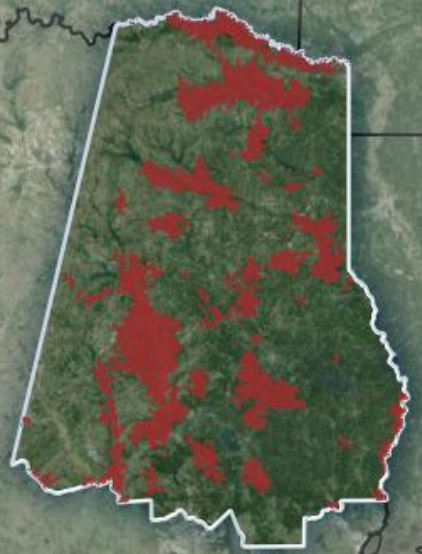
Using GIS to develop priority areas for the restoration of eastern wild turkeys in Texas



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**** Previously with TPWD***

TEXAS PARKS & WILDLIFE

Background

- Despite restoration efforts dating back to the 1970's, Eastern wild turkeys (*Meleagris gallopavo silvestris)* in Texas have remained low and fragmented

- In 2007, Texas Parks and Wildlife (TPWD) funded research through Stephen F. Austin University to test a super stocking model for restoring turkey populations

- Recently, TPWD reopened the restoration program with a goal to restore wild turkeys to large tracts of suitable habitat

Current Protocol

- Landowner applies for an evaluation for restoration (meets the minimum requirements)
- GIS evaluation-Use NAIP imagery and a supervised classification to measure basic landscape metrics
- On the ground evaluation
- If all criteria is met, site receives a super stocking of 80 birds

= 80 turkeys


Fannin
Lamar
Red River
Bowie
Hunt
Hopkins
Franklin
Titus
Morris
Cass
Camp
Rains
Wood
Upshur
Marion
Kaufman
Van Zandt
Gregg
Harrison
Smith
Henderson
Rusk
Panola
Navarro
Anderson
Cherokee
Shelby
Freestone
Nacogdoches
Limestone
San Augustine
Sabine
Houston
Leon
Angelina
Falls
Trinity
Robertson
Newton
Jasper
Polk
Tyler
Milam
Walker
Brazos
San Jacinto
Grimes
Burleson
Montgomery
Liberty

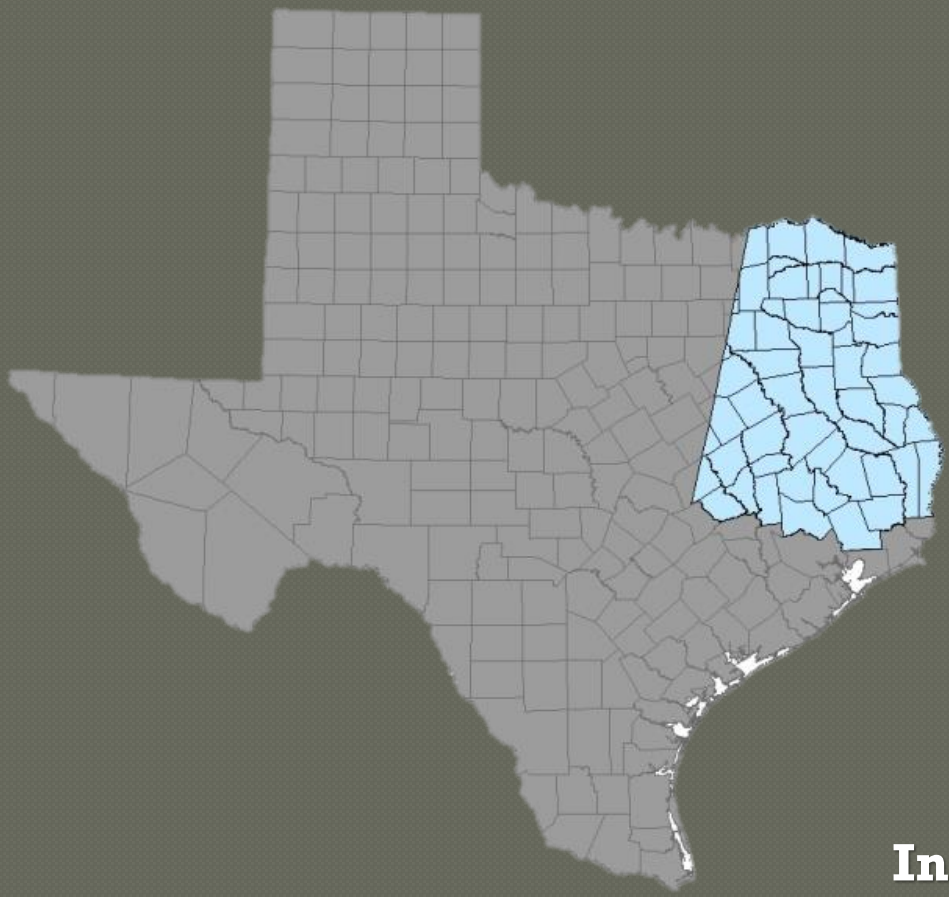
Goal of the Project

- Turkey restoration to East Texas
- Needed a more **strategic** approach
- Be more proactive

Objectives

- Develop landscape-scale habitat suitability index (HSI) models for Eastern wild turkeys.
- Develop landscape priority areas to focus restocking efforts
- Serve as a decision support tool for ongoing habitat evaluation efforts as well as guiding and focusing future restoration and management efforts.

Study Area



Includes all or parts of 56 counties, encompassing approx. 26 mil ac.

Philosophy-Occam's Razor

(The hypothesis with the fewest assumptions should be selected)

- The simplest model that is consistent with existing knowledge is likely to be the most appropriate to produce reliable insight.
- Remain Dynamic!!
- EWT require a set of physical environmental factors, associated with certain structure and composition of specific vegetative communities.

Four Factors

- **Avoidance**
- **Edge**
- **Landcover**

- **Floodplain data**-riparian, wet forest, bottomland hardwood, etc.

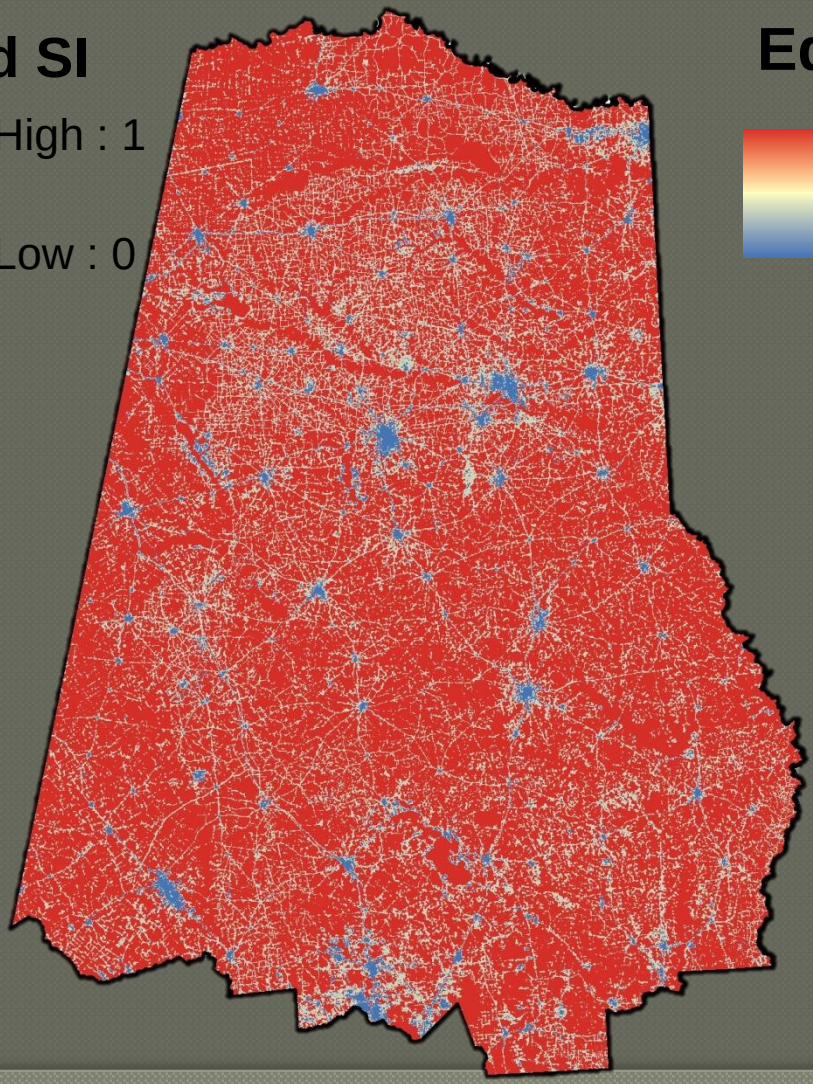
GAP Analysis

$w = 0.5$

Avoid SI

High : 1

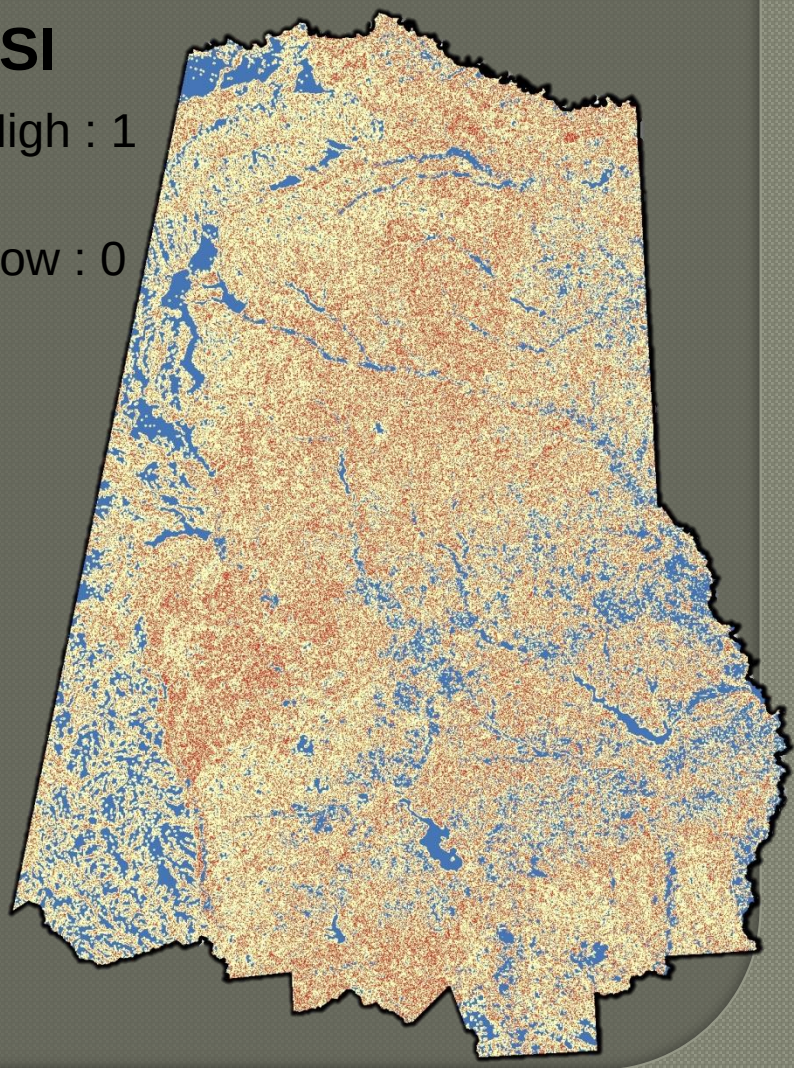
Low : 0



Edge SI

High : 1

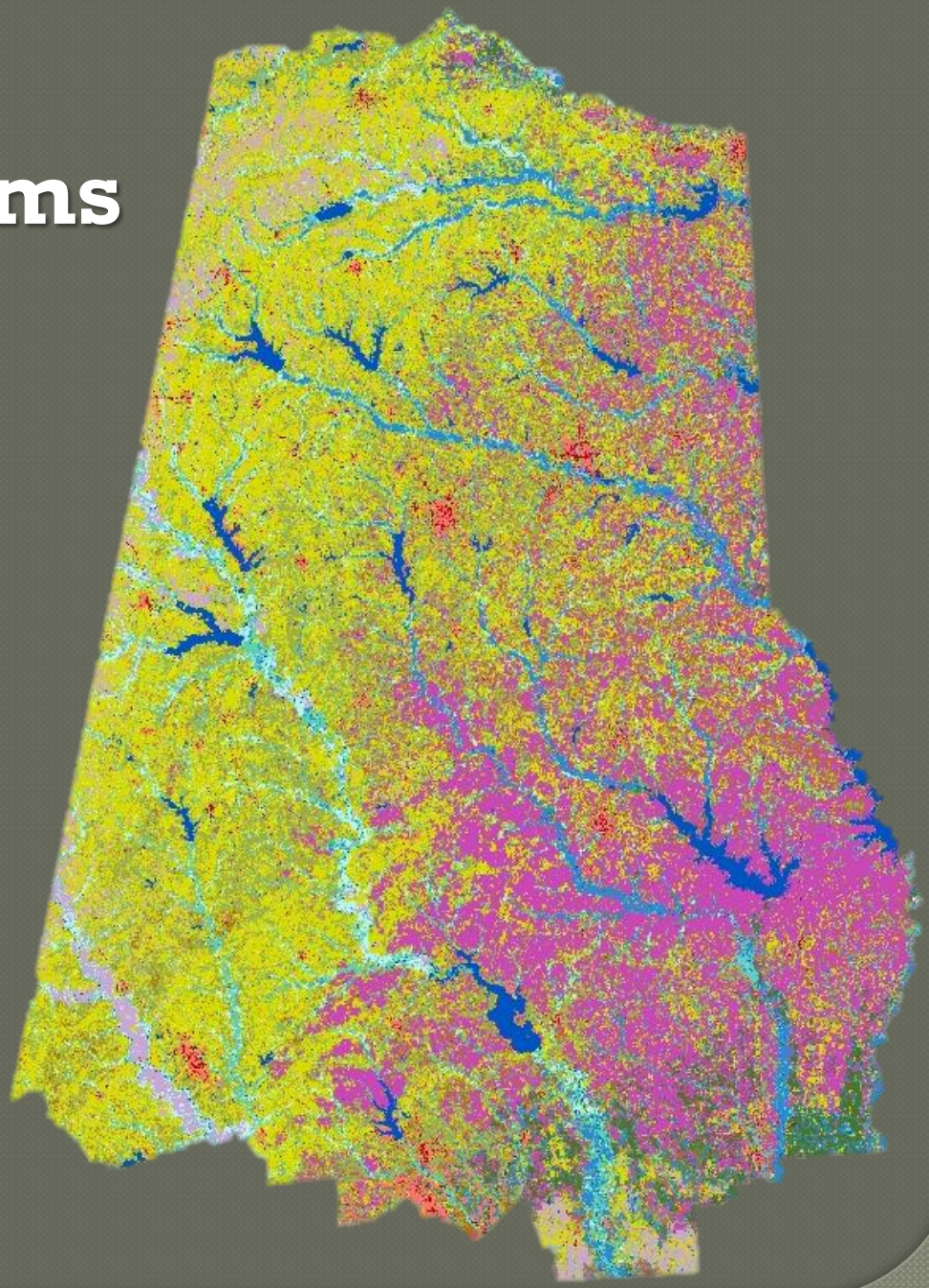
Low : 0



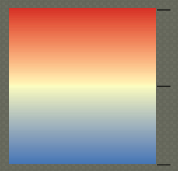
Ecological Management Systems

23 Landcover Types

LANDCOVER	Score
Barren	8
Coniferous Forest	8
Deciduous Forest	8
Herbaceous	7
Riparian Coniferous Forest	9
Riparian Deciduous Forest	9
Riparian Herbaceous	9
Tidal Marsh	0
Urban High	0
Urban Low	0
Wet Evergreen	1



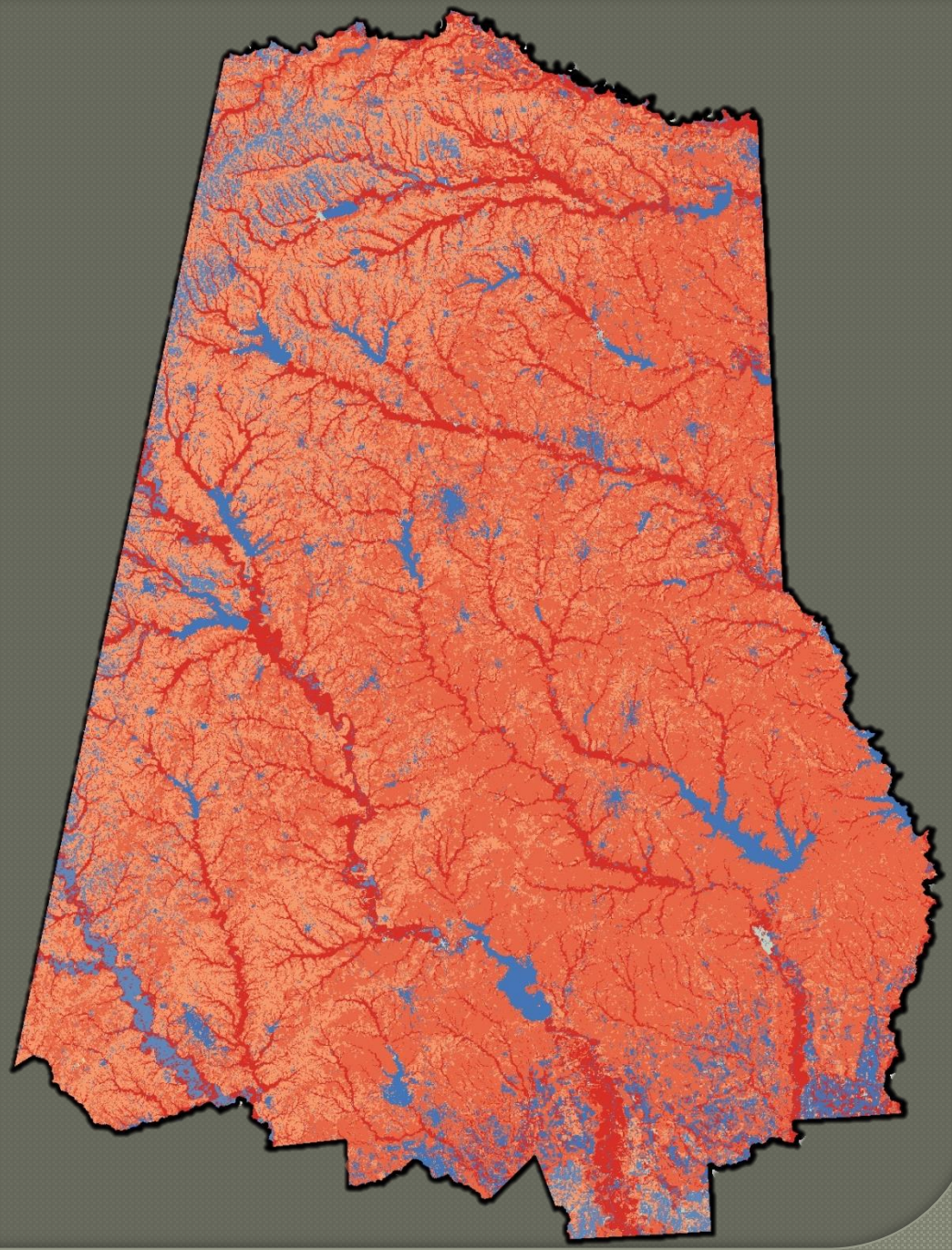
Landcover SI



High : 1

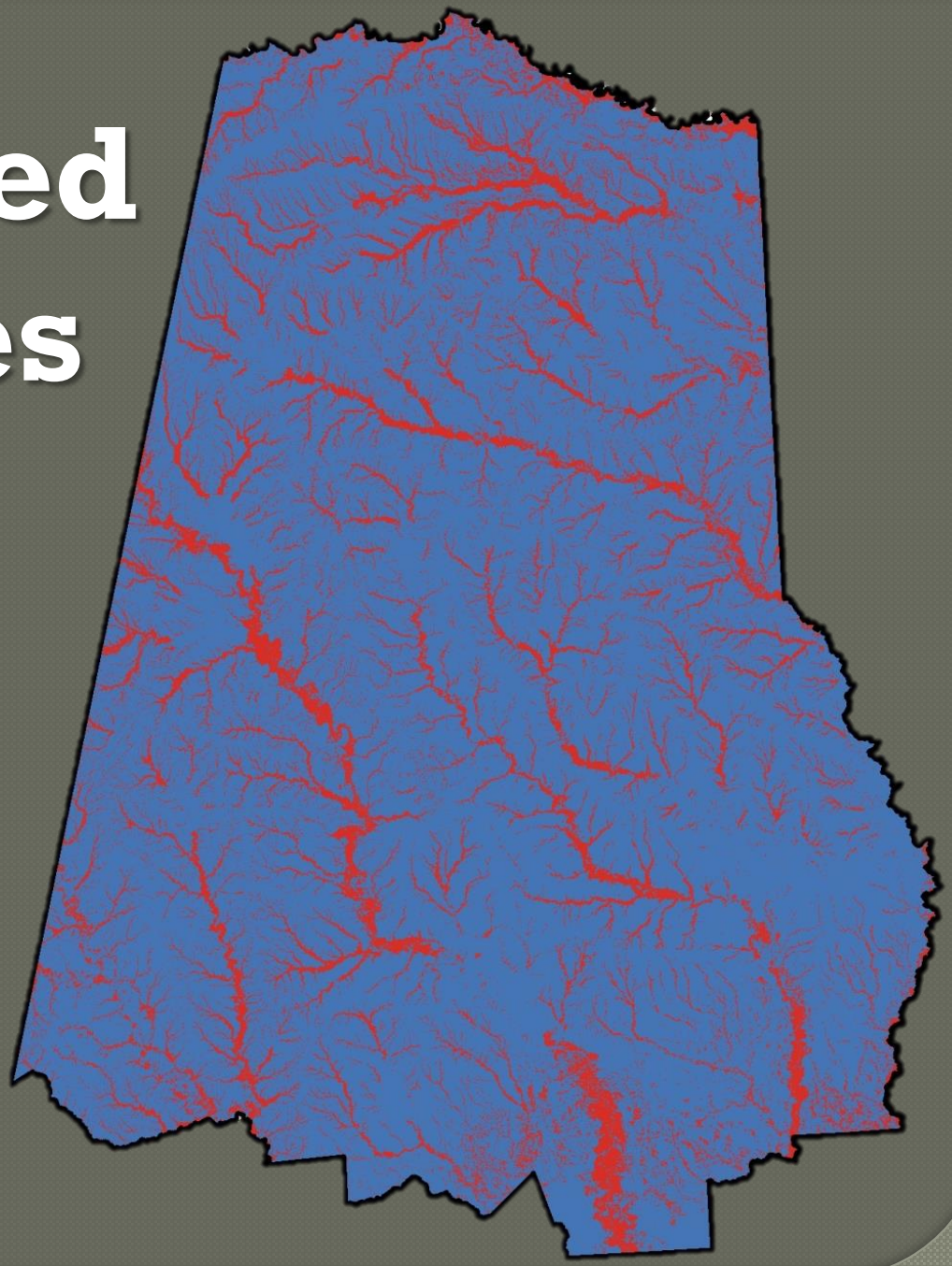
Low : 0

$w = 1.0$



Water-based forest types

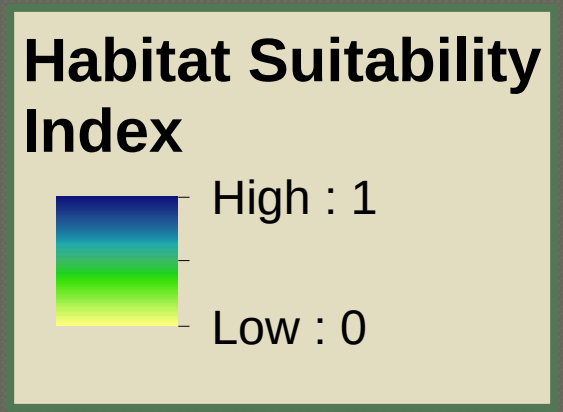
w = 1.0

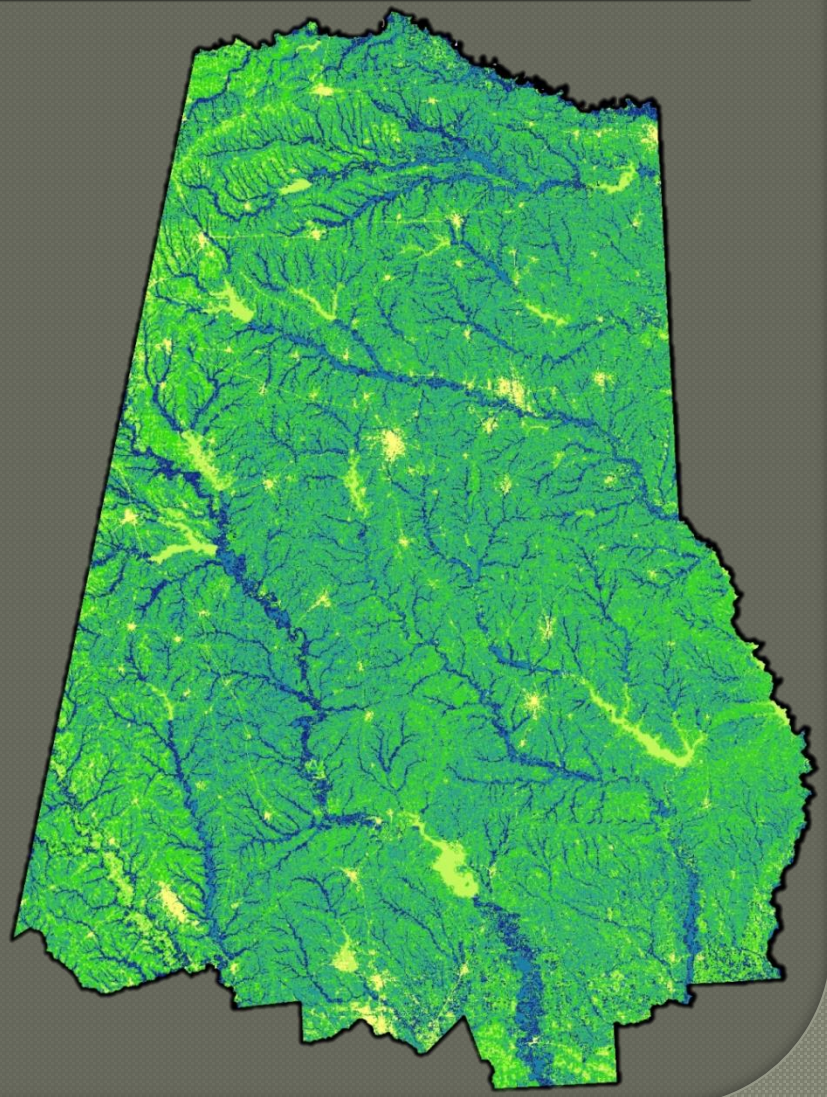


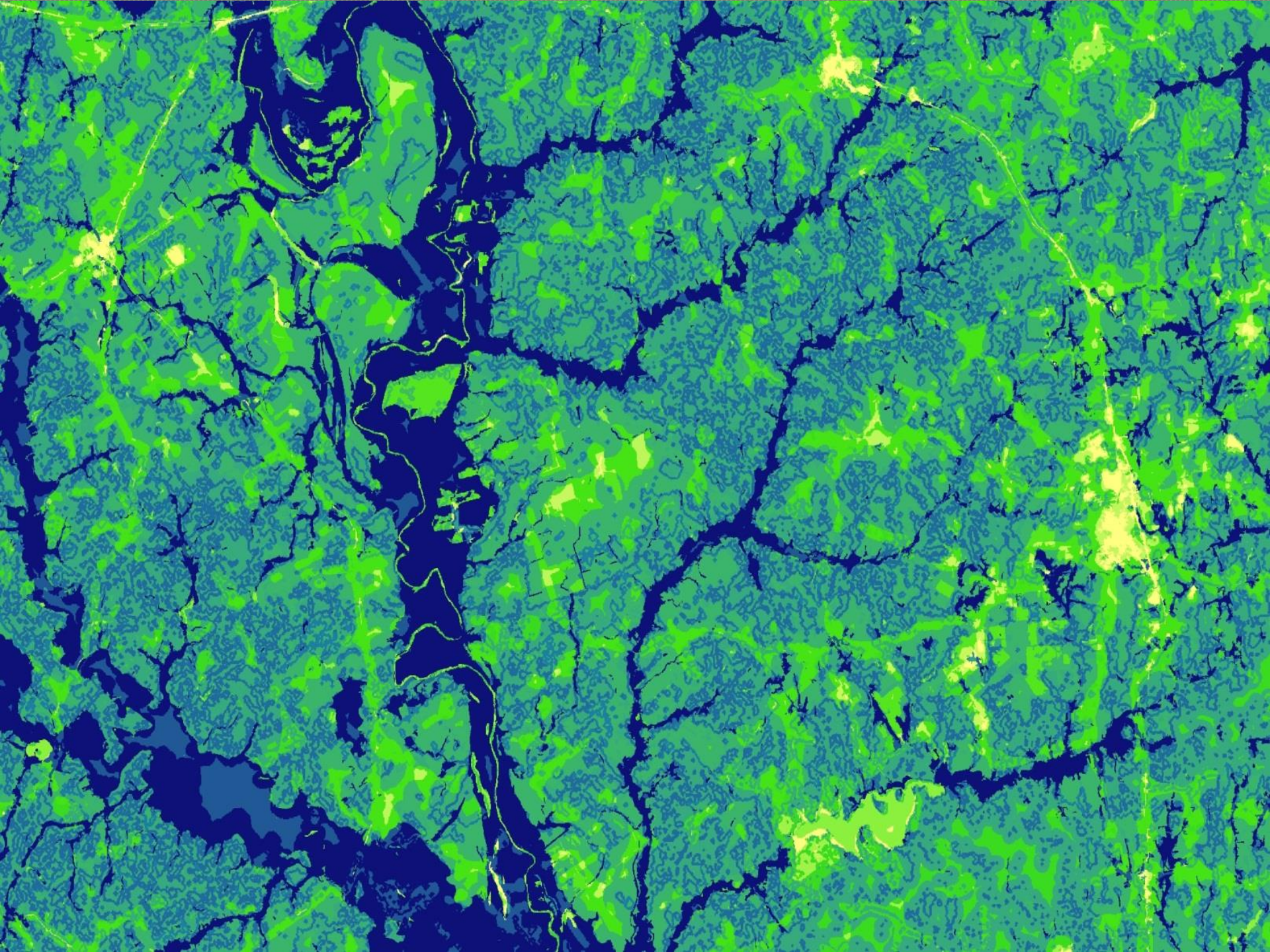
Analysis and Calculations

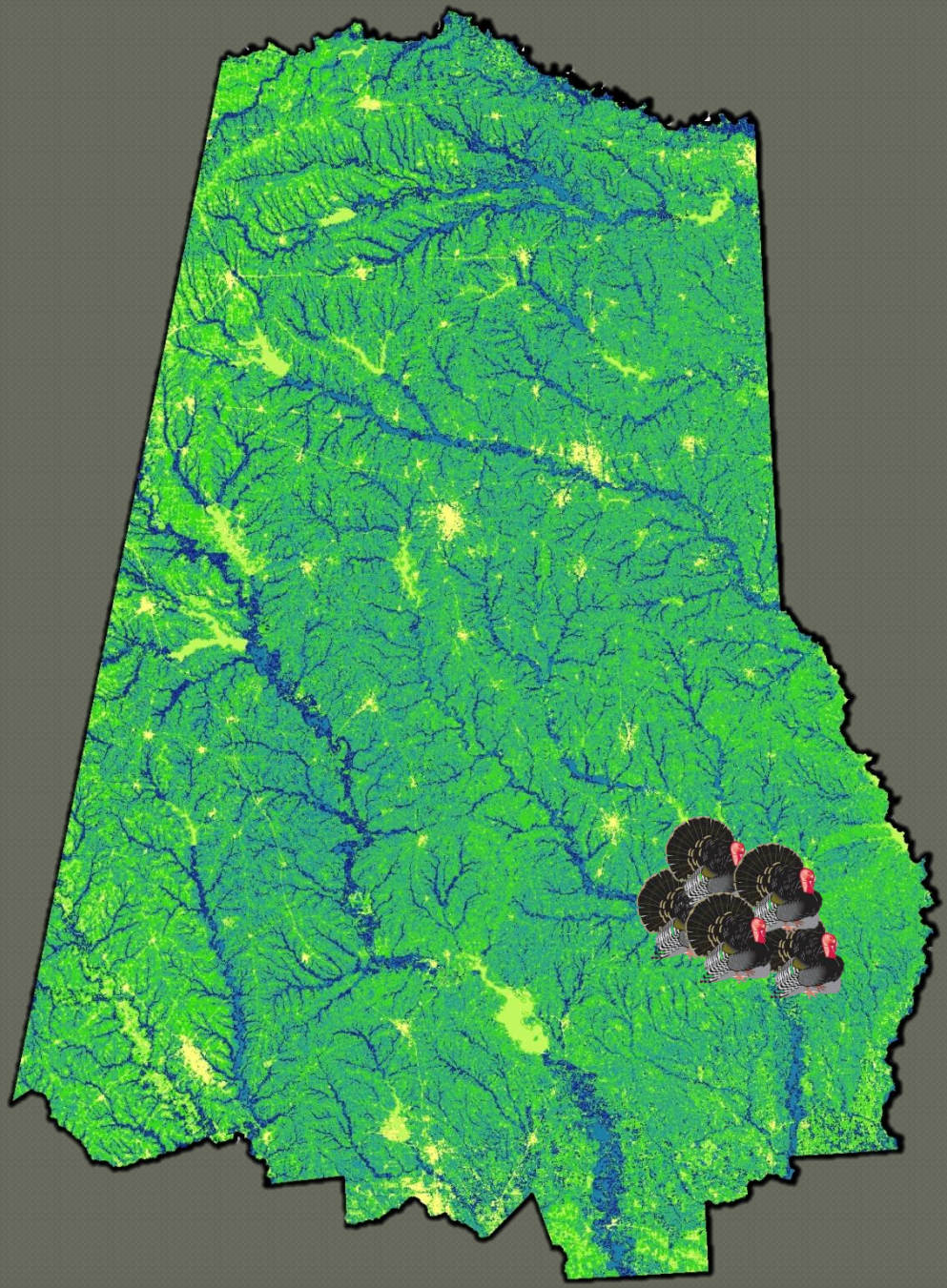
Weighted Sum

$$X_i = \sum_i^n (Piwi) / \sum wi$$



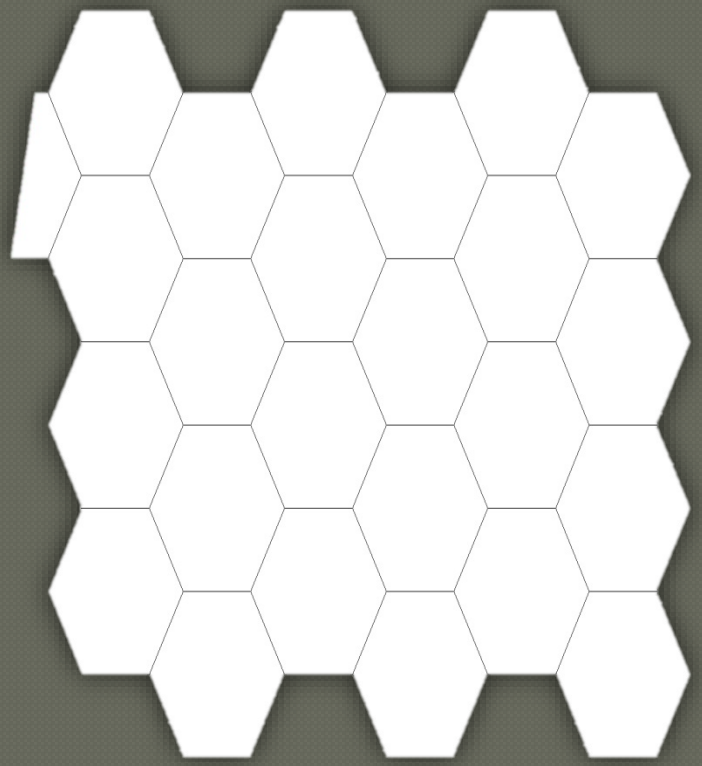




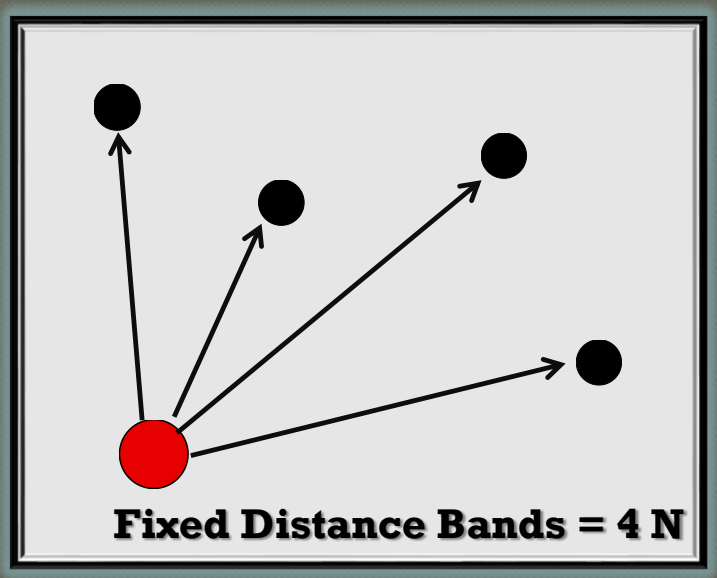


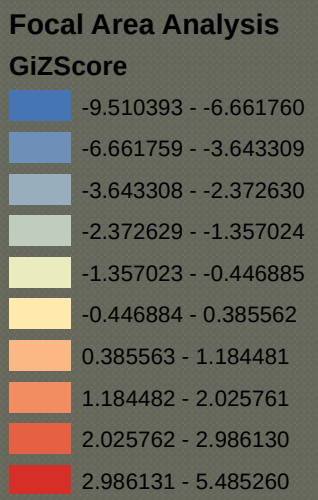
650 ha Hexagonal Grid

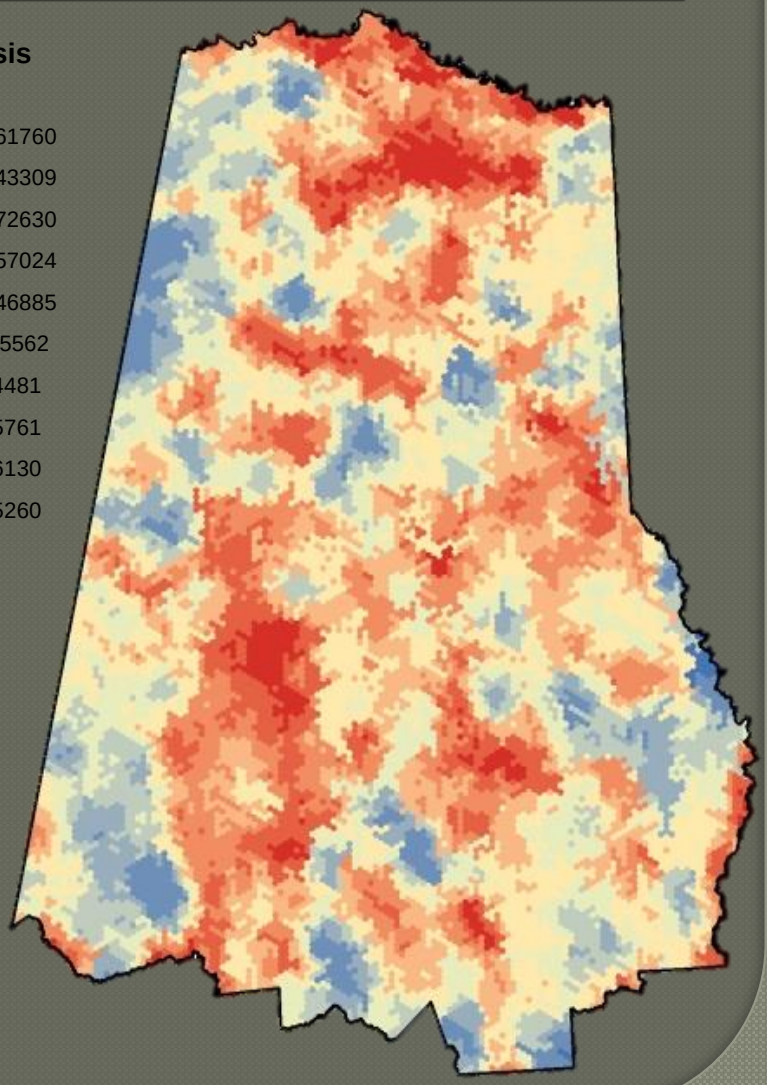
Zonal Mean Statistic



Focal Landscapes-"Hot Spots"







- **Getis-Ord Statistic**

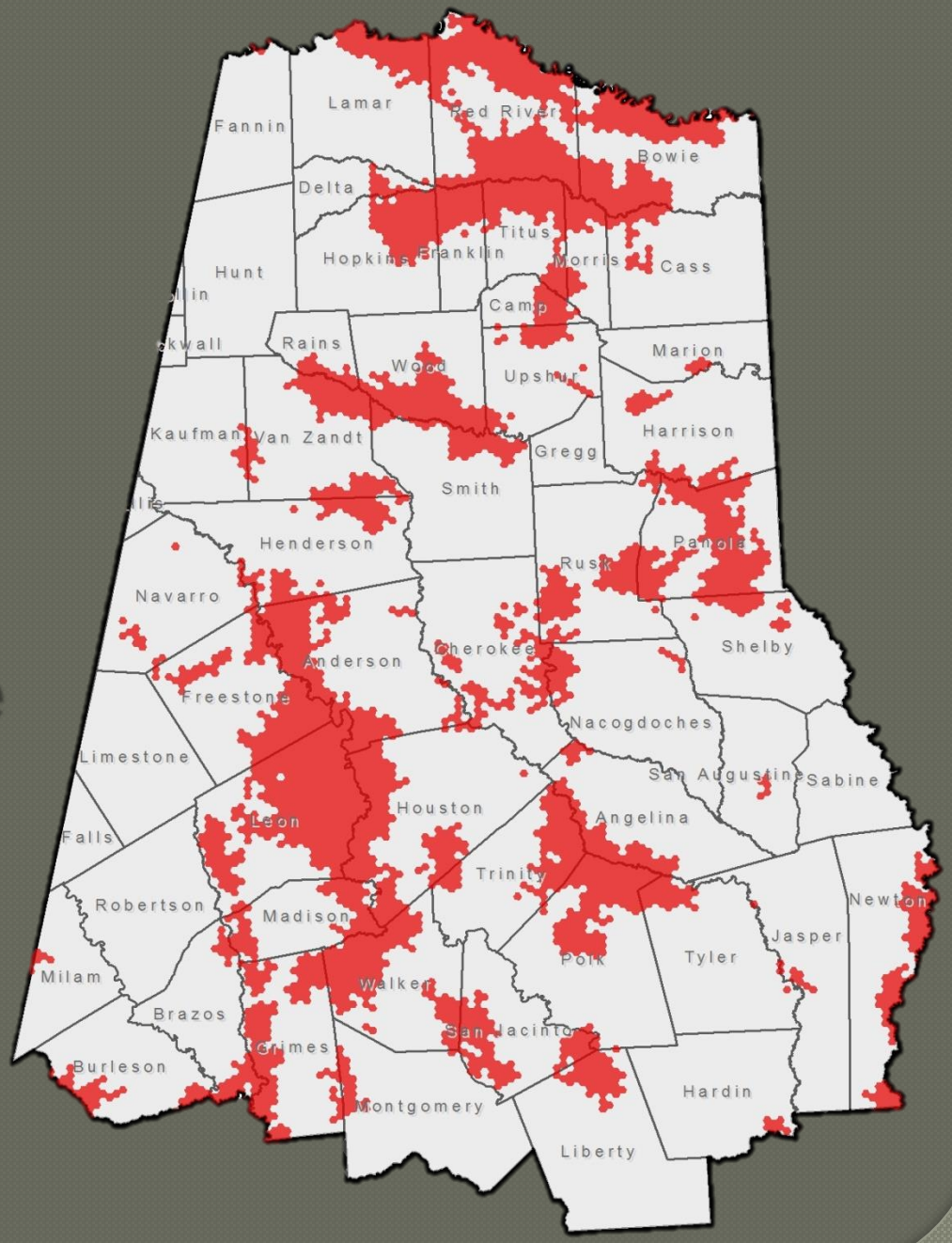
$$Gi^*_{(D)} = \sum_j w_{ij}(D)x_j \,/\, \sum_j x_j$$

So, how can we use this??

Focal Areas

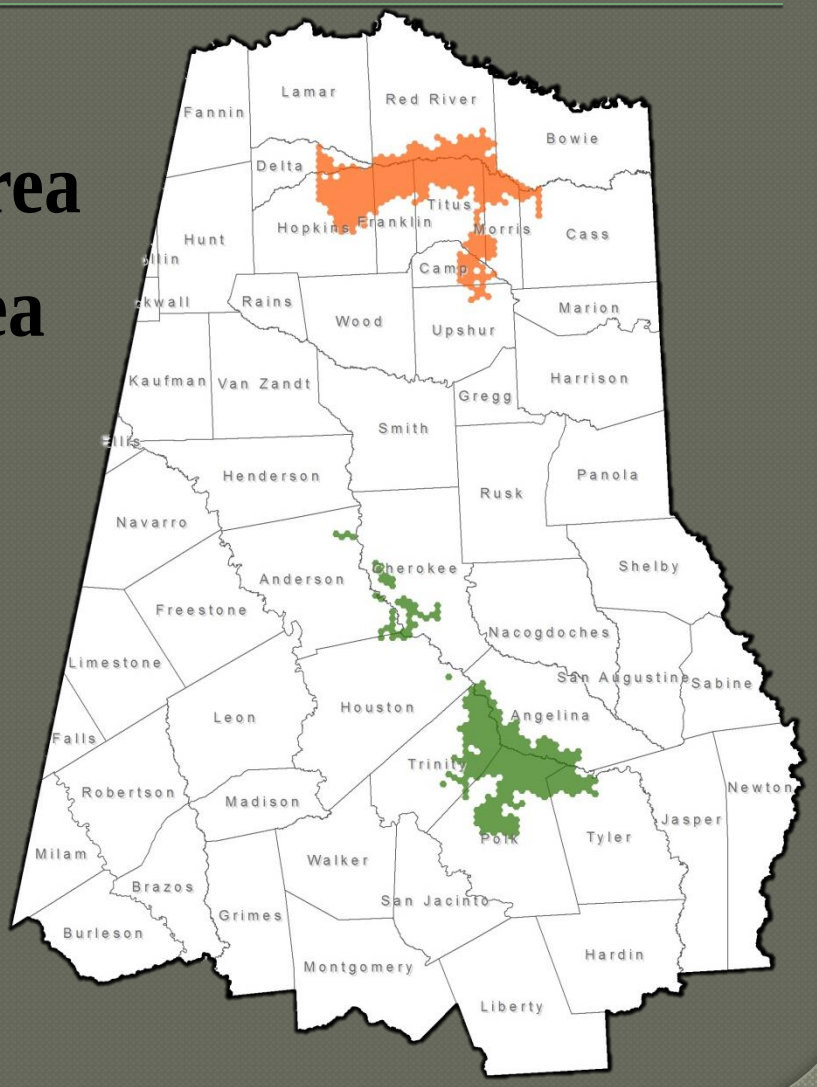
Z score ≥ 1.65

90% Confidence



Priority Areas

- **Sulphur River Priority Area**
- **Neches River Priority Area**



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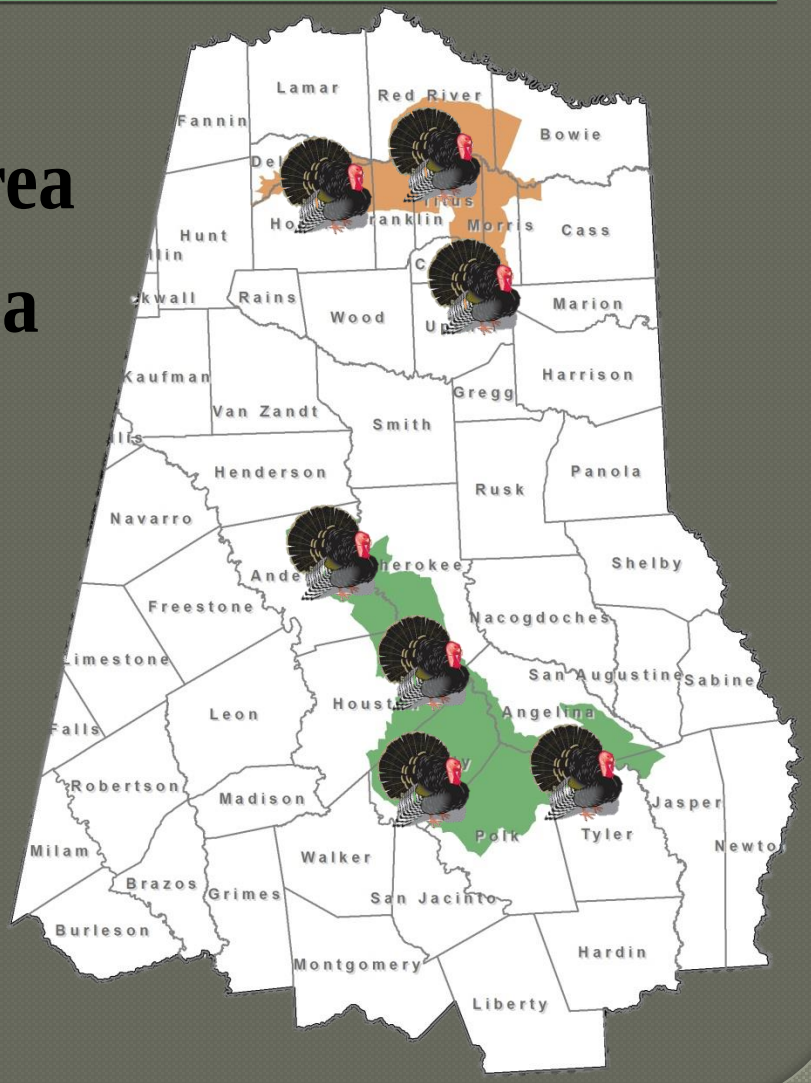

Moving Forward

- **Ongoing research including GPS, telemetry, and camera surveys**
- **Biologist Ranking Index**
- **Deer Hunter Fall Surveys**
- **Continue to promote a dynamic and strategic approach to restoration**


MAKING TRACKS


MCULTRIE
67°F
08/06/2014 07:21AM GE


MCULTRIE
92°F
08/08/2014 05:39PM GE


QUESTIONS???
56°F 03/19/2014 09:59AM BLBC142014