The General Effects Of Fire On Wildlife Essay, Research Paper

The General Effects of Fire on Wildlife

Abstract:

Fire is an important part of many ecosystems and helps maintain the condition of habitats for wildlife. The effect of fire depends upon many factors, varying from the type of wildlife to their different habitats. Fire affects ungulates through positive, but often, short-lived improvements in diets by allowing ungulates to consume new plant growth. Fire mediates species interactions thereby reducing conflict. Birds are often positively benefited or unaffected by fire in the short-term. The beneficial role of fire on terrestrial ecosystems is contrary to the negative impact of fire on aquatic ecosystems. The long term effect of fire on wildlife is the maintenance of feeding areas by preventing succession of a habitat to its top state.

INTRODUCTION

Fire is an important part of many ecosystems, affecting wildlife populations in various ways, such as by changing habitat, affecting food supply or quality, or by altering interactions of species. Fire suppression has allowed forested areas to achieve a climax state which provides less forage for wildlife. While terrestrial wildlife is benefited by fire, aquatic ecosystems are negatively impacted by large fires through the increase in sediment flow. Fire is essential in maintaining biological diversity in the Northern Rocky Mountain forests.

NEGATIVE EFFECTS – AQUATIC ECOSYSTEMS

Contrary to the beneficial impacts of fire on terrestrial wildlife, aquatic ecosystems are negatively affected, such as the decrease in fish populations by fire. In the North Fork Shoshone River adjacent to Yellowstone National Park, fish died from increased sediment flow during a heavy rainstorm two years after the canyon had burned (Armbruster, 1996). Fish are sensitive to sediment both in concentration and length of exposure. When fire clears vegetation on slopes surrounding a river, runoff from rainstorms carries sediment into the river, killing portions of the fish population by obstruction of the gills.

REGROWTH

After a fire it takes many years for all trees and shrubs to grow back to their former levels; up to three-hundred years in the northern Rockies (Fuller, 1991). Burned forests show effects many years after the actual fire. Forests at lower elevations grow faster than those at high elevations. Fire and regrowth are part of a cyclic process like that of the seasons. Regrowth does not mean the fire caused the death of forest by only that it is at a different stage, as natural as that of an old forest.

FIRE DAMAGE AMONG TREES

Fire damages trees by a combination of crown, root, and cambium damage. Tress can lose twenty to thirty percent of crown before the fire affects its growth(Fuller, 1991. Thick growth of bark, like a ponderosa pine (Pinus ponderosa) and western larch (Larix occidentalis), protects against cambium damage. Cambium is a layer that produces new plant tissue. A tree s roots will only be damaged if the layer of duff burns away. Thick duff and deep roots are good protection. Thick trunked trees resist fire because their size prevents from heating quickly. Deciduous trees resist fire better that evergreen (Syngonium podophyllum) trees because foliage contains more moisture and fewer organic compounds (Harrison, 1969).

SUCCESSION

Fire prevents plant communities from succession to a climax condition, therefore maintaining the habitat in a state which provides greater forage. Woodland caribou (Rangifer tarandus caribou) are adversely affected by crown fires in the short-term due to major losses of forage and the avoidance of burned locations by the caribou. However, these fires provide the long term benefit of ensuring some of the habitat will remain as jack pine (Pinus banksiana) forest, which provides greater forage quantity for caribou(Patent, 19??).

Key deer (Odocoileus virginianus clavium) are also benefited by long term maintenance of habitat. Plant species used most often by the Key deer (Odocoileus virginianus clavium) are located in pine forests which are replaced by hardwood forests in the forest succession. Fire maintains areas of jack pine forest thus benefiting the Key deer. In oak-jack pine forests, white-tailed deer (Odocoileus virginianus) are found in greater numbers in burned areas eight years following a large fire. Fire acts as a disturbance creating a mosaic of patches that each undergo succession at different times.

BIRDS

Birds in Florida slash pine (Pinus elliotti) forests are relatively unresponsive in the short-term to ground fires; while in ponderosa pine (Pinus ponderosa) forests, bird populations increase after fire. Response of birds in slash pine forests varies depending upon the type of cover used by the species. Woodpeckers (Melanerpes formicivorus) and ground-dwelling birds use burned areas frequently because bare ground is rare in undisturbed slash pine forests and woodpeckers utilize the snags created in the fire. Other birds such as the Florida scrub jay (Aphelocoma coerulescens coerulescens) show no response to most fires because their range is much larger than the area affected by the fire. Cover and food are relatively unaffected by fire for most bird species in the slash pine forest. In the ponderosa pine (Pinus ponderosa) forests, bird populations increase following ground fires for a single year and then decrease to normal populations (Fuller, 1991). These fires do not alter the habitat structure and thus the change in bird populations may be attributed to an unknown increase in food quality or quantity. However, fires repeated at short intervals lead to the decline of shrub-dwelling birds. In conifer forests of the Northern Rocky Mountains, areas burned by intense fires have a wide diversity of bird species. In these areas, migrant birds were found to be the major bird species utilizing the burned, forest.

FIRE S AFFECT ON SOIL

Thick duff protects the soil from heating up too much unless it catches on fire, and so fire does not usually burn all the duff (the top layer of soil.) In severe fires, only ashes remain on top, and the upper mineral soil is cooked and discolored by a chemical change. This happens when the surface soil reaches one thousand degrees fahrenheit and one inch underground reaches four-hundred degrees fahrenheit, the chemical change will occur (Armbruster, 1996).

Nitrogen, phosphorus, potassium, and calcium can vaporize in a severe fire (Armbruster, 1996). Opposing the loss, ash and charcoal from burned trees add minerals to the soil, which is a fertilizer.

THE EFFECT OF FIRE ON ANIMALS

The biggest effect on animals is change of habitat. In the long term, fire creates more forest edge which provides habitat for larger variety of animals. In absence of fire, dense forests develop that reduce the amount of grasses, causing the decline of populations of elk, deer, ant other large ungulates.

FIRE AND NUTRITION

The number of aspens (Populus tremuloides) and willows (Salix lasiandra) rise after a fire because it removes competing conifers and adds minerals to the soil. Animals benefit from additional minerals when they eat new plant growth. They may also eat the charcoal and ashes. The additional minerals also stimulate the growth of grasses, providing better nutrition for grass eating life, and stimulate growth of shrubs. The number of berry shrubs goes up after a fire, which raises the number of black bears that eat the berries, and deer, elk and moose that eat the berry leaves. The amount of protein in shrubs remains higher for five years, benefiting animals (Fuller, 1991.)

FIRE AND ECOSYSTEMS

Many people think fire is detrimental because it blackens landscapes and burns trees. People focus on its negative aspects. The reason is that in forests adapted to frequent fires, suppression has caused pine needles, underbrush and dead trees and branches to build up to high levels increasing the duff protection.

WILDLAND FIRE ASSESSMENT SYSTEM (WFAS)

The U.S. Forest Service’s Intermountain Fire Sciences Laboratory in Missoula Montana developed this system to calculate and distribute fire danger information. The data comes from daily weather reports from more than 1,000 fire danger weather stations nationwide. The Wildland Fire Assessment System predicts fire risk by generating fire danger maps. A Fire Danger Rating determination reflects the National Fire Danger Rating System (NFDRS), taking into account current and previous weather, fuel types, and the state of both live and dead fuel moisture.

Pic. 1

CONCLUSION

Fire is beneficial to terrestrial wildlife through improvements in nutrition and maintenance of forage areas. However, in aquatic ecosystems fire can negatively impact fish populations. Types of fire affect wildlife in different ways. Ground fires have short-term effects and wildlife are not severely impacted by these fires. Crown fires show major changes in habitat use patterns by wildlife and have much longer effects, sometimes with delayed onset. Fire intensity has not often been taken into account when determining the effect of fire on wildlife. The general effect of fire on aquatic systems needs to be more intensively studied. The greatest impact of fire is its disturbance of habitats creating patches which are each undergoing succession. This mosaic provides areas that are

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utilized by wildlife for forage. Intense fire is essential to some conifer forests of bird species and in maintenance of biological diversity. Fire plays a critical role in the regulation of many wildlife habitats.

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