Animal Endangerment and Solutions for Survival: A Case Study on Gray Wolves in the United States

Sabrina I. Schulwolf

Senior Capstone

Professor Horowitz

Spring 2024

Submitted to the School of Liberal Studies
in partial fulfillment of the requirements
for the degree of Bachelor of Arts

Purchase College
State University of New York

Abstract

The topic of this case study is the endangered Gray Wolf (Canis Lupus) population in the United States, and the positive support given by the laws, acts, regulations, governmental, congressional, state, and conservation organizations. I decided to write a paper on this topic because it has not been publicized enough and endangered species need more support. While using peer-reviewed, journalistic, and governmental sources, I aim to answer the following question. What positive impacts do acts, laws, regulations, research, and conservation have on the Gray Wolf population, and what are the next steps to ensure their survival? The method I used was analyzing secondary peer-reviewed sources that I gathered from the SUNY Purchase College Library database and other sources from the web. I hypothesized that the endangered Gray Wolf population has a lot of positive support from acts, laws, regulations, research, and conservation, but that there are dilemmas that have caused their support to diminish. While gathering my research, I found my hypothesis to be true. There are many issues regarding the human-wolf connections, the delisting and relisting of the species with the Endangered Species Act (ESA), and the available land for reintroduction or introduction. Now that I know of these issues and the positive impacts that have and are being made for the survival of the Gray Wolf species, the best outcome would be continuing to monitor their ecological, and governmental aspects.

Keywords: Grey Wolf Endangerment, Endangered Species Act, Fish and Wildlife Foundation,

Chapter 1: Introduction

The topic that I will be researching for this case study is the endangerment and solutions for the survival of the Gray Wolf population in the United States. The research question that I will be formulating a hypothesis and answer to is, what positive impacts do acts, laws, regulations, research, and conservation have on the Gray Wolf population, and what are the next steps to ensure their survival? The reason that I chose this topic is that there is not enough research done on this topic. Endangered species do not have enough publicity, research, or protection that could be given with more understanding of their dilemmas and needs for survival. What I hope to accomplish by going into detail on the Gray Wolf species in the United States is for other animal-loving people, and scientists to take on making endangered species more of a widespread public priority. The Gray Wolf has been an endangered species for years and has had a lot of struggles regarding being listed and desisted from the Endangered Species Act (ESA[1]). This listing is to provide the utmost protection for that species, but when delisted can cause greater harm. The method that I will be using to formulate an answer to my research question is to use ten peer-reviewed sources from SUNY Purchase Library databases along with other sources that I have found on the web. By using other sources with less professional data, I will be able to compare and analyze with scientific data. This is important to see the full picture of the data collection on the Gray Wolf and to see if there are any ethical dilemmas, opposition, or opinionated results. The primary data that I will be using are from peer-reviewed sources. The next chapter is on the historical background of the Gray Wolf population, this information is vital to the deeper understanding of the species.

[1] See appendix for full PDF Document of the Endangered Species Act

Chapter 2: Historical and Theoretical Background

To complete the understanding of why it is important to save the endangered Gray Wolf, you must know the history of their endangerment, their background as well as the history of their laws, acts, and regulations. To understand the complete background and history I will be going through four main topics. First the background of the species, in terms of the history of their endangerment. Then I will be going into their symbolism and the stigmatization of their carnivorous behaviors. Thirdly, I will talk about why the Gray Wolves need support from organizations and the public. Fourth I will go into the history of the acts, laws, and regulations as well as their history of being listed and delisted and the effects.

The reason for the Gray Wolf's endangerment goes back to the 1800s when settlers came and caused deforestation that took away their habitat as well as unregulated hunting occurring at an alarming rate. Over the years there have been sightings that the Gray Wolves are slowly making a comeback but not without the support from the acts, laws, and conservation efforts. "Until recently, it was thought that the last wolf in the Adirondacks was shot in the late 1890s, but a 2011 study brought to light the fact that a wolf was killed north of the Great Sacandaga Lake in 2001 and two others were bagged from Vermont's Northeast Kingdom in 1998 and 2006. This suggests one of two things: either wolves that were raised in captivity found a way to escape or wild wolves are beginning to re-populate the area they once called home" (Adirondack Wolves). Scientific studies are continuing with evidence from the Gray Wolf's endangerment in past and present situations. These current studies will give us more details of their history as it progresses.

Why do the Gray Wolves need support? Gray Wolves are one of many endangered species in the world, so why talk about this specific one? Every species in an ecosystem plays a

vital role in their overall survival. Hypothetically, if all wolves went extinct the wolves' prey such as fish, and small mammals' populations would rise drastically. This would cause the prey that the fish and small mammals eat to drastically drop in their population. Even though all species play a vital role in the environment, they share a common threat, humans. The wolves' biggest threat is human beings, "Wolves are threatened by conflict with humans and intolerance, and the loss of both habitat and protections under state and federal endangered species laws." (Frank, 2024). By writing this paper I hope to gain more publicity and an understanding of why the Gray Wolf, as well as other endangered species, need our help.

Wolves have been a symbol to human beings, without many people considering it, for thousands of years. Wolves have represented greed, power, bravery, strength, just to name a few. Wolves are found on artifacts from all over the world, but these connections have done more harm than good when it comes to helping the wolves who are endangered like the Gray Wolf. Even though most symbolism in connection with wolves is positive, this leads people to think that they don't need as much attention, strength, or help as other species. Thinking about wolves as strong makes scientific information on the matter of their need for support less substantial. "This ease with which humans are able to replace the wolf, the animal, with symbols- freedom, family, wilderness, failure, oppression- has made management of wolves more complicated and more contentious than for any other species in the US." (Cassidy, 2022). The opposing force to the symbolism of wolves is science. Science is the most important contributing factor to helping endangered species. When having an opposition to science, the species cannot be helped by its full potential. This is why certain organizations to help endangered species have a very hard time doing so and need large sums of contribution to stay active. Two of the biggest organizations that

are trying to get donations to help the wolves are the American Wolf Foundation (AWF) and the World Wildlife Fund (WWF).

In terms of the history of the Gray Wolf with governmental advocation, the Gray Wolf has undergone a lot of distress. “The Gray Wolf Under the Endangered Species Act (ESA): A Case Study in Listing and Delisting Challenges” by Erin H. Ward Legislative Attorney November 25, 2020. Erin H. Ward is a legislative Attorney Coordinator of Research Planning at the Congressional Research Service, she also went to the University of Virginia School of Law. This case study investigates the delisting of the Gray Wolf and the support from the Endangered Species Act (ESA) and the Fish and Wildlife Service (FWS). The significance of this case study is to learn and determine the legal process that protects the Gray Wolf from endangerment, and the issues that arise when listing and delisting the species under these acts. The methods that were used to gather the data needed were to go directly to the FWS in conjunction with the Congressional Research Service (CRS). The theory was to go through the methods and gather data to determine the positive and negative outcomes for the endangered Gray Wolf population. This will also give a better idea of other species on the endangered list who share similar problems with the FWS and the ESA. Identifying the species can be broken down into three parts, Taxonomy, Defining DPSs, and experimental populations. Under taxonomy, under the rules of the FWS, there are difficulties involved in the identification process and listable systems and analyzing Gray Wolves positively considering the disagreements over the taxonomy classification of wolf species and subspecies. This process can be an issue scientifically because scientists often do not always agree on their taxonomic conclusions with the subspecies involved. This can lead to changing classifications which would then delist species from the ESA. As research and opinions evolve, this also changes the classifications and taxonomy making it hard

to keep certain species on the endangered list for an extended timeframe. Defining the DPSs, the DPSs is a Distinct Population Segment "Under the Endangered Species Act, a distinct population segment- or DPS- is a vertebrate population or group of population that is discrete from other populations of the species and significant in relation to the entire species." (Fisheries, 2022). To designate the Gray Wolf's DPSs the FWS has applied a DPS policy. This policy may designate a DPS if it is discrete (discrete meaning distinctively separate from other populations based on physical physiological, ecological, or behavioral factors of international boundaries.) It determines this by whether the population remains in an unusual habitat for the specific species, is marked differently, or represents the only naturally occurring animal in the wild. However, the FWS's determinations that the Gray Wolf populations meet the DPS policy have not been the subject of these legal challenges yet. Outside parties have challenged FWS's determination of DPS's geographical boundaries, specifically in the Oregon court district. Defining experimental populations is the last section when identifying the species. "The ESA allows the secretary to release specimens of listed species into the wild and designate the population as an "experimental population"." (Ward, 2020). This means that these animals get monitored to keep track of their well-being and likelihood of survival. These experimental populations are protected and listed as threatened which allows the services to divvy out and limit which acts are prohibited. These limited protections reduce the harm and fear of the local community but do not fully protect the species. These animals are then relocated from existing packs or populations to qualify themselves for these reduced levels of protection as well as possible threats from an already established pack. Farm bureaus, researchers, and conservation groups have challenged these limited approaches as well as the decision to release away from a known pack. In conclusion, the history of the Gray Wolf population under the ESA shows challenges that the

FWS has faced to conserve this species. With the everchanging scientific data and conflicting news, delaying the relisting of delisting species takes an unsafe interference from needed protection. Congress could consider amending the act to address these issues and ensure that the act is by the congressional intent. Options to move forward are to continue to keep an eye on experimental populations and the scientific research that might delist the population again. In addition to this monitoring the population numbers as well as the conservation efforts that have been put into place to provide a positive outcome for the Gray Wolf to not be delisted due to a rise in their population. The process will continue as the scientific research continues which will inevitably delist the Gray Wolf in the process, but there is more positivity than negativity in their return to the list due to the support from the ESA and the FWS.

In conclusion, the information provided on the background of the Gray Wolf species, the need for their support, and the history of the acts, laws, and regulations that protect them now serve as a ground level of understanding of the species. In the next chapter, I will be diving into ten peer-reviewed sources that I chose for the main part of my research.

Chapter 3: Literature Review

In my research, I found ten peer-reviewed sources that dive into important topics on the endangered species of the Gray Wolf. These peer-reviewed sources were difficult to find because there has not been enough qualified research done on this subject. The organization of these sources is as follows. The first two sources are on the recolonization and reintroduction of Gray Wolves in Oregon and Yellowstone National Park. My third peer-reviewed source is on the population numbers in Montana with the help of hunters. My fourth and fifth peer-reviewed sources are on the habitat and forestry of Gray Wolves in Canada and the Eastern part of the United States. For my sixth peer-reviewed source I will be discussing conservation efforts in the United States. My seventh peer-reviewed source is on the diet of Gray Wolves across the world. My eighth and ninth peer-reviewed sources are on the governmental connections to the Department of the Interior and the ESA. My tenth and final peer-reviewed source is on the symbolism connected to wolves and how that affects people's fears and thoughts about them. These topics are vital to understanding and helping the Grey Wolf's endangerment and management for survival.

Recolonization and Reintroduction

The first peer-reviewed source that I will be using is "Gray Wolf (Canis Lupus) Predation Patterns Following Recent Recolonization in a Multi-Predator, Multi-Prey System" by Elizabeth K. Orning, October 2021. This source dives into the recolonization of Gray Wolves in Oregon U.S. I rated this paper as a highly peer-reviewed source. Orning is a biologist at the Fort Collins Science Center where she works on research that supports conservation and management of

wildlife and their habitats. The research question in this case study is, what are the predation patterns for recolonizing wolf populations, and patterns that were similar to other multi-prey systems in North America? The justification for the importance of this research is to address the importance of the information on predation patterns for recolonizing wolf populations. This case study gathers kill rates over 2 years in Oregon USA. The hypothesis that was made was that the recolonization wolf population was similar to other multi-prey systems in North America. The methods that were used to gather data were documentation of diet composition and kill rates for wolves in a recently recolonized area (specifically the Blue Mountain Range of Northeast Oregon) over both winter and summer seasons.

For my next peer-reviewed source, I will be using "Coyote Foraging Ecology and Vigilance in Response to Gray Wolf Reintroduction in Yellowstone National Park" by Adam T, June 2003. This source explains the connections between coyotes and Gray Wolves in Yellowstone National Park. I rated this paper as a highly peer-reviewed source. Adam T. Switalski has made publications on degraded streams and watersheds across the U.S. Northern Rockies, additionally, he has examined the wildlife, fish, vegetation, and soils as well as lessening their negative impacts. Switalski also has over twenty years of research and project management experience. This study examined whether wolf reintroduction in 1995 and 1996 in Yellowstone National Park influenced coyote activity budgets. The justified importance of this research is that when the wolves were being re-introduced, coyotes used them as a continuous source of food and vice versa. The hypothesis is that these changing dynamics resulted in a wide-range cascading effect throughout the ecosystem in the Yellowstone National Park. The methods that were used to consolidate and analyze data were made from December 1997 to July 2000 in the Lamar and Soda Butte valleys of Yellowstone National Park. A series of observation points

were used to attempt to locate the coyotes of the highest priority, after this success the next step was to find the next in the highest priority. After being located, the coyote was continuously recorded using a focal-animal sampling method which means firsthand watching and documentation. The data that was recorded were lists of behaviors as well as the time of day they were recorded and entered in the data spreadsheet. The theory that was used in this case study was a firsthand collection of data and observations, this is the most accurate way to collect firsthand data.

Population

Another source I will be using is "Estimating Occupancy and Predicting Numbers of Gray Wolf Packs in Montana Using Hunter Surveys" by Lindsey N. Rich, August 2013. This source evaluates the population numbers of the Gray Wolf in Montana. I rated this paper as a high-reliability peer-reviewed source with primary data. The main author of this paper is Lindsey N. Rich who works at the Montana Cooperative Wildlife Research Unit and studied at the University of Montana. The basic research question was how survey data on hunter's sightings of wolves could be used to estimate the occupancy and distribution of wolf packs and predict their abundance in Montana. The importance of this research was to monitor carnivores which is difficult to conduct over large areas. Having the connection to hunters who know the land and the species, becomes a much easier task that has major importance in its research. The proposed hypothesis was "That the environmental features including forest cover, elevation, and slope could influence occupancy and local colonization and extinction probabilities of wolf packs because wolves are associated with forest areas with low elevations and slopes where ungulates are more accessible and abundant during winter." (Rich, 2013). The methods that were used to

obtain results were hunter survey data as the detection-non-detection data for their occupancy model. More focus was put on models for detection probability then followed by initial occupancy, local colonization, and local extinction. For each parameter selected, the best model was found and then used to structure alternative model forms when evaluating forms for each parameter.

Habitat and Forestry

For my fourth source, I will be using "Cumulative Effects of Forestry on Habitat Use by Gray Wolf (Canis Lupus) in the Boreal Forest" by Mélina Houle, March 2010. I rated this paper as a highly reliable peer-reviewed source using primary data firsthand collection data. Mélina Houle is an environmentalist, animal ecologist and conservationist. The basic research question was what are the cumulative effects of forestry on habitat selections that are wildly distributed in Quebec's Boreal Forest? The justification of the research was to understand the impacts of the changing landscapes on the populations of animals. This is a vital piece of information for wildlife conservation and management. The hypothesis that was established was that human disturbances alter the composition, structure, and function of forest ecosystems. "Our objective was to investigate whether logging activities have cumulative effects on habitat use by gray wolves in the boreal forest within and among home ranges. Specifically, we assessed multi-level cumulative effects by examining functional responses associated with the selection of roads and cut blocks during different periods of the year." (Houle, 2010). The method that was used in this research was to focus on the habitat selection of 6 wolf packs in the Boreal Forest in Quebec Canada. Each pack was 500km apart in an area covering 10,000km to provide appropriate data.

The preceding source I will be using is “Identifying Potential Gray Wolf Habitat and Connectivity in the Eastern USA” by M. Van Den Bosch, September 2022. I rated this paper as middle reliability due to the use of secondary data analysis. M. Van Den Bosch is a part of the Department of Fisheries and Wildlife in Michigan. The basic research question was to understand the potential for further recolonization. This requires measuring the quality of the remaining habitats of Gray Wolves and the connecting habitats of the packs as well. The justification for this study is that because the Gray Wolves have partially recolonized in the Western Great Lakes region of the U.S., but they still haven’t ventured into the eastern parts, this study analyses why this is the case. The hypothesis was that 35% of the landscape was unsuitable for wolves, and 18% of these suitable areas were protected under state and federal jurisdictions.” (Bosch, 2022). The method that was used was, “We used recent snow tracking data from the western great lakes region to create an ensemble distribution model to estimate areas of habitat large enough to support gray wolf populations in the eastern USA. We then modeled cost-weighted distances between these areas and circuit connectivity to identify potential linkages.” (Bosch, 2022). Another method that was used was a distribution model to calculate the available habitat area in the eastern part of the U.S. where the wolves did not recolonize. “We developed a distribution model to estimate current wolf range in the western Great Lakes region and used it to predict habitat availability throughout former wolf range in the eastern USA, expecting wolf habitat to occur mostly in areas with low human disturbance and greater proportions of natural land cover. We also estimated habitat connectivity, including southern Canada, to identify potential linkages that could connect unoccupied areas with currently occupied areas. Finally, we evaluated the ownership status of protected suitable areas, potential linkages, and identified areas likely suitable to maintain viable wolf populations.” (Bosch, 2022).

Conservation

The following source I will be using is "The VIPs of Wolf Conservation: How Values, Identify, and Place Shape Attitudes Toward Wolves in the United States" by Shelby Carlson, January 2020. I rated this paper as a high-reliability peer-reviewed source with a thorough analysis of secondary data. Shelby C. Carlson went to the School of Environment and Natural Resources and Ohio State University. The basic research question is to evaluate the hypothesis that there are different success rates in different areas and to combine the data to make a generalized idea. The justification for this paper is, that it is important to realize that the large mammalian carnivores are on the rise, but it is even more important to see the negative results of those actions. Hunting and trapping have come back into play since the wolf populations grew. This rise in population will go on another downfall if hunting and trapping do not cease or slow down. The hypothesis that was made was the liberation of hunting and trapping of the newly marketed wolves would create another steep decline in their population which would make them endangered once again. "Various agencies have liberalized killing of wolves through regulated public hunting, trapping, and lethal control, contending that such actions are necessary to avoid erosion of public support for wolves and the laws that protect them." (Carlson, 2020). The methods that were used were "one-way analysis of variance tests and hierarchical regression analyses" (Carlson), and to compare regions of the U.S. that have different experiences with wolf recovery. The data analyzed in this study was from a survey conducted by Bruskotter et al. (2018) on 1,287 individuals in the United States. The survey responses were collected using Qualtrics by the GfK Group in 2014. The individuals were from three regions with varying experiences in protecting gray wolves under the Endangered Species Act (ESA), but these excluded cases from states that had controversy over ESA protections for the Mexican wolves

and red wolves. The study used a semantic differential scale to measure attitudes towards wolves, social identity, and individual beliefs about human-wildlife relationships. Four response items were measured on a seven-point scale and the respondents' scores were averaged to get the results. The study also employed a bi-polar scale to measure control and similar-based items. The study analyzed these attitudes toward wolves across three study regions using one-way ANOVA tests (Analysis of Variance) and hierarchical regression analyses. Data was then organized on whether it was occurring after or on regional sociodemographic characteristics and analyzed using sociodemographic, identity, and measures. The results showed little interaction between the organized variables.

Dietary Habits

The seventh peer-reviewed source that I will be using is “Food Habits of the World’s Grey Wolves” by Thomas M. Newsome, December 2015. I rated this paper as a highly reliable peer-reviewed source with secondhand sources and low quality due to observing such a large area for research. Thomas M. Newsome is part of the Desert Ecology Research Group, Department of Forest Ecosystems and Society USA, and Centre for Integrative Ecology and went to the School of Biological Sciences, University of Sydney, Oregon State University, and Deakin University. The basic research question was, what is the extent of the Gray Wolf’s diet in North America, Europe, and Asia? The justification for the importance of the research is the Gray Wolf is a prime example of a large carnivore that has undergone a recent population decline, the decline was the result of the impact of deforestation and hunting. What resulted in this impact was a change to the Gray Wolf’s habits and diet. To understand and to have an informed discussion about the conservation and management of Gray Wolves it is vital to have

an understanding of their dietary habits. The hypothesis was that dietary diversity would be lower in areas that are trafficked by humans more heavily than others because humans have caused environmental and ecological changes all over the world. The methods to procure their answer to their research question were to review the literature on Gray Wolves and identify publications with a clear focus on Gray Wolves. They sorted the results by relevance and cross-checked reference lists in the initial papers that were found and collected.

Governmental

An additional source that I will be using is ""This Land Was Made for You and Me" *-And Them: Why and How the Department of the Interior Should Give Greater Consideration to the Gray Wolf's Historical Range" by Amy Collier, July 2018. I rated this source as a middle-reliability peer-reviewed source because secondary data was collected and explained with minor opinionated points. Amy Collier is a deep environmentalist, activist, and writer. The basic research question or statement for this paper was why and how the Department of the Interior should give greater consideration to the Gray Wolf's historical range[2]. The historical range of the species is the range of the habitat where that species used to inhabit. Collier justified the importance of this paper by focusing on the complex history of the Gray Wolf. There are deeper issues within the Department of the Interior that have had effects on other species as well. The hypothesis was that this paper explores the traditional justifications for species preservation and the justifications for other species as well. This identifies the lists of principles that should be used to inform these decisions on listing and delisting and the preservation laws of the endangered species. By reflecting on these principles, you can argue for a better consideration of

[2] Map of Currently Occupied Habitat, Potential Habitat, and Historical Range can be seen in the Appendix.

the species' historical range. The methods that were used were detailed research on the complex history of the Gray Wolf in the Department of the Interior.

The ninth peer-reviewed source I will be using is "Prolonged Gray Wolf Endangered Species Act Listing Fluctuation and Policymaker Response in the United States" by David Ross Price Martin, February 2020. I rated this paper as a middle reliability due to its use of secondary data although the topic was thoroughly researched and had good information. David Ross Price Martin went to Rutgers University. The basic research question was "Why did the ESFS continually publish rules that were inconsistent with the law and could be overruled by judicial review?" (Martin, 2020). Even though there have been reports of flourishing wolf populations in the Midwest and Northeast there has been a different instability that has emerged and needs to be evaluated. The justification for this paper came from the Environmental Conservation Act (ESA) listing and delisting Gray Wolves 16 times from 2007 to 2017. The reason for their delisting has been noted by some journalists but has not had major research done on the topic of why and the response it got. The hypothesis is, that while some law scholars suggest that agencies have strong motivations to avoid lawsuits, other scholars believe that agencies have these motivations to get into lawsuits. This paper identifies the possibilities of the motivations behind delisting and relisting the Gray Wolf. The methods that were used to gain the information needed to answer the research question are as follows. Recapping the listing fluctuations between 2007 and 2013, researching the listing fluctuation in the context of adversarial legalism, recording other possible agency motivations for delisting, and understanding policymakers' response to the listing fluctuations and the ESA concerns.

Symbolism

The final peer-reviewed source that I will be using is "The Gray Wolf as a Symbol or a Subject of Science" by Kira A. Cassidy, April 2022. I rated this paper as middle reliable due to its opinionated point, but it is well-researched and peer reviewed. Kira A. Cassidy is a part of the Yellowstone Wolf Project and the Yellowstone Forever group. The basic research question to this paper was what does the effect of the symbolism of wolves have on the science and research of the endangered species? The justification for the importance of the paper was that wolves have been used as metaphors inside the human brain for generations as a symbol of freedom and strength, but this has made it more difficult in the scientific management of wolves. When people think of wolves, they don't tend to think they need as much support due to the fact of their metaphoric strength. The hypothesis that was made was people do not understand the need for management of the wolf populations due to their metaphors and symbolism. The method that was used to gather information was Kira A. Cassidy's knowledge to compartmentalize her thoughts.

Through my literature review process, I have found ten peer-reviewed credible sources that will give me the information I need to answer my research question. In my next chapter, I will be discussing the methods I used to procure these peer-reviewed sources and the ethical dilemmas that I faced when doing the research.

Chapter 4: Methods

The methods that I used to procure my answer to my research question were as follows. I used the SUNY Purchase Library Catalogue to answer what positive impacts do acts, laws, regulations, research, and conservation have on the Gray Wolf population, and what are the next steps to ensure their survival? To obtain the information I needed to answer my research question for this case study, there were specific key phrases that I used. Some of these key phrases that I used were, “Grey Wolf endangerment solutions” “Grey Wolf conservation in USA” and “Grey Wolf rehabilitation in USA”. I found ten peer-reviewed sources using the library database to get solid information and a couple of other journalistic sources that I found through Google search. My ten peer-reviewed sources have the most qualified and scientifically backed-up data for my case study. The analysis method I used was carefully studying the data that these ten peer-reviewed sources and other journalistic sources provided to determine an answer to my research question. Through my preliminary and more detailed research, I concluded that there is a risk of bias and opinions in scientific subjects. In the process of procuring my sources, I realized that there were not as many case studies or articles on this topic. What I came to find was there are a lot of sources from underqualified publishers about opinionated and symbolic topics of Gray Wolves and the endangerment of this species and others. There were also not as many sources from qualified scientists on the specific endangerment of Gray Wolves. Some of the authors from my peer-reviewed sources came from science-based collages while some other authors came from less qualified backgrounds. Some of the studies came directly from governmental organizations which provided insight into the specifications of a specific state that I later get to in this paper, New York State. More widespread education on the topic of species endangerment needs to be done. One of the reasons I have chosen to research this topic is to dive into one

specific endangered species to learn and teach others about the processes made through science, government, and journalism. I hope to bring this topic into a more public eye to better understand other endangered species' needs for survival. In the next section, I will be talking about my results and findings.

Chapter 5: Results/Findings

In this chapter I will be explaining the results I found to answer my research question, what positive impacts do acts, laws, regulations, research, and conservation have on the Gray Wolf population, and what are the next steps to ensure their survival? To organize the results that were found to answer my research question, I broke the results into four major sections. The four sections that I have decided to organize my results are ecological and environmental results, governmental results, symbolism and human-wolf connectional impacts, and what would happen if the endangered Gray Wolves were reintroduced in NY state? In the last section, I answer a question about reintroduction to New York State to connect myself to this paper. Another reason for answering this question is to find out specific state governmental support of the endangered species and specifications on the Gray Wolf.

Ecological and environmental results

Reintroduction and recolonization

For my first peer-reviewed source on recolonization, "Gray Wolf (Canis Lupus) Predation Patterns Following Recent Recolonization in a Multi-Predator, Multi-Prey System" by Elizabeth K. Orning, October 2021, the conclusion from this paper was as follows. Elk were the primary prey, while white-tailed deer were less prevalent, it varied by pack. The theory that was proposed to be used for this study was observation and documentation over higher action climates. There was one main ethical dilemma that came up in this study, predator versus prey relationships. There was a pattern found in newborn and juvenile elk and deer, that they make up the overall diet of wolves in every season. The predation patterns of wolves are heavily influenced by prey abundance. The data that was collected was primarily in the Blue Ridge Mountain Range of Northeast Oregon. This land consists of private, public, and tribal areas. The

Gray Wolf populations have been naturally recolonizing in this area making it a prime location to study their predation patterns. Gray Wolves in this study were captured and collared by the Oregon Department of Fish and Wildlife (ODFW) with their annual population monitoring program. They also followed the procedures set by the U.S. Department of Agricultural Forest Service. By using this identification, the data can be captured as well as having the ability to gather location variants. By using these methods and a specific location it was easier to investigate prey composition, kill rates, and results. The findings that were reported in this study were that the ODFS's wolf monitoring program located 11 wolves with GPS collars from 4 different packs from June 2012-2015. The success rates were 92.3% for the wolves that were collared. The location clusters identified the potential prey remains of 159 victims at 152 clusters. The possible remains of prey at two of these clusters lacked evidence to determine wolf predation or scavenging behavior and were excluded from further analysis. Out of the 159 possible prey remains 139 were determined to be wolf predation events (96.4% being native ungulates or large mammals). The conclusions that came from this study were elk were the primary prey of 63%. Juvenile elk were most prevalent, in the summer at 63.3% and in the winter at 36.3%. The adult elk made up 32.5%. With this information, we can make a knowledgeable hypothesis, that if Gray Wolves make a comeback in New York, then they will have no issues with predation as the white-tailed deer population is abundant. There were no further recommendations made for future research on this topic.

For my second peer-reviewed source on reintroduction, "Coyote Foraging Ecology and Vigilance in Response to Gray Wolf Reintroduction in Yellowstone National Park" by Adam T. Switalski, June 2003, the conclusions were as follows. The coyotes adapted to the reintroductions of wolves. The theory that was proposed for this study was a firsthand collection

of data and observations, this is a more accurate way to collect firsthand data. The ethical dilemmas that came into play were the tracker not working or being able to locate the animal or be found later for data collection. Another dilemma is that the young coyotes and wolves are the most vulnerable to predators. This can lead to predator increase due to prey decrease or vice versa. Coyotes did have behavioral changes, there was a trade-off between their awareness and their feeding. The wolves became a quick source of food and were good for the coyotes energetically, but there was a higher risk of getting killed by other wolves. The number of dead carcasses that were available to coyotes might be negatively related to the size of the wolf pack. As the wolf pack increases in numbers there is a chance that the kills that are made by the wolves will provide less energy to the coyotes and other scavengers. This is because most of the carcasses are completely consumed by the wolves themselves. The competition for killings and good sources has made the coyotes quickly adapt when there is the presence of wolves, or if they tread into high-risk areas. The reintroduction of wolves and the behavioral changes of the coyotes, as a result, may have wide-ranging effects but none were studied. Since there was no study on the possibility of changing effects in the entire ecosystem of Yellowstone National Park, to continue this study, that information would be beneficial long term.

Population

For my peer-reviewed source on population "Estimating Occupancy and Predicting Numbers of Gray Wolf Packs in Montana Using Hunter Surveys" by Lindsey N. Rich, August 2013, the conclusions were as follows. The theory was to use multi-seasonal occupancy models to form an answer to the research question. One ethical dilemma or limitation that came up in this paper was the inability to account for the number of minimum counts underrepresented actual population sizes by comparing the model predictions to the number of new packs that

were discovered. Through their research, they collected primary data by interviewing and surveying hunters and gathered their information as well as their insights. The study area was very broad covering the entire state of Montana and the Gray Wolves in Western Montana. The Methods that were used were hunter survey data, assessing false positives, model covariates, and associated hypothesis, estimation of wolf pack occupancy and distribution, and prediction of the total area occupied and the number of wolf packs. The conclusions were "Our results indicate that multi-seasonal occupancy models based on public sightings can be used to monitor populations and changes in the special distribution of territorial carnivores across large areas where alternative methods may be limited by personnel, time, accessibility and budget constraints." (Rich, 2013). What can be done after this research is to improve the methods applied and continue the research done over time. The recommendations that were offered were to continue the research to gather more data to see if there were any changes in the process.

Dietary Habits

For my peer-reviewed source on dietary habits "Food Habits of the World's Grey Wolves" by Thomas M. Newsome, December 2015, the conclusions were as follows. The theory that was used matched their hypothesis, that the dietary diversity is lower in areas that are highly trafficked by humans because humans have caused environmental and ecological changes all over the world. Two main ethical dilemmas came up in this study. The first concern was the impacts on private and public livestock and the harm and prosecution because of those repercussions. The second concern was that Gray Wolves have adapted to eat smaller prey like rodents and birds, this recovery method might not be a lack of other prey but more of a societal acceptance and management due to having a new location and habitat. Secondary data was collected and revisions to already published literature on the dietary patterns of the Gray Wolf

were analyzed. I believe that the sampling size of data that was used was appropriate, but the study would have come out with clearer results if it had been focused on a smaller area rather than the entire world. The findings of the studies were as follows. There have been studies on the Gray Wolf but no detailed reports on their ecology. 117 studies compiled together as well as references to other sources in those studies were used. There was no evidence that the Gray Wolf diet varies globally but there were some results from Southern Europe that suggested that they do tend to switch their diets when there is a plentiful amount of prey available. The diversity of the Gray Wolf's diet shows that they can adapt to human disturbances and environmental challenges. There is a need to understand the Gray Wolf species in more detail and their connections with ecology in human-dominated locations. There is also a need to research the preventative measures that need to be taken to avoid human-wolf conflicts. The conclusion was there needs to be more research done on the human-wolf connections and ecology. "Our results show that future research needs to be focused on ascertaining whether maintaining healthy populations of wild prey, both small and large, could assist in conserving grey wolf population, while also reducing their impacts on livestock." (Newsome, 2015). What can be done after this research is to address the questions that were not answered properly in this study and continue more research on the wolf-human connections of new habitats as well as their changing ecology. The recommendations were "Therefore, it is critical that we increase our understanding of grey wolf foraging ecology in a broader range of habitats so that human attitudes and management decisions can be based on scientific knowledge. Without such knowledge, management strategies for grey wolves may continue to be focused on lowering perceived risks to humans and their activities, rather than also incorporating the benefits of grey wolves to human society and the environment (*sensu* Bruskotter & Wilson 2014)." (Newsome, 2015).

Habitat and Forestry

For my peer-reviewed source on Habitat and Forestry "Cumulative Effects of Forestry on Habitat Use by Gray Wolves (Canis Lupus) in the Boreal Forest" by Mélina Houle, 2010, the conclusions were as follows. The proposed theory was cut into three parts. The first part was to use GPS radio collars, these were put onto captured Gray Wolves in each pack by net-gunning from a helicopter in winter or by using foot-hold traps in the summer. The locations of the Gray Wolves that were trapped and had GPS tracking devices were monitored every 4 hours from March 2005 to March 2007. The locations and data were collected after retrieving the GPS collars. 17,906 locations were procured and located in the span of the two years. Secondly, The Geographic Information System (GIS) characterized the study area by elevation, slope, hard edge density, and snow depth. Thirdly the habitat selection models were assessed by using recourse selection functions or RSFs. RSFs are classes of functions that asses which habitat characteristics are vital to a specific species by assessing the probability that the species has in using a certain resource available in its environment. This mathematical function gives a measured proportion to the probability of resources by the Gray Wolves. There was one ethical dilemma that came up in this study. The effects varied with seasons, as well as the breeding seasons that changed the location patterns. There was a decrease in the selection of roads following an increase in the local road density during the nomadic or emigrational periods but not during the hibernation periods. The findings or summary of the report were as follows. "We evaluated the cumulative effects of forestry on habitat selection by six packs of gray wolf (Canis lupus) widely distributed in Quebec's boreal forest. Resource selection functions were used to evaluate cumulative effects at two levels. First, we studied how the response of wolves to roads and cut blocks varied within their home range (HR level) as a function of the local abundance of these habitat features.

Second, we assessed whether differences in the response to roads and cut blocks observed among packs (inter-HR level) could be explained by variations in their average abundance among individual home ranges." (Houle, 2010) The conclusions were that the average road density and cut block abundance cannot explain the inter-pack differences, but they can during the Gray Wolf's denning period. "We found that cumulative effects shaped habitat selection of wolves, and the nature of the effects varied during the year." (Houle, 2010). What can be done after this study and what is recommended for future research is effective management of wolf habitat in human-altered landscapes that require more consideration of their cumulative effects in the future.

For my second peer-reviewed source on habitat, "Identifying Potential Gray Wolf Habitat and Connectivity in the Eastern USA" by M. Van Den Bosch the conclusions were as follows. The theory that was used for this research was to assess the role of protected and unprotected land in wolf-recolonizing areas to manage and develop plans for their survival. Additionally, evaluating recolonization on a national level can help in better understanding and learning where other recolonization areas might be and the positive and negative impacts they will have on human interaction. This will also give the information if human assistance will be needed why the wolves moved, and whether their land before became unsuitable or not. There were no ethical dilemmas in this study since the information was taken from other studies who already gone through their dilemmas in their processes. The data that was collected and analyzed was the "winter wolf track survey data that was collected by the Departments of Natural Resources (DNR) of Minnesota, Wisconsin, and Michigan." (Van Den Bosch). The summary of the findings is as follows. The understanding of where, how and the effects of recolonization of the Gray Wolf is a very important aspect in the conservation efforts being made. This case study

dives into the specifics using the "winter track survey data that was collected by the Departments of Natural Resources" (Van Den Bosch). By using this survey data, they could then analyze and come up with deeper knowledge on this issue. The estimation was that 34.7% of land in the Eastern U.S. was potential for Gray Wolf reintroduction. The results were that they only occupy 11.9% of the land that was estimated. There was also a "total linkage area of 26,871km^2" (Van Den Bosch) which is within protected land. Despite the changing landscape due to human disturbances, there are plenty of well-suitable areas for Gray Wolves to inhabit. Knowing where and the number of reintroduced carnivores can help better prepare the area and the humans in or in surrounding areas to be better notified. This with ensure successful coexistence with humans. "Our final distribution model has good performance and suggests wolves selected against areas with greater human population densities and proportions of agricultural land. Gray wolves currently occupy about 4% of their historical range in the eastern USA, which represents 12% of the area estimated to remain suitable." (Van Den Bosch). What we can do now that we know this is several parts of the eastern U.S. that will not be recolonized naturally but there is plenty of space in the remaining parts of the U.S. where wolves can inhabit and have successfully done so. Other than the availability of habitat, the recolonization, conservation, and persistence of these aspects will require humans to share their land with this species and others. The recommendations are "Knowing where and how large carnivore recolonization may occur can aid in prioritizing areas for conservation and promoting successful co-existence with humans." (Van Den Bosch).

Conservation

For my peer-reviewed source on conservation "The VIPs of Wolf Conservation: How Values, Identify, and Place Shape Attitudes Toward Wolves in the United States" by Shelby C.

Carlson, 2020, the conclusions were as follows. The theories that were used to analyze the data that was procured in the methods section can be broken down into four parts. First analyze the region of the U.S. which is the Northern Rocky Mountains, and the Western Great Lakes region. Second was the analysis of the sociodemographic characteristics such as age, gender, income, and urban and rural residencies. Thirdly, the background education of the individuals who were chosen for the study was established. Fourth are the wildlife value orientations on mutualism and domination. The ethical dilemma that came up during this study was the finding that the farmers and ranchers were the most negatively affected group when wolves entered their property. The data that was collected was secondary data and analysis of the data was studied by a survey conducted by Bruskotter et al. (2018). The data was obtained by using one-way variance tests and hierarchical regression analyses to provide answers. The summary of the findings was as follows. The attitudes towards wolves have always been more negative than positive. However, scholars have noticed that the attitude towards this species is an important factor in the conservation process. To understand this the analysis was broken down into four sections. The results from this analysis found that attitudes do not tend to differ across regions, but the ones who come into more contact with the species have a more negative attitude, farmers/ranchers. The United States' attitude at the national level has become a lot more positive. The conclusion that was drawn from the study was, "Found that attitudes do not statistically differ across regions with wolves (compared to regions without wolves), yet the people who identify with interest groups most likely to directly impact or be impacted by wolf populations, such as farmers/ranchers, are less tolerant of wolves when they live closer to them when accounting for individual-level values." (Carlson, 2020). What we can do now that we know this is "we do not expect that removing federal protections will increase tolerance for wolves; rather, such

decisions are likely to result in greater levels of harvest and lethal control…which could significantly impede wolf recovery efforts." (Carlson, 2020). The recommendations that were provided are as follows. "In order to further disentangle the complexity and intersectionality of VIPs as it applies here, we additionally advocate for future analyses to employ multilevel modeling that can address impacts of group level characteristics above and beyond individual level characteristics (as cone by Dietsch et al., 2016)." (Carlson, 2020).

Governmental Results

Department of the Interior

The first governmental peer-reviewed source is the Department of the Interior. ""This Land Was Made for You and Me" *- And Them: Why and How the Department of the Interior Should Give Greater Consideration to the Gray Wolf's Historical Range" by Amy Collier, 2018. The proposed theory was that the issues regarding the Department of the Interior and the re-listing and de-listing of the endangered Gray Wolf have effects on other species. There were two ethical dilemmas that I found in this paper. The first is that Collier does not dispute the Fish and Wildlife Service's (FWS) position that the Endangered Species Act (ESA) does not recommend the restoration of the Gray Wolf across the entire historical range. The second ethical dilemma that I found was if wolves cannot safely disperse then there can be increased pressures within their core packs that can disturb their ways of living. Secondary data was collected on the history of the ESA in connection with FWS and Congress as well as the Department of the Interior. The summary of the paper is as follows. The ESA and FWS have been using their ways to combat the decline of the endangered species of the Gray Wolf. Their efforts have not been providing to be effective due to the Grey Wolf being listed and delisted from the endangered species listing which provides them with the necessary support. The FWS's delisting of the Gray Wolves failed

to give sufficient consideration to both the wolf's historical range and the remaining populations that were outside the new Distinct Population Segment (DPS). There were a few conclusions that were drawn from this research. First, several other species would benefit from the same amount of research that has been done on the Gray Wolf, one example being the Bald Eagle. These other species continue to face numerous legal battles over their habitat range and endangerment status. Secondly, the Gray Wolf has endured years of legal battles over its classifications under the ESA. Understanding the principles and history of the species leads to more thoughtful wildlife management decisions that affect a whole range of species. What we can do now is we need to suggest a deeper understanding of the Gray Wolf's consideration of their historical range as well as other species to help them through their legal battles. The recommendations were, given the Gray Wolf's adaptability and successful recovery period when in close contact with human-caused morality, it is necessary to keep an eye on this and have a deeper consideration of the wolf's historical range as well.

Endangered Species Act (ESA)

The second government peer-reviewed source is on the Endangered Species Act, "Prolonged Gray Wolf Endangered Species Act Listing Fluctuation and Policymaker Response in the United States" by David Ross Price Martin, 2020. The theory that was proposed was to identify other possible motivators for the delisting of the Gray Wolf. This theory is important because it is necessary to understand why delisting and relisting occur from every angle. The ethical dilemmas that were brought up in this paper were the complex series of listing decisions as well as the identification of who was mainly responsible for the fluctuations. The data that was collected for this report was secondary data on the history of the ESA, Congress, and other listing and delisting factors of the Gray Wolf. The Summary of the findings in this paper is as

follows. The U.S. Fish and Wildlife Service (USFWS) delisted the Northern Rocky Mountain (NRM) Gray Wolf from the Endangered Species Act in 2008 due to a lack of genetic connectivity. Environmental groups sued and a judge issued a preliminary injunction. The delisting threatened the possibility of the newly released wolves intermixing, which is essential for maintaining genetic diversity. The decision was more difficult to justify in the case of the NRM Distinct Population Segment (DPS) due to Wyoming's poor state protection plan. The Congressional Western Caucus introduced an ESA modernization package in July 2018. The package included bills that would delist Western Great Lake (WGL) wolves and prevent judicial review. These efforts, along with bills that restrict the ability for interest groups to be reimbursed under the Equal Access to Justice Act, unfairly focus on one side of the overall conflict. The last two bills seem ill-advised when considering some state governments' negative responses to the listing of the Gray Wolf. The conclusions that can be drawn from this are as follows. In the attempt to identify the systematic failures that make up the ESA listing and delisting fluctuations of the Gray Wolf, the policymakers' responses to these fluctuations were analyzed and found to be inadequate, along with the ESA concerns. The solution to this issue is to push and force the bureaucratic backburner to avoid it going back into a backlog, but that is easier said than done. The recommendations for the future are that Congress should give the USFWS the tools it needs to properly implement the ESA as it was indented and as it still functions.

Symbolism and Human-Wolf Connectional Impacts Results

For my peer-reviewed source "The Gray Wolf as a Symbol or a Subject of Science" by Kira A. Cassidy, 2022, the conclusions were as follows. This paper was primarily written by Cassidy with her knowledge of the topic, due to this there was no theory other than a justification

of her ideas. There were a lot of ethical dilemmas and negative opinions that were brought up in this paper. First, it is easy for people to replace the wolf itself with the symbols connected to wolves. This has made the management of the wolves a lot more complicated and more disputed than for any other endangered species in the U.S. and the management of the wolves has been stigmatized by our sustained liking and usage of their symbols. Secondly, when wolves were reintroduced in several states in the western parts of the U.S., many people decided to express their own opinions and thoughts on this topic on the internet. This shows that the wolf's symbolism affected the perception of the population on the issue of their endangerment. Thirdly in this situation, science comes out as the opposing force to the population's knowledge of wolves. The population has difficulties in opposition to their own opinions, and the scientific data is being swept to the sidelines. These damages and distrust in science were causing harm in the rehabilitation of endangered species. Fourth, because of the century-long symbolism of wolves, trying to eliminate other peoples' justifications against the scientific facts would be working against years of human psychology making it almost impossible. The data that was collected was secondary personal data, opinions, and information. The report summarized that it is hard to work against the thousands of years of human psychology in thinking that the symbolism, thoughts, and feelings about wolves are more accurate than science. This is necessary in the effort to preserve the Gray Wolf species from endangerment. The conclusion was "Those making the decisions about how many wolves there should be and where they should be eliminated or protected were certainly influenced how their viewed wolves: by their own wolf-identity, lup-entity." (Cassidy, 2022). Because the Gray Wolf's scientific name is Canis Lupus Cassidy formulated a word for people having their identity of the Gray Wolf as a lup-entity. From this report on the symbolism and the connection to scientific data and the effect

it has on the endangered Gray Wolf population, this is what we can do now. “To untangle the Gray Wolf from politics and get back to science-based wolf management, we need to examine and manage our own lup-entities; seek knowledge from trusted sources of wolf research and science; and reshape that lup-entity so that the foundation is in truthfulness” (Cassidy, 2022). Some of the recommendations to solve this issue are to understand the difference between non-science and actual scientific facts that are giving us information on the Gray Wolf species. The internet has a lot more accessible unqualified sources than qualified sources on this topic which is one of the biggest dangers to the charities and other organizations that need support to protect the Gray Wolf.

What Would Happen if Gray Wolves Were Reintroduced in New York State?

For every state in the U.S., there are specific laws and regulations about endangered species in the area. For New York, the Department of Environmental Conservation (DEC) is the one in charge of endangered or threatened species regulations on a government level. There are also many rehabilitation facilities and organizations that prioritize the endangered Gray Wolf species. The prey available for the Gray Wolves is also abundant, but the land area and the human-wolf interactions are the biggest issue, just like the rest of the country. In this section, I will dive into the question if it’s possible to reintroduce Gray Wolves to New York State.

New York Department of Environmental Conservation

The NY Department of Environmental Conservation or DEC for short, protects the endangered Gray Wolves governmentally. How their endangered species regulations work is under the State Environmental Quality Review Act. “SEQR requires all local, regional, and state

government agencies to equally examine the environmental impacts along with the social and economic considerations for a certain project, or *action,* during their discretionary review." (NYDEC). NYDEC assesses environmental impacts on endangered species and recommends ways to reduce them. NYDEC also regulates the activities that result in harm to the listed endangered species or harm to the habitat they live in. Some regulations require permits for taking threatened or endangered species or causing them or their habitat harm. These permits can be acquired and are called Incidental Take Permits. The Incidental Take Permits only apply to endangered or threatened species. The word "take" in the incidental take permit is only allowed to be justified by court decisions. The NYDEC determines if a habitat is occupied by protected species based using verified reports. The NYDEC collaborates with the New York Natural Heritage Program to map verified reports and provide screening tools. Habitats are considered occupied if the same species is observed using the field for breeding. Only 600 projects were near protected species in 2015, and only 5 required an incidental take permit. Permits are required for activities that may harm listed animals or their habitats. The NYDEC acknowledges that forested habitats support endangered and threatened species, but the conversion of forests for land development activities could potentially affect their survival in the long term. With forests covering more than half of New York's landscape, it is crucial to consider the impact of such activities on protected species and their habitats. But like every organization and governmental support, there needs to be consistent funding to support these issues. Additionally hunting regulations will have to be put into place which can cause distress and backlash from the hunting population.

Wolf Conservation Center, Salem New York

In New York, there is one conservation center in the town of Salem that has made major impacts. The Wolf Conservation Center or WCC for short has been working to support the Species Survival Plan (SSP) since 2003. The WCC is one of the three biggest conservation and rehabilitation facilities for Gray Wolves in NY. This facility holds the wolves in secure and livable enclosures that are not open for public viewing. The WCC encloses their wolves and gives them as little human interaction as possible in their attempt to later release them back into the wild. "This will ensure they have a greater probability of being successful if they are released into the wild as part of the recovery plan." (WCC, 2018). The WCC has Red Wolves, Mexican Gray Wolves, Eastern Wolves, and Eastern Coyotes in their enclosures. "Our mission is to advance the survival of wolves by inspiring a global community through education, advocacy, research, and recovery." (WCC, 2018). There has been a comeback in the Gray Wolf population, although slow, and funding has been hard to achieve. Today in the U.S. (2022), there is a single wild population compromising 241 individuals." (WCC, 2018). The WCC supports the Mexican Gray Wolf Recovery Program (as well as rehabilitating Red Wolves and Grey Coyotes), to restore wolves to their ancestral range in the southwest United States and Mexico. Eight wolves have been released from the care of the WCC restoration program.

Population and Human-Wolf Interactions, Adirondacks

The numbers of the endangered Gray Wolf population have been on the rise. "Some advocates are calling for New York State and federal Wildlife agencies to assist with the population boost." (Adirondack Wolves). But this has led some people to be scared about the species returning to now-populated land by humans. With the education brought to their attention, it is known that wolves generally don't attack unless they are provoked just like bears

and other carnivorous species. “Although some may fear that an increase in the wolf population will lead attacks on humans, those familiar with the species insist that wolves don’t see humans as prey, and therefore are not predisposed to attack them.” (Adirondack Wolves). The DEC has expressed their lack of interest in assisting Gray Wolves due to the lack of funding and personnel able to do this job. For coyote hunters to not hunt the wolves out to worse endangerment or even extinction, specific hunting regulations would need to be put into place. But despite these downfalls, the Gray Wolves have naturally reproduced and increased their population as well as moving into other areas. Some areas that are similar to the Adirondacks are the Great Lakes Region and Canada.

Land Available for Reintroduction

There is enough land in the upstate region of New York State for wolves to reinhabit. “Although Gray Wolves were exterminated from New York more than a century ago, there are tens of thousands of square miles of potential wolf habitat in the Northeast, much of New York. Wolves live just 60 miles north of the New York border—a distance a wolf can travel in under two days.” (Biological Diversity). Hunting and human-wolf co-existence remains the number one issue. Northeast wildlife agencies have not made the appropriate publicity about the wolves’ return to the wild and their protected status. This makes the Gray Wolves unprotected from coyote hunters and trappers who have in the past mistaken wolves for coyotes. With the implication of stricter hunting laws, the Gray Wolf population and habitat will be supportable.

Diet Available in New York

Gray Wolves' diet adapts to their habitat and the food that is most readily available to them. Gray Wolf's typical diet is made up of deer, elk, coyotes, and other mammals which are in abundance in NY. A study came out in 2011 that discovered that Gray Wolves have adapted to catch and eat fish. Fish are readily available in New York due to the number of streams and rivers in the state as well as being on the coast. "Typically moose, deer, and caribou make up a gray wolf's diet, but a growing body of research reveals that animals living along the coasts depend on other sources of food. Some biologists, including Alaska Fish and Game biologist Dave Person, who has been studying gray wolves on Prince of Wales Island for 12 years, have found that salmon accounts for up to 20 percent of a coastal wolf's diet." (Cosier, 2011). These discoveries give more hope to the reintroduction of the Gray Wolf population in New York State.

Conclusion

In conclusion, my results do answer my research question and match my hypothesis, what positive impacts do acts, laws, regulations, research, and conservation have on the Gray Wolf population, and what are the next steps to ensure their survival? I hypothesized that the endangered Gray Wolf population has a lot of positive support from acts, laws, regulations, research, and conservation, but that there are a few dilemmas that have caused their support to diminish. With my ecological and environmental results from my peer-reviewed sources I found that under reintroduction and recolonization, the wolves have adapted to capture an adequate amount of prey and can co-exist with coyotes. Under population, studies need to be more concise with location and need to be continued, but the results have hope for the future. Under dietary habits the Gray Wolves can adapt to human existence and their dietary habits can change

accordingly. Under habitat and forestry, there is enough land for reintroduction and the slowly growing population of the endangered Gray Wolf. Under conservation, the people who are trying to make an impact in conservation are having a rough time with farmers/ranchers who are very much opposed to the wolf's reintroduction. With more research and partnerships, the results can be more positive. The next group of results were Governmental connections to the endangered Gray Wolf population. Under governmental the results were that more funding and support as well as more people wanting a change needed to occur. The results from the peer-reviewed article on symbolism show that the separation of scientific and noncredible sources is extremely important for the survival of endangered populations. Lastly, the results for the question, what would happen if Gray Wolves were reintroduced to New York State? The DEC needs more funding and more reasoning to establish the movement to protect this species. The WCC is working hard on their mission to release and safely enclose wolves that need extra human-aided assistance. There needs to be more laws and regulations set on the hunting of coyotes that might be mistaken for wolves in the same areas. There is plenty of land and food in upstate New York for the reintroduction to occur. With time and with more steady, strong, and dedicated people for this case, it is more than feasible that the endangered Gray Wolf can live happily and healthy in the state of New York.

Chapter 6: Discussion/Conclusions

In conclusion, I now have the answer to my research question, what positive impacts do acts, laws, regulations, research, and conservation have on the Gray Wolf population, and what are the next steps to ensure their survival? The Gray Wolves have a lot of positive support from the acts, laws, regulations, research, and conservation and have a good outcome for their continued reintroduction and survival. What can be done now is to gain publicity on the issue of the endangered Gray Wolf population. To make this a positive impact we must publicize accurate scientific research. Another thing that can be done now is to support and donate to local, conservation, scientific, and governmental organizations that are supporting and aiding in the return of the endangered Gray Wolf population. Some recommendations that can now be brought to our attention are the continued research and understanding of the endangered Gray Wolf population as well as other endangered species.

Acknowledgments

Words cannot express my gratitude to my professors, role models, mother, and peers who have supported me through my journey of education. My professors at SUNY Purchase College have given me knowledge and support on many topics throughout my studies. They have all made an impact on my academic journey, but I would like to give an extra special thank you to Mara Horowitz who has not only been my professor for a few of my classes but also my wonderful advisor and assisted me in writing this final paper.

I am also grateful for my mother who has supported me through all my academic achievements over these many years and given me the opportunity to take the classes that I desired. I also want to thank my mother for helping me work through my academic disabilities to get me where I am now.

Lastly, I want to thank my role model Jane Goodall for inspiring me for so many years. Seeing her talk in person gave me so much hope for my future in animal conservation. I dedicated my graduation cap to her with the quote “And so began one of the most exciting periods of my life, the time of discovery.” – Jane Goodall.

References

Adirondack Wolves - A Once-Extinct Species Returning To The Adirondacks. (n.d.). Adirondack.net. https://www.adirondack.net/wildlife/wolves/

Carlson, S. C., Dietsch, A. M., Slagle, K. M., & Bruskotter, J. T. (2020). The VIPs of Wolf Conservation: How Values, Identity, and Place Shape Attitudes Toward Wolves in the United States. *Frontiers in Ecology and Evolution*, *8*. https://doi.org/10.3389/fevo.2020.00006

Cassidy, K. A. (2022). The gray wolf as a symbol or a subject of science. *Frontiers in Ecology and the Environment*, *20*(3), 135–135. https://doi.org/10.1002/fee.2487

Collier, A. (2018). "This Land Was Made for You and Me"—And Them: Why and How the Department of the Interior Should Give Greater Consideration to the Gray Wolf's Historical Range. *Ecology Law Quarterly*, *45*(2), 289–326. https://doi.org/10.15779/Z38V11VK7G

Cosier, S. (2011). *Studies Show that Wolves Eat Seafood | Audubon*. Www.audubon.org. https://www.audubon.org/news/studies-show-wolves-eat-seafood

Fisheries, N. (2022). *Glossary: Endangered Species Act | NOAA Fisheries*. NOAA. https://www.fisheries.noaa.gov/laws-and-policies/glossary-endangered-species-act#:~:text=Under%2520the%2520Endangered%2520Species%2520Act%252C%2520a%25

Frank, Jacob W. "Gray Wolf." *Defenders of Wildlife*, defenders.org/wildlife/gray-wolf#:~:text=Wolves%20are%20threatened%20by%20conflict,and%20federal%20endangered%20species%20laws. Accessed 29 Apr. 2024.

Houle, M., Fortin, D., Dussault, C., Courtois, R., & Ouellet, J.-P. (2010). Cumulative effects of forestry on habitat use by gray wolf (Canis lupus) in the boreal forest. *Landscape Ecology*, *25*(3), 419–433. https://doi.org/10.1007/s10980-009-9420-2

Martin, D. R. P. (2020). Prolonged gray wolf endangered species act listing fluctuation and policymaker response in the United States. *Biological Conservation*, *242*, 108408-. https://doi.org/10.1016/j.biocon.2020.108408

New Report IDs 350,000 Square Miles of Additional Habitat for Wolves in Lower 48, Including Grand Canyon Area Where Wolf Recently Spotted. (n.d.). Www.biologicaldiversity.org. https://www.biologicaldiversity.org/news/press_releases/2014/wolf-11-03-2014.html

New York's Endangered Species Regulations - NYSDEC. (n.d.). Dec.ny.gov. https://dec.ny.gov/nature/animals-fish-plants/biodiversity-species-conservation/endangered-species/regulations

Newsome, T. M., Boitani, L., Chapron, G., Ciucci, P., Dickman, C. R., Dellinger, J. A., López-Bao, J. V., Peterson, R. O., Shores, C. R., Wirsing, A. J., & Ripple, W. J. (2016). Food habits of the world's grey wolves. *Mammal Review*, *46*(4), 255–269. https://doi.org/10.1111/mam.12067

Orning, E. K., Dugger, K. M., & Clark, D. A. (2021). Gray wolf. *Canadian Journal of Zoology*, *99*(10), 902-. https://doi.org/10.1139/cjz-2021-0027

Rich, L. N., Russell, R. E., Glenn, E. M., Mitchell, M. S., Gude, J. A., Podruzny, K. M., Sime, C. A., Laudon, K., Ausband, D. E., & Nichols, J. D. (2013). Estimating occupancy and predicting numbers of gray wolf packs in Montana using hunter surveys. *The Journal of Wildlife Management*, *77*(6), 1280–1289. https://doi.org/10.1002/jwmg.562

Switalski, T. A. (2003). Coyote foraging ecology and vigilance in response to gray wolf reintroduction in Yellowstone National Park. *Canadian Journal of Zoology*,

Van Den Bosch, M., Beyer, D. E., Erb, J. D., Gantchoff, M. G., Kellner, K. F., MacFarland, D. M., Norton, D. C., Patterson, B. R., Price Tack, J. L., Roell, B. J., & Belant, J. L. (2022). Identifying potential gray wolf habitat and connectivity in the eastern USA. *Biological Conservation*, *273*, 109708-. https://doi.org/10.1016/j.biocon.2022.109708

Ward, E. (2020). The Gray Wolf Under the Endangered Species Act (ESA): A Case Study in Listing and Delisting Challenges. In *Congressional Research Service*. https://crsreports.congress.gov/product/pdf/R/R46184

Wolf Conservation Center. (2018, April 4). Wolf Conservation Center. https://nywolf.org

Appendix

1) Endangered Species Act (ESA) seen on pages… 1, 2, 5, 6, 7, 8, 13, 14, 16, 29, 30, 31

Full PDF- https://www.fws.gov/sites/default/files/documents/endangered-species-act-accessible.pdf

2) "Map by Curt Bradley, Center for Biological Diversity. This map and wolf photos are available for media use." (Biological Diversity, 2014).

This map shows the Gray Wolf's Historical Range (prior habitat before deforestation and hunting in the 1800s), potential habitat stated by conservationists and government organizations, and the area where the Gray Wolves inhabit now (2014). (Source number 8 under References).