# **Demographic response of a Spotted Turtle** (*Clemmys guttata*) population to multi-year mesopredator removal efforts in a northeast Ohio fen





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### A Landscape Perspective

#### 2016 USDA Cropland Data Layer.



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- Highly modified landscape
- Severe habitat fragmentation
- Mesopredator release and subsidization<sup>1</sup>

<sup>1</sup>Prugh, LR, et al. 2009. The Rise of the Mesopredator. *BioScience* 59(9): 779-791.











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Predation of hatchlings

Injuries to adults including shell damage and missing limbs

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- 6 acre emergent wetland in NE Ohio
- Surveys previously conducted in 2007
  - Baseline demographics
- Mesopredator control efforts yearly from 2011-2018
- Revisit site to conduct surveys in 2017 and 2018
- Compare demographics to assess effects of mesopredator control



# Mesopredator Trapping and Removal

- USDA APHIS Wildlife Services
- Occurred predominately during turtle nesting season (May – June)
- Additional two weeks in August of 2011-2013
- Effort varied yearly
- Trapped using cage and leg hold traps
- Humanely euthanized





- Visual encounter and hand capture surveys
- May and June



#### 2007

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#### 2017

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- Collapsible hoop traps baited with sardines and decoys<sup>1</sup>
  - 30 TR-502<sup>2</sup>
  - 4 mini hoop traps
  - 2 large hoop traps
- May (4 trap nights)





<sup>1</sup>Mansfield, PE et al. 1998. Using decoys to capture Spotted Turtles in water funnel traps. *Herpetol. Rev.* 29:157-158. <sup>2</sup>Howell, HJ et al. 2016. A novel method of collecting Spotted Turtles. *Herpetol. Rev.* 47:202-205.

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	TR-502		Mini Hoop		Large Hoop	
Species	Mean	SE	Mean	SE	Mean	SE
Clemmys guttata	0.111	0.008	0.083	0.004	0.000	0.000
Chrysemys picta	0.088	0.004	0.250	0.072	0.000	0.000

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- Visual encounter and hand capture surveys
- Collapsible hoop traps baited with sardines and decoys
  - 30 TR-502 (May)
  - 27 TR-502 (June)
- May (4 trap nights) and June (4 trap nights)

### Results – Mesopredator Removal



A total of 115 raccoons and 7 Virginia opposums removed from 2011-2018

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- 7 individuals captured in 2017-2018 originally marked in 2007!

### Demographics – Sex Ratio



Sex ratio did not vary between sampling periods

### Demographics – Size Comparison



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<sup>1</sup>Bowman, AW, and A Azzalini. 2003. Computational aspects of nonparametric smoothing and illustrations from the *sm* library. *Comp. Stat. and Data Anal.* 42:545-560. <sup>2</sup>Bowman, AW, and A Azzalini. 2018. *sm* v.2.2: smoothing methods for nonparametric regression and density

# Population Size and Density Estimation

• Estimated population size using the Lincoln-Peterson estimator with Chapman modification

Population estimate: 28 (95% CI: 19-37)

Density Estimate: 9 turtles/acre (95% CI: 6-12)



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### Successful recruitment in two other species



• Captured 31 C. picta with 7 or less growth lags

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- Size distributions are significantly different
  - 0 juveniles captured in 2007; 4 captured in 2017-2018
  - 8 individuals with 7 or less growth lags
- Density estimates are relatively high for the species
  - Most studies report density of 0.4 4 turtles/acre

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  - This is a small site with concentrated nesting easier for mesopredator control
  - In larger sites or more suburban/urban sites, control efforts may be less successful
- Why do we suspect control efforts and not other factors?
  - Habitat at this site is actively managed
  - Available habitat has not increased on landscape; likely decreased due to local suburban development nearby
  - Available open water habitat has decreased

### Acknowledgements



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