

Abiotic Factors as Predictors of Terrestrial Vertebrate Species Richness in Kentucky

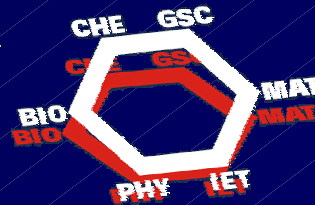
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Purpose

- To examine the predictive value of abiotic variables in relation to species richness at a regional level
- To improve our understanding of the distribution of terrestrial vertebrate species in Kentucky

Objectives

- To produce up-to-date maps of the distribution of terrestrial vertebrates in Kentucky
- To describe the variation in species richness across Kentucky
- To determine relationships between abiotic factors and variation in species richness of terrestrial vertebrates

Species List



Broadhead Skink

Reptiles - 51



Tiger Salamander

Amphibians - 52

Mammals - 63



Bobcat

Breeding Birds - 153

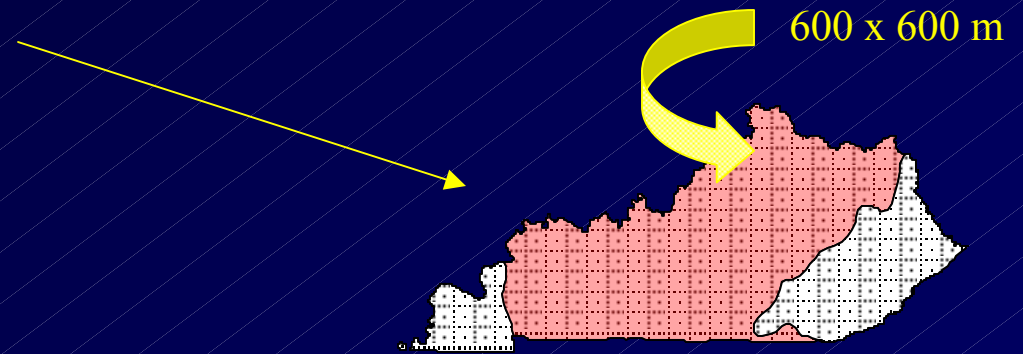
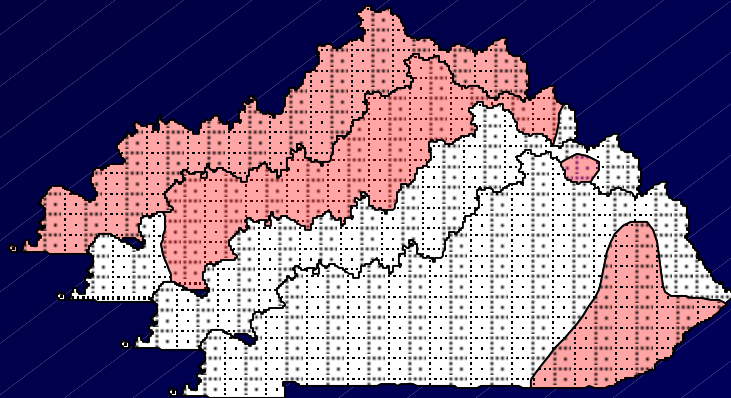


Kentucky Warbler

Mapping of Species Richness

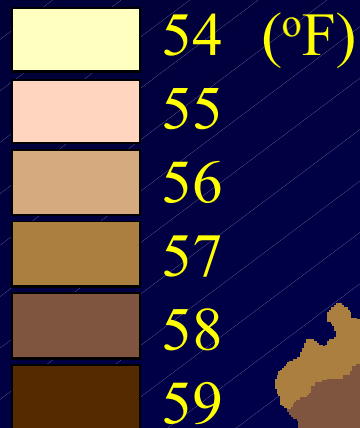
Ranges:

- Published Ranges
- State Records
- Review by Biologists



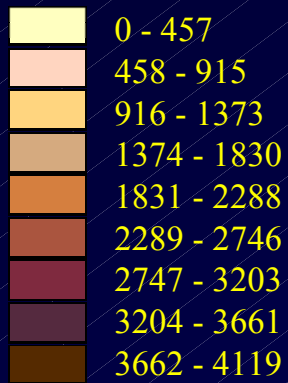
Mean Annual Temperature

(National Climate Data Center, Mid-West Regional Climate Center,
and the UK Agricultural Weather Center)

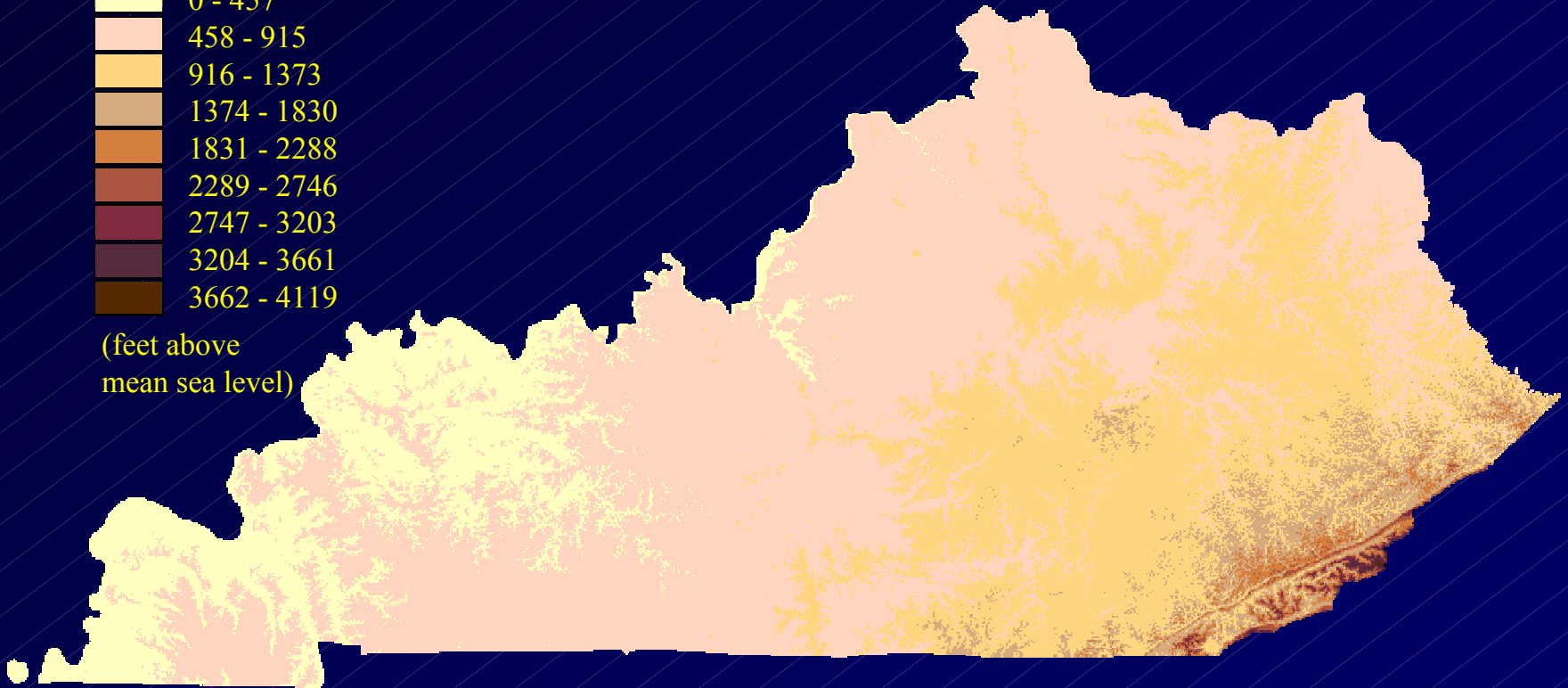


Elevation

(Digital Elevation Model, USGS)



(feet above
mean sea level)

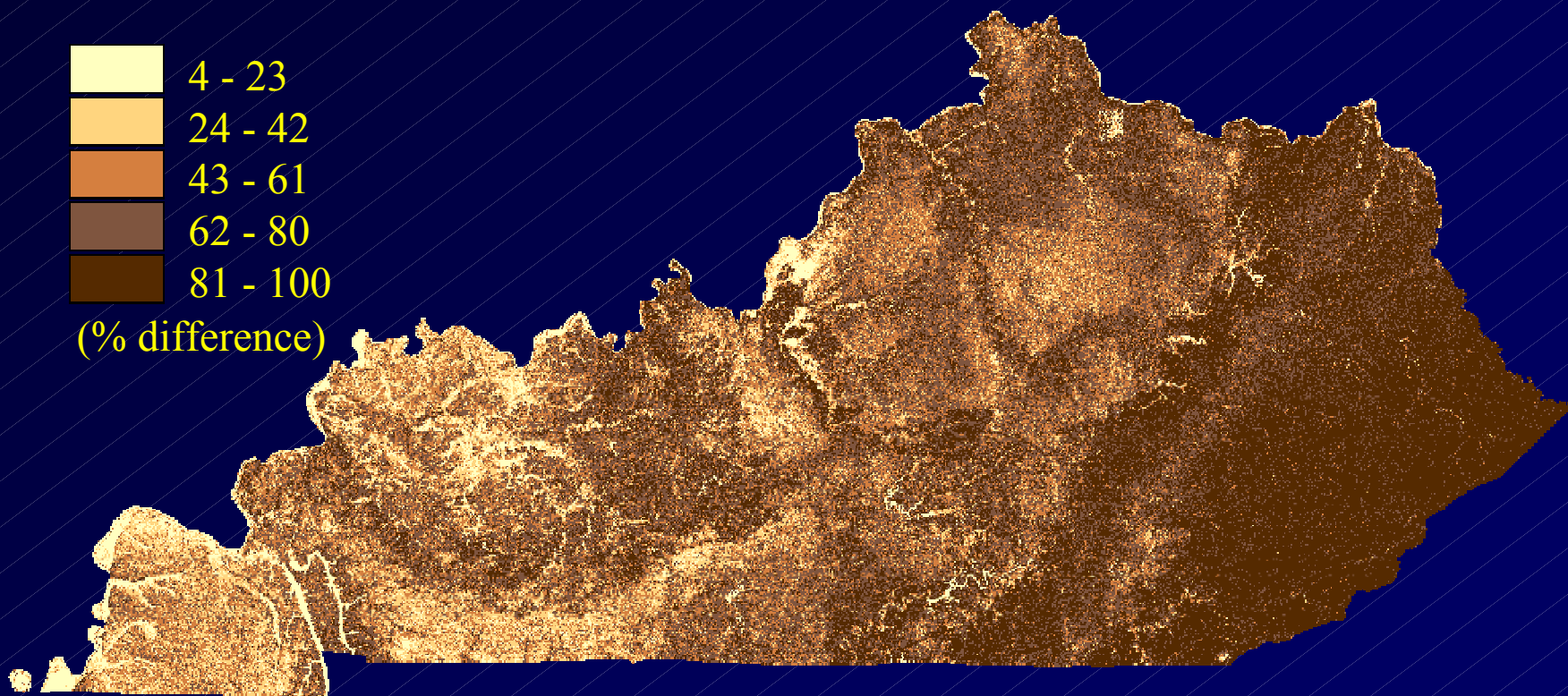


Topographic Variation

(constructed from DEMs, USGS)

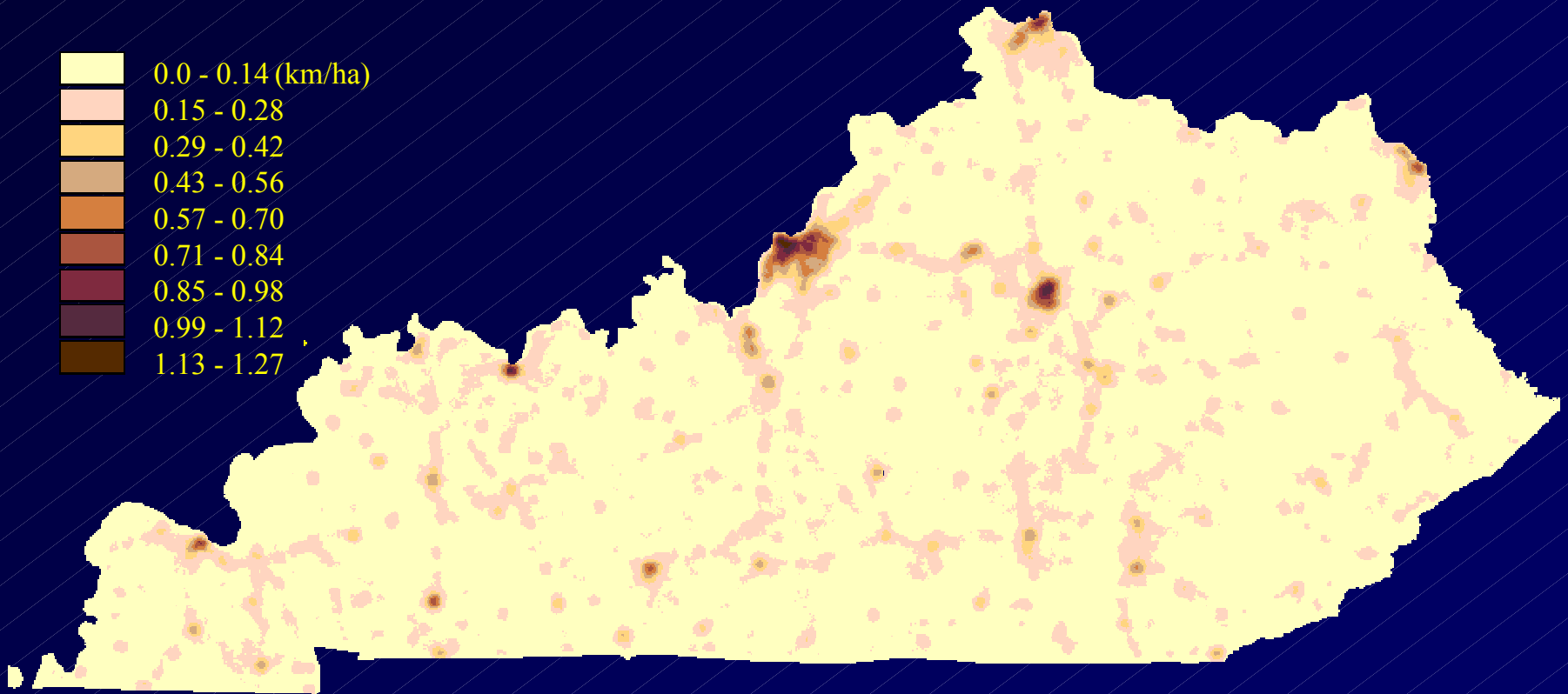
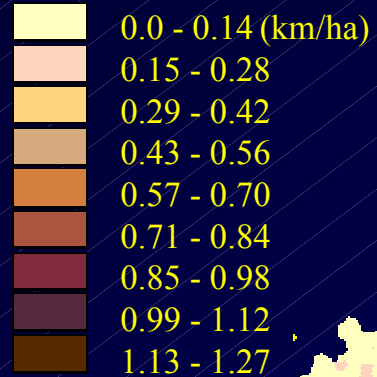


(% difference)



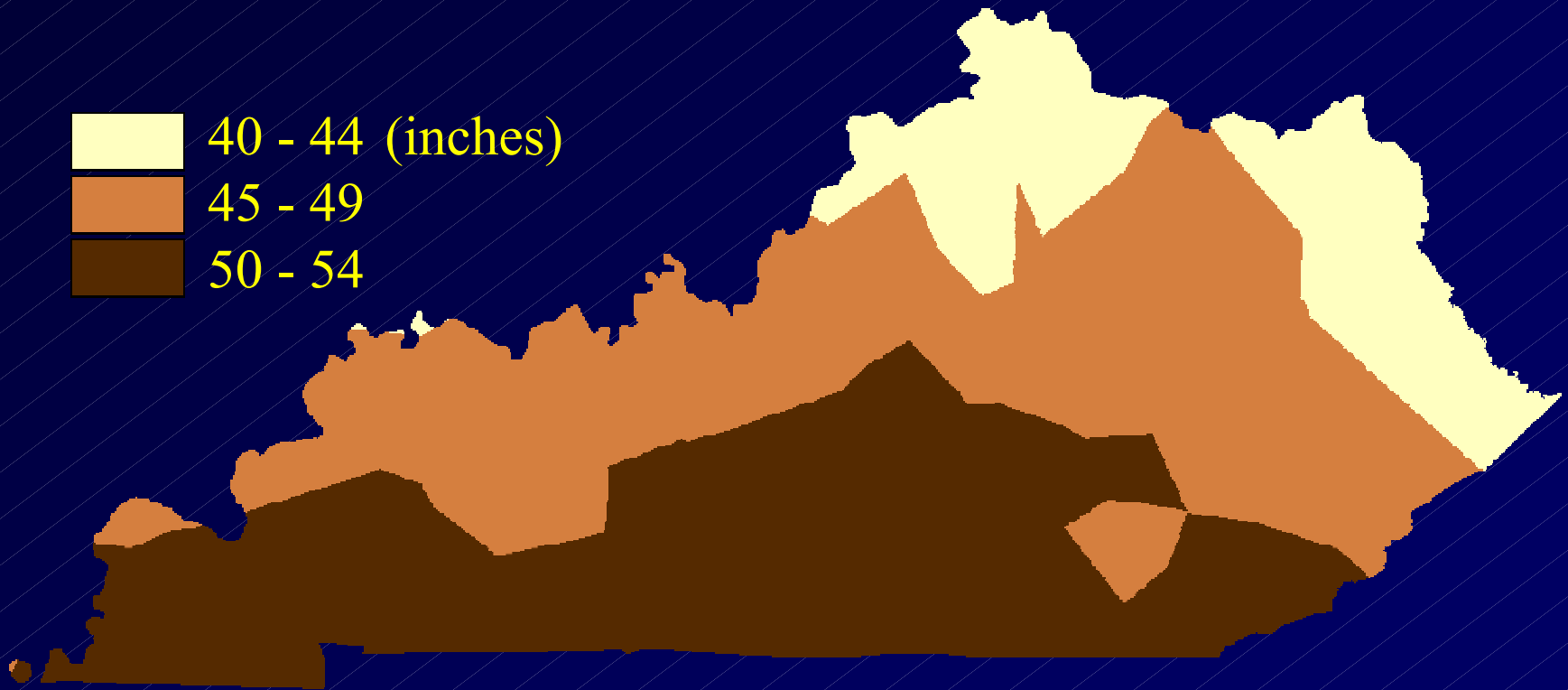
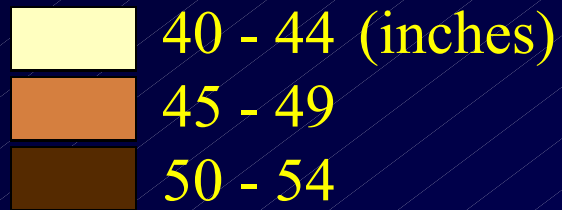
Road Density

(constructed from TIGER LINE FILES, US Census Bureau)

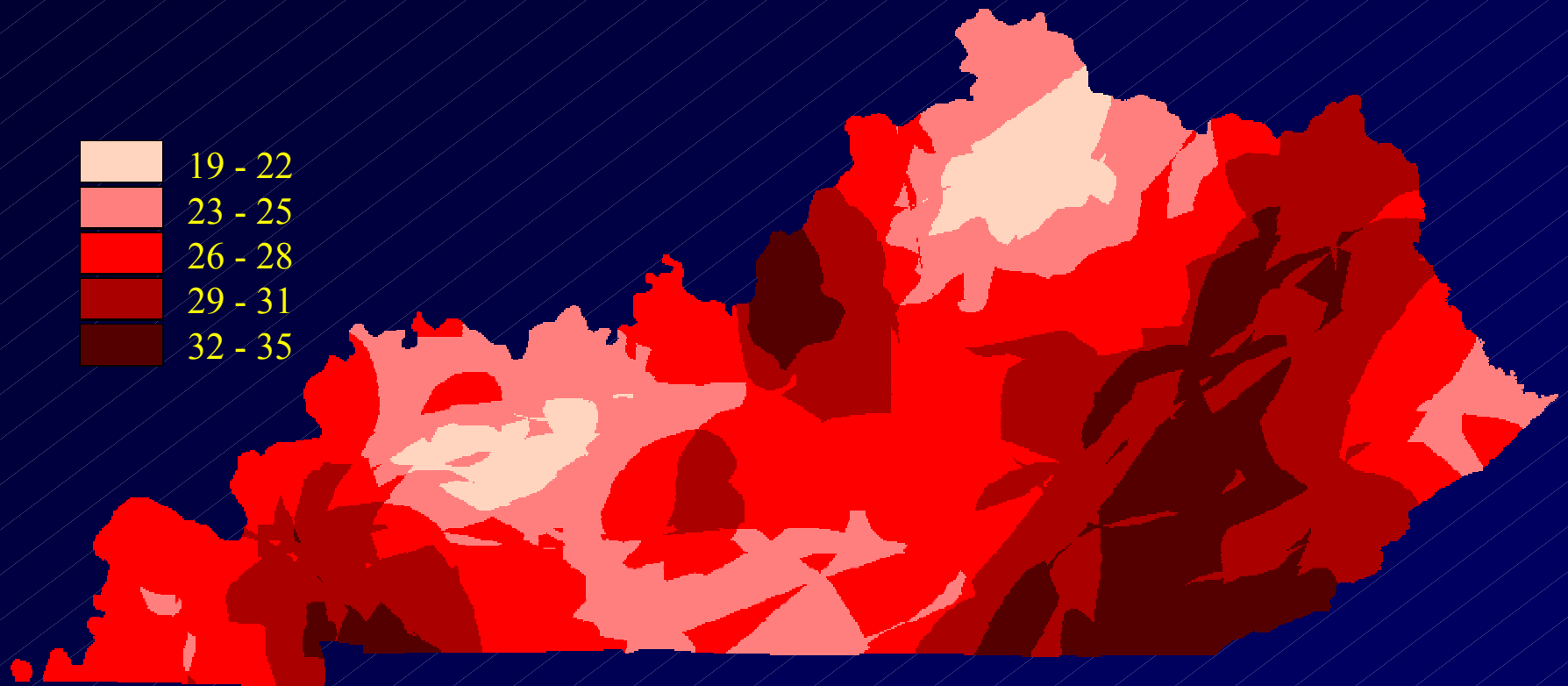


Mean Annual Precipitation

(National Climate Data Center, Mid-West Regional Climate Center,
and the UK Agricultural Weather Center)



Amphibians - Species Richness



Best Model

Elevation

R²

.15

Elevation + Temperature

.18

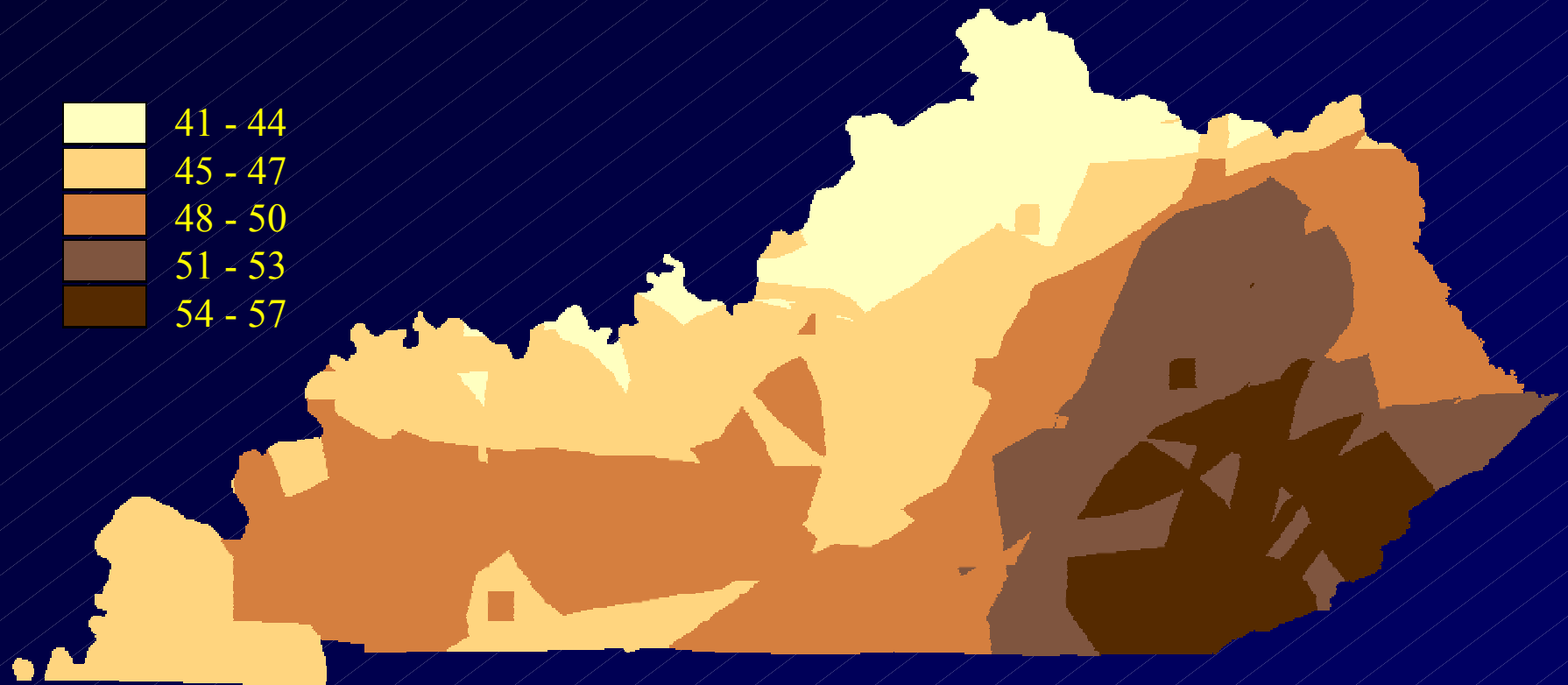
Elevation + Temperature + Topographic Variation

.18

Elevation + Temperature + Topographic Variation + Road Density

.18

Mammals - Species Richness



Best Model

	<u>R²</u>
Elevation	.37
Elevation + Temperature	.44
Elevation + Temperature + Topographic Variation	.46
Elevation + Temperature + Topographic Variation - Road Density	.47

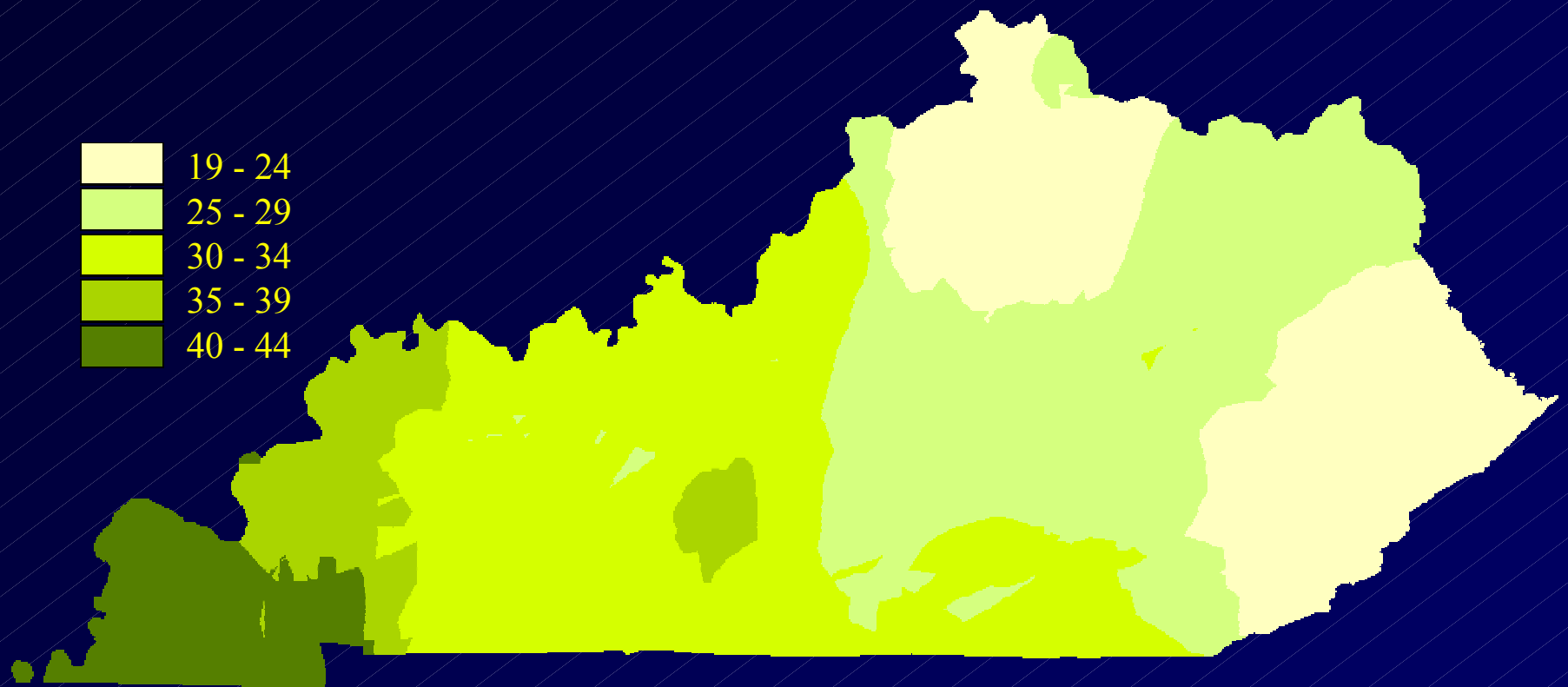
Breeding Birds - Species Richness



Best Model

	<u>R²</u>
-Elevation	.36
-Elevation + Temperature	.46
-Elevation + Temperature - Topographic Variation	.49
-Elevation + Temperature - Topographic Variation + Road Density	.49

Reptiles - Species Richness



Best Model

Temperature

R^2

.66

Temperature - Elevation

.73

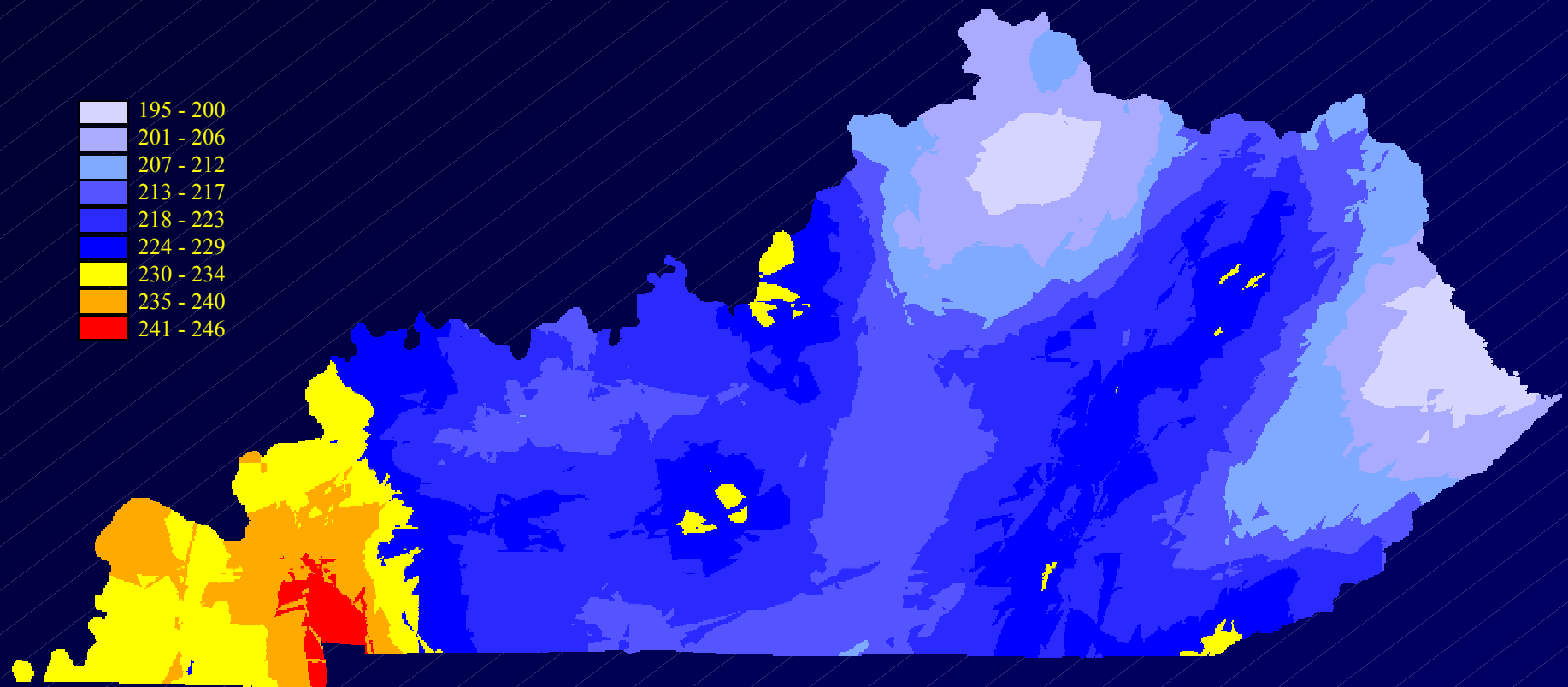
Temperature - Elevation - Topographic Variation

.73

Temperature - Elevation - Topographic Variation - Road Density

.73

All Terrestrial Vertebrates - Species Richness



Best Model

Temperature

R²

.55

Temperature + Elevation

.55

Temperature + Elevation + Road Density

.56

Temperature + Elevation + Road Density - Topographic Variation

.56

Conclusions

- Among the abiotic variables, elevation and temperature were the best predictors of terrestrial vertebrate species richness in Kentucky.
- Abiotic variables accounted for much of the variation in reptile species richness but little of the variation in amphibian species richness.
- Abiotic variables can be useful in modeling variation in species richness at a regional level.

Acknowledgements

National GAP (USGS)



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and Wildlife Resources



Mid-America Remote
Sensing Center

