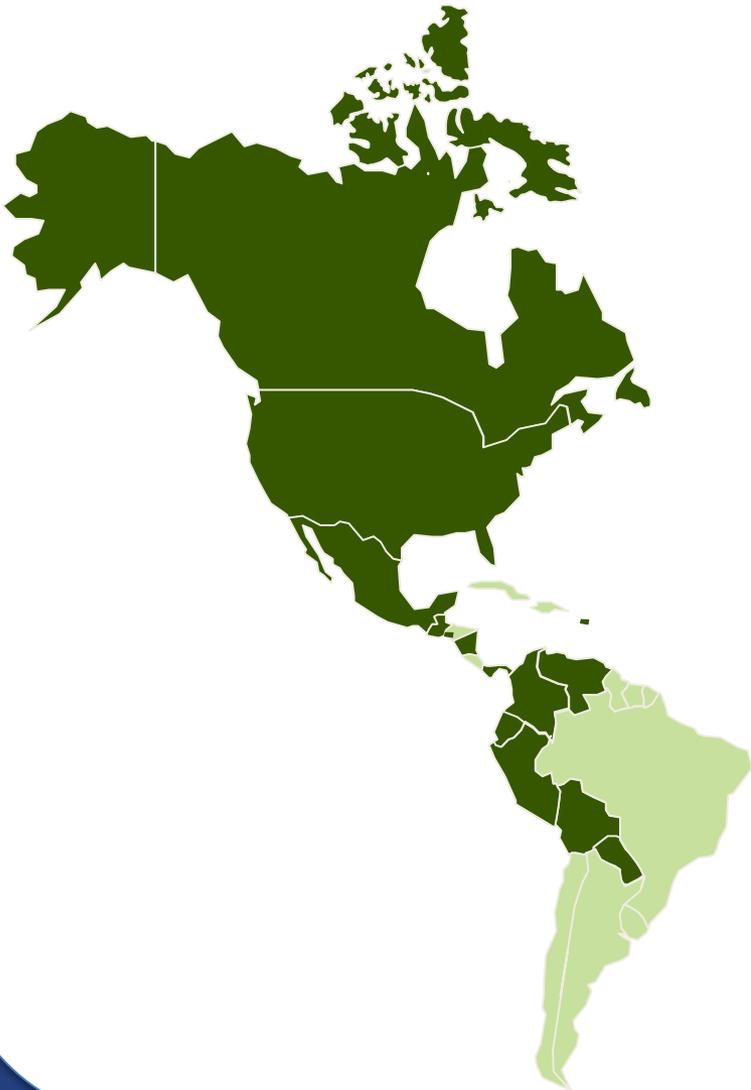


Species Distribution Data: Range Maps & Distribution Models

Regan Smyth
ESA-FIFRA Workshop
June 29, 2016



Who is NatureServe?



- Distributed network of biodiversity inventories
- Scientifically rigorous field and data management standards and protocols
- 40+ years of data collection and curation
- 1K+ professionals updating status and location of species
- 6M+ inquires annually

We Answer Key Questions



What Exists?



Where Are They Found?



How Are They Doing?

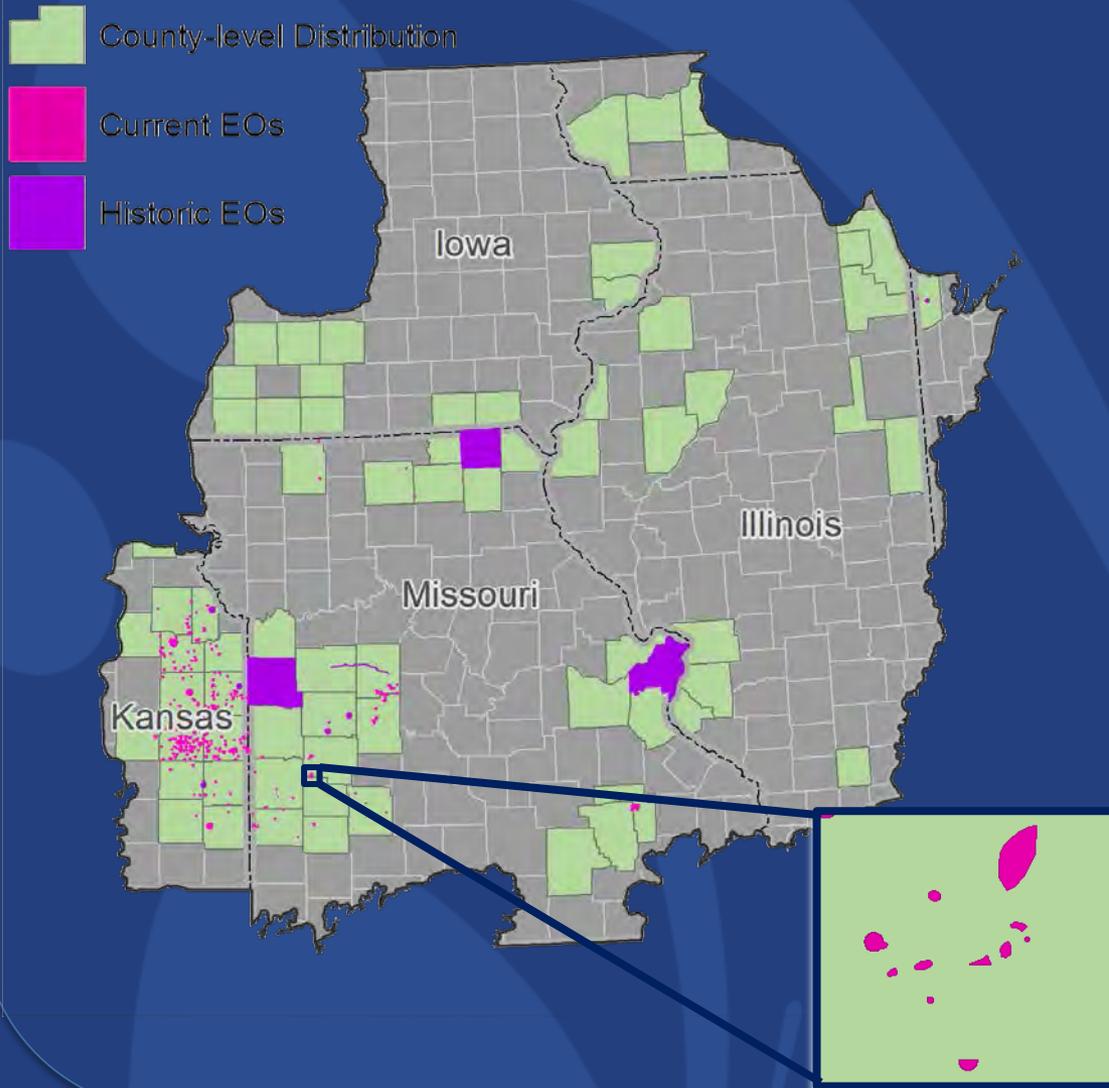


What Actions Will Help?

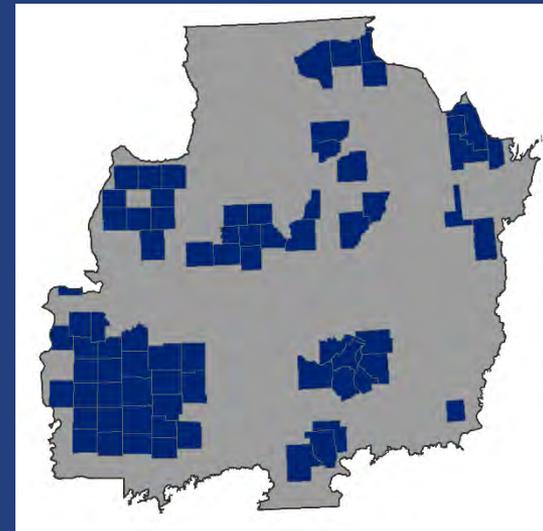
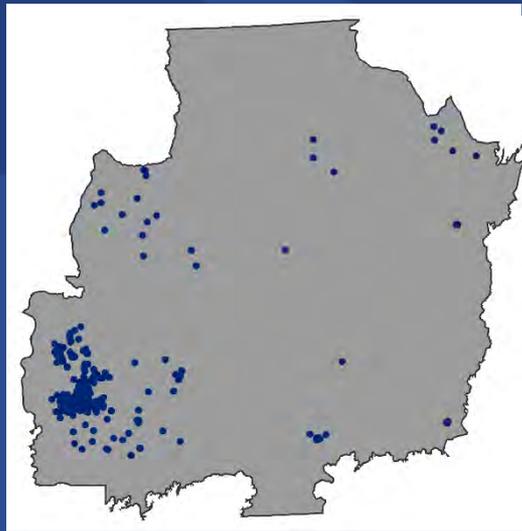


Are The Actions Working?

Species Occurrence Data



An Element Occurrence (EO) is an area of land and/or water in which a species or native plant community is, or was, present.



**When a EO map is used
as a distribution map :**

- Underpredicts occupied area**
- Overpredicts unoccupied area**
- Accuracy depends on intensity
& distribution of sampling effort**
- Can be difficult to validate or test**

**When a range map is used
as a distribution map :**

- Overpredict occupied area**
- Underpredicts unoccupied area**
- Can be difficult to replicate; often
subjective**
- Can be difficult to validate or test**

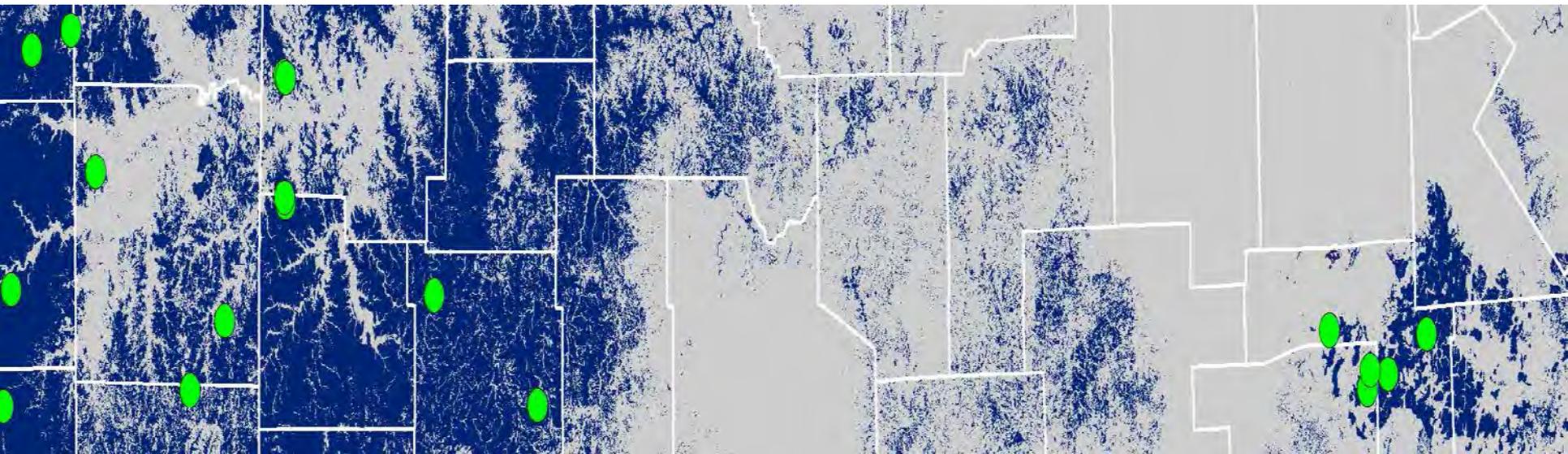
A better alternative

Build a model of the environmental conditions at points of known occurrence...

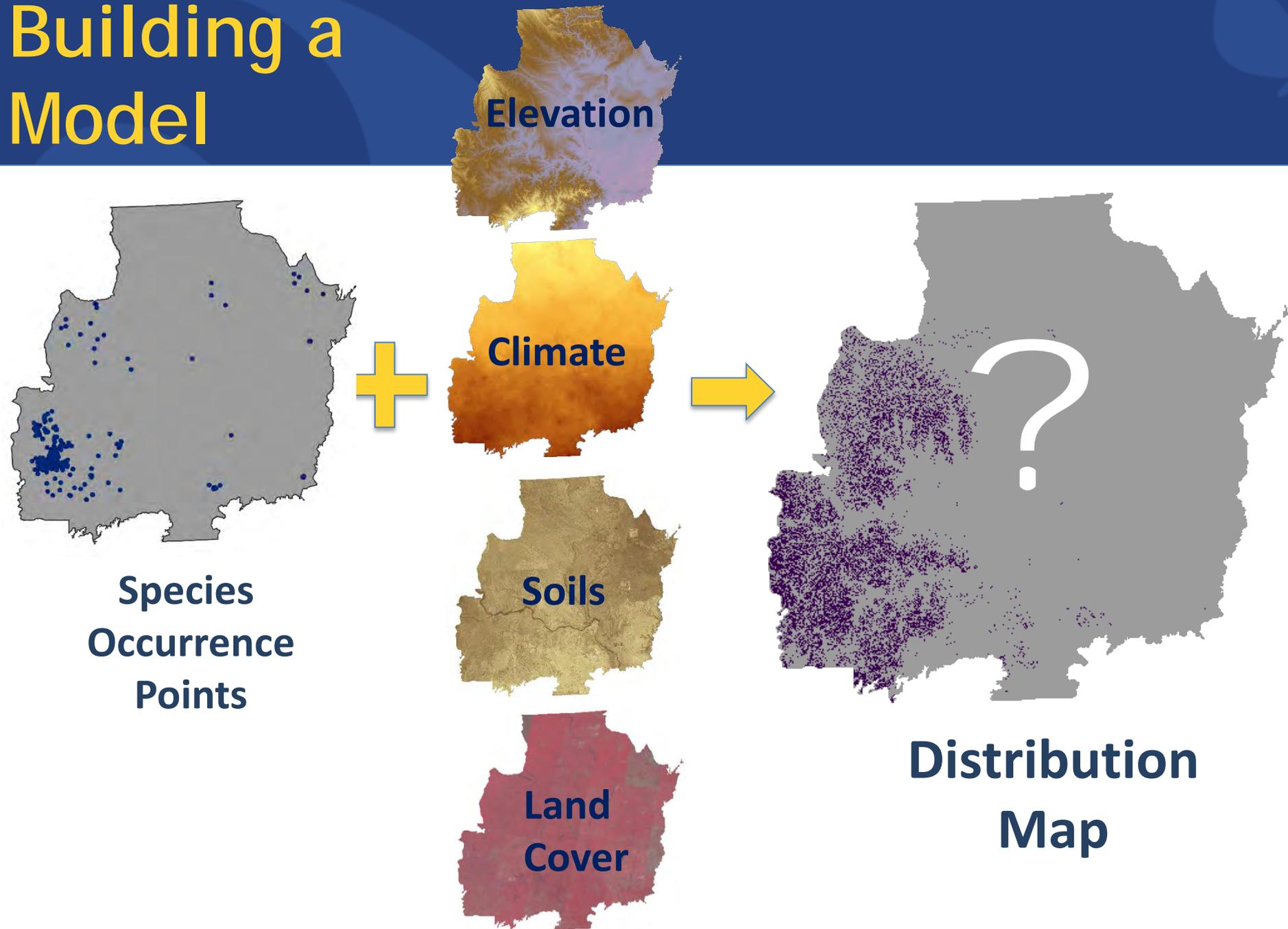
MODELING

... then identify and map all areas where those conditions occur within the study area.

MAPPING



Building a Model



NatureServe / Syngenta Pilot

Objective: Test species distribution modeling as a means of producing better spatial distribution data for listed species, while also improving the EO data available for our two target species.



Asclepias meadii, G2

Distribution: KS, MO, IL, IA



Boltonia decurrens, G2G3

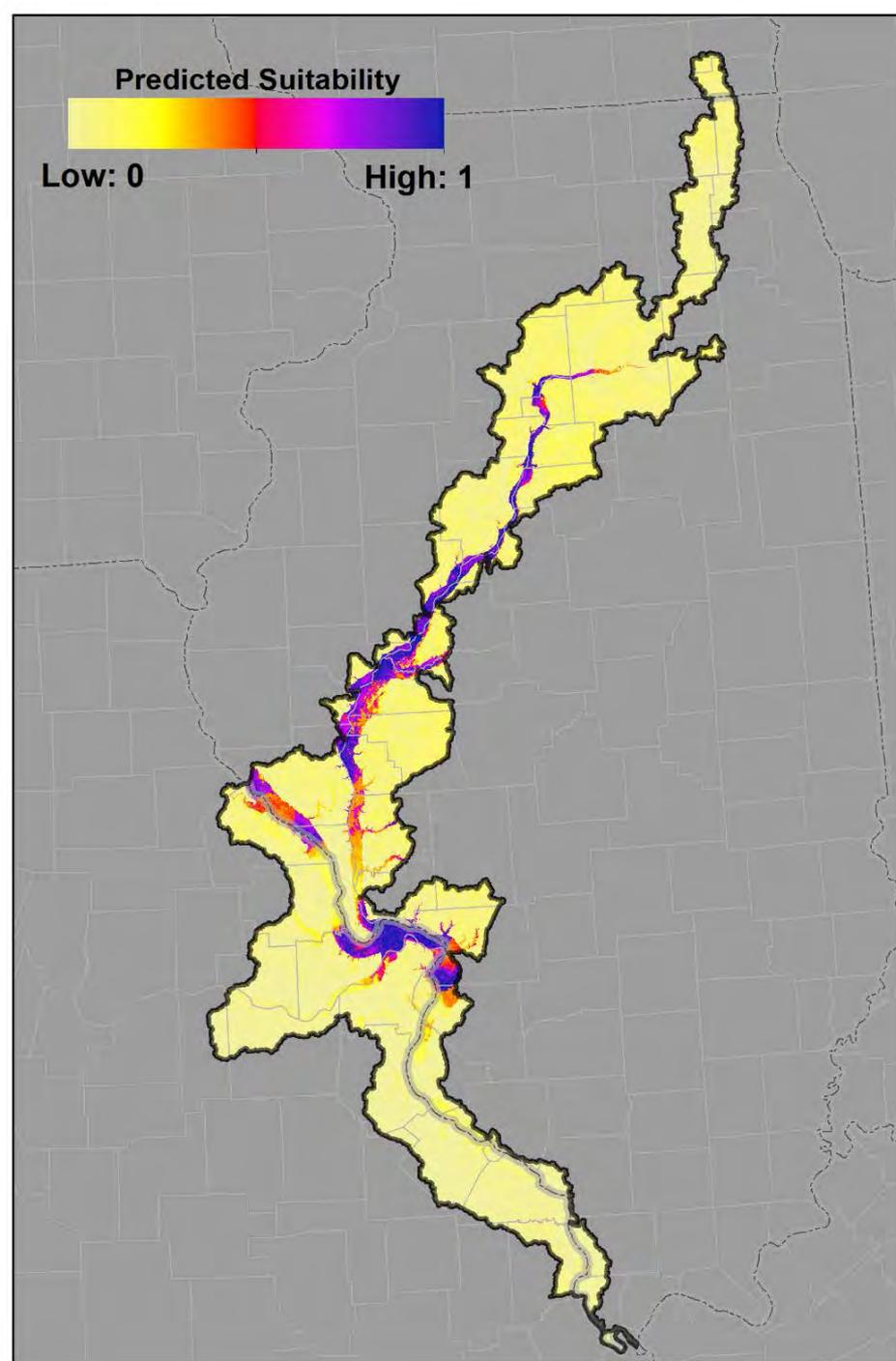
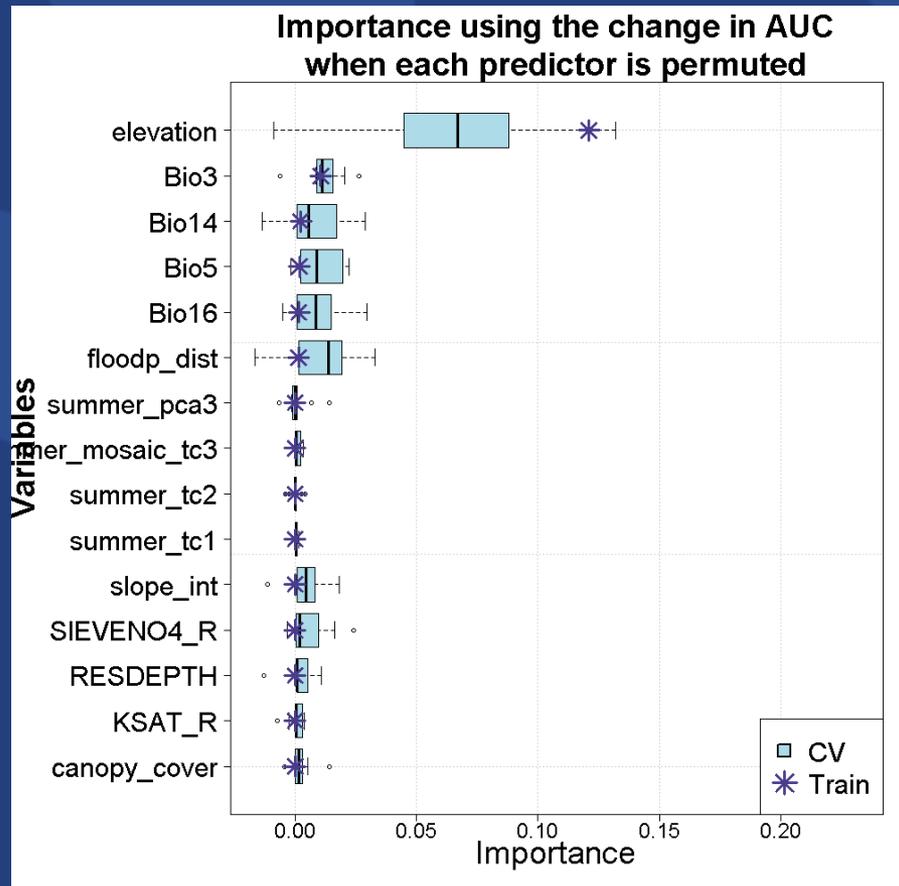
Distribution: MO, IL

Decurrent False Aster

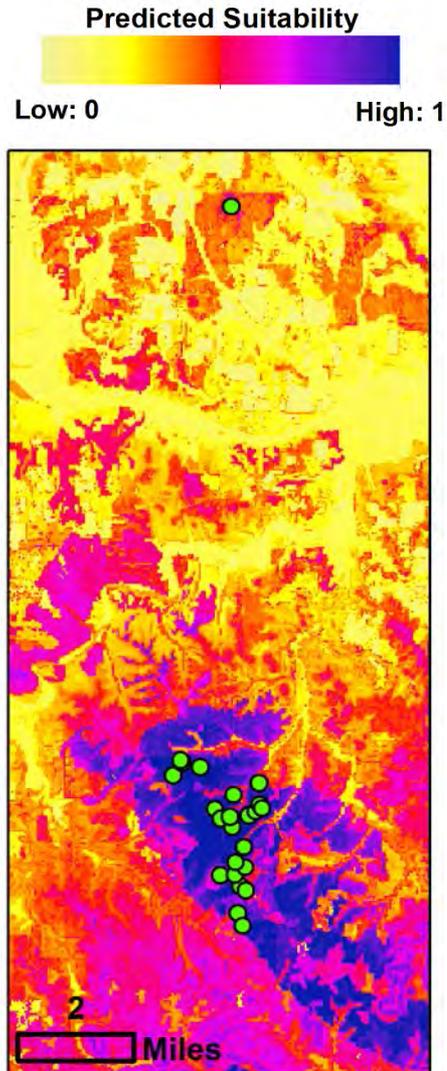
Boltonia decurrens



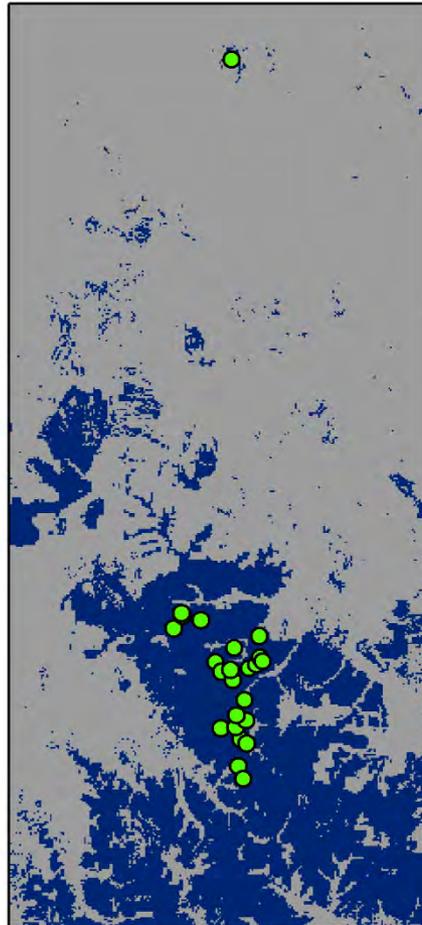
Random Forest Model



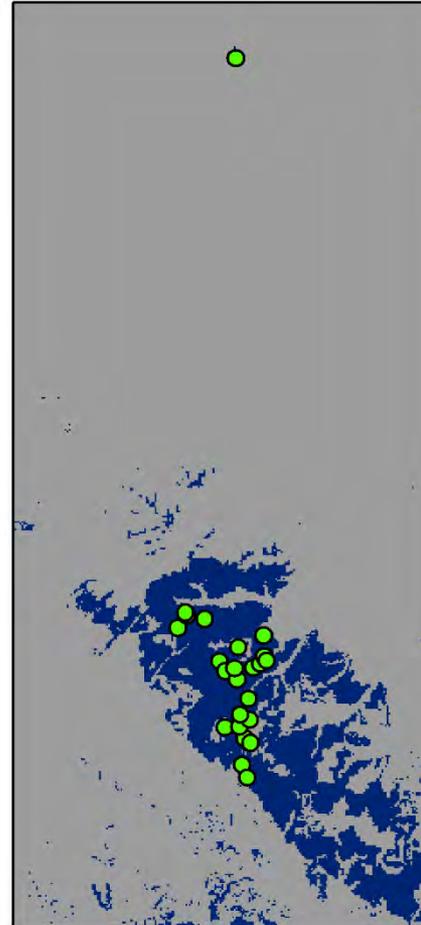
Thresh-holding Options



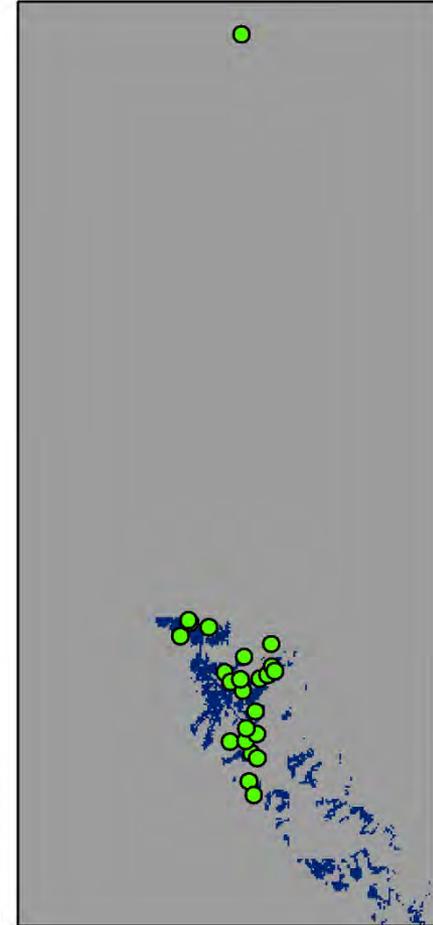
100% Sensitivity

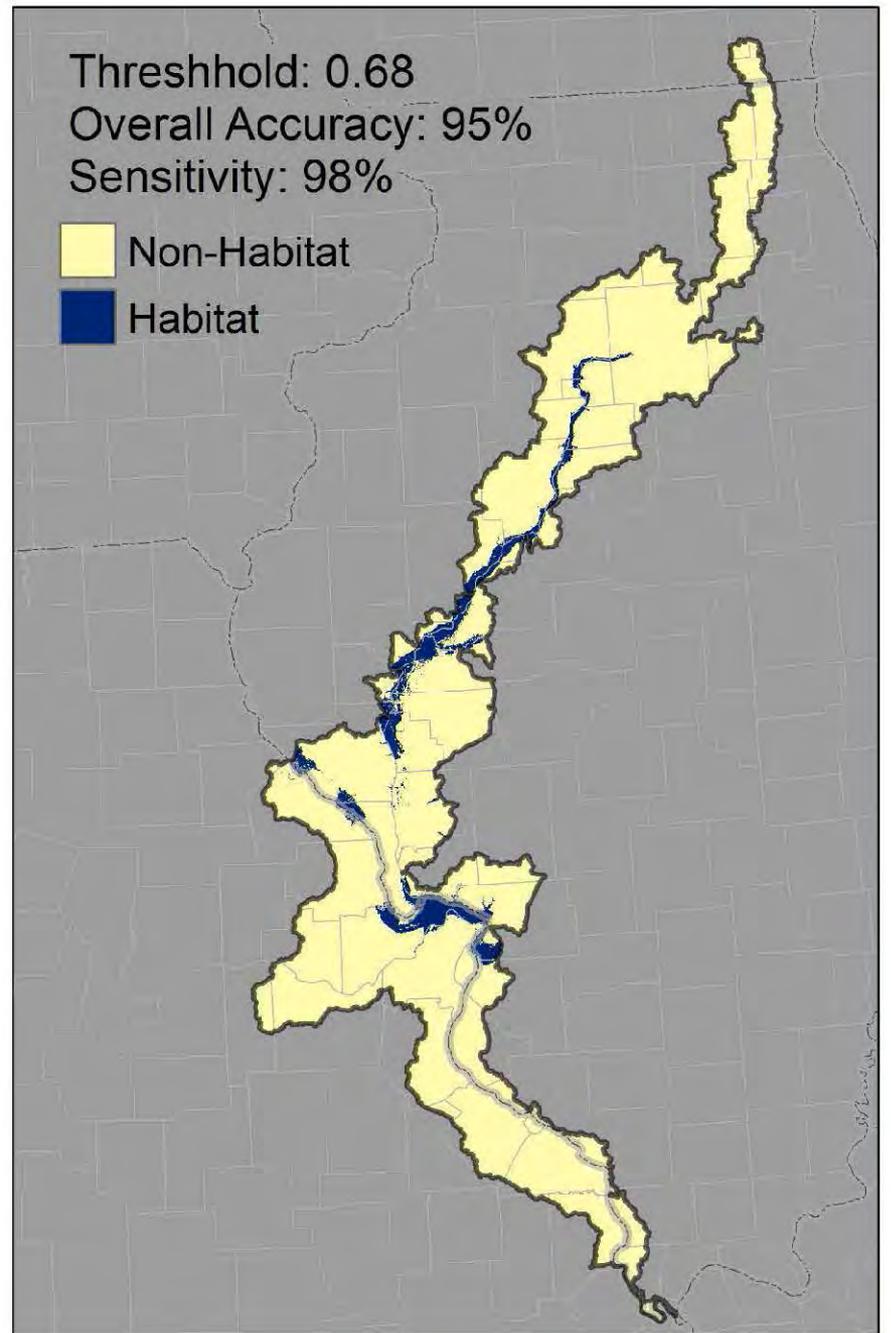
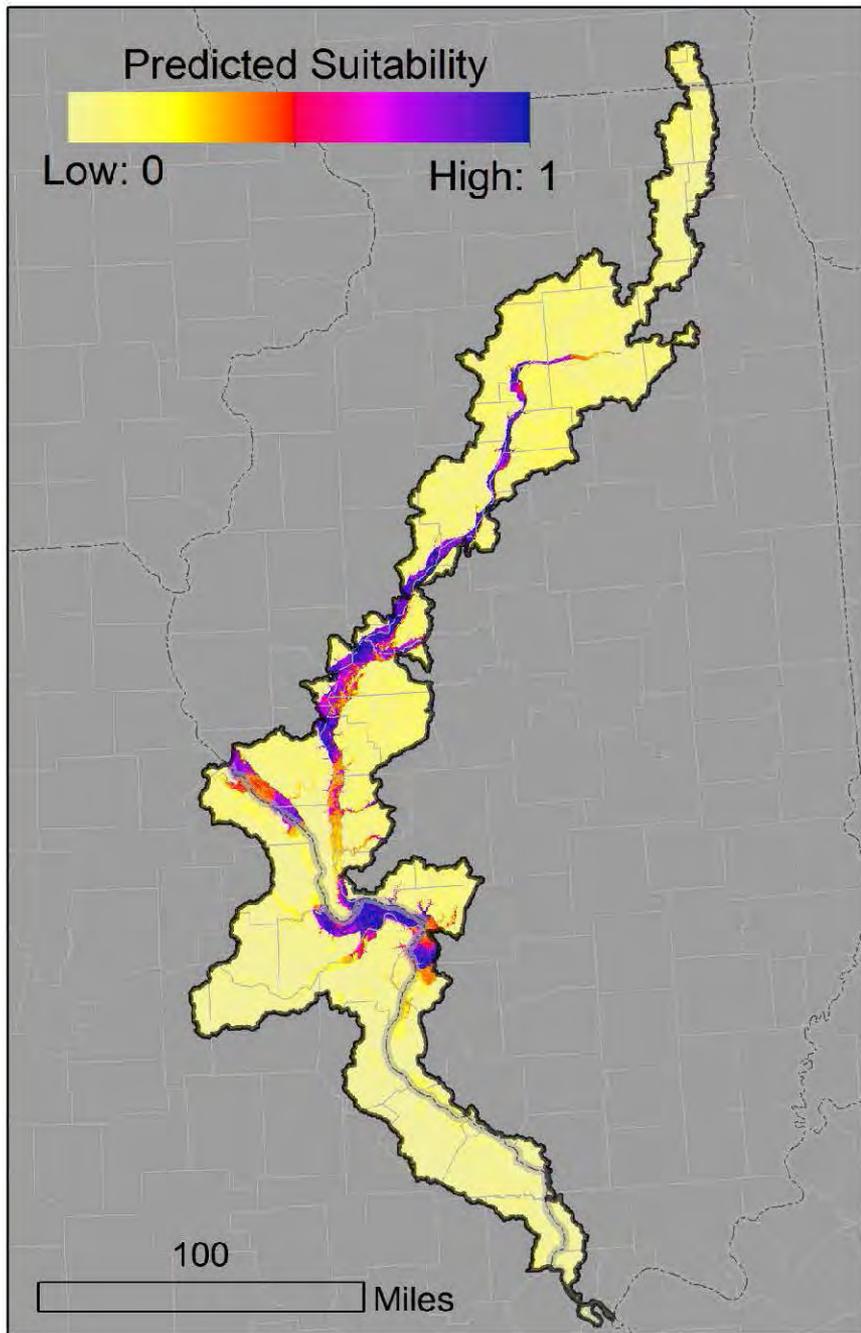


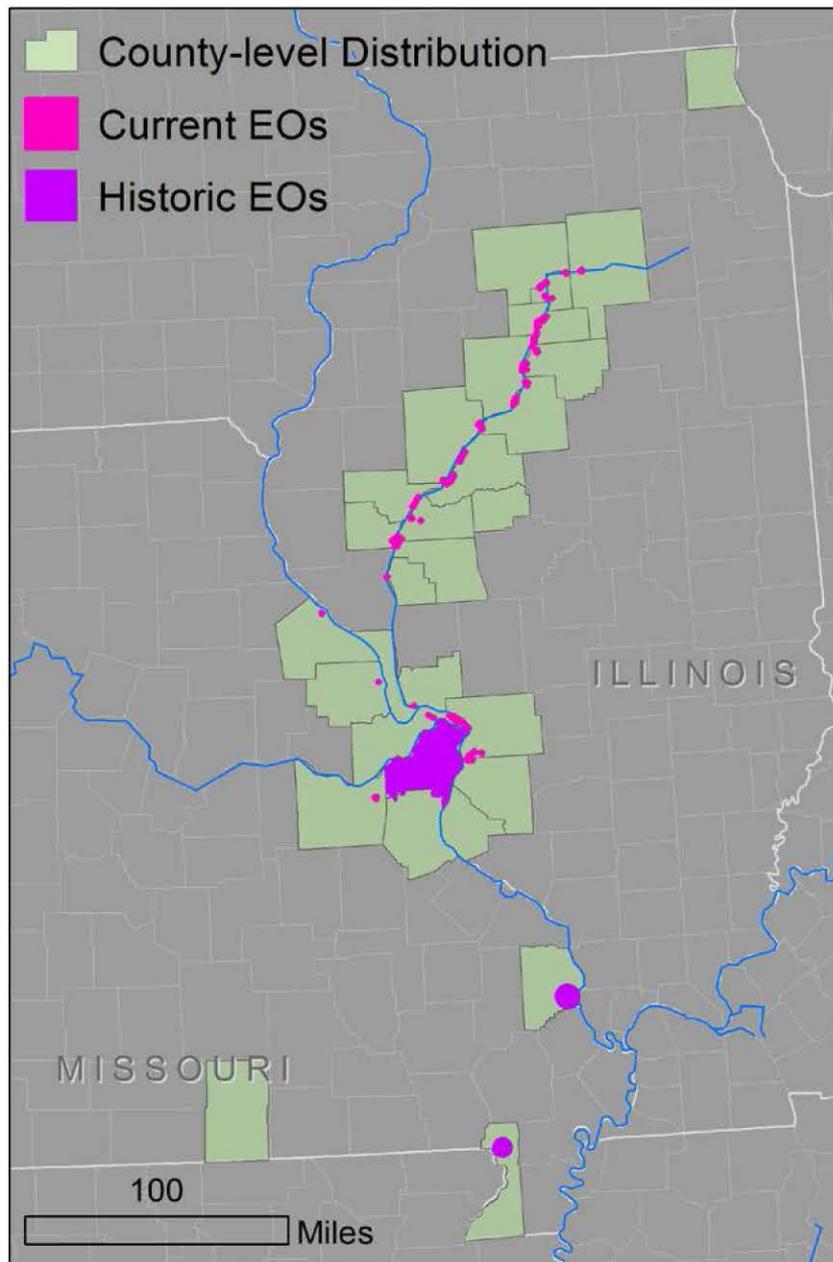
90% Sensitivity



Highest Probabilities







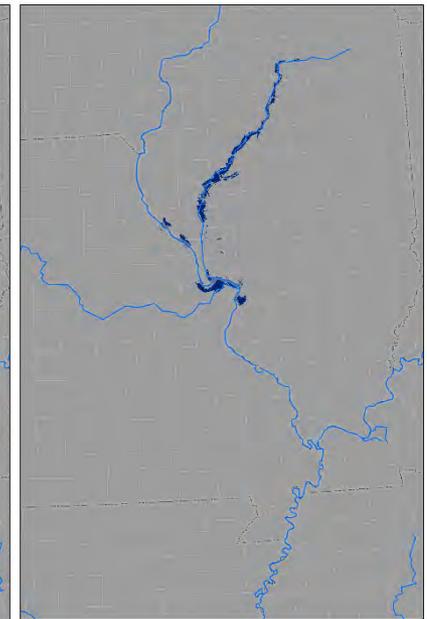
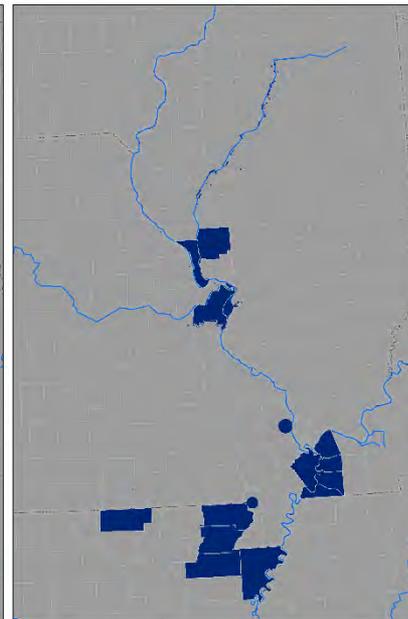
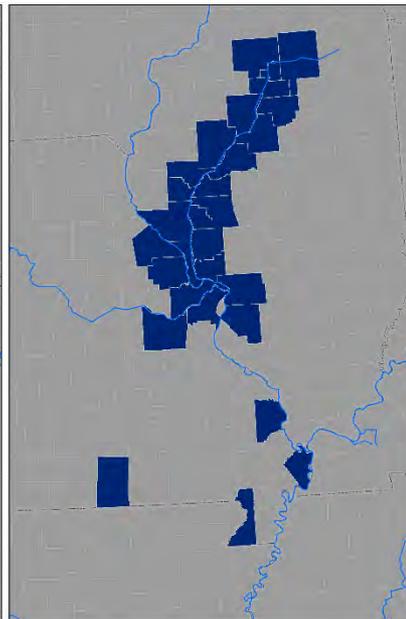
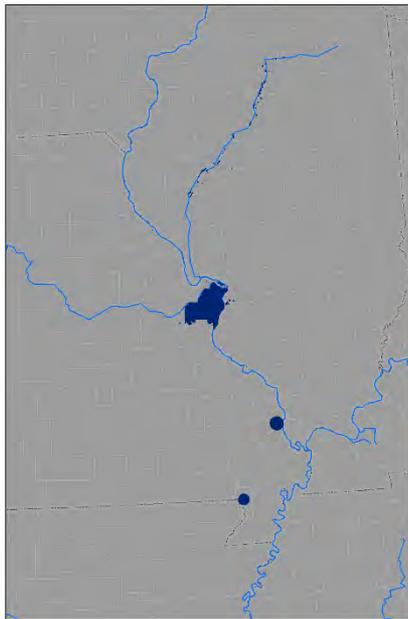
Area Comparison

461, 463

10,982,453

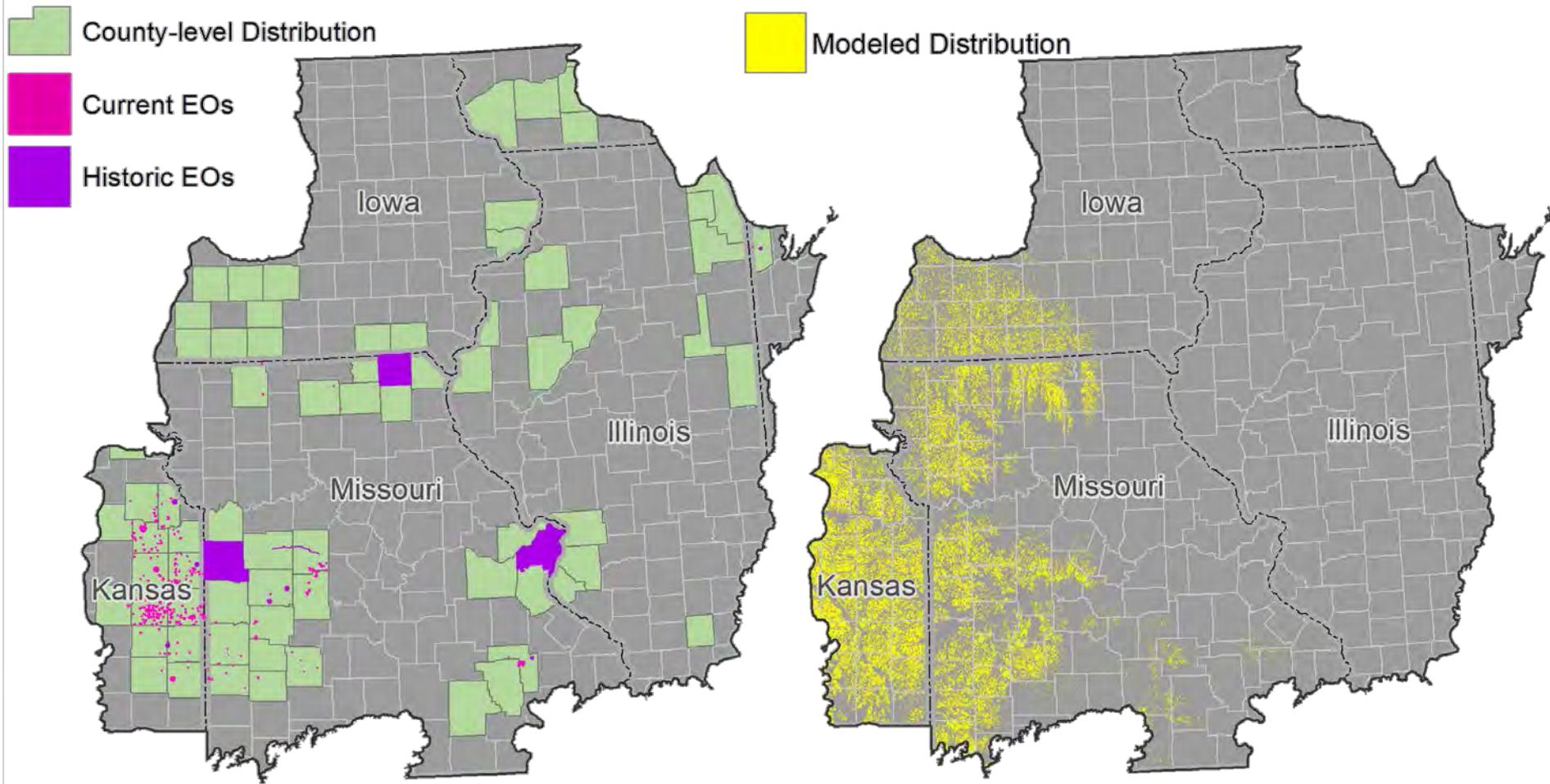
4,098,825

568,575



all areas are in acres

Asclepias meadii



Scaling Up:

Moving towards models for a large number of listed species



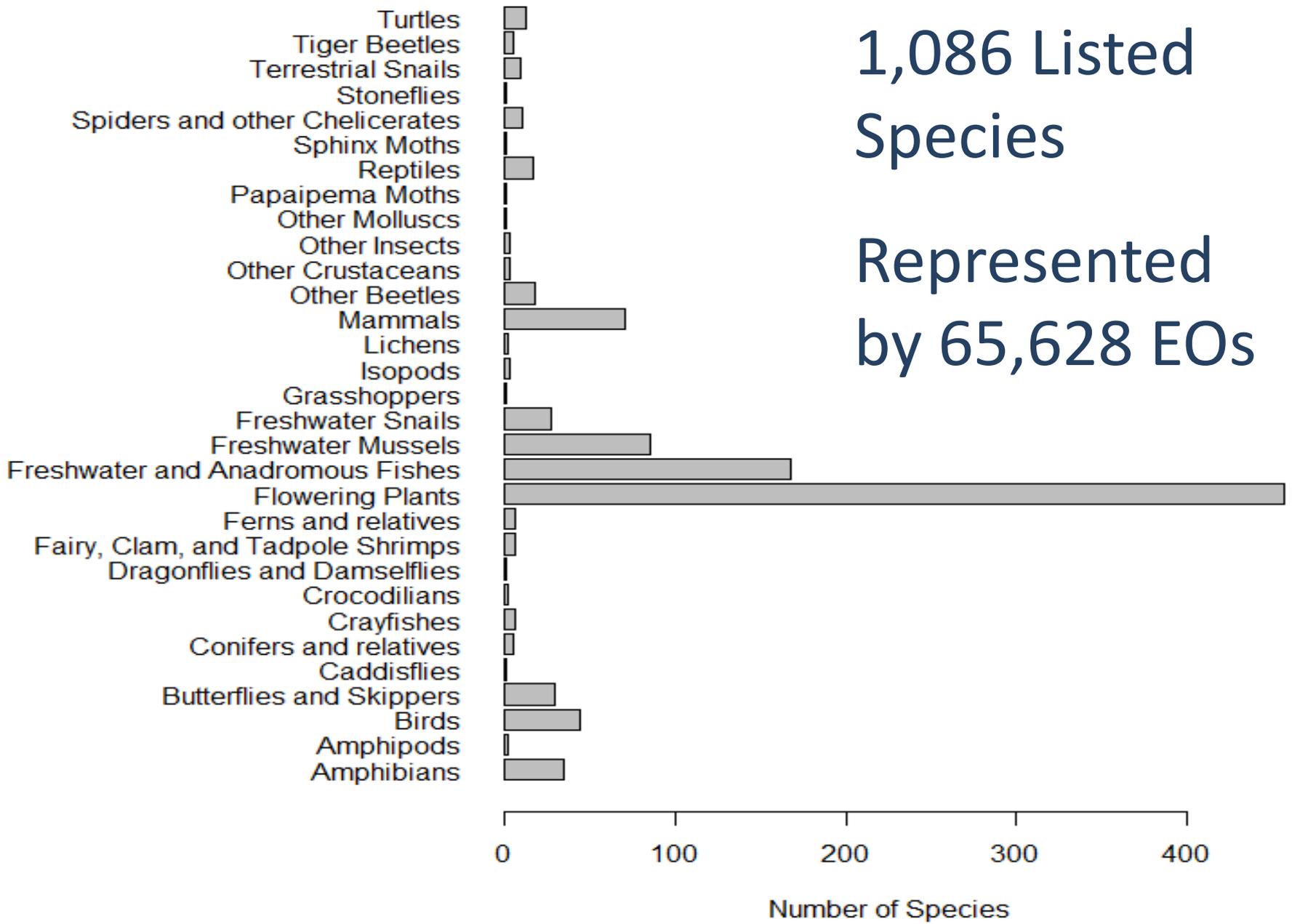
National Scoping



- ★ Network Modeling Center
- ★ NatureServe Modeling Center

1,086 Listed
Species

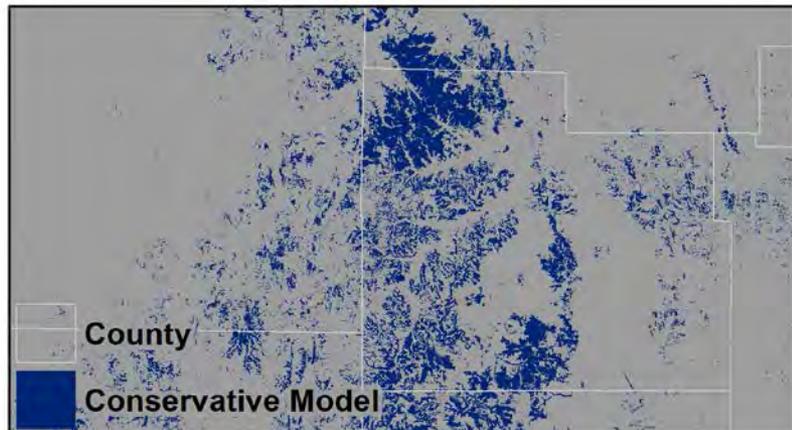
Represented
by 65,628 EOs



Products

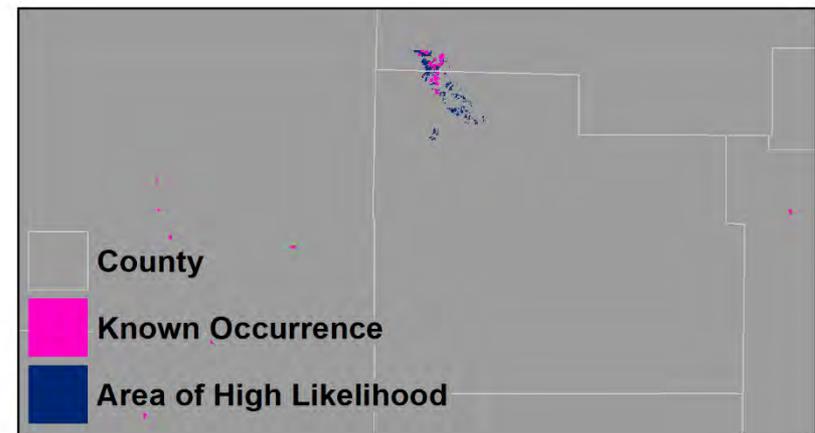
Potential Distribution

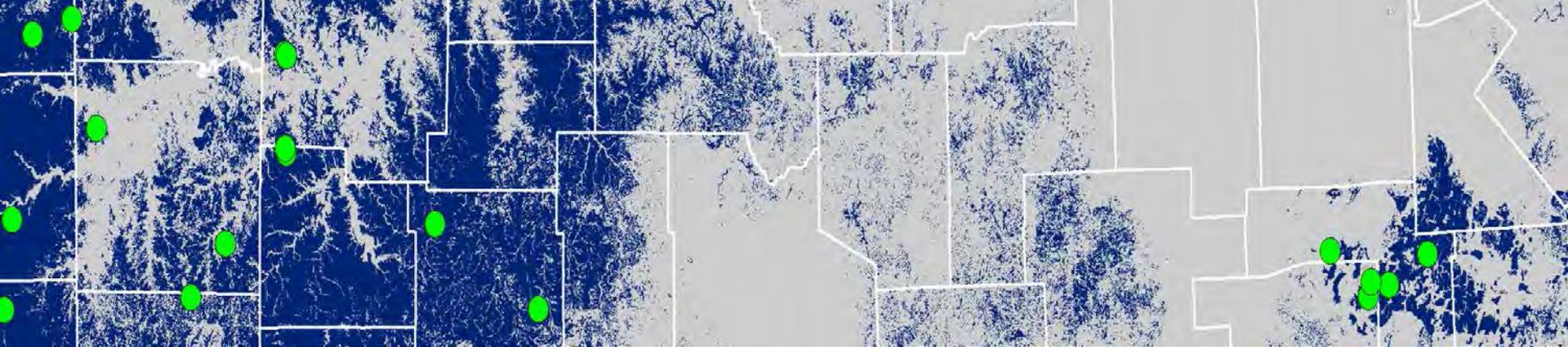
- Modeled habitat with conservative threshold for inclusion
- Indicates species has potential to be found at site



Areas of High Likelihood

- Known occurrences
- Critical habitat/recovery areas
- Areas of highest predicted suitability





Questions?

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