Gray Wolves in Washington: Possible Habitat and Corridors for Movement

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Introduction

Increasing the Gray Wolf (*Canis lupus*) population in Washington state plays two important roles. First, they are an important part of many ecosystems as they are a keystone species. This means that they are a top predator and their absence has reverberating effects on the rest of the ecosystem. As seen at Yellowstone State Park in Wyoming, elk populations ran rampant for many years and reached their peak of roughly 25,000 individuals in 1988 (Kauffman et. al. 2008). The issue lies in the grazing that these elk partake in of a vital habitat producer, Aspen saplings. In 1995 thirty one Canadian Gray Wolves were released into Yellowstone in an attempt to reestablish the population and help curb ungulate populations (Larsen 2006). The park acts as a perfect 'laboratory' to monitor the effects wolves have on elk populations and on vegetation recovery levels.

Second, Gray Wolves have been on the Washington Endangered Species list since 1967. This is attributed to the mass hunting and elimination of these animals that were largely perceived as nothing more than pests, mostly by owners of livestock. Washington State, as of December 2011, currently has a Gray Wolf population of twenty seven individuals and only three active breeding pairs (WDFW 2011 & Figure 1). The purpose of this study is to see if Washington has viable habitat for them and if so, how the Gray Wolves can move from each of these habitat islands.

Current Gray Wolf Packs

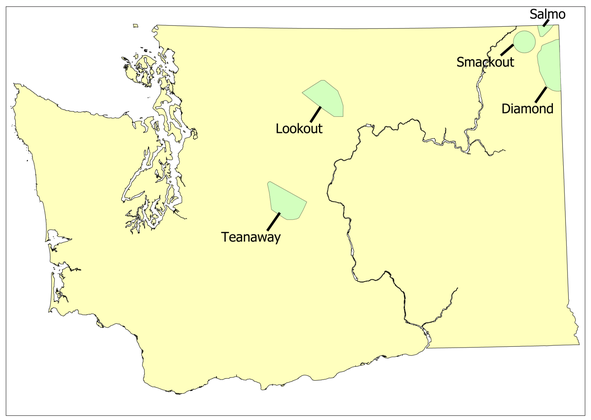

Figure 1: This displays current Gray Wolf packs in Washington

Objectives

1. To use GIS to show habitat areas in Washington that are able to support Gray Wolves.

2. To find the associated cost of movement for the wolves depending on positive and negative habitat classifications.

3. To use GIS to discover corridors in which the wolves will be able to move from one quality habitat to another.

Gap Analysis

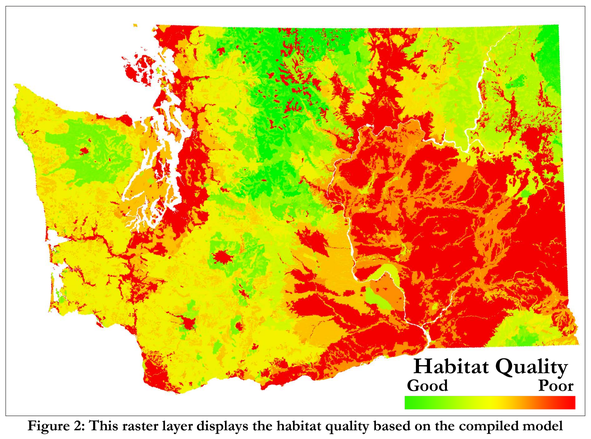

Figure 2: This raster layer displays the habitat quality based on the compiled model

Anthropocentric Raster

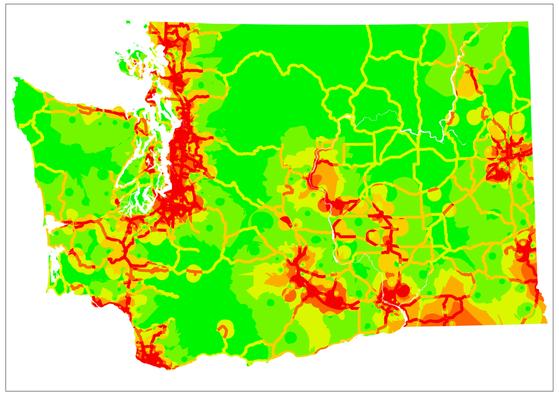

Figure 3: This raster layer shows the habitat quality based on anthropocentric issues

Quality of Protected Land

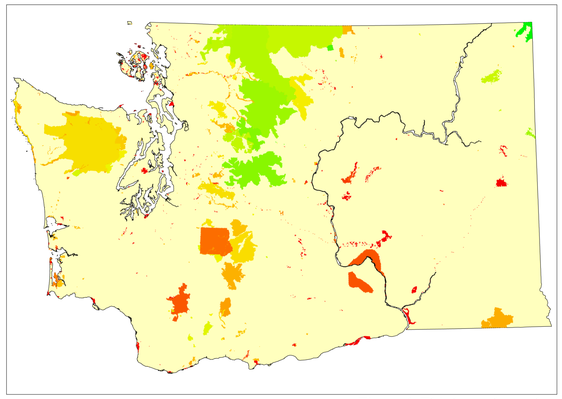

Figure 4: This layer shows the habitat quality of all Federally protected land in Washington

Habitat Quality

Good — Poor

Total Cost Distance for Gray Wolves

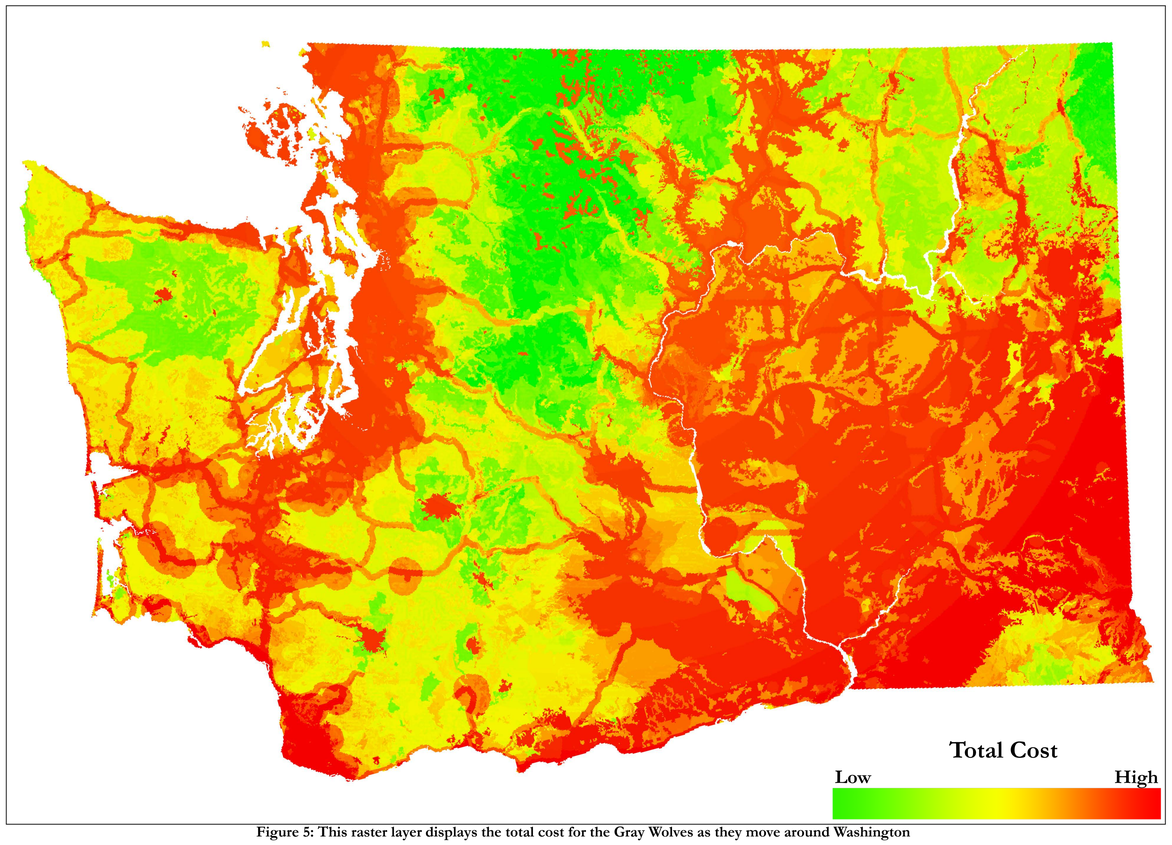

Figure 5: This raster layer displays the total cost for the Gray Wolves as they move around Washington

Methods

The model for Gray Wolf habitat was broken into three distinct phases. This first involved creating a layer for a Gap Analysis (Figure 2). This included where the wolves currently are located, if the land was protected, and the compilation of various attributes that compose a quality habitat. The first two components are self explanatory but the third requires building a habitat model from scratch. I felt that the habitat model should include the density and 'BMI' ratio of the prey species, type of land cover, and slope and consisted of twenty separate raster layers. Each were given a weighted value based on the importance they play in a proper Gray Wolf habitat. The three features (Gray Wolf location, protected land, and proper habitat) were added together using the Raster Calculator tool to become my Gap Analysis. Next, it was important to add to the costs already establish in poor habitat areas through the use of anthropocentric data. This included human population densities, major highways, and dairy farms in Washington. Each were given a weighted value, similar to the habitat layer, based on how detrimental they would be to the Gray Wolves. These were then added up using the Raster Calculator tool to form my Anthropocentric Raster (Figure 3). The second phase involved subtracting the Anthropocentric Raster from the Gap Analysis to establish a Total Cost layer of habitats for Washington (Figure 5).

For the third phase it was important to isolate protected land and find out how each could be used for Gray Wolf habitat. I achieved this by running Zonal Statistics on protected land areas to find the mean habitat grade for each parcel. From the averaged habitat grades protected land was then selected based on those parcels that contained suitable habitat for the Gray Wolves (Figure 4). These would then function as starting and end points for the corridors. A tool from Corridor Design was used that required an input of a cost layer and a start and end point (Figure 6).

Corridor One Corridor Two

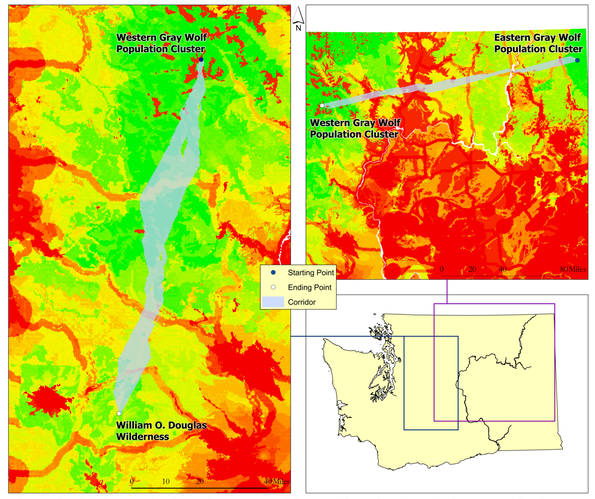

Figure 6: This image displays the two possible corridors the Gray Wolves can take from central population areas

Results & Discussion

The results of this project show that there could be many areas in Washington State that can function as Gray Wolf habitat, especially land that is already protected (Figure 4). Much of the Cascades, barring no steep slopes or elevations, looks to be suitable for a population of the wolves as well as areas near the boarder of Idaho. This also includes much of the areas in the North Cascades which are already protected and gives hope for these animals to thrive in a protected environment. The corridors also show, with some resistance in high cost areas and the Columbia River, the ability to move to new habitats (Figure 6).

One area that I feel sticks out in my project is the effect that highways have on the movement of the wolves. They can act as a barrier and run through many of the areas that I have deemed suitable habitat. To combat this Green Tunnels can be installed to give animals the ability to travel under these roadways, rather than over a dangerous highway.

Much of this project is based on the assumption of a couple of things. First is that prey densities for the nine species analyzed would stay consistent through out the areas in which the data stated they existed. I know this is impossible but it is also just as difficult to gauge the densities of these species throughout the entire state. Second is that nature will follow the model produced. The final analysis and maps that are produced here could be vastly different to what actually takes place in the field. I hope this project serves as an eye opener to wildlife conservationists and the public that an endangered species like gray wolves do have a chance in this state, but will need some human guidance to combat the anthropocentric challenges they may face.

Acknowledgements

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References

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