COLORADO STATE UNIVERSITY EXTENSION

NATURAL CAPITAL EVALUATION OF THE COLORADO WHITE RIVER ELK HERD

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Project Overview

Elk are a vital Colorado resource. Not only are elk heavily connected to the state identity, but they also generate significant economic activity from hunting licenses and hunter spending. This project attempted to provide an economic valuation of this resource.

We created an economic model in R using the capN method developed by Fenichel and Abbott 2014. To apply this model to hunting in Colorado, we adapted the work of Kirkland et al. 2024 which incorporated the capN method to the Jackson Hole elk herd in Wyoming. For our model, we evaluate the net present value of the White River elk herd. This herd is the largest in the nation and inhabits the area where we conducted interviews, including Garfield County and parts of Rio Blanco and Moffat County.

Hunting also provides significant economic contributions to small town rural economies in this region. We interviewed a local outfitter and a local business owner to independently express the importance of hunting in the region.

Our results show the general shape we expect NPV and Shadow Price figures to take. It also allows us to show distributive flows of money. As an example, I compared NPV of the herd under the current license allocation to the estimated NPV if all licenses went out of state

Goals

Develop a method of elk valuation that can be expanded upon and applied to other herds/species in Colorado

Capture the importance of hunting to the local community from the perspective of those who live and work in the area.

Application To My Education

This project is heavily intertwined with my education, as completing this project has given me a jumping off point for my thesis. Familiarizing myself with the capN model has been incredibly beneficial, as this is the same method I will use in my thesis.

While my research may not continue with hunting issues, it will certainly be with natural capital. Working on this project has given me experience thing about natural capital valuation and working through the fine points of model building with natural capital

Project Steps

- Research Colorado elk herd dynamics, Colorado hunting management and policies, and how natural capital evaluation has been used on game populations in the past
- Collect and organize public data on Colorado elk populations and hunting license allocation
- Create model functions, i.e. elk population growth, elk license quantity, hunter elk harvest, hunter surplus, government revenue
- ❖ Output Net Present Value (All “benefits” or “dividends” discounted over time till infinity) and Shadow Price (how adding one elk changes NPV)
- Display results and change data values or model functions to consider alternative scenarios
- Interview local outfitter and business owner to expand on the impact to local economies as well as the non-monetary value of hunting

Conversation With Locals

Outfitter: All businesses in town rely on hunting in one way or another. Without hunting in the area, even Walmart would likely change drastically. Hunting provides vital supplementary income to farmers and ranchers in the region. This additional income, in many cases, sustains the farming/ranching operation.

Business Owner: These small Colorado towns are now primarily tourist communities, and businesses reflect that. Businesses always try to diversify, but many businesses operate solely from hunting clientele, e.g. taxidermy, gun shops, UTV rentals.

-Both expressed that, beyond being a source of revenue, hunting is important to the local identity. Many local residents/business owners hunt themselves. Both told me that they would be willing to sacrifice revenue in exchange for herd and ecosystem health.

Figures

- *Figure 1: Total NPV (millions $) given elk stock (herd count)*
- *Figure 2: Shadow Price (change in NPV from an additional elk) given elk stock, 80% resident, 20% non-resident*
- *Figure 3: Shadow Price, 100% non-resident*
- *Table: In-state and out-of-state benefits were 80% of licenses are resident, 20% are non-resident, and stock level is the average level (39,692)*

Charts and Graphs

Figure 1

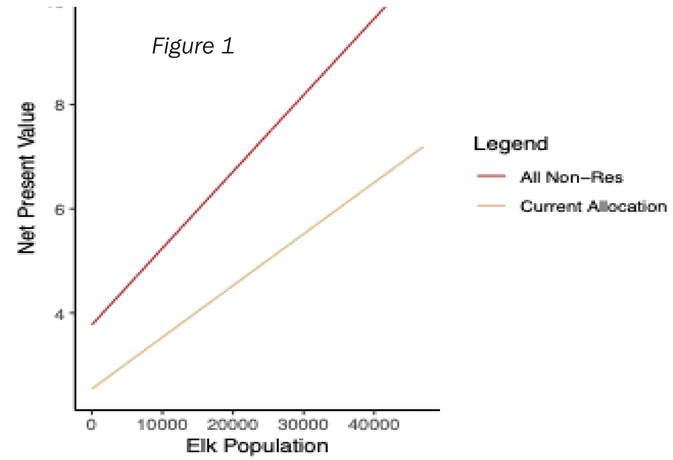


Table	In State Benefits	Out Of State Benefits
80 Res : 20 NonRes	$5,021,676.00	$1,454,023.00
0 Res : 100 NonRes	$2,337,706.00	$7,270,116.00
Diffrence	-$2,683,970.00	$5,816,093.00

Figure 2

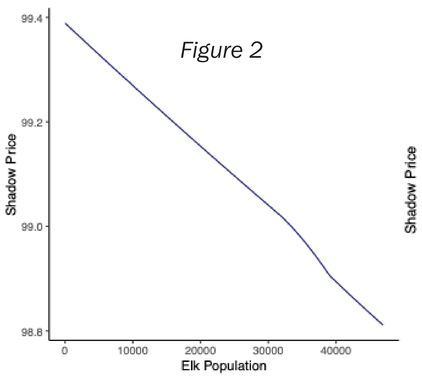
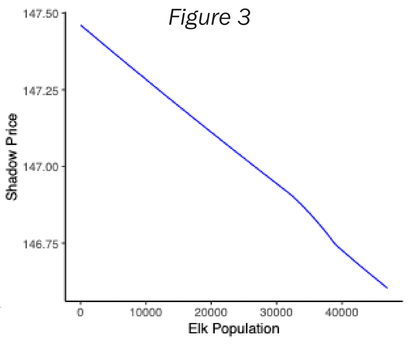


Figure 3



Future Work

- ➢ Improve existing values and functions or add new ones
- Survey hunters or use travel cost for better willingness to pay values (also expand across resident/non-resident)
- Improve existing functions to more accurately reflect the real world (e.g, modeling the preference point lottery)
- Adding missing values/functions into capN (e.g, local business revenue, non-use values like wildlife watching or ecosystem services