

APPENDIX

Role of Fire

Appendix Content

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GLOSSARY

active layer the layer of ground above the permafrost that freezes and thaws each year.

The Alaska Wildland Fire Coordinating Group was formed in 1998 to continue developing specific fire management plans for lands in Alaska. This Coordinating Group consists of representatives from federal and state agencies, Native organizations, and local governments.

animals all organisms in the Animal Kingdom, including birds, mammals, amphibians, fish, and invertebrates.

annual production the total amount of biomass produced through photosynthesis in one year by the producers of a given area.

boreal forest the largest and northernmost forest ecosystem in the world. In Alaska the boreal forest occurs predominantly in the interior and is characterized by spruce, aspen and birch tree species.

canopy fire a fire in the upper forest canopy.

canopy fuels all green and dead materials located in the upper forest canopy including tree branches and crowns, dead standing trees (snags), moss, and high brush.

carnivores meat eating consumers.

climax aging forest when the hardwood trees become mature and eventually die, being replaced by spruce, leaving the forest with a wide variety of tree species, sizes, and ages (also referred to as an old growth or decadent.) The final stage in forest succession.

combustion the oxidation, or burning, of any material. Combustion breaks down organic materials into raw minerals and energy (which is released in the form of heat).

conifers plants which bear cones and have needle-like or scale-like leaves.

consumer an organism that obtains energy and minerals by eating (consuming) other living things; includes herbivores, carnivores, omnivores, and detritivores.

critical management option an Alaska management option assigned to lands where human lives and property require that immediate, top priority fire protection be provided. Fires on these lands will be given unquestioned priority in

the allocation of fire-fighting funds, manpower, and equipment. Fires will be immediately and aggressively suppressed.

crown the upper leaves and branches of a tree.

crown fire same as a canopy fire. A fire in the upper forest canopy.

decadent declining or decaying. A decadent forest is over mature and in the climax stage of succession.

deciduous woody plants that seasonally lose their leaves.

decomposers organisms that help dead plants and animals decay.

decomposition the process of decay, or breakdown, of organic materials such as dead plants or animals and waste materials.

defensible space an area you create around your home or cabin that is free from burnable materials.

detritivore an organism that eats dead organic material; used as a synonym for decomposer or scavenger.

dichotomous key one that continually divides the characteristics of the objects to be identified into two branches or parts until all the objects are identified.

diversity a variety of plants and animals living within an ecosystem.

duff organic layer of the soil consisting of dead and decaying leaves, branches, wood, and other plant parts.

ecology the study of plants and animals in relation to their environment.

ecosystem all living and nonliving things in an area of any size, with all parts linked together by energy and nutrient flow.

edge the area where different successional stages of plant growth or plant communities overlap.

EPT insects are especially sensitive to changes in their environment, thus good indicators of water quality. EPT stands for the scientific orders Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddis flies).

fire the state or process of combustion, or oxidation, in which ignited material combines with oxygen and gives off light, heat, and flame. A source of ignition (heat), oxygen, and fuel is required for a fire to burn.

fire frequency the time period in which a fire is most likely to occur; Alaska's fire frequency is as often as every 50-100 years.

fire impact the overall effect of fire on an ecosystem. In Alaska, fire impact is determined by the amount of organic soil material removed by a fire.

fire intensity term used to describe the amount of heat fire produces.

low intensity slow burning, cool fire; not all fuels consumed.

moderate intensity faster burning, hotter fire; most small fuels consumed.

high intensity burns very fast and hot; larger fuels consumed; these fires are harder to contain and often travel great distances.

fire interval the length of time that passes between natural fires in a given area.

fire line a line constructed for fire control by removing all vegetation and scraping away the organic layer down to mineral soil.

fire management the art and science of using fire as a tool to increase beneficial products and services from natural environments.

fire season the time of year when fires are most prevalent. In Alaska this is usually from June to September.

fire suppression the art and science of putting out fires.

fire triangle the term used for the three components needed to start a fire: fuel, oxygen, and heat.

flagging limp or drooping branches. Usually caused by heavy snowfall, wind, or avalanche.

food chain the pathway of energy and nutrients from the nonliving parts of the ecosystem, through the living parts, and back to the nonliving environment.

food web many interconnecting food chains.

fuel any combustible (burnable) material that will support a forest or tundra fire; dead and down wood material in a forest.

fuel ladder a series of dead and live branches which forms a path for fire to spread into the tops of trees.

full management option an Alaska management option which includes lands with high cultural or historical values or other resource values that landowners or managers determine to need fire protection. These lands are generally

uninhabited. On lands classified for full protection, all fires will be aggressively fought throughout the fire season.

fungi organisms in the Kingdom Fungi, including mushrooms, molds, rusts, mildews, and rots. Lichens are also included in this kingdom, although they are formed by the symbiotic association of fungi and algae or certain bacteria.

ground fire a fire that not only consumes all the organic material--duff---on the forest floor, but also burns into the underlying soil. This type of fire occurs when the soil is very dry and the soil temperature becomes high enough to cause the duff to burn. This should not be confused with a surface fire.

ground fuels all combustible materials lying at or below the ground surface, including deep duff, roots, rotten buried logs, and other woody fuels.

habitat the place where an animal lives that provides food, water, cover, and space in the proper arrangement; the natural home of a plant or animal.

heat usually required to start reaction between fuel and oxygen, creating fire.

heavy burn most or all of the organic material in the soil is burned. All plants have been burned.

hedging the process of creating short bushy shrubs or trees by repeated removal of the terminal (end) buds of the plant.

herb stage the stage of succession that contains seed plants whose stems wither away to the ground each winter.

herbivore a consumer that obtains energy and minerals by eating producers such as plants.

hydrocarbons air pollutants containing hydrogen and carbon that are released during wildland fire.

lateral bud the buds found on the side of the branch.

Lichens a fungi/algal organism that photosynthesizes; favorite food of caribou.

light burn a burn where the organic layer of soil remains mainly intact.

litter the top layer of the forest floor consisting of loose organic debris and freshly fallen plant material.

limited management option a Alaska management option category that recognizes those areas where a near-natural fire regime is desirable, or where

the resource values at risk are worth less than it would cost to launch a fire fighting effort. On these lands, fires are only monitored unless they threaten lands in other higher-valued categories or critical sites within the area. Suppression action then will be taken if the responsible land management agency deems it necessary.

limiting factors those things that may influence the success of an animal, its population, or its species. These include air, water, space, food and their quality as well as predation (by humans and animals) or disease.

long term effects those things having a long lasting effect.

management policy the policy made by management that determines the course of action or non-action taken with regard to wildlife and habitat.

mature forest stage a forest where many of the trees have grown from saplings into mature trees.

microscopic organisms members of the Protist and Monera Kingdoms. Includes bacteria, algae, and protozoans.

mineral a naturally occurring element or compound.

moderate burn burns some of the organic material in the soil. Logs may be deeply charred.

modified management option the Alaska management option that serves as a buffer area between Full and Limited management option areas. It includes lands where fire protection is needed during critical burning periods (unusually dry months), but where fires are otherwise desirable. On these sites, immediate fire-fighting action is taken if conditions indicate that a large fire could occur (generally during the first and drier part of each fire season). If the fire cannot be contained the first day, an escaped fire situation analysis (EFSA) will be made to determine levels of continued action. When the danger is deemed low due to wetter conditions, no initial attack is made on new fire starts, and these lands are treated much like those in Limited management option areas.

mosaic a patchwork of vegetation in which two or more types of plant communities are interspersed in an irregular pattern (see vegetation mosaic).

natural resource manager an individual whose job is to make decisions about uses and treatment of natural resources to ensure that the benefits of these are maintained for present and future generations of people.

nonliving components air, water, soil, energy; the physical surroundings of an ecosystem; the nonliving components of an ecosystem form the base of all food chains in that ecosystem.

nonrenewable resources nonliving resources such as rocks and minerals; resources which do not regenerate themselves; substances such as petroleum, coal, copper, and gold which, once used, cannot be replaced.

nutrient a naturally occurring element or compound (mineral) needed by living organisms. Some important nutrients are nitrogen, phosphorus, potassium, and calcium.

omnivore a consumer that obtains energy and minerals by eating a variety of things, including producers, other consumers, and dead organisms.

organic material material originating from any living organism (i.e., the remains of plants, animals, fungi, or other organisms).

oxidation the combustion, or burning of any material. Oxidation breaks down organic material into raw minerals and energy (which is released in the form of heat).

oxygen one of the three components which is needed to create a fire.

perennial living from year-to-year.

permafrost a layer of soil which remains frozen from year-to-year; permafrost exists in many northern soils and may be a few inches to 1000 feet thick; continuous permafrost occurs everywhere in a given area, and discontinuous permafrost occurs in some places but not in others in a given area.

photosynthesis the process by which chlorophyll-containing cells in plants convert sunlight energy into chemical energy and make organic energy from inorganic compounds (make carbohydrates from water and carbon dioxide); this process is accompanied by the release of oxygen.

pingo a conical-shaped mound of earth or gravel generally found in arctic regions, as much as 65 m high and 1000 m in diameter, presumably formed from frost action.

plants organisms in the Plant Kingdom, including trees, shrubs, herbs, mosses, liverworts, ferns, and horsetails. Most are producers.

polygon a hexagonal or block arrangement of surface soil forming part of a uniform pattern and often caused by alternate freezing and thawing of the earth's crust.

prescribed fire (burn) a carefully monitored fire occurring in a pre-selected area; a prescribed fire may be ignited by fire managers or by lightning.

producers organisms that can use energy and minerals from the nonliving environment to make food. Most plants and some microscopic organisms are producers. They "produce" food through photosynthesis.

pyrogenic tundra a tundra area where lush plant growth caused by fire decreases the depth of the active layer due to increased vegetative insulation; this prevents the re-establishment of trees that survived on the site before the fire.

reforestation reseeding or planting trees in an area after a burn.

renewable resources living resources, such as plants or animals, which have the capacity to renew themselves when conditions for survival are favorable.

resources a portion of the environment upon which people have placed or assigned value, or see as being available for use.

rhizome a root-like stem growing under or along the ground that sends out roots from its lower surface and leaves or shoots from its upper surface.

sack fry small fish with eggsack attached.

semi-serotinous see serotinous.

semi-serotinous cone a cone that remains on a tree and closed long beyond its maturation time. Heat (from sun or fire) will dry the resin sealing the cone shut and cause the cone to open. "Semi-serotinous" refers to the lengthy closure rather than to the method of opening.

serotinous late developing or late ripening of fruits (such as cones of black spruce trees).

short term effects an effect that does not last long.

shrubs usually low woody plants with several permanent stems instead of a single trunk.

shrub stage the successional stage where the vegetation has moved from ground cover to shrub or bush sized vegetation.

snags dead, standing trees.

succession the natural, orderly change in plant and animal communities that occurs over time when a new environment is created or an existing environment is changed.

successional stage see succession

surface fire a fire that burns fuels on the ground as well as small shrubs and trees.

surface fuels all materials lying on or immediately above the ground including needles or leaves, duff, grass, small dead wood, downed logs, stumps, large limbs, and low brush.

terminal bud the bud on a tree found at the tip.

topography the physical features of a region or place.

transect a straight line or profile that creates a cross-section of an area to study plants.

transpiration the process by which plants give off water through the surface of leaves or other parts.

tundra a cold climate landscape having a vegetation characterized by the absence of trees. Predominantly occurs beyond the temperature limits of tree growth, north and west of treeline in Alaska, and at elevations above treeline on the mountains; occurs in patches throughout interior Alaska.

tussocks plant form that is tufted with many stems rising from a central small mound. The base of tussocks often have accumulated dead leaves and roots.

vegetation mosaic a patchwork pattern of different vegetation types in various stages of succession in the boreal forest and tundra; fire helps maintain the vegetation mosaic.

watershed all the area that drains into a stream.

wildland fire a fire occurring on remote and generally uninhabited land. Usually lightning caused.

young forest stage a forest where the shrubs have been replaced with young trees.

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2000. Protecting your home or cabin from wildland fires. US Government Printing Office: 2000 – 573-278/21013 Region No. 8.

Fire in Alaska. Fire Information and Resource Education. US Fish and Wildlife Service

OTHER RELEVANT CURRICULUM

There are several other curriculums that could help you and your students more fully understand and appreciate the relationships found in different Alaskan Ecosystems. We have included examples from the *Alaska Ecology Cards* in several activities, *Alaska Wildlife Curriculum Series* on pages 26-30, and the *Alaska Wildlife Notebook Series* on pages 30-32. To obtain these and other curriculums, contact the following sources listed below and on the order forms provided with *The Role of Fire in Alaska*.

Alaska Specific Materials

Alaska Ecology Cards

These can be purchased for a minimal fee from Wizard Works, PO Box 1125, Homer, AK 99603, (907) 225-8757 or www.xyz.net/~wizard/.

Alaska Wildlife Curriculum Series

These can be purchased for a minimal fee from Wizard Works, PO Box 1125, Homer, AK 99603, (907) 225-8757 or www.xyz.net/~wizard/.

Alaska Wildlife Notebook Series

Available through the Alaska Department of Fish and Game. Contact the Project WILD Coordinator at Project Wild Coordinator, Alaska Dept. of Fish and Game, Division of Wildlife Conservation, 333 Raspberry Rd., Anchorage, Ak.99518
Phone (907) 267-2168

Fire Wise Community Action Program for Alaska

This Program was developed by fire professionals to improve the chances that the students, their families, and home will survive a wildfire. The video and educational materials in this program are well suited for use by teachers.

To obtain this unit contact your local land manager or:

Project Manager

Phone (907) 373- 8800

www.firewise.org

Books

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Magnuson Beil, Karen, 1999. Fire in their eyes: wildfires and the people who fight them, Harcourt Trade. ISBN 0152010424.

Sipiera, Paul and Diane Sipiera, 1999. Wildfires, Children's Press. ISBN 0516264451.

Simon, Seymour, 2000. Wildfires, Morrow/Avon. ISBN 0688175309.

Web Pages Ecology and Management

National Wildland Fire Coordinating Group

www.nwccg.gov

This site has the fire information you may need, or a website that can answer your questions.

Earth Alert

<http://www.discovery.com/news/earthalert/earthalert.html>

Prepared by the Discovery Channel. Includes a wildfire report with maps, photos.

Earth Observatory

<http://earthobservatory.nasa.gov/Library/GlobalFire/>.

Sponsored by National Aeronautic and Space Administration, this site explains and illustrates current global fire activity and trends.

Fire Ecology

<http://fire.nifc.nps.gov/fire/default.htm>

Department of Interior Fire Ecology educational awareness package. Training and education. Fire education resource material concerned with fire ecology. Located under Fire Management.

Fire Ecology and Management

<http://atlas.ksc.nasa.gov/fire/fire.html>

Describes the Kennedy Space Center fire management area, including photos, maps, and information on vegetation and the use of prescribed burning as a tool. Site sponsored by the National Aeronautic and Space Administration.

Fire Effects Information System

<http://www.fs.fed.us/database/feis>

Research conducted about fire effects on plants and animals. Site maintained by USDA-Forest Service.

Fire, Weeds & Riparian Areas

http://www.blm.gov/education/fire_and_weeds.html

Teaches fire ecology and the role of fire in ecosystems. Site maintained by the Bureau of Land Management.

Satellite Maps of Fire

<http://sd-www.jhuapl.edu/fermi/avhrr/gallery/fire/fire.html>

Johns Hopkins University site which includes interpretation of satellite-gathered information and on-line movies.

Simulating Fire Patterns in Heterogeneous Landscapes

<http://research.esd.ornl.gov/EMBYR/embyr.html>

Computer fire simulator developed after the Yellowstone Fires of 1988.

Systems for Environmental Management

<http://www.montana.com/sem/>

Contains Farsite Fire Area Simulator and FireLib, a wildfire behavior function library.

Two Sides of Fire

<http://www.forestinfo.org/index.html>

Temperate Forest Foundation. "Two Sides of Fire" explains alternative viewpoints concerning the wildland fire issue.

Satellite Observations of Forest Fires

http://fermi.jhuapl.edu/avhrr/gallery/fire/best_of.html

Web Pages Defensible Space and Prescribed Burns

Creating Fire Safe Zones -

<http://www.colostate.edu/Depts/CoopExt/PUBS/NATRES/06302.html>

Create areas of defensible space around forested home sites to improve chances of surviving a wildfire.

How to Conduct a Prescribed Burn, by Mike Porter

<http://www.noble.org/ag/Wildlife/prescribedburn/>

Web Pages Curriculum

Bureau of Land Management Environmental Education -

<http://www.blm.gov/education/index.html>

Agency site devoted to educational and ecological topics.

Education World

<http://www.education-world.com>

Education search engine for information and lesson plans.

Fire Ecology

<http://fire.nifc.nps.gov/fire/default.htm>

Department of the Interior Fire Ecology educational awareness package. Training and education. Fire education resource material concerned with fire ecology. Located under Fire Management.

Fire Field Trip - Teacher's Guide

<http://fire.nifc.nps.gov/fire/ecology/docs/trippbn.htm>

In preparation of the fire plan, fire managers study the site to minimize the risk of fire escaping. Prepared by the National Park Service.

Fire in My Backyard - Teacher's Guide Background

<http://fire.nifc.nps.gov/fire/ecology/docs/bkyrdint.htm>

Background for a 15-20 minute discussion of the wildland/urban interface with students who are familiar with fire ecology concepts. Prepared by the National Park Service.

Interagency Fire Education Initiative

<http://fire.nifc.nps.gov/fire/ecology/docs/construct.html>

Resource Management Education Unit, Wildland Fire Ecology Education. Under construction.

Line of Fire: You're on the Hot Seat

<http://www.discovery.com/area/science/wildfires/gamestart.html>

Educational game using fire simulation software. Discovery Channel.

Living with Fire

<http://www.fs.fed.us/rm/>

An interactive game for students, teachers and fire professionals. Developed by the Rocky Mountain Research Station, USDA-Forest Service.

Pikes Peak Wildfire Prevention Partners

<http://www.ppwpp.org/>

Provides information on FireBox curriculum. Dedicated to educating Front Range homeowners about wildfire and defensible space.

Smokey Bear

<http://www.smokeybear.com/>

Appeals to ages 6-10. Offers games and puzzles about campfire safety and forest fire prevention.

Smokey's Animal Friends: An Adventures in Education program in the Natural Science. Teacher's Guide

http://www.r5.fs.fed.us/fire/prevention_programs/chp2/main.html

Teacher's Guide sponsored by the USDA-Forest Service and Knott's Berry Farm for grades one through six.

Sparky's Home Page

<http://www.sparky.org>

Includes Sparky's story, a fire truck section. Site sponsored by National Fire Protection Association.

The Fire House

<http://www.preventor.com/>

On-line store for purchasing wildland fire education materials.

Washington Department of Natural Resources Recreation and Education -

<http://www.wa.gov/dnr/htdocs/rp/prevention/k3.htm>

State of Washington Department of Natural Resources fire prevention curriculum prepared for grades K-3.

Wildland Fire Prevention and Education Materials

<http://www.nifc.gov/preved/edmtls.html>

Federal wildland fire prevention and education materials available by mail order.

Wildfire: Feel the Heat Curriculum -

<http://pictures.discovery.com/dppages/wildfire/teacher/teacher.html>

Discovery Channel. Prepared in conjunction with the release of the IMAX film, "Wildfire: Feel the Heat." Designed to familiarize students with the properties of fire.

Woods on Fire

http://whyfiles.news.wisc.edu/018forest_fire/index.html

Fire web site for children created by National Institute for Science Education and the National Science Foundation.

FEMA Parent / Teacher Lounge

<http://www.usfa.fema.gov/kids/l.htm>

Includes Lesson Plans, discussion points, resources, and is geared for Pre-K through grade 3. The quiz is one of the stops on the Wildfires Field Trip.

FIRE ECOLOGY: Unit Lessons (Teacher's Guide)

<http://fire.nifc.nps.gov/fire/ecology/docs/toc.html>

Fire Prevention Goals K_12+

http://www.wa.gov/dnr/htdocs/rp/prevention/k3_11.htm

Teacher's Lesson Guide for Fire in My Backyard

<http://fire.nifc.nps.gov/fire/ecology/docs/bkyrdint.htm>

Wildland Fire Prevention/Education Teams

<http://www.nifc.gov/preved/teams.html>

Especially For Teachers: Fire Facts

<http://pictures.discovery.com/dppages/wildfire/teacher/teacher.html>

Workshops

Project Learning Tree (PLT)

After attending a PLT workshop, you will receive the PLT Activity Guide that has many forest activities that have been used by thousands of teachers. These activities have been revised based on the comments from these teachers. To sign up for these classes contact:

State of Alaska, Dept of Natural Resources Forestry- Central Office
3601 C Street, Suite # 1034, Anchorage, Ak.99503
Phone (907) 269-8481

Project Wild

After attending a Project Wild workshop, you will receive the Project Wild K-12 Activity Guide and Aquatic Education Activity Guide that has many environmental education activities that have been used by thousands of teachers. These activities have been revised, and reprinted in new additions, based on the comments from these teachers.

To sign up for these classes contact:

Project Wild Coordinator, Alaska Dept. of Fish and Game, Division of Wildlife Conservation, 333 Raspberry Rd., Anchorage, Ak.99518
Phone (907) 267-2168

Grade Index

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