



Establishing Long-term Monitoring of Birds, Herpetofauna, and Vegetation on Mined Land in Southeast Kansas

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Introduction

The History of Reclaimed Mined Lands

- Mining in Crawford and Cherokee county began in the early 1920s and concluded in the 1970s. Once mining ended, Kansas Department of Wildlife, Parks, and Tourism as well as Pittsburg State University gained mined lands by means of purchase or donation. Many lands are now restored to native grasslands and forest fragments (Fig. 1), and open to the public. Few studies have recorded data to indicate whether reclamation efforts were productive or provided sufficient habitat for local fauna.

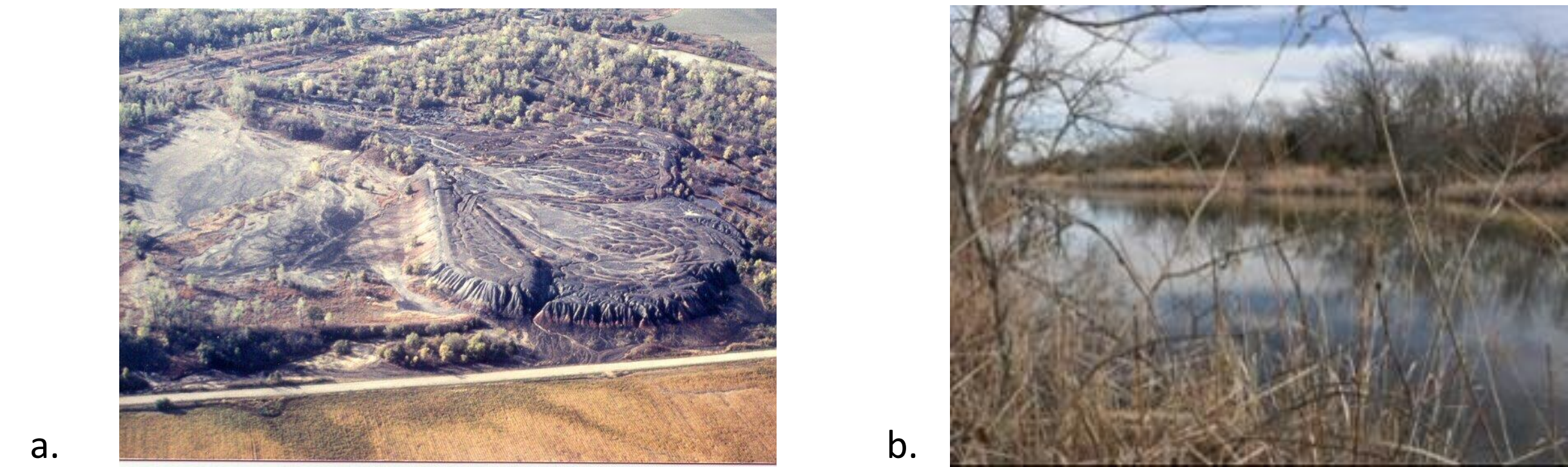


Figure 1. Example of historical mining activity at the Monahan Prairie property, before (a) and after (b) reclamation.

Objectives

- Initiate ecological monitoring program on reclaimed mined lands
- Determine the distribution, abundance, and diversity of local species
- Document any Species in Need of Conservation
- Quantify habitat relationships between sampled fauna and establish a baseline dataset for planning and assessing habitat modifications

Study Locations

We selected five historically mined properties and one property without a mining history (Buche Area) for the study's first year, all located in southeastern Kansas (Fig. 2). Each site had bird point count locations, either located in grassland or forest habitats; and herpetofauna survey locations (i.e. pitfall traps and cover boards).

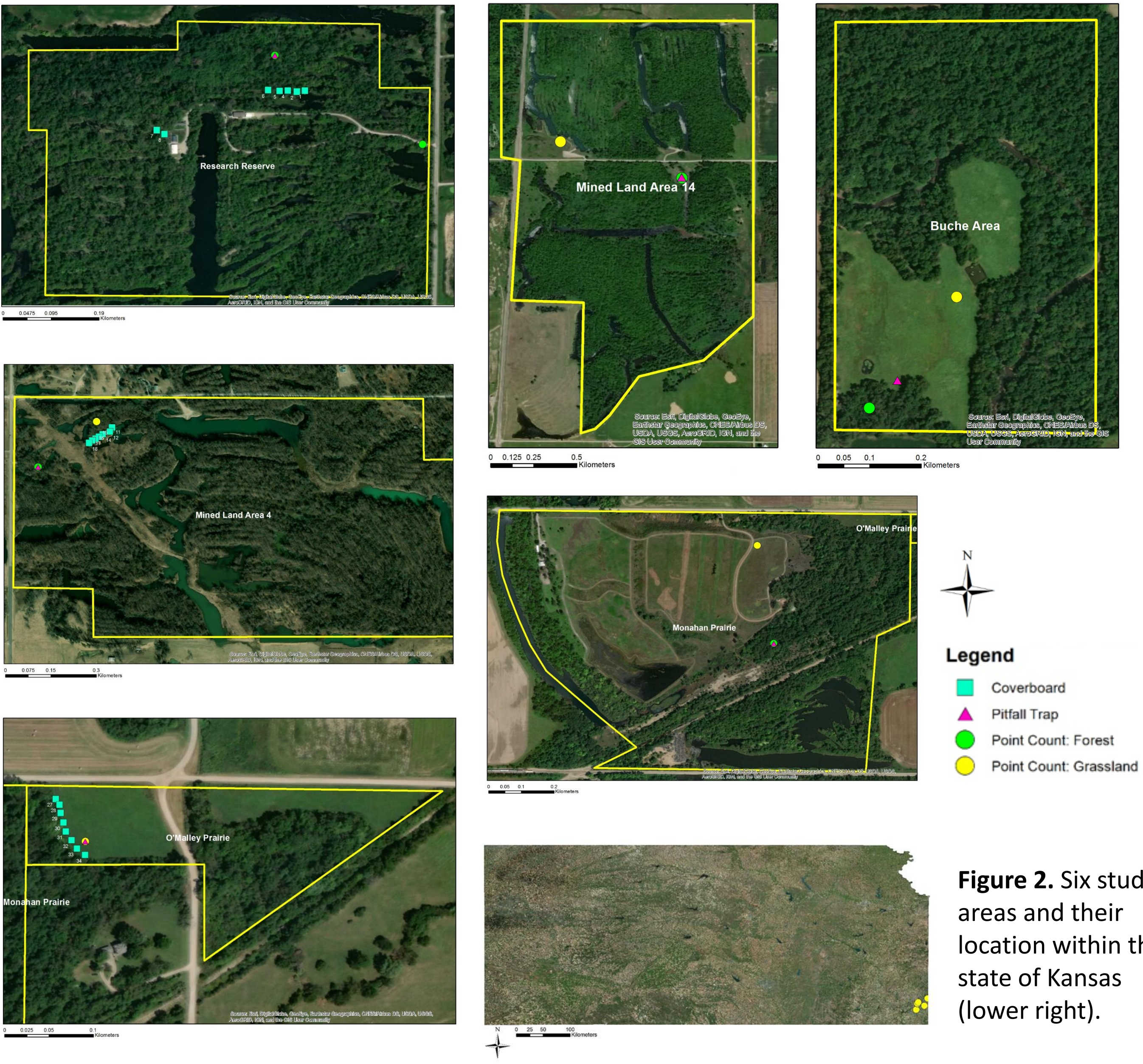


Figure 2. Six study areas and their location within the state of Kansas (lower right).

Methods

Herpetofauna Monitoring

- Herpetofauna long-term monitoring sites were established in each property.
 - There were total of 6 arrays, 21 cover boards, and 18 funnel traps.
- Each site has a trap array (Fig. 3) formed by drift fence, pitfall traps, and funnel traps.
 - Pitfall traps were constructed by drilling 1/8th inch holes in the bottom of five-gallon buckets and burying them until the rim of the bucket was flush with the ground level.
 - Funnel Traps were made from carpenter fabric formed into a cylinder with two inward facing cones at each end. All individuals found in funnel traps were released.
- Cover boards were located at five sites, all but Buche Area. Not all locations were recorded with a GPS unit (Fig. 2).
- Traps were checked daily from late March to early November.

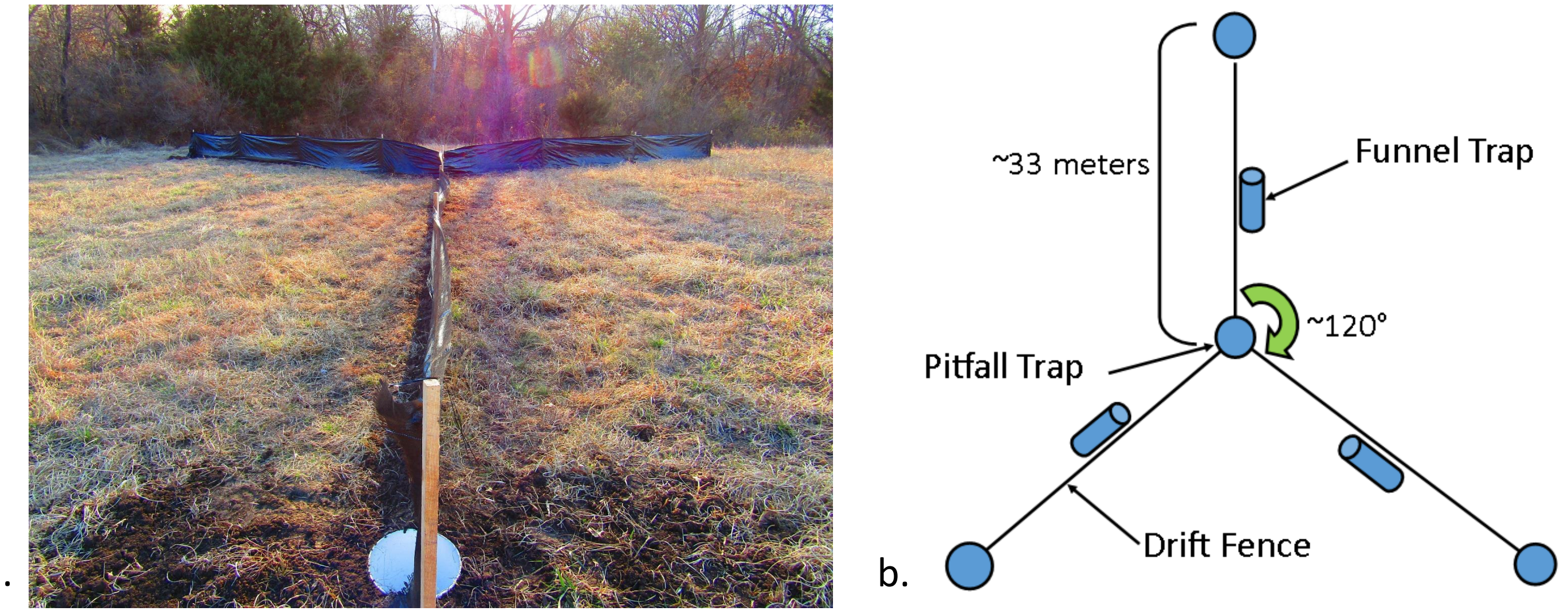


Figure 3. Trap array constructed in the field (a) and its schematics (b).

Bird Monitoring

- All sites except the O'Malley Prairie at two point count locations (n = 11).
- 3, 5-Minute, unlimited radius point counts (May – July)
 - Recorded all birds heard or seen
 - Detection variables recorded: wind speed, temperature, cloud coverage

Vegetation Survey

- Vegetation composition and structure were assessed at each point count and trap array location.
 - Ground vegetation composition & cover (Daubenmire frame)
 - Artificial surface, bare soil, forbs, grass, leaf litter, rock, shrubs, tree, woody litter, water
 - Tree community composition and diameter-at-breast-height (DBH)
 - Shrub community composition
 - Canopy cover
 - Grass height
 - Vertical density (Nudd's board)



Rough Green Snake



Red-winged Blackbird Nest



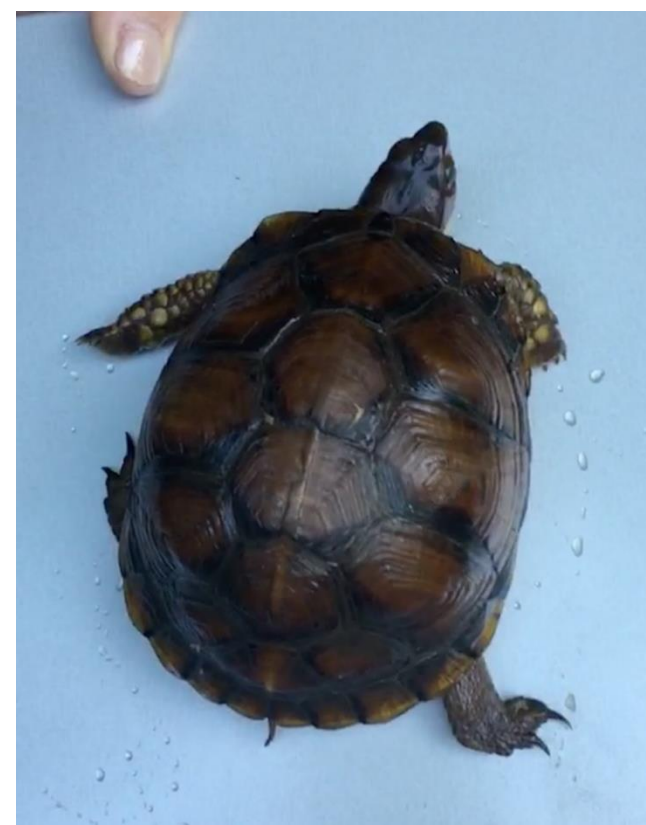
Southern Leopard Frog

Results

Herpetofauna

- We observed 54 reptiles and 155 amphibians; 209 individuals overall.
- 12 reptiles species, 7 amphibian species
- No Species in Need of Conservation

Site	Number of Individuals	Relative Abundance of Area	Species Richness	Reptile/Amphibian Individuals
Buche Area	19	0.09	8	9/10
O'Malley Prairie	19	0.09	6	11/8
Mined Land 4	24	0.11	4	3/21
Research Reserve	32	0.15	8	14/18
Mined Land 14	46	0.22	9	4/42
Monahan Prairie	69	0.33	10	13/56
Total:	209	-	19	54/155



Three-toed Box Turtle

Bird Community

- We observed 19 bird species and 432 individuals
- Species in Need of Conservation:
 - Dickcissel – 34; Eastern Wood-Pewee – 16; Bell's Vireo – 2; Eastern Meadowlark – 1; Northern Bobwhite – 1; Baltimore Oriole – 1
- Grassland and forest point count location had similar species richness (Fig. 4), yet community composition differed. Forest bird species (e.g. northern cardinal, indigo bunting) were unique compared to grassland communities (e.g. dickcissel, red-winged blackbird).
- More bird species were found in areas with more forbs (Pearson correlation; $r = 0.56$) and fewer trees ($r = -0.6$), which could be a function of sampling site locations.

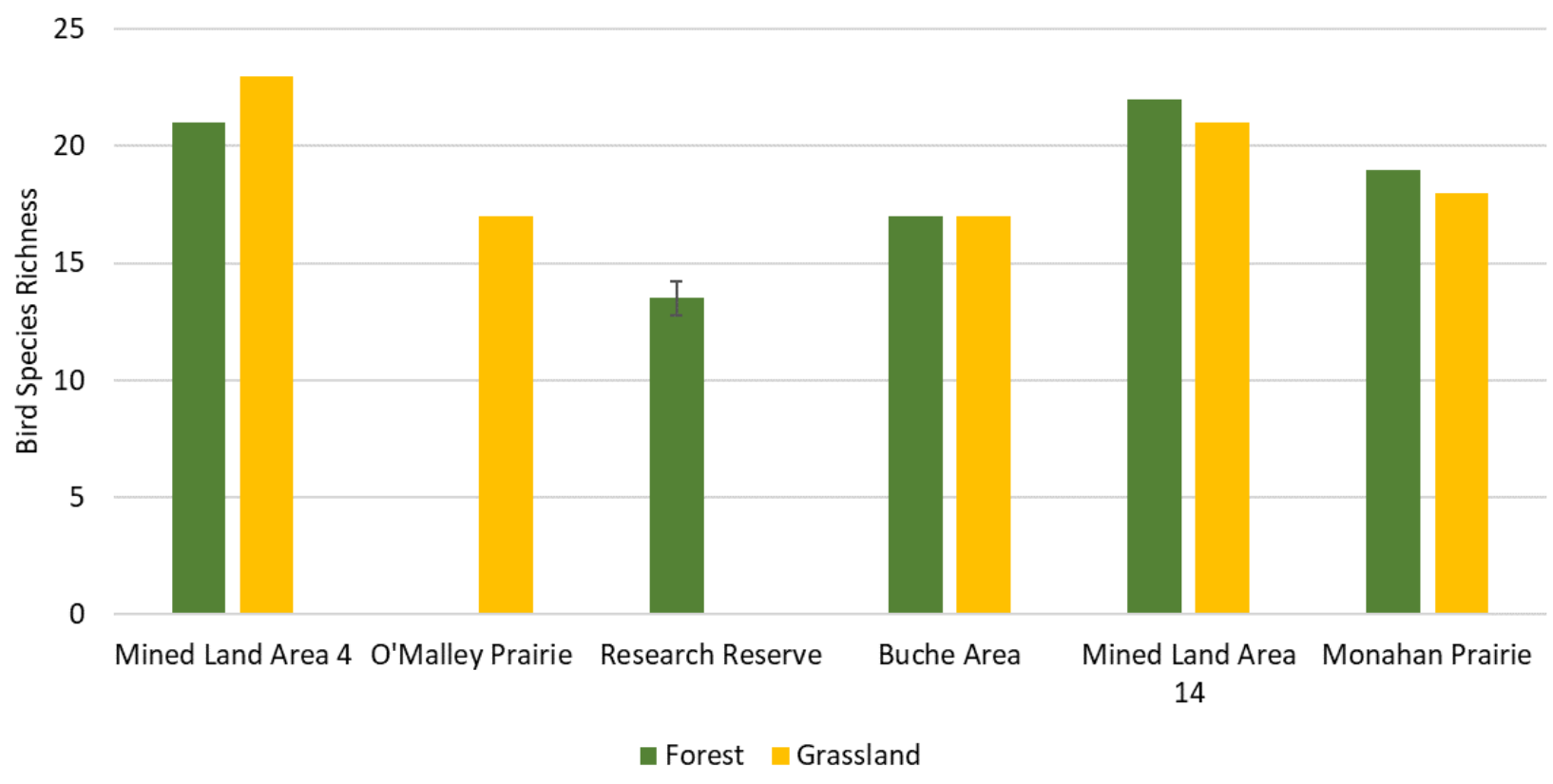


Figure 4. Bird species richness for each site, and each point count location.



Dickcissel

Conclusions

- Two very distinct communities would mean that two unique management plans would be more effective than just one.
- More bird species are found in mined land areas with less leaf litter, fewer tree species, and more forb ground cover.
- More habitat analyses (e.g. impacts of invasive species)
- Future Goals:
 - Add more long-term monitoring locations
 - Deploy drift net surveys earlier in the year
 - Aural frog surveys
 - Bird nest searches



Acknowledgements & References

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- Anderson, L. R., & Arruda, J. A. (2006) Land use and anuran biodiversity in southeast Kansas, USA. *Amphibian Reptile Conservation* 4(1):46-59.
- Fisher, R., Stokes, D., Rochester, C., Brehme, C., Hathaway, S., & Case, T. (2008) Herpetological monitoring using a pitfall trapping design in southern California: U.S. Geological Survey Techniques and Methods 2-A5, 44 p.
- Ryan, T. J., Philippi, T., Leiden, Y. A., Dorcas, M. E., Wigley, T. B., & Gibbons, J. W. (2002) Monitoring herpetofauna in a managed forest landscape: effects of habitat types and census techniques. *Forest Ecology and Management* 167:83-90.

