Mapping US Local Food Systems

the impacts of diet on US foodsheds

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Outline

- Research Questions
- Calculating Land Requirements
- 6 Diet Scenarios
- U.S. Findings
  - Regional Self-Sufficiency
  - Foodshed Size
  - Perennial & Grazing Land Teaser
- Limitations & Discussion

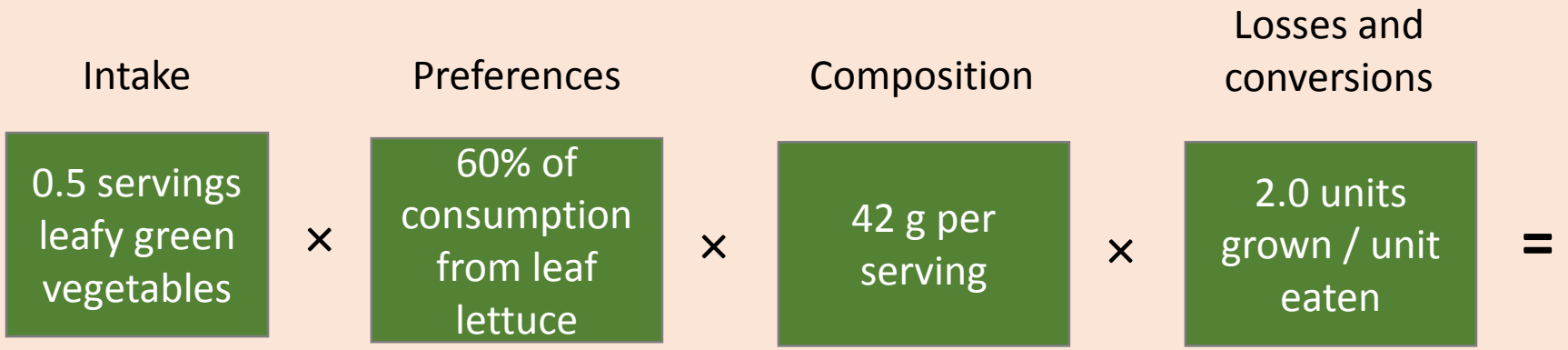
Research Questions

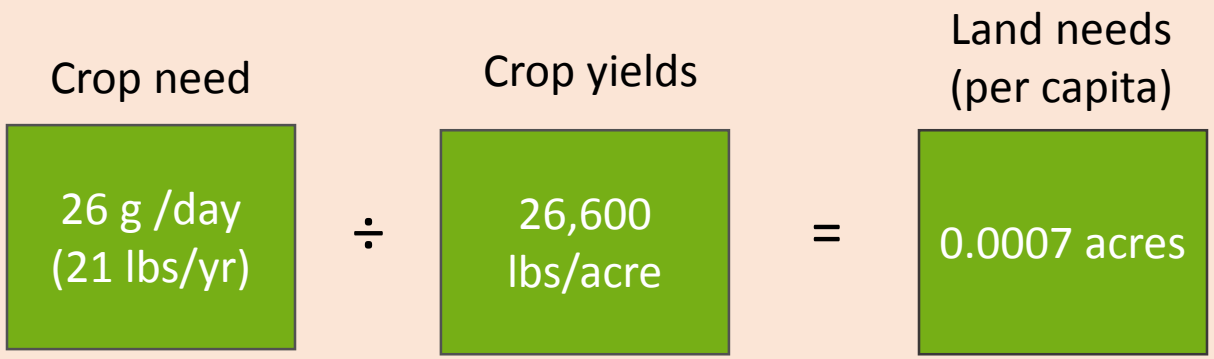
- **If all food were local, how far would food need to travel to satisfy the entire contiguous US population?**

- **How do the different variables (diet type, land productivity, available cropland, population) impact the number of people the US land base can feed and the distance food must travel?**

Working Backwards: from Fork to Farmland

Example: Leaf lettuce



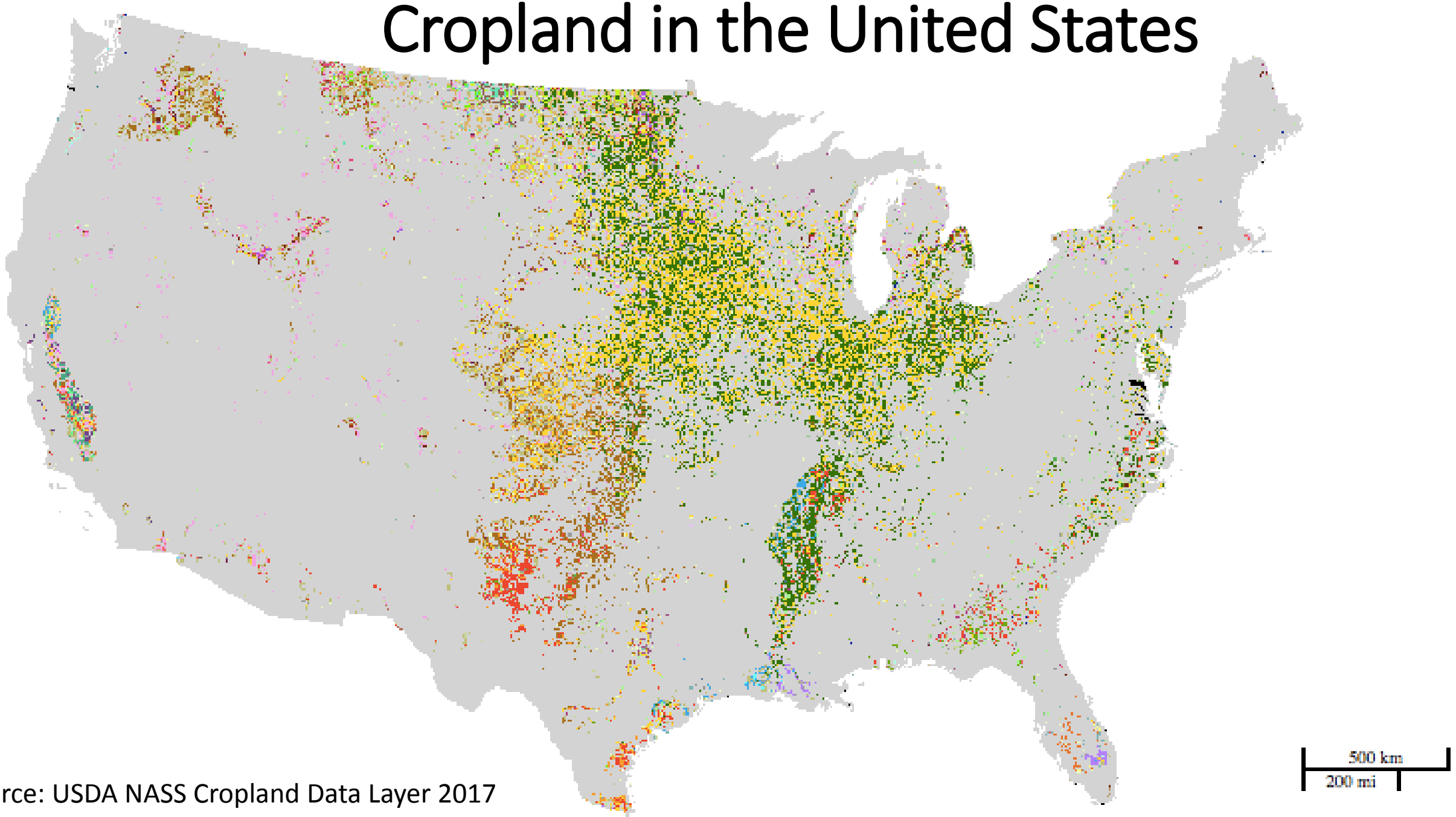


Six Complete Diet Scenarios

	Land Needs (hectares)	Total Energy (kcal/day)	Protein (g/day)	Fat (g/day)	Carbohydrate (g/day)
US Baseline	0.175	2,844	93.0	119.0	363.1
Positive Control	0.152	2,153	91.9	80.0	272.6
80% Omnivorous	0.142	2,153	86.5	72.0	301.4
20% Omnivorous	0.123	2,153	78.9	71.0	315.4
Ovolacto Vegetarian	0.120	2,153	77.5	70.5	320.1
Vegan	0.129	2,153	74.0	65.8	336.2

Based on calculations from the US Foodprint Model, Peters et al. 2016

Cropland in the United States



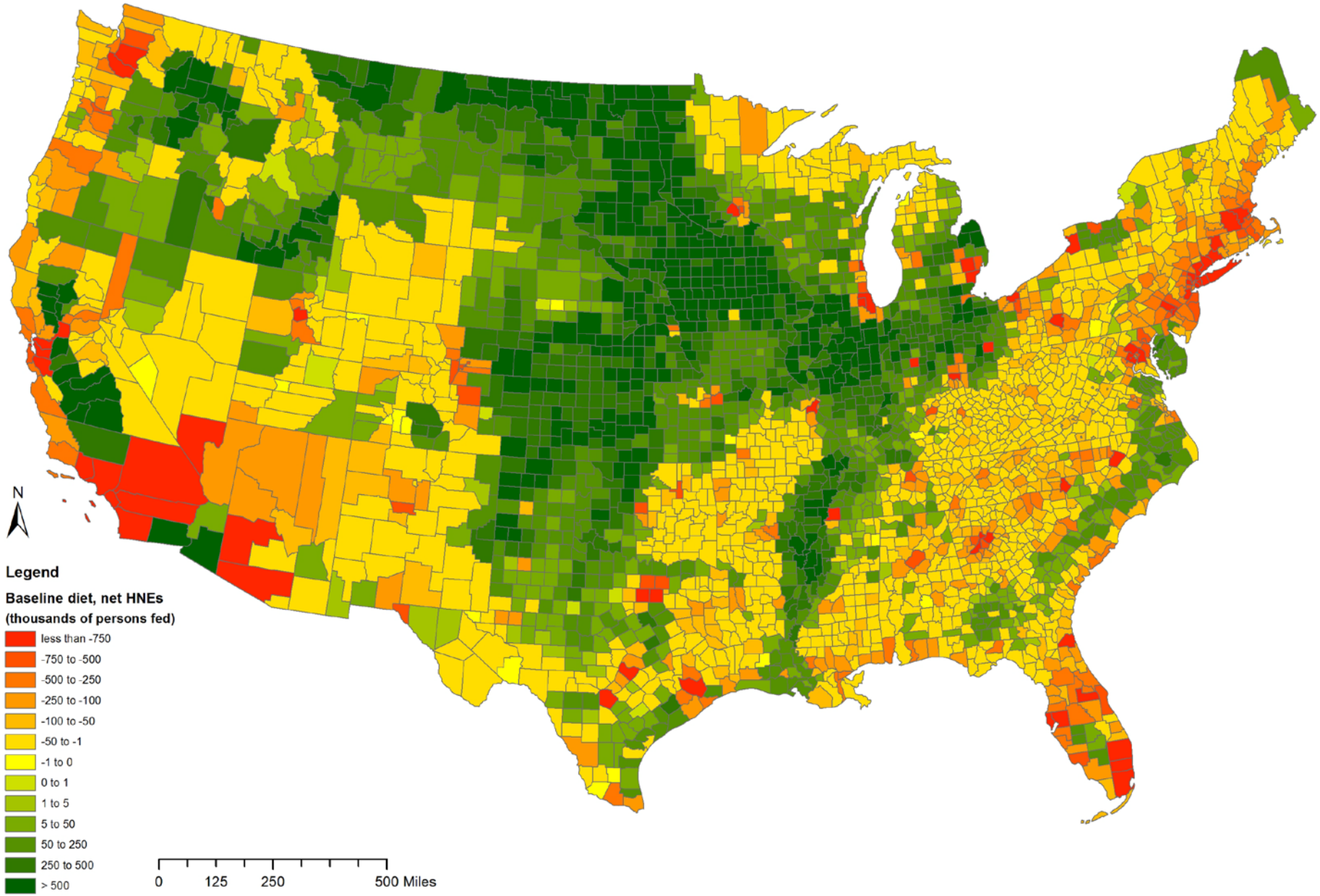
Source: USDA NASS Cropland Data Layer 2017

Calculating Net Producer/Consumer Counties

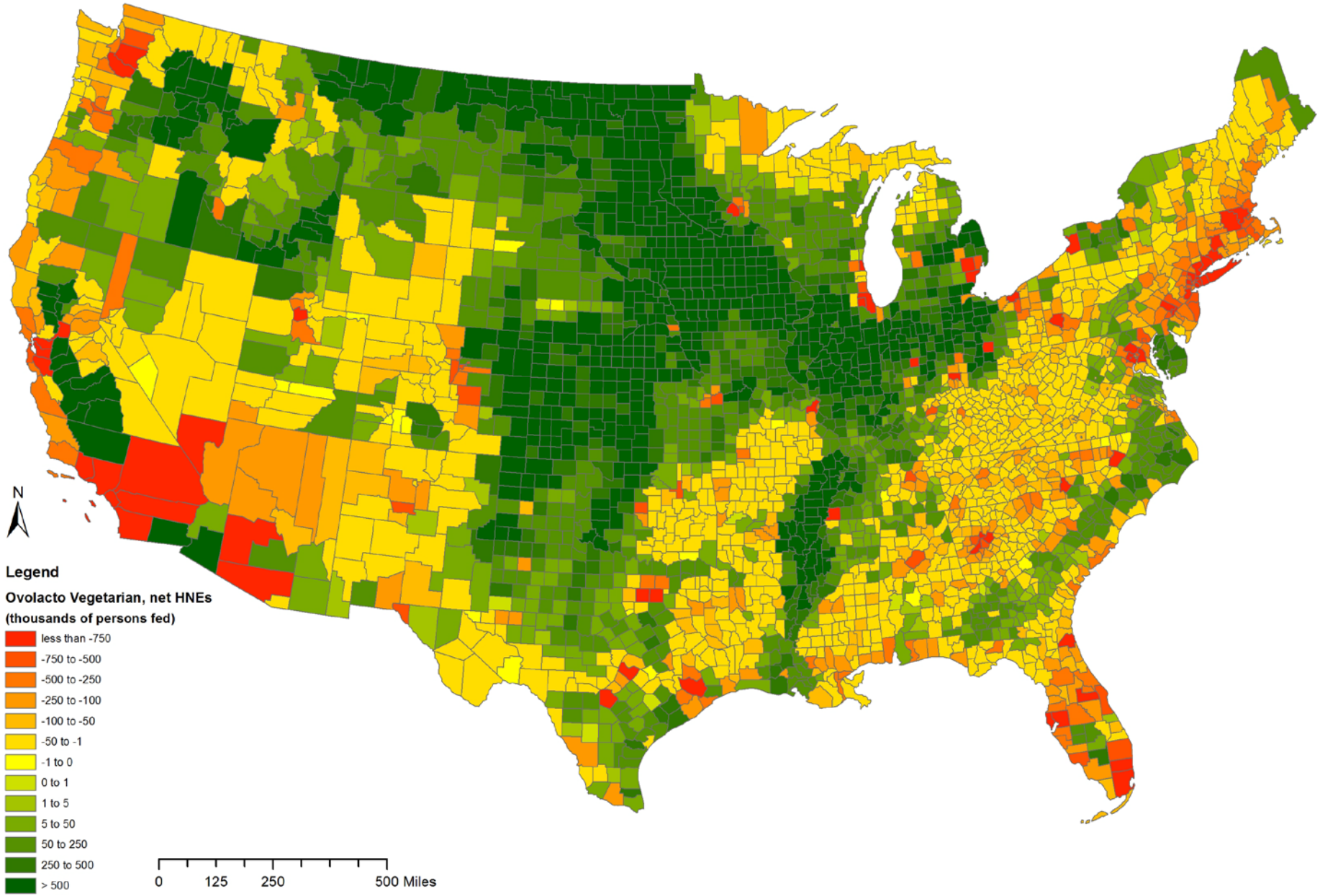
Production – Consumption = Degree of Self-Sufficiency

Available Cropland (by county) - (Land Requirement (per capita) ÷ Local Productivity x Population (by county))

Net number of persons fed (net HNEs) by county, Baseline diet



Net number of persons fed (netHNEs) by county, Ovolactarian diet

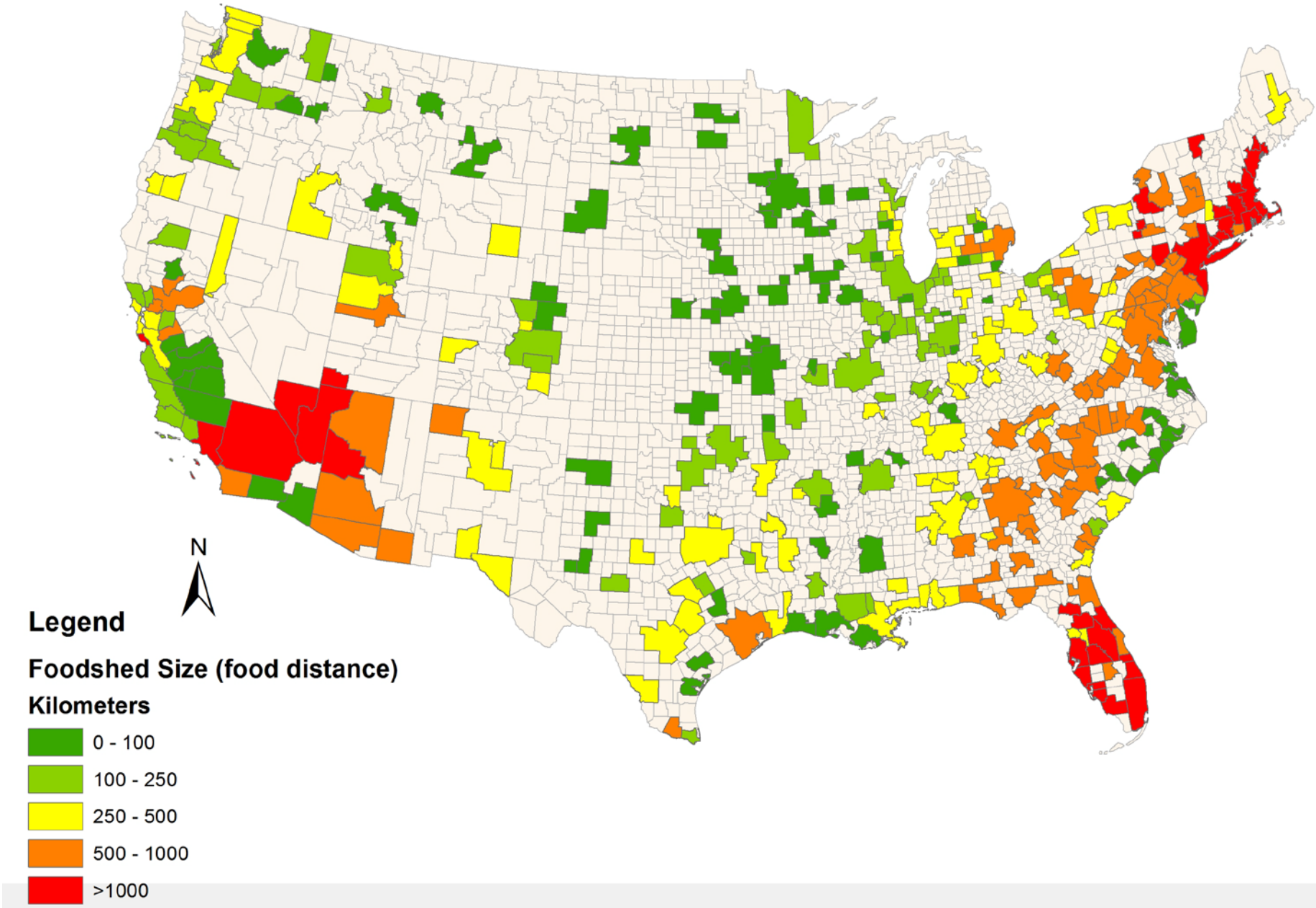


Defining a Foodshed

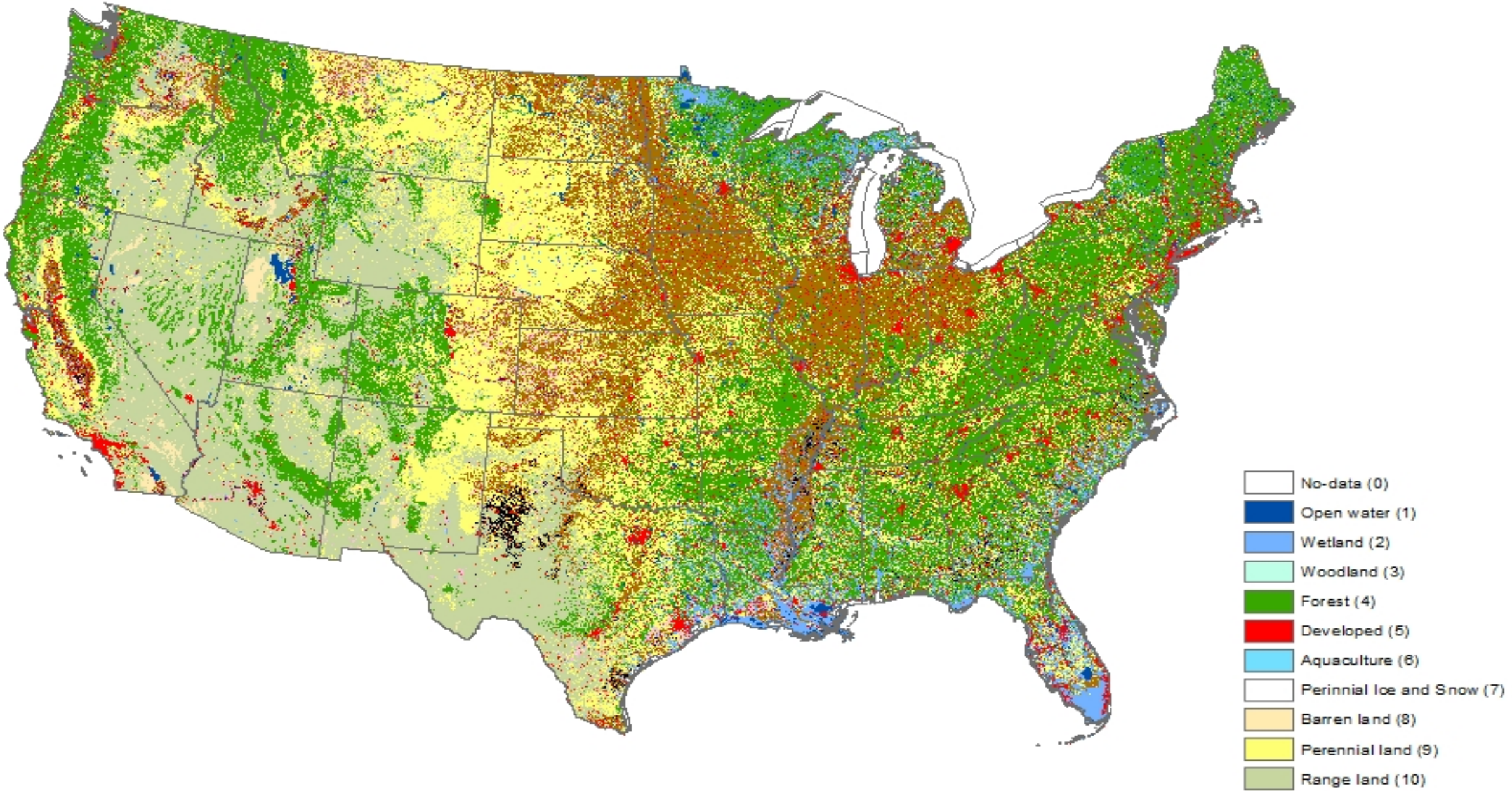
Foodshed: the surrounding area required to feed a population center.
It captures the essence of natural resources flowing toward a gravitational center…

Univ KY Water Resources Research Institute (KWRRI)

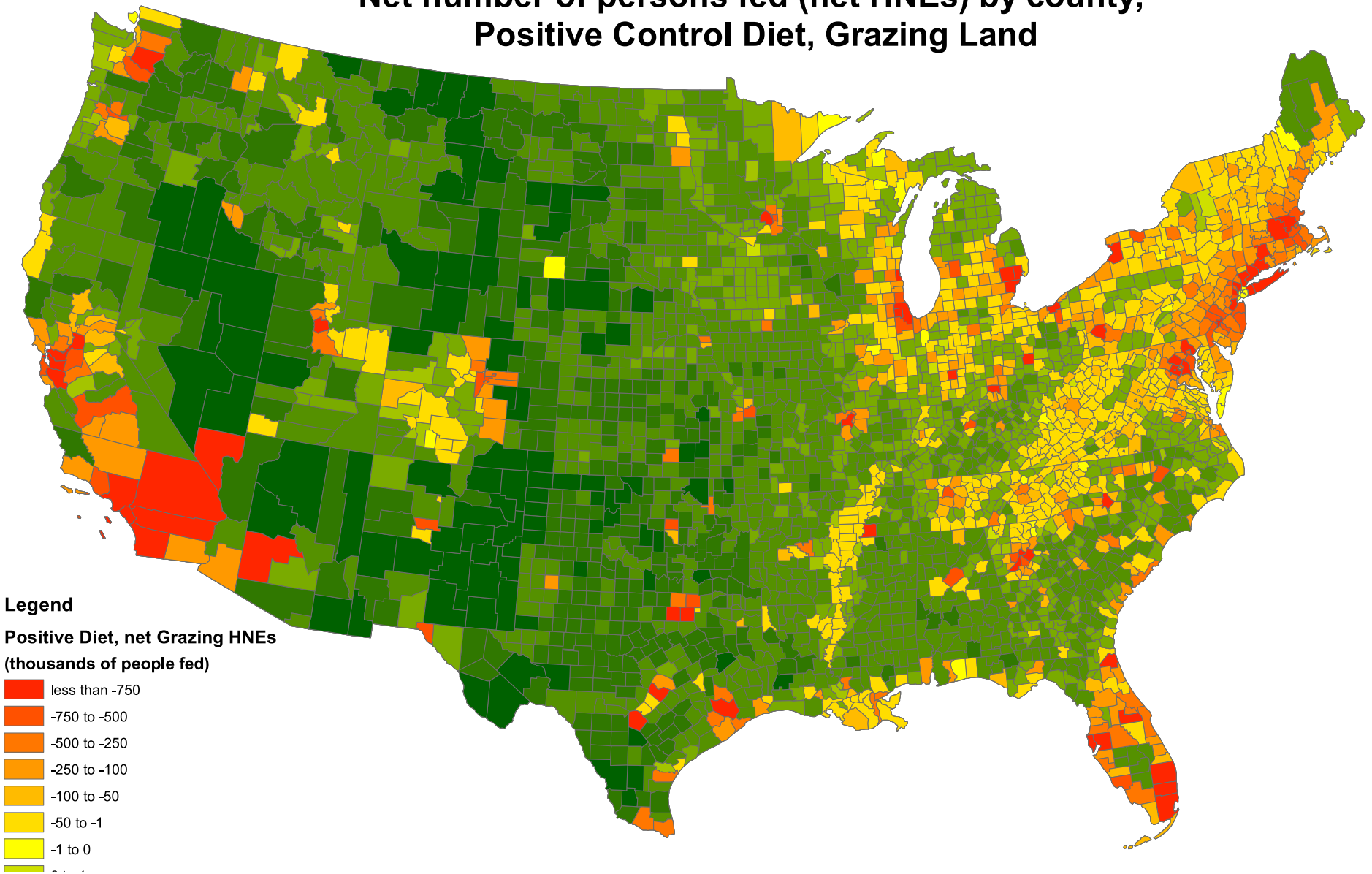
Weighted Average Source Distance, US Metropolitan Consumption Zones



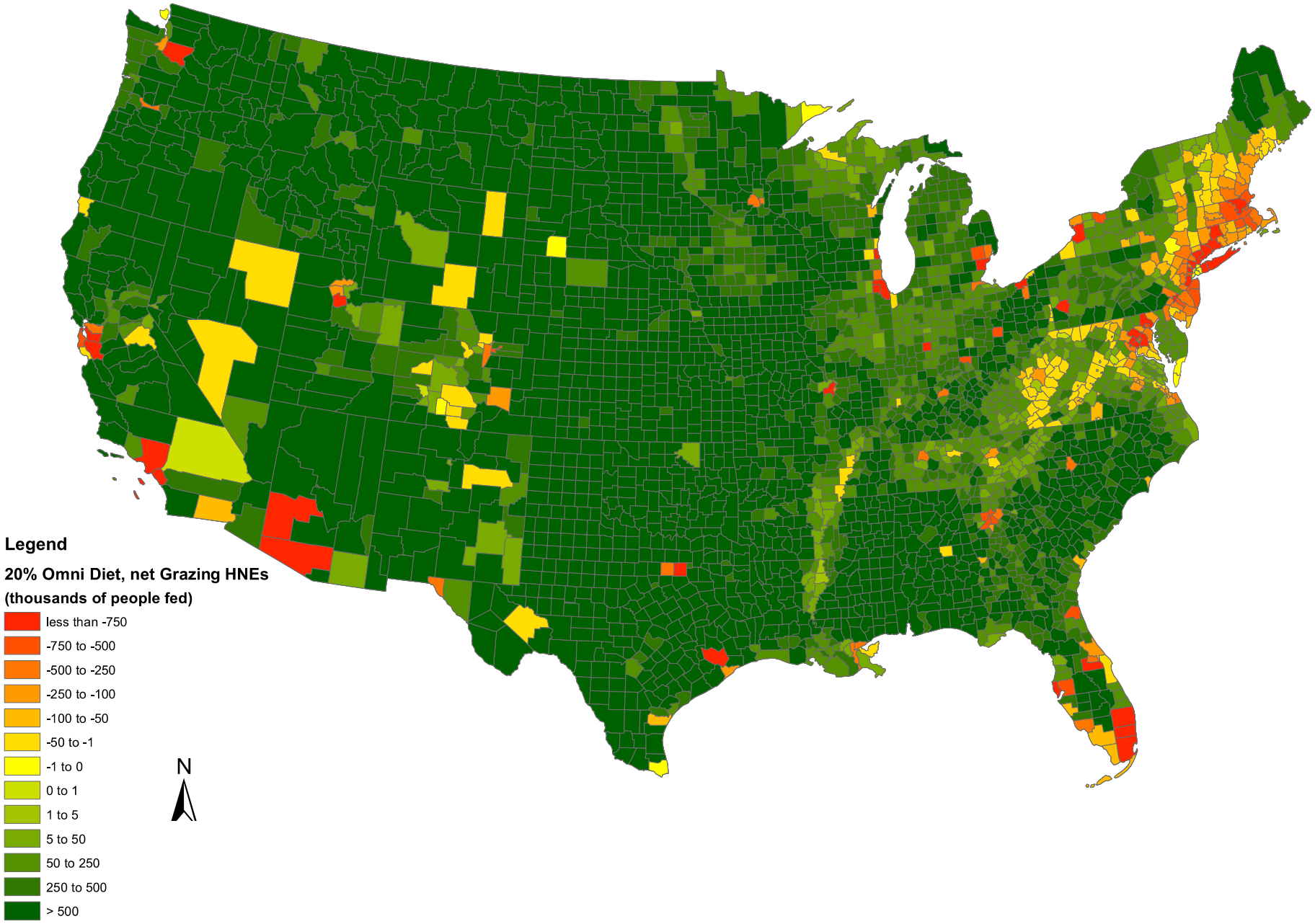
Grazing & Perennial Land



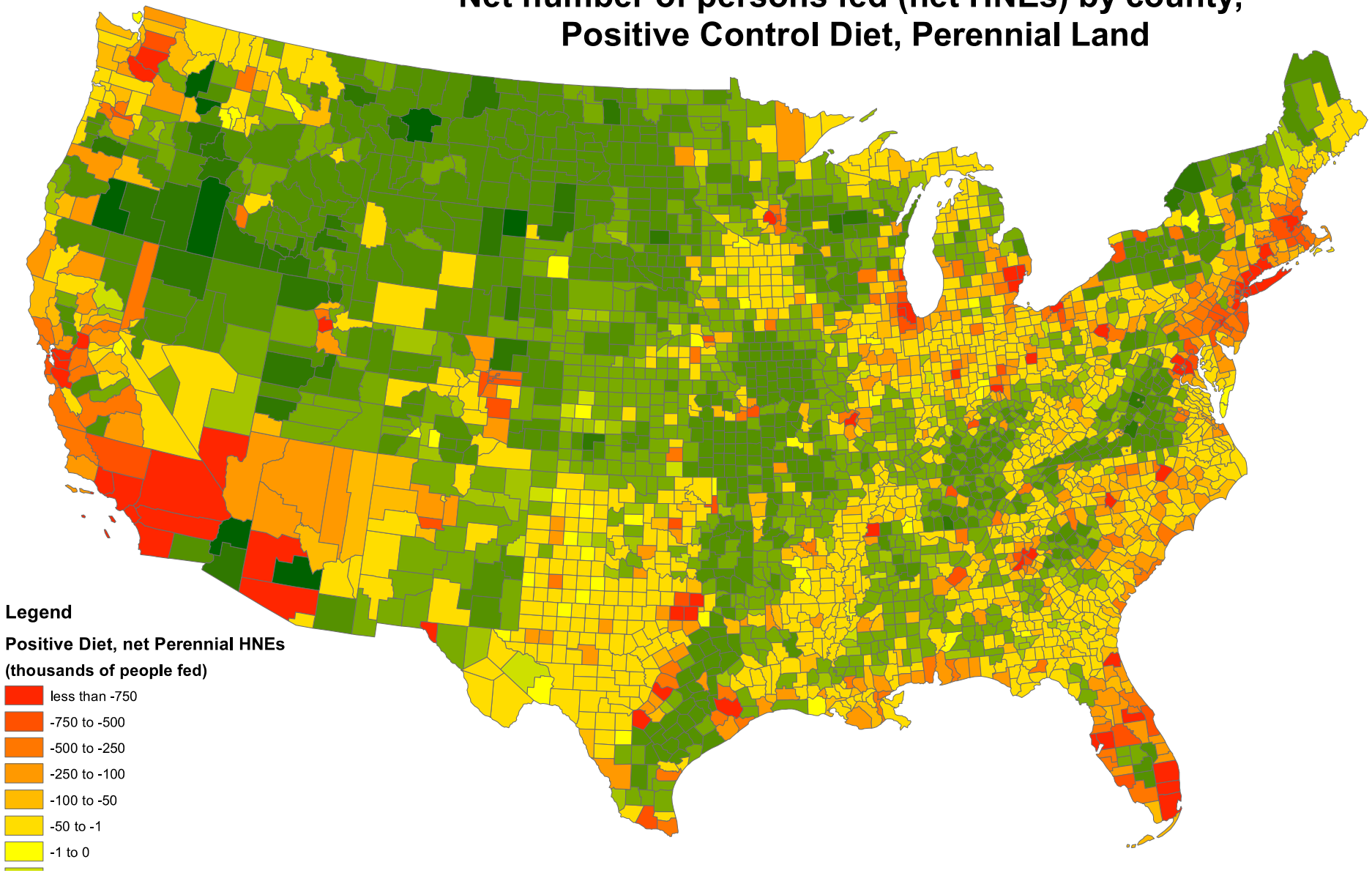
Net number of persons fed (net HNEs) by county, Positive Control Diet, Grazing Land



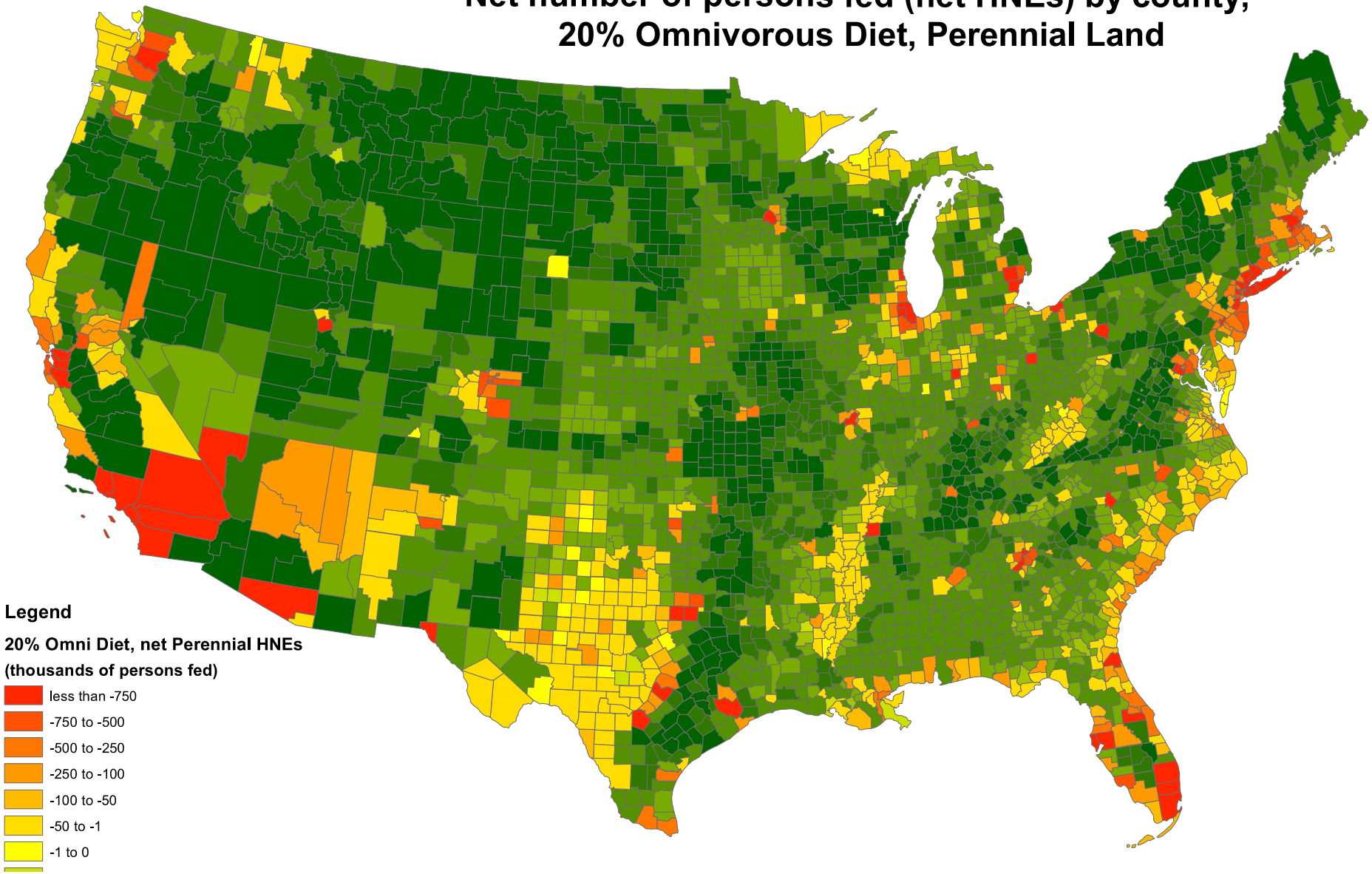
Net number of persons fed (net HNEs) by county, 20% Omnivorous Diet, Grazing Land



Net number of persons fed (net HNEs) by county, Positive Control Diet, Perennial Land



Net number of persons fed (net HNEs) by county, 20% Omnivorous Diet, Perennial Land



Limitations & Discussion

LIMITATIONS

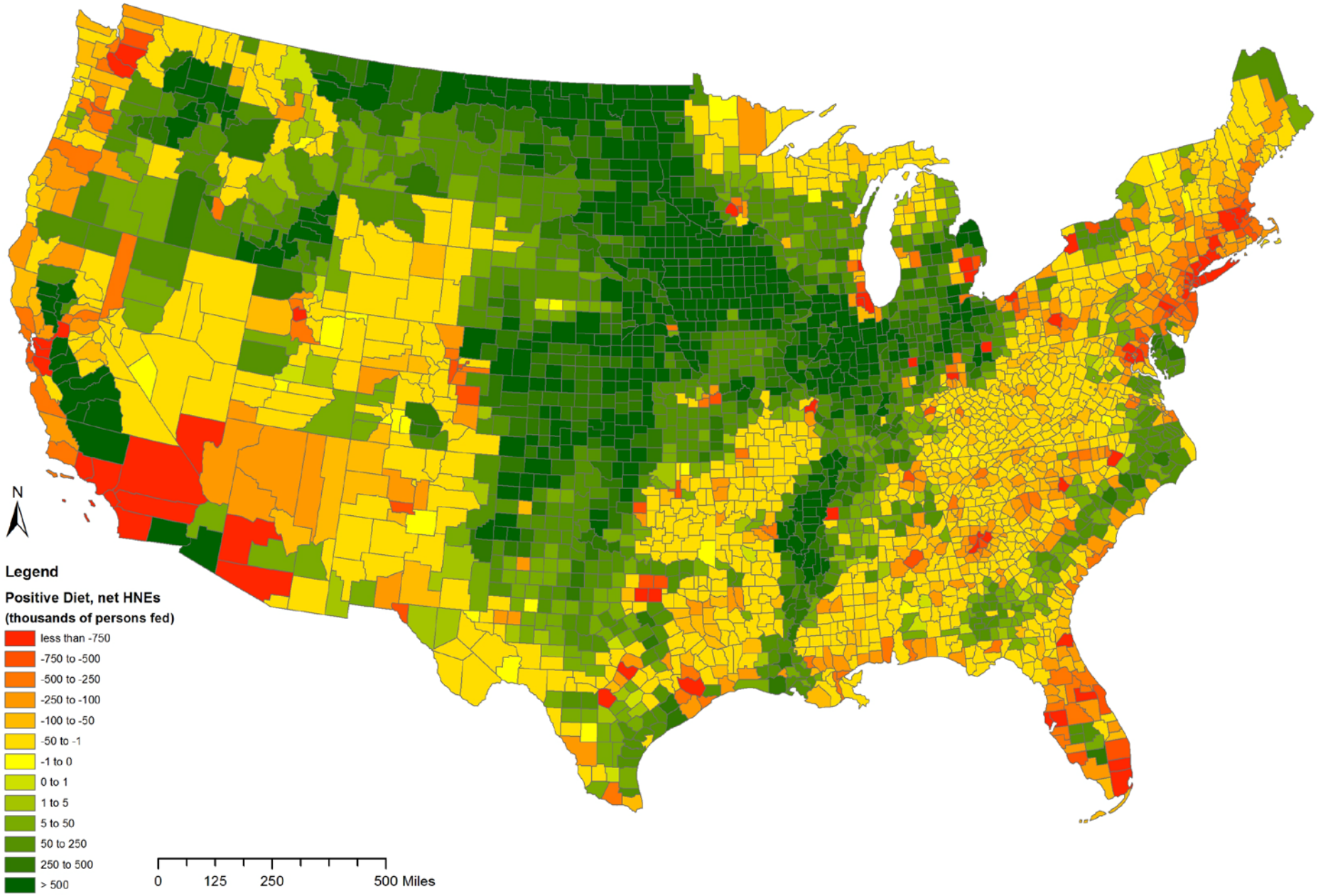
- Assume conventional management and livestock practices
- No economic or distributional considerations
- Spatial data errors, and may overlook small and peri-urban farms

DISCUSSION

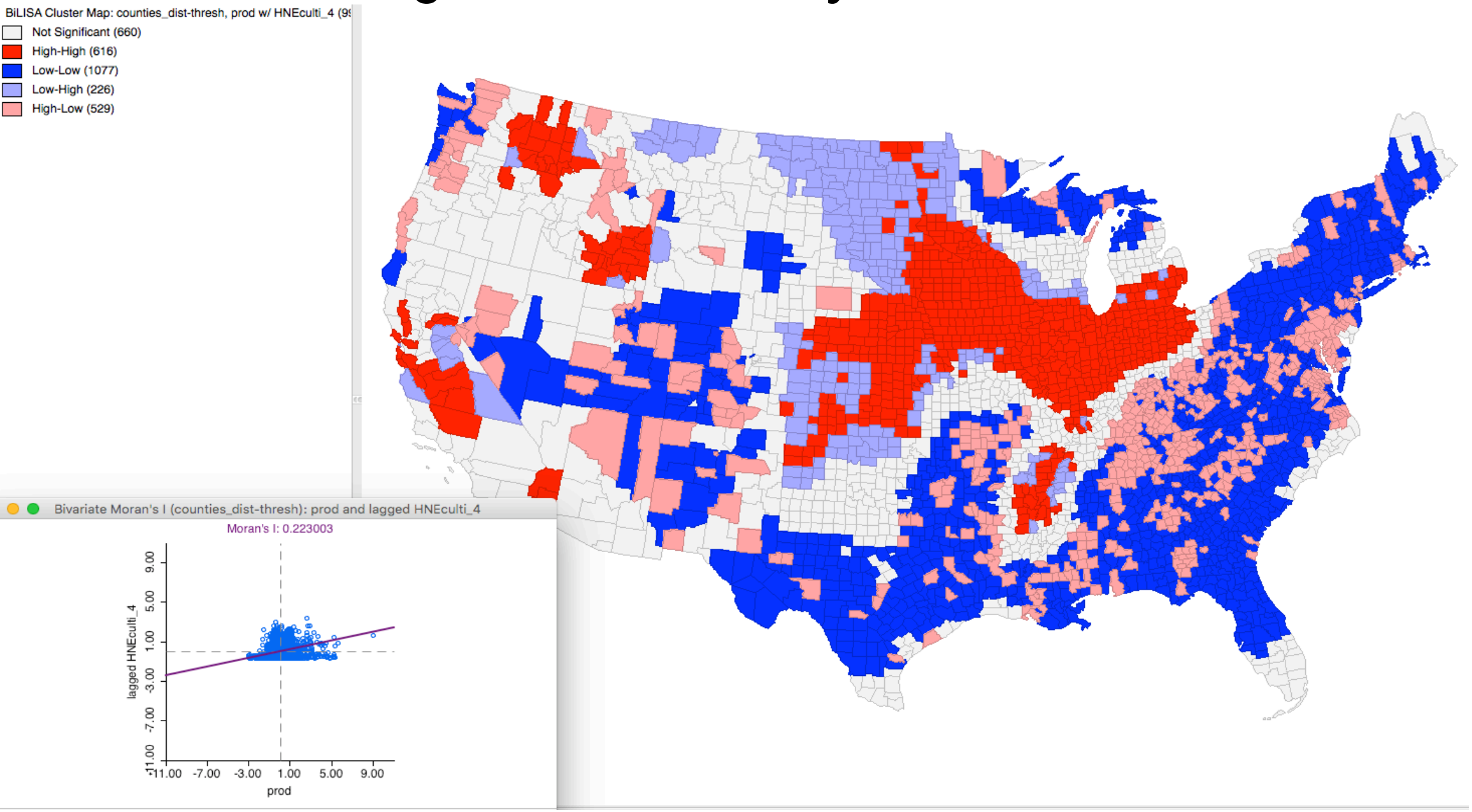
- Appropriate expectations for a local diet?
- Changing the diet doesn’t change the overall pattern
- Largest opportunities, based on land quality and regional diets


Thank You!

Net number of persons fed (net HNEs) by county, Positive control diet



Clustering of Productivity & Food Production



Clustering of Food Production & Population