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Environmental Health

Research Paper Draft

Impact of Climate Change on Elk

Executive Summary:

The future effects of climate change on elk are uncertain. The number of elk in the United States fell significantly in the early 20th century, but has since risen back up due to effort from conservation agencies. Elk numbers are still supported through the sale of sport hunting. The loss of habitat may cause elk to compete with local livestock population and lead to a higher rate of interaction with humans. A greater number of elk have been reported to be inflicted with digital dermatitis, linked to an increase in bacteria numbers in the environment. Along with an increase in bacteria, there has also been an increase in ticks which can be attributed to reduced snowpack and warmer winters. Climate change has led to a change in available plant species available to elk for both food and habitat sources. There are many factors that make it difficult to predict the future of elk populations from the effects of climate change.

There is no other sound quite like the bugle of an elk bull, but this may become more and more of a rarity as climate change affects the elk population in the Pacific Northwest. The effects of climate change and warming is undeniable when looking at the impact on big game and wildlife such as elk. Change in habitat, behaviors, and demography can be seen among the elk population. With the increased emission of carbon into the atmosphere, temperatures have risen across the world, leading to a wide array of environmental impacts which have in turn affected the demography of elk in the Pacific Northwest.

Elk numbers were originally around 10 million across the U.S., however numbers fell to under 50,000 by the early 20th century due to human damage such as overhunting and habitat loss. Since then the population has risen back up to 1 million by recovery efforts. (Inkley, Price, Glick, Losoff, Stein, n.d.). Since 1984, the Rocky Mountain Elk Foundation and its partners have conserved 6.7 million acres of land in North America. Repopulating historic elk habitats require the work of conservation group to transfer healthy elk herds to areas that have been studied and shown to be habitable for elk. Then they are monitored for 3-5 years to analyze survival rates and movement patterns. The RMEF has helped to launch successful elk repopulations in Wisconsin, Kentucky, Tennessee, Ontario, Missouri, and Virginia, and also have completed successful studies in Illinois, Maryland, New York, and West Virginia. (Elk Facts, n.d.).

Elk populations may have been saved from possible extinction in the past, but the population won't reach the original numbers. Historically, elk have existed across the entire continent of North America, thriving in many different types of habitats, but human settlement has since changed the areas that elk are able to live. They are able to live in such varied climates because of the coats that they have. With one coat for hot summer heat and one to maintain body temperature and warmth through frigid

winters. Regardless, of this ability to change coats, elk still require adequate habitat in order to thrive. Like most animals, proper food, water, space, and shelter are essential elements for the elk.

Ungulates are managed by state and federal agencies and funding is supported through sale of sport hunting, along with other outdoor related sales such as fishing licenses and campground fees. (Cross, Chong, 2013). While the elk population may not be immediately endangered, the now steady population is not a product of natural survival but a result of the high cost efforts of human sport conservation, protecting elk from factors such as overhunting and loss of habitat. This meaning that the elk numbers are only able to thrive due to effort from hunting agencies to maintain numbers across the nation in order to have a large enough population to accommodate hunters. The elk population has been drastically altered since interaction with industrial civilization; further environmental impacts could alter the population even more with no policies to protect the environment.

The behaviors of elk may be impacted by global warming including interactions with other animals and with one another. Competition with livestock for both food and habitat may occur with the decrease of forest and fields for the elk to graze in along with the change in migratory patterns among the elk. (Inkley, Price, Glick, Losoff, Stein, n.d.). Since the elk are not migrating, mostly due to habitat defragmentation causing them to become isolated within a specific habitat area, defragmentation is also traced to the root of many other ecological damage. (Didham, 2010). The elk then spend more time consuming the resources that are available to all other grazing animal species. With loss of habitat wild elk may wander into towns or farms in search of the resources that they need. This would lead to elk interacting with humans much more commonly. In turn, elk may be adapting to behave differently with humans, other animal species and among themselves than they would have prior such as seeing humans as a sign of nearby resources or become competitive with species that they once coexisted with. This

could create disharmony within the natural interactions among these animals and the world around them.

An increased number of elk have been spotted limping and struggling to walk. (Elk Hoof Disease in Washington Elk, n.d.). This is tied to a greater number of elk becoming inflicted with hoof disease, also known as digital dermatitis, which may be linked to an increase in bacteria numbers due to warmer climate allowing the bacteria to survive more efficiently and thus lead to a higher spread of the disease. It is said that hoof disease has plagued livestock for decades, yet this is the first time that it has been seen effecting wild animals, this could be tied to the more common interactions taking place between elk and raised livestock. Digital dermatitis is leading cause of lameness in dairy cows nationwide and could very well impact elk population in the same manner. Currently there is no vaccine for the disease and no proven options for treating diagnosed animals.

There has also been an increase in ticks due to climate change. (CDC, 2015). With the warmer winter season ticks are better able to survive throughout the year leading to higher transmission of diseases, which can also affect humans as well. That being said, non-migratory elk are much more susceptible to the spread of disease because of the lack of genetic variation within their population. (Cross, Heisey, Scurlock, Edwards, Ebinger, Brennan, 2010). The increased spread of disease among elk should raise significant concern, especially since it could affect other species that share the environment.

With reduced snowpack and shorter winters elk have been migrating less or not at all, which as stated briefly in the previous paragraph greatly affects the cycle of the whole ecosystem. Reduced snowpack is one reason for this change in migration pattern. With the warmer weather elk no longer need to migrate to find food and survive the winter. That being said not all elk populations are migratory, however the change in behavior in previously migratory groups could lead to changes in the

habitat such as overgrazing or overpopulation of a certain species. Increased climate change has led to different numbers of plant species that are readily available to elk, changing their diet. The rise in regional and global temperatures causes some plants to become more abundant while others become scarcer. Aspen forests are one example of a favored habitat of elk that are disappearing, yet with warmer winters more forage food may become available to elk for longer periods of time. (Inkley, Price, Glick, Losoff, Stein, n.d.). Even with the possibility of more forage for elk, habitat loss may overpower any possible benefits ungulates could gain from warmer temperatures.

While it is not yet clear whether climate change will be a positive or negative outcome for elk in the future, it is for certain that there are many changes happening within the population. Overall numbers of elk are being sustained due to efforts from sport hunting funding, however elk are experiencing changes in behavior with increased interaction with livestock and humans. Since many populations of elk are not migrating and disease is becoming more prevalent it is hard to tell what the future holds for elk and how that change will in turn affect the greater ecosystem.

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