

# THE FORCE OF FIRE



*Teacher Resource '04*

Lesson plan and support materials

**PRIMARY**

*Developed by:*

**Jeannie Steele**

Educational Liaison

Riverside Forest Products

P/F: 250-542-8993

**Debbie Sluggett**

Educational Liaison

Bell Pole, Downie, LP-Canada,

Tolko, Revelstoke Community Forest Corp.

P/F: 250-503-2477

**[www.learnforestry.org](http://www.learnforestry.org)**

*Assisted by:*

Jennifer Stewart, Riverside

Deb Bazett, COFI: Southern Operations

*Sincere thanks to our sponsors and support team!!*

## *Sponsors*

Riverside Forest Products Limited  
Bell Pole Company  
Downie Timber  
Louisiana Pacific - Canada  
Tolko Industries  
Revelstoke Community Forest Corporation  
Thompson Okanagan Inter-agency Committee  
Interior Logging Association and Trades  
Weyerhaeuser Company Limited  
Fire Trol  
Association of British Columbia Forest Professionals  
Council of Forest Industries - Southern Operations  
Williams Lake Forestry Capital 2004

## *Support Team*

Ministry of Forests Fire Protection Branch, Kamloops Centre  
B.C. Forest Service Protection Program  
Partners in Protection  
USDA, Rocky Mt. Research Stations, Fire Sciences Lab, Missoula, MT  
Alberta Sustainable Resource Development and Partnerships in Protection

## *Photographs*

Cover: Steve Grimaldi, Forest Protection Branch, MoF  
Kamloops Fire Centre Staff, Forest Protection Branch of BC  
Tolko  
Riverside  
The Daily Courier

# THE FORCE OF FIRE

## LESSON OVERVIEW

---

### Learning Outcome:

- The fire triangle
- Plant and animal survival
- Some aspects of fire behaviour
- Preparedness at home

### Question:

- What do we need to have fire?
- How do animals and plants survive?
- How can fire be good and/or bad?
- How can we help prevent fires and protect our homes?

### Setting the Stage:

Introduction: (10 minutes)

- Part One: Hangman game trying to spell out the word fire \_ \_ \_ \_ or wildfire \_ \_ \_ \_ \_ \_ \_ \_
- Part Two:
  - Photo of fire - discussion of what students know about fire
  - Photo: Fire triangle - discussion on what three things are necessary for fire to occur, main causes of fire (human and nature)

Lesson: (30+ minutes)

- Part Three: (15 minutes)
  - Discussion on “fire dog” and reading of first half of story about Rufus the firehouse dog
- Part Four: (15 minutes)
  - Completion of story/summary
  - Discussion of how to prepare their homes for fire

### Materials needed:

- Lesson Plan and glossary
- Photos: Fire, Fire triangle, Dalmatian dog, lightning, smoke, air tanker, Cartoons: thick bark/cones, animal survival, preparedness; new growth
- Storybook: Rufus the firehouse dog: Firestorm
- Activity Worksheets: Good Fire/Bad Fire, Living in The Wild Interface
- Other photos - Look to websites in background information

# THE FORCE OF FIRE

National Forest Week 2004

## PRIMARY LESSON PLAN

(This would need to be adapted for Kindergarten)

### Objective:

- Fire components: the fire triangle
- Distinguish between good fire/bad fire
- Survival of plants and animals
- Smoke indicators
- Preparedness at the home

### Curricular connections:

- K/1: Weather and Seasons
- 2/3: Plant survival/Animal survival

### Materials:

- Lesson Plan with Glossary
- Storybook: Rufus the firehouse dog: Firestorm
- Photos: ("Information on back of most photos")
  - Fire
  - Fire triangle
  - Lightning
  - Dalmation *on back of photo some information about the "fire dog"*
  - Smoke
  - Air tanker
  - Animal survival
  - Plant survival /New Growth/Thick bark
  - Protecting your home
- Activity worksheets
  - Good Fire/Bad Fire worksheet
  - Interface: Living in the Wild
- Information
  - Teacher information material: Fire facts/fire history/websites

## LESSON INTRODUCTION: (8-10 minutes)

### **A. Hangman game on blackboard:**

- I'm thinking of a word with 4 letters \_\_\_\_\_. This word is important to many people but it can also be dangerous. (Could use "wildfire")
- Tell students you will give them an opportunity to choose 6-8 letters from the alphabet. Fill in where appropriate. AND/OR

### **B. Photos:**

- #1. Fire** – ask what they know about fire. (Fire can be good - cooking, heating, controlling spread of insects, etc.) This photo would be a fairly hot fire. We rank fires from 1 (*white smoke, no open flame, smouldering ground fire*) to a 6 (*violent fire behaviour*). Many of the fires that we had in the Thompson Okanagan in 2003, were a rank 6.
- #2. Fire triangle** – discuss three components required to have fire (*see information on back of photograph*)

### **C. Photo:**

- #3. Lightning** – fires begin either by nature or by man. Short discussion on how man starts fires. The 2003 Okanagan Mountain fire was started by lightning. The cause of fires is approximately 50% man made, 50% nature.

## LESSON DEVELOPMENT: (30 - 40 minutes)

Teachers may want to divide this activity into two days

**A) #4. Photo:** Dalmatian dog. Ask students what they see, what they know about this type of dog and if they know what this dog is often associated with. (*refer to information notes on back of photo*)

**B) RUFUS THE FIREHOUSE DOG:** FIRESTORM - this story has been written by a Kelowna grandmother, Elizabeth Lycar for her grandson, Caleb.

**C) READ PART ONE OF STORY** (beginning to middle of book)

(On page 2 are the words “**fiercely, relentlessly and dangerously**” These words appear often throughout the story - review meaning and print words on the board, on flashcards or on an overhead)

## Questions

1. How did the fire start? (*lightning*)
2. Stress importance of being very careful. What are some ways they can be careful not to start a fire. (*not playing with matches, putting out camp fires, etc.*)
3. Were the animals frightened? What did they do? (*ran to safer places or went underground*)
4. Were the firefighters able to save some of the homes? (*Yes, they were real heroes - just like the ones that fought the Thompson Okanagan fires in the summer of 2003.*)
5. Why were they so successful? (*they didn't give up*).
6. Where were the bunnies found? (*in burrows*) (review meaning of burrows). Were they burned? (*singed ears*)....talk about the word singed.

### D) PART TWO OF STORY (Middle to end of book)

- #5. Photo: Smoke**
- The color of smoke will tell you a lot about a fire. The darker the smoke, the hotter the fire. Billowing or boiling smoke indicates a hot, active, unpredictable fire. White or blue smoke floating in the air indicates a cooler, less active fire.

### E) READ PART TWO OF STORY followed by questions and photo:

- Who fights the fires? What do they need for fighting fires? (*firefighters*) (*equipment, food, clothing, tools, machines, communication, etc.*)
- #6. Photo: Air Tanker** - this is an air tanker - it scoops up water. Helicopters with buckets are also used. Sometimes, planes drop a red substance called a retardant that helps keep the heat of the fire down or slows the fires' advance.
- What happened to the animals once the fire was out? (*many of them came back or found new homes*)
- What did the people do to thank the firefighters? (*brought them treats, thank you notes*)
- How can fire be good? (*animals can survive, lots of people get to return to their homes, return of plants, new sources of food and habitat for animals etc.*)

## SUMMARY

- ❑ **#7. Photo:** "Birds fly away".....  
Discuss what happens to animals during and after a forest fire.  
(not all will survive but many can and do)
- ❑ **#8. Photo:** Plant growing out of burned stump.....  
Many plants return after the fire these new healthy growing plants provide new food and habitat for many animals. The larger burned trees provide branches and cavities for nesting birds and other birds of prey.
- ❑ **#9 Photo:** "Stimulates new growth".....  
New growth in the forest is good food for plant eating animals.
- ❑ **#10 Photo:** "By Adapting".....  
Fire resistant trees - some trees have such thick bark that it can protect them from fire. (Eg: Douglas Fir, Ponderosa Pine) Some deciduous trees can also survive fire. Some cones require heat to open them and to release the seeds.
- ❑ **#11 Photo:** "Clean debris from roof".....
  - What are some ways we can help protect our homes from fire?
  - When people move closer to the forest, they become more vulnerable to fire.
  - Make a list on the board or develop a chart refer to activity worksheet, Living in the Wild.
- ❑ **Worksheets:**
  - Good Fire Bad Fire worksheet/Living in the Wild–Interface–teacher directed.

## **GLOSSARY:** (vocabulary from the storybook)

**Abandoned** – left empty or unused

**Burrows** – hole or tunnel dug out by a small animal as a dwelling

**Dangerously** – causing danger

**Frantic** – great hurry or anxiety

**Impatiently** – showing a lack of patience; restlessly eager

**Lightning** – flash of bright light produced by an electrical charge between clouds or between clouds and the ground

**Lumbering** – moving in a slow, clumsy, noisy way

**Nervously** – with fear

**Occasionally** – now and then, not regular

**Perched** a high or precarious place for a person or thing to rest on

**Pounced** – make a sudden attack

**Relentlessly** – uncompromising

**Resounding thud** – unmistakable noise

**Singed** – burned lightly

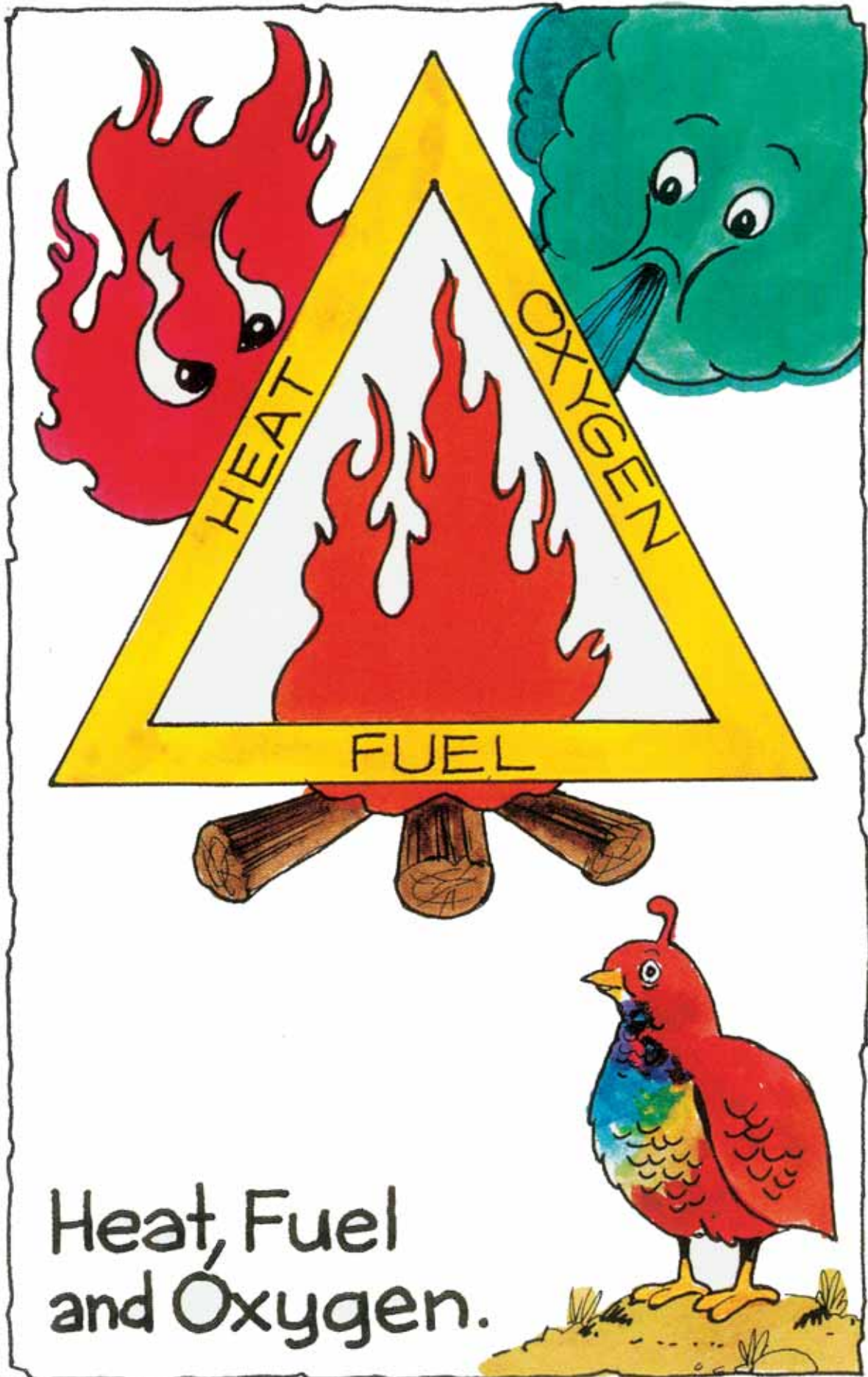
**Soot-covered** – covered in ash

**Ventured** – an undertaking of a risk



photo by: Kyle Sanguin

**Photo # 1**



Heat, Fuel  
and Oxygen.

**Photo # 2**

## **Quail Fact:**

Quail gather into coveys—groups may number over 100 birds—dispersing during the day for feeding and reassembling at night or in bad weather. The covey seeks warmth and protection by huddling in a circle with their heads turned outward. If frightened, quail prefer to run from danger; when flushed, they fly rapidly with a loud whirring sound.

## **Fire Tip:**

Before a fire can start, three components must be present: oxygen, fuel, and heat. Fuel is any living or dead material that will burn. Some fuels, such as dead plants, dry leaves, pine needles, and grass, are more likely to burn than moist, green plants because the dead material contains less moisture or water than living plants. Heat can be supplied by lightning striking a tree or grass. People also can provide heat by using a match, carelessly starting a fire, or leaving a fire unattended. Fires are dangerous. Fire safety must be carefully practiced to prevent undesirable fire.



**Photo # 3**

## **Causes of fires**

**Fires are caused by nature or by man. Approximately 50% of fires are started by nature, the other 50% are man made. Lightning is one of the biggest causes of wildfire.**

**Canada has a “Lightning Location System” that detects the electromagnetic radiation that is generated by a strike. This network can detect about 90% of all lightning strikes. The information can be used to develop a map which shows lightning hot spots and is used by forest personnel when out on air patrols to spot wildfires.**

**Photo # 4**



**Dalmation**

## All about Dalmations

Dalmations are associated with fire departments.

This began many years ago when these dogs used to chase rats out of the horse stables and fire stations of London.

Dalmations used to guide horse-pulled fire wagons through the city streets.

Some research states that these dogs could be trained to run with the horses and bark loudly keeping other dogs away.

Dalmations are born with pure white coats. The black or brown spots they have appear as they get older.



**Photo # 5**



photo by: The Daily Courier / Gary Nylander

## Photo # 6

Birds fly away , Large Animals  
run away .



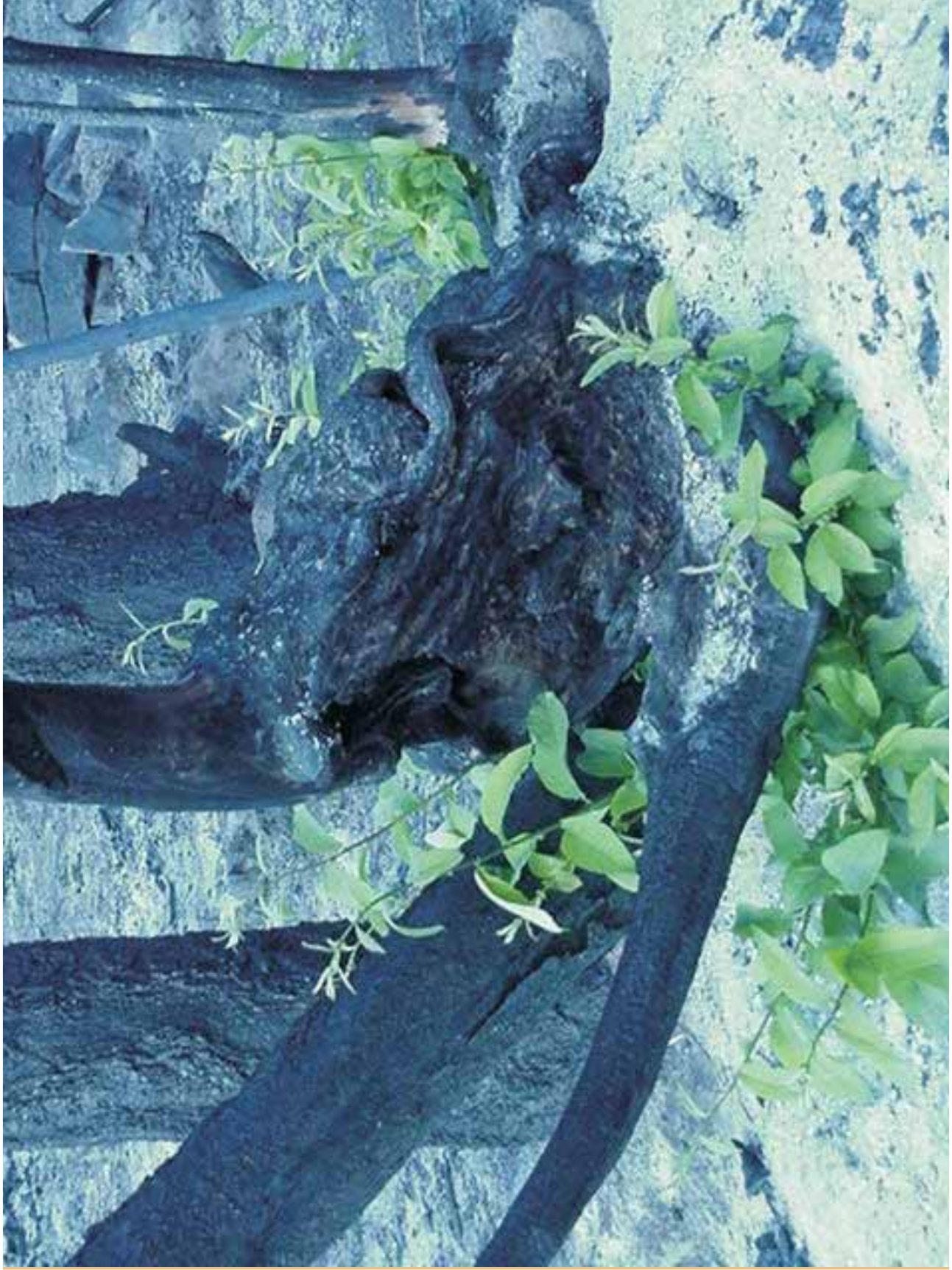
Small Animals hide in Holes or  
under rocks .

## **Bobcat Fact:**

Bobcat: common name for one type of wild carnivore. Bobcats are found throughout the temperate regions of the northern hemisphere. They are stout-bodied animals with thick, soft fur and short, stubby tails. Bobcats are agile climbers, sometimes waiting on limbs of trees for weaker mammals and birds to pass beneath them. It is also common for bobcats to stalk their prey. Bobcats find shelter in caves or in hollow trees or logs. Two to four kittens make up the average litter.

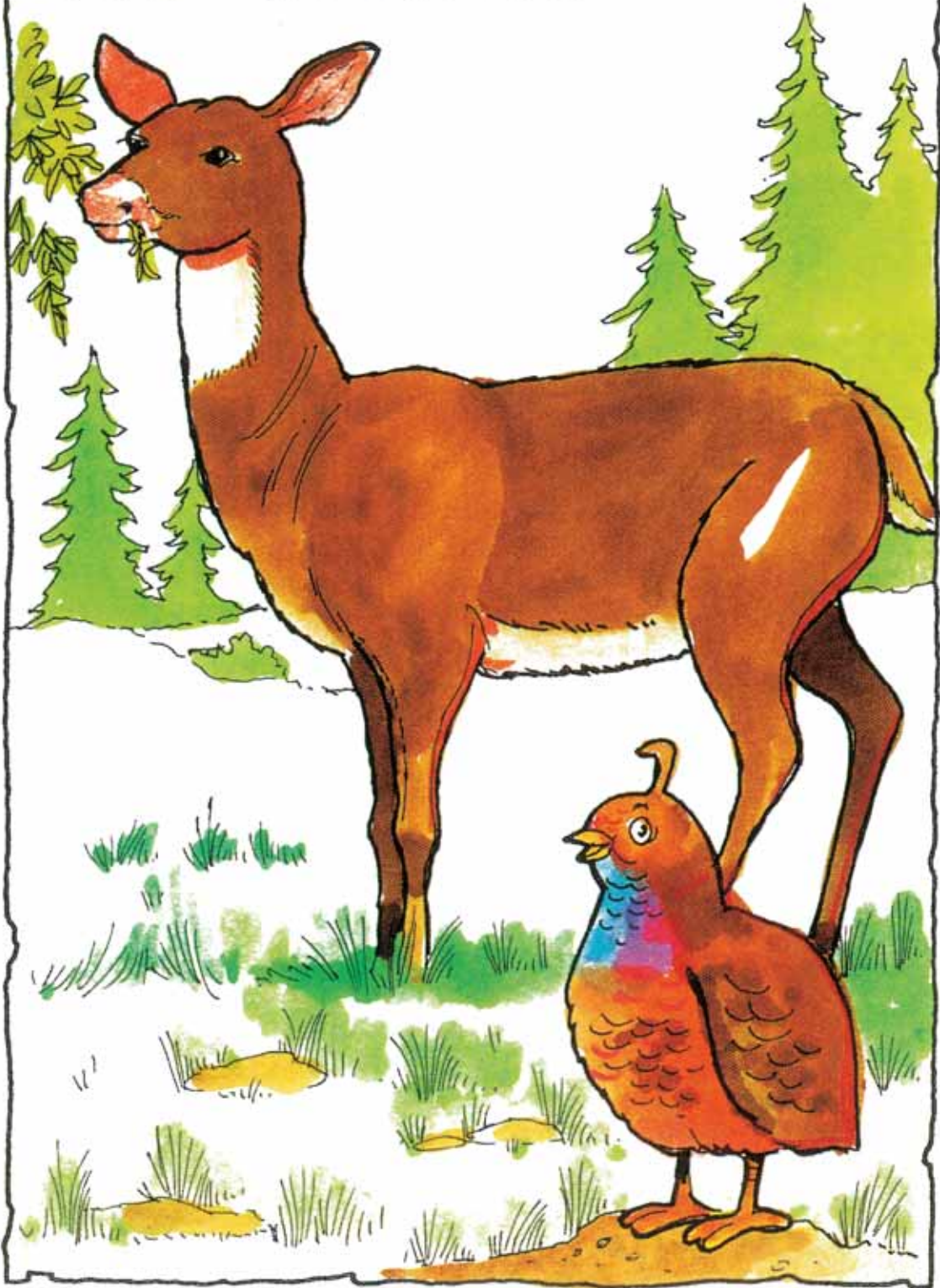
## **Fire Tip:**

Wildlife species have developed different methods or strategies to escape fires. Animals such as deer, elk, bear, and fox are accomplished runners and use this skill to escape the flames. Other animals not so adapted for running hide in underground burrows, in rock cliffs, or other refuges. Rats, mice, moles, shrews, snakes, lizards, and turtles burrow to escape fire.



**Photo # 8**

Stimulates  
New Growth.



**Photo # 9**

## **Quail Fact:**

In the western United States, the most familiar species is the California quail, a handsome bird with a black topknot. Its call can be heard in the soundtrack of many Hollywood movies. Gambel's quail inhabits the deserts of the southwestern United States and northwestern Mexico.

## **Fire Tip:**

Fires help provide plant-eating animals (herbivores), such as bison and deer, with enhanced grasses. The nutrients that are released after a fire provide the lush, green growth that is preferred by many grazing animals. The Kirtland's warbler favors young jack pines for nesting. Larger trees that are killed by fire provide cavities and branches for nesting birds, such as woodpeckers and birds of prey.

By Adapting  
Thick Tree  
Bark that  
Resists Heat.

—  
Pine Cones that  
Require Heat  
to Open and  
Release Seeds.



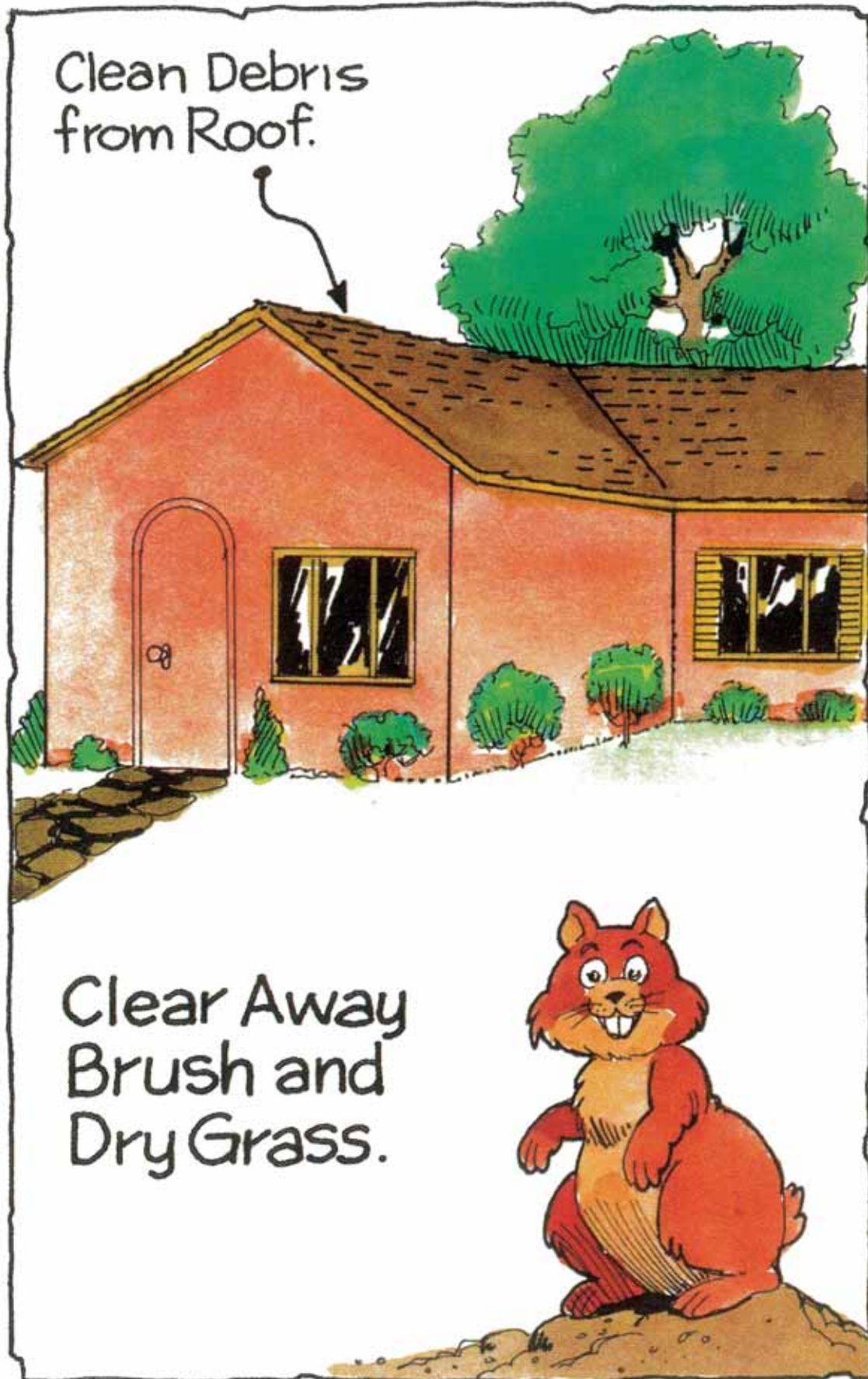
**Photo # 10**

## **Coyote Fact:**

The coyote is the most widespread relative of the wolf in North America. The native range of the coyote extends from Panama north to Alaska and includes all states except Hawaii. Coyotes can survive in a variety of habitats and have adapted to living in and near cities in many parts of the United States and Mexico. Essentially nocturnal, coyotes feed on small rodents, birds, insects, snakes, lizards, and even deer and sheep.

## **Fire Tip:**

Some habitats rely on wildfire for their existence. The tall grasses of the Midwest, the chaparral (brush) of California, and the jack pine are examples of habitat that can be considered “fire dependent.”



**Photo # 11**

## **Marmot Fact:**

Marmots form strong families. Unlike other squirrel species, the female cares for the young. Both marmot parents take responsibility for the pups. Other adult children may help, too, standing guard over play sessions. Marmots hibernate as a family with as many as 15 animals in one den. The entrance is sealed by the last one to enter.

## **Fire Tip:**

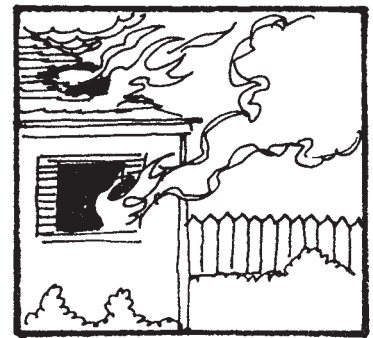
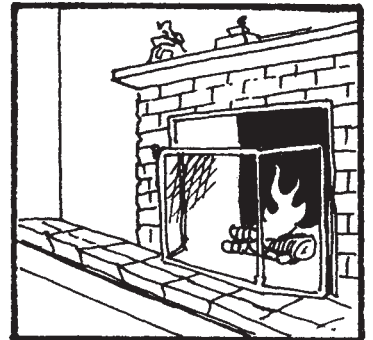
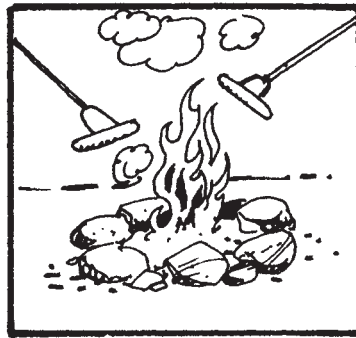
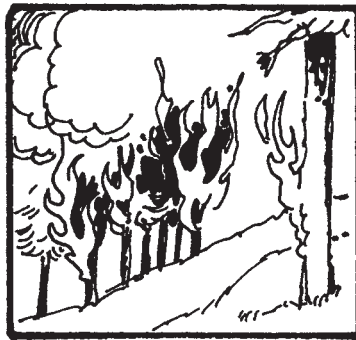
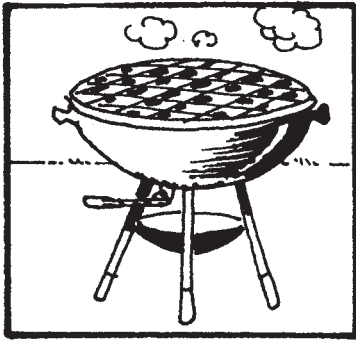
You can help protect your home from wildland fire by making sure your roof is free of all flammable materials such as leaves, broken branches, and pine needles. It is also important to remove all dead and dying vegetation from the landscaping around your home. Remember, it's up to you!



# "Good Fire, Bad Fire" Activity Sheet

Draw a line from the happy flame to good fires.

Draw a line from the angry flame to bad fires.



## **WEBSITES:**

Interactive sites:

- ◆ [www.survivealive.org/](http://www.survivealive.org/)
- ◆ [www.usfa.fema.gov/kids/sa.htm](http://www.usfa.fema.gov/kids/sa.htm)
- ◆ [www.onlinep2000.com/movie.html](http://www.onlinep2000.com/movie.html)
- ◆ [www.nfpa.org/sparky](http://www.nfpa.org/sparky)

Information on Okanagan fires 2003:

- ◆ [www.castanet.net](http://www.castanet.net)

Teacher lesson plans:

- ◆ <http://pictures.discovery.com/dppages/wildfire/teacher/lesson2.html>
- ◆ [www.canadianforestry.com](http://www.canadianforestry.com)

## **2003 BC Wildfire Statistics**

- More than 2500 wildfires destroyed approximately 265,000 hectares in B.C.
- The previous 5 year average was 21,000 hectares.
- The Ministry's corporate goal is not to exceed 150,000 hectares over a 5 year period.
- The cost to B.C. for fighting these fires was estimated at \$550 million dollars.

Okanagan Mountain Park Fire:

- The fire was ignited by a lightning bolt.
- The fire spread to 25,000+ hectares.
- The cost of the residential destruction alone was estimated at \$160,000,000.
- This fire was one of the most expensive fires for suppression costs and infrastructure damage.

McLure-Barriere Fire:

- The fire was ignited by a cigarette.
- The fire destroyed the Tolko sawmill, transmission power lines and most of the community of Louis Creek.
- The cost of the residential destruction alone was estimated at \$8,200,000.

Other provincial fires:

- Chilko Lake, McGillivray, Lamb Creek, Kutetl, Venables Valley, Ingersol, Strawberry Hill, Kuskanhook, Vaseux Lake, Plumbob Mountain, Cedar Hills, Tatla Lake, Bonaparte Lake, Anarchist Mountain.



## FIRE FACTS



- Fires have played a major role in the ecology of the Interior for a long time.
- Fires in the forests of B.C. have been a major influence since the glaciers receded which was about 7,000 years ago.
- Many of the mature forest stands around us in the Okanagan, resulted from large stand replacing fires that occurred in the late 1880's.
- The word “fire” has its roots in the Greek word “pyra” which means glowing embers (pyromaniac, pyrotechnics, pyroclastic flows).
- There is evidence that the First Nations who lived in the interior of B.C. used fire to alter the forest in their traditional territories for hunting and berry picking purposes.
- B.C. is a world leader in fire fighting technology and techniques.**
- Fires come in different sizes and intensities, from cool slow ground fires to hot, fast and explosive crown fires. These fires can move at speeds up to 100 metres per minute. They can travel from 7 kilometers an hour and in open grassy areas can reach speeds up to 17 kilometers per hour.
- The behaviour and severity of the fires is linked to the type of fuels the fire is burning, the topography of the area and the weather.
- Once a forest fire begins to burn, you can tell a lot by the color of the smoke:
  - The darker the smoke, the hotter the fire. Smoke that is billowing or boiling means a hot active unpredictable fire.
  - White/blue smoke that is floating in the air means a cooler less active fire.
- Fires can burn both uphill (heat of the day, upslope winds) and downhill (evening downdrafts, downslope winds from cold fronts).
- Fires are like living things - they want to expand and grow.
- Sparks or firebrands can ignite spot fires up to 3km. away.

## FIRE FACTS continued...

- ❑ Large fires can create their own wind and weather patterns that can include mini-tornadoes within the fire.
- ❑ Fires can burn in the roots and stumps for many months and in some cases for many years.
- ❑ Fires can open cones and allow seeds to germinate.
- ❑ Fires renew the forest and landscape
  - help to recycle nutrients back into the soil
  - diversify vegetation and animal habitat
  - balance insect populations and forest age distribution
- ❑ Without fire, our forests become overstocked and susceptible to insects and disease and the quality of habitat is reduced for many animal species.
- ❑ Two types of fires:
  - Stand maintaining - occur frequently (3-15 years) and they are usually cooler ground fires
  - Stand replacing - tend to occur more infrequently (once every 100 years) and consume large areas of forest this starts a new forest cycle
- ❑ The cooler, stand maintaining fires are fires that burn mostly along the ground, consuming grasses, shrubs, small trees and some of the duff layer. They rarely burn hot enough to kill the larger and older trees.
- ❑ The hotter stand replacing fires are fires that burn along the ground and in the canopies of the trees consuming grasses, shrubs, small and large trees and a large amount of the duff layer. These fires usually destroy all the vegetation and trees providing the opportunity for a new stand to begin to establish itself. On occasion, these fires will burn up all of the forest floor duff, exposing mineral soil and rock. This intensity of fire may take many years or decades to recover from.