PhragNet: CROWDSOURCING PHRAGMITES MANAGEMENT DATA

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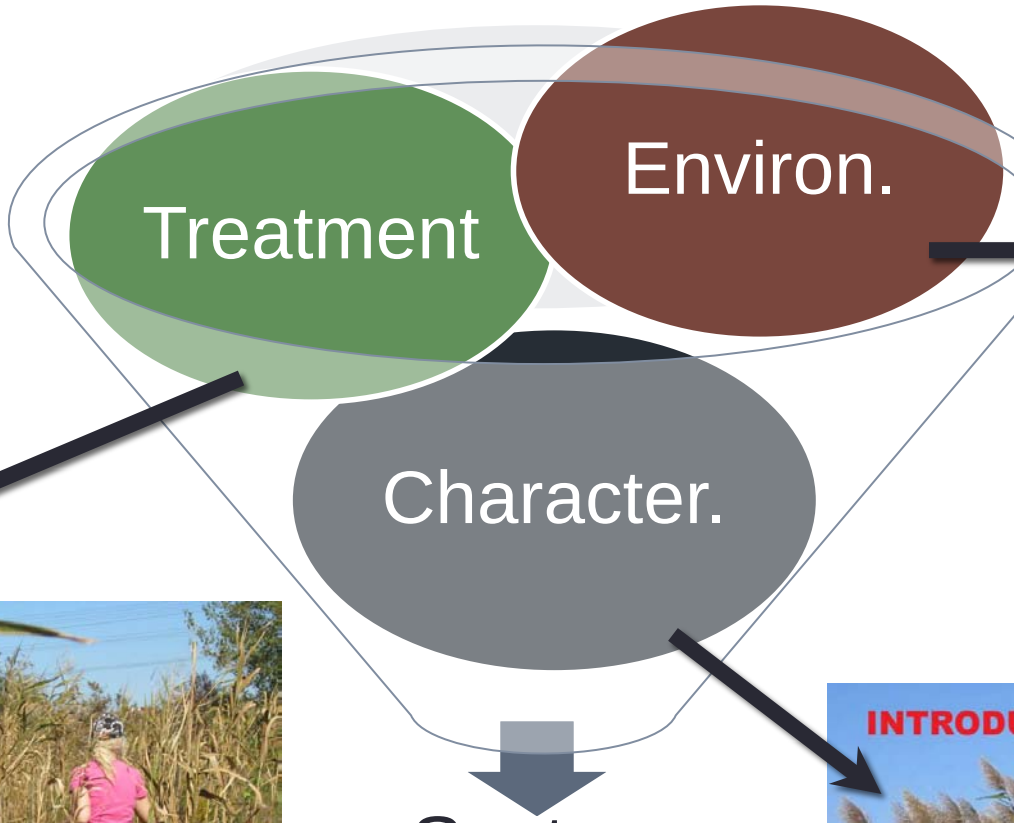
CHICAGO BOTANIC GARDEN

Background

- What is PhragNet?
  - Collaborative effort to improve *Phrag* management
  - Reduce uncertainties

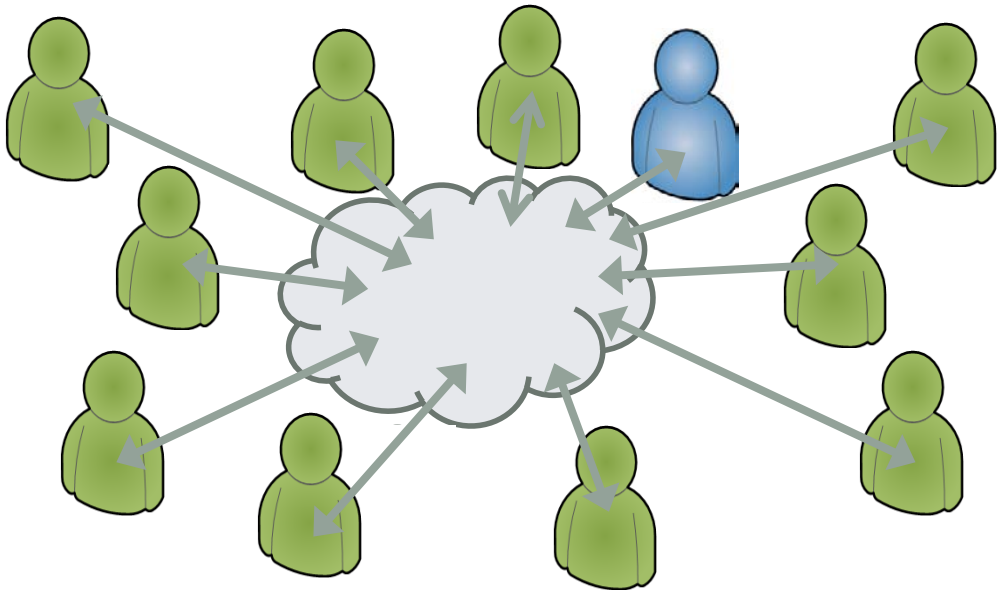
Price et al., Ecology of native vs. exotic *Phragmites australis* (common reed) in Chicago-area wetlands. Biological Invasions.



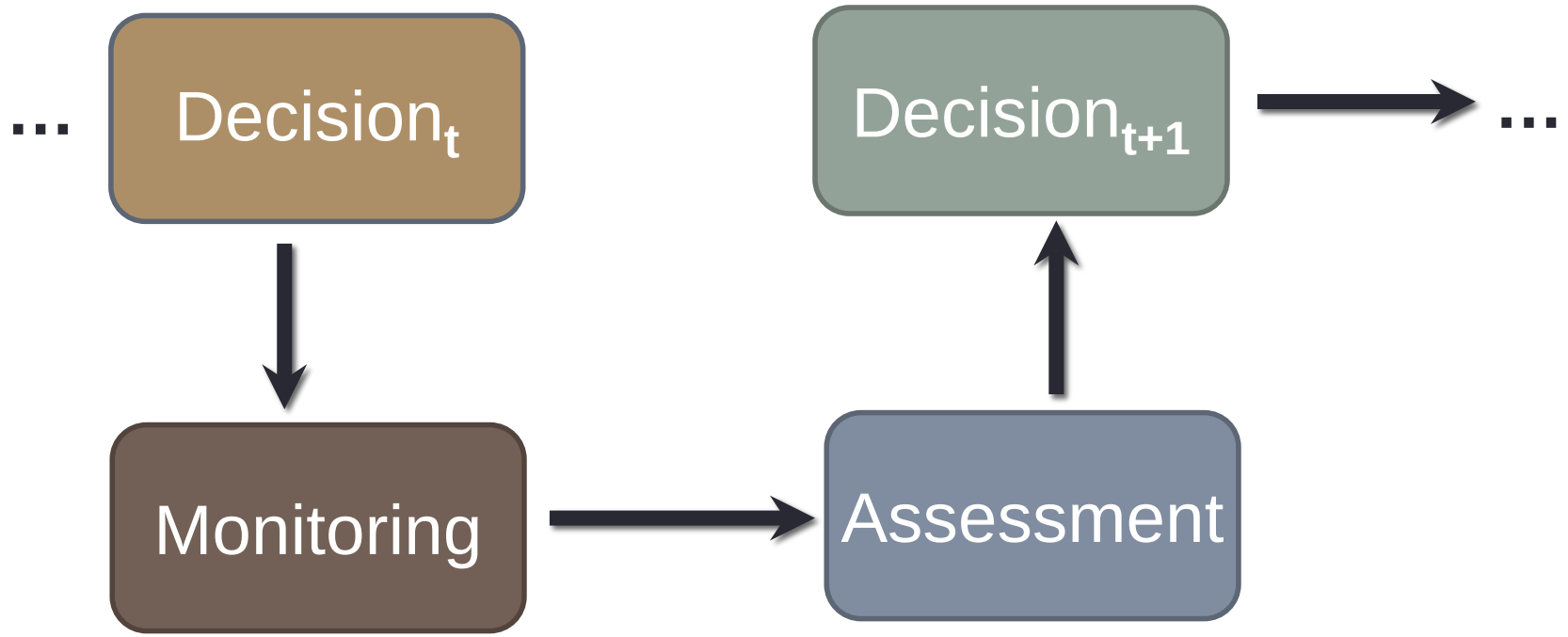
System State

Objectives

- Use Adaptive Management (AM) to ID effective treatment(s)
- Develop learning **network**
  - Professionally-diverse
  - Great Lakes focus
  - Repetition



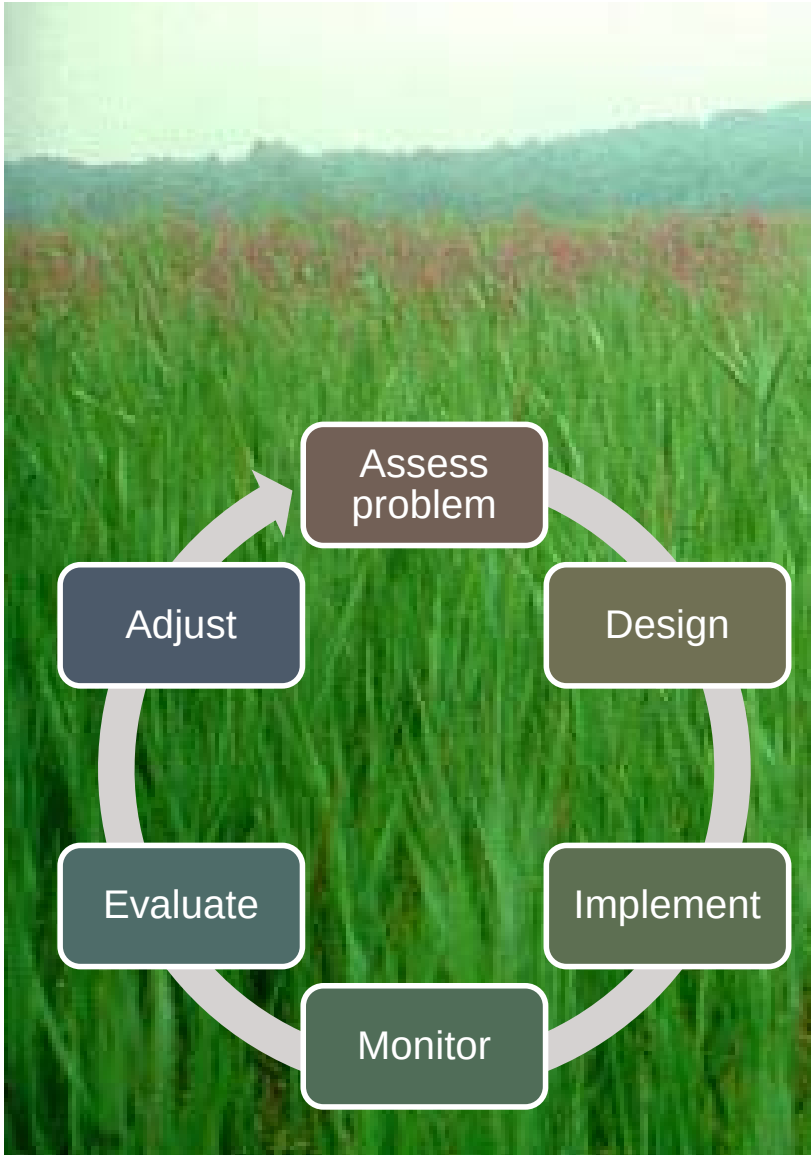
AM Sequence



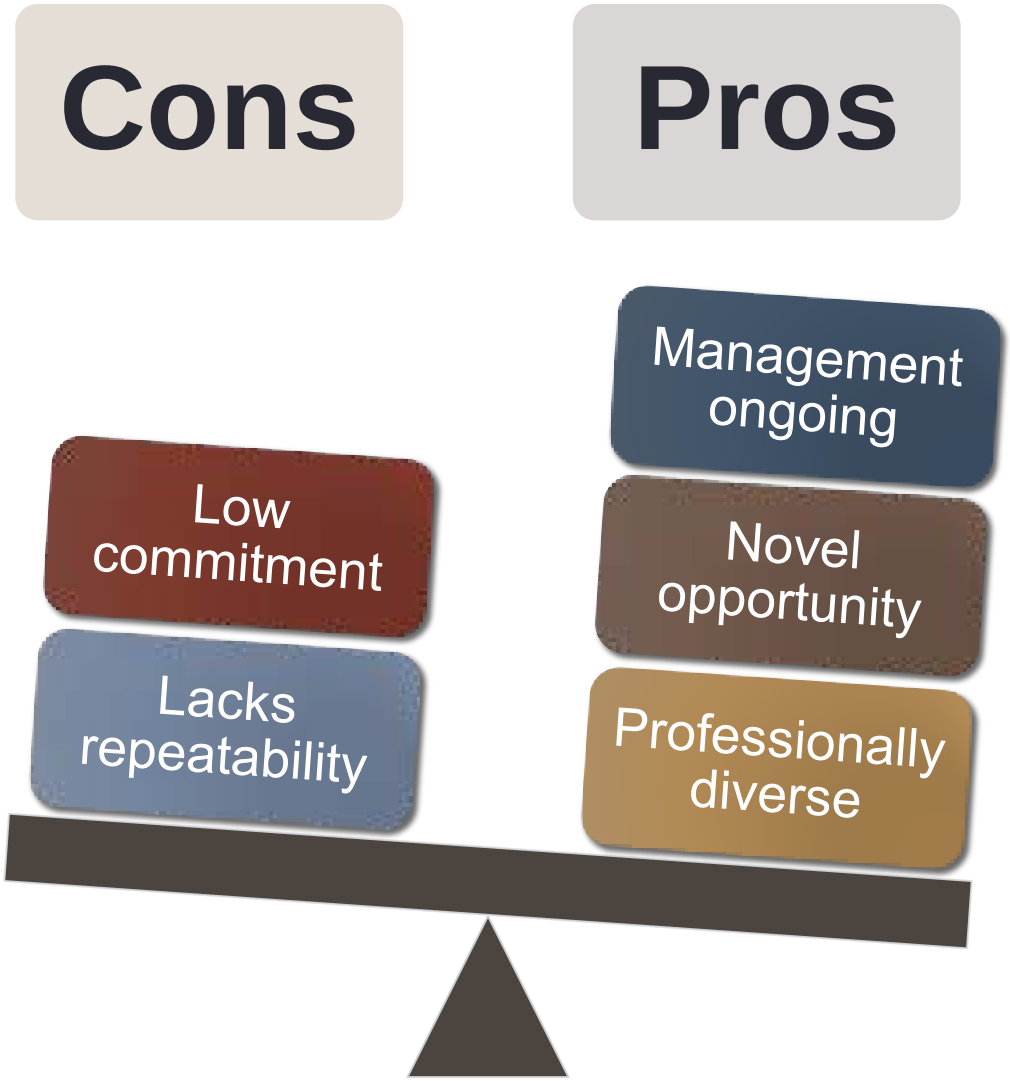
- Objectives guide decisions at each time (t)
- Monitoring tracks system responses
- Combine new info with previously collected info → model
- Adjust decisions based on that improved understanding

AM Criteria

- Critical uncertainty
  - If I knew the true state, would it affect my actions?
- A way to predict outcomes for different actions
  - Models represent hypotheses
- A way to test those predictions
  - Focused monitoring

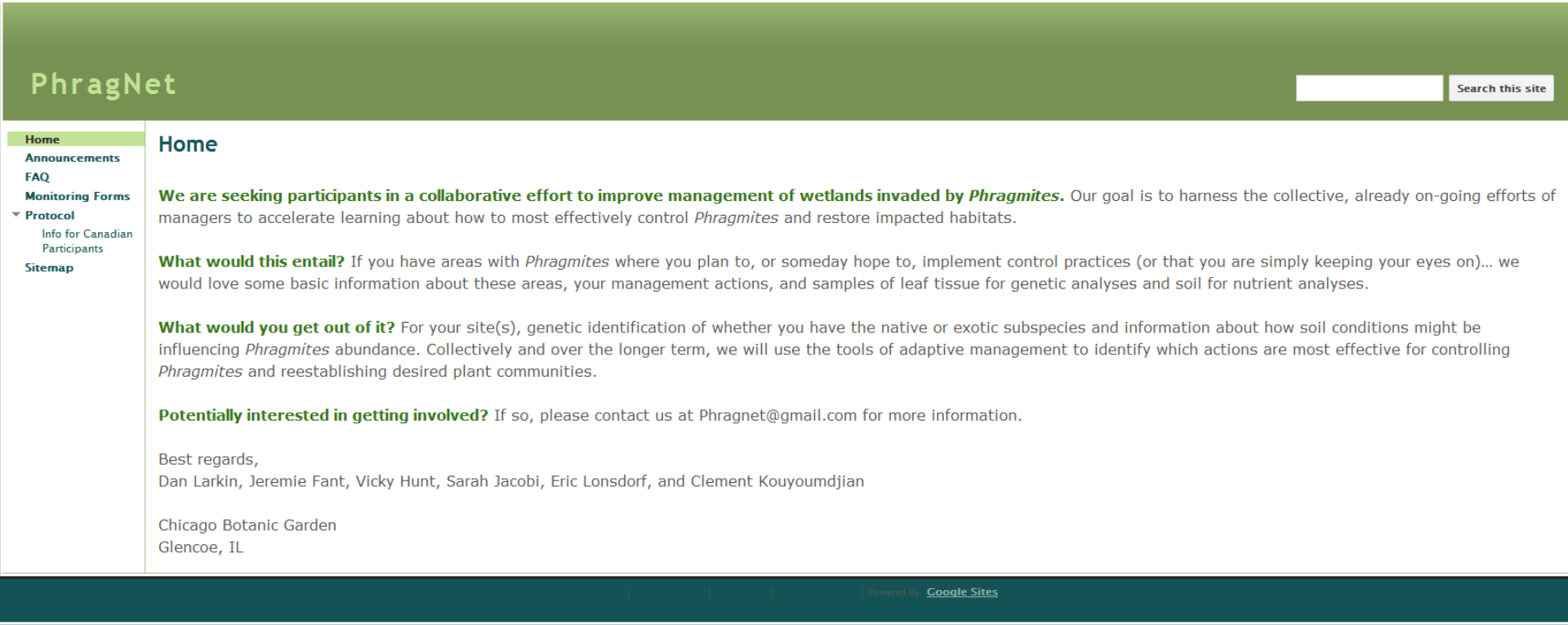


Communication - Crowdsourcing

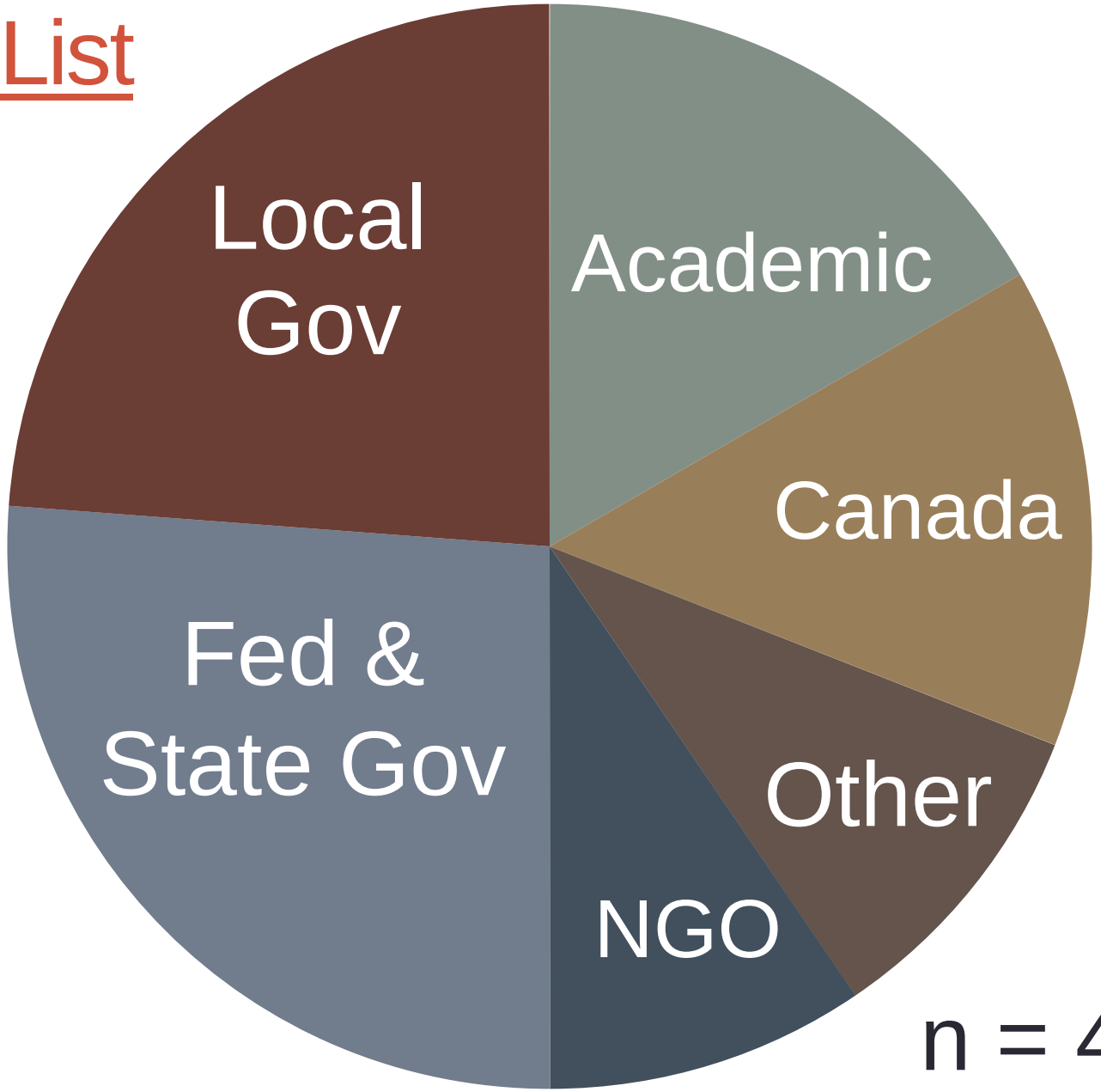


Communication Hub

https://sites.google.com/site/phragmitesnet/



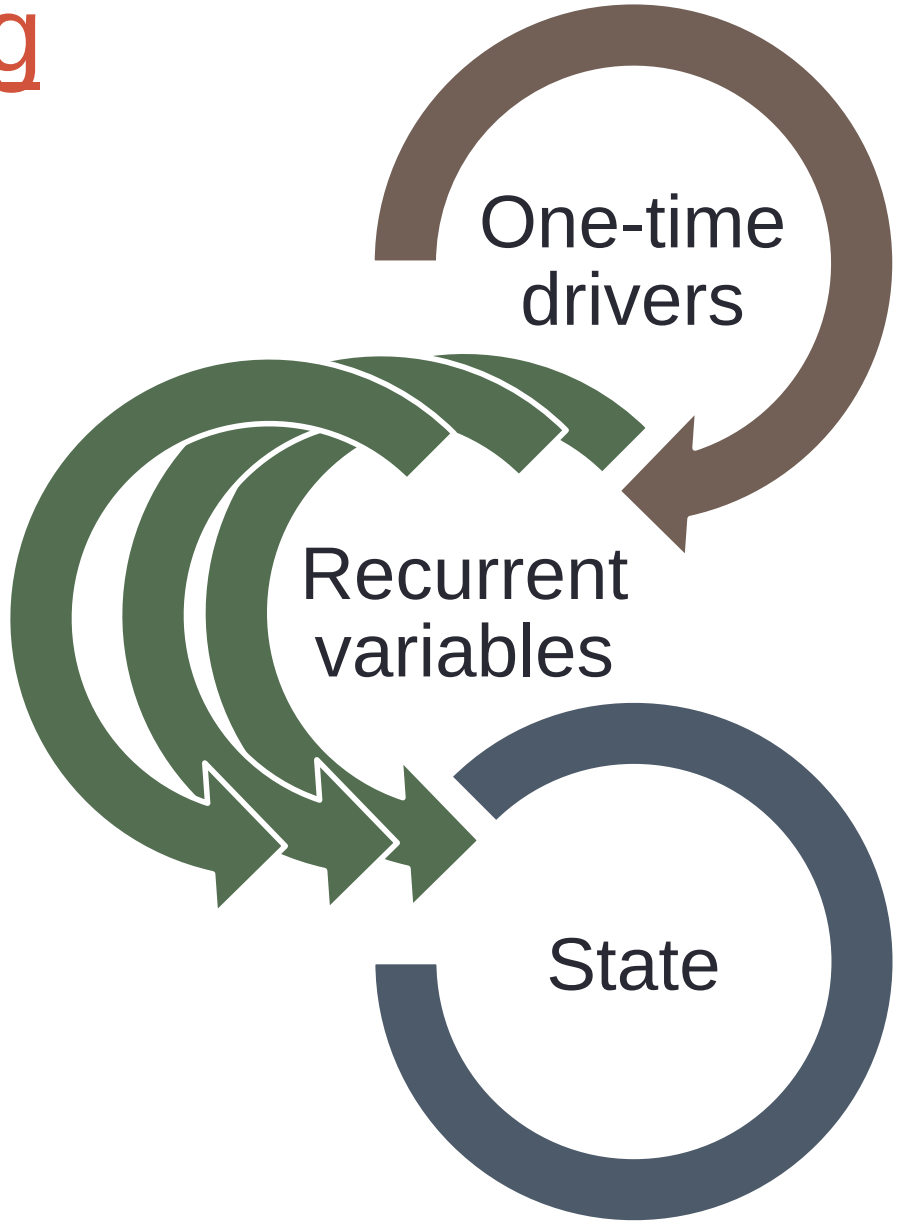
Mailing List



n = 43

Monitoring

- Patch size
- Cover
- Native sp.
- Invasive sp.



- Location
- Hydrology
- Soil
- Genetics

Monitoring Protocol

Importance

- Participation
- Momentum
- System state

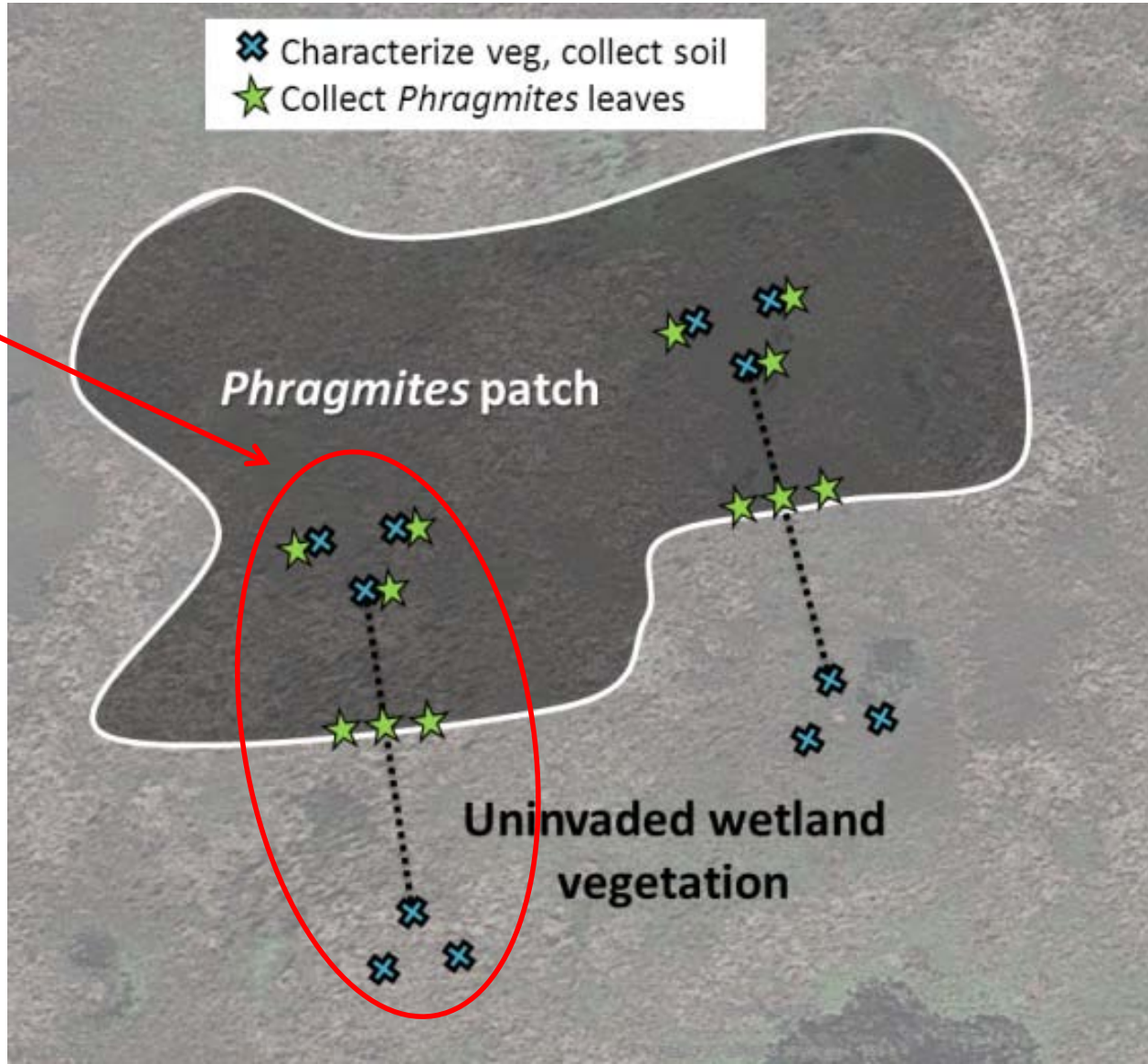
Characteristics

- Accessible
- Rapid
- User-friendly
- Scalable
- Flexible

One time Drivers

Soil

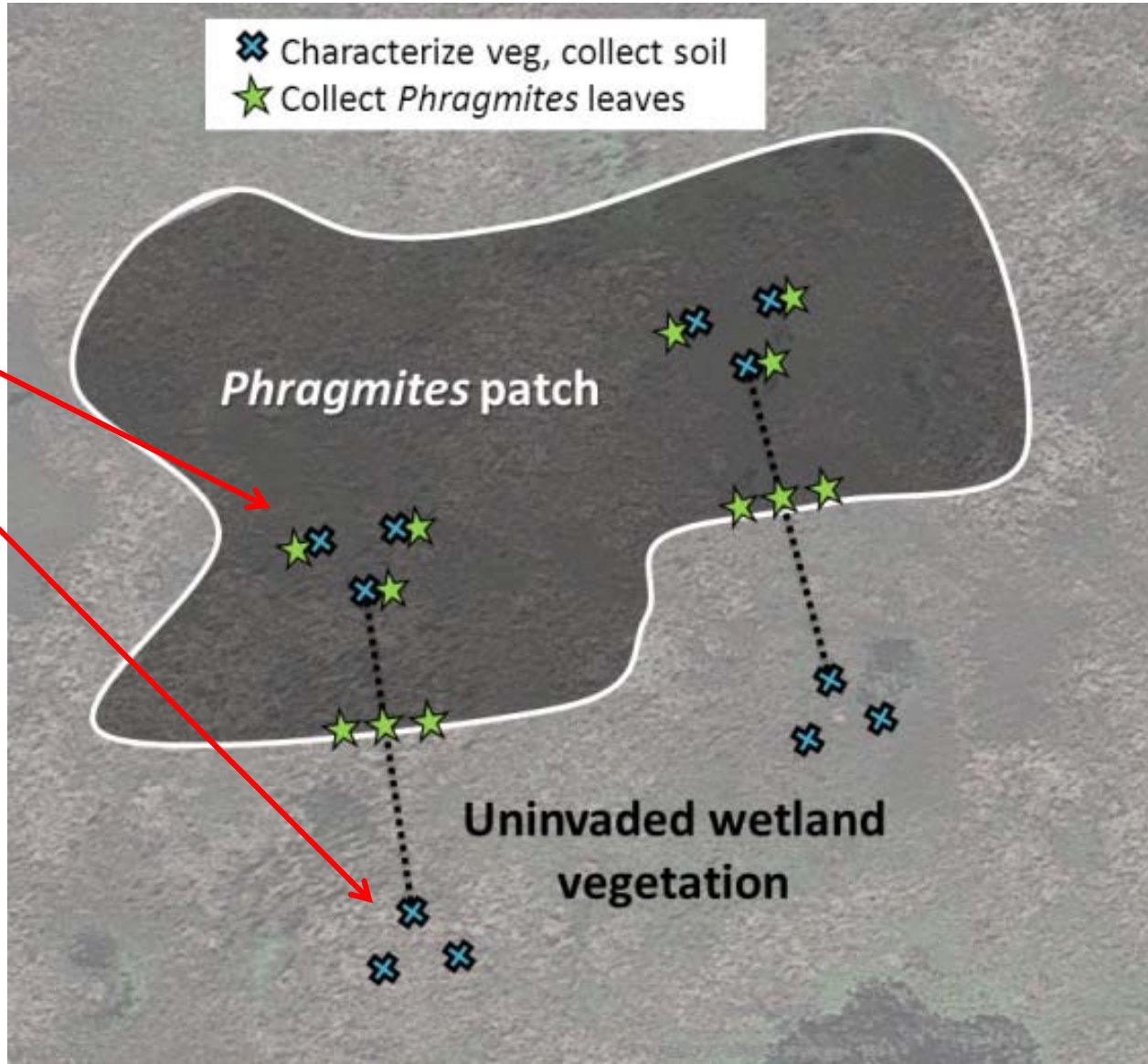
- Transect



One time Drivers

Soil

- Samples



One time Drivers

Soil

Sample

- 3 tbs soil from 10 cm depth
- Ziplock bag
- Mail to CBG lab

Nutrients

- Ammonium
- Nitrate
- Phosphorous

Physical characteristics

- % moisture
- Electrical conductivity

One time Drivers

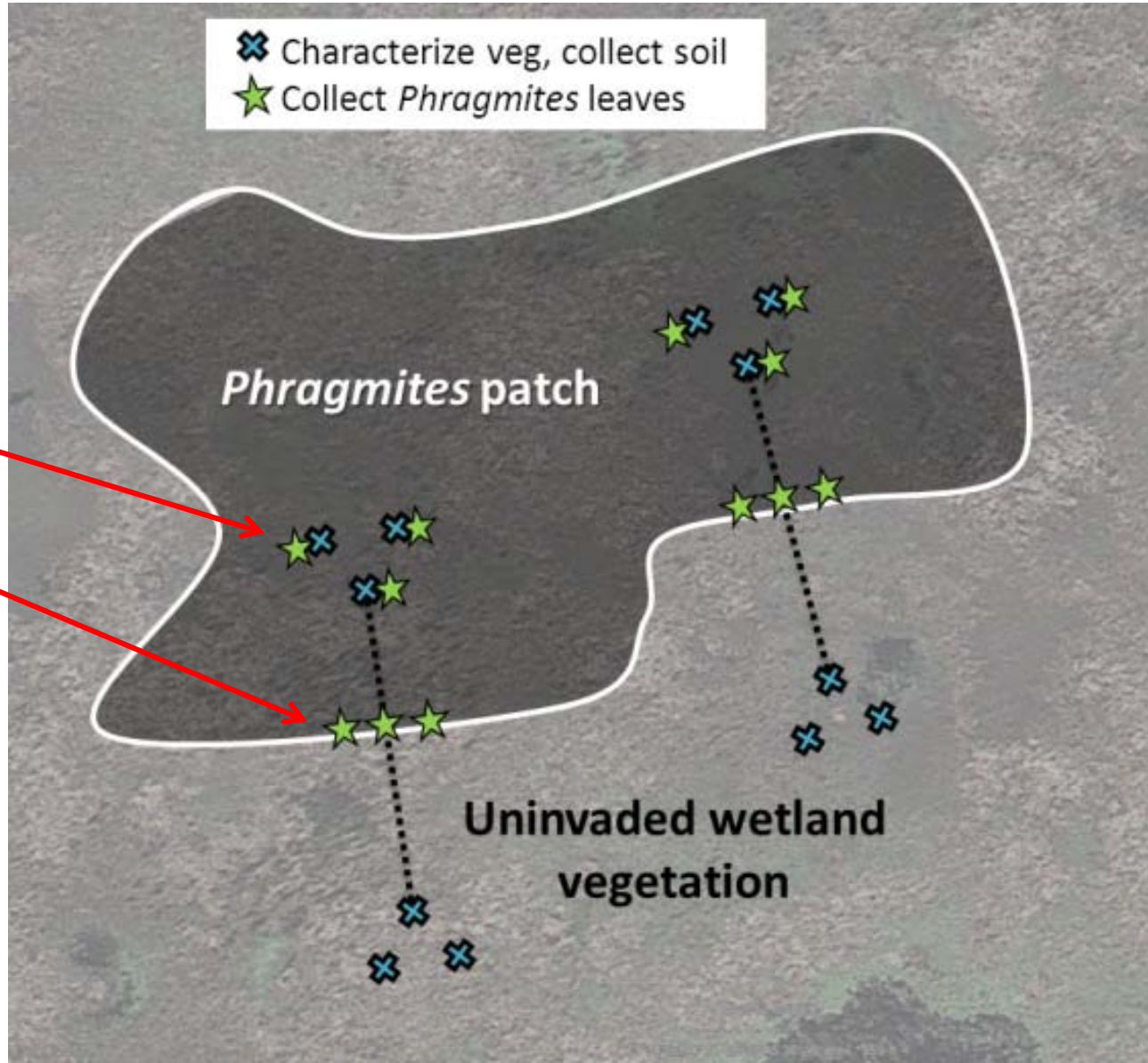
Soil: Preliminary results

- Paired t-test: no significant differences
- Variation, outliers
- Labeling…

One time Drivers

Genetics

- Samples
  - Interior
  - Edge



One time Drivers

Genetics

Sample

- Leaves from 3 *phrag* stems
- Ziplock bag
- Mail

Genotype

- CBG lab
- 10 microsat.
- Saltonstall (2002, 2003)

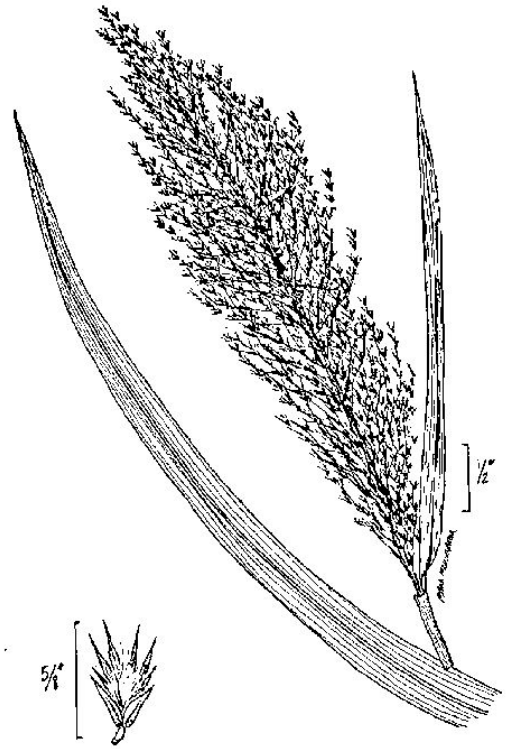
Analyze

- Subsp. ID
- Native or exotic
- Variation

One time Drivers

Genetics – Preliminary Results

- Perk of participation
- 100% genotyped samples identified as exotic subsp.
- Invasive is “bad apple”

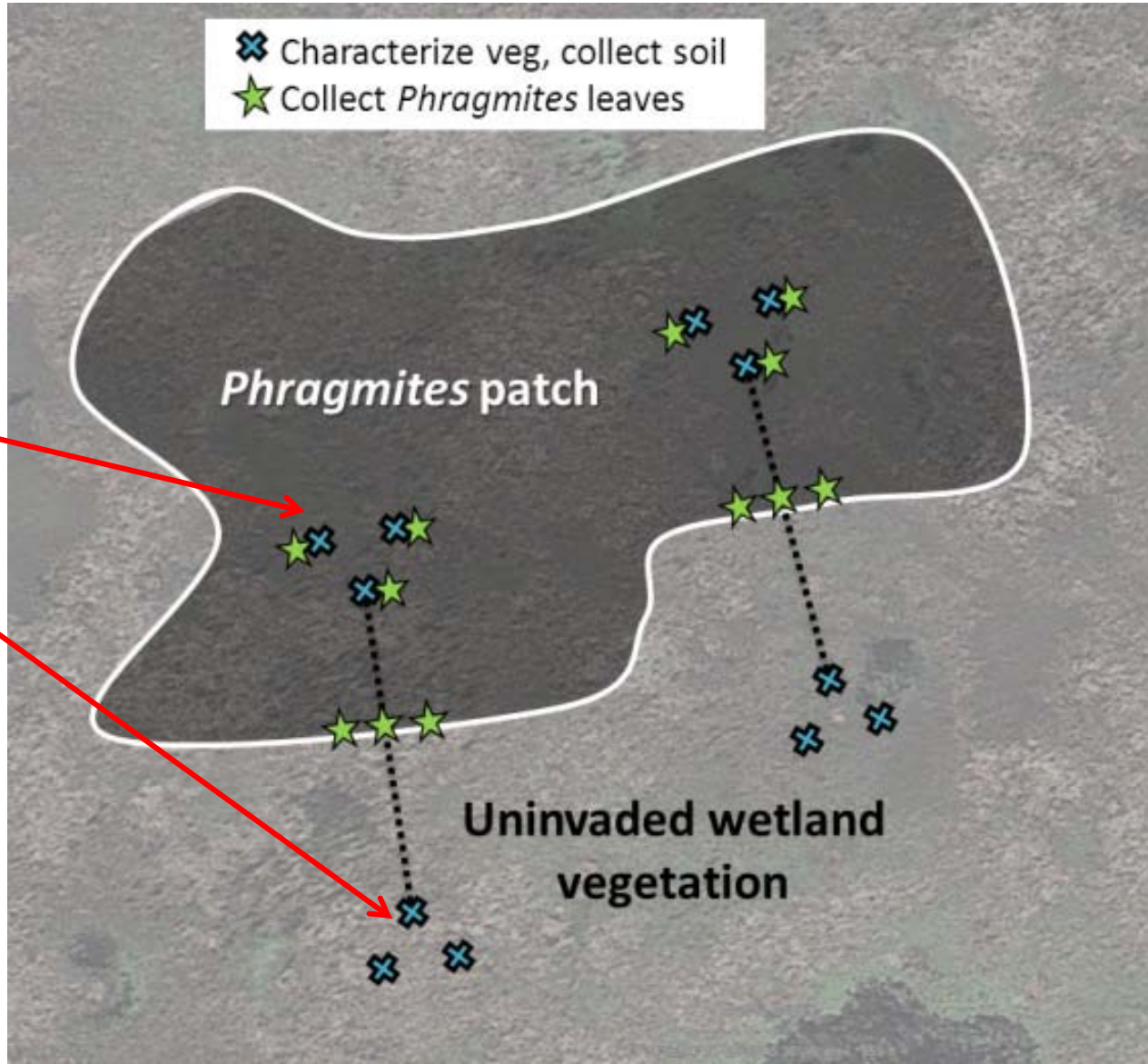


One time Drivers

Hydrology

- Assess
  - Interior
  - Paired

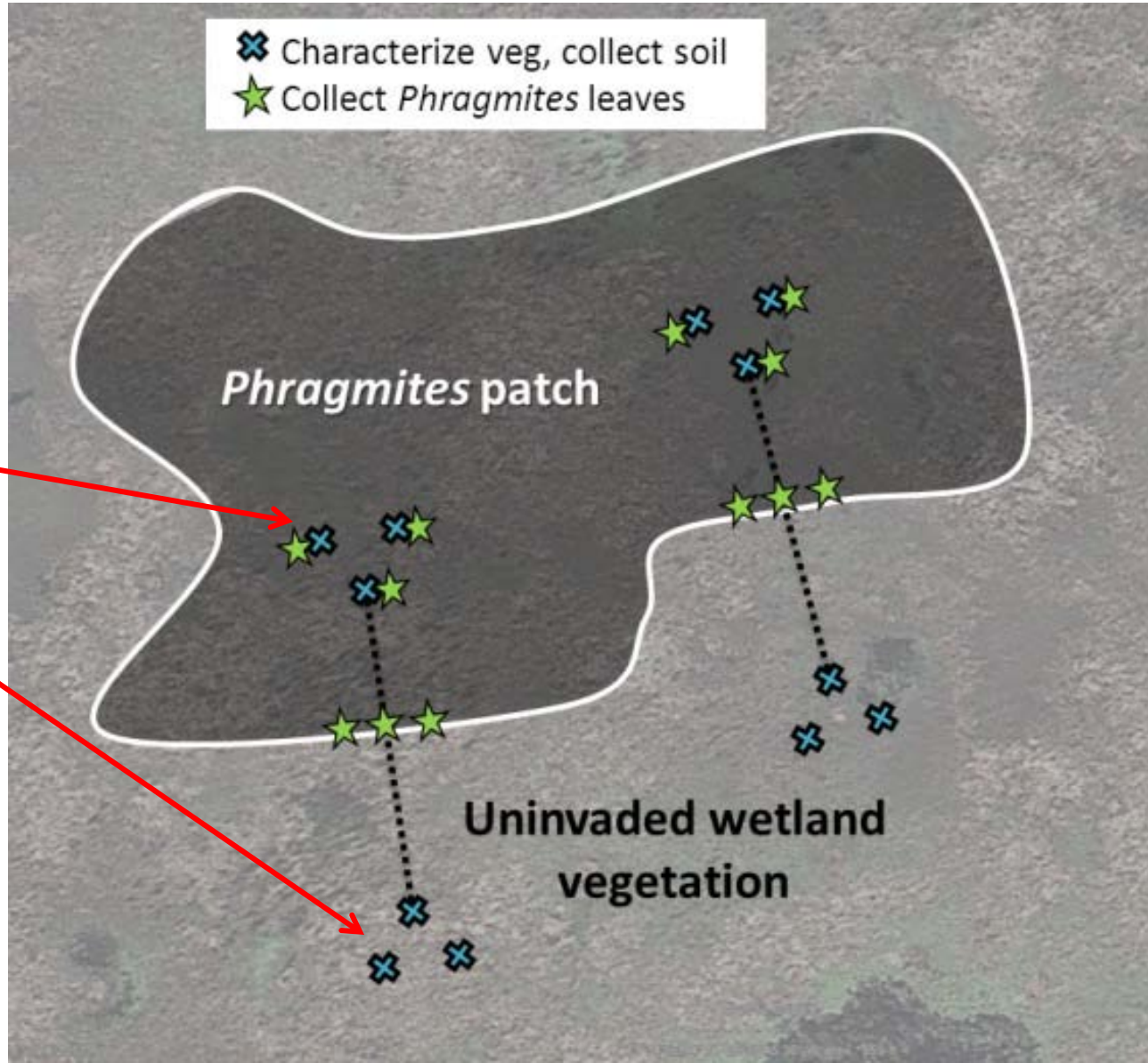
Levels
Water
Muddy
Dry



Recurrent Variable

Vegetation Abundance

- Assess
  - Interior
  - Paired



Recurrent Variables

Vegetation abundance

Phrag patch

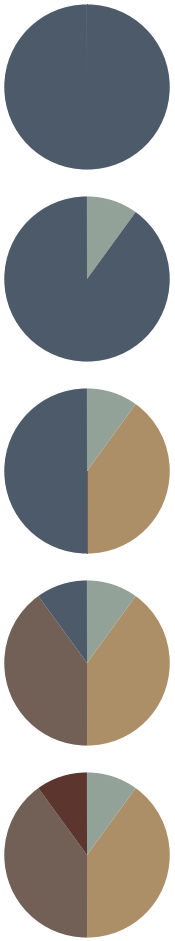
- Phrag
- Other invasives
- Native plants

Paired

- Dominant sp.
- Species 2
- Species 3

Vegetation abundance

Abundance Class	Percent Cover
None	0%
Low	0-10%
Med-Low	11-50%
Med-High	51-90%
High	91-100%

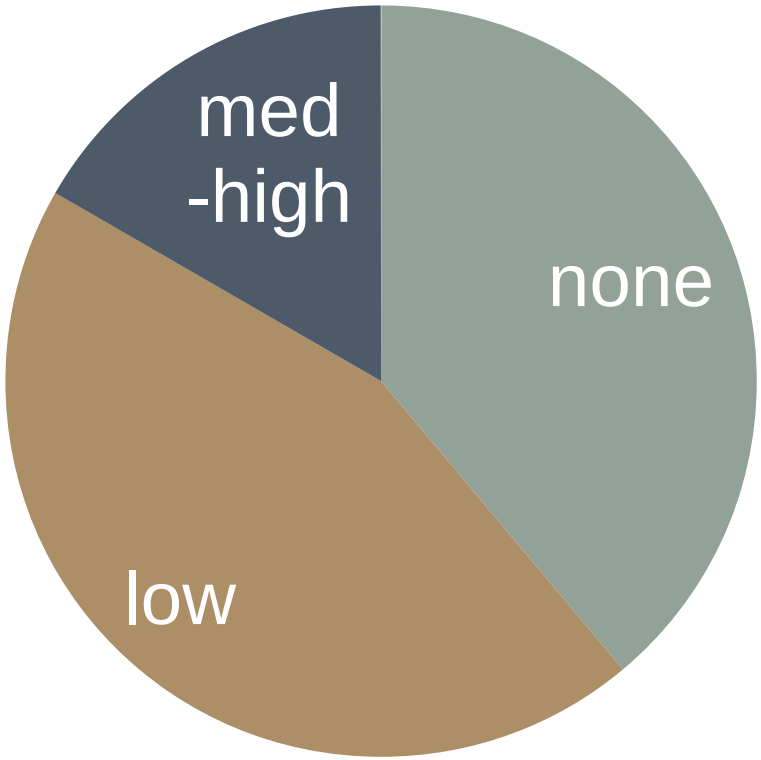


Prelim. results - Veg in paired plots

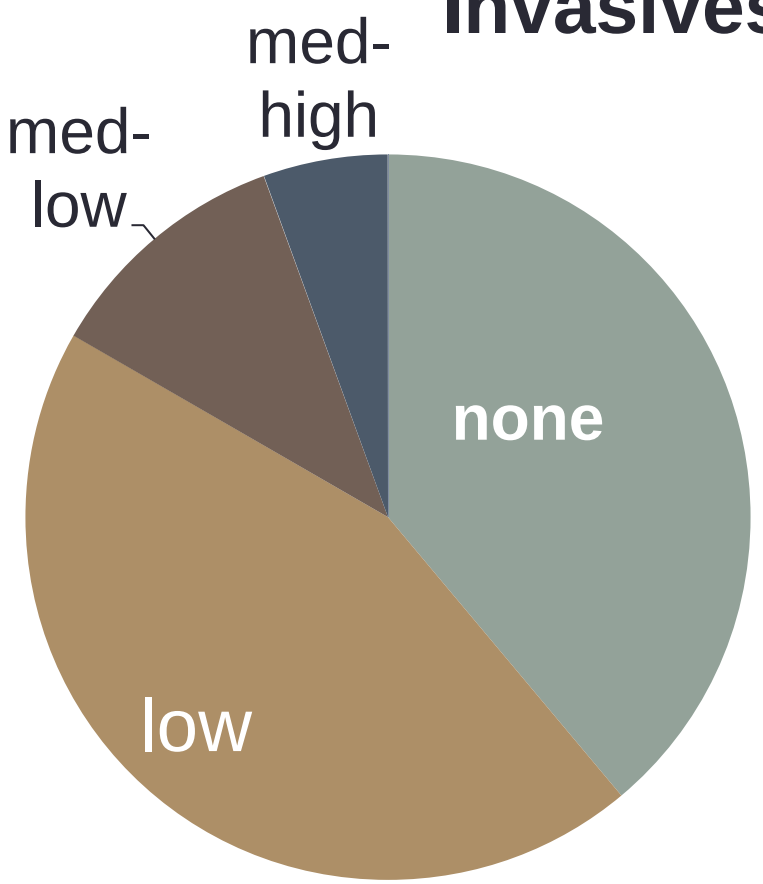
- Big Bluestem
- Boneset
- Bulrush
- Cattail
- Cirsium arvense
- Cottonwood
- Eastern red cedar
- *Eupatorium maculatum*
- Fine Grasses
- Goldenrod
- Grasses
- Indian Grass
- Mares tail
- Marram Grass
- Marsh elder
- Milkweed
- Native grass
- Poplar
- Prairie Cordgrass
- Red Osier Dogwood
- Reed Canary Grass
- Russian Olive
- Sedges
- Shrub Willow
- Smooth brome grass
- Soft rush
- Switch Grass
- Vetch

Prelim. results - Veg in *Phrag.* plots

Natives

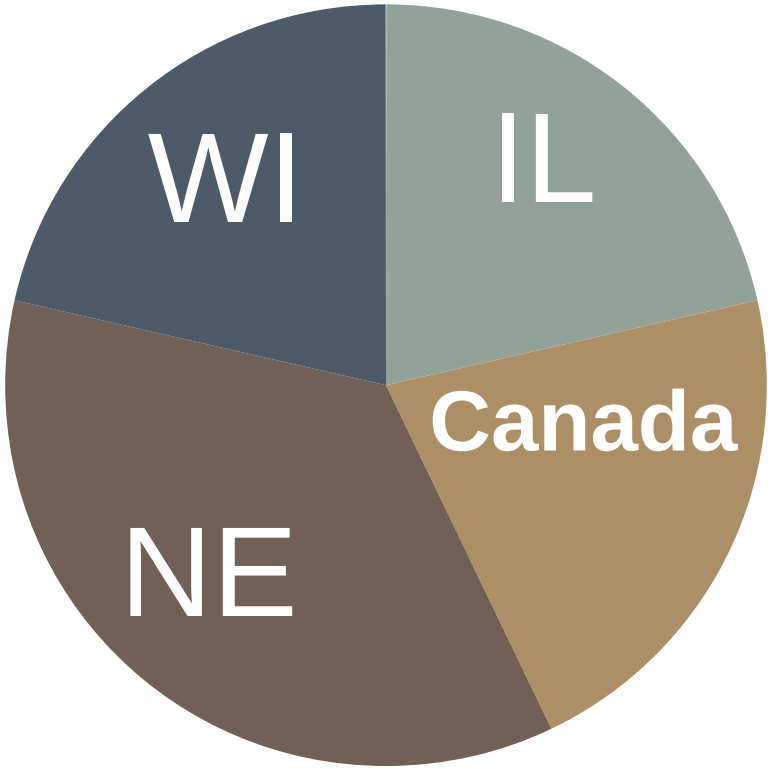


Invasives

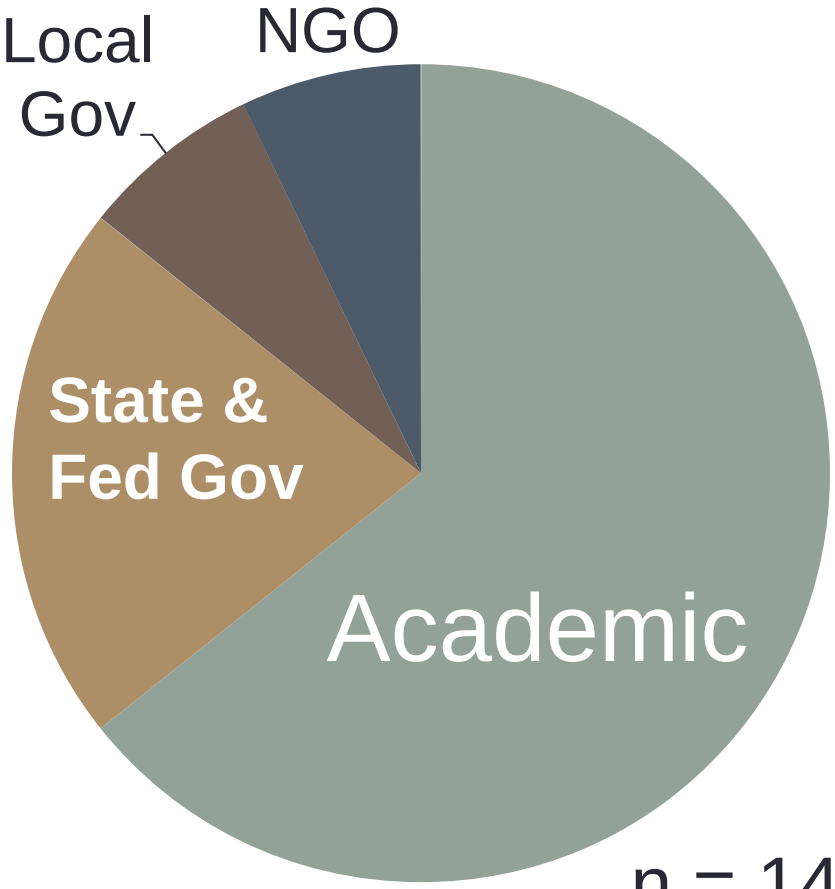


Management Units

Locations



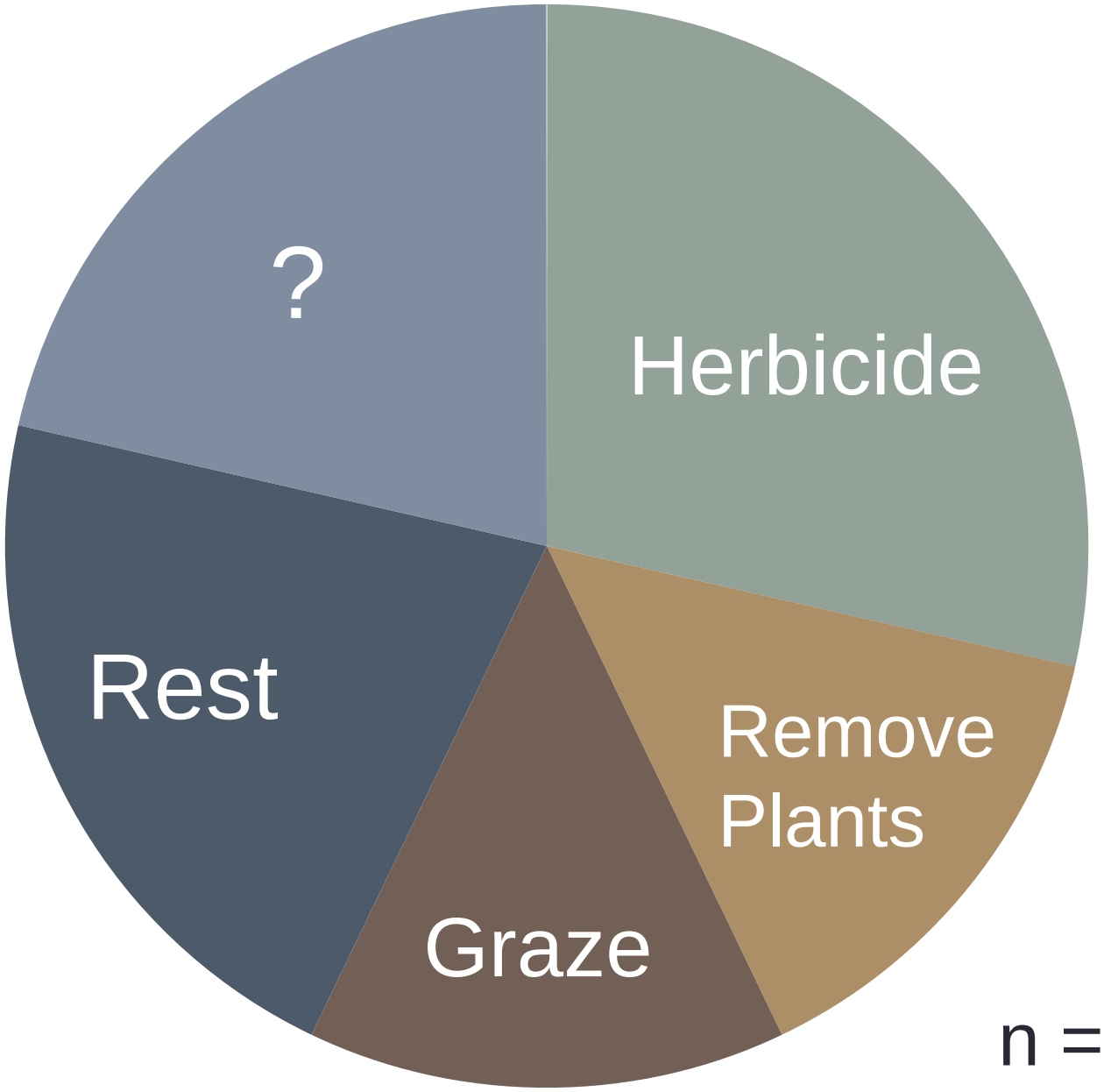
Affiliations



n = 14

Management Units

Actions



n = 14

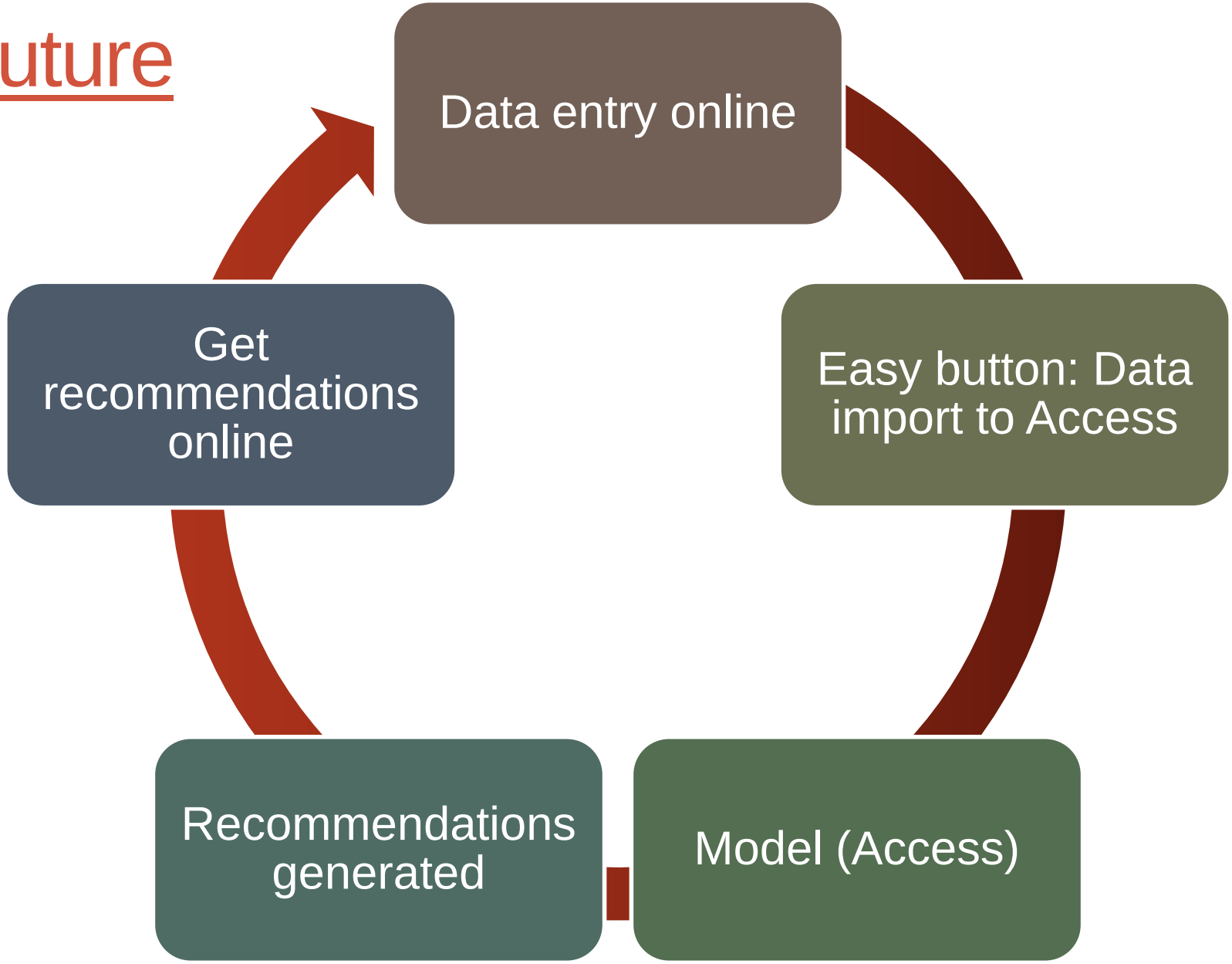
Collaborations

- USF&WS in Northeast and Midwest (Regions 5, 3)
- Spatial prioritization
- Decision support tools

Lessons learned

- Academics
  - Small % of respondents
  - Contributed majority of data
- Variety of management techniques
  - Potential to explore novel methods
  - Experimental alternatives
- Limits on recommendations

Future


Data entry online
Easy button: Data import to Access
Model (Access)
Recommendations generated
Get recommendations online

Coauthors

- E. Lonsdorf, J. Fant, S. Jacobi, P. Hartzog, D. Larkin

Funding

ILLINOIS-INDIANA SEA GRANT

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Images: USDA-NRCS PLANTS Database

Thank you. Questions?

Take Home Messages

- Managers targeting invasive haplotype
- “Crowdsourcing”
  - Clarity of protocol – Quality control
  - Pro: Get diversity of scenarios and management techniques
  - Con: Low repeatability
- Adaptive management used when there is
  - 1. (Critical) uncertainty
  - 2. Repeated decisions
  - 3. Decisions affect system state
- Potential for looking at experimental treatments

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