Developing a cost-effective technique to estimate wolf abundance in Michigan

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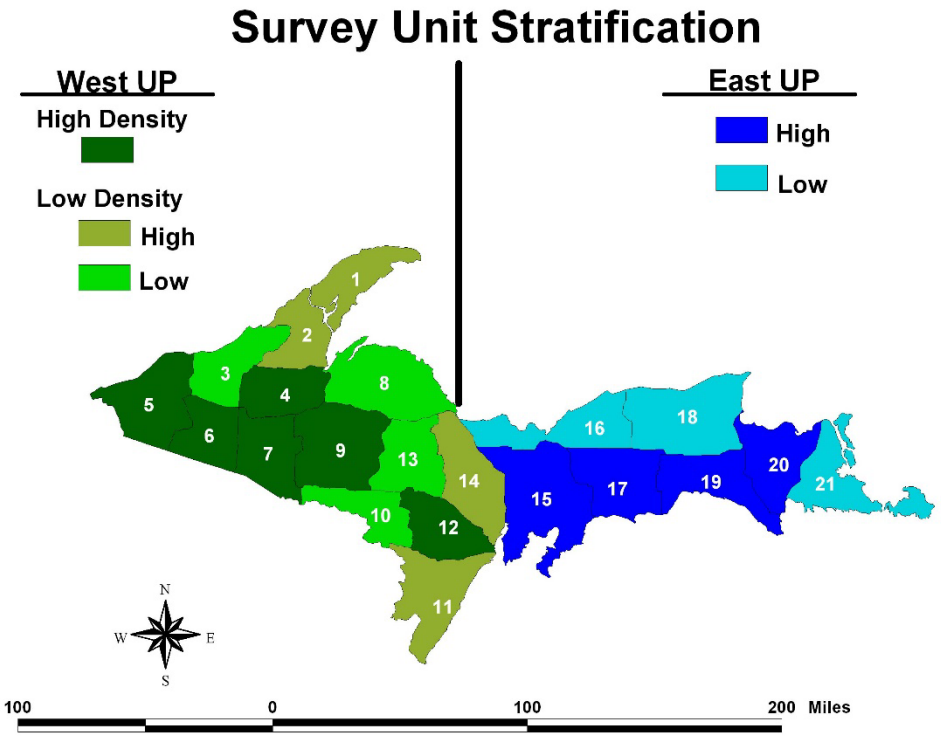
Minimum Count: Wolf Population Index

- Track Surveys
  - Cover 60% of UP biennially
  - Travel by truck or snowmobile
  - Intensive & extensive search for wolf tracks and sign
  - Aerial counts



Background/Need for Wolf Abundance Project

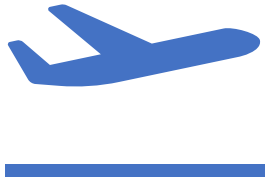
- Ongoing delisting/relisting of wolves requires the Department continue to monitor wolf abundance
  - Desire to have accurate information on wolf status and abundance

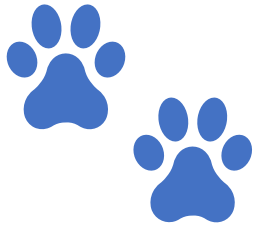
- Current minimum count requires significant effort to provide index of abundance
  - As wolf density has increased more time is needed to discern adjacent packs
  - Does not account for imperfect detection
  - Does not provide a confidence (or credible) intervals

  - Proposed wolf abundance project to research alternatives to estimate wolf abundance (2022-2027)
    - Increase precision
    - Decrease cost

What are the alternatives?

- Aerial surveys
  - Significant forest cover and area precludes this method from being used
- Acoustic-howling
  - Low response rate and detection requires significant time investment to determine abundance
- Occupancy based snow track surveys
  - Modification of current track survey to account for imperfect detection
- Camera surveys
  - Breakthroughs in machine learning allow for rapid classification of remote camera images
  - Potential to monitor other wildlife species in addition to wolves



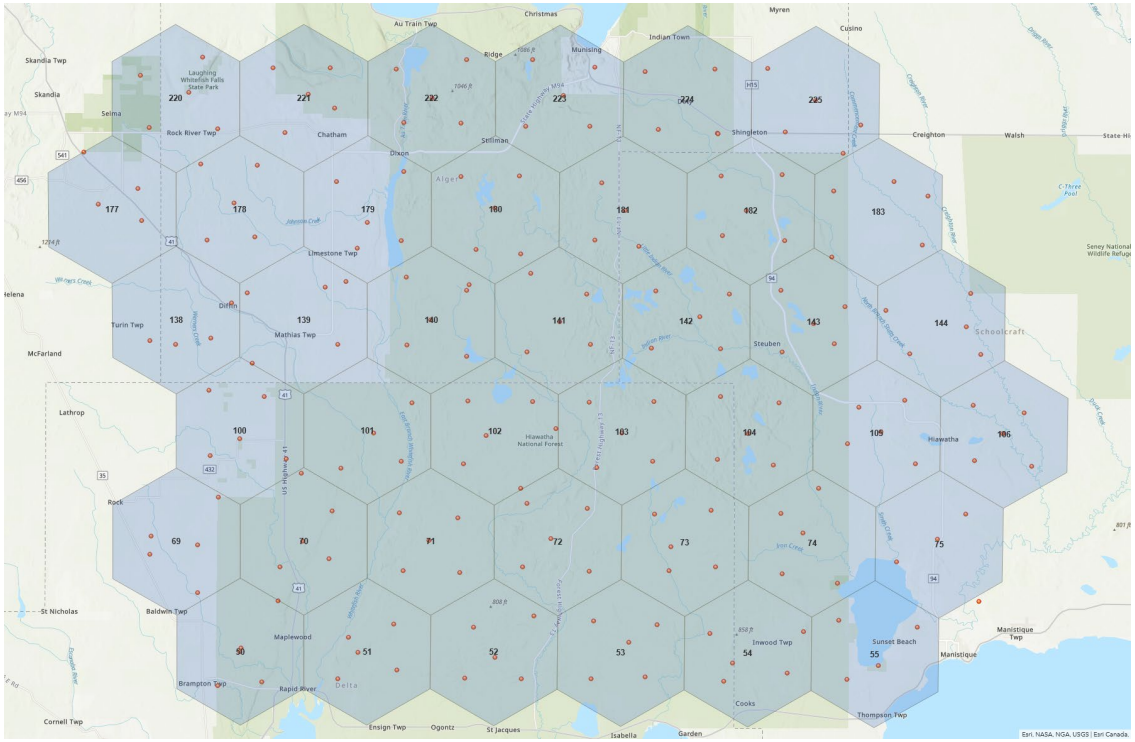


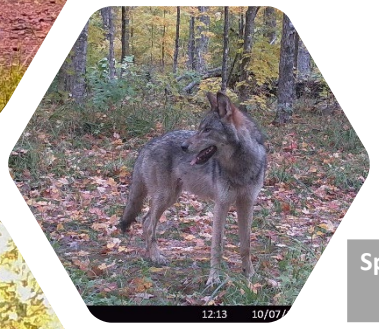
Wolf Abundance Project: Approach

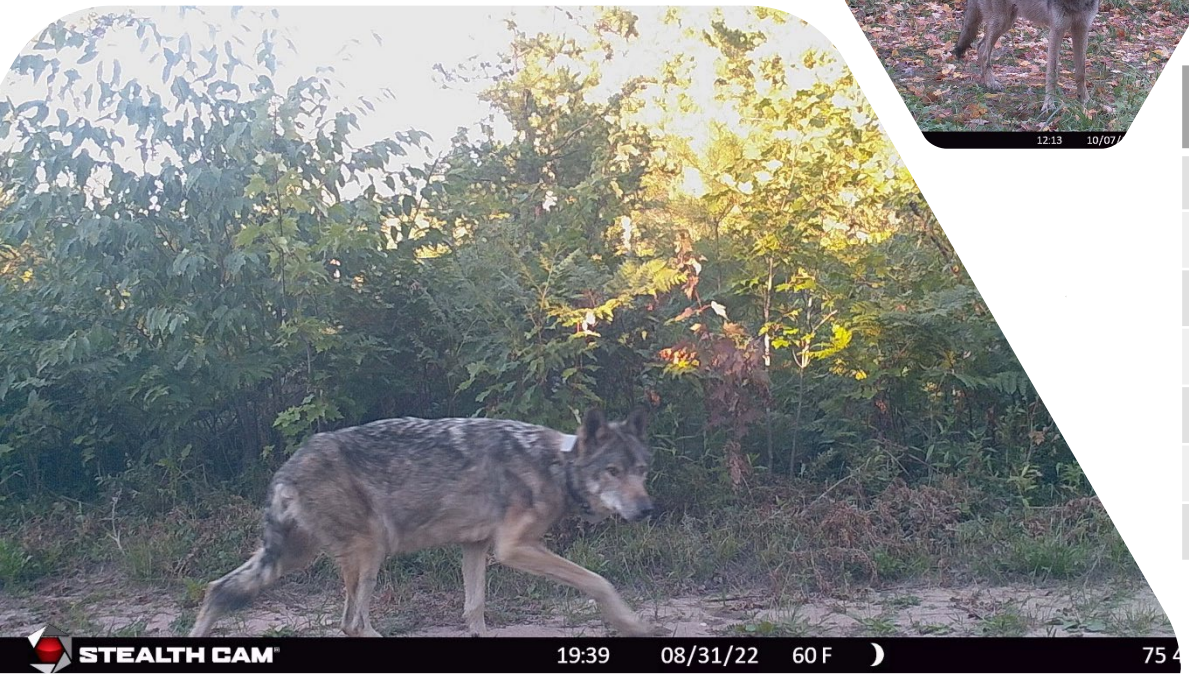
- Evaluate Efficacy of Occupancy-based Track Surveys
- Evaluate Efficacy of Camera-based Surveys
- Compare Cost-effectiveness of the 3 survey techniques, considering potential for monitoring other wildlife species.

2022 Pilot Camera Survey

- Feasibility study
- Pilot of 40 cells
  - 100 km^2 (~62 mi^2)
  - 200 cameras
  - 5 cameras per cell
    - Camera density: 1 camera / 20 km^2 (~12.5 mi^2)





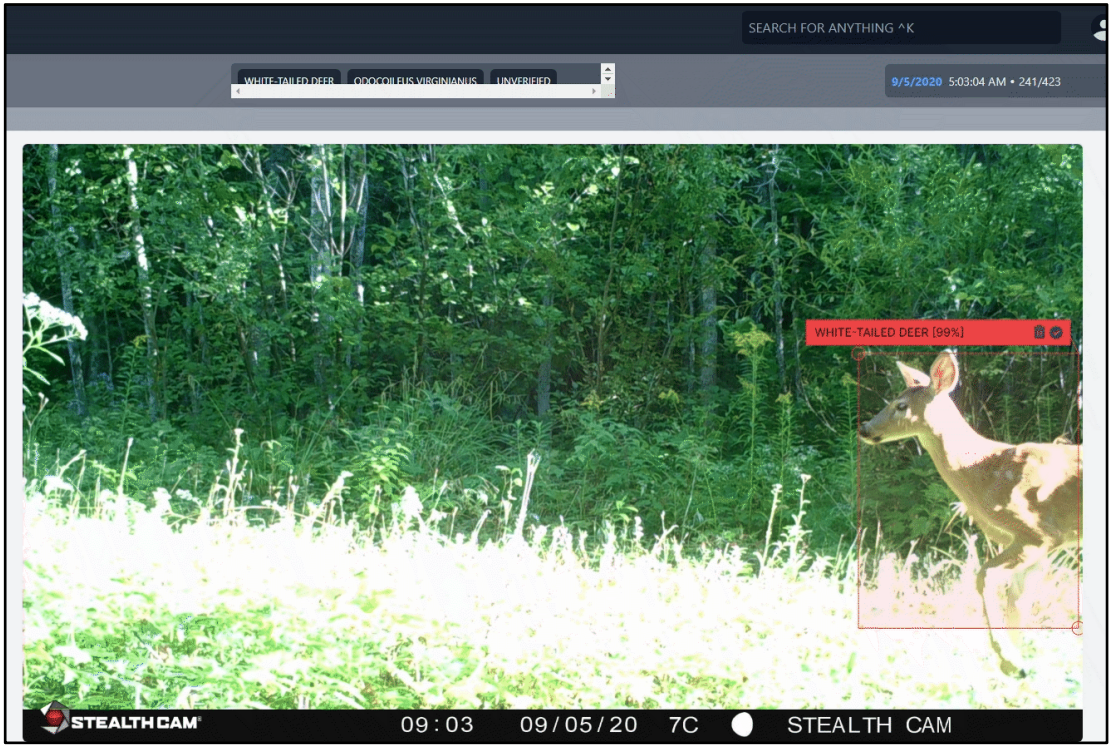


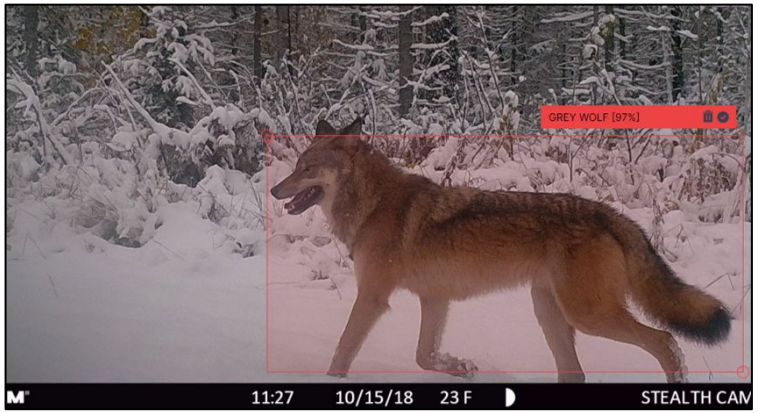
Preliminary Camera Survey Results

- Cameras deployed for 3 months
  - 1.7 million images

Species	Number of photos
Wolf	4,221
Black bear	7,534
Coyote	2,936
Bobcat	764
White-tailed deer	40,323
Sandhill crane	2,823
Red fox	2,315

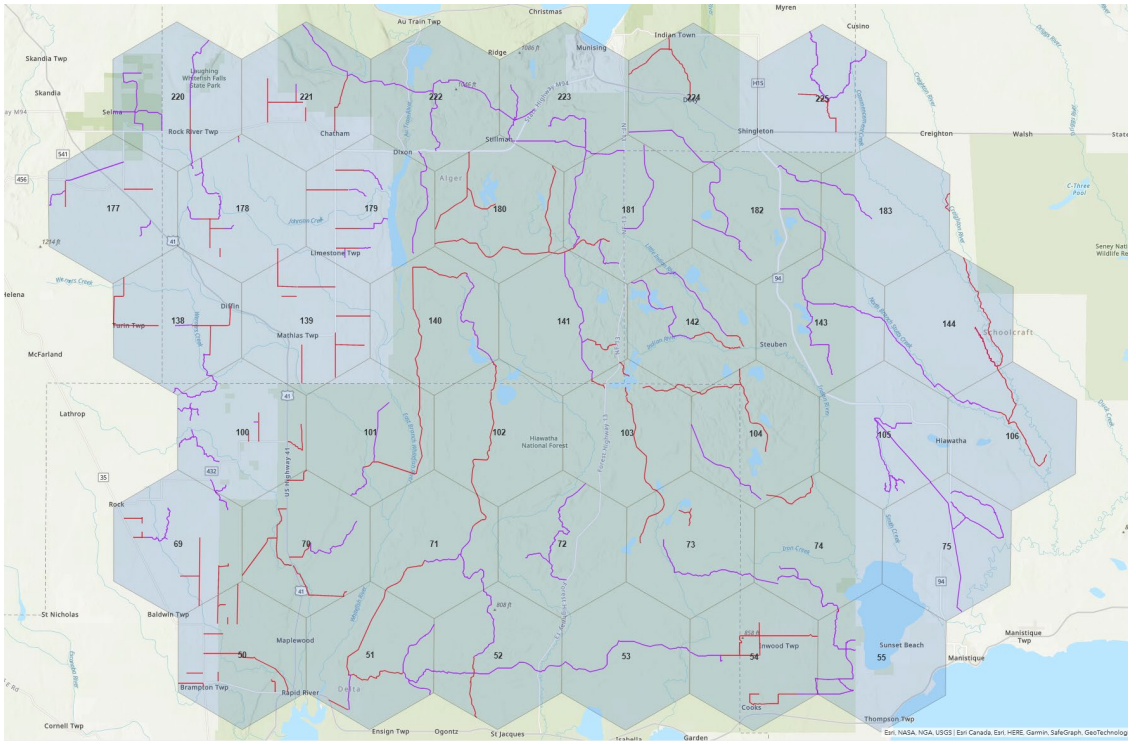
RECONN.AI - Sorting Through Photos





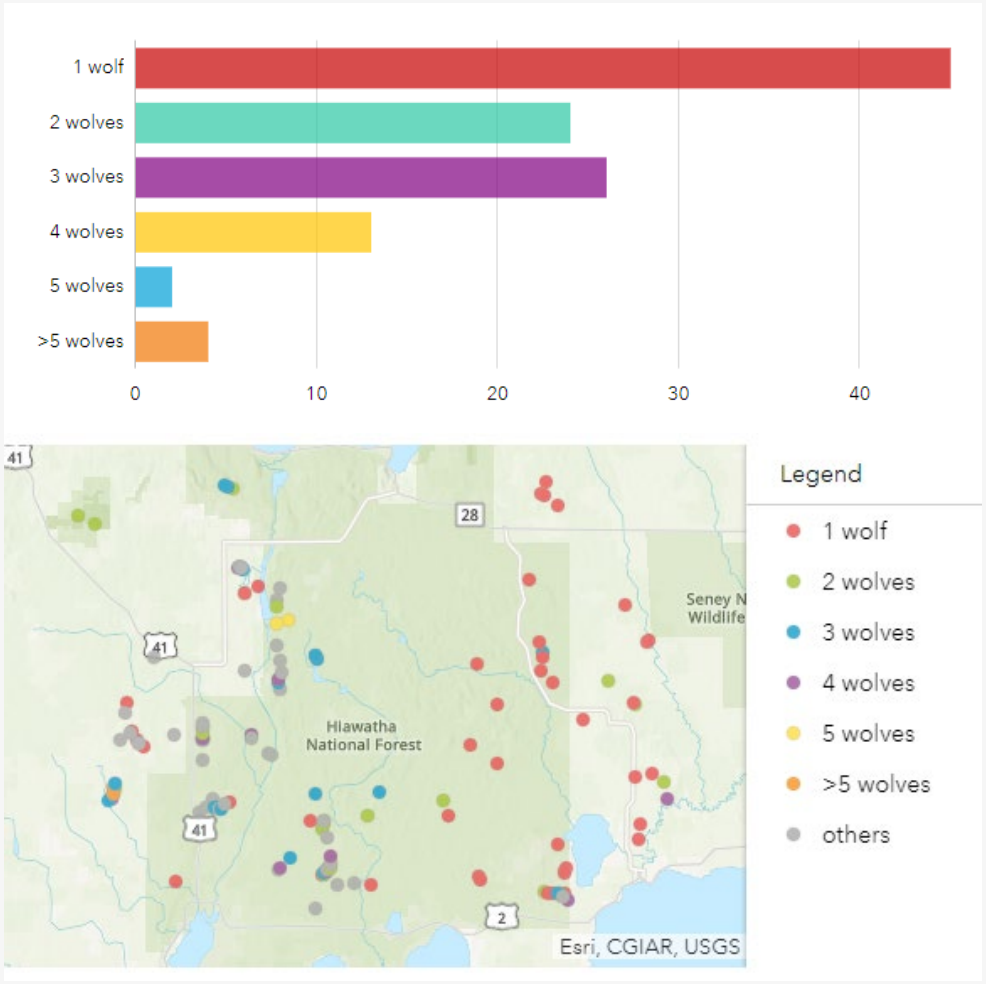
2022-2023 Pilot Snow Track Survey

- Feasibility study
- Pilot of 40 cells
  - 100 km^2 (~62 mi^2)
- Wolf snow track survey throughout pilot area
  - Truck/snowmobile track survey
  - 756 miles; average 19 miles/cell
  - Time consuming
  - Weather dependent
  - Scaling up is difficult



Preliminary Track Survey Results

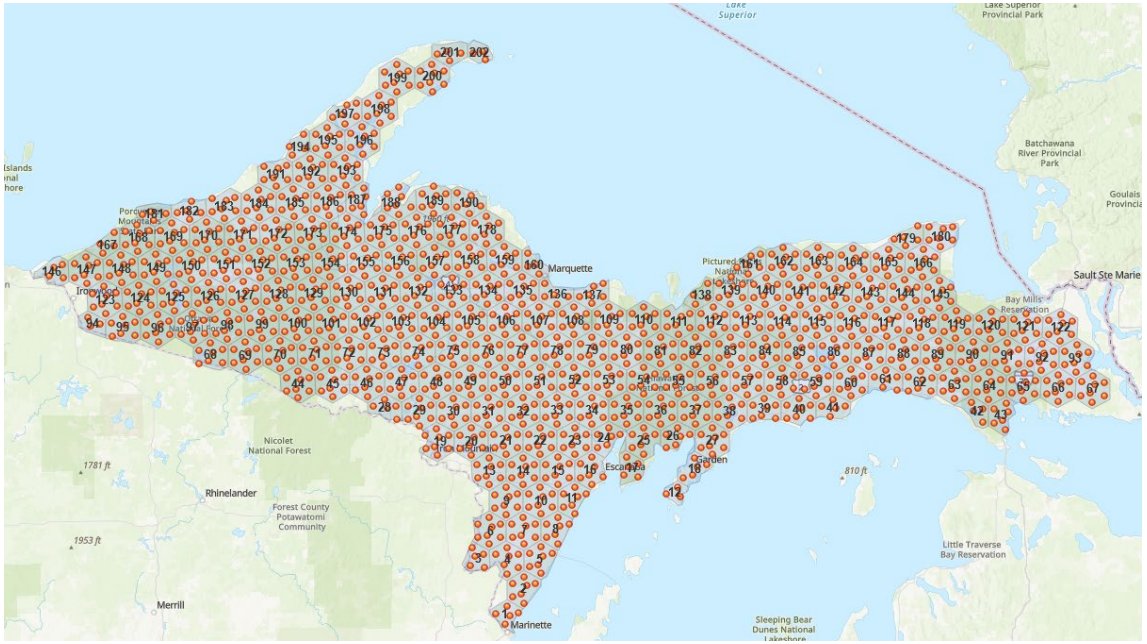
- 2,268 miles driven
- 119 observations of wolf tracks



Scaling up to a Peninsula-wide survey

- Preliminary analysis
  - Demonstrated need for some alterations
  - Cell size increased to match annual home range of GPS collared wolves
  - Camera density decreased
  - Change in deployment style

- Camera grid to cover entirety of UP
  - 202 cells
    - 210 km^2 (~130.5 mi^2)
  - 8 cameras per cell
    - Camera density: 1 camera / 26.25 km^2 (~16 mi^2)



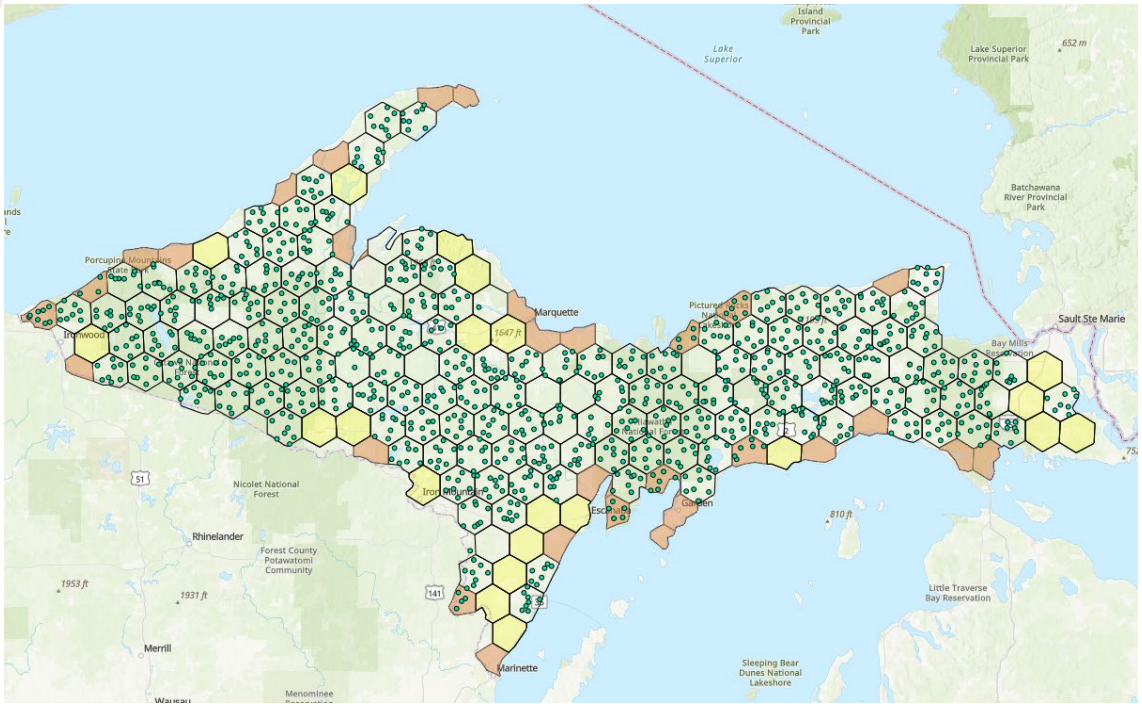
Camera Deployments

- Browning Dark Ops HD ProX Cameras
- Placed on closest accessible road or trail near pre-determined point
  - Wolves habitually travel low use roads and trails
- Camera placement
  - Approximately 4.5 ft. from the base of the tree
  - Oriented in a general north direction down the trail

Peninsula-wide deployments

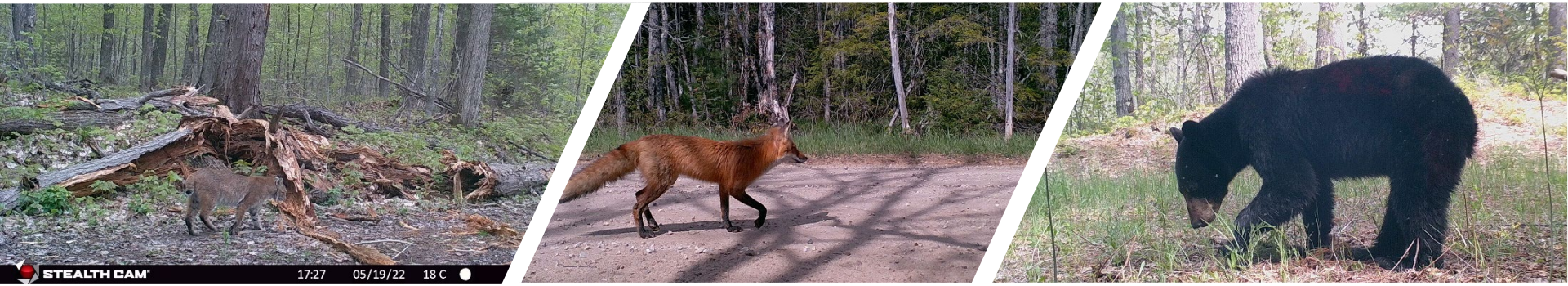
- 159 cells with cameras
  - 1,230 cameras deployed

- Some cells excluded due to size/ownership
  - 22 partial cells
  - 21 cells mostly private ownership



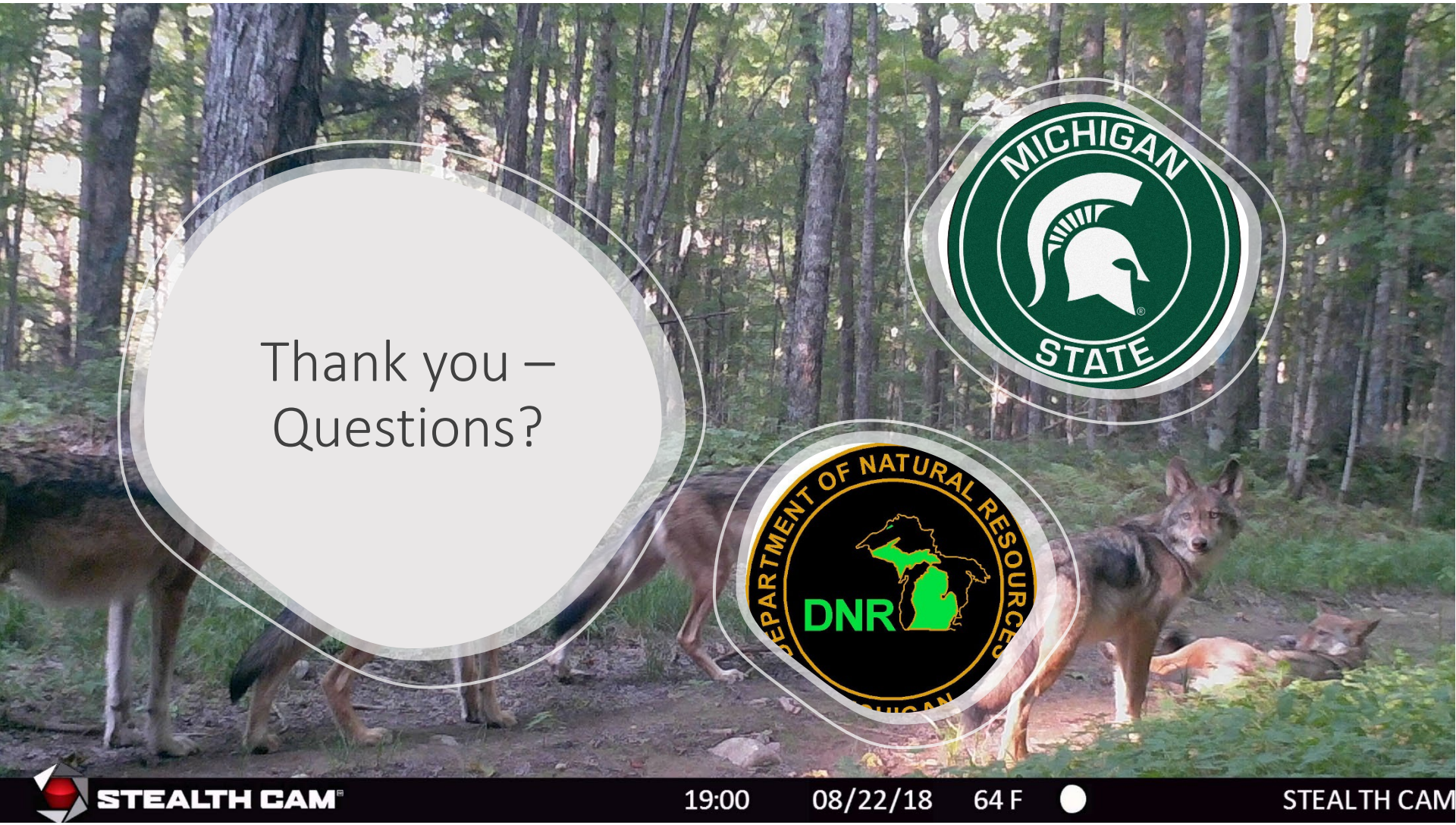
Potential monitoring tool for other wildlife species

White-tailed deer, moose, bobcat, black bear, red fox, gray fox, coyote, turkey



Wolf Abundance Project – Ongoing Research

- Full camera deployment planned for next two years
  - Cameras deployed in summer 2023 will be revisited in 2024 and 2025
- 2024-2025
  - Photo analysis using RECONN.AI
  - Wolf abundance estimate for U.P.
  - Annual reports available to public
  - Public facing website with interactive results
- 2025 and beyond
  - Continuation of full camera deployment for wolf and other species abundance estimates in the U.P.


Thank you –
Questions?
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