

AN EXAMINATION OF COVER TYPES AT THE DENTON GREENBELT AND THEIR EFFECTS ON BROWSING, WITH A 3-DIMENSIONAL PORTRAYAL OF THE STUDY AREA

By David Waterstreet
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Dr. Minhe Ji

Introduction

Environmentalists concerned with isolated populations of animals are currently looking into ways to reopen areas for species to migrate between inhabitable areas. A University of North Texas Student is undertaking a study funded by the Army Corp of Engineers. Troy Bruce, examines whether the Denton Greenbelt serves the purpose as a migration pathway from the north end of Lewisville Lake to the South End of Lake Ray Roberts.

This research involves the native deer population with an emphasis on tracking the movements of 15 subjects with the use of radio telemetry. Data has been collected on deer movement patterns for over one year. Some of that information is included as part of this report.

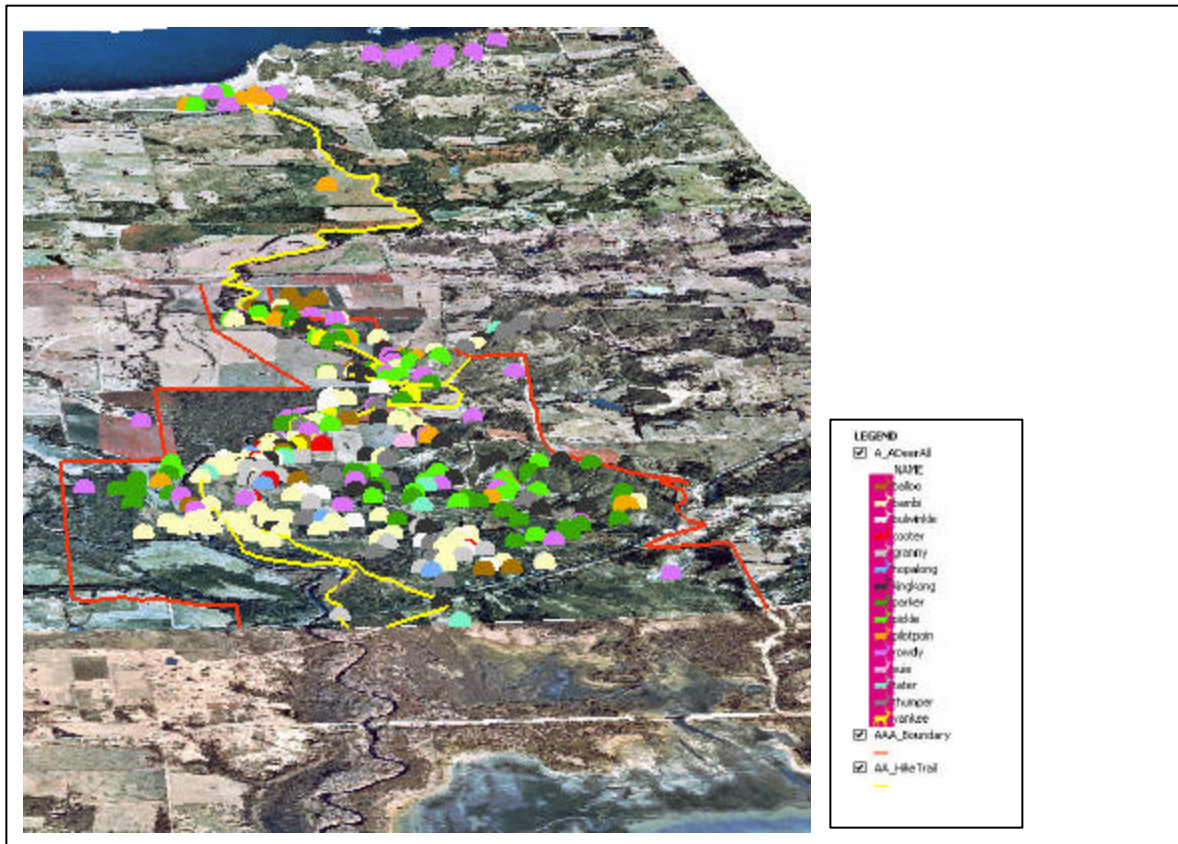
The ultimate purpose of this report is to show the skills that have been acquired in one year worth of training in GIS. In order to portray some of the methods that have been learned in class, this paper is divided into two areas that will be put together as a study of deer movements at the Greenbelt. The first area deals with one of four major habitat components necessary for survival, growth and reproduction of deer populations: food, cover, water, and space. The scope of this paper is limited to cover. Three general cover types have been identified as part of the study area: 1) lightly covered – pasture land, farm land, and areas that no longer serve these roles but are currently predominated by grasses and low shrubs, 2) moderate cover – areas that are predominantly inhabited by sparsely populated mesquite groves or other species of lower growing trees and shrubs, 3) heavy cover – areas consisting of heavily forested areas with a high percentage of full canopy cover. The second area of this paper deals with a 3-dimensional image of the study area that has been produced using tools in 3D Analyst and portrayed in ArcScene.

Two questions accompany the data that has been obtained, processed, graphically represented in the following pages: 1) what percentage of deer have been spotted near the border of the three cover types? Hunters and those who study deer habits note that deer are generally found near a tree line or the border of heavy or moderately covered areas. 2) What observations can be made by looking at the study area in a three dimensional image? Although the author is familiar with the study area and has been the span of the park on several occasions, it is eye opening to have a tool that allows a person to review gathered data spatially with a visual representation along the x, y, and z, axis.

Several sources dealing with preferential deer habitats and movement patterns were reviewed prior to beginning this paper. Most of the articles that are referenced at the back of this report confirmed information already known by the author. Significant information is included in the following relevant sections figures and attachments.

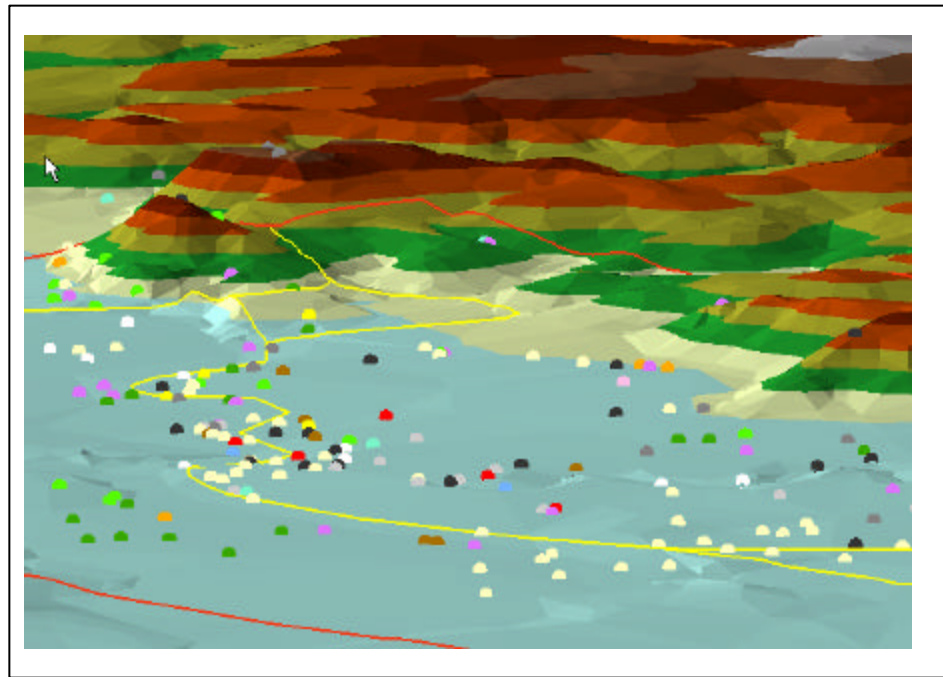
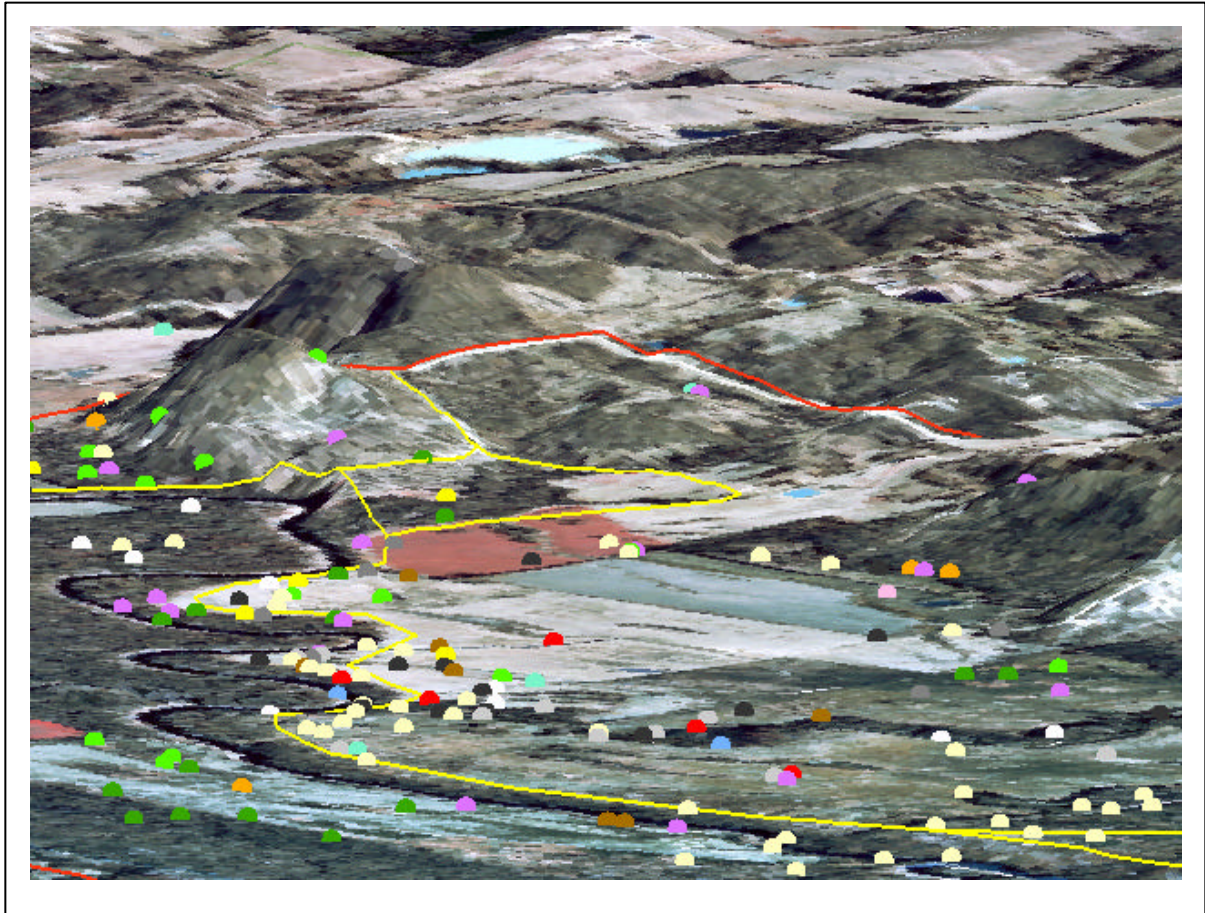
Methodology and Findings

The study area is shown below and depicted by Lake Ray Roberts to the north and Lewisville Lake to the southeast (bottom right-hand corner).



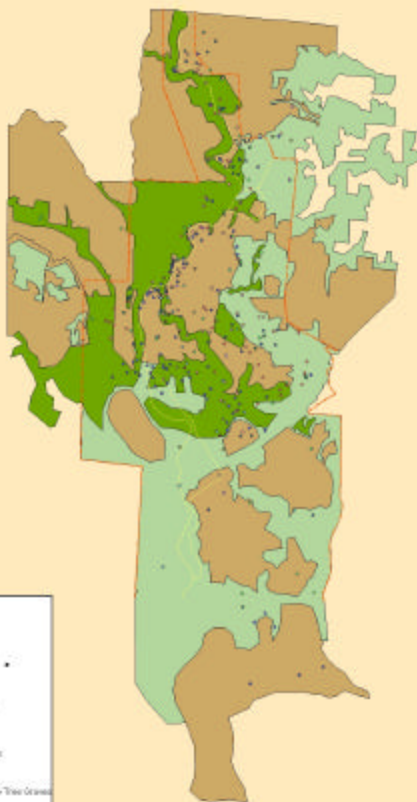
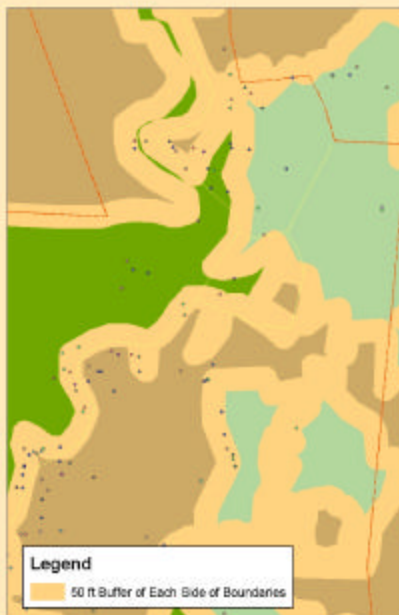
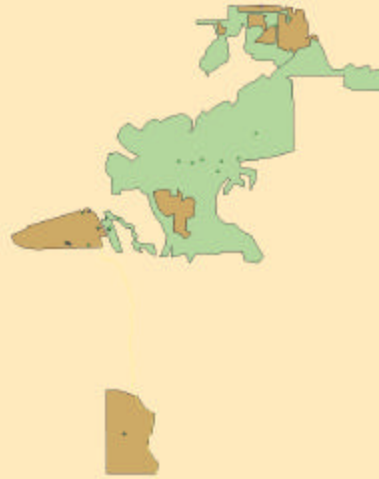
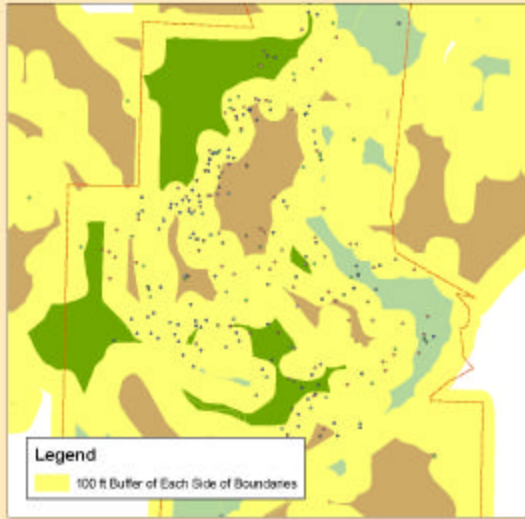
The above image was taken from TINRIS and overlaid onto DEM data. The process included taking the DEM data and converting it into three TIN layers. The Tin Layers were then draped over by the three TIFF file images. The three shape files were added after setting their base heights to that of the middle TIN. The outcome is the above image portrayed in three dimensions.

The image shown below is a rendering of the middle, more heavily populated area of the Greenbelt. The yellow line is the trail, the red line denotes a portion of the property boundary and the multi-colored points denote the different spotted deer locations. A legend is provided on the prior page.



The image to the left is the TIN that was used to create the top image. It shows the elevation layers clearly.

DEER COVER TYPES AND DEER LOCATIONS AT THE GREENBELT IN DENTON COUNTY, TEXAS



The map shown on page 4 depicts the three major cover types observed on the Greenbelt. In this map the shape files are used to observe where deer, individually and as a total population, are spotted in each cover type. The Top left photo is a close-up image of the cover type map and has been buffered at 100 feet from each bordering cover type. The lower left map is also a cover type map that has been buffered at 50 feet.

From the attribute tables and using the field calculator, the following statistics were calculated.

NAME	TIMES SITED	% IN 50 FT BUFFER	% IN 100 FT BUFFER	% IN HEAVY COVER	% IN MODERATE COVER	% IN LIGHT COVER
Baloo	15	40	67	13	0	87
Bambi	80	60	83	54	20	26
Bulwinkle	18	39	67	78	0	22
Cooter	10	50	60	50	0	50
Granny	20	55	75	45	20	35
Hopalong	4	50	100	100	0	0
Kingkong	38	47	87	26	29	45
Parker	46	54	76	43	22	35
Pickle	34	59	0	44	26	29
Pilotpoin	18	44	72	11	56	33
Rowdy	53	47	72	23	41	36
Suie	2	50	100	0	50	50
Tater	8	38	50	13	13	74
Thumper	19	63	74	37	42	21
Yankee	6	50	67	67	0	33
Avg.		49	74	37	26	37

Prior to beginning this project, Troy Bruce and myself sat down and discussed the different qualities that are necessary for a healthy heard of deer. We then discussed the subject area and decided what would be an appropriate topic that could be covered at the Greenbelt with the skills we acquired in class. The following page is a flow chart of the methodology used for this project.

Flow Chart

Merit

This information should be useful for Troy's research into the movement of Deer at the Greenbelt. First he has not been able to view the data he has collected in 3Dimensions until the end of this project. As can be seen when reviewing the data in ArcScene a whole new light is shown on the study area. Second, The four major needs of deer are partially represented by cover type. The deer use cover type to hide themselves from predation and as a source of food.

Unfortunately it appears that the Army Corp of Engineers is not going to find out the information that they had hoped for. It appears that deer are not necessarily using the Greenbelt corridor for migrating from one area to another but rather using the park as a home base for growth and reproduction.

Time Schedule

This project was completed over the entire semester. It took a great deal of time to make the meetings with Troy Bruce and process the data partially contained in the attached maps. I hope you enjoy the information as much as I did gathering and processing it.

References

1. A Publication of the Samuel Roberts Nobel Foundation, Inc. NF-WF-94-01. White-Tailed Deer Their Food and Management in the Cross Timbers. 1994.
2. Halls, L.K., ed. 1984. White-tailed deer: ecology and management. Stackpole Books, Harrisburg, PA.
3. Porter, W.F. 1991. White-tailed deer in eastern ecosystems: implications for management and research in national parks. Natural Resources Report NPS/NRSUNY/NRR-91/05, National Park Service, Denver, CO.
4. Tzilkowski, W.M., and G.L. Storm. 1993. Detecting change using repeated measures analysis: white-tailed deer abundance at Gettysburg National Military Park. Wildlife Society Bull.
5. Wiggers, E.P., and S.F. Beckerman. 1993. Use of thermal infrared sensing to survey white-tailed deer populations. Wildlife Society Bull.