The Distribution of Ashe Juniper Forests in the Hill Country in Relation to Abiotic Site Type

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Missouri Resource Assessment Partnership

http://www.cerc.usgs.gov/morap

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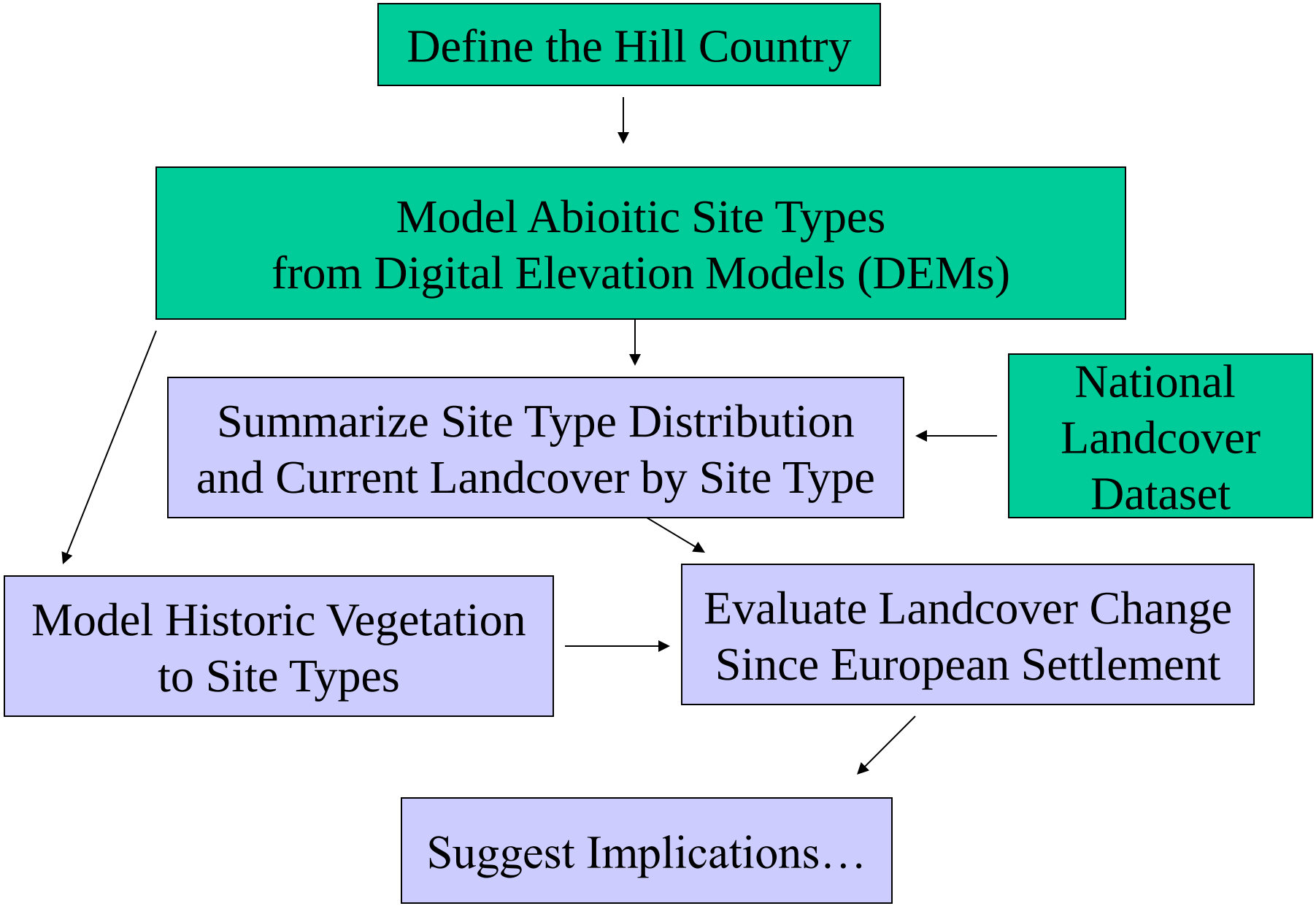
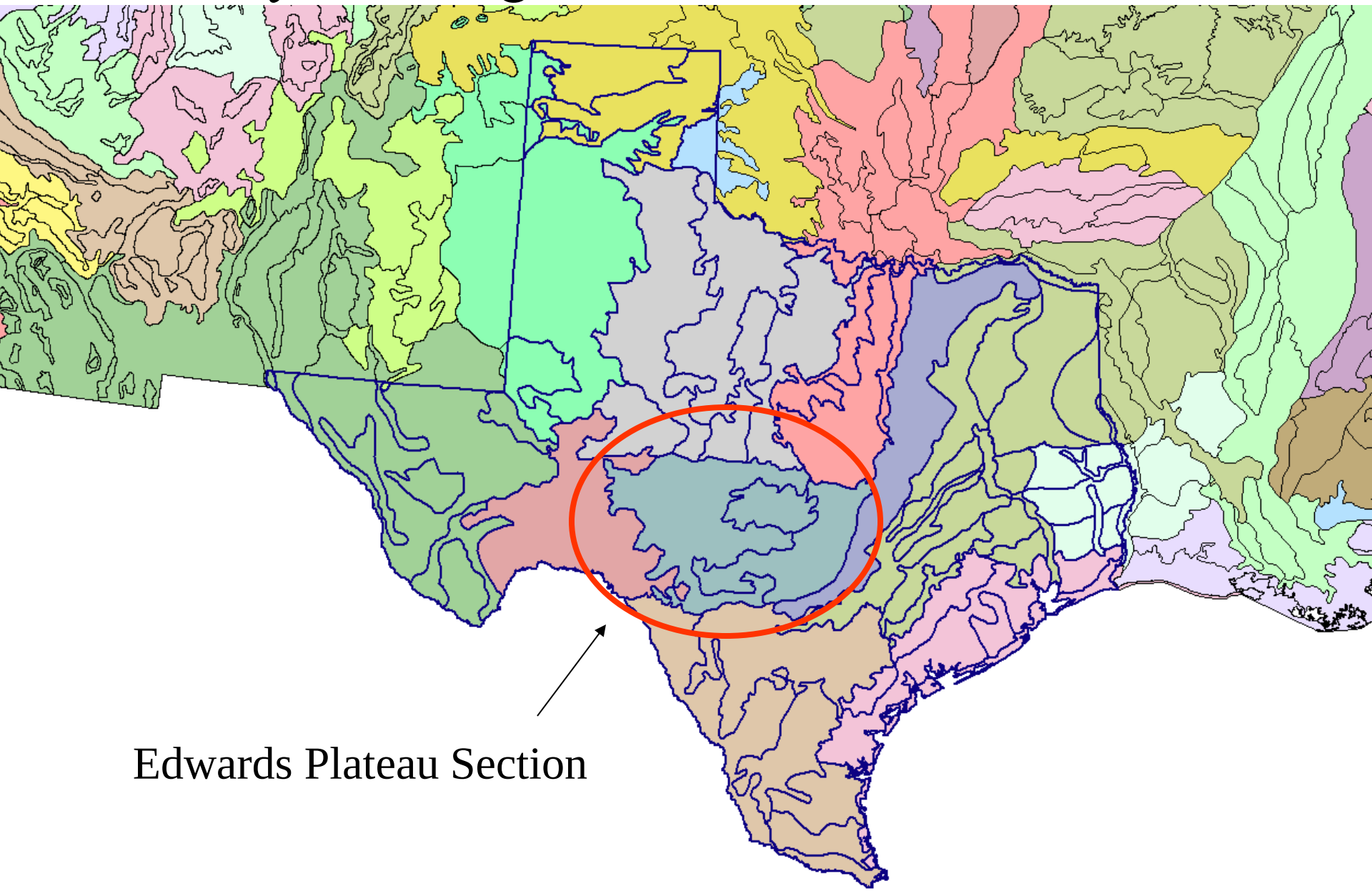
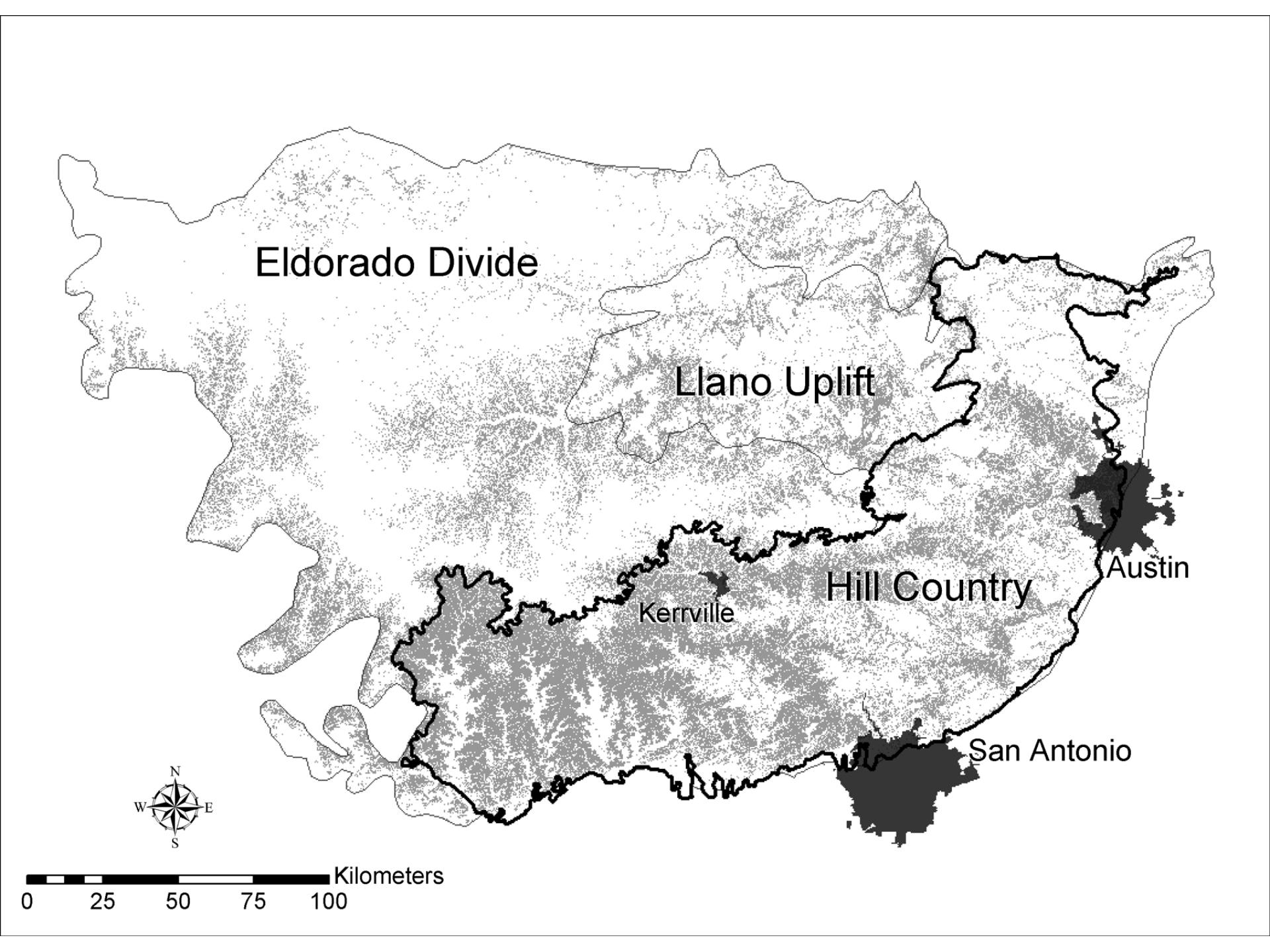

Define the Hill Country
Model Abioitic Site Types
from Digital Elevation Models (DEMs)
Summarize Site Type Distribution
and Current Landcover by Site Type
National
Landcover
Dataset
Model Historic Vegetation
to Site Types
Evaluate Landcover Change
Since European Settlement
Suggest Implications…

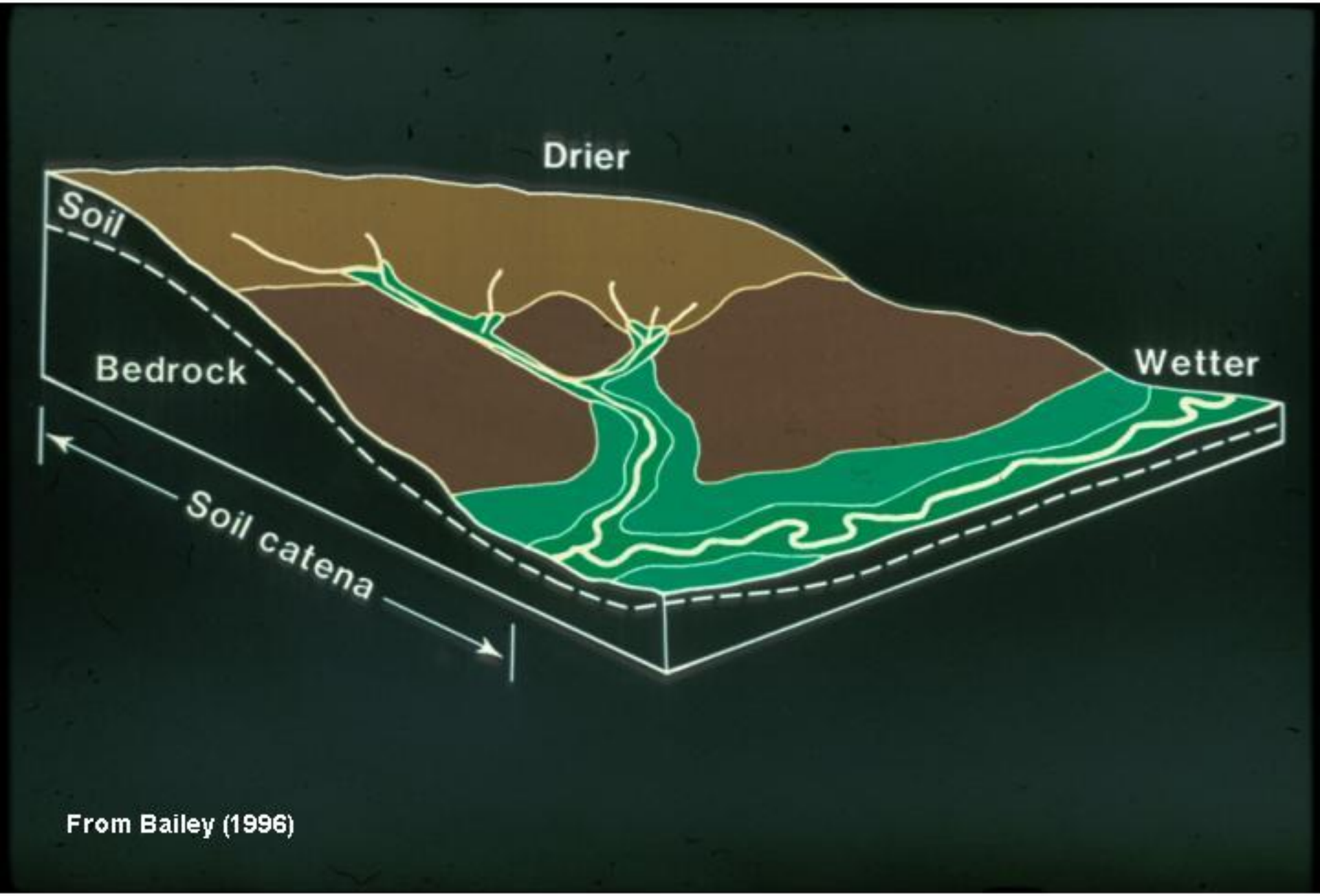
Bailey's Ecological Sections & Subsections



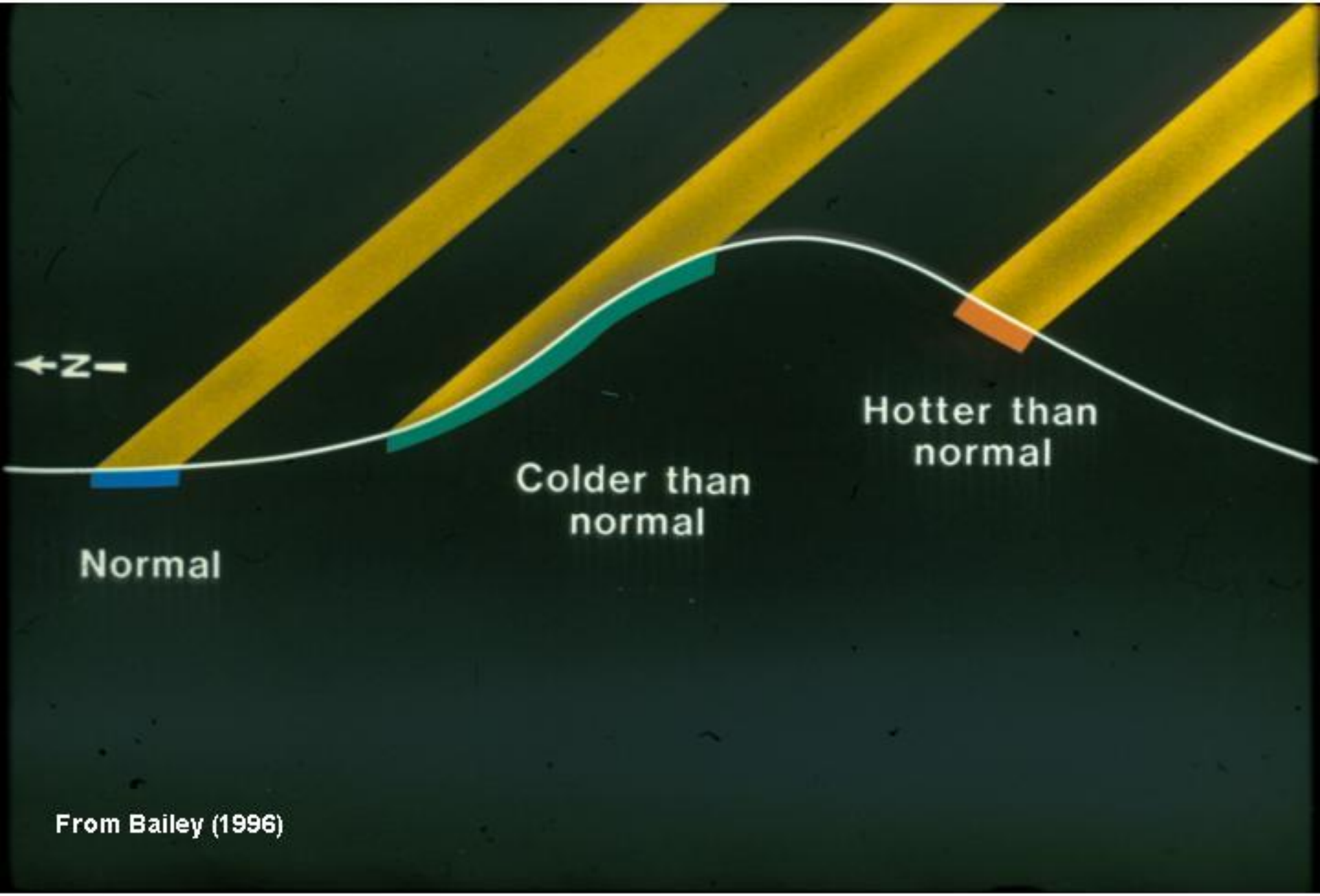

Eldorado Divide
Llano Uplift
Hill Country
Kerrville
Austin
San Antonio
N
W
E
S
Kilometers
0
25
50
75
100

Why characterize abiotic site types and historic vegetation, and compare these to current conditions?

- General vegetation patterns are predictable
  - Climate at large resolution, landform differentiation at mid-resolution, soil moisture at fine-resolution
- Implications for land stewardship at site level
  - Current vegetation depends on site type and history
  - Future vegetation depend on site type, management, and “luck”
  - Goals that are not compatible with site types & current conditions are difficult or impossible to achieve

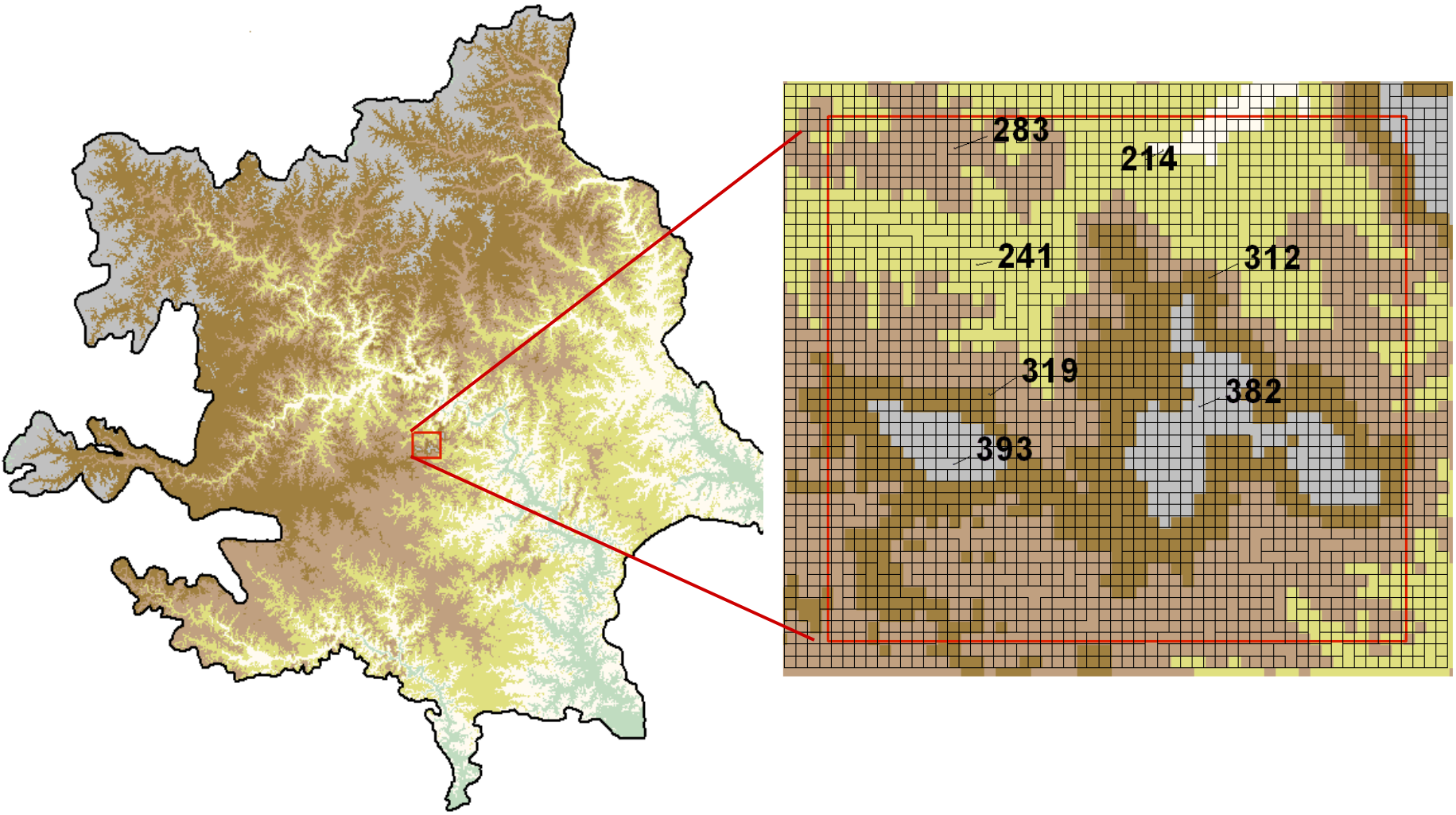


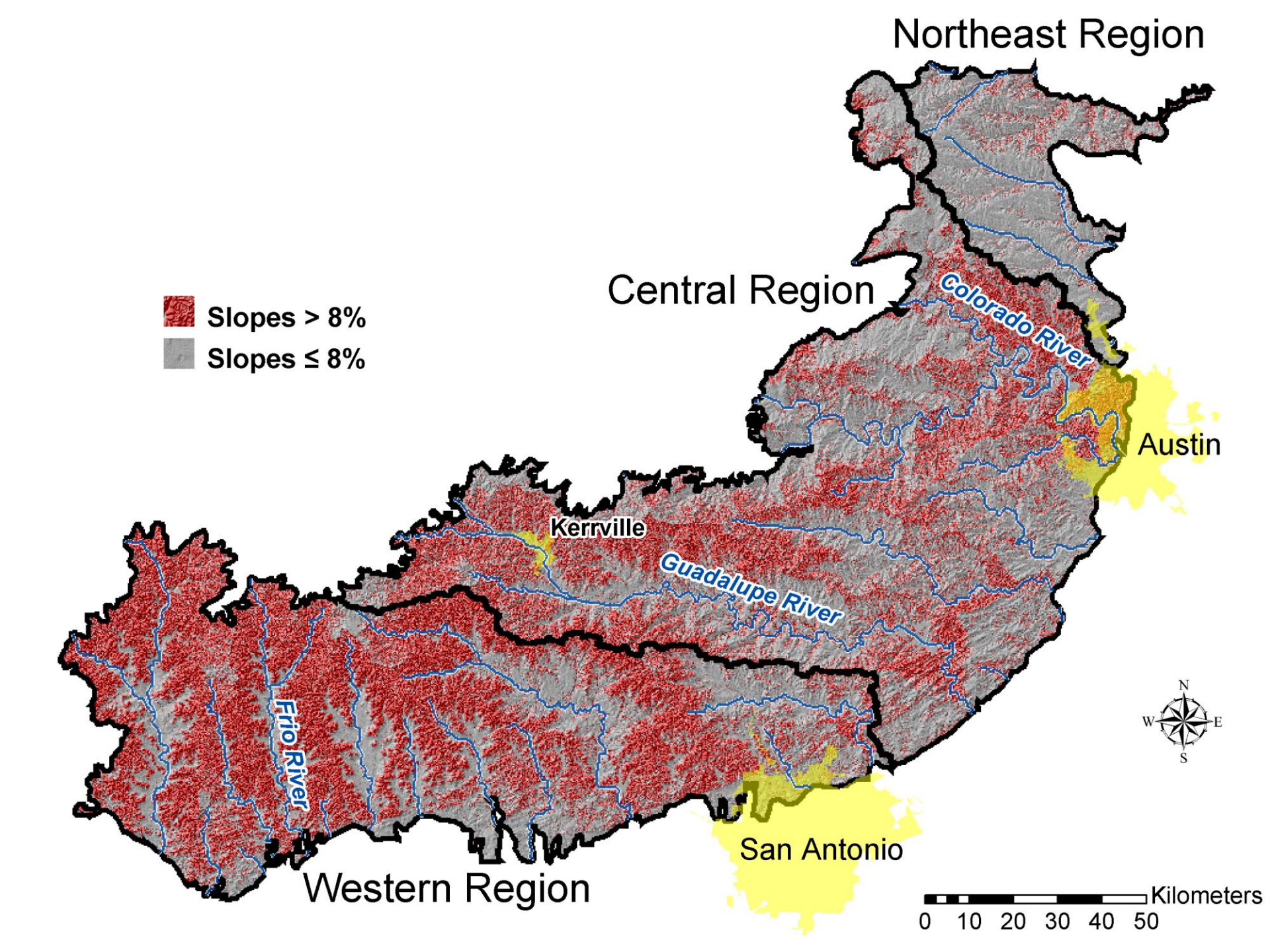
From Bailey (1996)

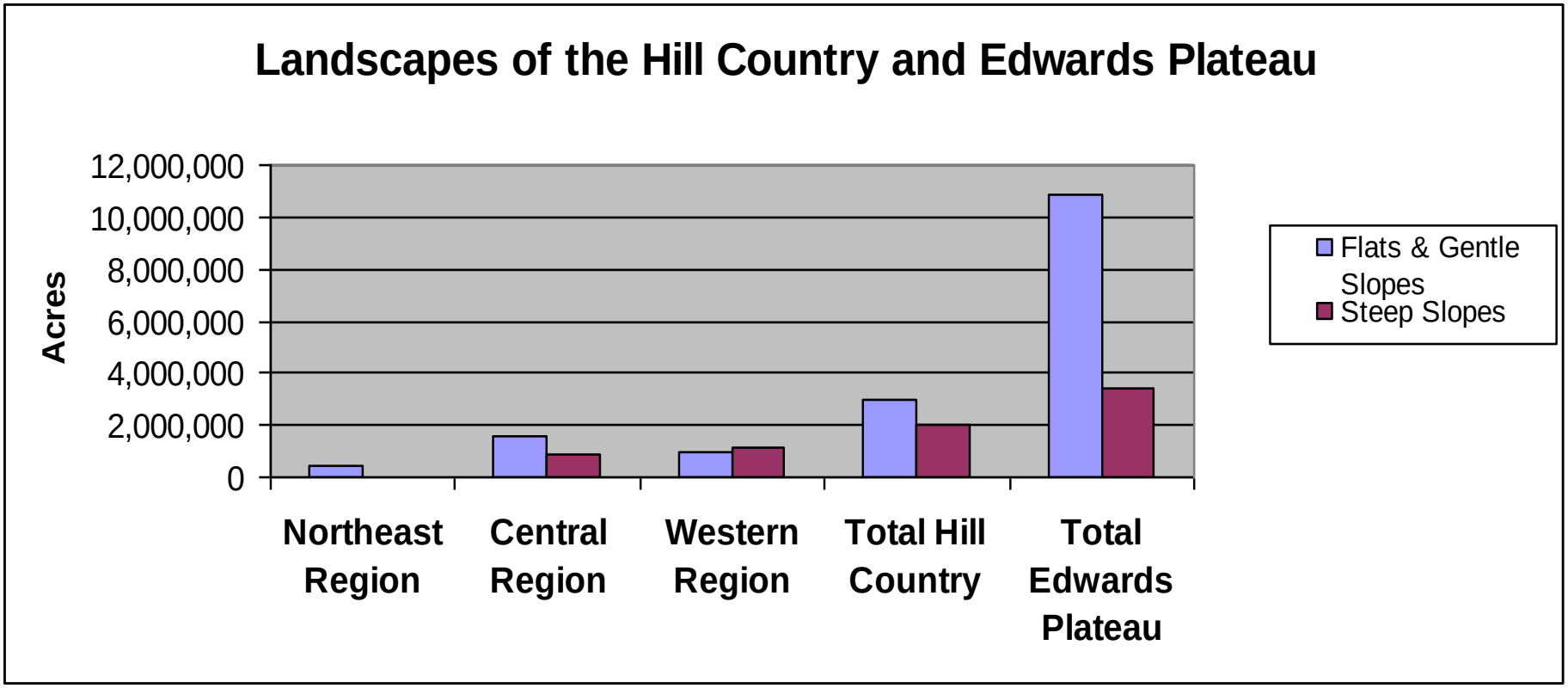


From Bailey (1996)

Digital Elevation Model (DEM): elevation is represented by a regular grid with elevation values; facilitates abiotic site type modeling (slope, exposure, position high or low)

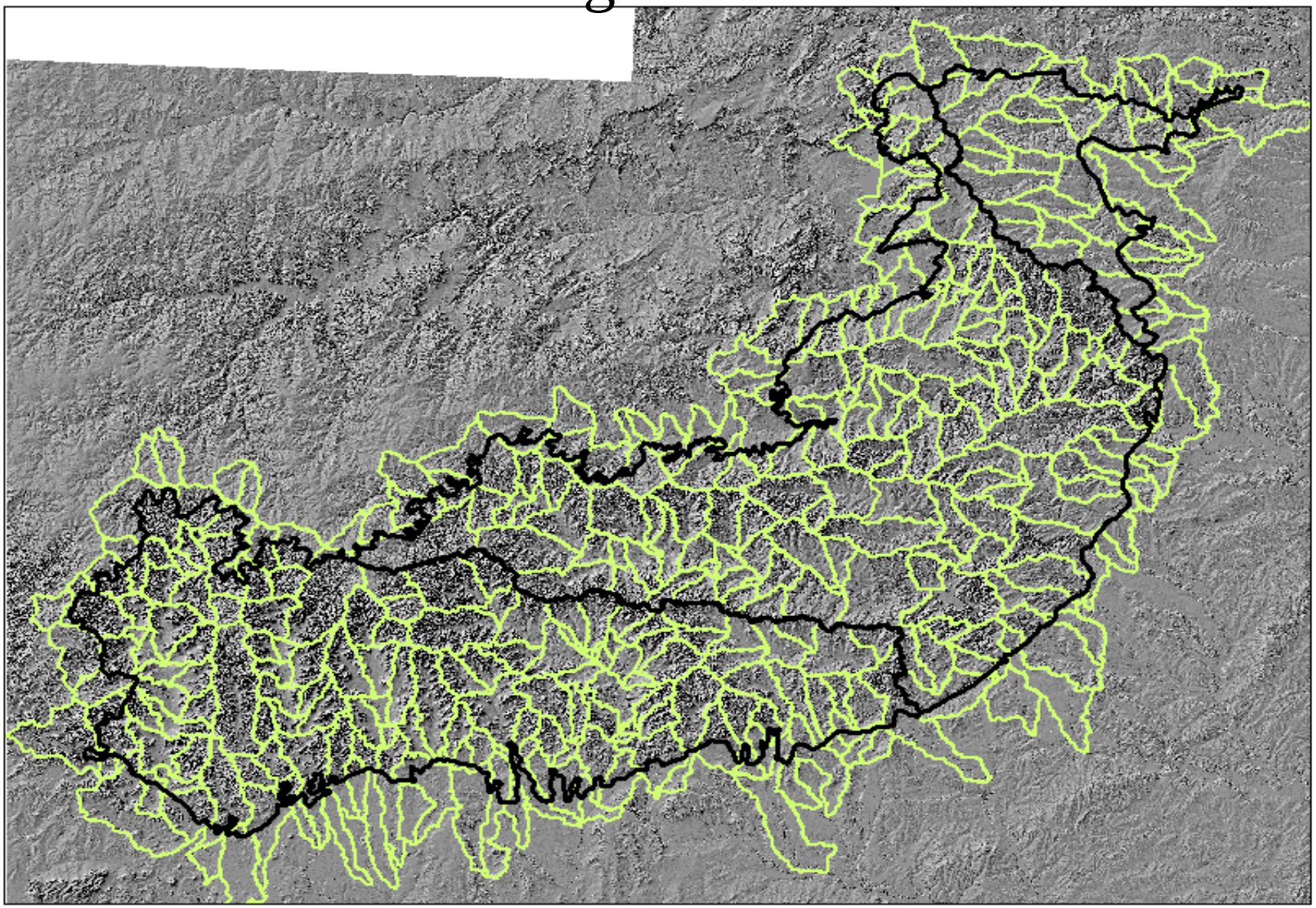


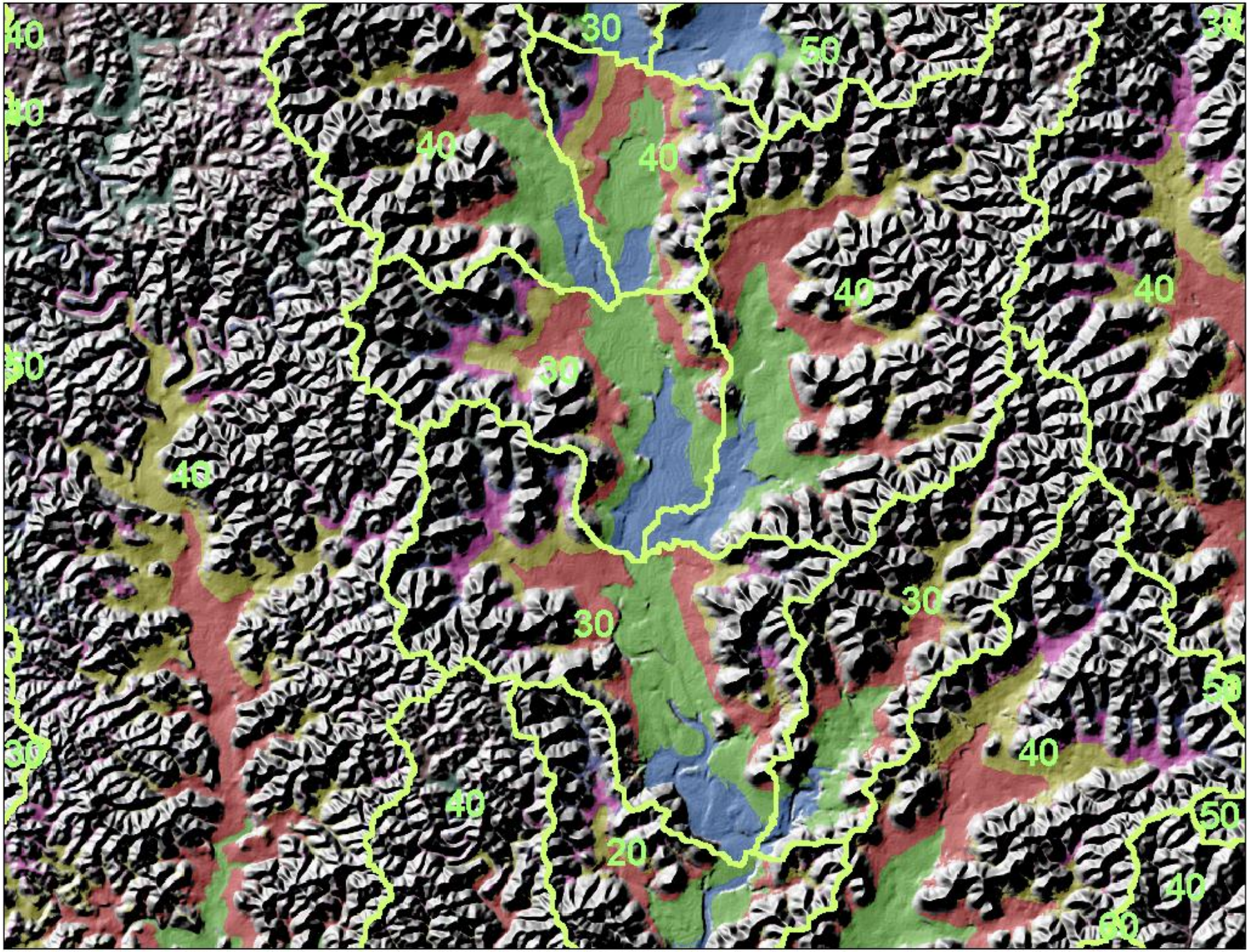

Northeast Region
Central Region
Western Region
Slopes > 8%
Slopes ≤ 8%
Colorado River
Austin
Kerrville
Guadalupe River
Frio River
San Antonio
N
W
E
S
Kilometers
0 10 20 30 40 50



Hill Country makes up 35% of the Edwards Plateau but contains 61% of all slopes over 8%

Separating High Flats from Floodplains & Low Flats: 372 catchments generated from DEMs

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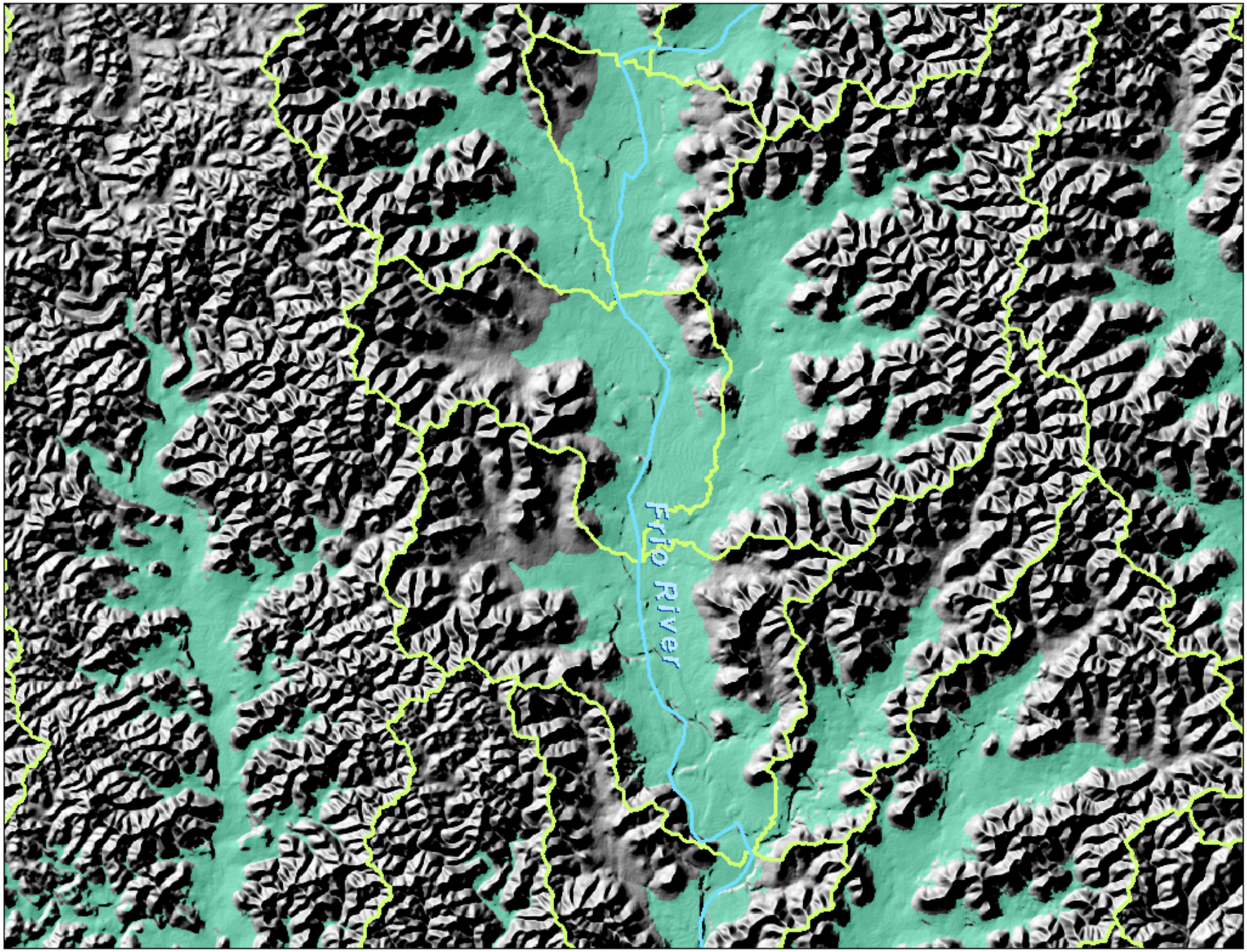
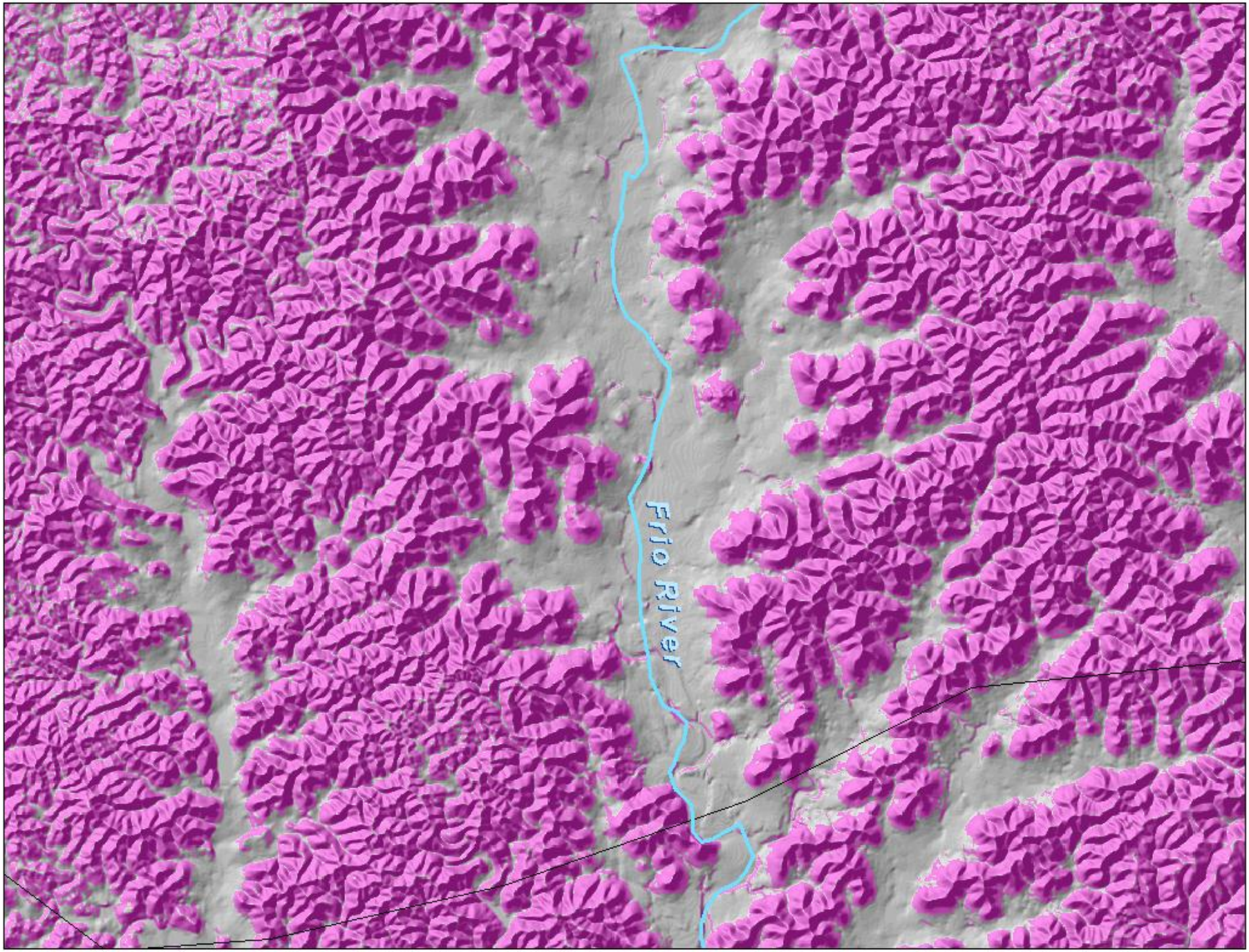
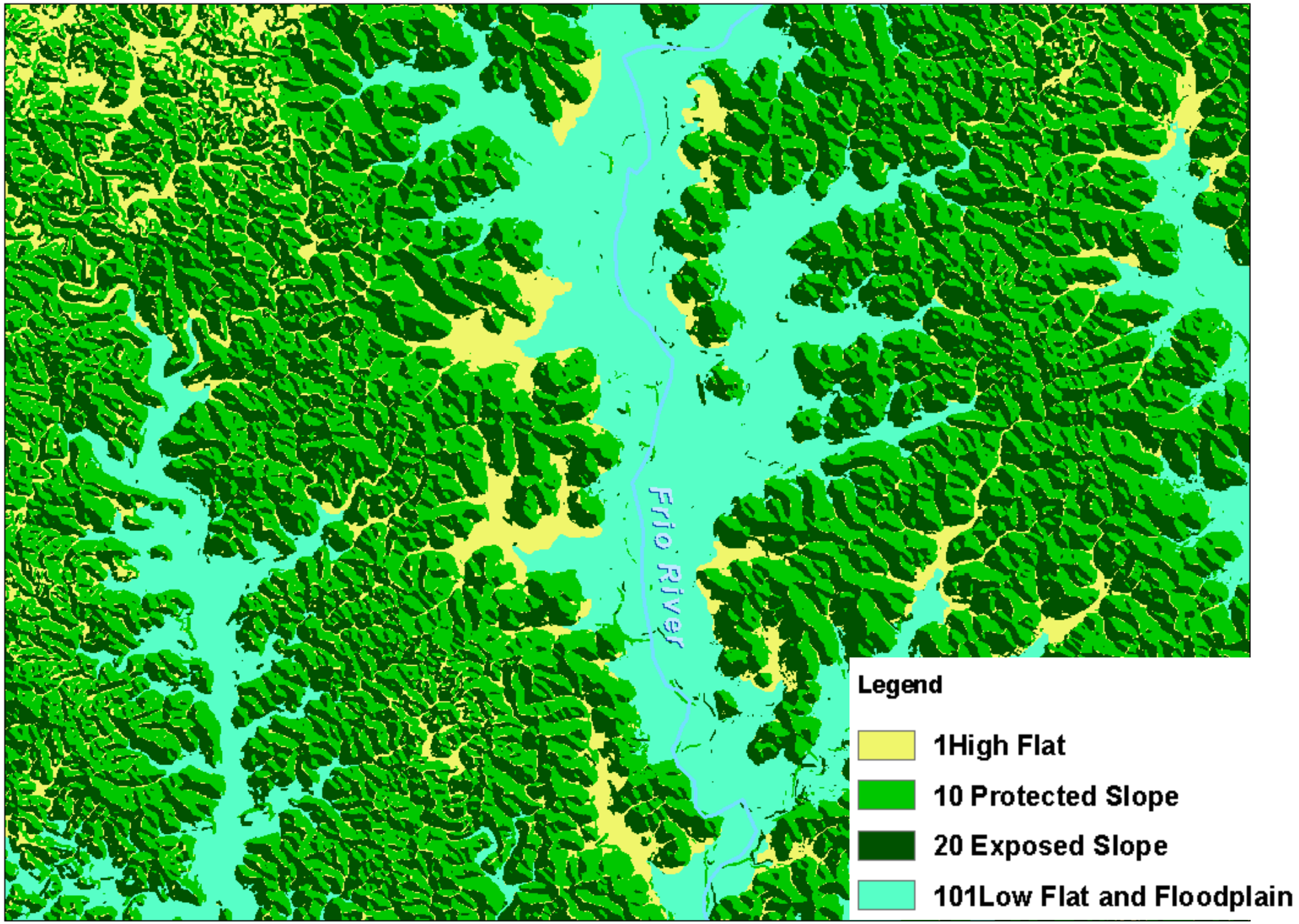
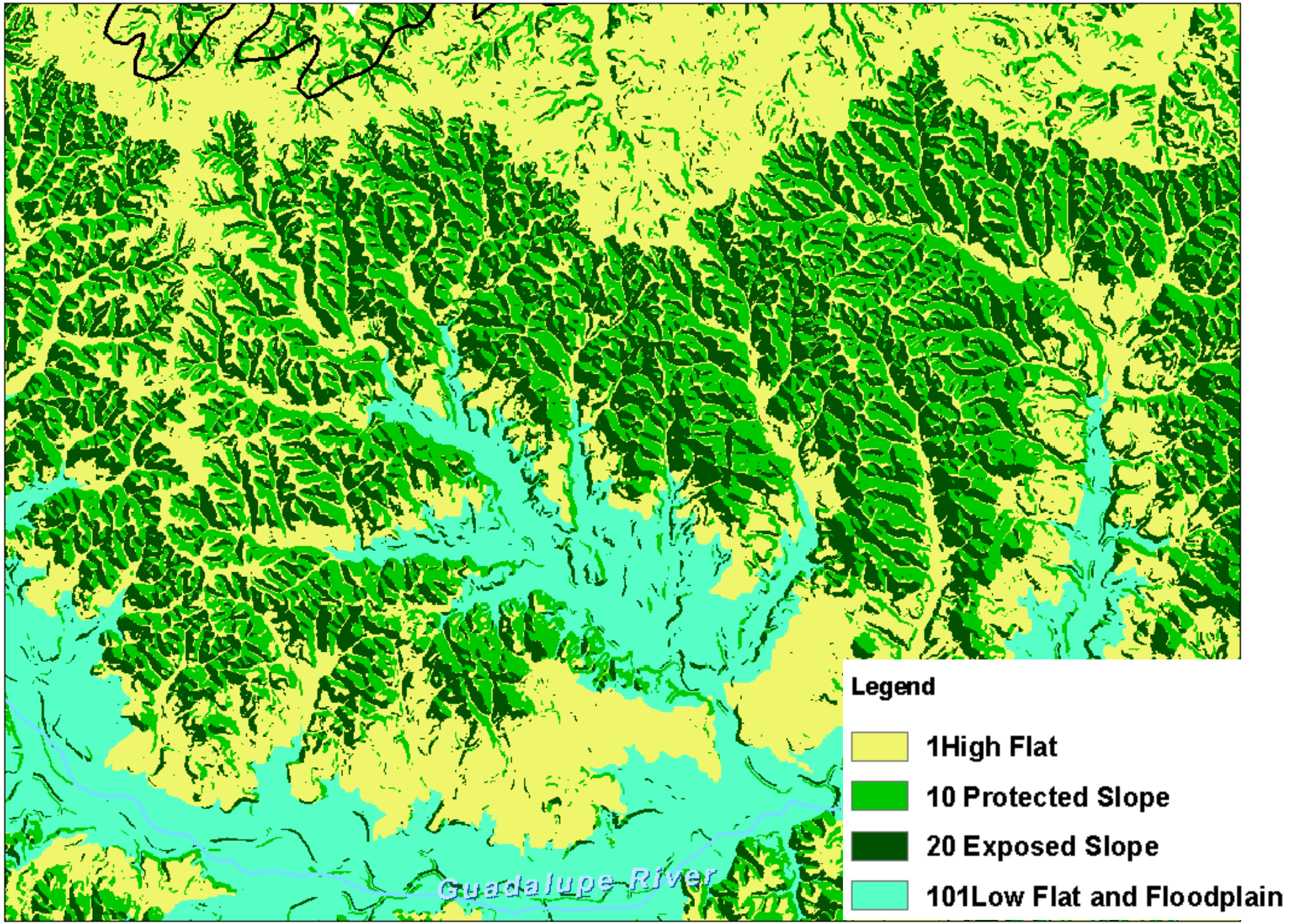
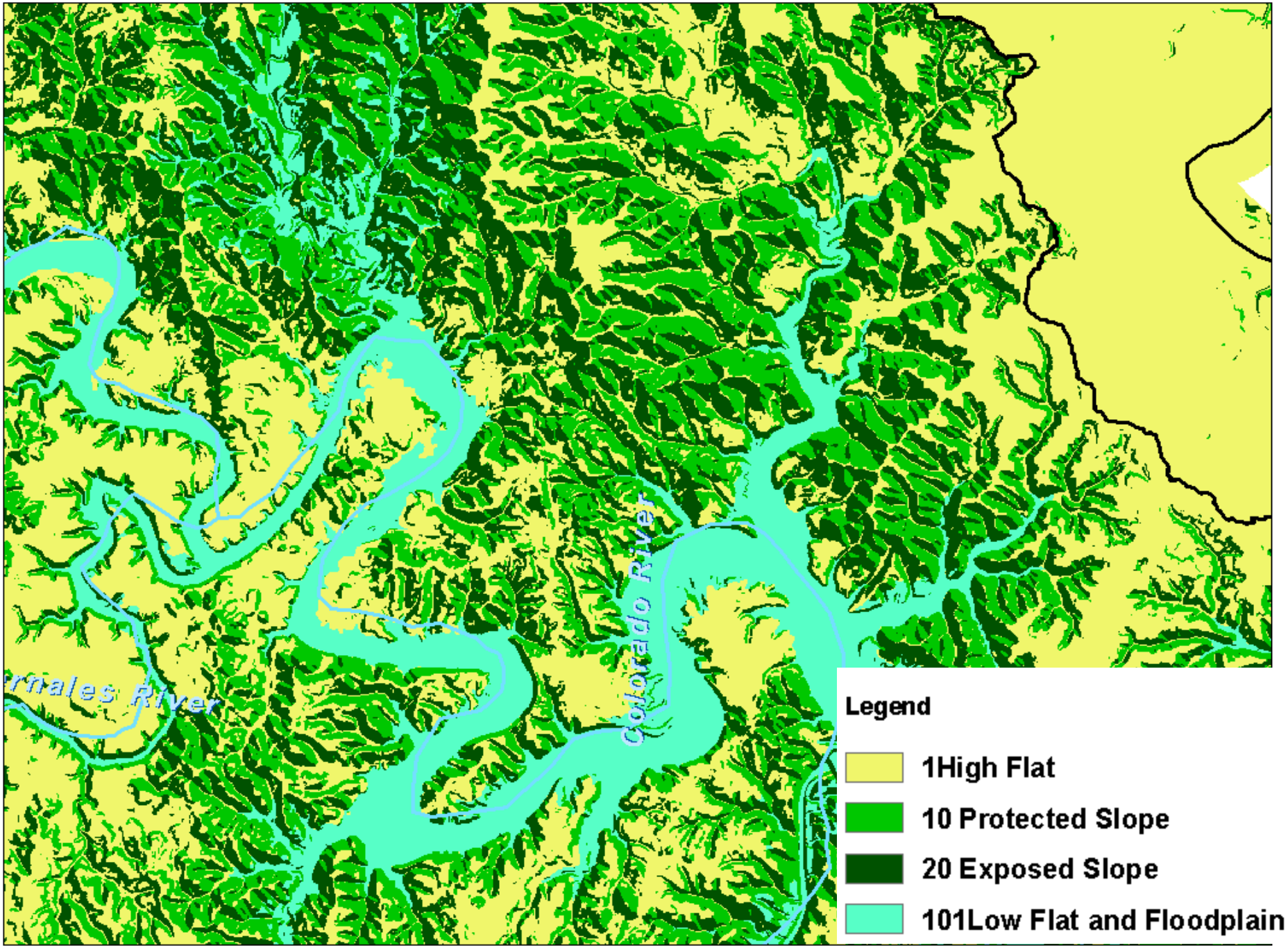

Frio River


Frio River


Frio River
Legend
1High Flat
10 Protected Slope
20 Exposed Slope
101Low Flat and Floodplain


Legend
1High Flat
10 Protected Slope
20 Exposed Slope
101Low Flat and Floodplain
Guadalupe River


rmales River
Colorado River
Legend
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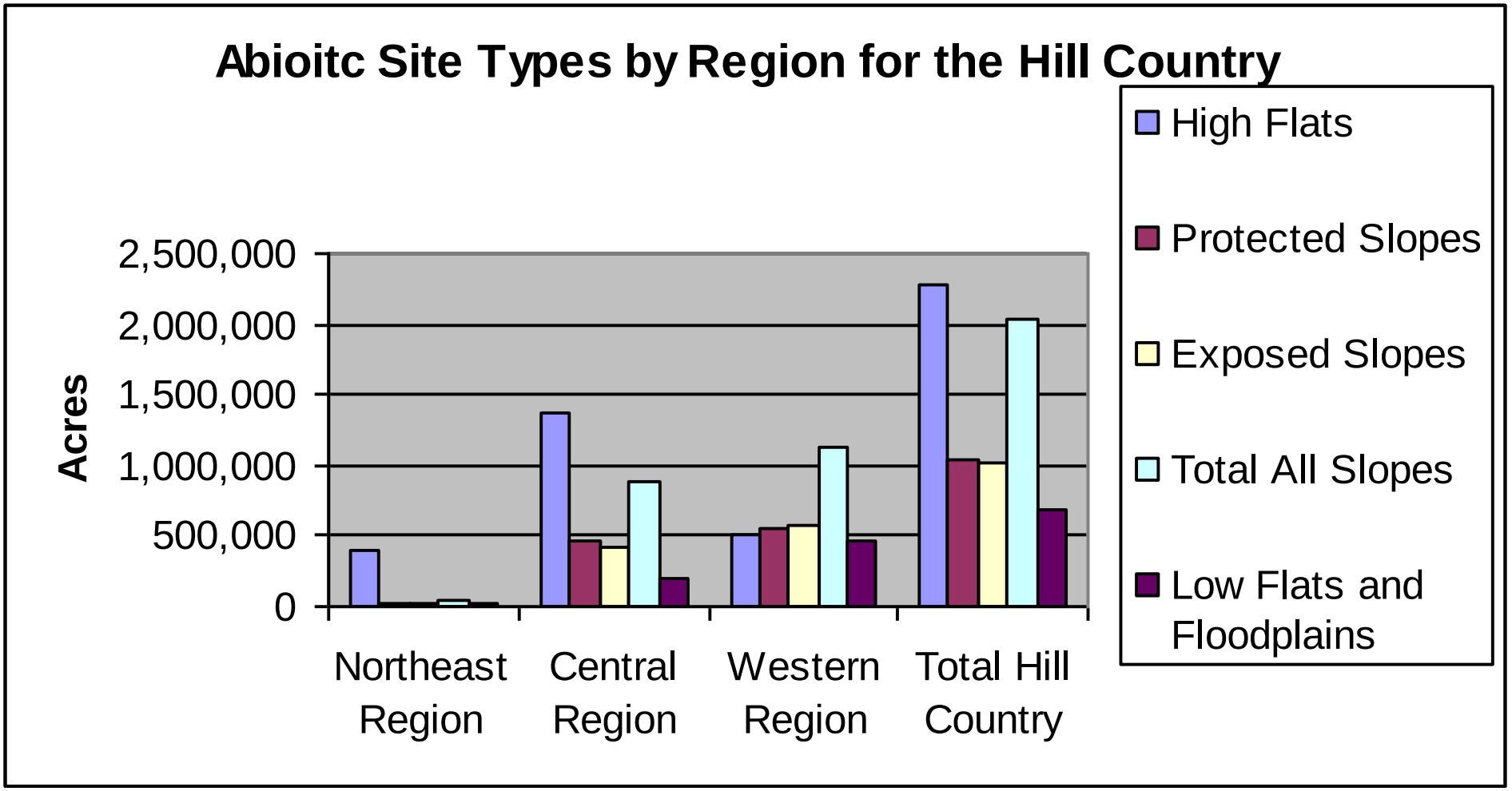
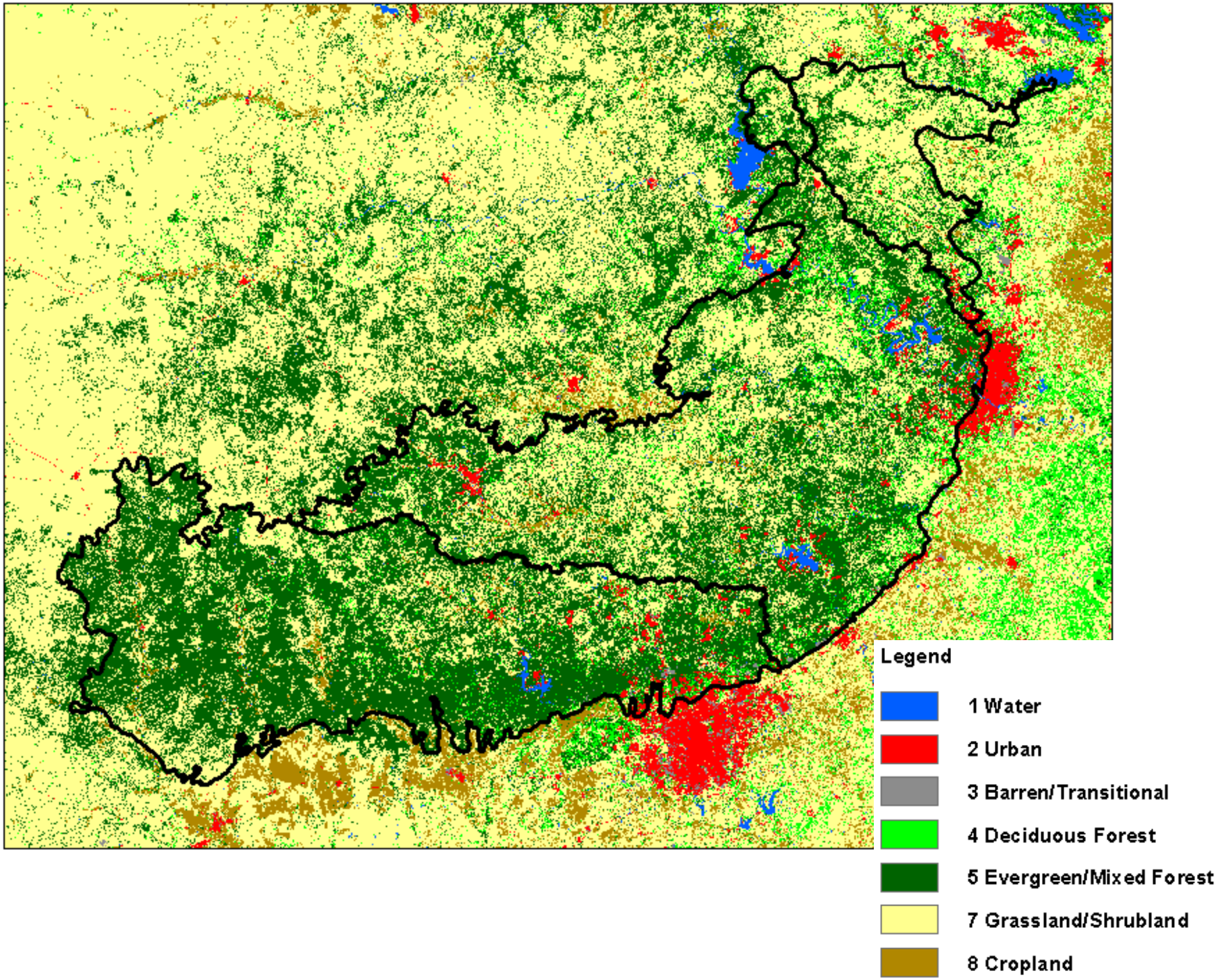
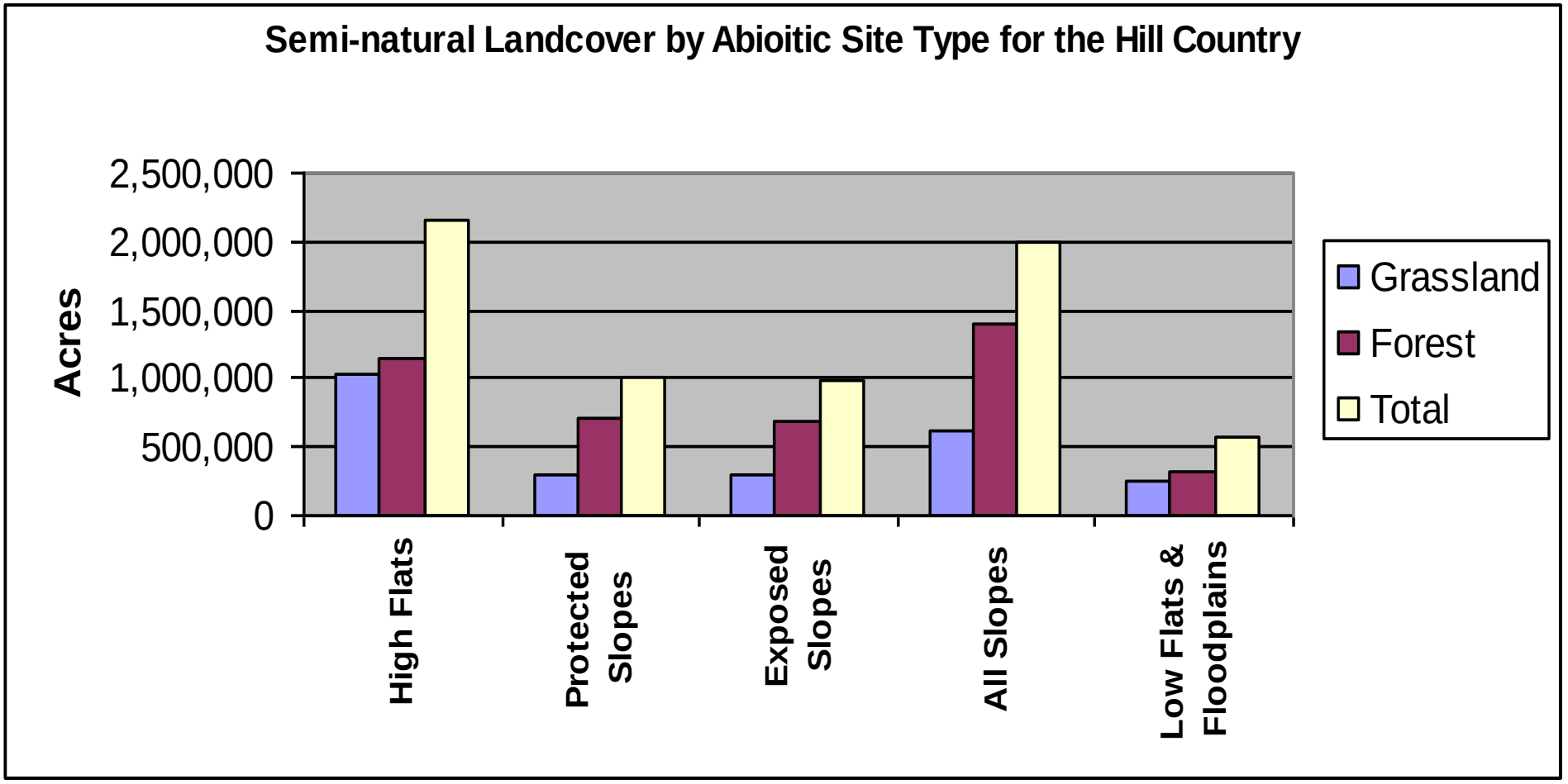
101Low Flat and Floodplain



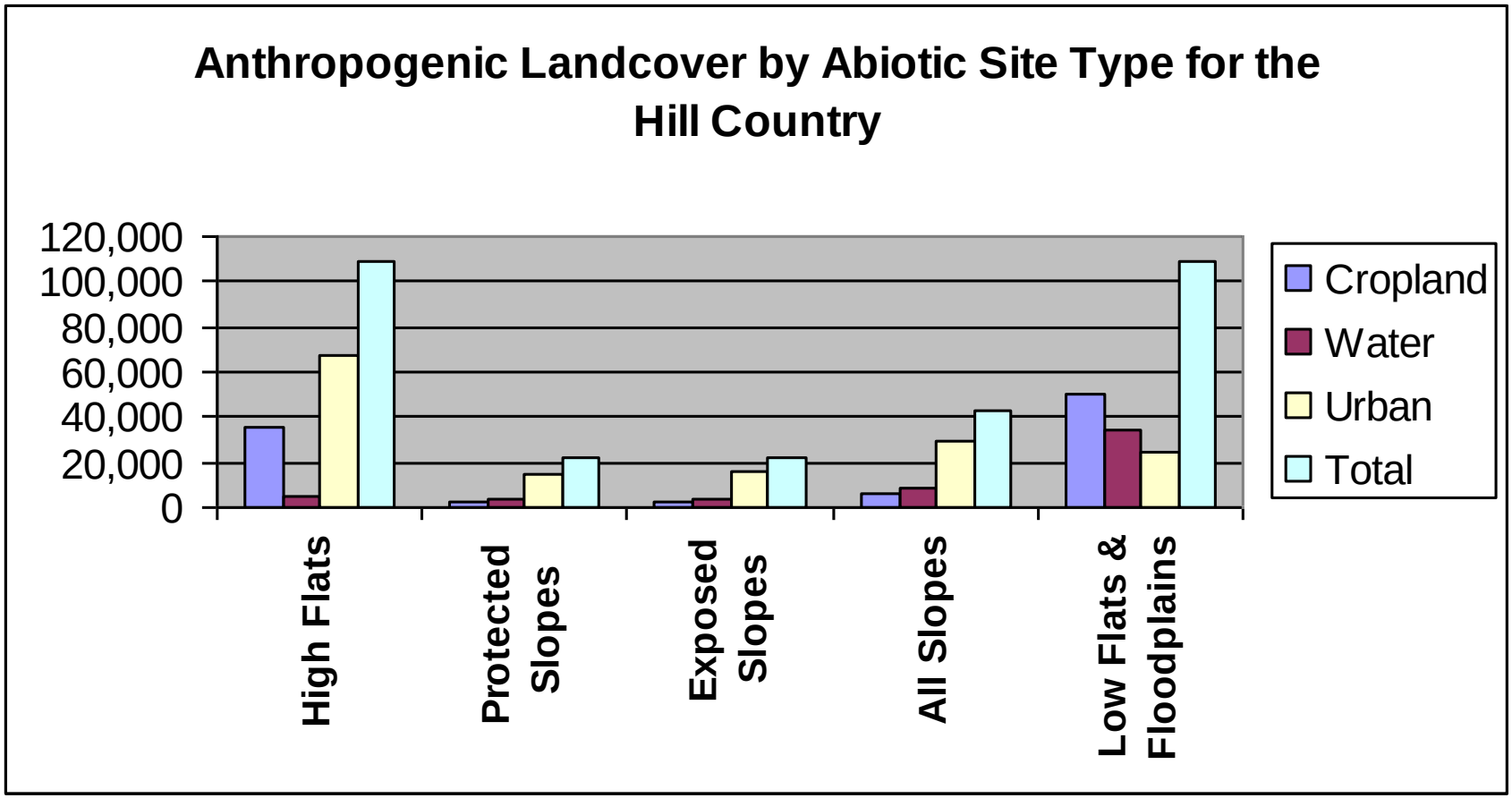
Western region is more rugged, northeast region is flat, and central region is intermediate; western region contains relatively more floodplains and low flats


Legend
1 Water
2 Urban
3 Barren/Transitional
4 Deciduous Forest
5 Evergreen/Mixed Forest
7 Grassland/Shrubland
8 Cropland



All slopes are mainly forested (68%), high flats support about as much grassland as forest, as do low flats and floodplains

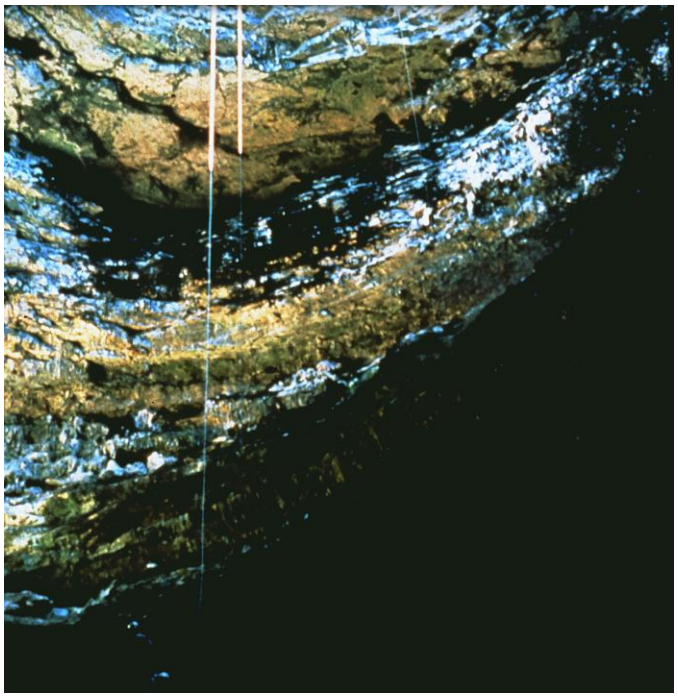
Total Anthropogenic Landcover: 5.2%

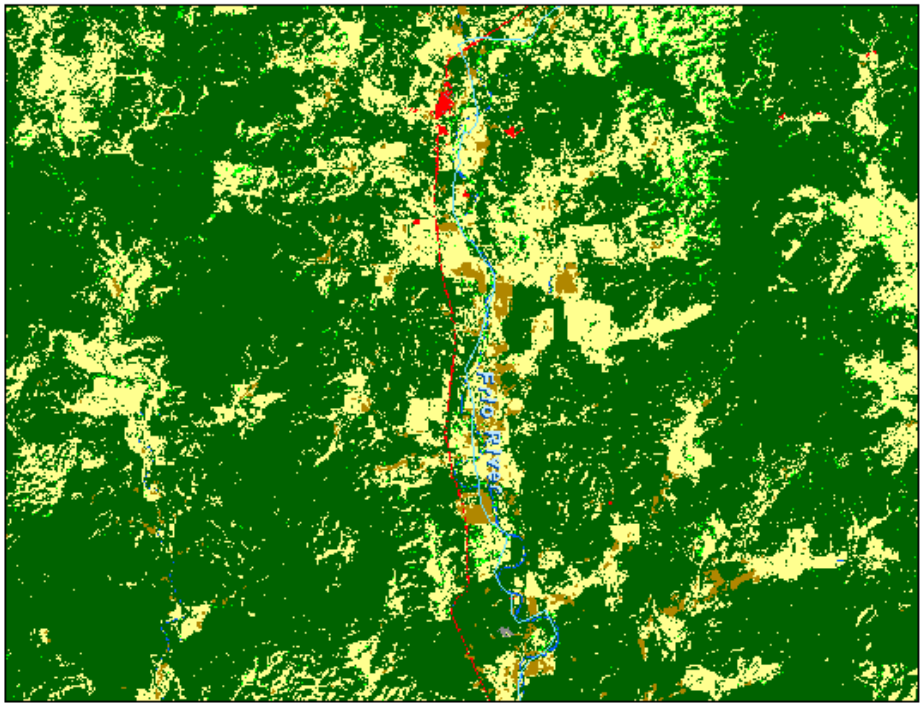


On a percentage basis, low flats and floodplains contain three times more anthropogenic vegetation (16.2%) than high flats (4.8%) and 8 times more than slopes (2.1%)

Historic Vegetation Modeling

- Issues
  - no good soils/geology digital data
  - no way to evaluate dynamics due to fire, drought, floods, random events
  - slope exposure and slope position are continuous variables





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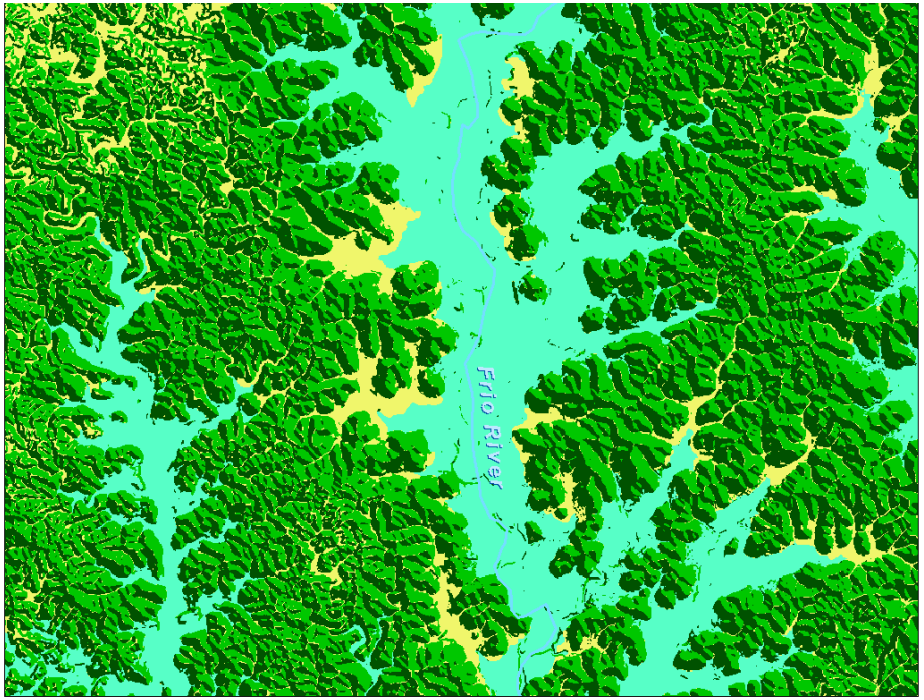

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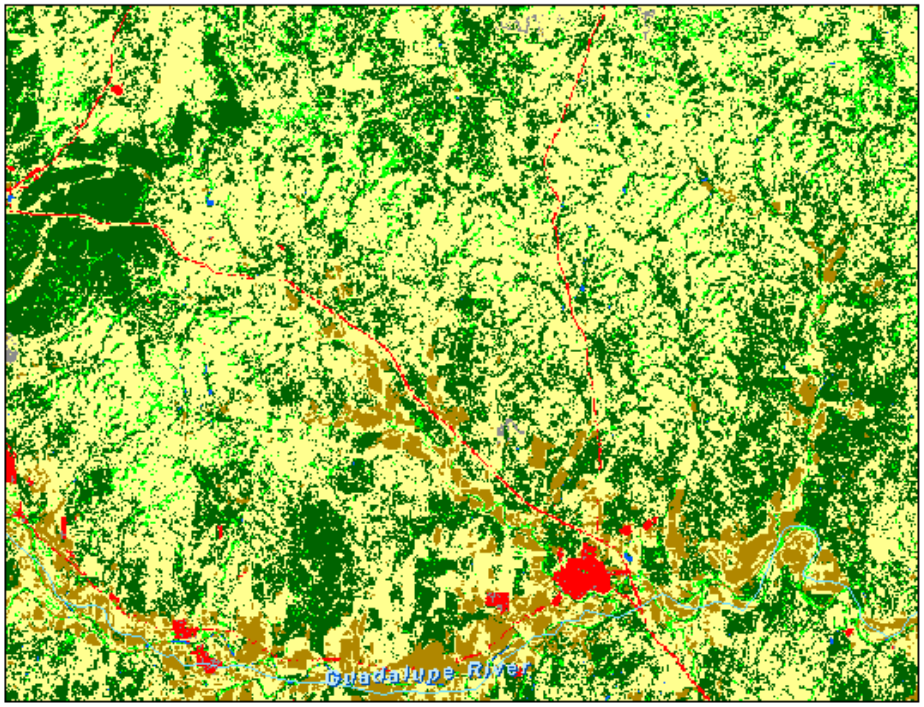

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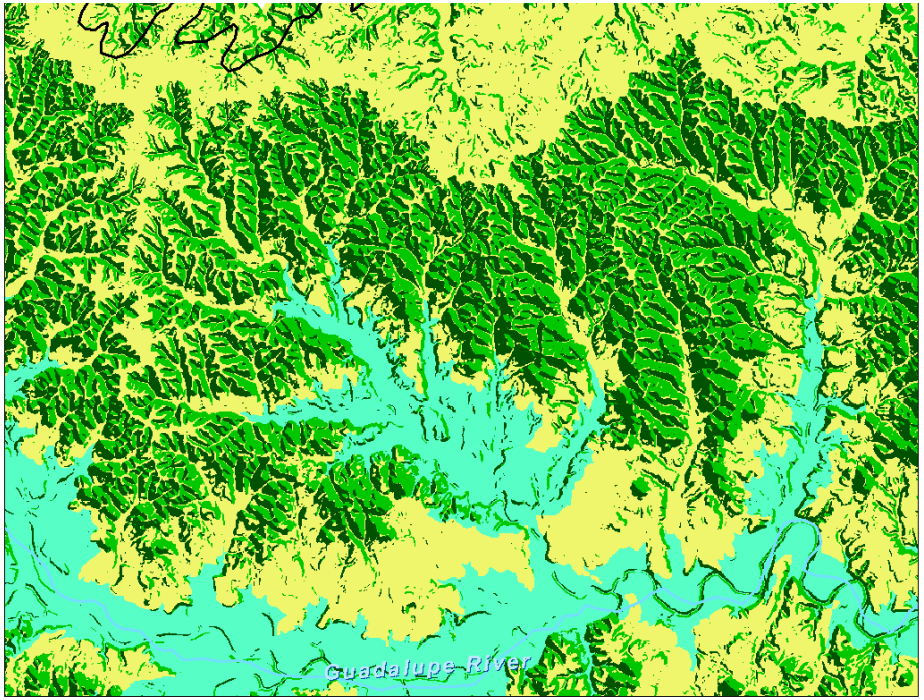

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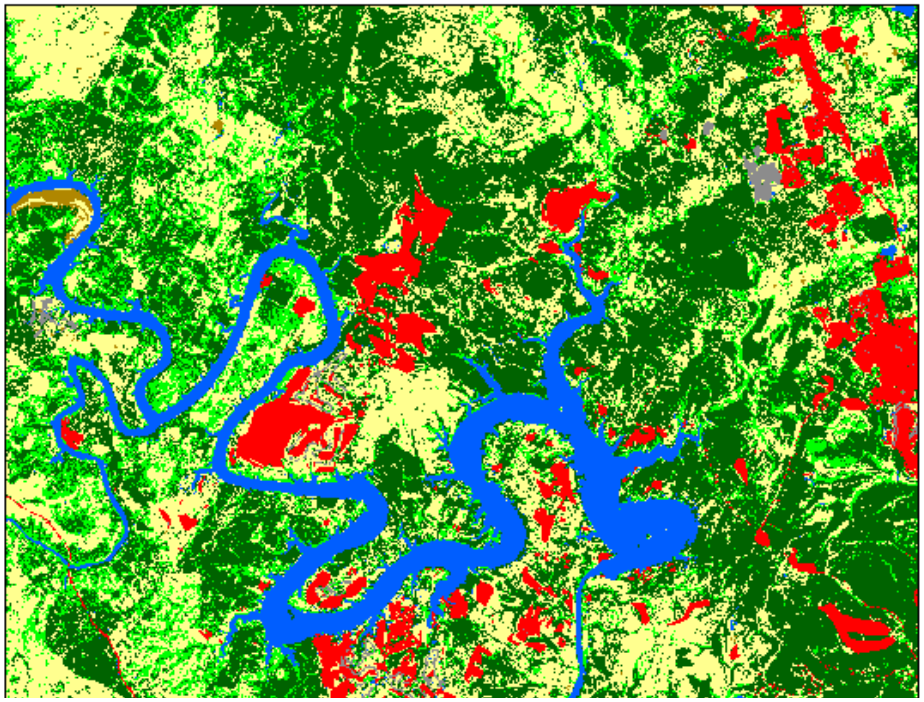

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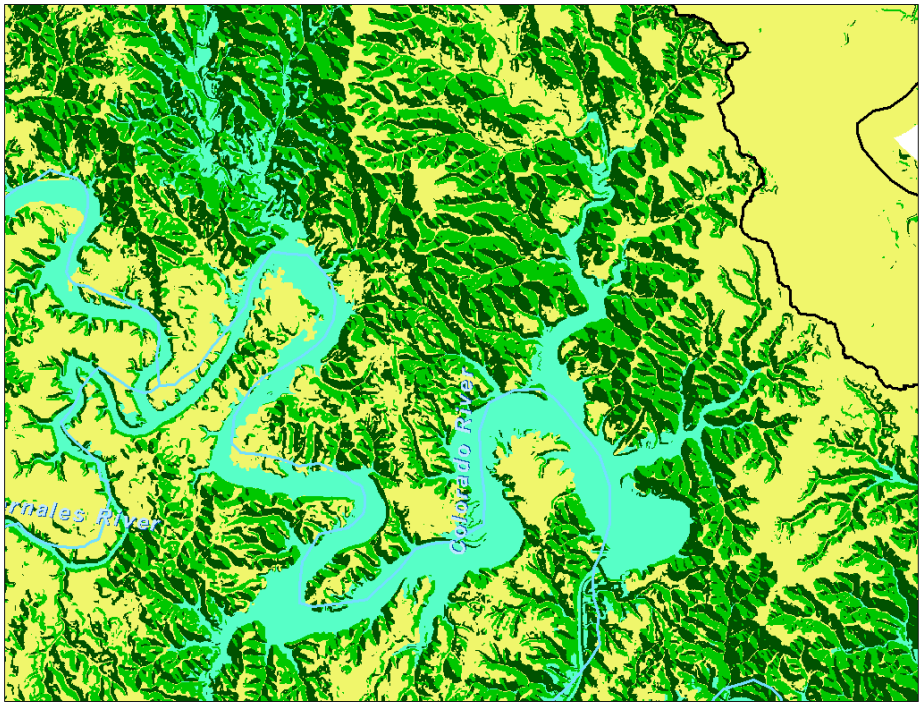

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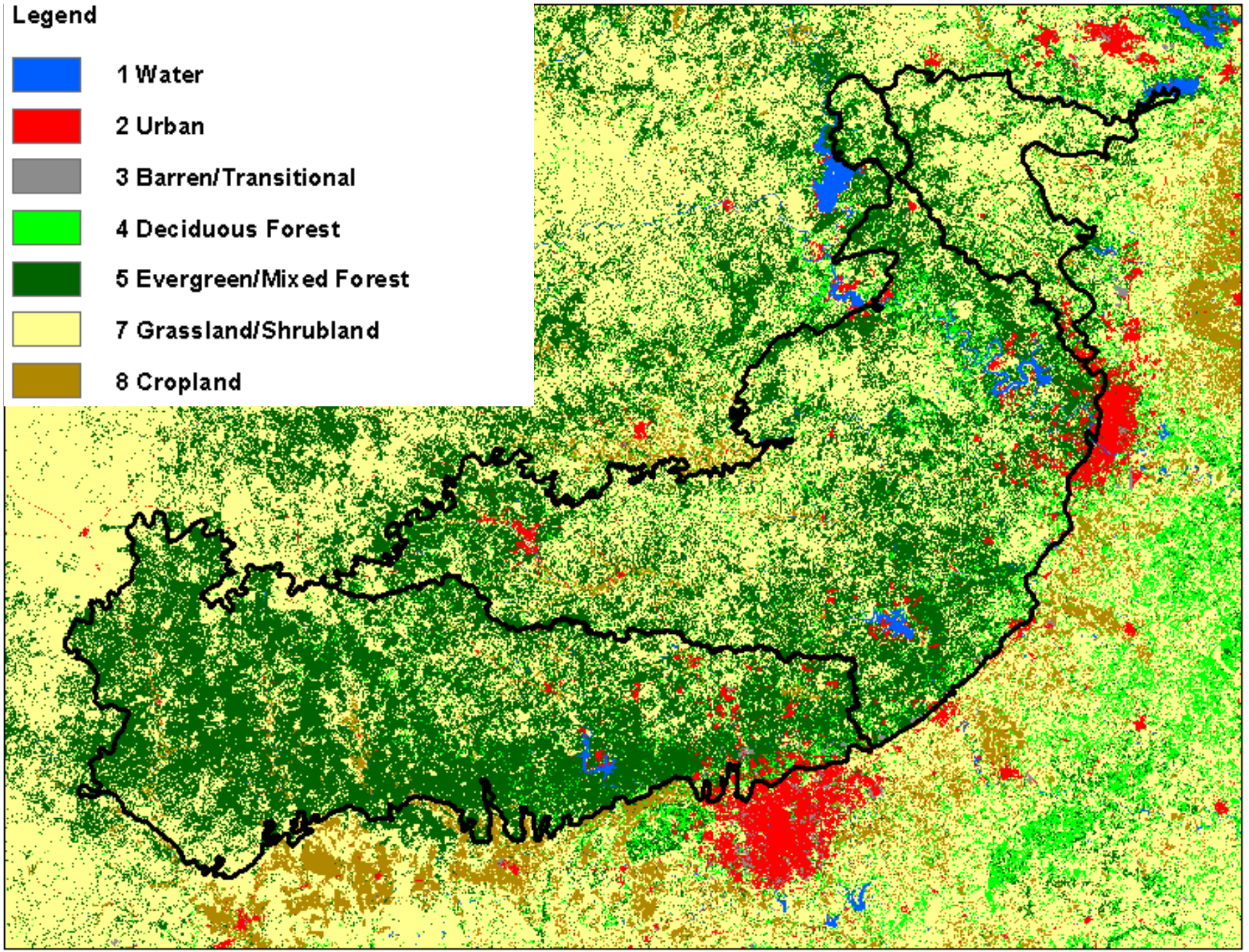
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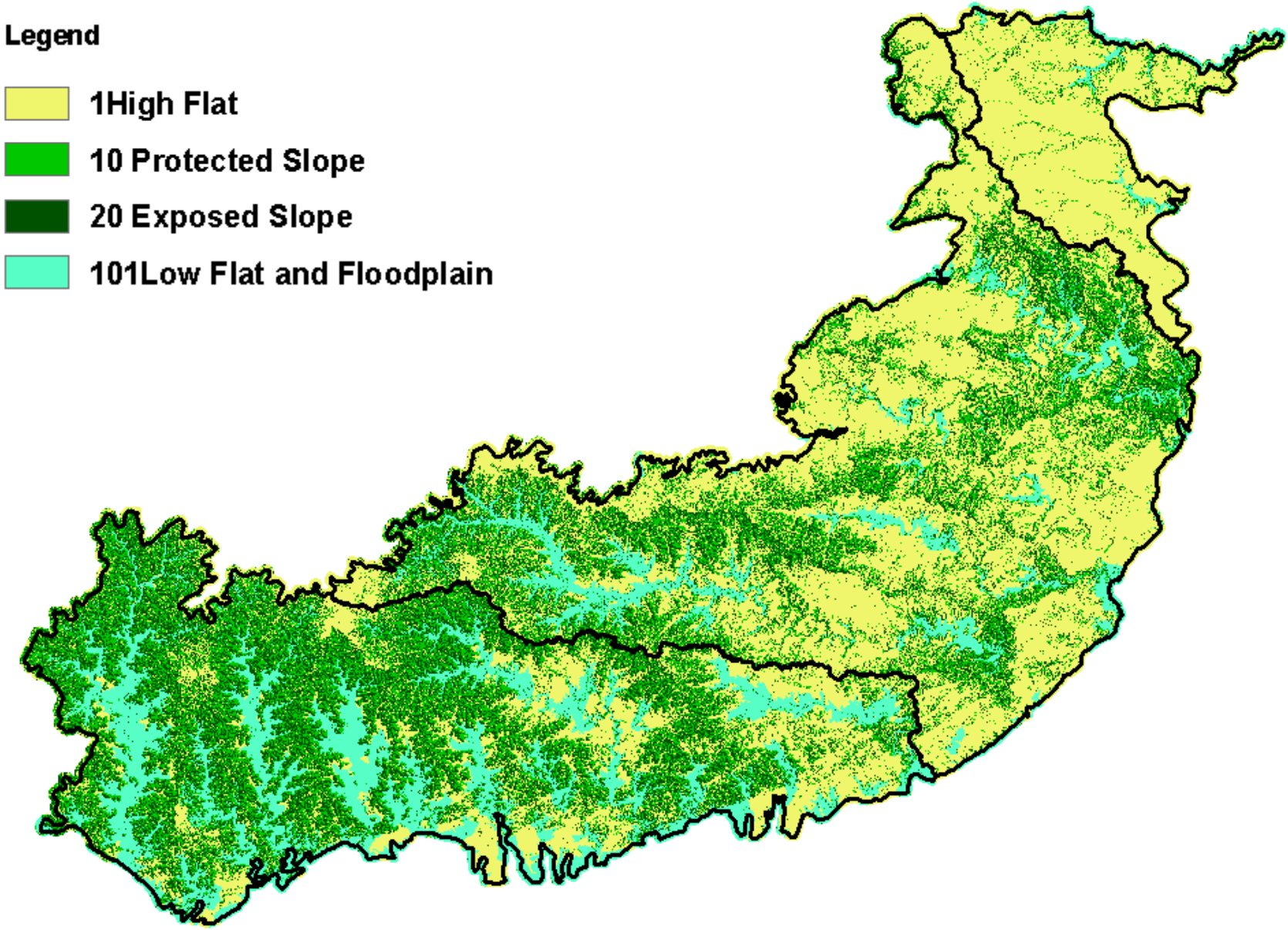
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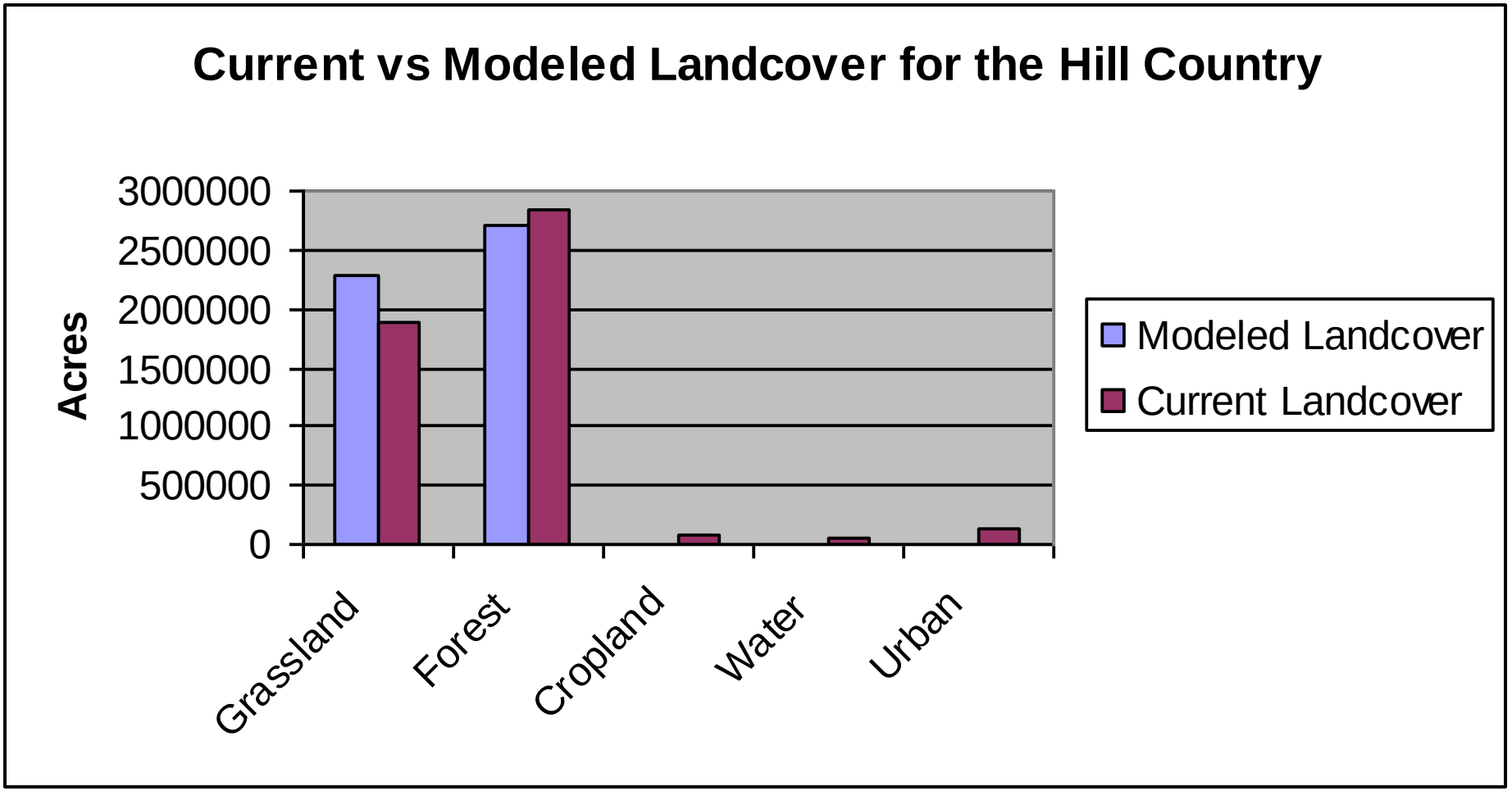

Overall, forest has increased and grassland decreased versus the modeled historic vegetation, but variation is not dramatic

Conclusions

- The Hill Country (35% of the Edwards Plateau) is relatively rugged and wet:
  - Contains 61% of all slopes >8% in Edwards Plateau
  - >50% of Hill Country was modeled historic forest
  - >75% of the Western Region modeled historic forest
- Current major landcover types are not dramatically different from historic landcover
- Land stewardship implications
  - Attempts to “control” Ashe juniper on many abioitic site types have failed (and will always fail?)
  - Would it be more logical and cost effective to match management goals to site types and current condition?