

Avoiding Impacts to Rare Species: Eastern Massasauga Rattlesnake



Yu Man Lee

Conservation Scientist / Zoologist

Michigan Natural Features Inventory (MNFI), MSU Extension

Michigan Wetlands Association

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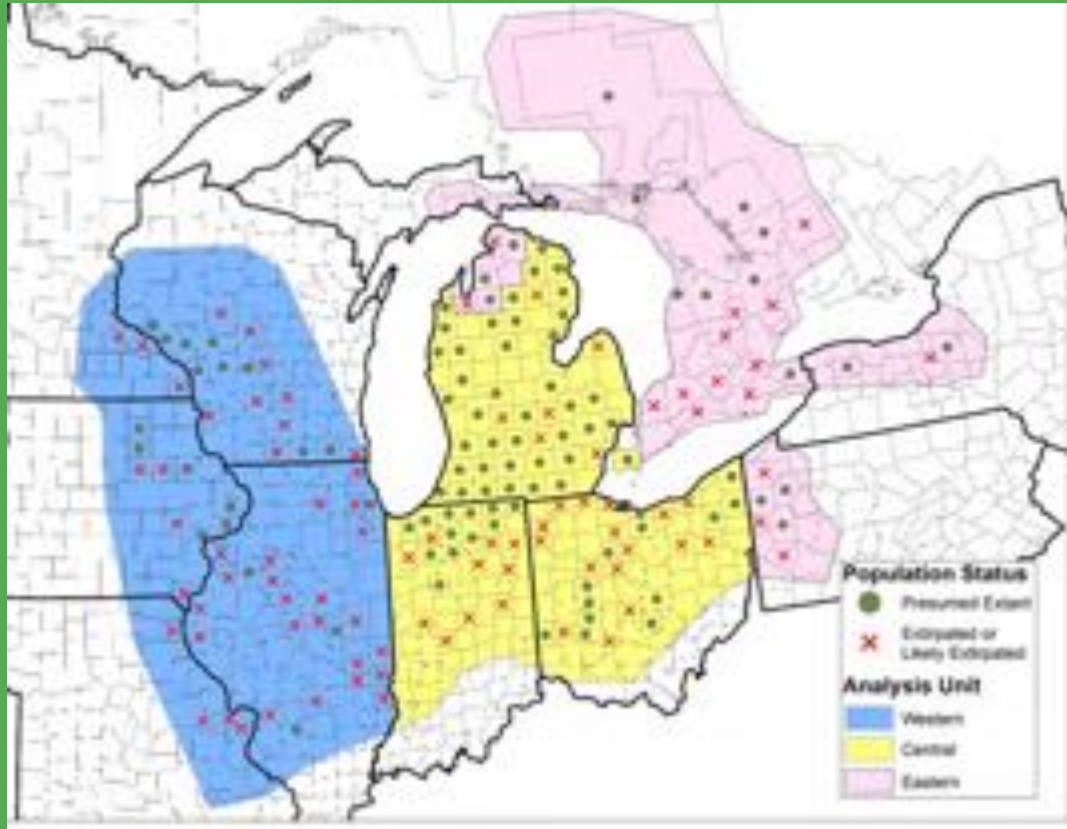
Eastern Massasauga (EMR) (*Sistrurus catenatus*)



- 1992 - Special Concern in MI
- 1993 - Protected under DNR Director's Order
- 1999 - Federal Candidate
- 2016 - Federally Threatened



Eastern Massasauga Status & Range



Szymanski et al. 2016

- 53% decline (263/558 pops extant)
- 15% unknown status
- Of extant populations
 - 30% DGP robust
 - 40% quasi-extirpated
 - 62% on protected lands

Map from Szymanski et al. 2016 – USFWS Species Status Assessment for the Eastern Massasauga Rattlesnake

EMR Status & Distribution in MI

- MI Status Assessment 1994-1996:
 - 204 element occurrences (EOs)
 - 40 secure (20%)
 - 40-50 extirpated (20-25%)
 - 78 vulnerable (38%)
- 2016 – 285 EOs
 - 65 “secure” (23%)
 - 74 historical/extirpated (26%)
 - 116 vulnerable (41%)

MNFI 2016





S. Crescenzo



Julie Oakes, MDNR



S. Crescenzo



Massasauga Rattle



EMR Look-alike Snakes



Gray [Black] Rat Snake



Wetland Habitats



- Fens
- Wet meadows
- Wet prairies
- Bogs
- Emergent marsh
- Northern shrub thickets
- Forested swamps
- **Varies across range**

Wetland Habitats



- ❖ Wet but not flooded for long periods

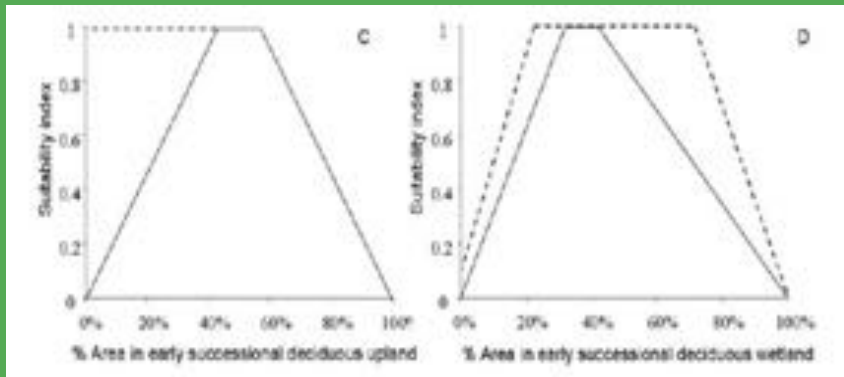
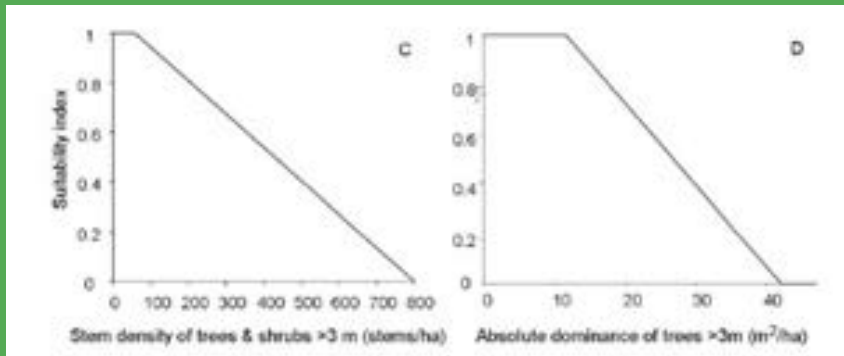
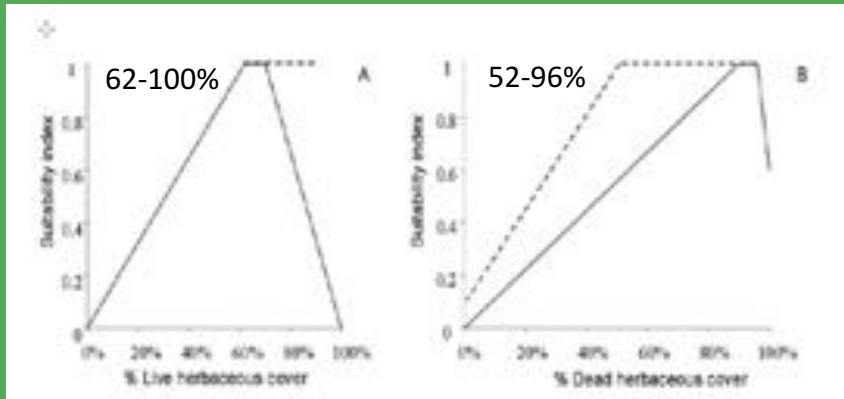
- ❖ Early to mid-successional
- ❖ Open canopy w/ cover
- ❖ Structure more important than composition



Upland Habitats

- Open & forested uplands
- Adjacent to wetlands
- Early to mid-successional
- Avoid late-successional / closed canopy forests





Habitat Suitability Index (HSI) models for EMR

- Bissell 2006
- Modified by Bailey 2010
- 1 site in SW MI
- Currently being tested at other sites – Zimmer/MSU
- Scale – Bissell 1-20 ha; Bailey – 2 ha

- April to October

- Late March - early May
- Soil temp inversion
- Basking & feeding
- Disperse/migrate to summer activity areas (200 – 600 m away, Marshall et al. 2006)



Massasauga Diet / Prey

- Small mammals – voles, shrews, mice
- Also small snakes, birds, frogs, lizards



J.N. Stuart / Zipcode Zoo

Massasauga Hunting Strategy



- Ambush predator
- Venom used to kill and digest prey
- Specialized digestive enzymes that disrupt blood flow and prevent clotting

Massasauga Predators



- Birds – hawks, turkeys, large wading birds (e.g., great blue herons)
- Mammals – skunks, raccoons, weasels, foxes, coyotes



Reproduction/Breeding

- Maturity – 2-4 yrs (up to 7)
- Breed every 1 – 2 years
- Breed primarily in summer/fall (mid-July-mid-Sept), also spring



Reproduction



- Thermoregulate all summer
- Give birth to “live” young in late Jul – mid-Aug
- Open uplands & wetlands
- In/under cover (brush piles, stumps), in/near burrows, and in the open

Home Range / Movements



- Max distances moved – 300 m to 2 km
- S. MI – Avg 3 to 7 acres (Sage 2005, Moore & Gillingham 2006, Bissell 2006)
- N. MI – Avg 41 acres (DeGregorio et al. 2011)
- Males > Non-gravid Females > Gravid Females
- Not territorial



Inactive Season - Overwintering

- Oct/Nov to Mar/April
 - Fall migration back to hibernacula – Sept/Oct
 - Burrows, root networks, etc.
 - Upland/wetland transition zone
 - In water / below frost line



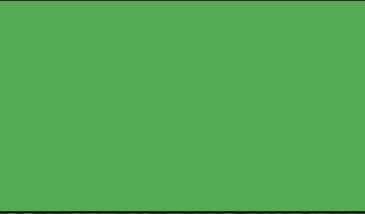
Additional Information



- Site fidelity
- Cryptic, non-aggressive
- Snakebites do occur, but are rare / infrequent.
- 25-30% of snakebites – dry
- Prompt medical treatment



Threats in Michigan



- Habitat loss/degradation
- Habitat fragmentation
- Inappropriate management
- Road mortality and barriers
- Intentional killing
- Illegal collection
- Climate change
- Snake fungal disease



Snake Fungal Disease

- First documented in U.S. in 2006, in MI in 2013
- 14 snake spp. in 16 states
- *Ophidiomyces ophiodiicola*
- Feeds on keratin & fatal(?) in EMR



Danielle Bradke



USGS



Sasha Tetzlaff

Avoiding Take / Impacts

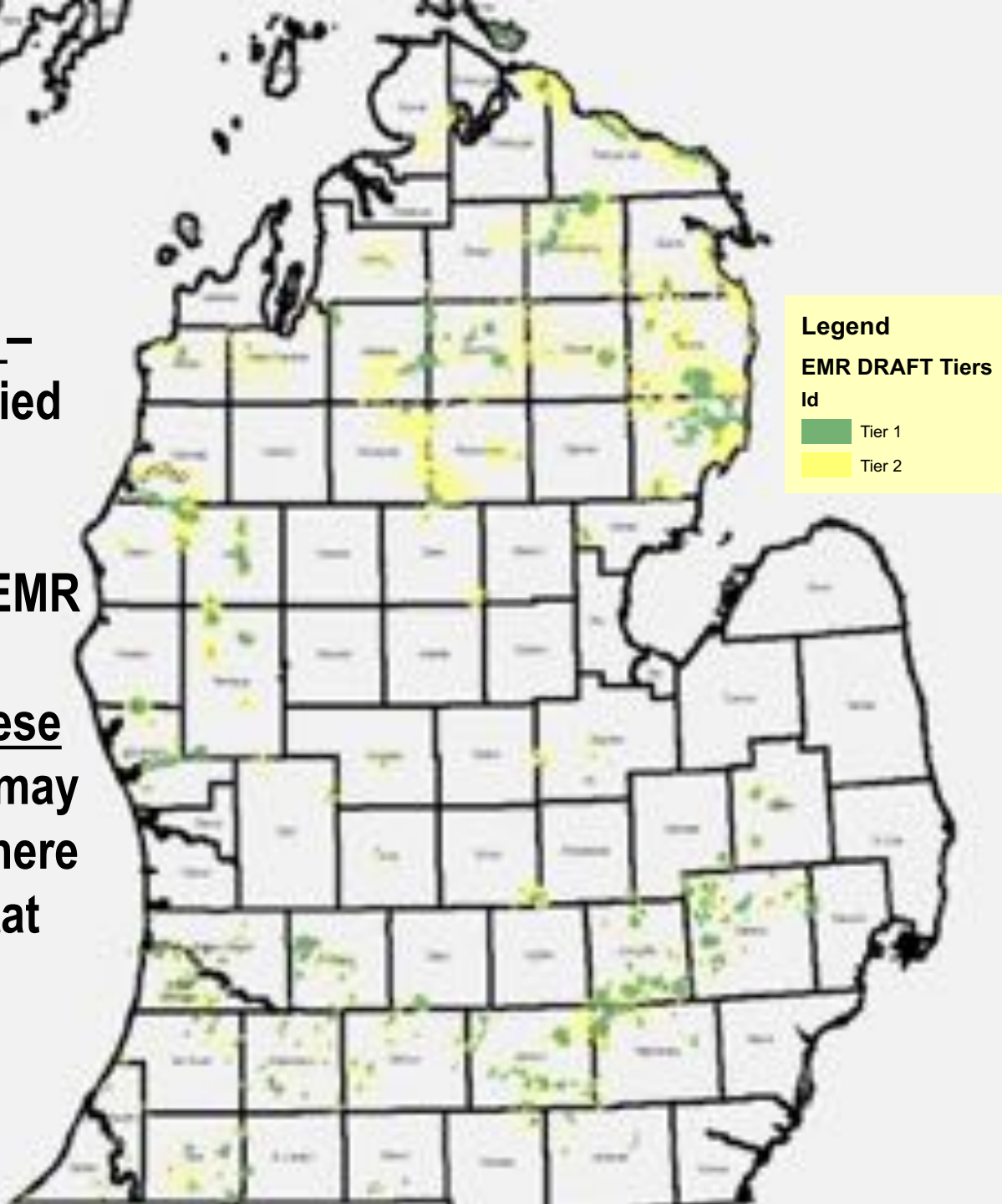
- Do EMRs occur there? Is there potential for EMRs to occur there?
 - Presence of suitable habitat
 - County Distribution Map
 - USFWS Screening Tool (IPaC project planning tool)
 - Tier 1 Habitat: Areas known to be occupied or highly likely to be occupied by EMR.
 - Tier 2 Habitat: Areas with high potential habitat and may be occupied by EMR.



Tier 1 Habitat –
known occupied

Tier 2 – high
potential for EMR

Outside of these
areas – EMR may
be present where
suitable habitat
exists



Avoiding Take / Impacts

- If EMRs occur or have potential to occur at project site, will the project impact/have potential to impact the snake? If so, how can impacts/take be avoided?
 - Projects that cause direct take
 - Projects impact habitat suitability/availability (e.g., vegetation structure, hydrology, availability of cover/burrows, etc.)
 - USFWS BMPs -
https://www.fws.gov/midwest/eastlansing/te/pdf/MichiganEMR_BMPsProjectReviewGuidelinesMarch2017.pdf



Managing and Restoring EMR Habitat

- Maintain suitable habitat for all life stages / requirements
 - Wetlands and adjacent uplands
 - Basking sites
 - Foraging / prey base
 - Gestation
 - Overwintering
- Maintain connectivity
- Monitor, evaluate and adapt



A. Feldpausch

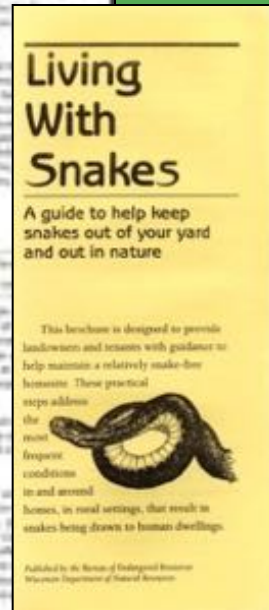
Surveying for Massasaugas

- Standard survey protocol – USFWS (Casper et al. 2001)
 - Spring emergence (April-May) and mid/late summer (late July/early Aug) for gravid females (fall migration)
 - Visual searches (coverboards, drift fences/funnel traps)
 - Weather – 50/60-80°F, >50% cloud cover, and less than 15 mph breeze.
 - At least 40 hours
 - Qualified surveyors
- Disinfect boots, gear, etc. with bleach solution (3%)



Massasauga Resources

- Websites
 - USFWS
 - MDNR
 - MNFI
- Education and outreach materials
- Training workshops



Summary

- ❖ Eastern Massasaugas are federally threatened as of Sept 2016, and are endangered, threatened, and/or declining across its range.
- ❖ Medium sized, thick-bodied rattlesnake found in a variety of open and forested wetlands and uplands.
- ❖ Requires open, sunny areas intermixed with shade for thermoregulation (basking sites), abundant and available prey (foraging sites), retreat sites to escape temperature extremes and predators, water table near the surface for hibernation, and connectivity between these habitats.
- ❖ Maintaining access to suitable habitat for all life history stages is critical to EMR conservation and recovery!



Questions?

Yu Man Lee
leeyum@msu.edu
517-284-6201

