Grassland Management for Priority Amphibian and Reptile Species

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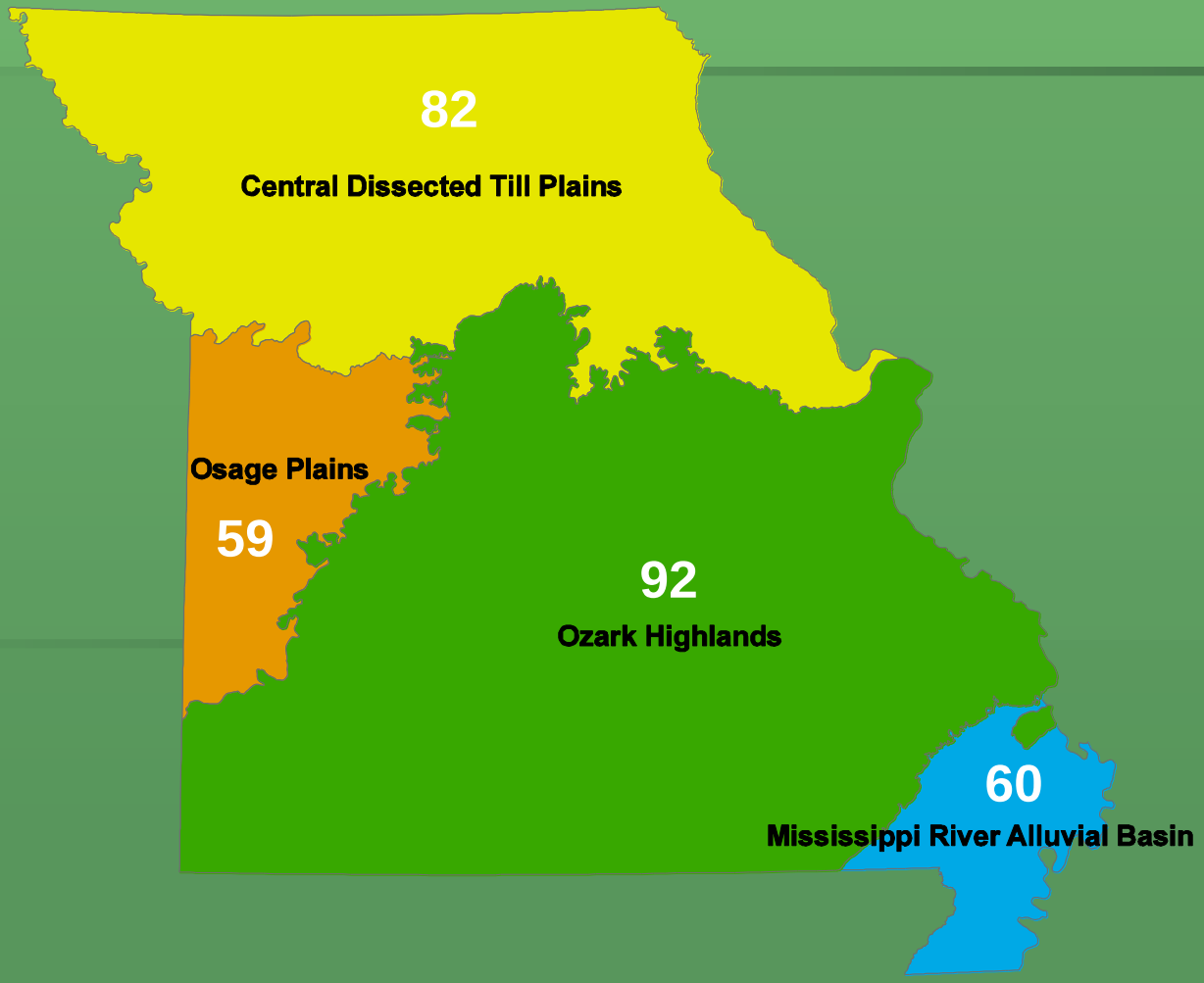
Amphibians & Reptiles
(116 species)



Grassland Amphibians & Reptiles

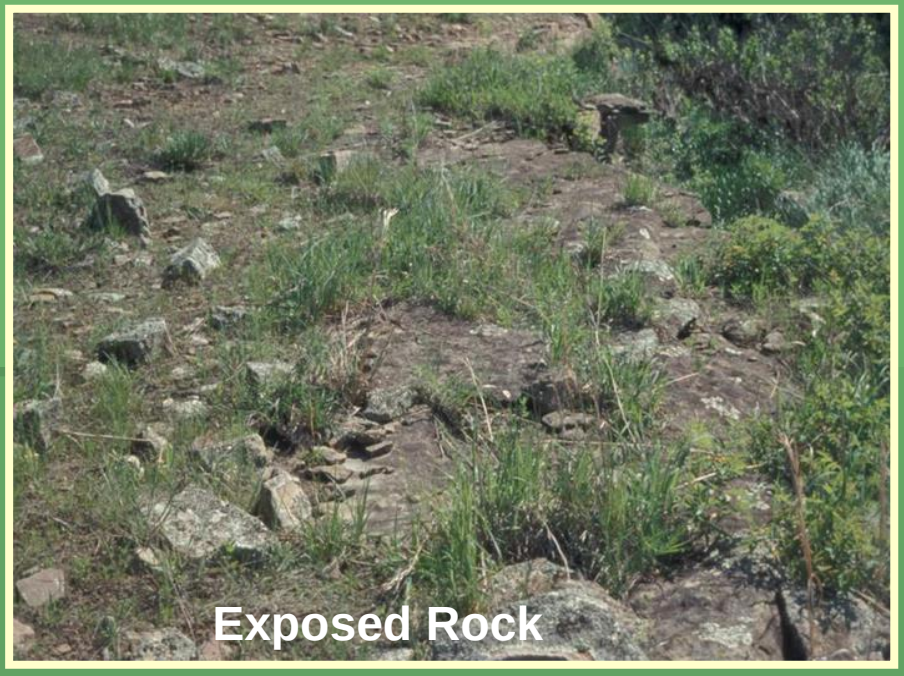
Taxa	No. Species	No. Grassland Species*	% Grassland Species	No. SOCC Species	No. Grassland SOCC Species	% Grassland SOCC Species
Salamanders	19	2	10.5%	7	1	14.3%
Toads & Frogs	25	11	44.0%	6	5	83.3%
Turtles	18	5	27.8%	4	2	50.0%
Lizards	11	5	45.5%	4	3	75.0%
Snakes	43	31	72.1%	12	10	83.3%
TOTAL	116	54	46.6%	33	21	63.6%

- Indicates obligate, depended for portion of life history, or most abundant in grassland systems

Prairie Types


Upland Prairies

Permanent Wetlands-Marshes



Exposed Rock

Ephemeral Wetlands-Bison Wallows

Crayfish Burrows

Characteristic Species

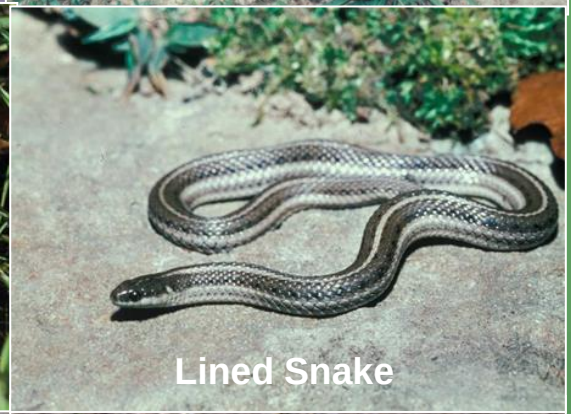

Eastern Tiger Salamander


Ornate Box Turtle


Bullsnake


Boreal Chorus Frog


Western Slender Glass Lizard


Lined Snake

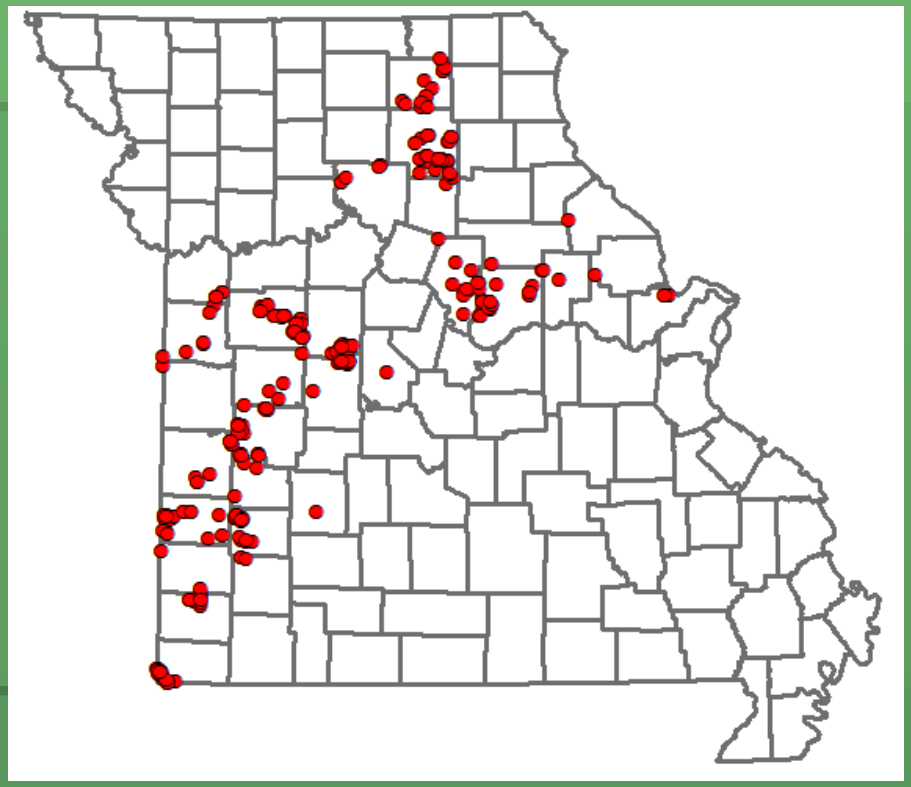

Northern Crawfish Frog


Prairie Skink


Prairie Kingsnake

Northern Crawfish Frog

S3: (Vulnerable)



Why Vulnerable?

- Loss/degradation and fragmentation of native prairies & grasslands
- Loss of fishless wetlands (e.g., ephemeral pools, bison wallows) used for breeding
- Dependence on crayfish burrows

Dispersal:

- Adults = 1 km
- Juveniles = 1.5 km

Some Threats:

- Plowing/Discing
- Altered water table (e.g., drain tile system)
- Soil compaction

Soil Compaction

- Most grassland amphibians and reptiles rely on crayfish burrows
- Increase soil compaction (e.g., excessive heavy equipment and over-grazing) can reduce crayfish burrow densities and trap animals

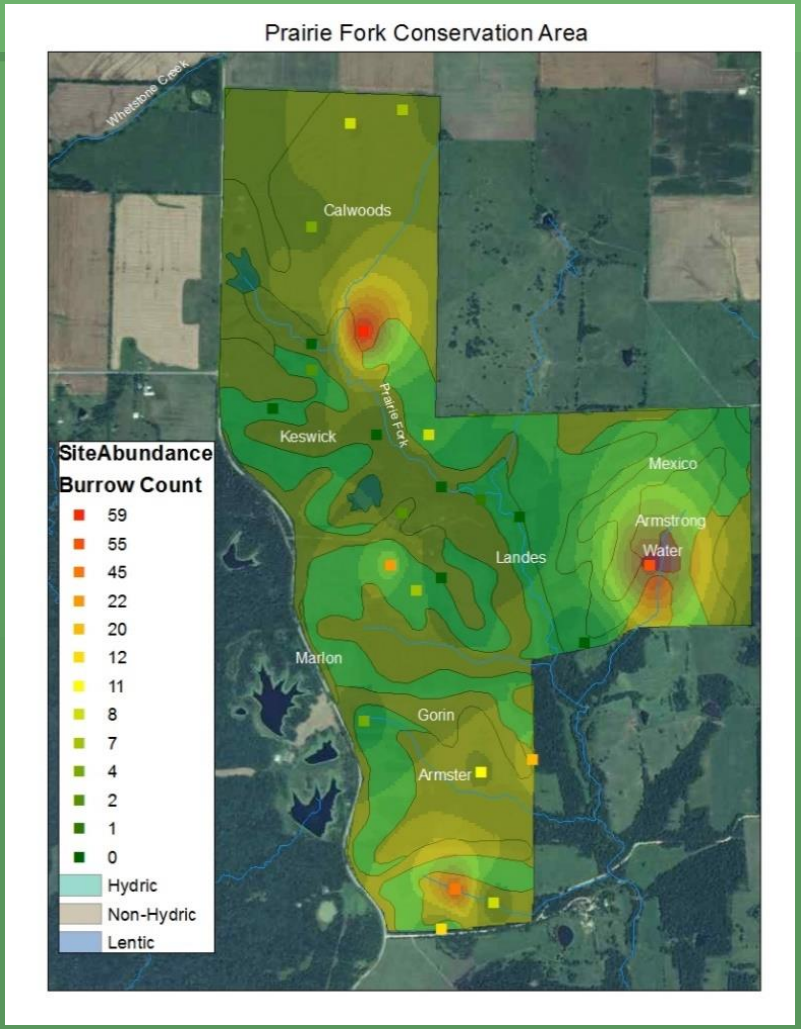
- Limited the footprint of heavy equipment on the grasslands where feasible
- Moderate grazing (e.g., bison, cattle, etc.) can be beneficial to maintain open habitats of grasslands
  - Best is low intensity rotational (patch) grazing with light to moderate stocking rates

Wetland (Pond) Management

- Shallow shoreline & micro-topography
- Maintain as fishless (rotenone)
- Renovation of existing wetlands
- Construction of new wetlands, especially ephemeral pools
- Grazers can reduce the aquatic vegetation around wetlands, increase steepness of pond banks, & generally reduce water quality.
- Bare, steep banks around ponds seldom support amphibians
  - Best to provide alternative water sources for grazers and fence wetlands (or limit drinking access to a specific location)

Upland Prairie Restoration
(Prairie Fork CA-Callaway County)

- 911-acre area donated to the MDC by Hilda P. Jones in 1997
- Research, Education, & Management goals managed jointly by MDC and UM-School of Natural Resources
- Re-establish Northern Crawfish Frog



- **Collect eggs/hatching tadpoles in northern MO**
- **Introduced into 3 shallow, fishless wetlands on 10 April 2019**
- **Confirmed calling of numerous individuals in March 2024**

Wet/Bottomland Prairies

Bottomland-Floodplain

Upland-Swales

- **Estimated <0.4% remain**
- **Floristically not diverse**


Ephemeral Wetlands


Ant Mounds


Floodplain Connection


Crayfish Burrows

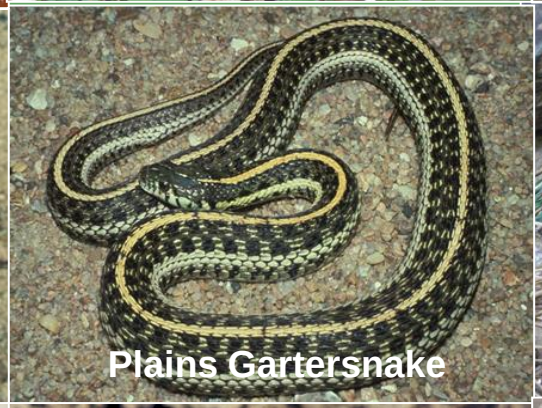
Characteristic Species


Small-mouthed Salamander


Red-sided Gartersnake


Dekay's Brownsnake


Plains Leopard Frog


Plains Gartersnake

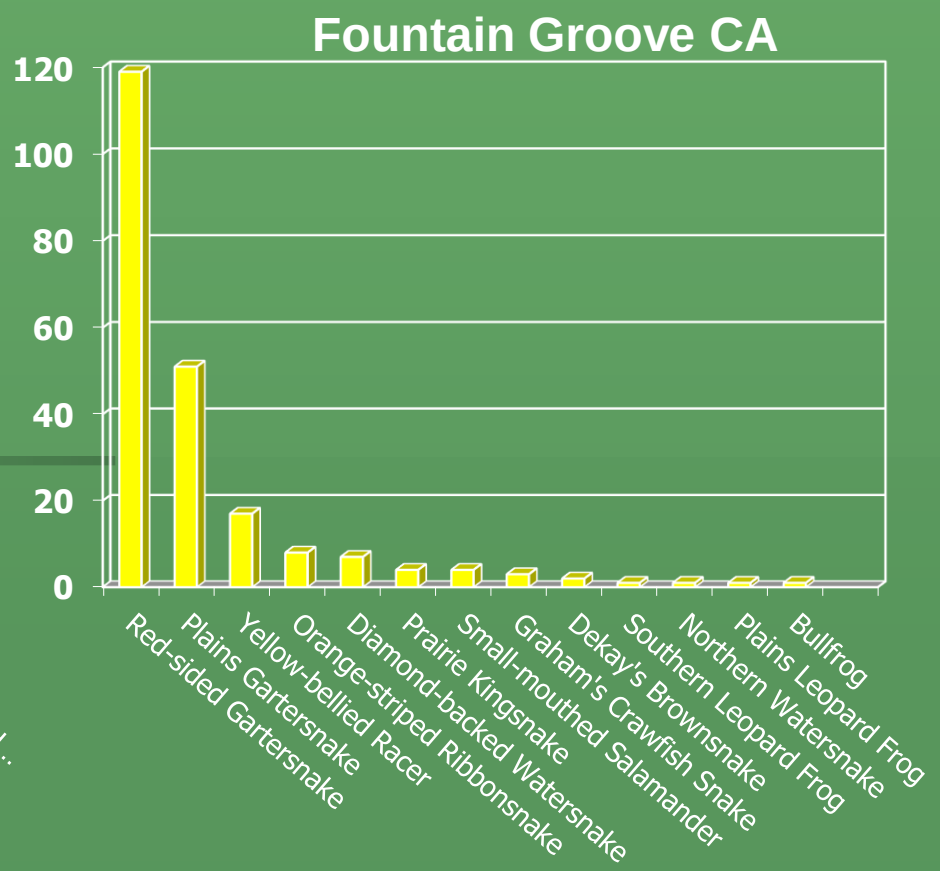

E. & W. Foxsnake


Diamond-backed Watersnake


Massasauga


Graham's Crawfish Snake

Drift-fence Survey Results in Bottomland Prairie



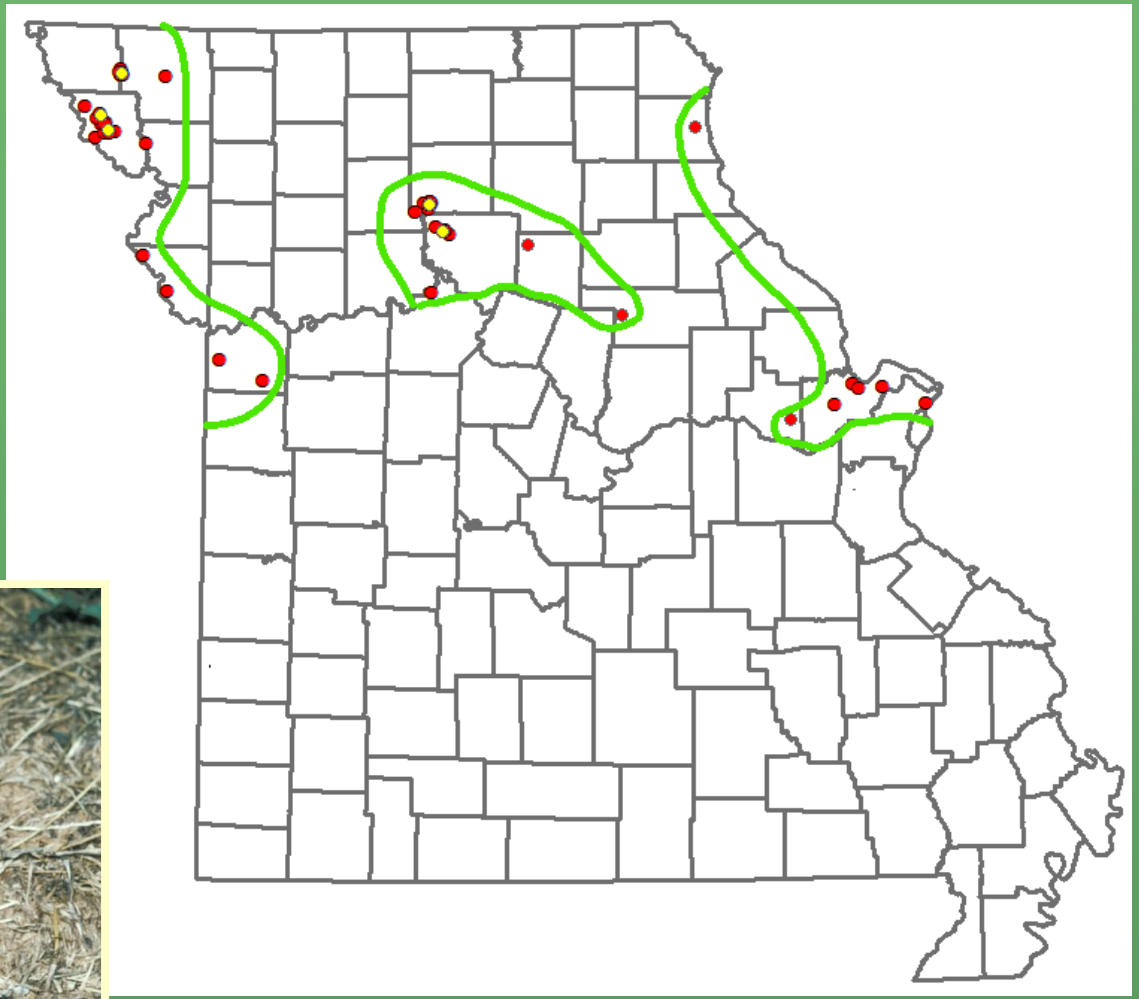
Massasauga

Prairie Massasauga:

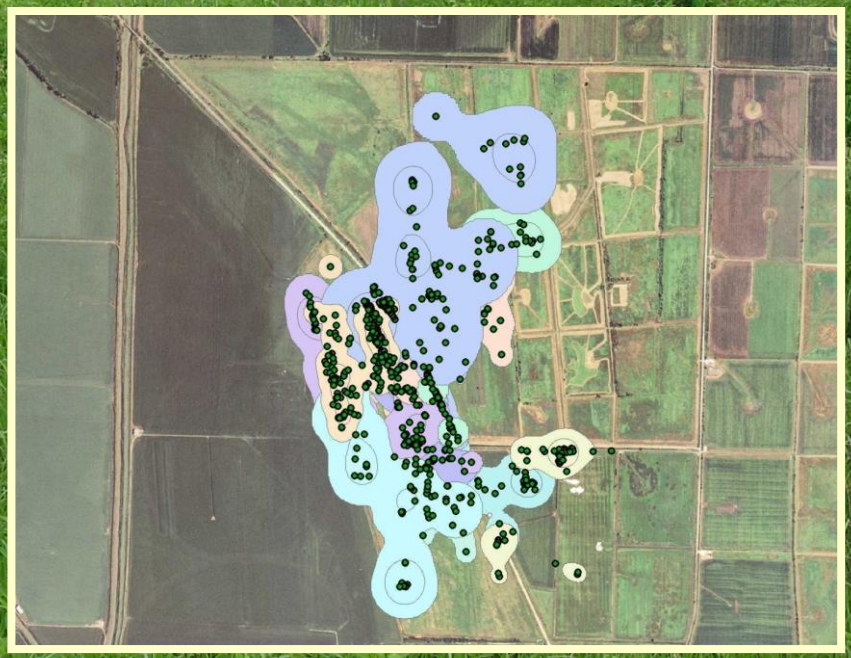
- Critically Imperiled & State Endangered

Eastern Massasuaga:

- Presumed Extirpated & Federal Threatened



- High densities, especially overwinter sites
- Home range:
  males = 19.3 ha (47.7 acres)
  females = 6.6 ha (16.2 acres)



Some Threats

- Loss of bottomland prairie (99.6%)
- Water level manipulations from drain tile systems to intentional flooding
- Flooding due to restricted floodplain
- Little to no elevated habitat refugia
- Disease (e.g., snake fungal disease)
- Land management (e.g., prescribed fire, disking, mowing, soil compaction, etc.)

Prescribed Fire

Herps are more susceptible to the effects of fire compared to other species because of their limited mobility:

- Restricting burns to winter is best (b/w November and mid-March)
  - Rule of thumb:
    - **~ 45 F soil temp. (emergence)**
    - **By 50 F soil temp. most herps will emerge**
- Patchy burns (leave some ground cover)
- Rotate the burned areas (no more than 1/3 of area/year and 3-year rotation) for many species
- Many reptiles are susceptible to fire mortality, especially late March into early May

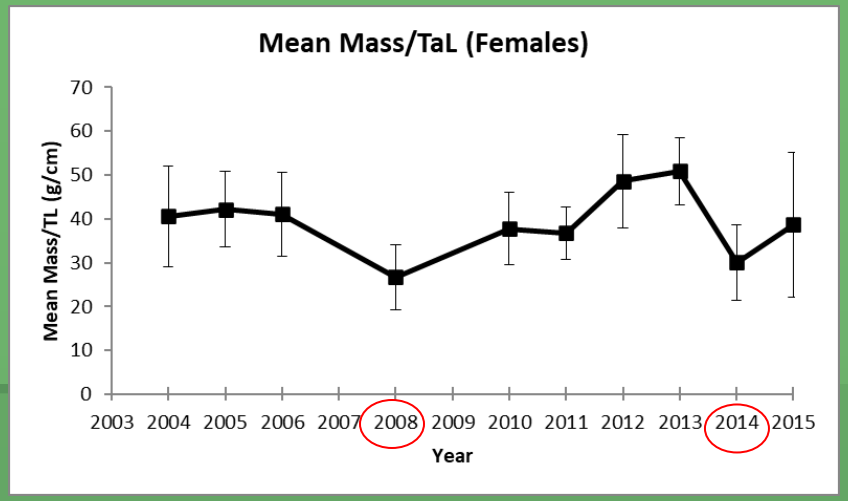
Some Examples of Grassland Burns

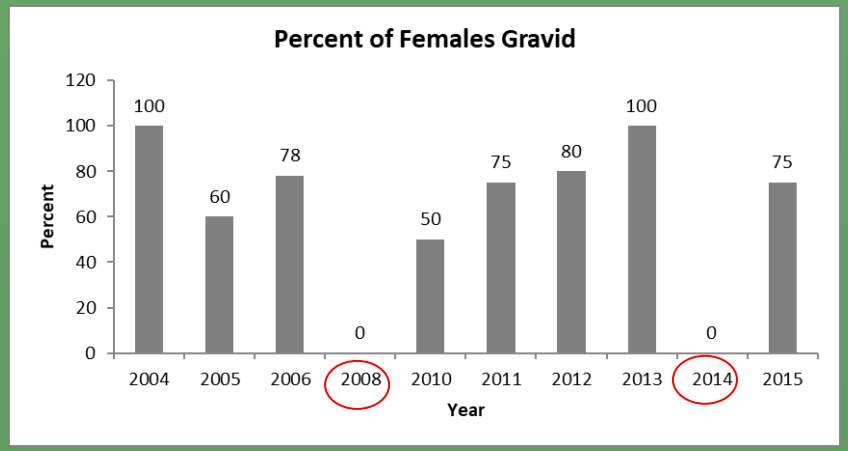
- 46 Individuals of 12 reptile species with 35 mortalities (17 Graham's Crayfish Snakes)
- 23 individuals of 6 species (3 Massasaugas)
- 72 individuals of 8 species with 29 mortalities (22 Box Turtles)

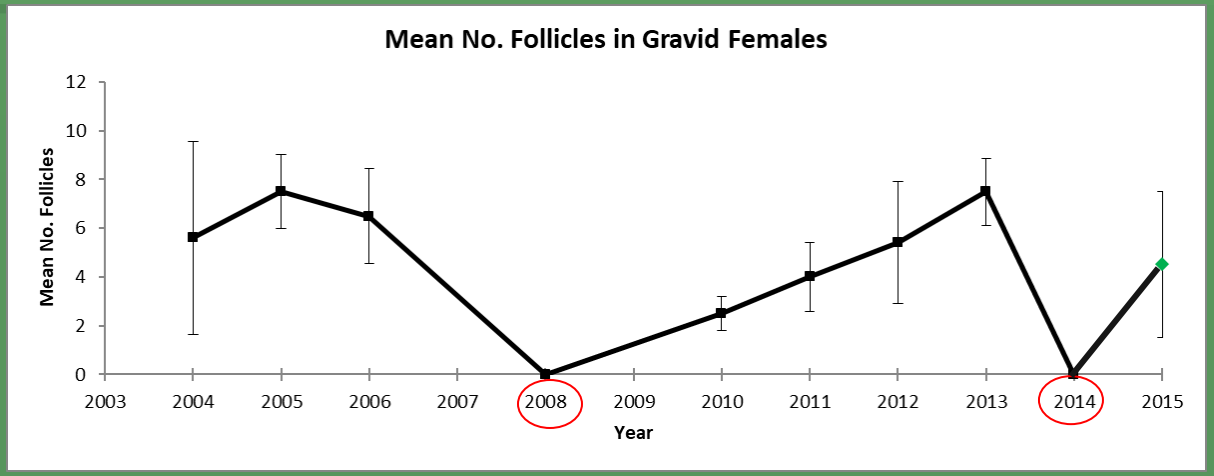
Massasauga

Impacts of floods

- Body Condition:
- Reproductive Condition:
  - Gravid Females
  - Number of Follicles

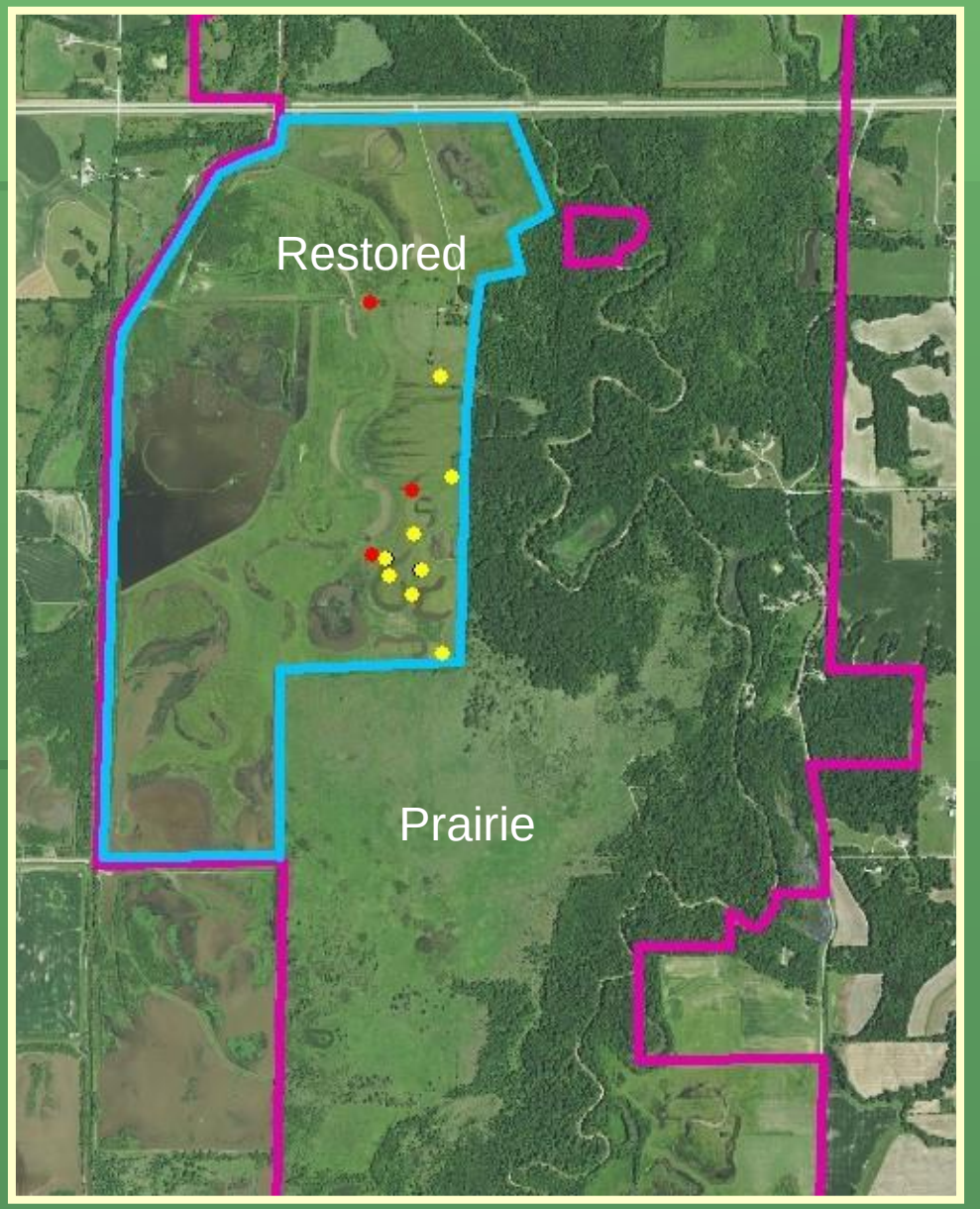






Bottomland Prairie Restoration

- Purchased in 2009
- Restore bottomland prairie and forest habitats
- Restore wetlands and expanded floodplain
- Elevated Enhancement in 2017



Sand Prairies


Sparse Vegetation


Ephemeral Wetlands

Characteristic Species

Illinois Chorus Frog

Why Vulnerable?

- Loss of habitat
- Loss of breeding wetlands (leveling land or
- lower water table)
- Potential herbicides and pesticides
- Road mortalities

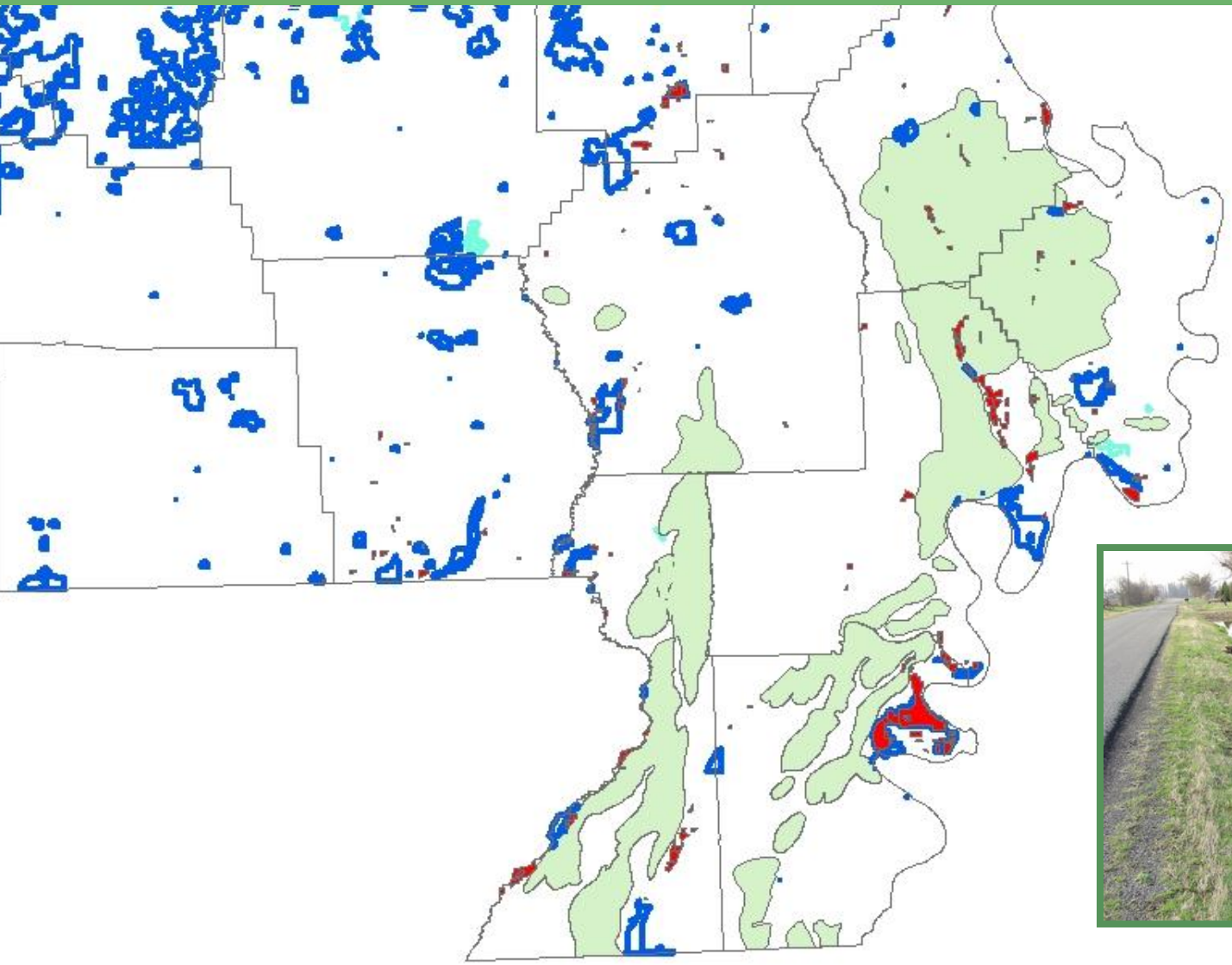
Burrowers:

- 85 – 142 seconds to complete burrow
- Summer = 15-20 cm
- Winter = > 25 cm

Dispersal:

average = 0.52 km
maximum = 0.9 km

Calling Surveys within Sand Prairie



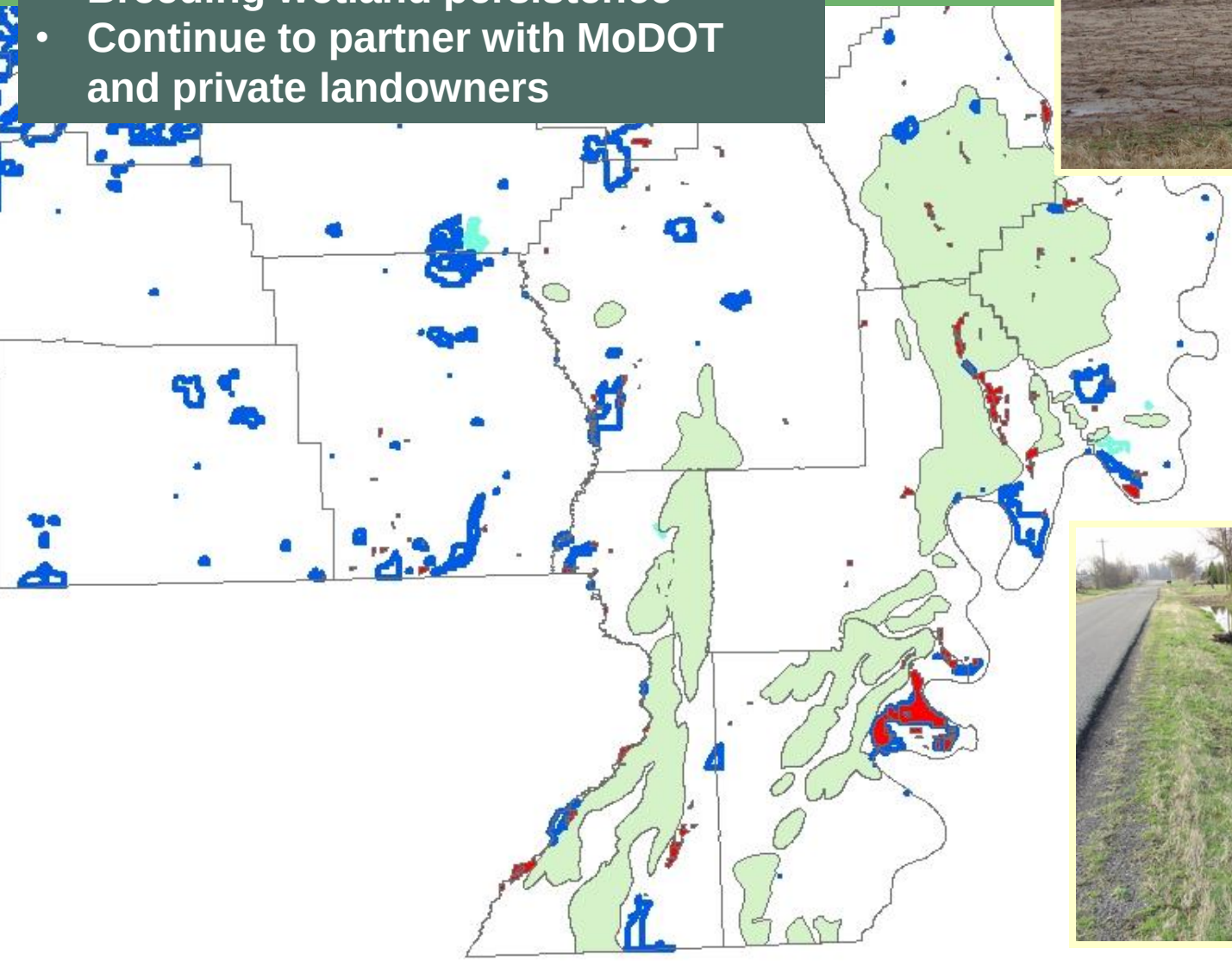
- 1991/1992
- 2001/2002
- 2011/NA
- 2021 (2019)

Number of Breeding Sites by calling index in Missouri

Survey Year	≤ 10	11-30	> 30	Total
1991	20	45	27	92
1992	58	30	9	97
2001	103	49	26	178
2002	111	42	23	176
2011	126	120	54	300
2019	248	100	113	461

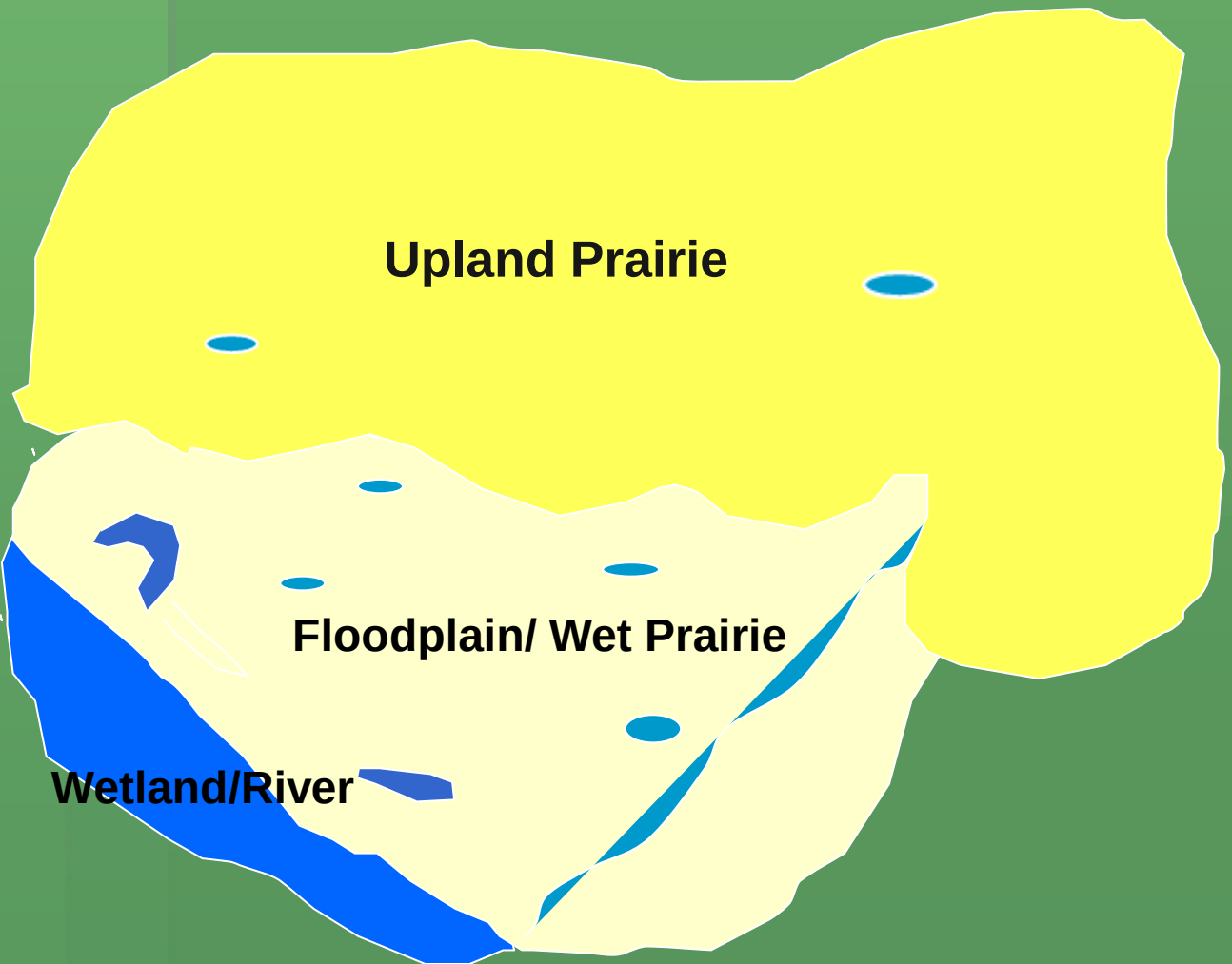
Future:

- Does well in cultivated lands
- Re-establish grassland (e.g., acquisitions & easements)
- Breeding wetland persistence
- Continue to partner with MoDOT and private landowners



Landscape Scale and Complementary but dis-similar Habitats

THINK CONNECTIVITY!



Questions?