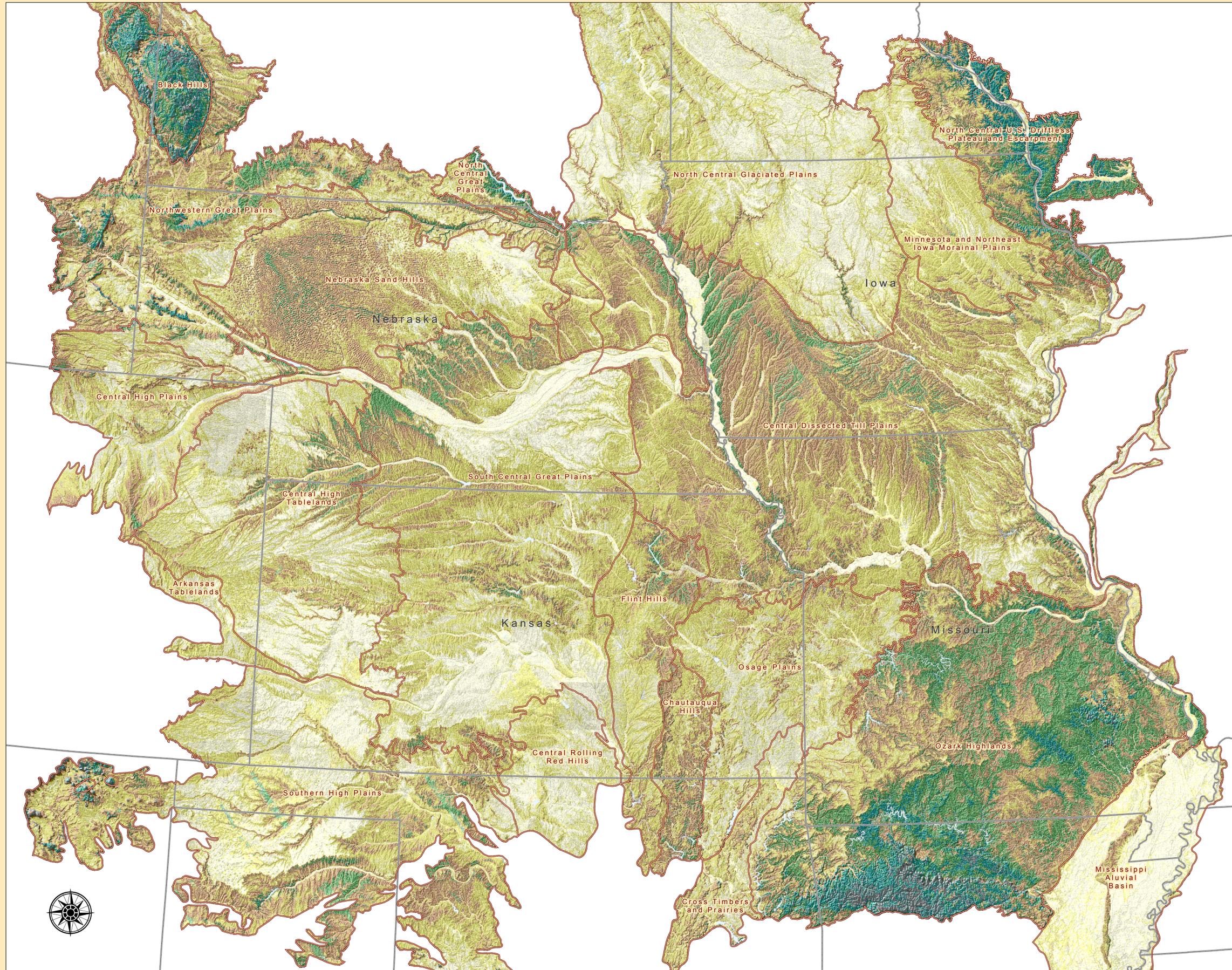


Landforms of the Lower Mid-West



Legend

Landforms	
11	Flat Plains
12	Smooth Plains
13	Irregular Plains
14	Escarments
22	Low Hills
23	Hills
24	Breaks
25	Low Mountains

States
Ecoregions

1:1,500,000
1 centimeter equals 15 kilometers



In 1954, Edwin H. Hammond published an article in the *Annals of the Association of American Geographers* entitled "Small-Scale Continental Landform Maps." According to Hammond, the purpose of landform mapping is to promote objectivity in classifying a given piece of terrain, to make possible the comparison of different regions, and to ensure comparable results obtained by different people. Given the inherent unknowns associated with impending global climatic changes, enduring features may make a more logical conservation target than any individual species.

In 1964, Hammond published "Analysis of Properties in Land Form Geography: An Application to Broad-Scale Land Form Mapping" also in the *Annals*. In this article he described how to delineate the landform geography of the United States. He assessed the percentage of area that is gently sloping (less than 5% slope) and calculated the maximum difference in elevation. Hammond stated that his system of classification and symbolization were readily applicable to maps at scales between 1:8,000,000 and 1:500,000.

Our goal at the Missouri Resource Assessment Partnership (MoRAP) was to convert Hammond's manual cartographic techniques to computer analysis (GIS) techniques utilizing the newly available National Elevation Dataset (NED) developed by the United States Geological Survey. We created an Enduring Features data layer from the following equation:

$$\text{Slope} + \text{Relief} = \text{Landform}$$

We defined two categories of slope based on the amount of gently sloping area surrounding the center cell within a one square kilometer circular neighborhood.

- 10: >50% of area gently sloping
- 20: <50% of area gently sloping

Relief is defined as the elevation range surrounding the center cell.

- 01: 0-15 meters
- 02: 15-30 meters
- 03: 30-90 meters
- 04: 90-150 meters
- 05: >150 meters

The combination of slope and relief created the two-digit code listed in the legend above. For example, Flat Plains (11) have greater than fifty percent of the area in gently sloping land (10) and a total elevation range of less than 15 meters (01).

This map shows the ecoregions - as defined by Robert Bailey, U.S. Forest Service - of Region 7 of the U.S. Environmental Protection Agency. The landforms were draped over a hillshade to demonstrate the variability within and among landforms.



Map by C. Diane True
and the staff of the Missouri Resource Assessment Partnership
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