

Uncertainty in Digital Soil Maps



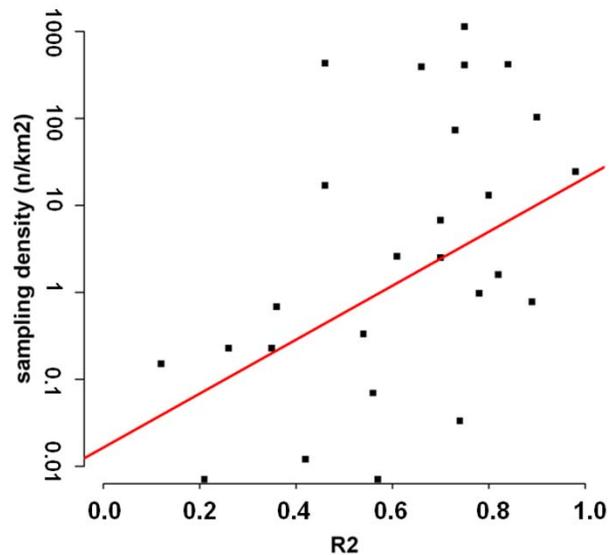
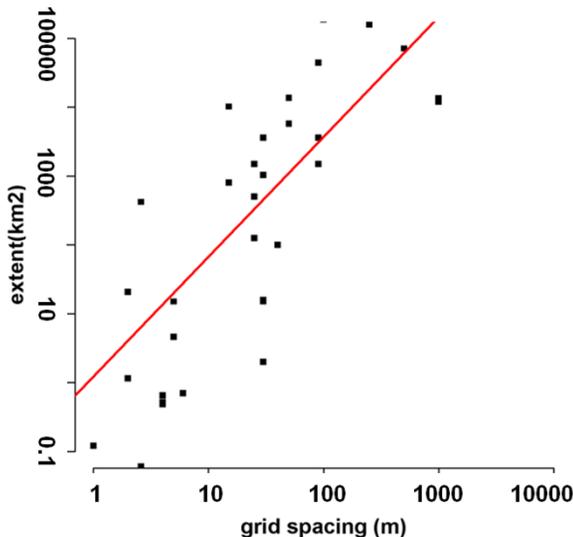
The Uncertainty of Maps
Poems by Nina Corwin

Uncertainty in point data

- Uncertainty in locations
 - Uncertainty in measurements
 - Differences in analytical techniques
 - Uncertainty in spatial model prediction
 - Uncertainty in inference (using PTFs)
 - Uncertainty in extrapolation
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- How do we quantify all of these?

Uncertainty in point data

- On grid spacing and uncertainty
- Needs to acknowledge extrapolation, you can't sample all of the geographical and

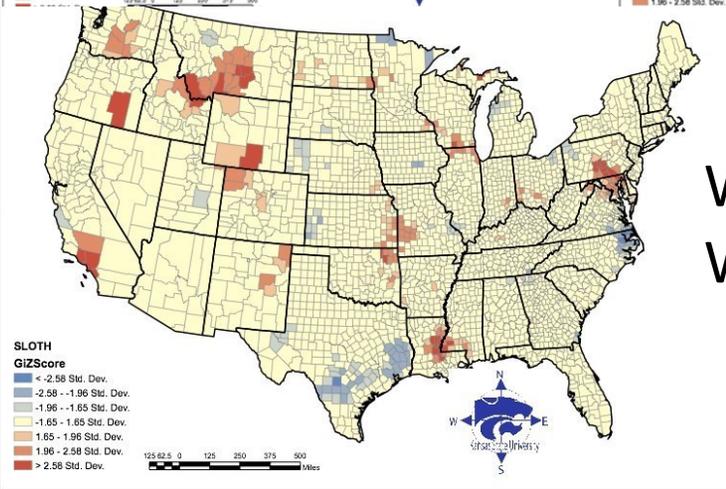
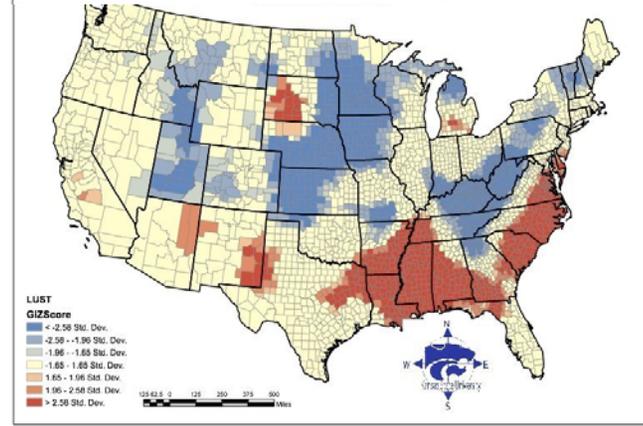
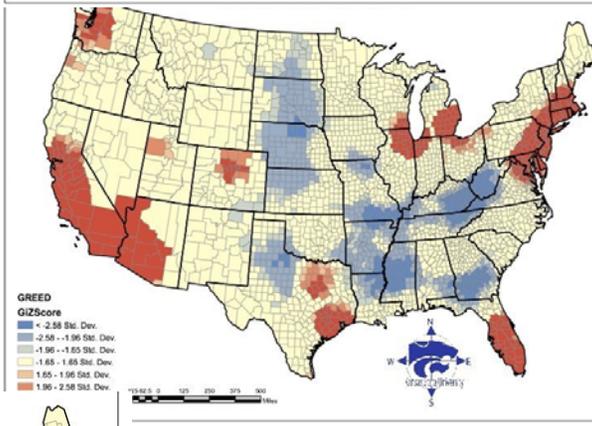
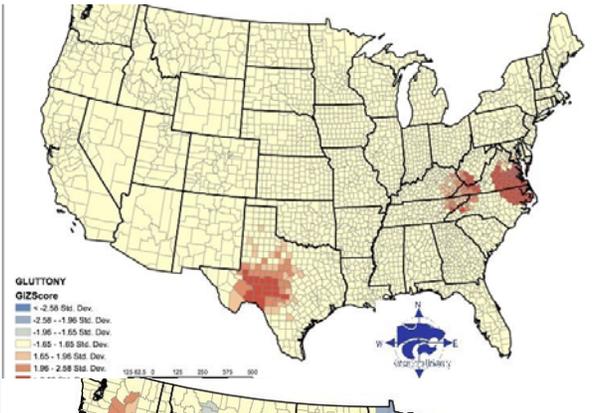
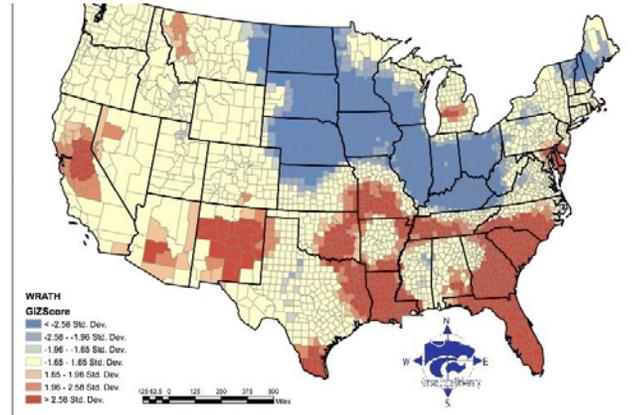
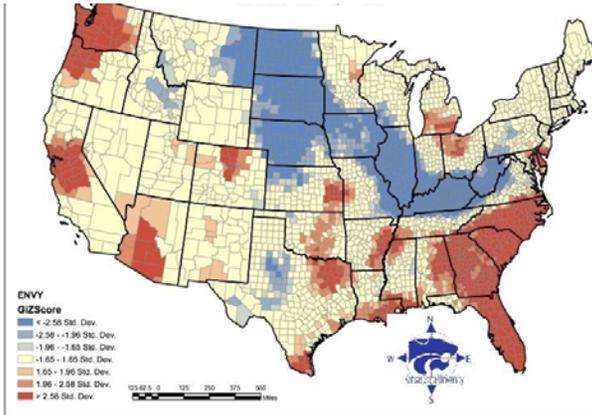
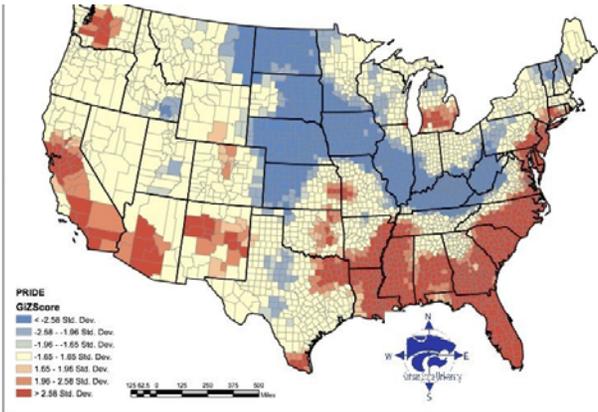


Polygon maps

- Uncertainty in locations
- Uncertainty in the class
- Uncertainty in composition of a polygon
- Uncertainty in the modal profile
- Uncertainty in the model

Methods

- First-order Taylor analysis: valid for linear model
- Kriging variance
- Monte Carlo method: large areas impossible?
- Empirical method

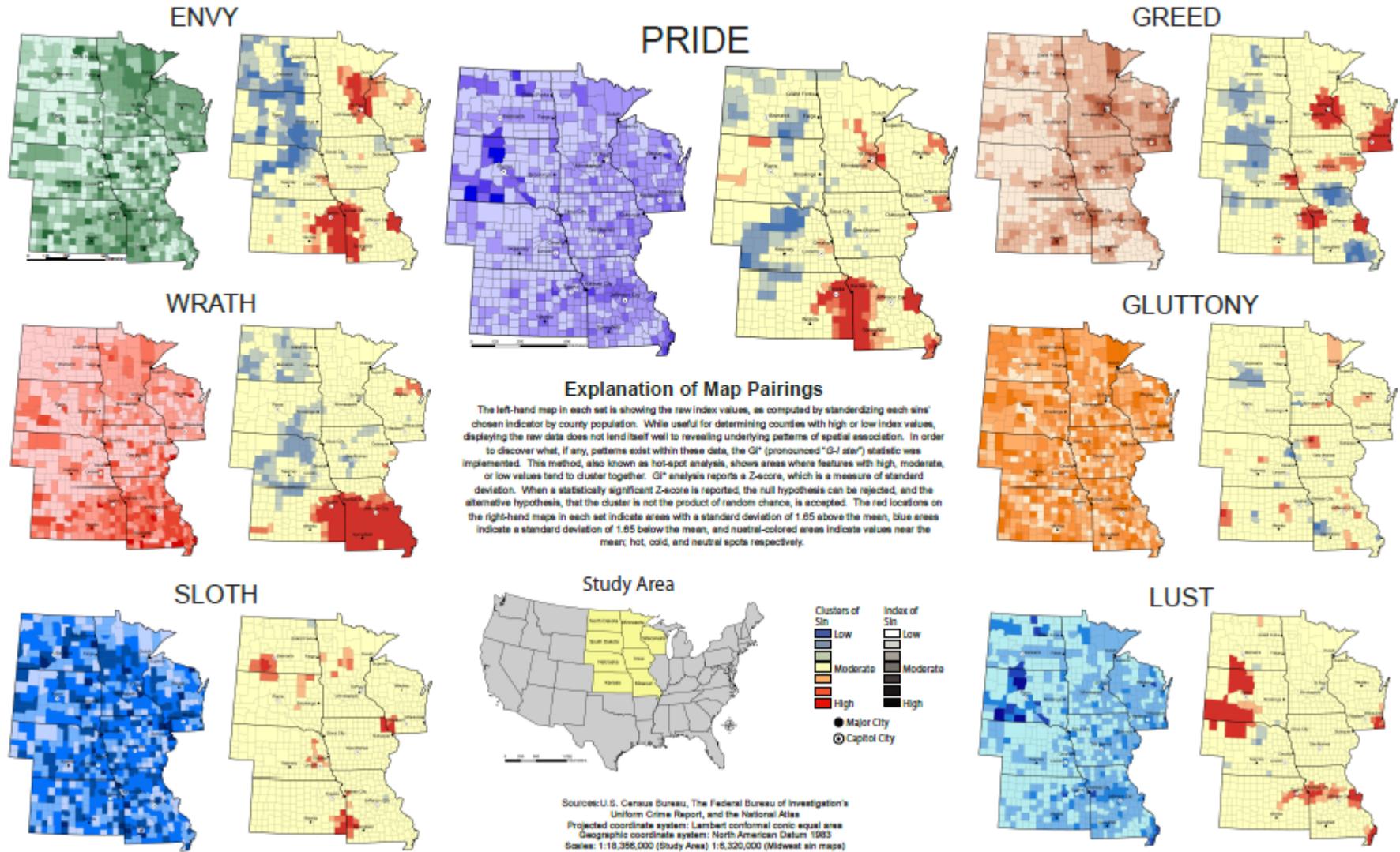


What properties are these maps showing?
What's the uncertainty?

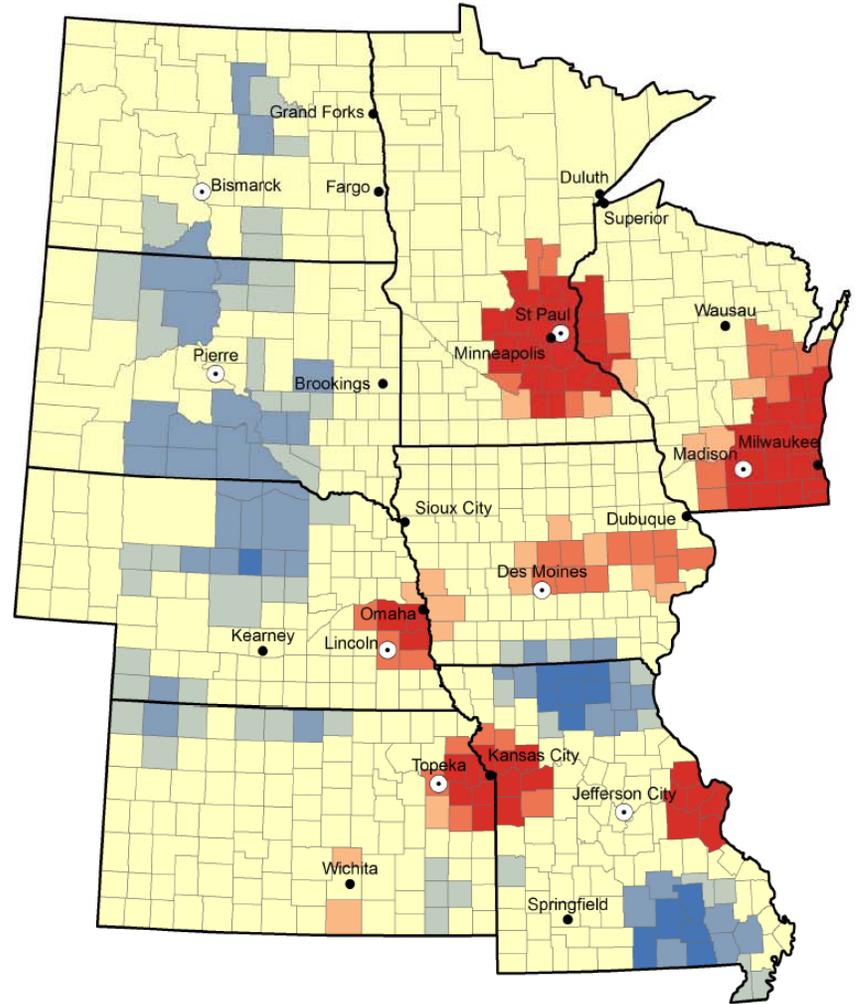
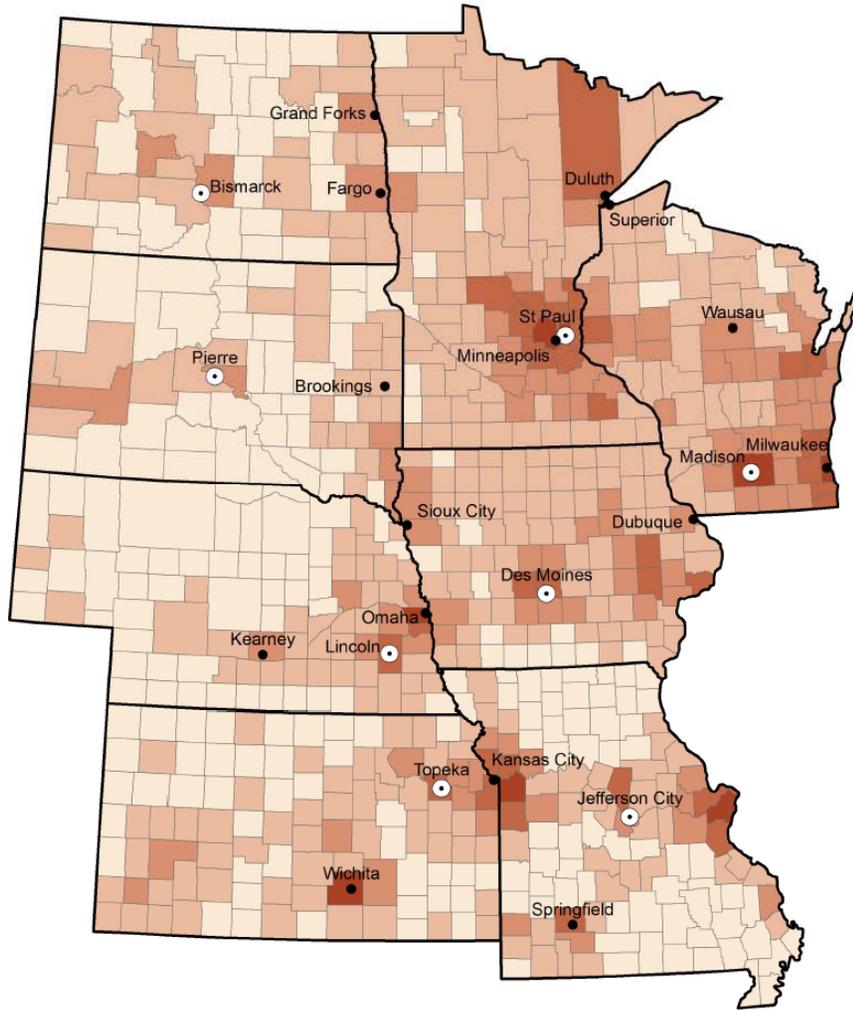
Capital Vice in the Midwest: The Spatial Distribution of the Seven Deadly Sins

Mitchel Stimers, Ryan Bergstrom, Thomas Vought, and Michael Dulin

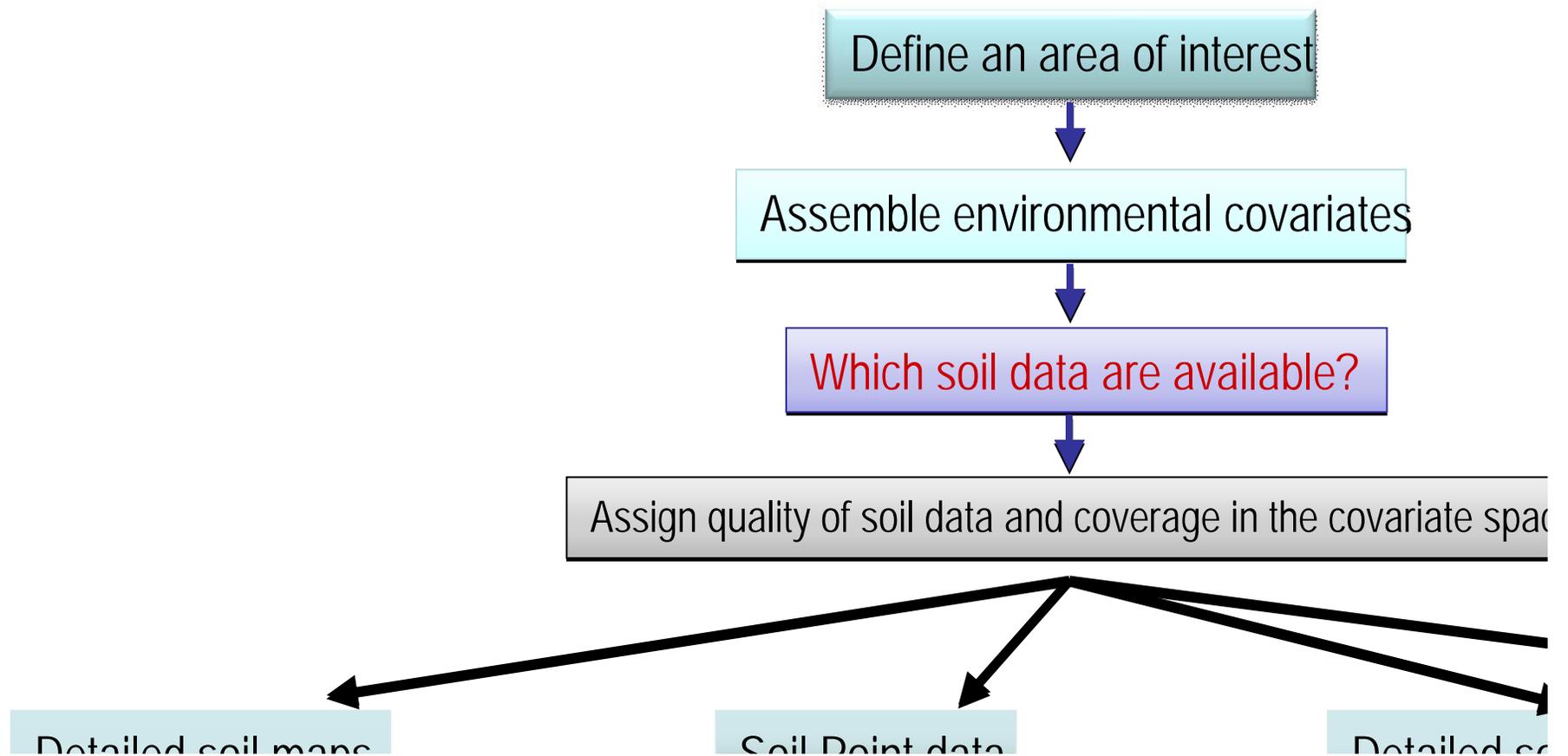
Department of Geography, Kansas State University



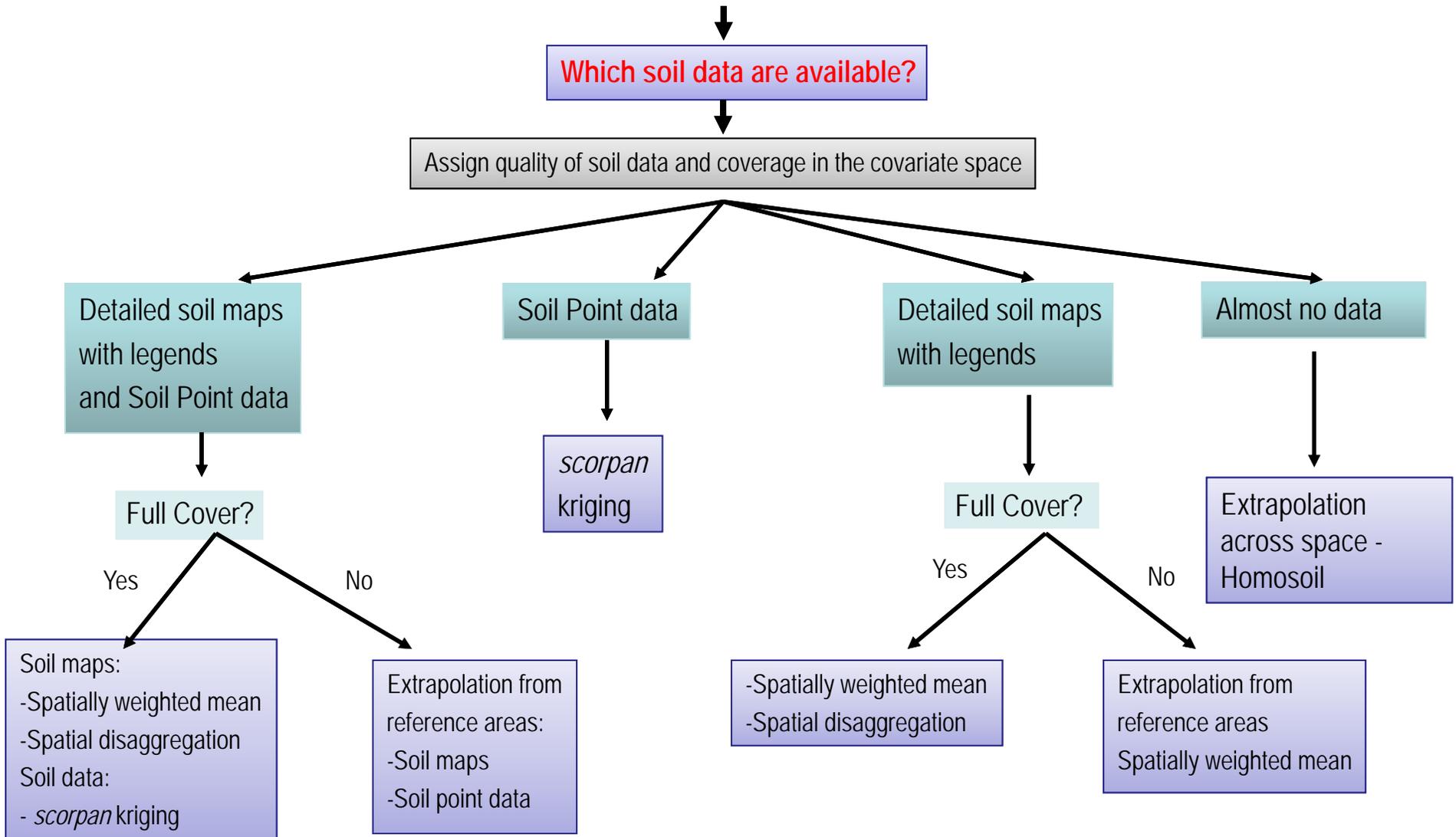
GREED



A legacy-based approach



Versioning



UNCERTAINTY discussion points

1. Definition

Location specific?

Also discuss accuracy

Prediction interval and %

Conservatism?

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2. Levels of uncertainty measure

Minimum for version 1

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3. Uncertainty of input data?

Splines (depth increments)

Age

Propagation through to product uncertainty

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4. How will it be done??

Agreed uncertainty estimation methods
(each directly based on spatial
prediction approach?) Table and
explanation

Probabilistic models

Expert opinion

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5. Communication of product uncertainty to users

Certainty

Modelling community

Consultant community

Limitations

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6. Validation of location-specific uncertainty measures

e.g., Areal proportion of map within prediction interval

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7. Points to blocks

Validation of location-specific uncertainty measures

e.g., Areal proportion of map within prediction interval

Defining uncertainty

- Prediction interval (95%, ...) captures most uncertainties

