

# EXPLORATION: **FUELS MITIGATION -** Grades 6-8 **Preparing for and Preventing Wildfires**



## ENDURING UNDERSTANDING:

*People in a community can work together to reduce fire risk and support thriving ecosystems.*

### Part 1 (30 minutes)

#### STUDENT DIRECTIONS

You will read a brief explanation about the ecological role of fires in Alaska and how our approach to fighting fires has changed over the years. Take notes on how fires start, how they are controlled and things managers and firefighters do to keep people and property safe. Afterwards you will answer 4 questions and then write an essay to reflect on how climate change may affect wildfires.

*Historically, wildfires were thought to be an intense destructive force that had to be prevented at all costs. We now know that wildfire has an important role in ecosystems. However, more and more humans are living and recreating within or at the edge of fire-prone wildlands. Fire managers now have the challenging task of keeping people safe while at the same time maintaining natural environments.*

## NGSS STANDARDS:

5-ESS3-1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment
5-LS2-1	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment
MS-LS2-1	Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
MS-LS2-3	Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem
MS-LS2-4.	Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
HS-LS4-5.	Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.
HS-LS2-6	Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.
MS-LS2-5	Evaluate competing design solutions for maintaining biodiversity and ecosystem services.
MS-ESS3-3	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

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## **ALL FIRES IN THE U.S. USED TO BE PUT OUT**

In the early 1900s, fire suppression was a major land management goal. Convinced that all wildfires resulted in total devastation, and that any standing timber needed to be protected, the U.S Forest Service determined that all fires needed to be put out right away. Smokey Bear came on the scene in 1944 to remind all citizens to prevent fires. The deep-voiced bear quickly became an iconic symbol of fire prevention that still exists today!



## **LIGHTENING, NOT HUMANS, STARTS MOST OF THE BIG FIRES**

Early land managers also thought that all wildfires were caused by humans. Settlers to Alaska in the late 1800s and early 1900s noticed that wildfires were common, but did not realize the importance of lightning. They blamed Native Alaskans and trappers for starting the fires, as well as the railroad and airplanes. Not until the 1950s did land managers acknowledge that lightning was the cause for most of the acreage burned in Alaska.

## **SMOKEY DIDN'T HAVE ALL THE FACTS**

Smokey preached fire prevention, but he failed to notice that over time, fire suppression was taking its toll on forests. Without frequent fires to thin out trees and clean up forest litter (cones, needles, branches and other plants on the forest floor), the forests were changing. Forests that had not burned for decades had less light and nutrients available for plants. There were also fewer young trees. Any new trees were growing so close to each other that they were scrawny and skinny. Older trees were growing very slowly and poor growing conditions meant they were more likely to be attacked by insects. The buildup of fuels (all the natural things in the forest or tundra that burn) also meant that gigantic fires were inevitable.

## **WILDFIRE CREATES MOOSE HABITAT**

In the 1950s, some biologists noticed that a large wildfire on Alaska's Kenai Peninsula may have actually created more moose habitat instead of destroying it. Before this 1947 Kenai fire, biologists argued fire would destroy moose habitat and kill moose. However, when they studied the fire afterwards, they noticed that where the fire had killed many spruces trees, shrubs that moose eat like willow and aspen were growing back vigorously. We know now that when spruce trees die, the forest begins anew, with plants like fireweed and grasses showing up sometimes within weeks; and young willows growing shortly thereafter. Moose happen to love these young shrubs and so a recently burned area is great moose habitat! (Take a look at the Kenai Wildlife Refuge's [Refuge Notebook](#) to learn how the burned area from the Funny River Fire had great moose habitat after only one year! )



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## **OTHER ANIMALS BENEFIT FROM A WILDFIRE**

Wildfire does not burn the whole landscape evenly; it creates a mosaic pattern of different types and ages of trees and plants. This mosaic provides a mix of habitats for a diversity of wildlife. For example, young song birds like Wilson's warblers prefer shrub thickets, while red squirrels prefer to feast on the cones of mature spruce trees. Snowshoe hares love young willows, and three-toed woodpeckers dine on the long-horned beetles that eat freshly burned spruce trees. The mixture of habitats created by wildfire means the forest or tundra can support a diversity of animals and insects.



## **MANAGE, NOT SUPPRESS FIRES**

In the 1970s, land managers realized that they needed to let some forests burn. They created management plans, which designated which lands would be put out, and which lands would burn. But what about those forests that would benefit from fire but are close to towns and cities? Managers now use a combination of prescribed fire, forest thinning, and creation of fuel breaks in places where they cannot let fires burn.



## **PRESCRIBED FIRES REDUCE FUEL LOADS AND RESTORE ECOSYSTEMS**

Prescribed fires or controlled burns are fires that are intentionally set by fire managers. Fire scientists carefully measure the fuel and weather conditions before burning, and take many precautions to make sure that the fire cannot spread beyond where they want it to go. A primary goal of prescribed fire is to remove some of the live and dead vegetation that can burn, thereby reducing the risk of a large uncontrollable wildfire. Prescribed fire also can "restore"

a forest to the condition it was in before people moved close by and suppressed all of the fires. Prescribed burns may create wildlife habitat and/or enhance growing conditions for plants.

## **THE RIGHT CONDITIONS FOR PRESCRIBED FIRE IN ALASKA ARE HARD TO FIND**

A multitude of factors such as weather, how dry plants are, what types and how close together trees are growing, and availability of fire crews have to all fit into place to make a prescribed fire happen. Conditions need to allow a potential fire to burn hot and long enough to make a difference – a fire that just peters out won't have the desired effect. At the same time, the possibility of the fire burning out of control must be avoided at all costs. More often than not in Alaska, all the variables just don't line up and the windows of opportunity are missed.

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## PHYSICALLY REMOVING TREES WORKS TOO!

Where burning is not possible, thinning and removing trees can reduce fuel loads. Foresters recommend that homeowners remove trees around their homes and thin out and prune trees within 100 feet. This kind of “firewising” makes homes more defensible, but creating fire breaks and reducing wildfire risk requires a lot more work. Land managers may cooperate with a variety of landowners to put in large-scale fuel breaks to help defend entire communities from wildfire.



## FUEL BREAKS DON'T ALWAYS REMOVE ALL OF THE TREES

Alaska fire managers use two types of fuel breaks. A shaded fuel break is where the underbrush has been cleared out, the lower limbs of trees have been removed, and some, but not all trees have been thinned. A masticated fuel break is where every single tree has been removed and the branches have been chipped (or “masticated”). On the Kenai Peninsula, the US Fish and Wildlife Service used both types prior to the 2014 Funny River Fire. They put in a six-mile long shaded fuel break AND a three and a half mile-long masticated fuel break 200 feet wide. Fire managers now think that the fuel breaks saved hundreds of homes and millions of dollars in fire suppression efforts during the 2014 Funny River Fire. ([Kenai Wildlife Refuge Notebook Series](#))



*The Funny River Fire around May 22, 2014. By the time it burned out in early June, the burn area encompassed about 200,000 acres, creating a mosaic of burned, lightly burned and unburned land. Photo courtesy Alaska Division of Forestry.*



*An aerial photo of the burn area in the central Kenai in the summer of 2014 showing the mix of burned and unburned land. Photo by Sue Rodman.*

*We've come a long way from the early days of Smokey Bear, when we thought all fires were bad and that every tree in the forest needed to be protected. Fire's ecological role is now widely understood. We also know that frequent small fires can reduce the chances of a large uncontrollable wildfire. However, fire is still potentially devastating near homes and as a result most people are afraid of wildfire. People in a community can work together to reduce fire risk and support thriving ecosystems.*

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Use the remaining time to answer the questions below. Your answers to these questions will be scored. Also, they will help you think about the information you read and reviewed, which will also help you write your essay. Answer the questions in the spaces provided below them.

**QUESTIONS:**

1. List four benefits of wildfire

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2. Why do fire managers use prescribed fires?

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4. What else do fire managers do besides prescribed fire to reduce fuel loads? Give an example of where this has been effective.

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## Part 2 (30 minutes)

### STUDENT DIRECTIONS

You will now have 30 minutes to review your notes and sources, plan, draft and revise your essay, which will be based on the essay topic below. You may use your notes and refer to your sources, but please work on your own! You may also refer to the answers you wrote to earlier questions, but you cannot change those answers. Now read your assignment and the information about how your essay will be scored, and then begin your work!

### ESSAY TOPIC:

*Prior to the 2014 Funny River Fire on the Kenai Peninsula, the U.S. Fish and Wildlife Service constructed two fuel breaks – a shaded fuel break and a masticated fuel break. In what ways, do you think each type of fuel break may have mimicked wildfire? How effective do you think each way is? Be sure to include examples for each type of fuel break.*

*Your essay should be about 5-8 paragraphs.*

## Part 3 (15 minutes)

### SCORING YOUR ESSAY

Your essay will be evaluated based on:

1. **Organization:** How well you included an introduction, reasons that are supported with details, and a clear conclusion.
2. **Use of examples to support your opinion:** How well you used various examples and scientific information to explain your opinion and new concepts.
3. **Scientific accuracy:** How accurate the facts were that you presented.
4. **Language and vocabulary:** how well you used precise language and vocabulary to explain your opinion.

How well did you think you did? Score yourself by giving yourself 1-5 (5 is highest and 1 is lowest) for each of the above evaluations.

1. Organization	_____
2. Examples	_____
3. Accuracy	_____
4. Language and Vocab.	_____
TOTAL	_____

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**Follow-up activity:**

**Comparing forested or tundra areas with open or cleared areas.**

1. Find a patch of forest or tundra near your home or school. You will compare the plants and animals in it to a space cleared by people around your home or school.
2. For each, list at least four types of plants that you see. Look for evidence of wildlife such as scat, tracks browse (chewed plants), middens (places animals piled or stashed food), bite marks or chews or dens or lays (places where the animal spent the night). Use the table below to gather your data.
3. Write a paragraph that summarizes your comparisons between the two. What did you find in each?
4. Which area did you like better? The natural forest or tundra patch or the space cleared by people? Write a sentence or two that clearly explains why.

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	Forest or Tundra (circle which)	Cleared or open space (circle which)
<b>Name, Describe, or Draw</b>		
Plant 1		
Plant 2		
Plant 3		
Plant 4		
<b>Tracks, Scat, Midden, Lays, Chews, Dens, etc.</b>		
Wildlife Evidence 1		
Wildlife Evidence 2		
Wildlife Evidence 3		
Wildlife Evidence 4		
<b>Name, Describe or Draw</b>		
Insect 1		
Insect 2		
Insect 3		
Insect 4		

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**Part 4**

**OTHER RESOURCES**

video link: <https://www.frames.gov/catalog/17677> Funny River fuel break

[Kenai Moose and the Funny River Fire](#), by Riley Woodforth, Alaska Department of Fish & Game.

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