



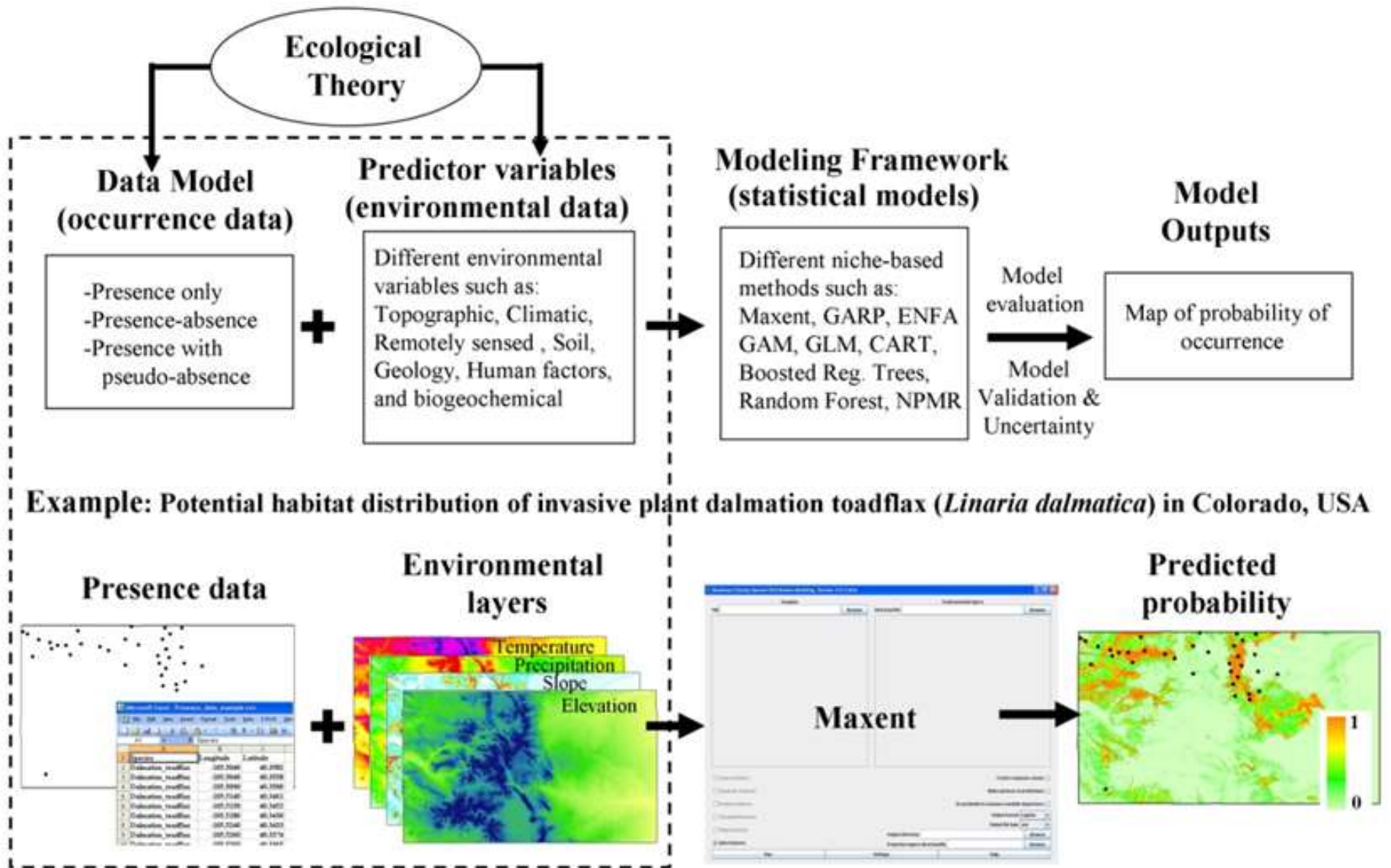
Habitat Suitability Modeling A Tool for Invasive Species Management

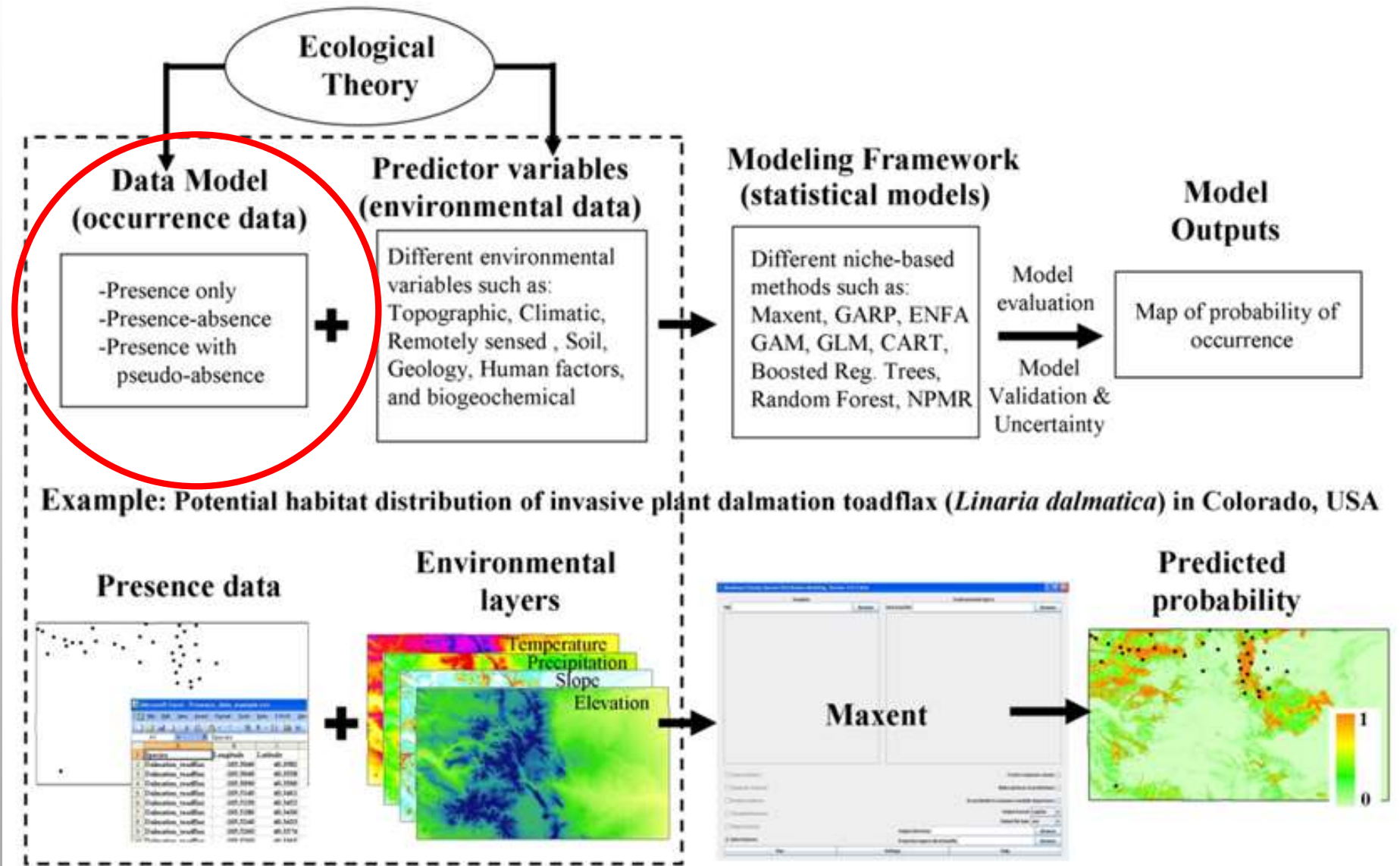
Lindy Garner, USFWS
CaIPC NWRS Session
October 16, 2019



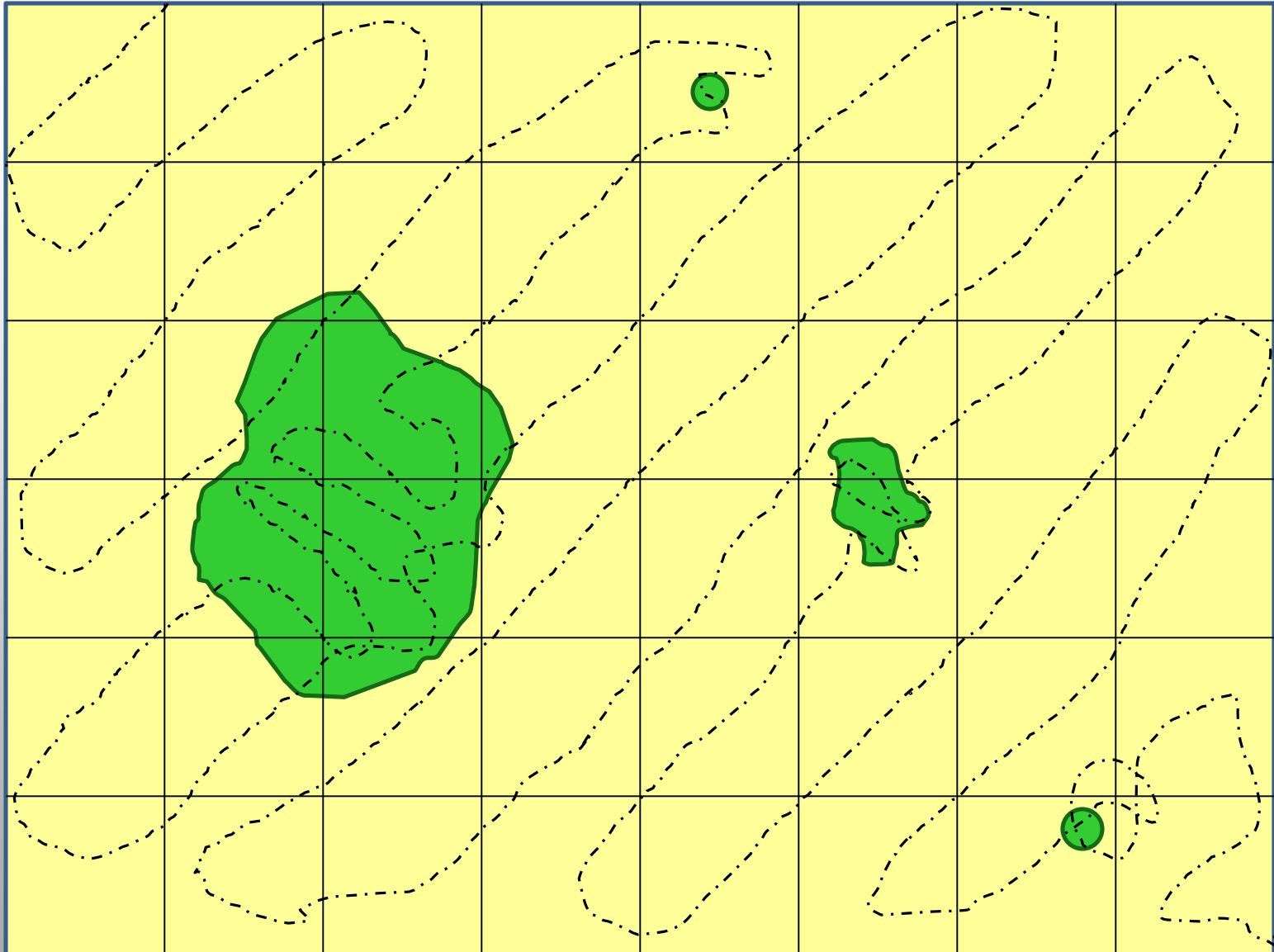
Ecology Matters!







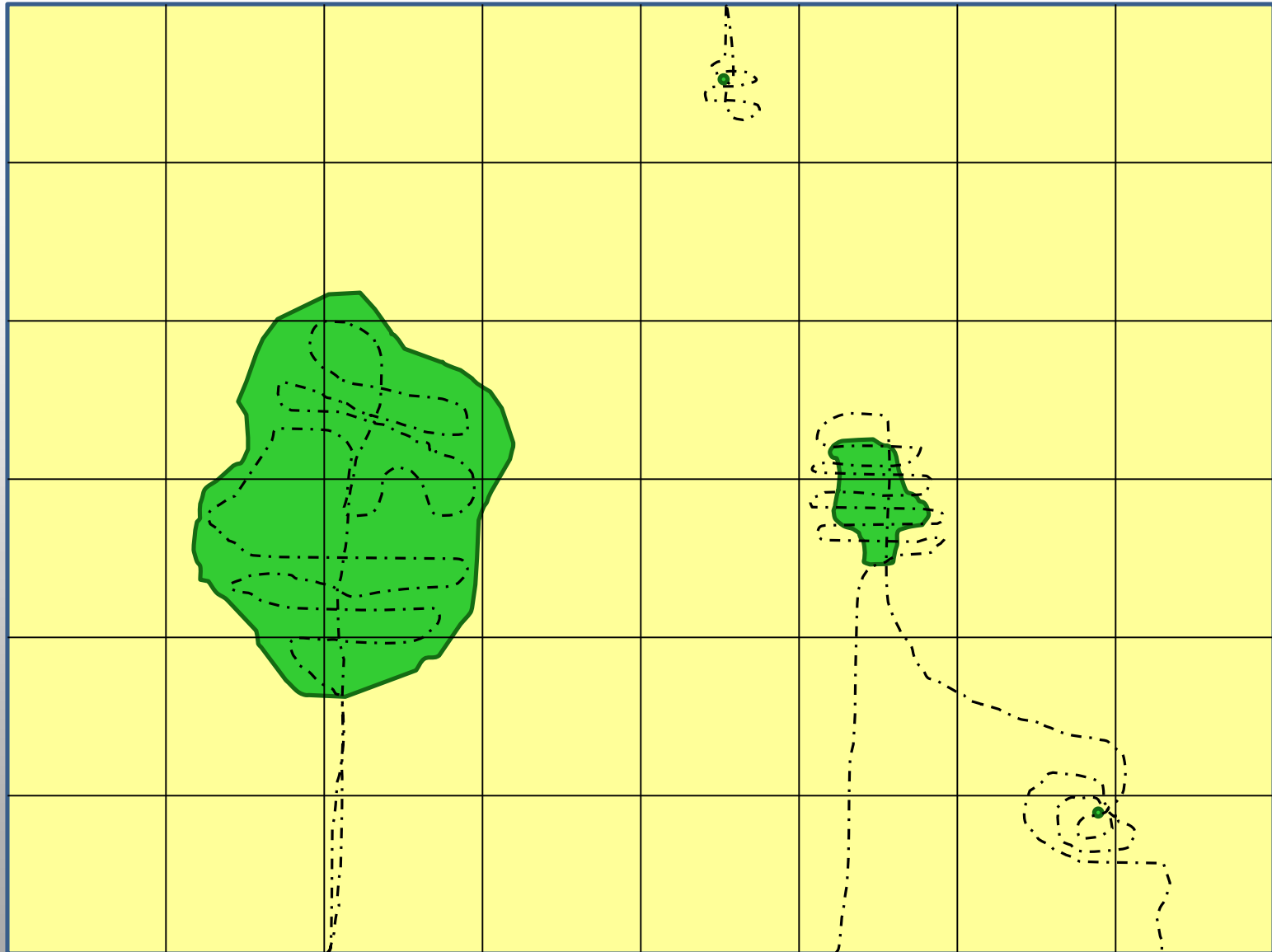
Management data – Presence/Absence



Management data – Presence/Absence

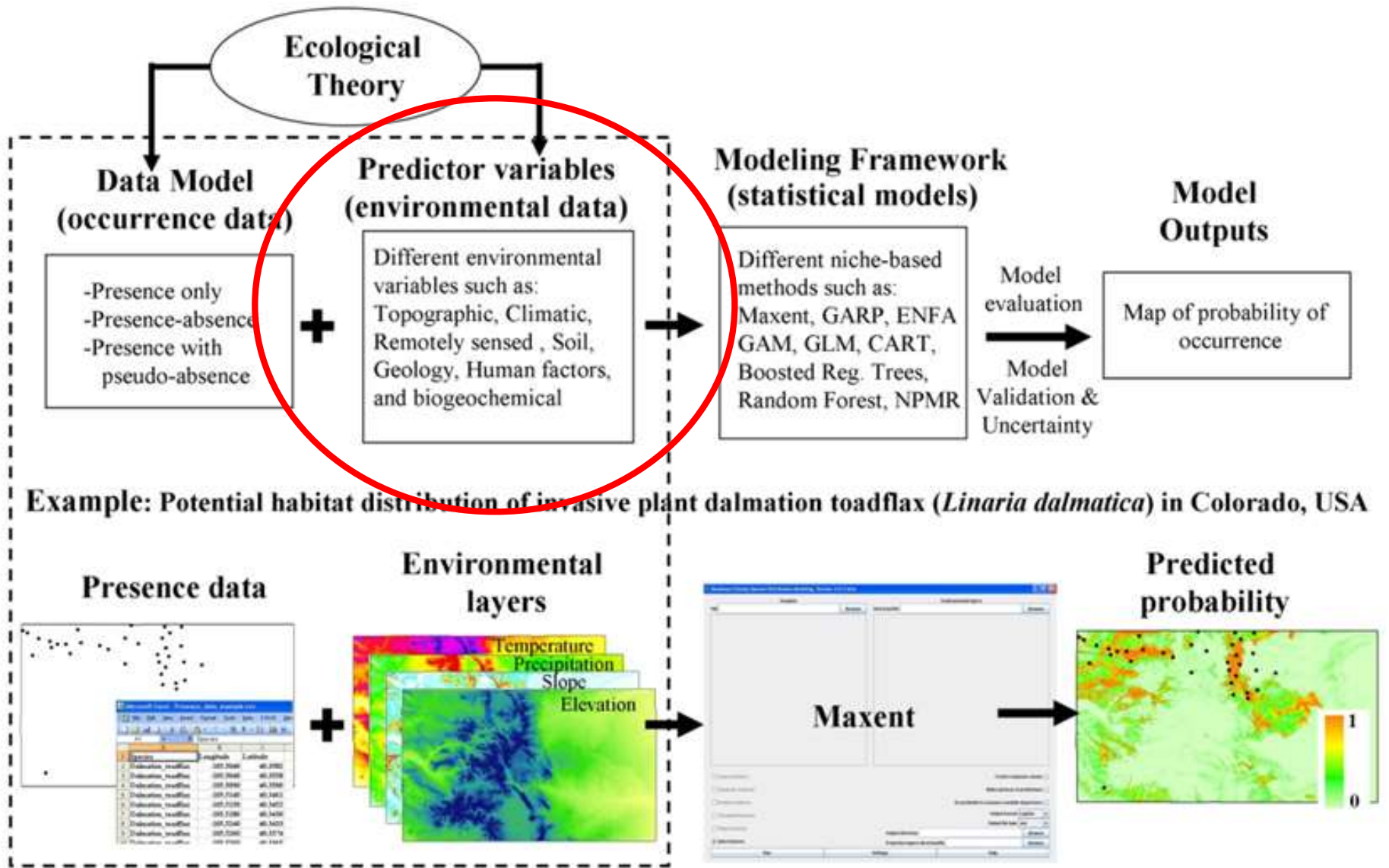
[illegible]

Management data – Presence only

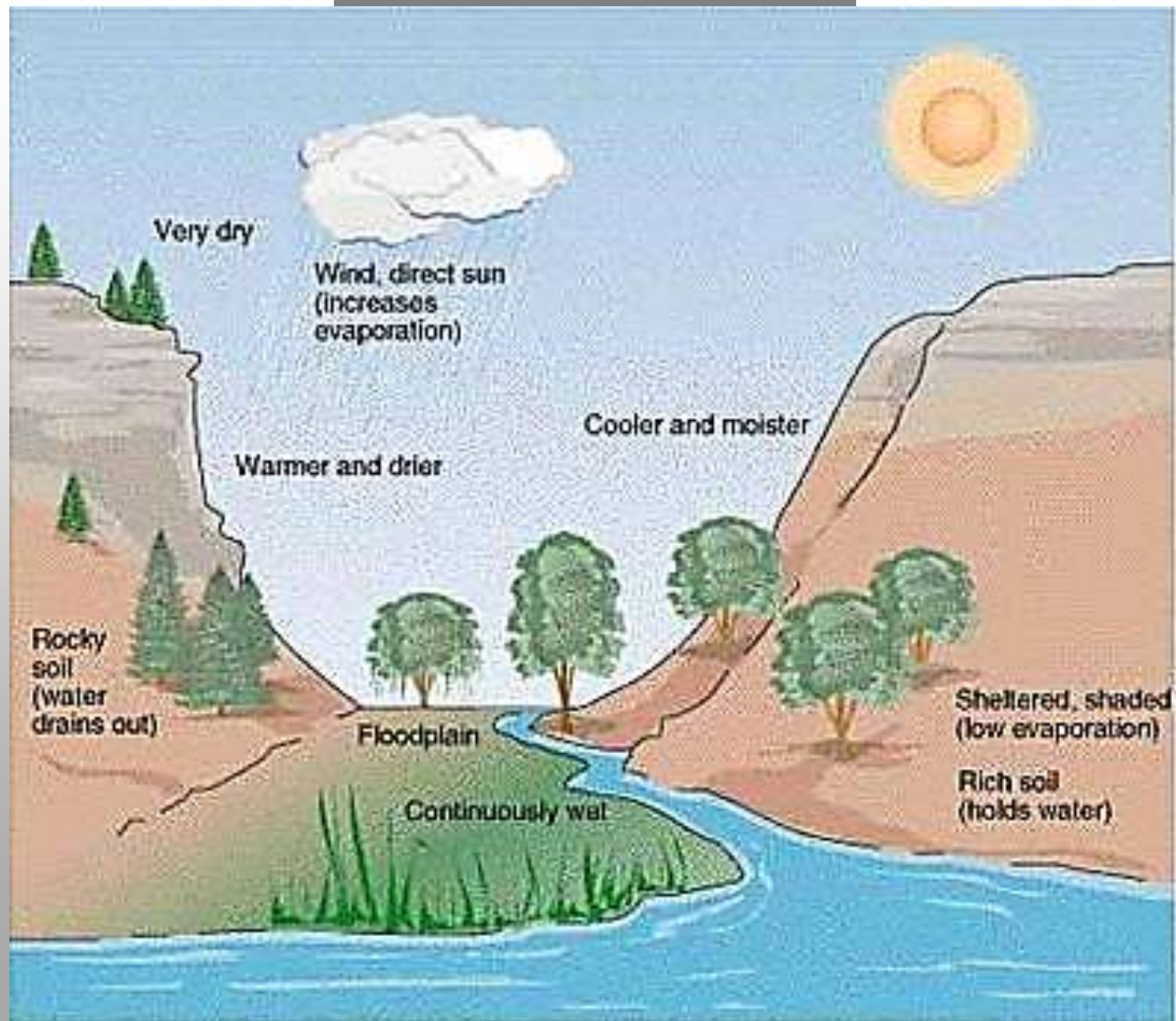


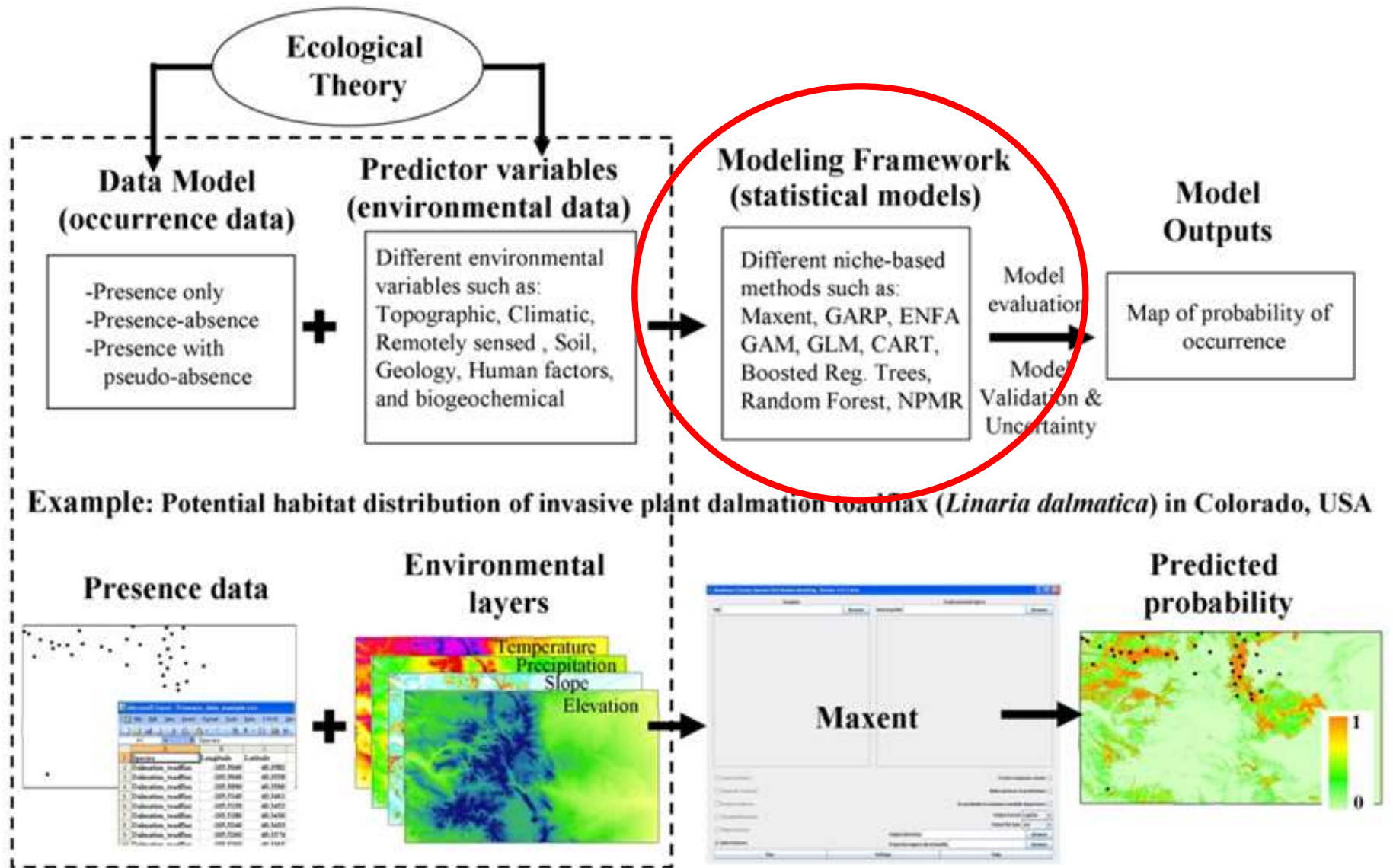
Management data – Presence only

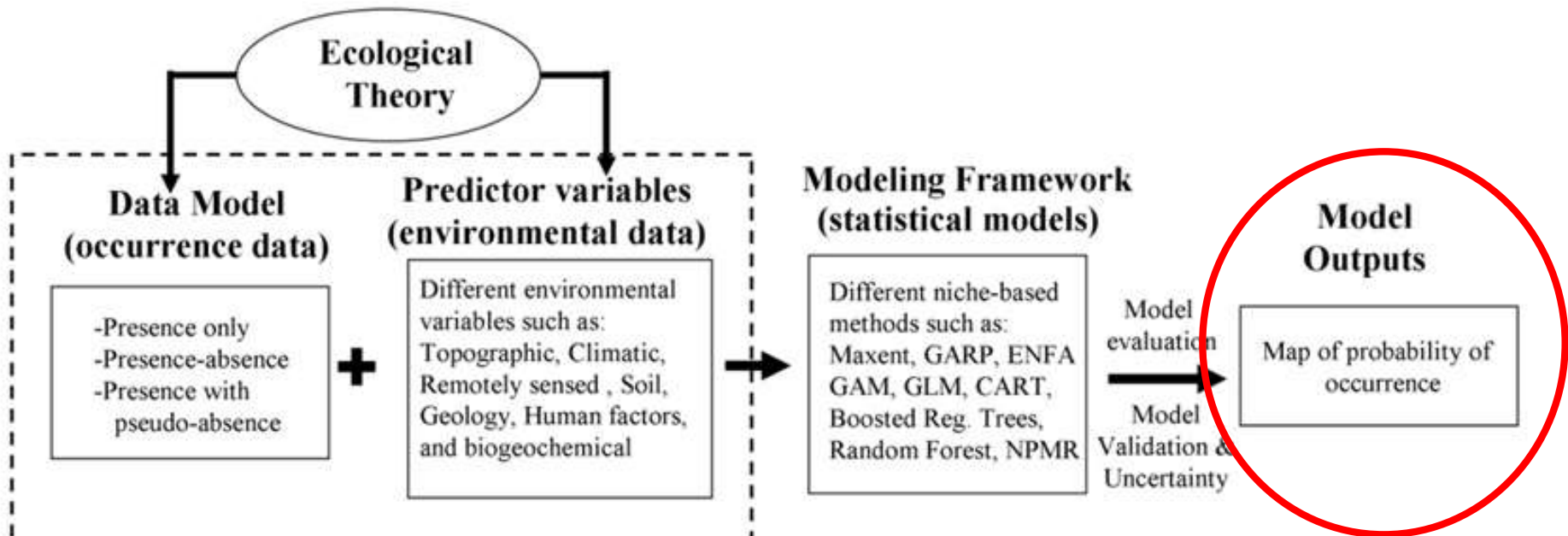
?	?	?	?	Present	?	?	?
?	Present	Present	?	?	?	?	?
?	Present	Present	Present	?	Present	?	?
?	Present	Present	Present	?	Present	?	?
?	Present	Present	?	?	?	?	?
?	?	?	?	?	?	Present	?



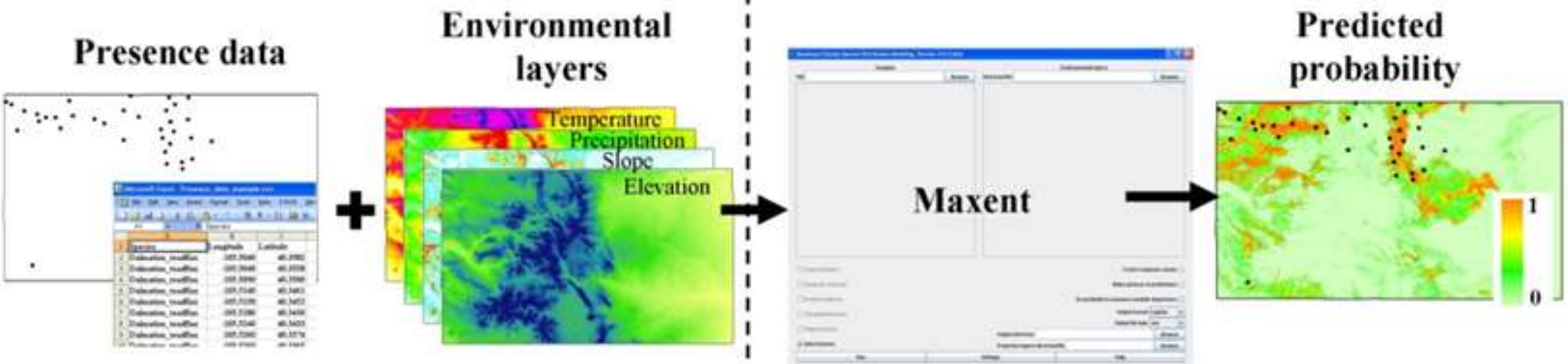
Predictor Variables







Example: Potential habitat distribution of invasive plant dalmatian toadflax (*Linaria dalmatica*) in Colorado, USA

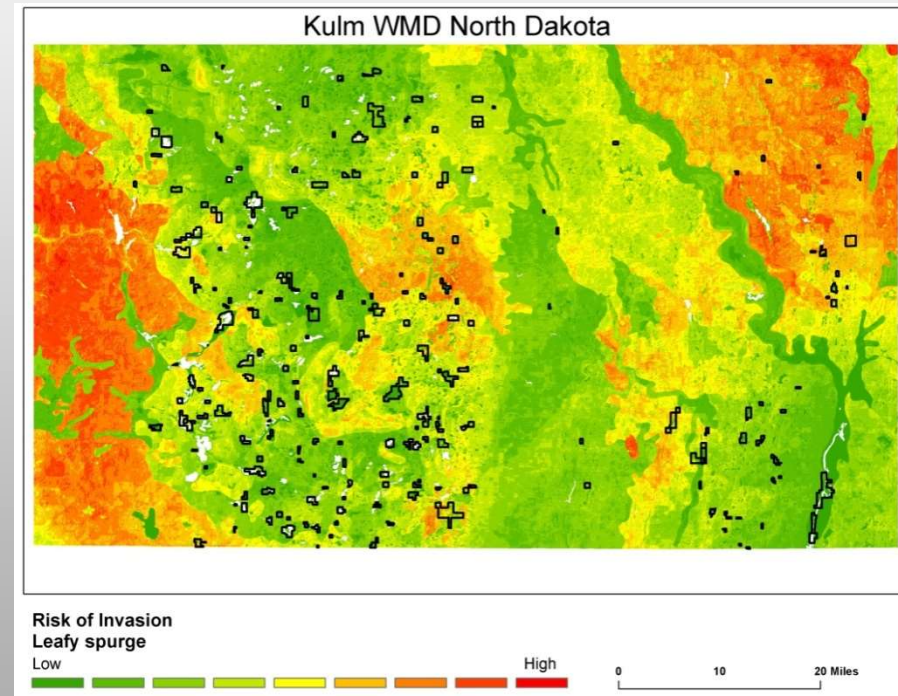




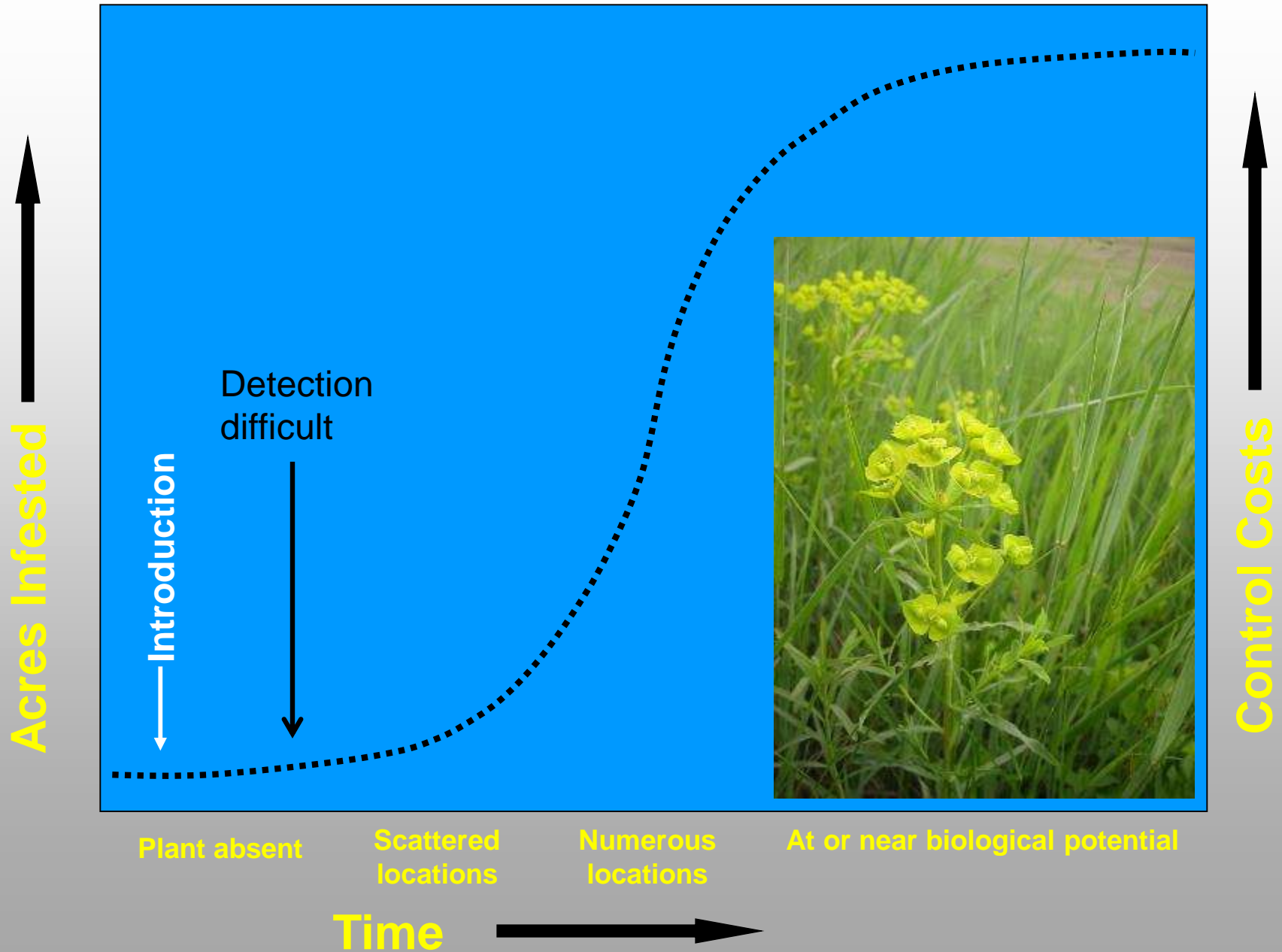
Model Outputs: Predicted Probability of Occurrence

Utilize survey or management data for predicting where species can/may occur

- Improve detection
- Highlight areas at risk of invasion
- Prioritize areas for management

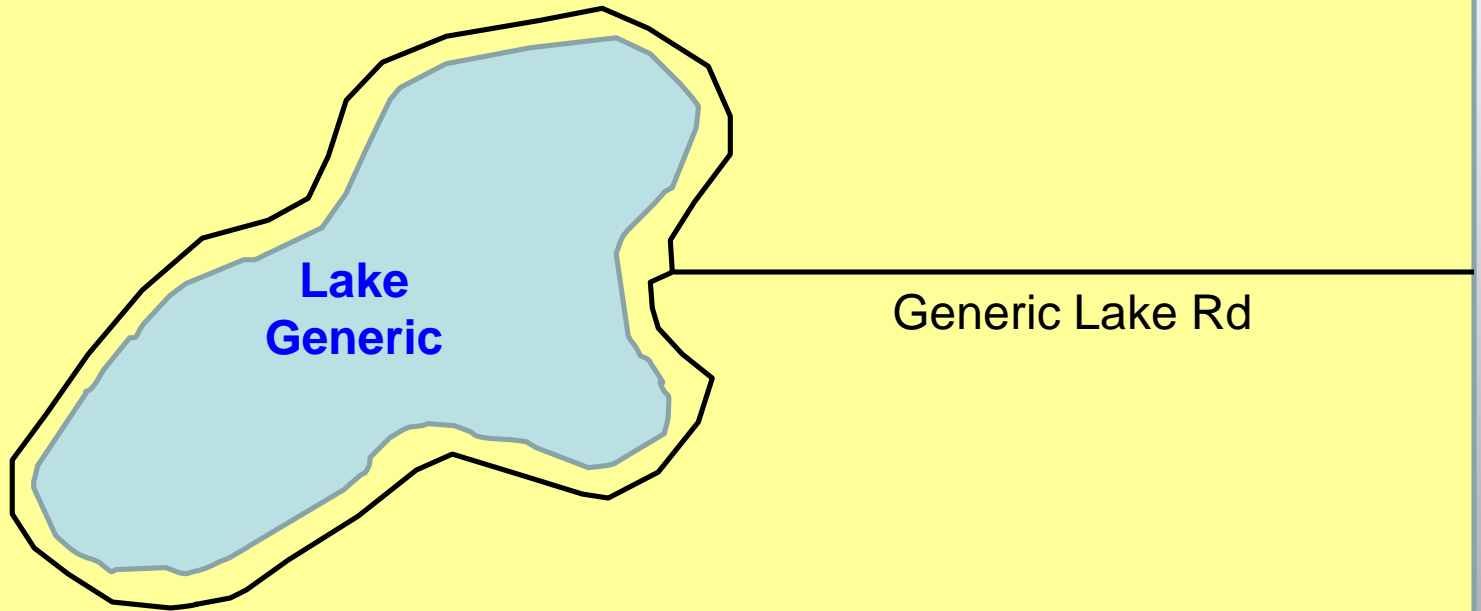


Invasion Progression and Detection Potential



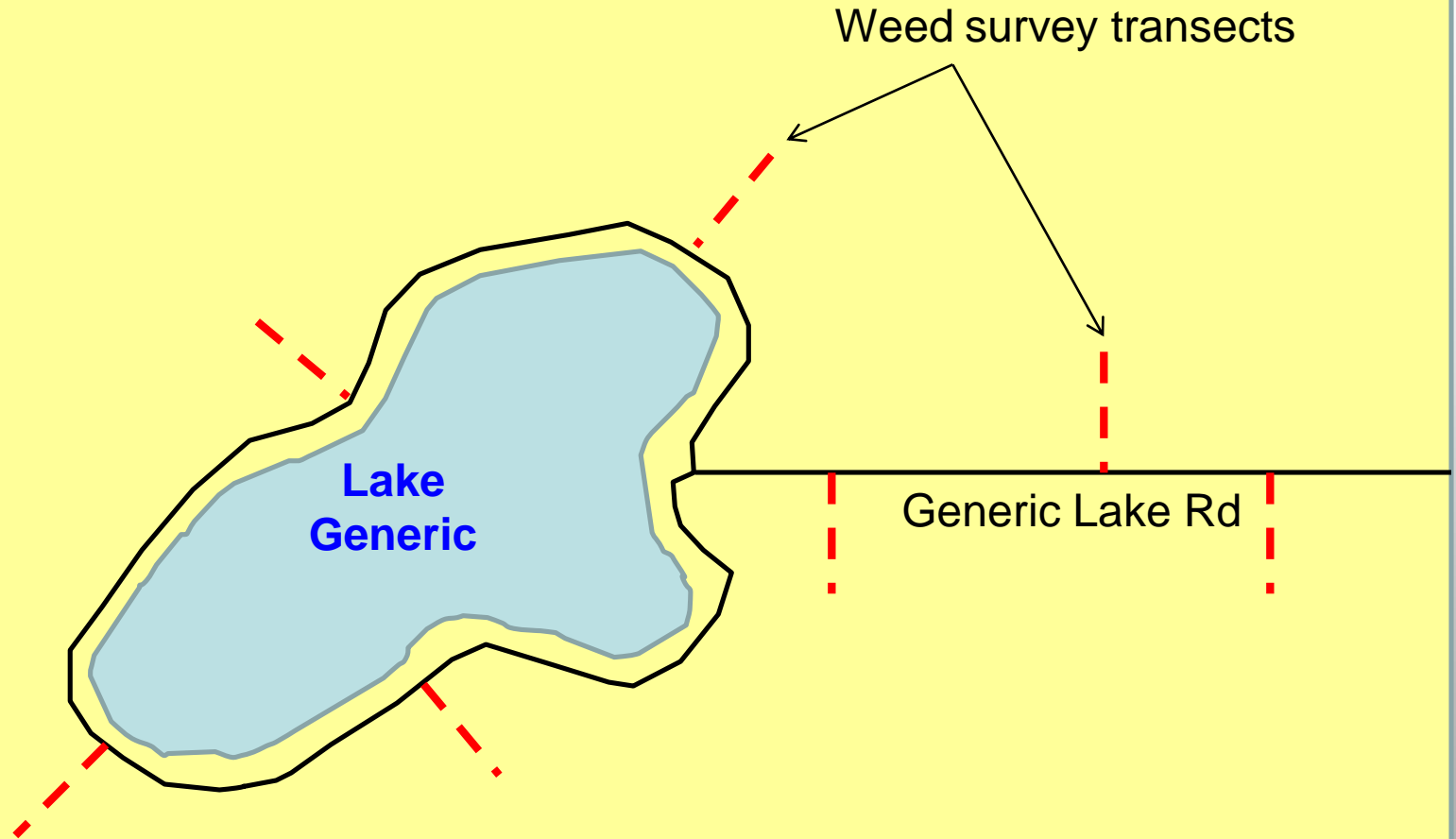
How can modelling improve detection?

Generic Lake NWR

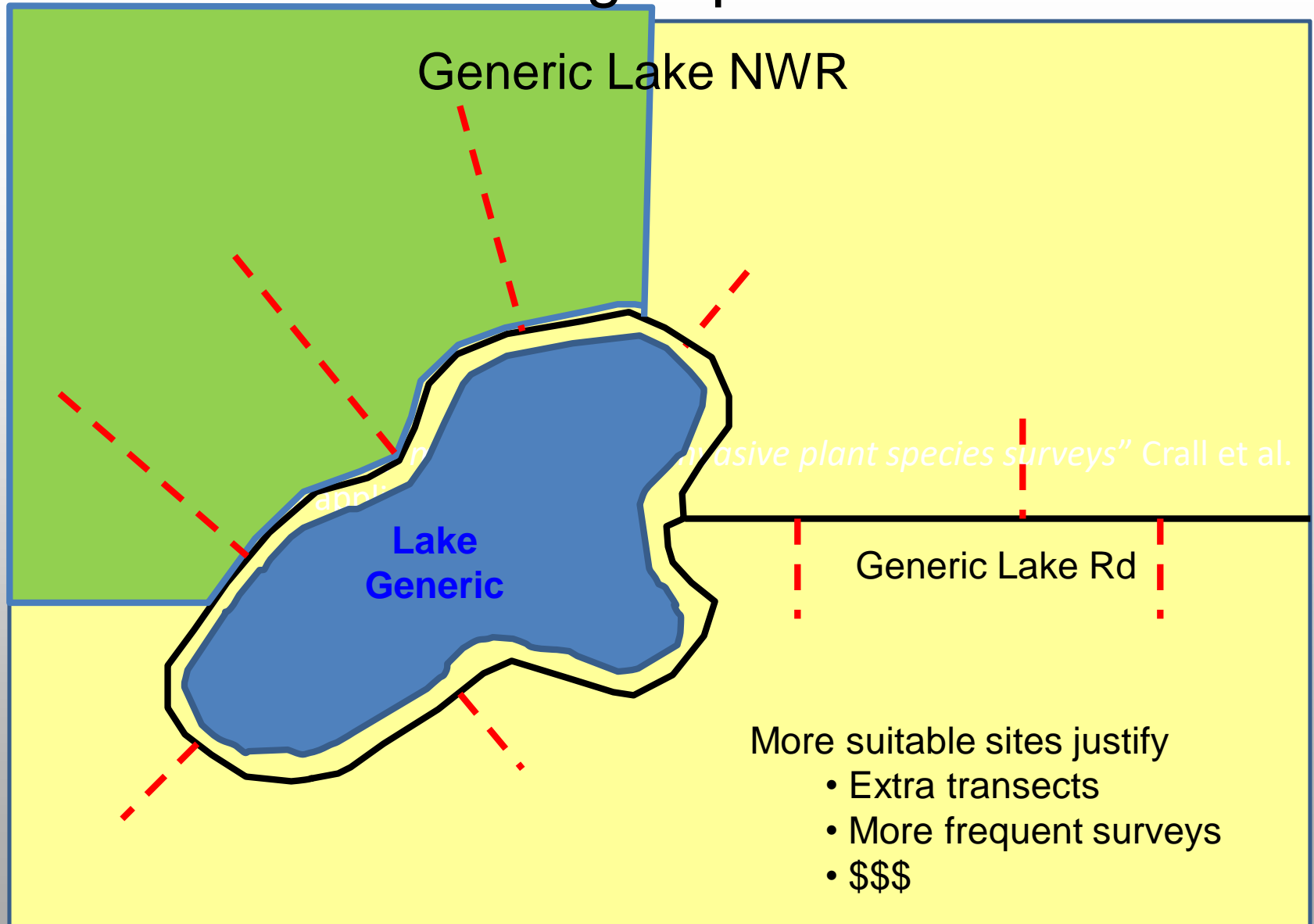


How can modelling improve detection?

Generic Lake NWR

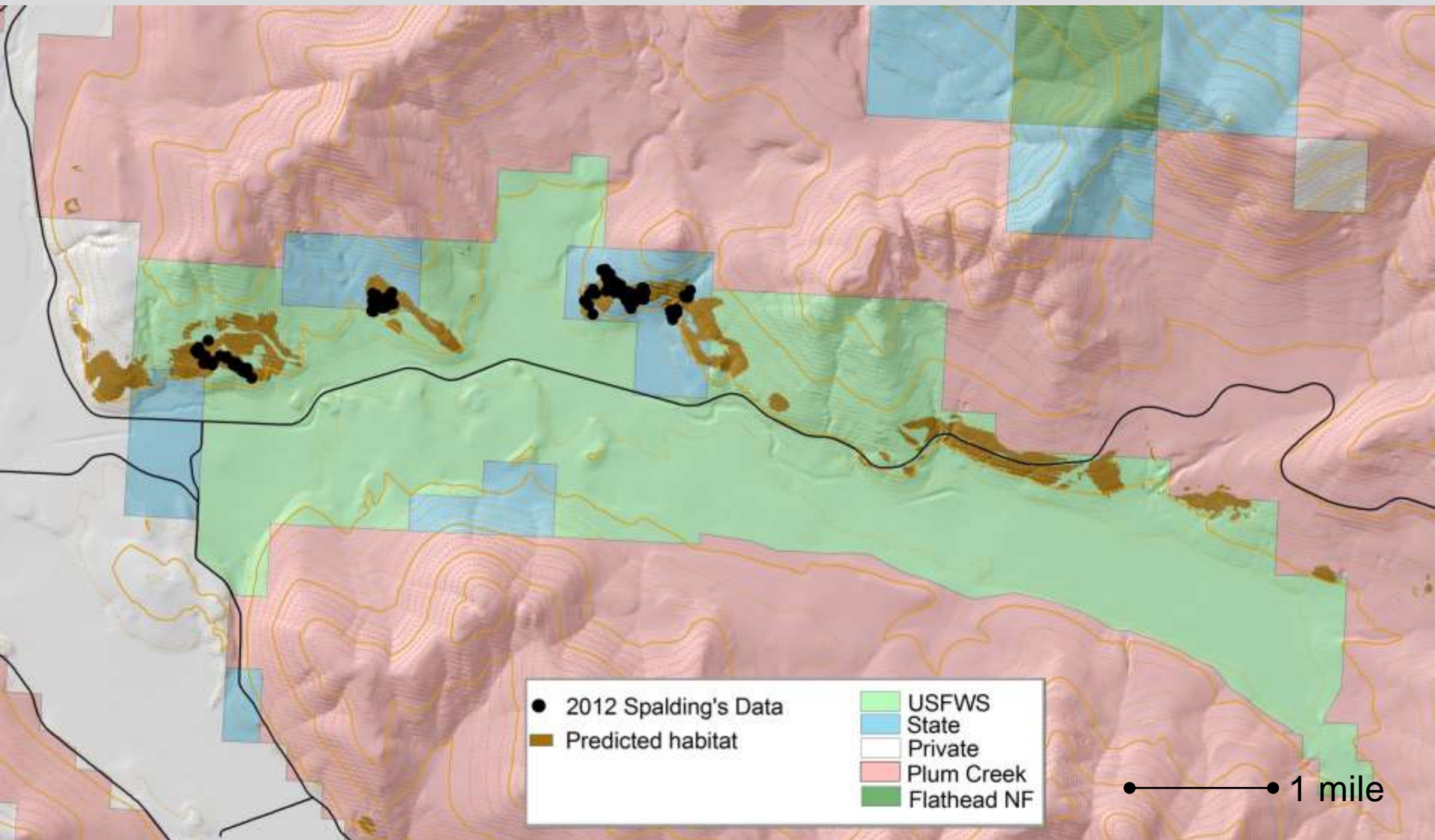


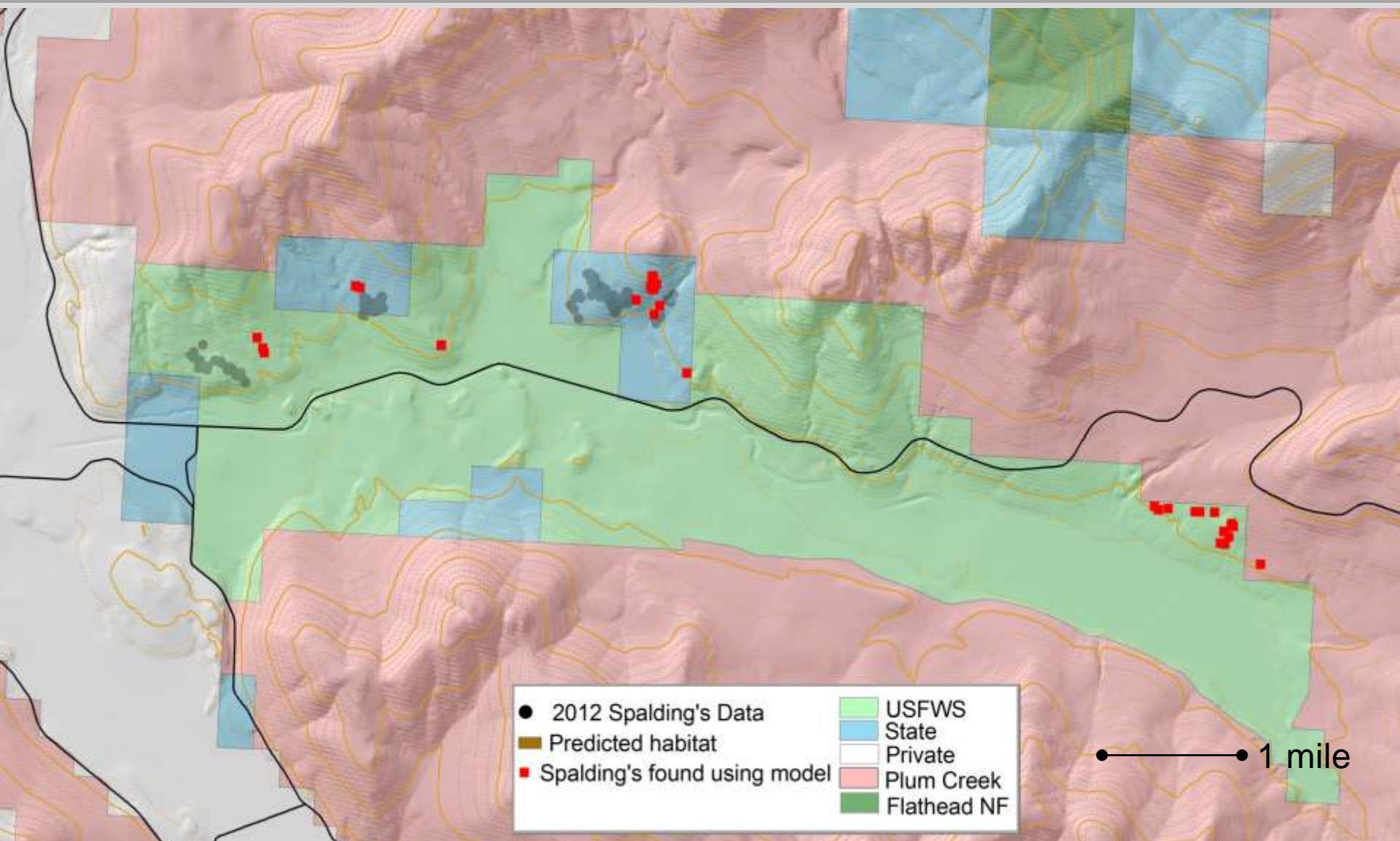
How can modeling improve detection?



"Using habitat suitability models to target invasive plant species surveys" Crall et al. 2013. in Ecological Applications.

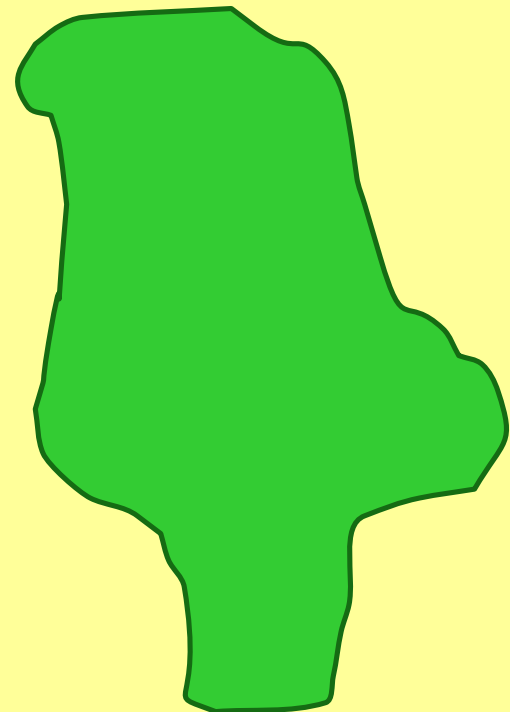
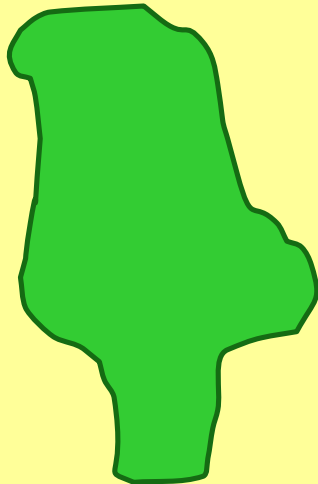






Two areas or management units

Which one more at risk of invasion?





Kulm Wetland Management District Leafy Spurge & Yellow Toadflax Habitat Suitability Model



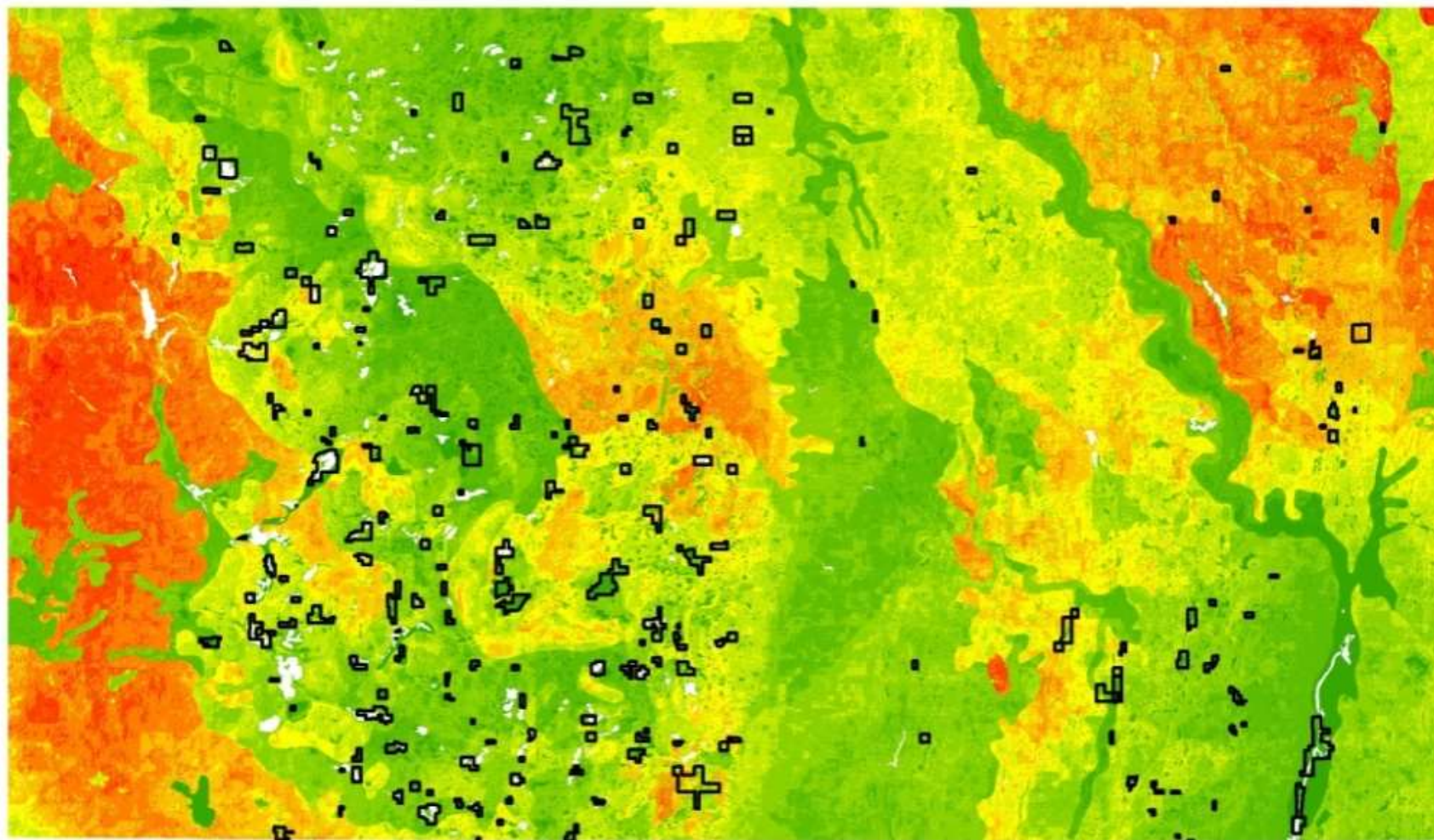


Kulm Wetland Management District

- Manages just over **45,000 acres of fee-title** lands with Waterfowl Production Areas (WPAs): **201 units**
- Oversees another **190,000+ acres** of privately-owned properties within the same landscape
 - Wetland Easements: 1,729 contracts protecting 121,540 acres.
 - Grassland Easements: 190 contracts protecting 64,551 acres
 - Three Easement and small fee National Wildlife Refuges (NWRs) totaling 4,152 acres.
 - Farmers Home Administration (FmHA) Conservation Easements: 30 contracts protecting 4,130 acres



Kulm WMD North Dakota



Risk of Invasion
Leafy spurge

Low

High



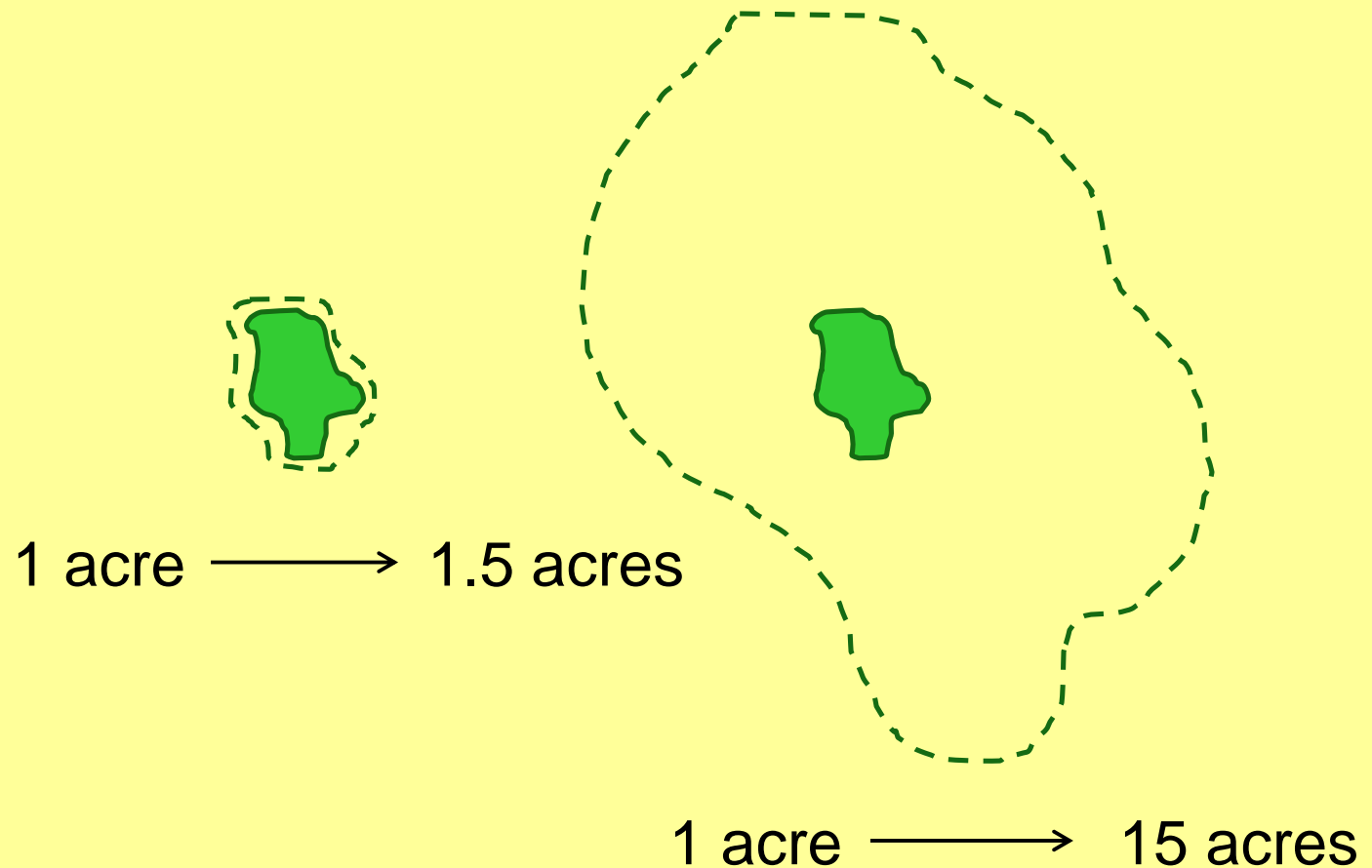
0

10

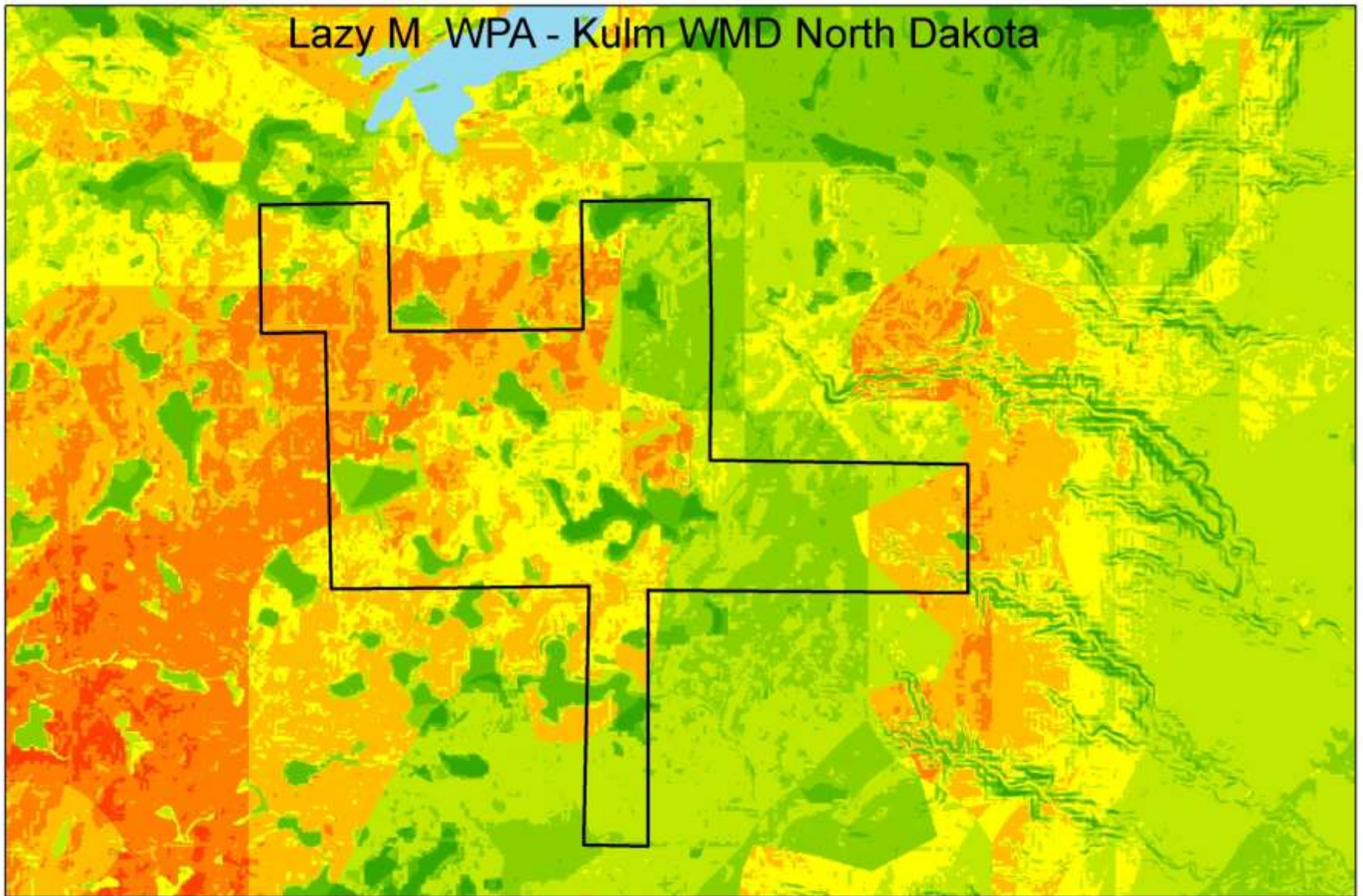
20 Miles



Knowing Risk or Potential for Spread



Lazy M WPA - Kulm WMD North Dakota

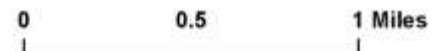


Risk of Invasion
Leafy spurge

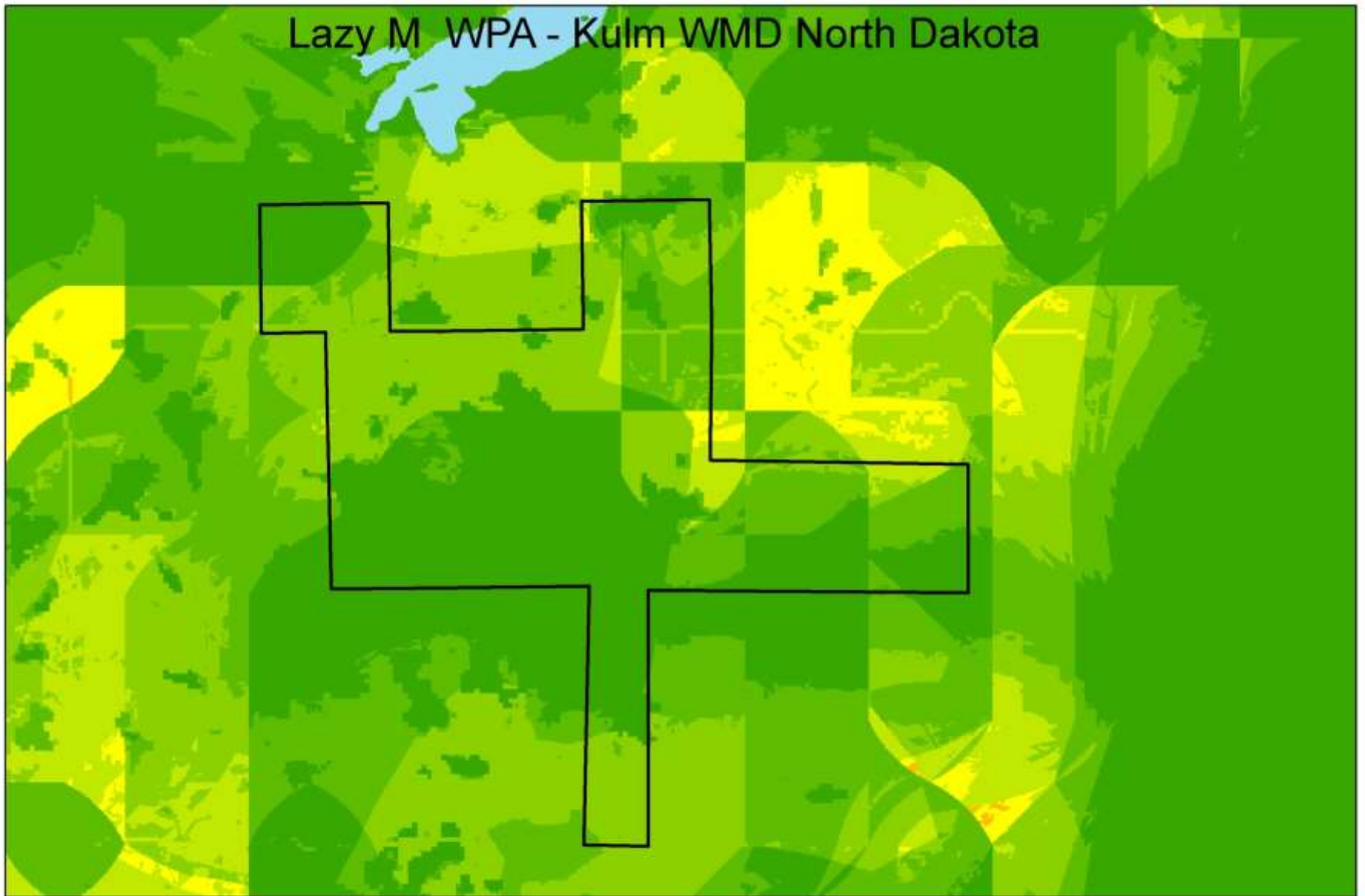
Low



High



Lazy M WPA - Kulm WMD North Dakota

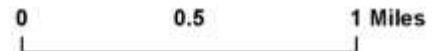


**Risk of Invasion
Yellow toadflax**

Low



High

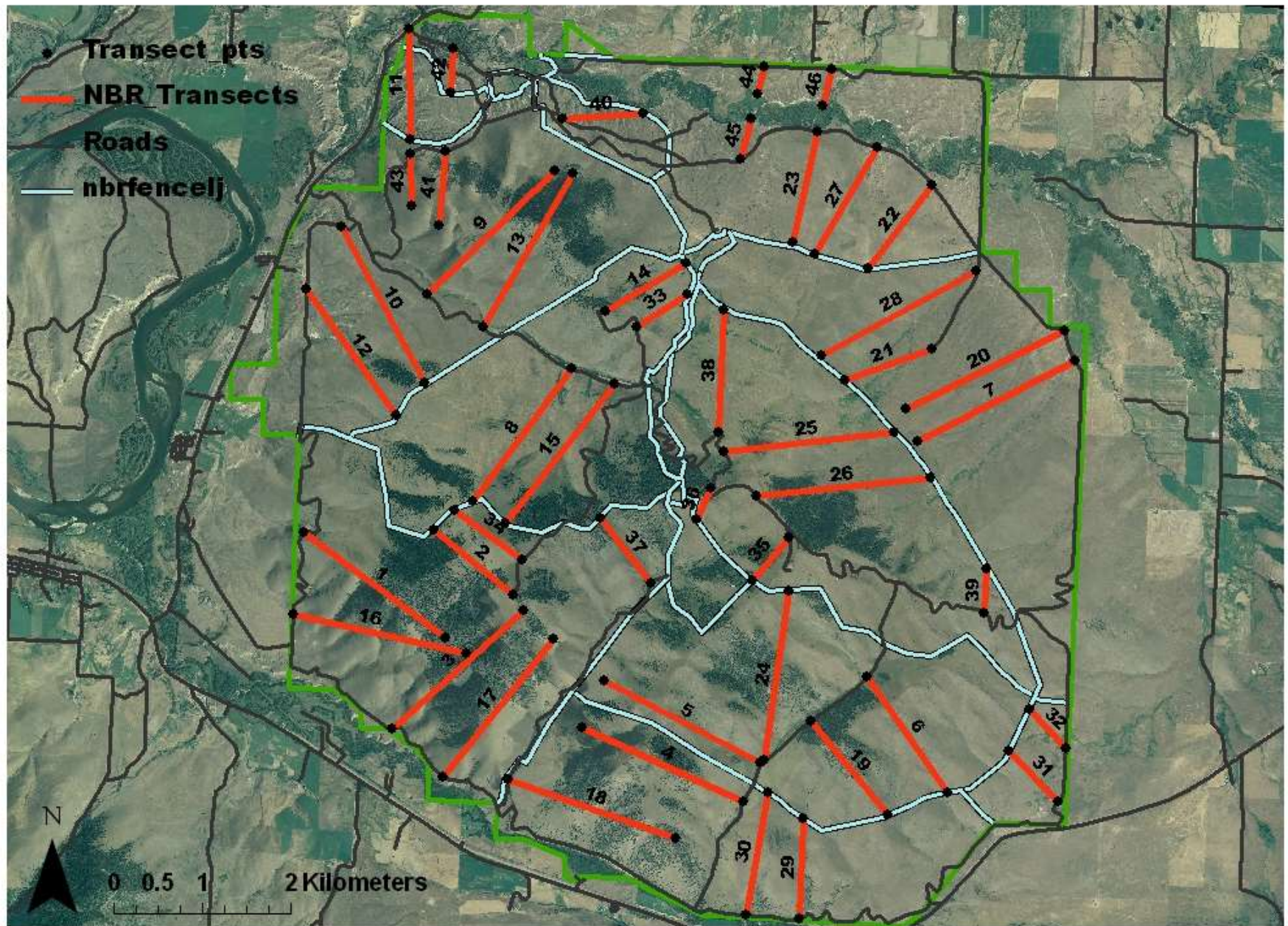




National Bison Range – All Noxious Weeds



National Bison Range Inventory Project-Transect Map

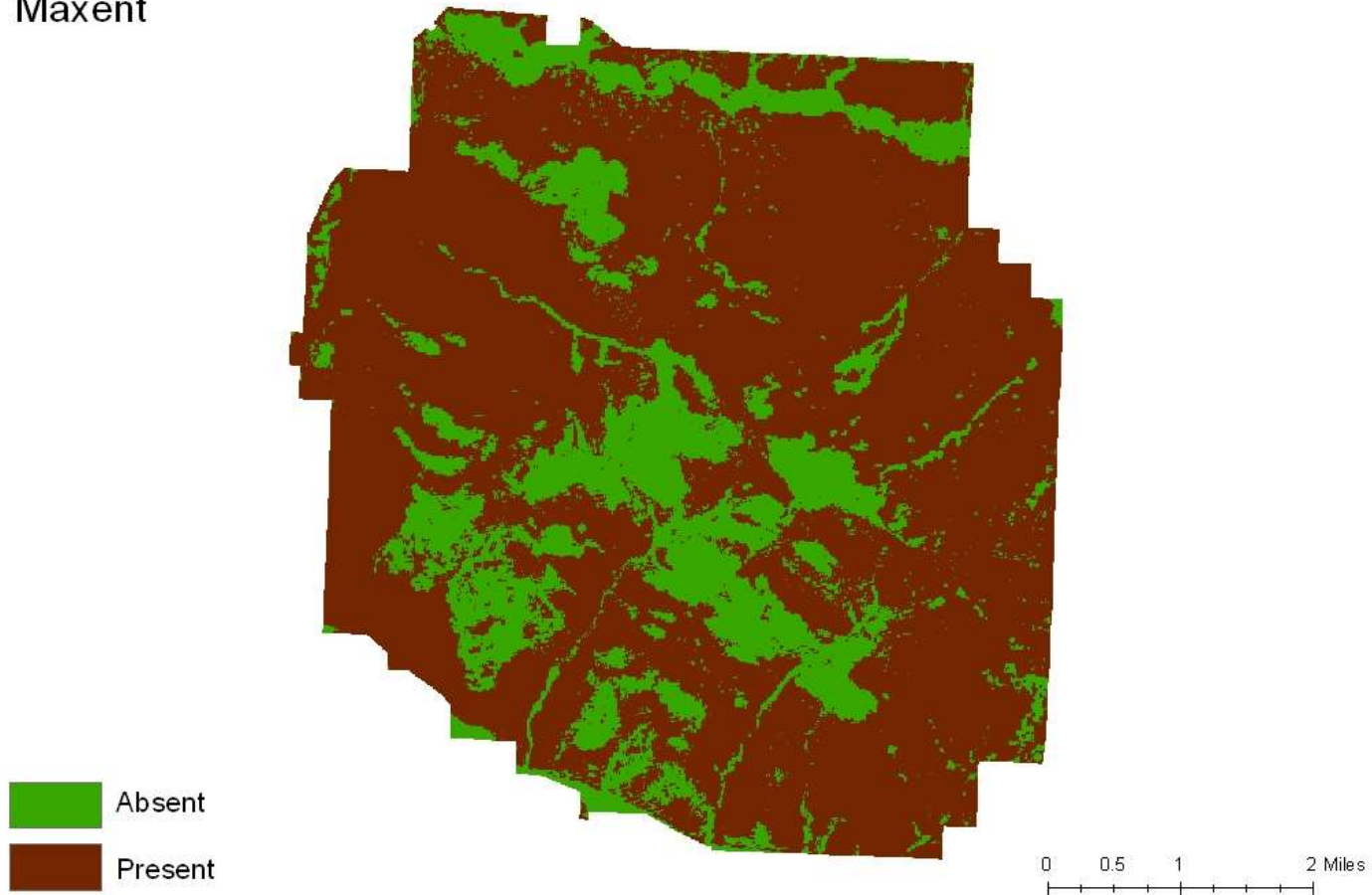




National Bison Range

Dalmatian Toadflax

Maxent

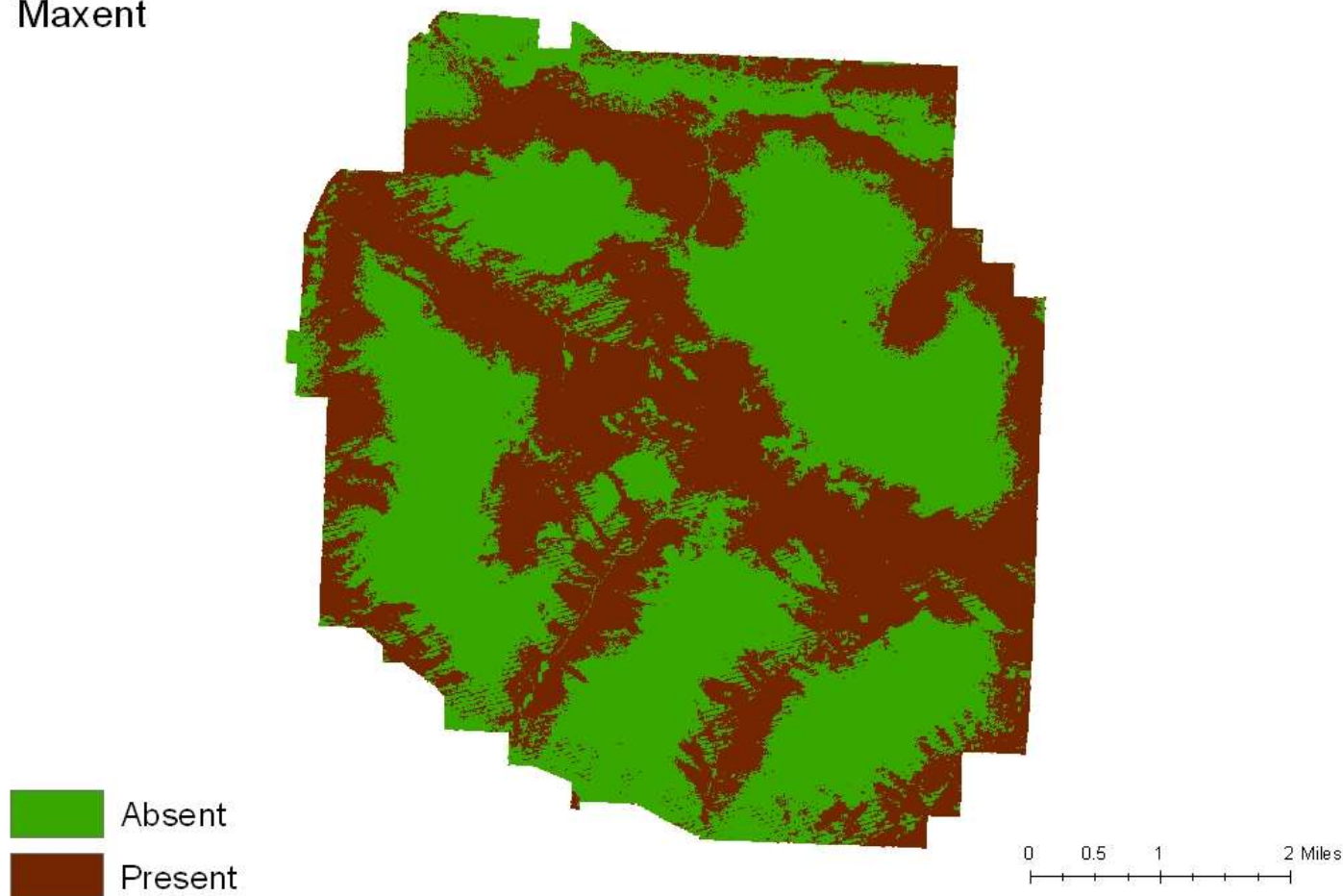




National Bison Range

Spotted Knapweed

Maxent



Species as completed by USGS
FORT utilizing the Software for
Assisted Habitat Modeling

Species of interest

Medusahead

Choose your agency of interest, then
select from the drop down:

✓ BLM Districts

✓ EPMT

✓ FWS

✓ NPS

✓ U.S. Counties

Start typing the name of a
management area

FWS: Browns Park NWR

Display Occurrence Points?

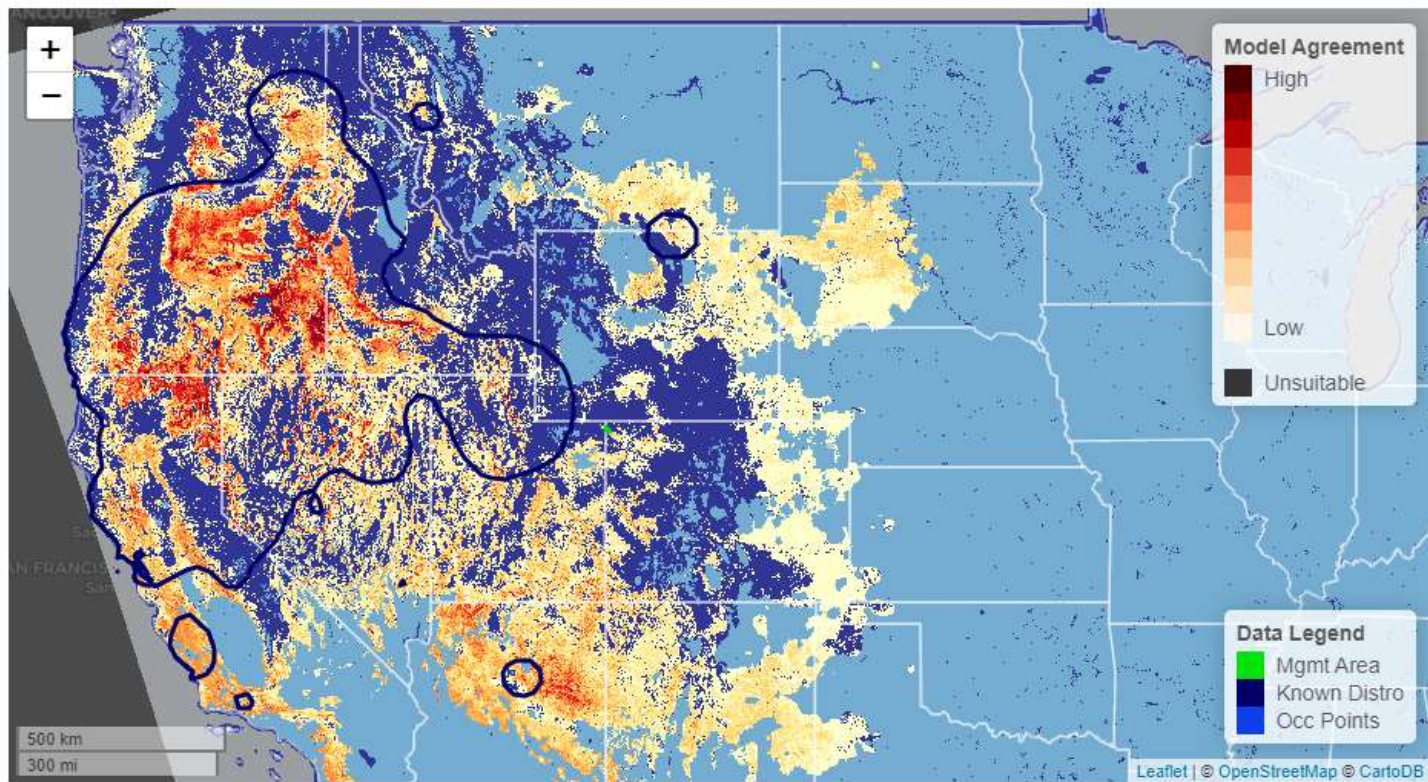
☐ yes

☒ no

If 'yes', the map will display the
occurrence points used to build the
model.

Choose your model threshold:

browns arapahoe....docx



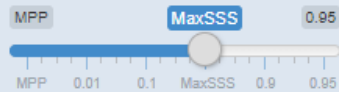
Display Occurrence Points?

☐ yes

☒ no

If 'yes', the map will display the occurrence points used to build the model.

Choose your model threshold:



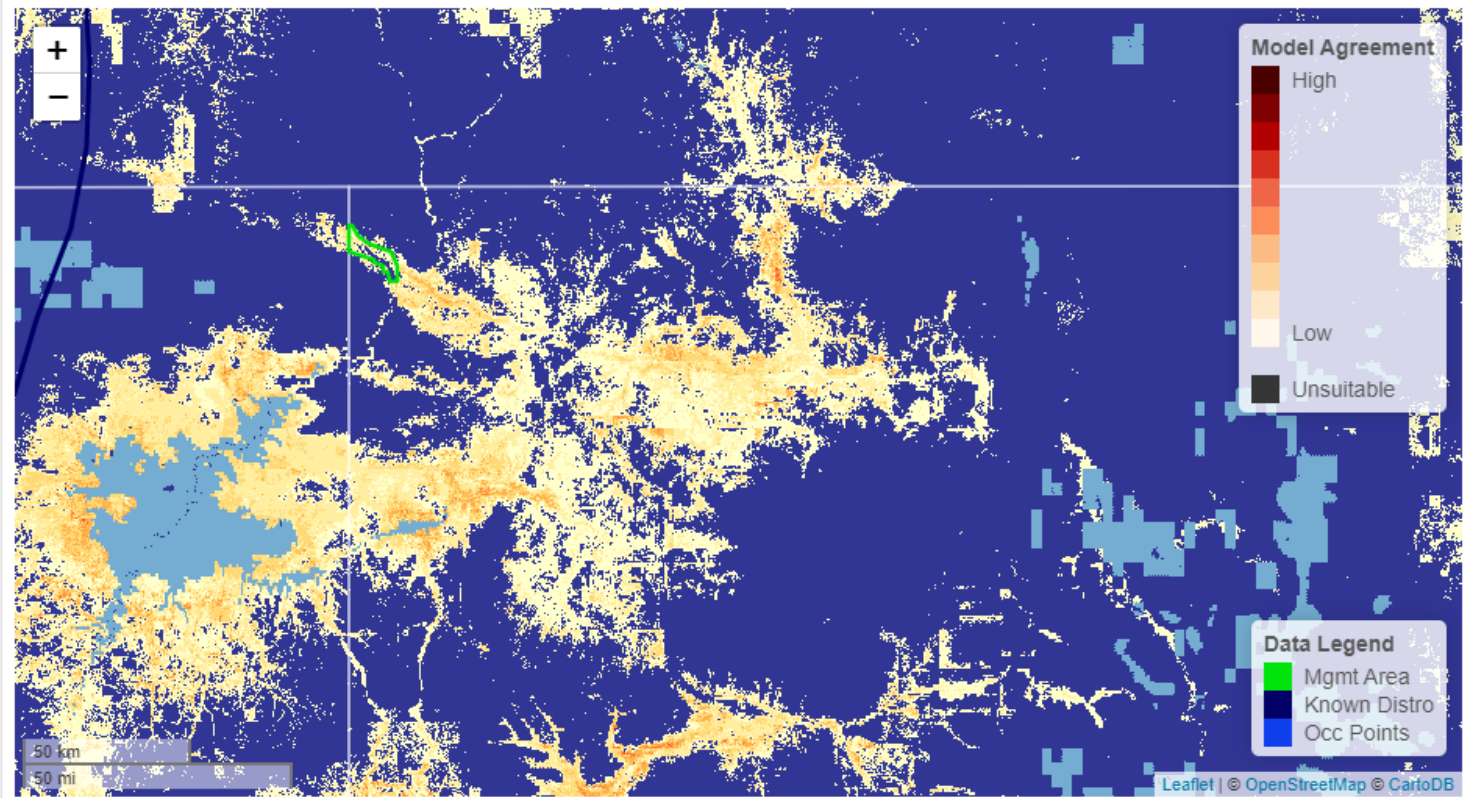
Lower values represent model results that are more inclusive. Higher values restrict the map output to areas where model confidence is higher. *MPP* represents the minimum presence threshold detected by the model. *MaxSSS* represents the optimal balance between accurate occurrences (sensitivity) and non-occurrences (specificity).

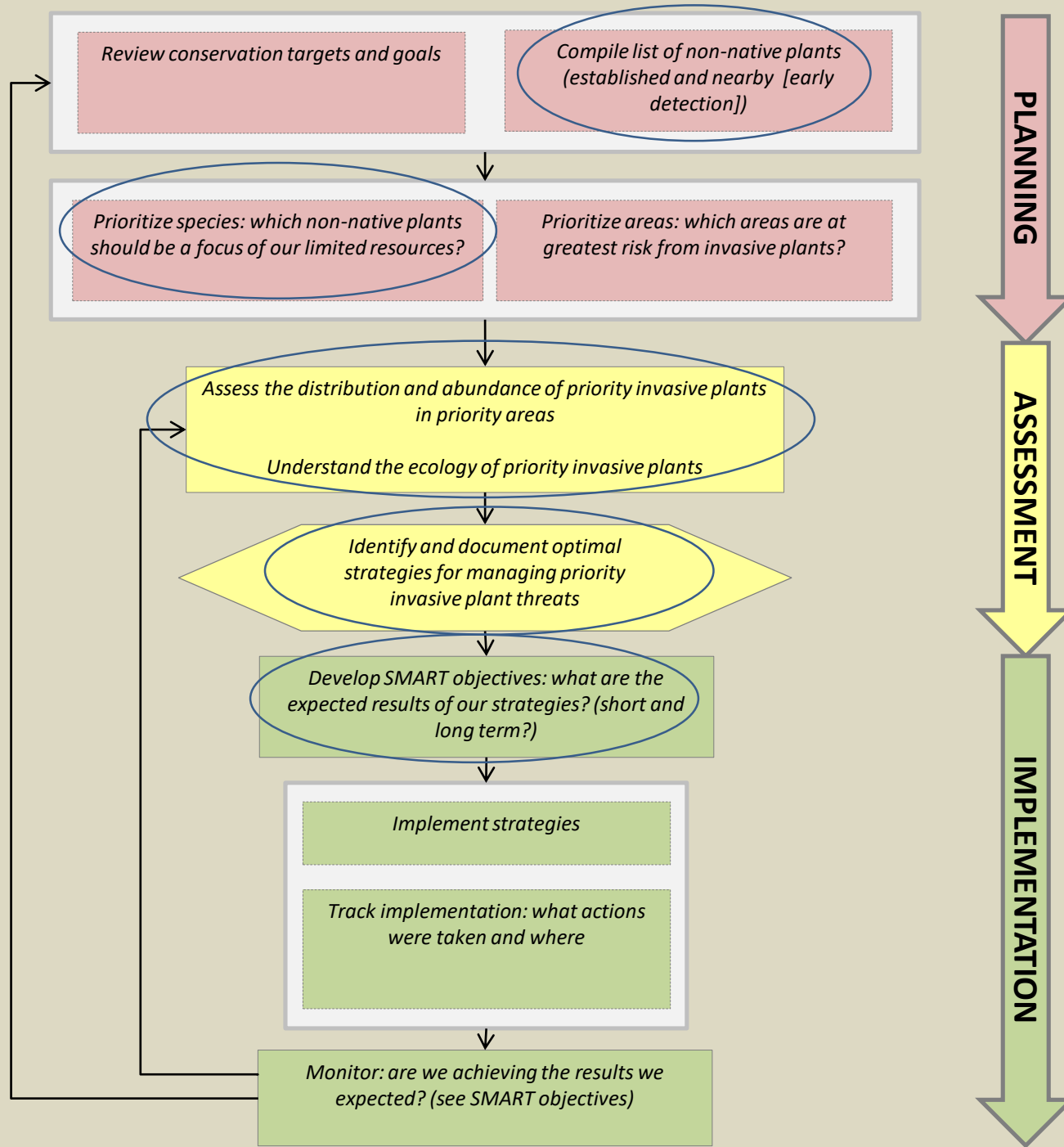
Restrict model extrapolation?

☒ yes

☐ no

If 'yes', the map will only display areas where environmental characteristics are inside the range of the values used





Contact Info

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