Alabama's forestland covers more acres than the size of Connecticut, Delaware, Maryland, Massachusetts, New Hampshire and Rhode Island combined.One twelfth of the ocean flowing water in the United States flows through Alabama.
The state tree is the long leaf pine.

Key Contacts

State Forester Timothy Boyce
Asst. State Forester Richard Cumbie
Administrative Division, Jerry Dwyer
Fire Management, David Frederick
Forest Management Bruce Springer

Internet sites for additional information:

http://www.firewise.org	http://aavfd.org
http://www.forestry.state.al.us/	http://www.aldoi.gov/FireMarshal.asp
http://www.nfpa.org/	http://www.riskwatch.org/
http://www.smokeybear.com/	http://redcross.org
http://www.usfa.fema.gov/kids/	http://rcfpi.com

Alabama Forestry Commission
513 Madison Avenue
Montgomery, AL 36104-3631
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The AFC has a number of partners that assist them in performing their mission. Among them are private landowners, land resource management corporations, fire departments, and other government agencies. Other state and federal agencies involved in fighting wildfires in Alabama are the Alabama Department of Conservation, the Alabama Department of Emergency Management, the Federal Emergency Management Agency, the United States Fire Administration, the United States Department of Interior, United States Fish and Wildlife Service, the United States Park Service, the United States Bureau of Indian Affairs and the United States Department of Agriculture-National Forest Service.

Alabama State Department of Education Curriculum Correlation

The partnership appreciates the amount of time and effort Alabama teachers spend in preparing lesson plans. In order to assist you, the Alabama Reader has been correlated to the Alabama Department of Education's approved curriculum to determine the specific areas of the minimum required content that it addresses. A PDF version of the Alabama Reader and information about curriculum correlation is on the Alabama Forestry Commission's web site @ http://www.forestry.state.al.us/

Nondiscrimination Notice

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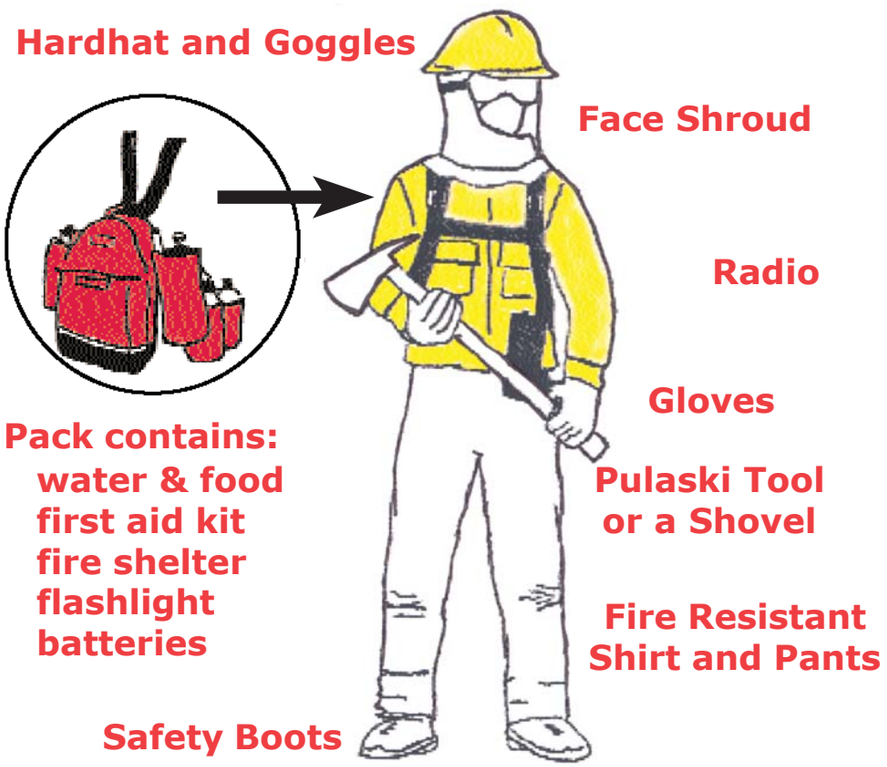
Fighting Wildland Fires

Firefighters are organized into crews. The ground tactical crews are the fire engines and hand crews. There also are helicopter attack teams (helitack) that can dump enormous buckets of water, airtankers that drop a chemical compound known as slurry and smokejumpers. Smokejumpers, hotshot crews and helitack crews are known as Type 1 firefighters. Some helitack crews rappel out of helicopters into the area that is burning. Smokejumpers parachute out of planes into remote areas with no roads. Hotshot crews hike into the area where the fire is burning. These crews act as if they were military units, each having their own responsibility but also being a part of a bigger team. They have to cooperate and support each other in order to keep each other safe.



We ALL live downstream...

The effects of fire can impact areas many miles away from where the fire occurred. For example, sediment increases in streams and rivers due to soil erosion following fires. Without vegetation to slow down the flow of water, dirt and other materials move down the watershed. In Colorado, after the very hot Buffalo Creek fire in May 1996, heavy summer thunderstorms followed the fires. The burned soils did not soak up the water that fell. Instead the water rushed down the hills faster and harder, picking up more and more sediment along the way.

For two years after the Buffalo Creek Fire, there were a total of 13 floods. Millions of tons of sediment flowed down from the hills, and some of this sediment finally entered the reservoirs used by Denver residents for their water. The amount of sediment that ran into the reservoirs was the amount that would normally occur in 14 years. There was also debris from the fire that needed to be cleaned out. Things such as trees and propane tanks (from upstream residents) had to be removed. Even today, the quality of the water in the watershed is reduced due to the long lasting impacts of the fire.

Soils, and the speed at which land “recovers” after a fire in Alabama, are very different than in the Western U.S. However, the potential for similar effects still exists.

Effects of Fire - Water Quality

Fire serves many positive purposes in plant and animal life ecosystems, but it can also damage communities as well. Perhaps the most damaging effect of fire is erosion. Intense fires, especially in small tree and shrub communities, can burn the vegetation down to the roots. Usually these plants help hold the soil in place during rain storms. When fire destroys the network of roots and grasses, landslides and flash flooding may occur. Sediment (soil, sand, rocks) cloud streams, which can affect fish life.

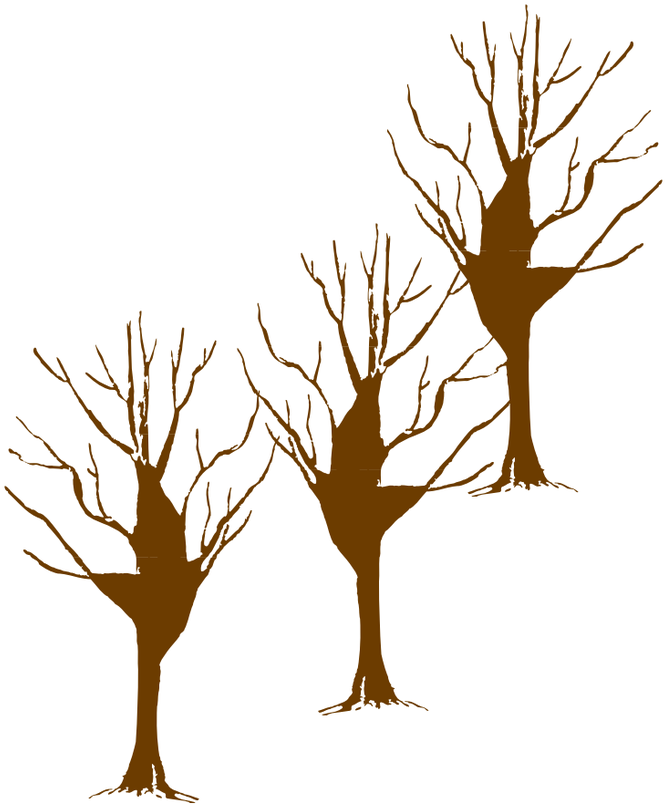
The effects of fire erosion can last for years following a fire. Fire affects water quality in many ways. Changes in water include 1) increase in sediment, 2) increase in stream temperatures, and 3) increase in nutrients. These are all forms of water pollution.

Stream temperatures increase after a fire because the vegetation that usually hangs above the banks, shading the water, is no longer there. The sun heats up the water. These higher temperatures cause problems to fish and other species whose habitat is normally cold water. The increased nutrients in the water can lead to algae blooms. This can also harm aquatic wildlife living in the streams.

There are two types of water pollution:

POINT SOURCE POLLUTION is the type of pollution that can be traced to a specific source. You can see it and easily identify where it comes from.

NONPOINT SOURCE POLLUTION comes from many sources. For example, each time it rains, run-off from the street picks up litter, motor oil, pet wastes, leaves, grass clippings and chemicals. These things are washed into storm drains and make their way to our rivers and streams.



Do you think the water pollution that occurs from a forest fire is a nonpoint or point source type of water pollution? Or might it be both? Explain your answer by writing a complete paragraph.

Effects of Fire - Air Quality

Air quality is one factor a resource manager needs to consider before setting a prescribed burn. If wind would blow smoke into a heavily populated area, the burn would be postponed. If a neighbor in the area is known to have respiratory problems, his/her health needs to be considered. Fire produces smoke, within smoke are both fine and coarse material (particulates), seventy percent of which is fine to very fine.

The coarse particulates are measured to determine the amount of air pollution. There is not much known about the effect of fine particles in the air. According to the air quality index and smoke index charts, if you can see four miles, the effects of the smoke are none. If you can see less than 4 miles, air pollution becomes more serious for people with respiratory diseases. One and one-quarter to two miles visibility, air quality is unhealthy and people with respiratory diseases, the elderly and children should avoid exercise. One-mile visibility is very unhealthy and those with disease, the elderly and children should not go outside. If visibility is less than one mile everyone should avoid going outside if possible and close windows.

We we look into the sky during a fire, we can see that particulates are abundant in the atmosphere during a fire. Five hundred miles away from the 1988 Yellowstone fires, the sun appeared behind a haze as if a curtain were filtering the light. This effect is caused by the particulates floating in the air. Particulates are carried by wind and air currents to areas hundreds of miles from the fire. In 1910, particulates were carried from the Idaho fires across the country to the East Coast. The sun in New Hampshire appeared copper-colored while those fires were burning.

Smoke Index

To determine your own forest fire smoke index:

1) face away from the sun;

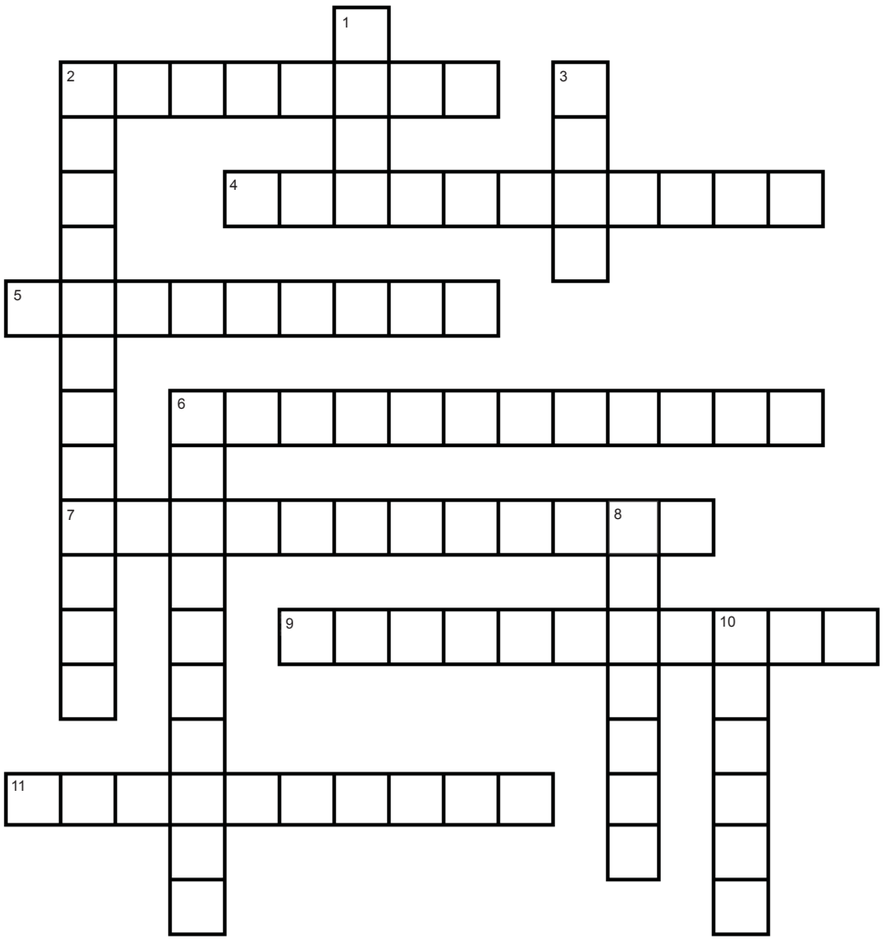
2) determine the limit of your visible range by looking at targets at known distances in miles (visible range is that point at which even high-contrast objects totally disappear); and

3) after determining the visibility in miles, use the information above to determine health

People who live in areas where wildland fires occur need to practice "fire mitigation." Mitigation means to change the environment to reduce the intensity of fire as a way to protect lives and property. Removing trees and brush or keeping grass cut around homes are examples of mitigation.

***Prescribed fires** can be natural or intentionally set fires. These fires are carefully planned and watched. Weather conditions are closely monitored. These fires are used to manage an area to lower the chance of a larger, damaging wildfire. Prescribed fire may be used to reduce fuels around campgrounds and homes. It may help to increase forage for wildlife by reducing non-native grass and shrubs. The reason it is called prescribed is that it is only set or allowed to burn when environmental conditions allow for controlled burning.*

Crossword Puzzle



ACROSS

2. To put fires out
4. Harmful
5. Some plants need fire; they are called fire _____
6. People who fight fires
7. Material in the air from a fire is called this
9. The study of wildland fires and their impact on living and nonliving things (two words)
11. To reduce the threat or damage done by fire

DOWN

1. The hot part of the fire triangle
2. People who parachute from planes to fight fires
3. Wood, grasses, etc. are considered this part of the fire triangle
6. How often fires occur, how intense they burn and the amount of fuel burned by fires is know as _____ (two words)
8. When water carries away soil particles it is called____
10. The third part of the fire triangle is an ingredient of air

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For more information, contact your local Alabama Forestry Commission Office.

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This Alabama Reader has been prepared for the fifth grade level of learning.
The Alabama Forestry Commission appreciates the amount of time and effort our teachers spend in preparing lesion plans. In order to assist you, The Alabama Reader has been correlated to the Alabama Department of Education's approved curriculum to determine the specific areas of the minimum required content that it addresses. Below you will find a listing of those areas in which we believe the Alabama Reader can be used to address the minimum content:

Fifth Grade

Alabama Course of Study: Health Education

Health Literacy **Goal 1**
Students will comprehend concepts related to health promotion and disease prevention.

Content Standards

8. Behaviors that result in the unintentional and intentional injuries.
9. Discuss solutions to environmental health problems.

Health Literacy **Goal 2**
Students will demonstrate the ability to access information and health promoting products and services.

Content Standards

11. Identify appropriate sources of help to cope with health-related problems.
12. Investigate reliable sources of health information.

Health Literacy **Goal 6**
Students will demonstrate the ability to use goal-setting and decision making skills to enhance health.

Content Standards

26. Apply a decision-making process to health-related issues and problems

Health Literacy **Goal 7**
Students will demonstrate the ability to advocate for personal, family, and community health.

Content Standards

28. Participate in school-sponsored health advocacy events.
30. Identify potential barriers to personal health advocacy.

31. Demonstrate the ability to influence and support others ti reduce health risks and to make positive health choices.
32. Demonstrate the ability to work cooperatively to advocate for healthful individuals, families, schools, and environments.
33. Use positive peer pressure to help counteract the effects of unhealthful behavior.
34. Serve the community with a health-related project.

Fifth Grade

Alabama Course of Study: Scientific Skills

Process and Application

5. Think critically and logically to make inferences and describe relationships between evidence and explanations

10. Demonstrate an understanding in the relationships among science, technology, and society past and present.
    - Explaining how scientists use technology in scientific research
    - Recognizing the importance of science and technology to many careers
    - Demonstrating an understanding of the impact of society on human health and environmental conditions
    - Recognizing contributions of science to development and design of technology

Physical Science

13. Describe various forms of energy
    - Chemical
    - Heat
    - Light

17. Describe methods of energy transfer
    - Conduction
    - Convection
    - Radiation

Life Science

Organisms and Environments

23. Relate populations within a habitat to communities, ecosystems, and biomes.