

# Modeling the impacts of climate change on Midwestern U.S. corn yields

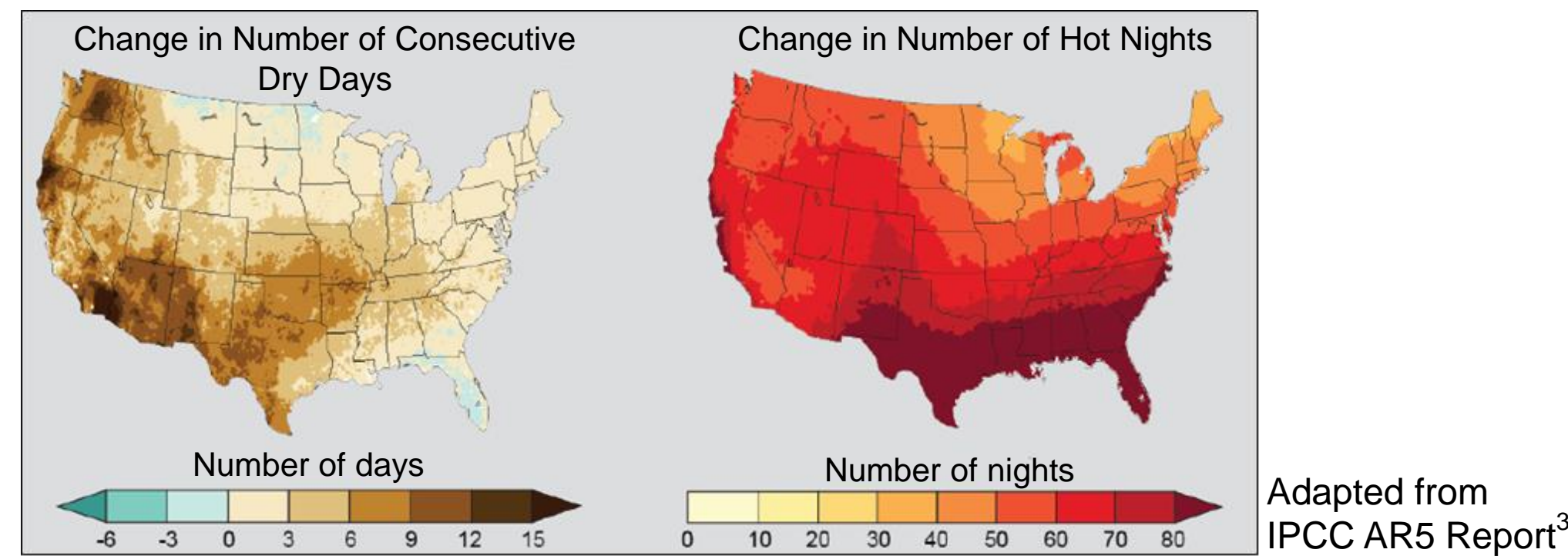
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## 1. Introduction and Rationale

- Climate change has the potential to reduce corn production in the Midwestern United States<sup>1,2</sup>
- Modeling gives estimates of magnitude and tests potential adaptations

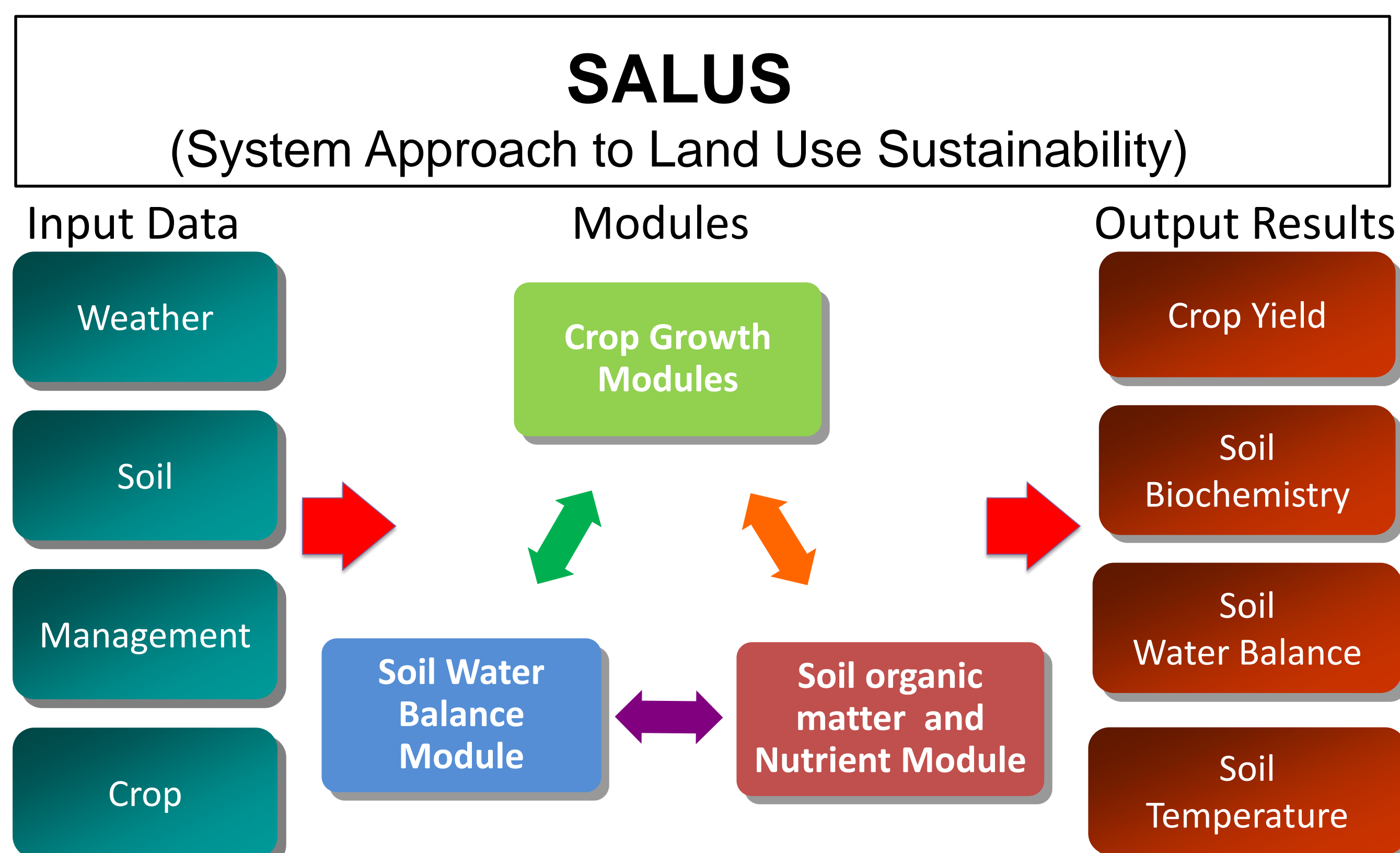
### Hypothesis:

- Projected warming and precipitation changes will reduce yields under traditional management
- Adaptation strategies will prevent these losses except under the higher emission scenarios
- In some regions adaptation will require additional nutrients and water resources



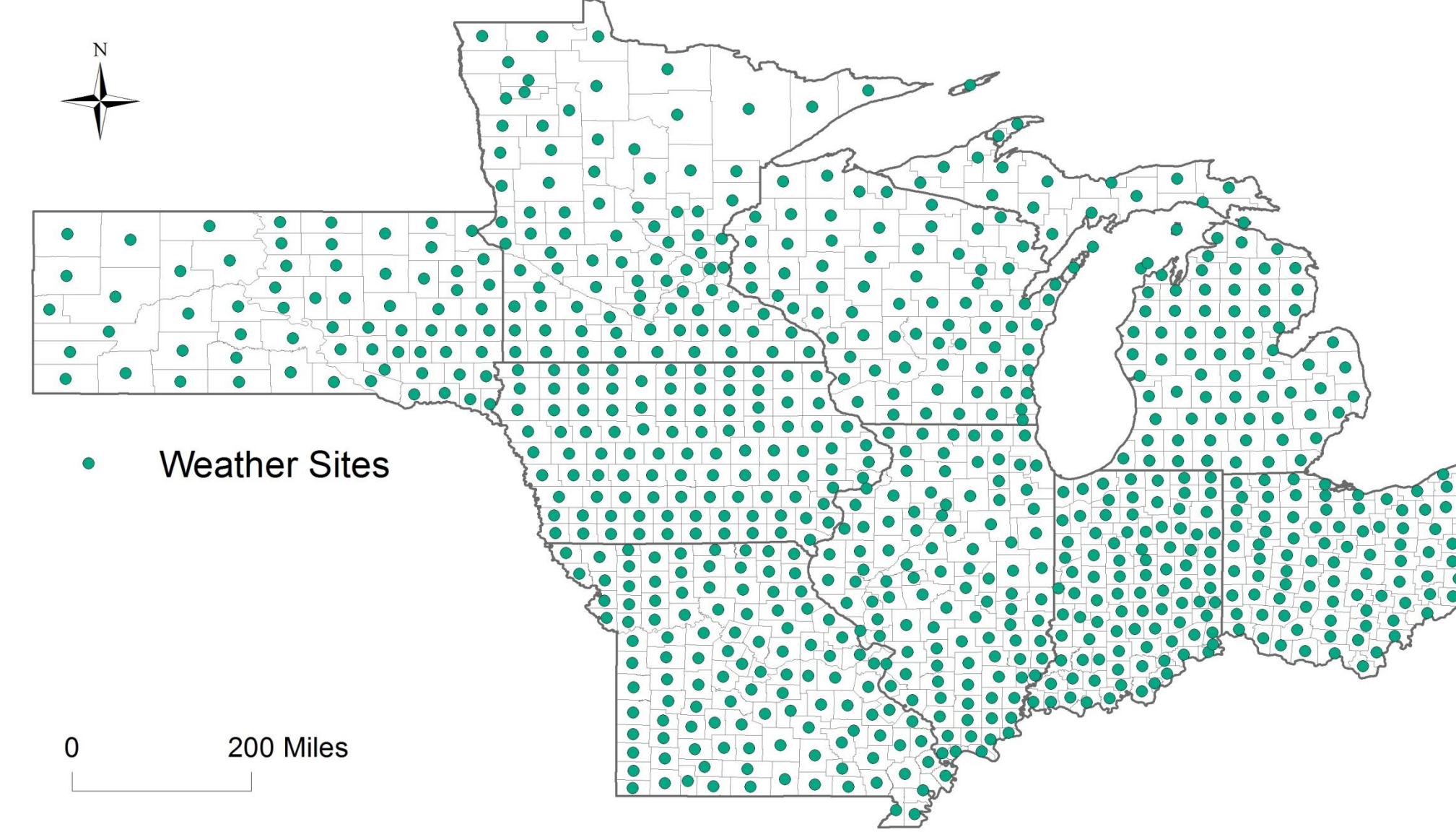
## 2. Procedure

- Determine location of corn fields and soils ← **We are here**
- Acquire climate projections
- Model past and future yields using SALUS model
- Model effects of adaptation strategies

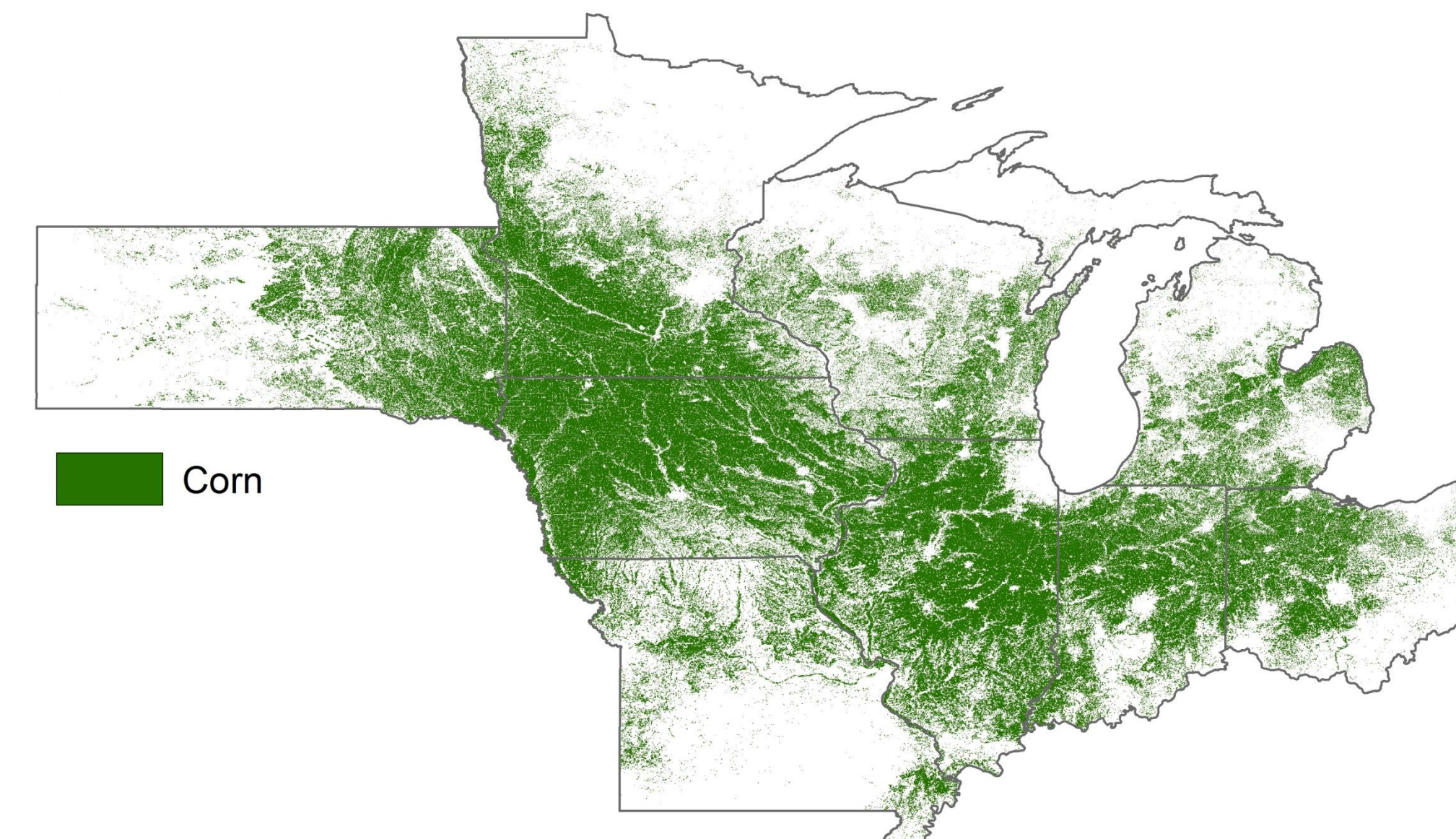


## 3. Results and Discussion

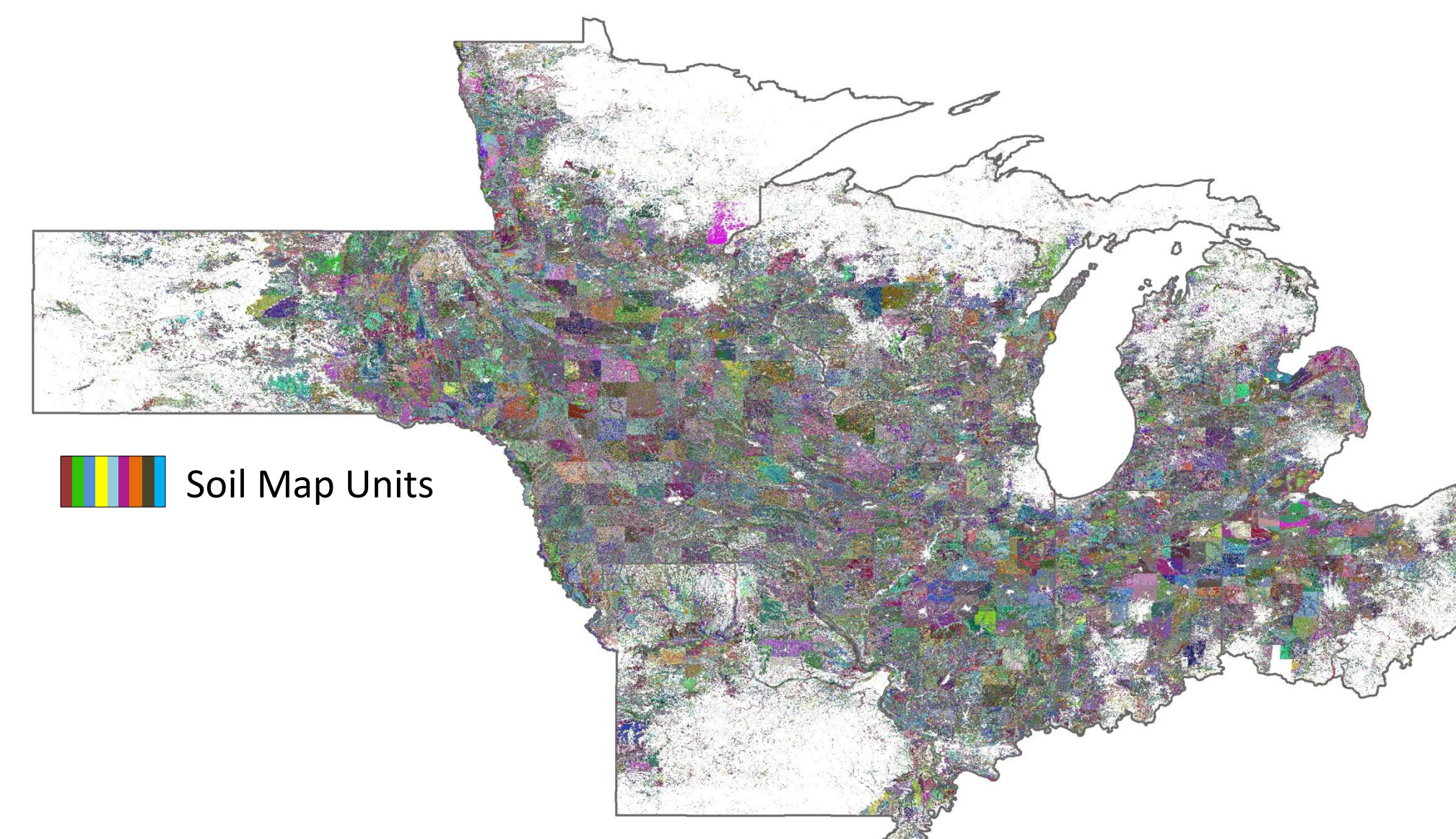
### Weather Data 812 sites



### Fields with Corn Planted in last 6 Years<sup>4</sup> 36% of Midwest



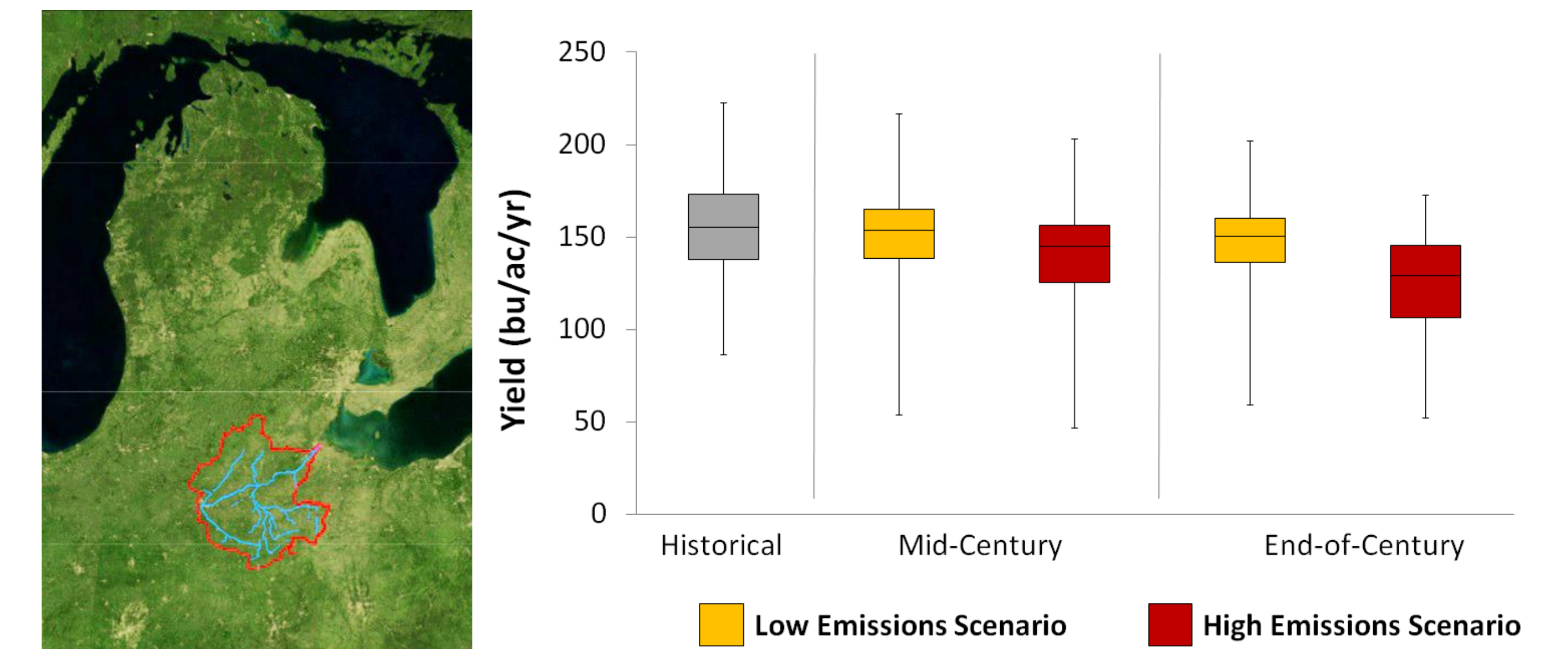
### Mapped Soil Units with Corn in last 6 Years<sup>5</sup> >71,000 mapped units



→ **Requires soil aggregation/simplification, otherwise =** ←  
**>57,000,000 simulations**

## 4. Previous and Future Work

### Modeled Effects of Climate Change on Maize Yields in the Maumee Watershed



### Future Work:

- Aggregate soil units into similar classes
- Simulate future yields and adaptation: early planting, cover crops, irrigation, increased fertilizer rates, and longer season cultivars

## 5. Conclusions

- Previous work shows a reduction in yields, however regional responses could show significant differences
- Model will test adaptation strategies and their large-scale impacts on yields, nutrient and water management at high resolution
- Seeks to inform growers and breeders of possible future challenges and solutions in their region

## Acknowledgements

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- Sources:
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  - USDA Natural Resources Conservation Service's Soil Survey Geographic Database