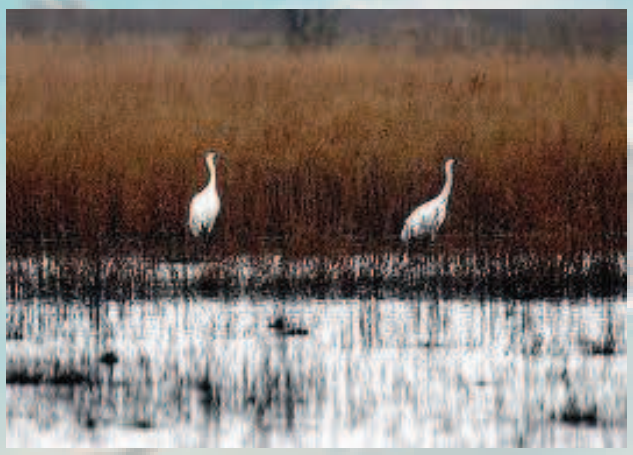
Connecting populations of Whooping Cranes (*Grus americana*) from Northern Alberta and Central Florida via a new migration route

Chris Chutter
Sarah Cancellieri
GEO 592 Final Project

Introduction

- Whooping cranes are returning from the brink of extinction
- In 1941 there were 15 or 16 individuals
- In 2004 there were 214 individuals in the wild, but limited to a couple of regions

Preferred terrestrial habitat



- Corn and other large grain crops
- Wetlands
- Inundated areas

Introduction | Methods | Results | Conclusions

The Problem:

- The Florida Whooping Crane population is isolated and non-breeding
  - Their gene pool is wasted, if they cannot breed

Possible solution to the problem:

- Find the best migration route to connect the non-breeding population in Florida with the breeding population of Alberta by joining them in their northern migration from Texas

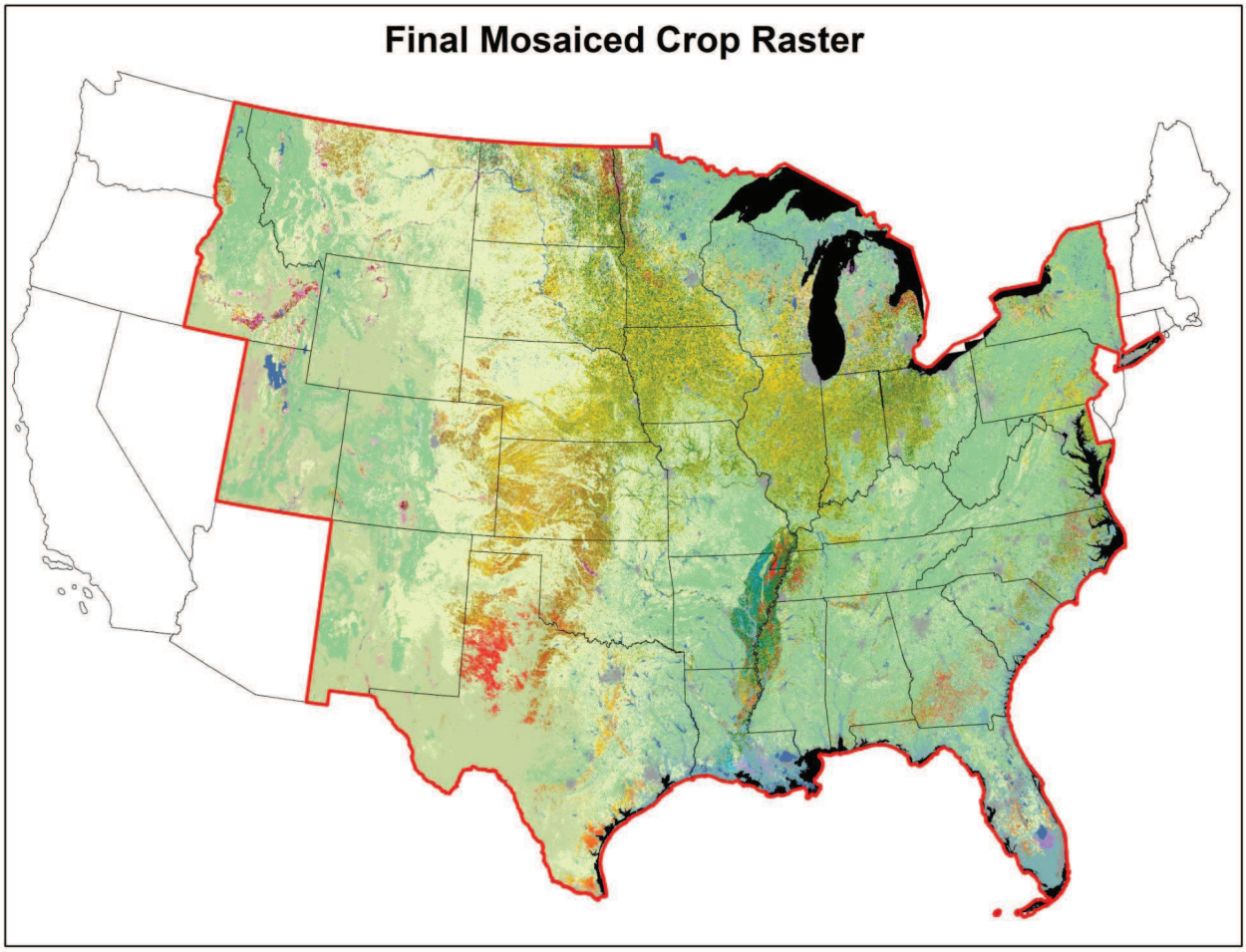
- Plan of attack
  - Generate a least cost path from Kissimmee Florida to Northwestern North Dakota
    - Create a resistance raster
  - Positive effect layers
    - Parks/protected areas and main highways
  - Negative effect layers
    - Urban areas, large military bases, major airports, steep slope, and states participating in Sandhill Crane hunts
    - Locations away from roostable areas

Introduction | Methods | Results | Conclusions

Methods - Layers

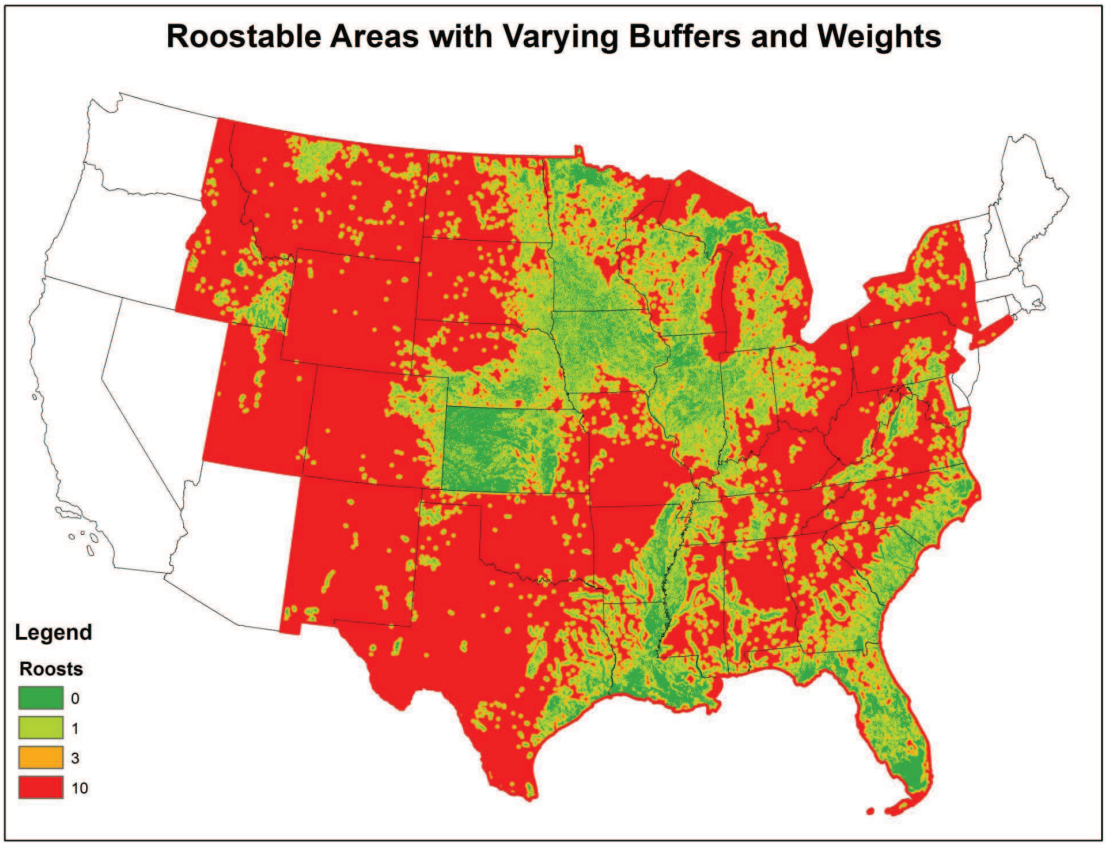
- Airports – multiple buffers
- Military – multiple buffers
- Urban Areas – multiple buffers
- Parks and protected areas
- Crop/wetland raster - multiple buffer
- DEM/Slope
- Main highways – buffer
- States hunting Sandhill Cranes

Final Mosaiced Crop Raster

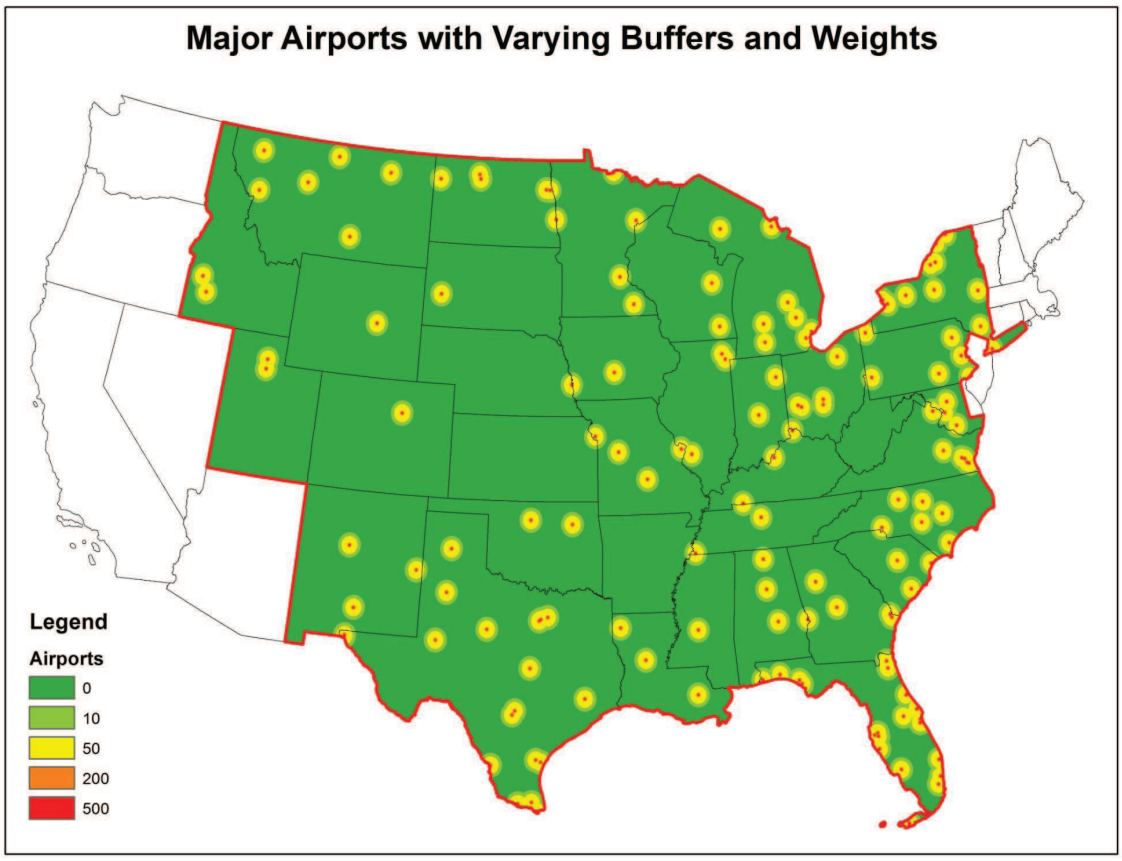


Introduction | Methods | Results | Conclusions

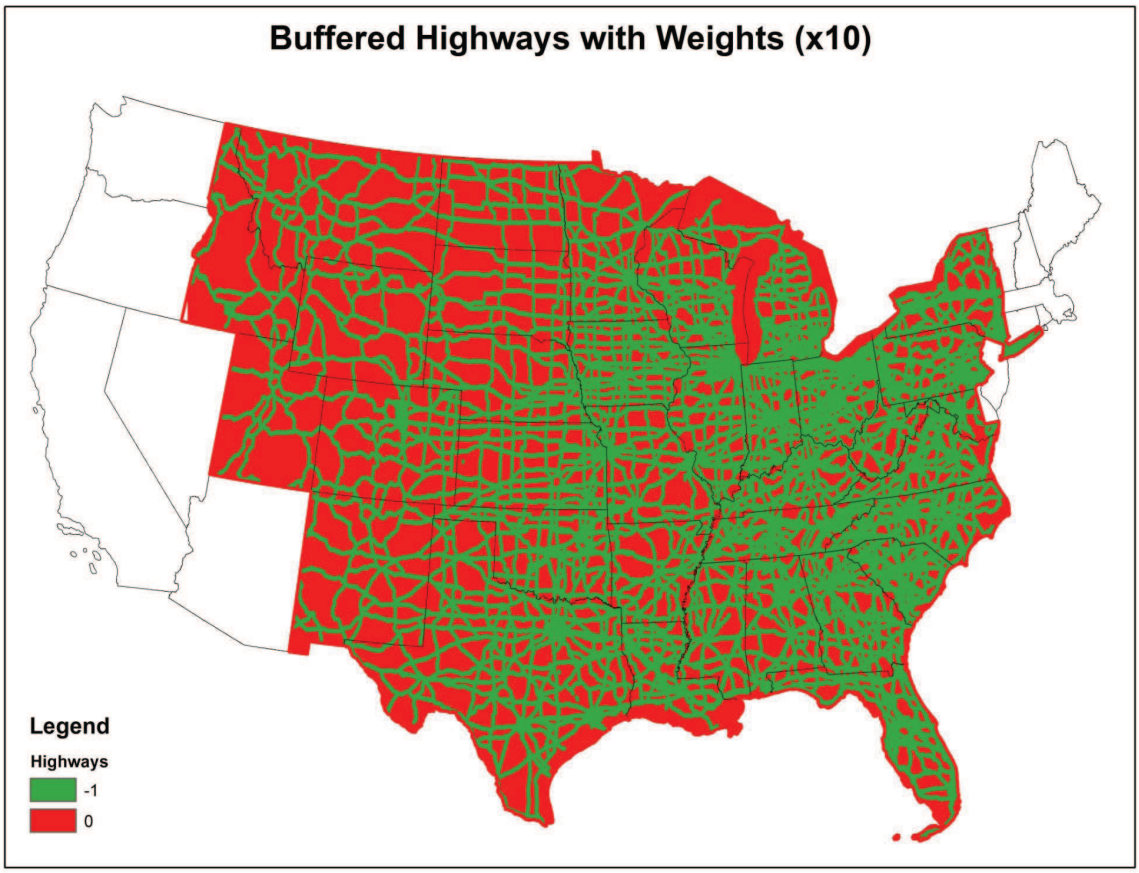
Roostable Areas with Varying Buffers and Weights



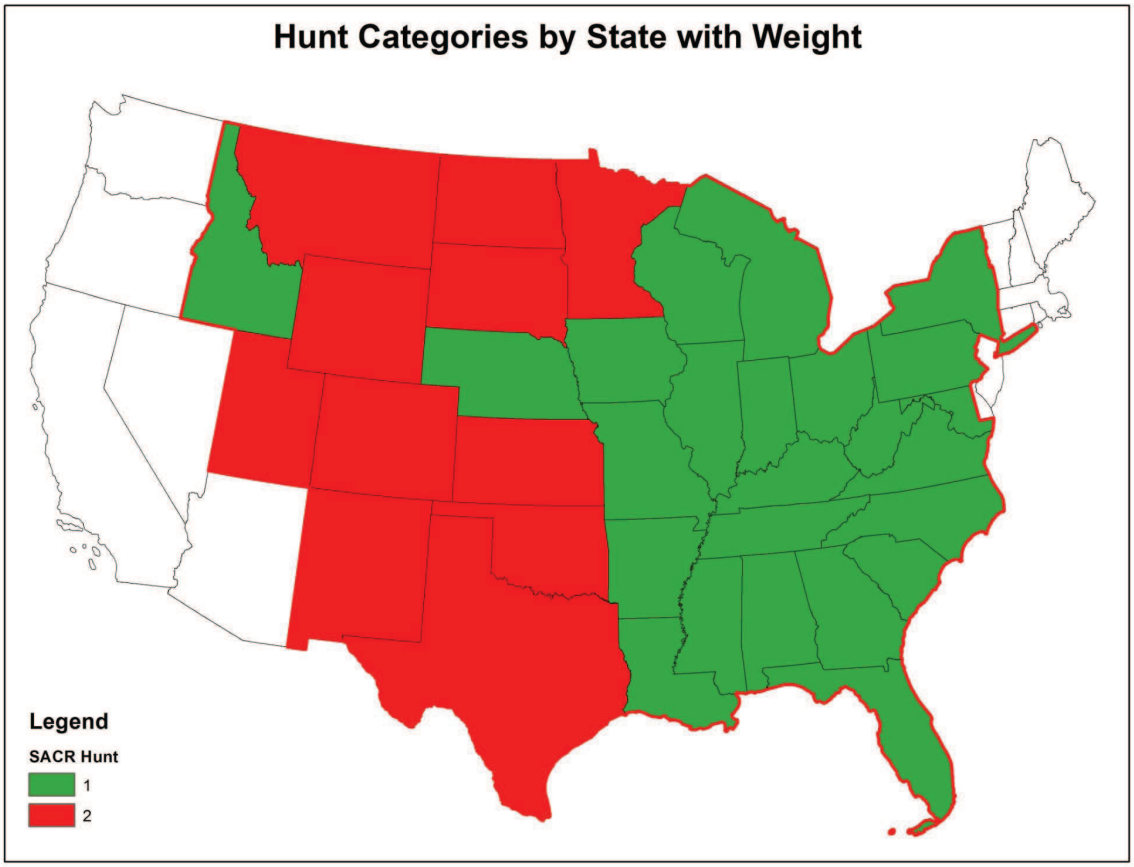
- Weighted based on appropriate habitat
- 0
- 5000m
- 10000m
- >10000m



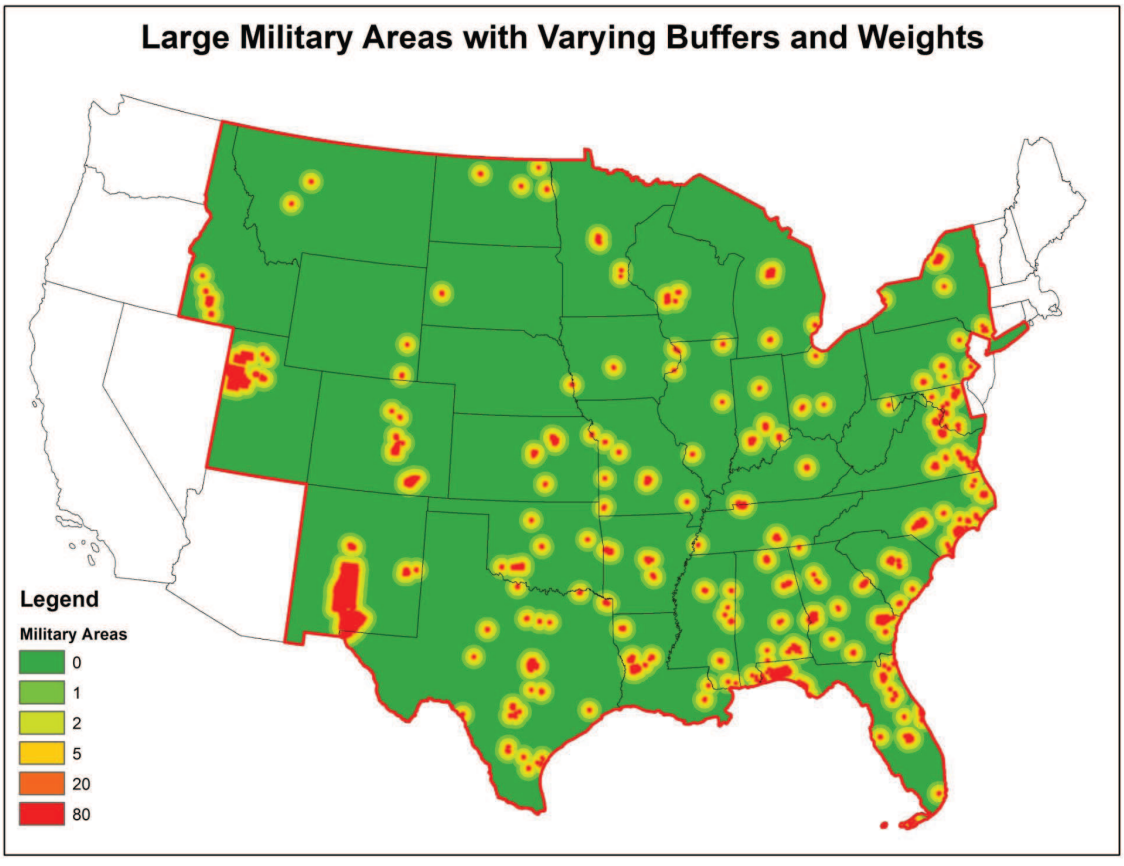
- Euclidean distance
- Reclassify
- 5000m
- 10000m
- 20000m
- 35000m
- 50000m



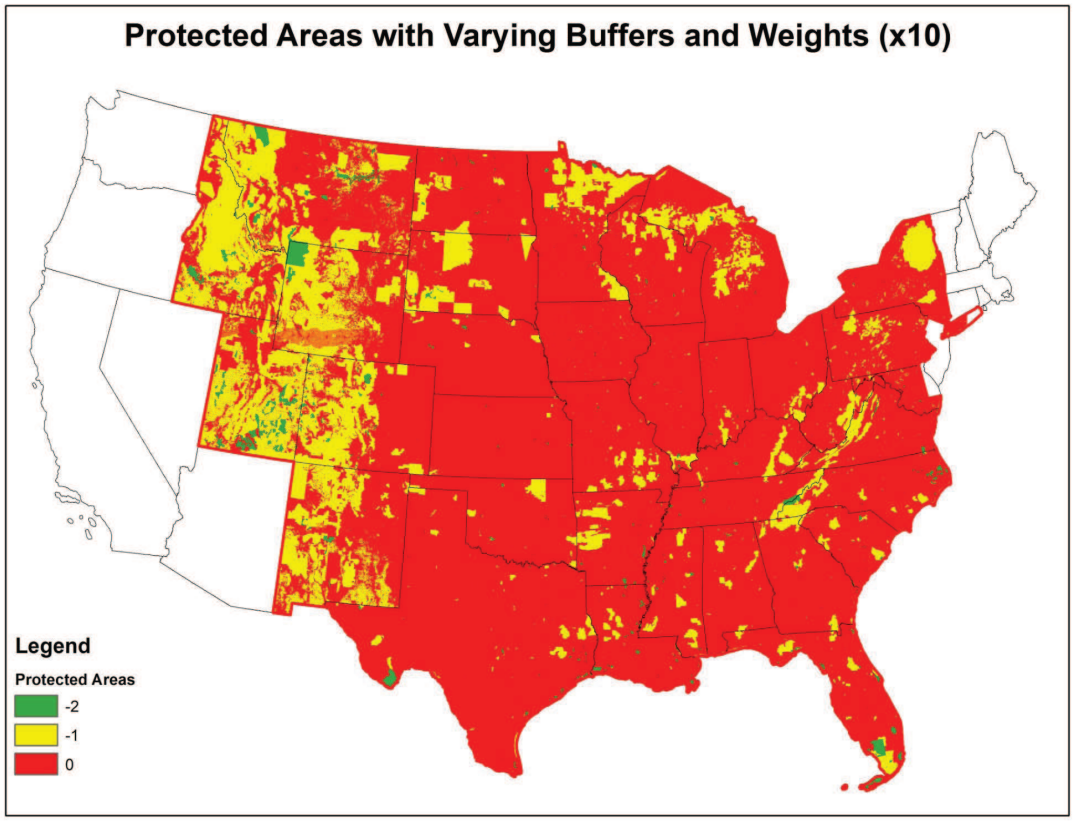
- Buffered
  - 10km
- Union both Major and Freeways
- Raster
- Reclass



- Added field in attribute table
- Converted To raster

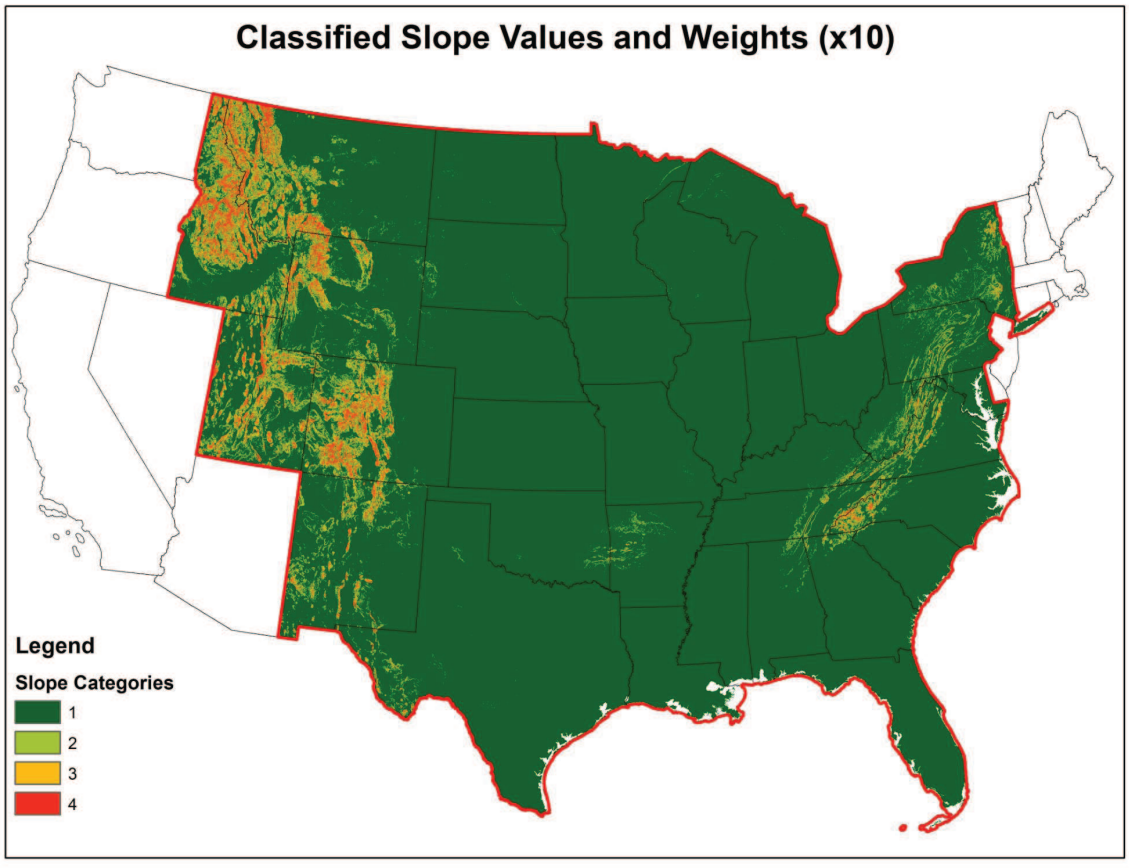


- Removed bases less than 5km^2 and no danger to birds
- Euclidean Distance
- Reclassify
  - 5000m
  - 10000m
  - 20000m
  - 35000m
  - 50000m



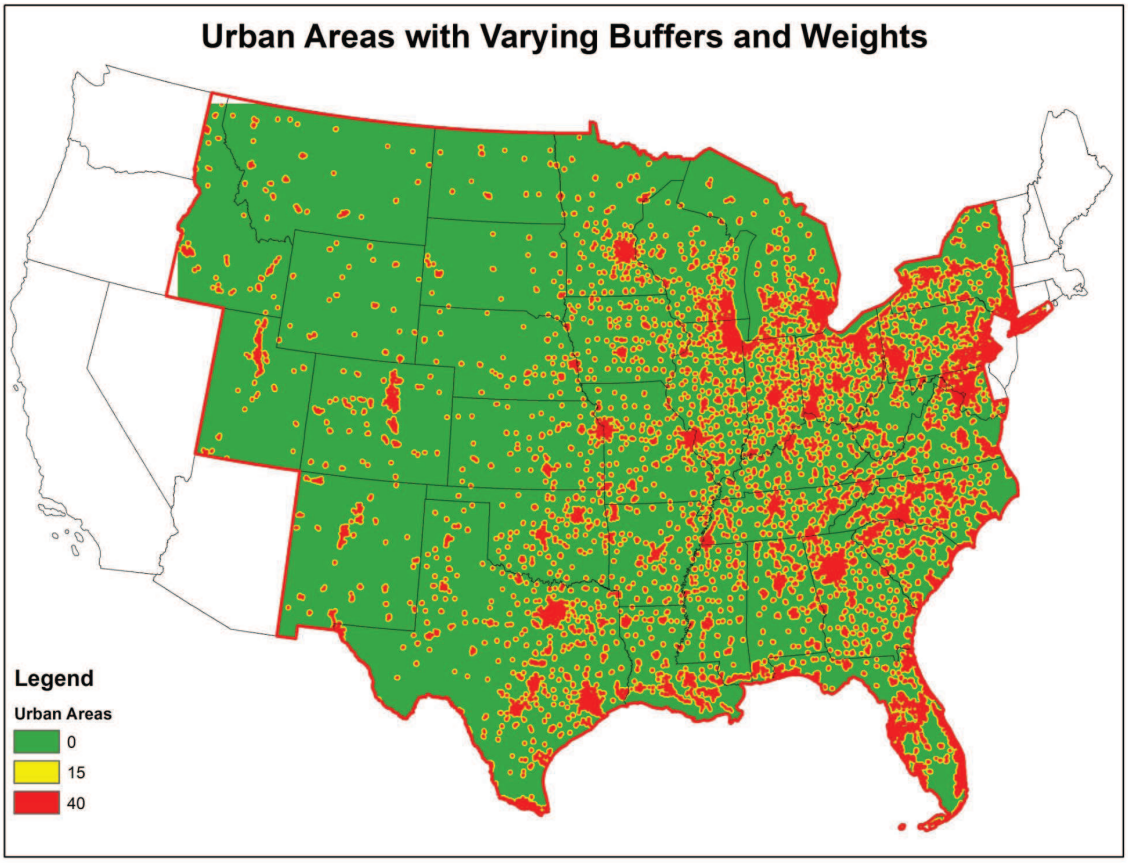
- Removed data of federal land that were not pertinent to the study
- Erased parks where overlap
- Unioned
- Created field in table for weighting based on protection value
- Converted to raster
- Reclassified

Introduction | Methods | Results | Conclusions



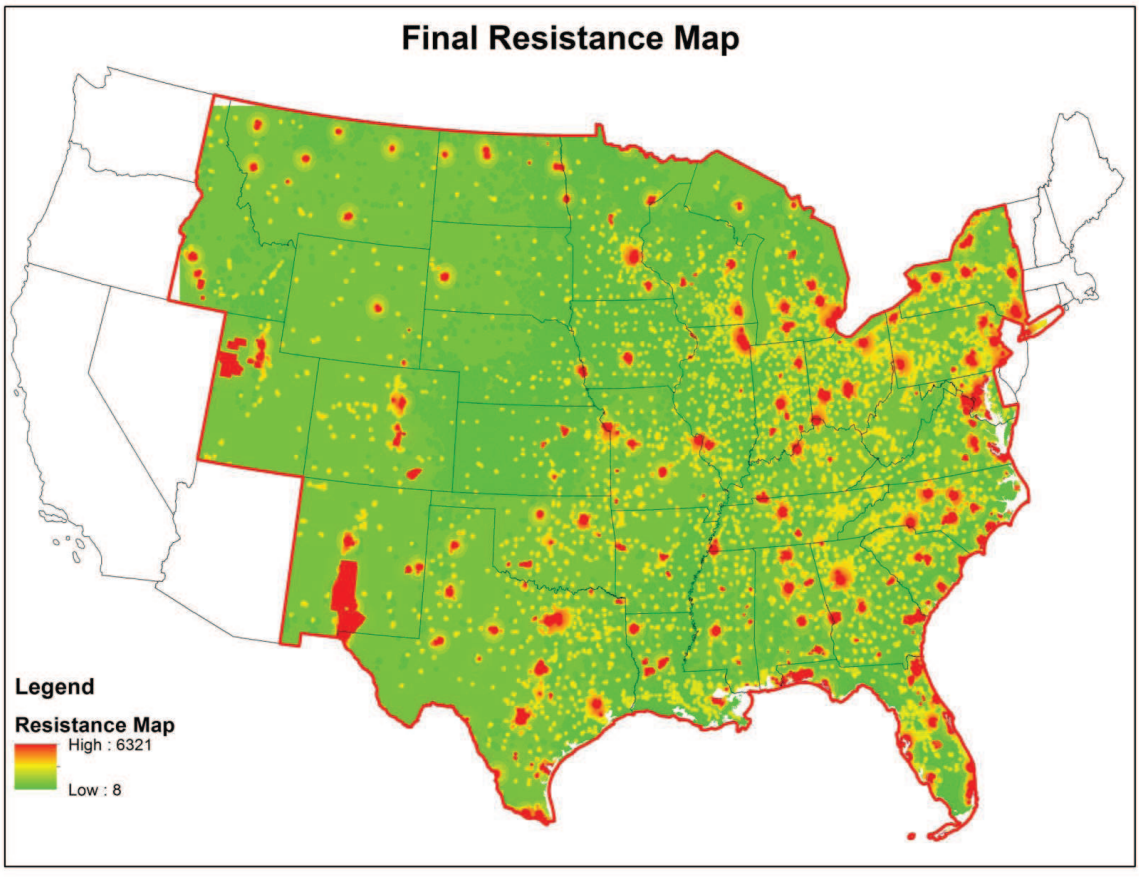
•Reclassified slope raster generated from DEM

1= 0-3^{o}
2=3-6^{o}
3=6-9^{o}
4= >9^{o}

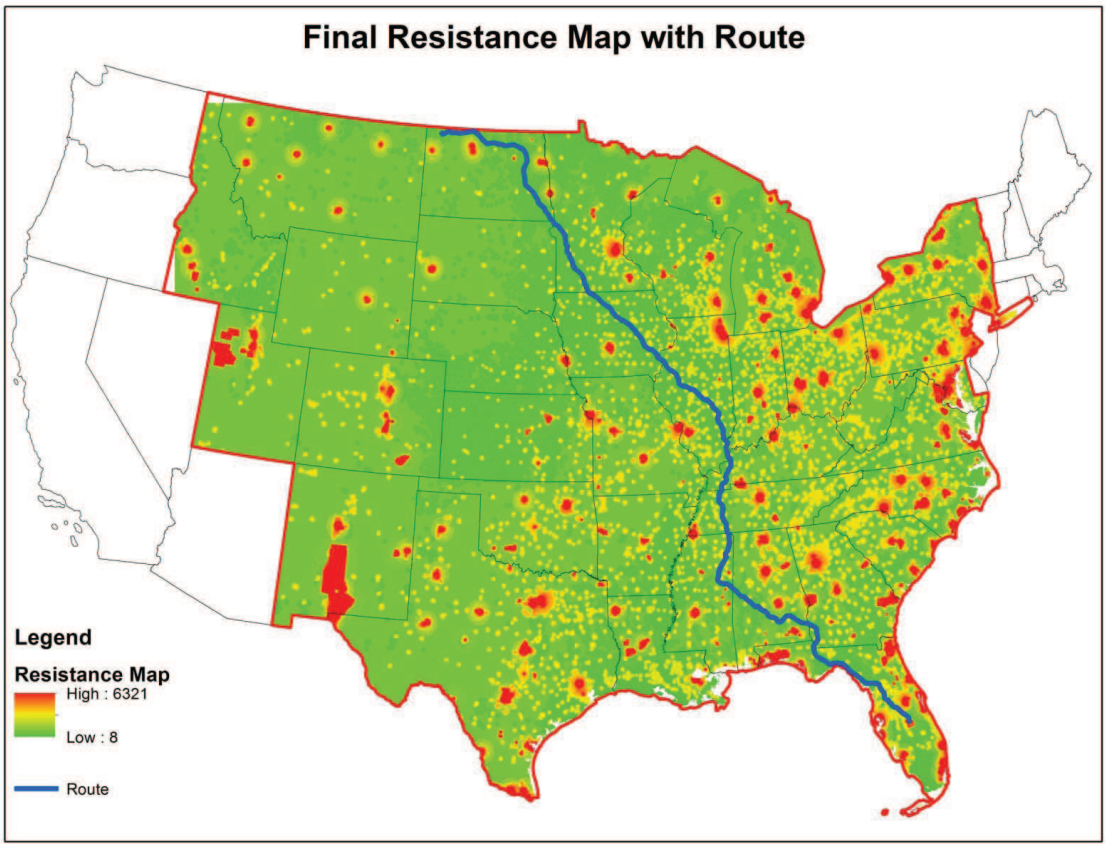


- Removed less than 5km^2
- Euclidean distance
- Reclassified
  - 5000m
  - 10000m

Introduction | Methods | Results | Conclusions

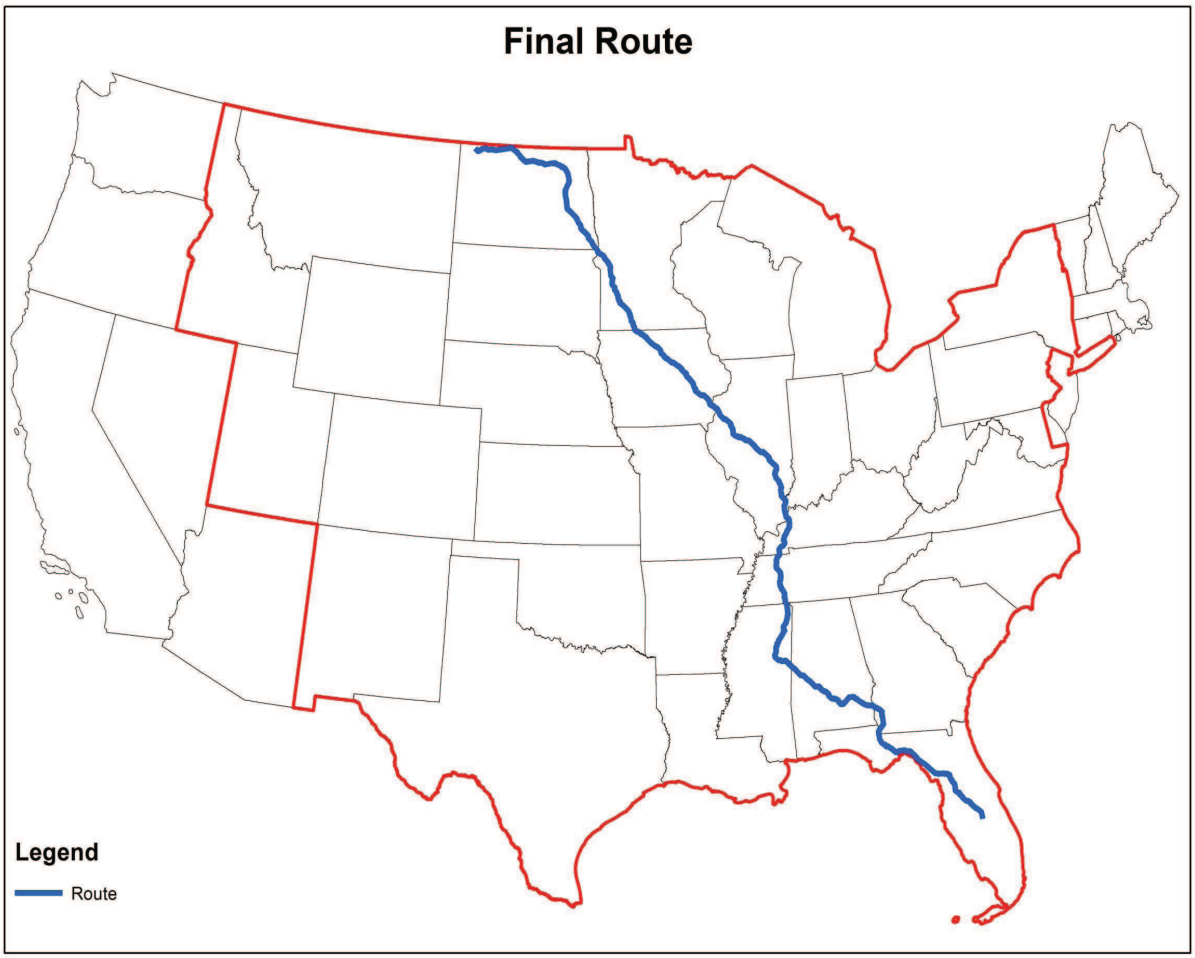


- Used raster calculator to combine raster layers



- Backlink path tool
- Cost weighted distance tool
- We used cost path tool

Introduction | Methods | Results | Conclusions



Desirable additions

- Ideal to add wind farm data
- Active hunting areas
- Wind velocity
- Areas prone to drought
- Canadian data
- Sandhill Crane distribution
- Tall powerline right-of-ways

References

•Stehn, Tom 2007. Whooping cranes and Wind Farms – guidance for assessments of impacts.
•Allaboutbirds.org
•I-drive
•Geospatial data gateway for federal government (USDA and USGS)
•Birds of North America Online
•dnr.wi.gov
•Birdfreak.com
•Greensborobirds.com
•Freespiritart.com
• bbc.co.uk
•www.tropicalconservancy.com/?p=81

Questions?