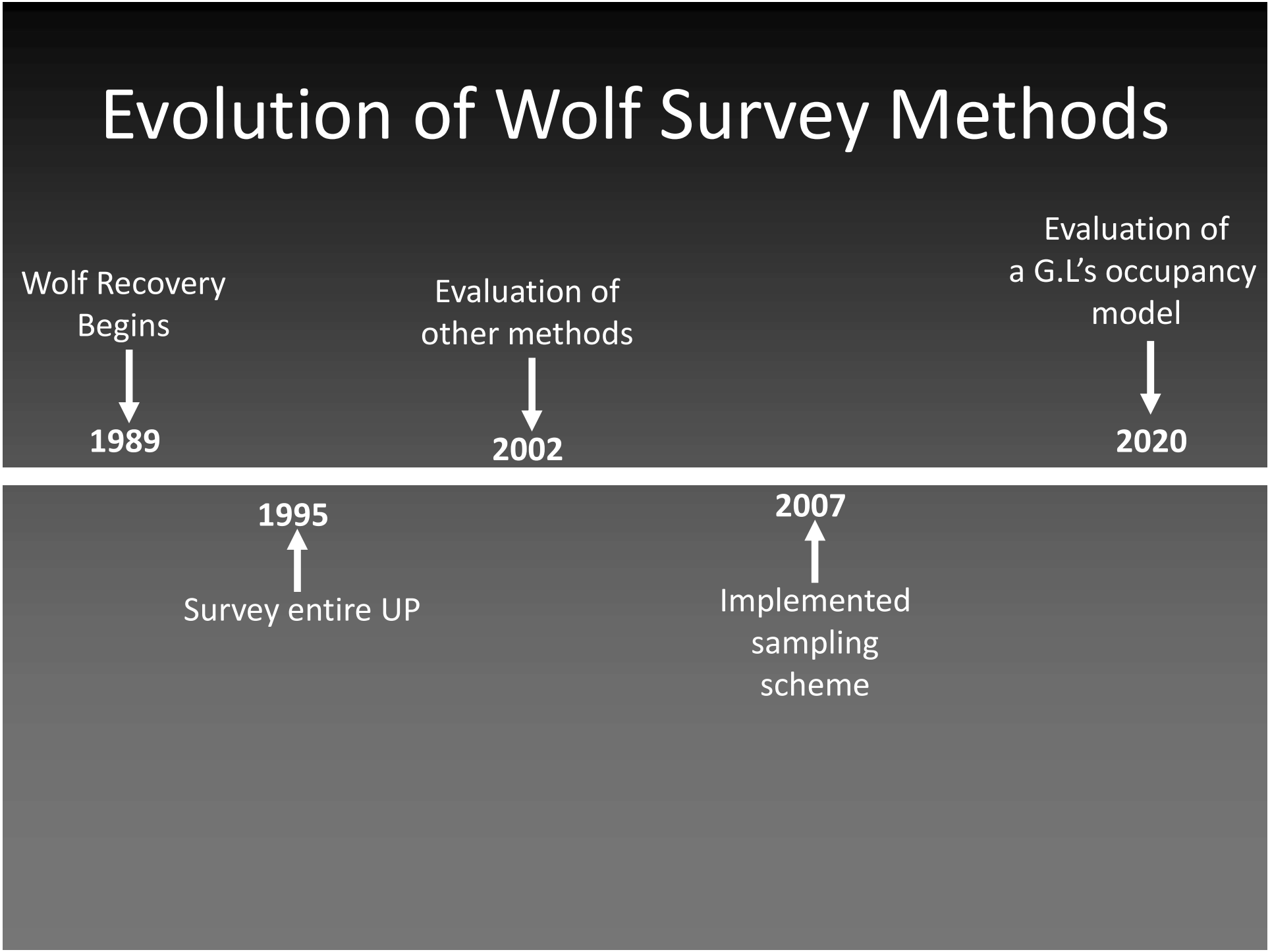
ESTIMATING THE ABUNDANCE OF WOLVES IN MICHIGAN

Why monitor wolf abundance?

- **Recovery Criteria:**
  - Federal: Combined MI & WI population of ≥100 wolves for a minimum of 5 consecutive years.
  - Federal: 5-factor threat analysis (habitat, overuse, disease, inadequate protection, other factors)
  - State: Population of ≥200 wolves for 5 consecutive years.
  - Federal: 5-year post-delisting monitoring
- **Wolf harvest management**


Actions
Legal Challenges
1974: Listed-Federal Endangered
1976: Listed-State Endangered
2002: Reclassified-State Threatened
2003: Reclassified-Federal Threatened
2004: Federal Delisting Proposed
2005: Federal Reclassification enjoined and delisting invalidated
2007: Federal Delisting
2008: Federal Delisting enjoined
2009: Federal Delisting; State Delisting
2009: Federal Delisting Withdrawn
2012: Federal Delisting
2014: Federal Delisting enjoined
2017: 2014 Federal Court Decision Upheld
2021: Federal Delisting
2021: On going litigation

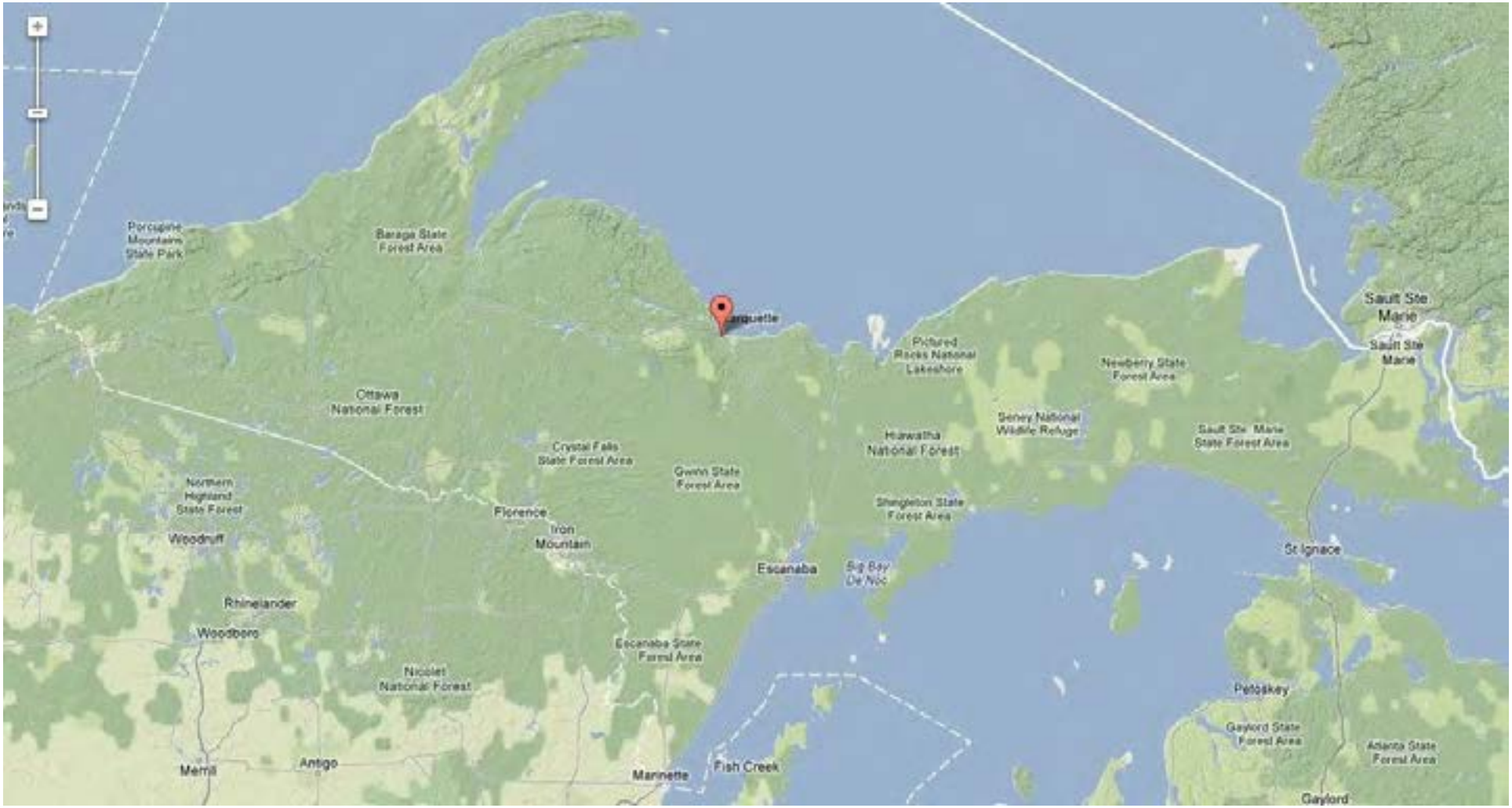
Evolution of Wolf Survey Methods



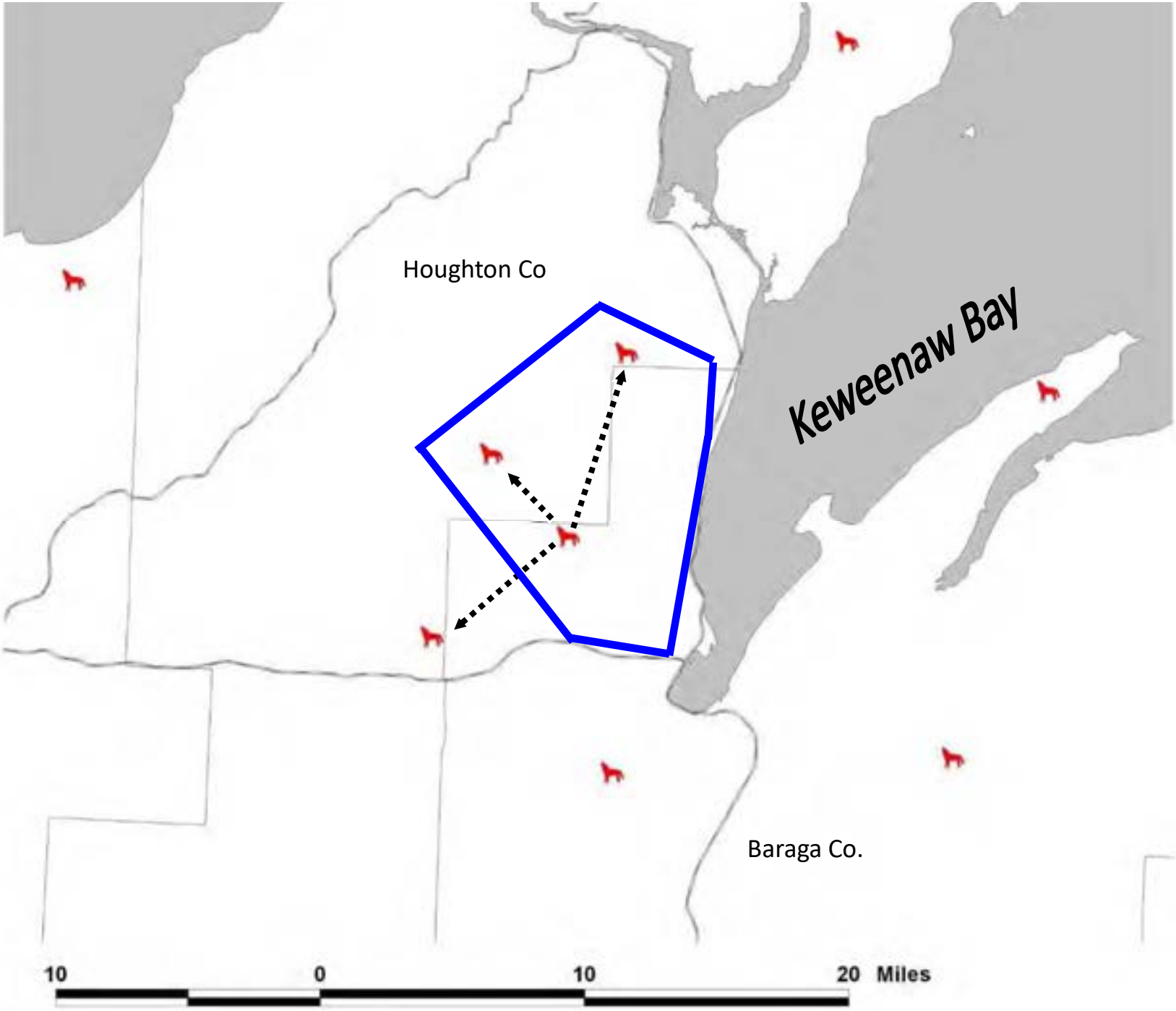
Winter Wolf Survey

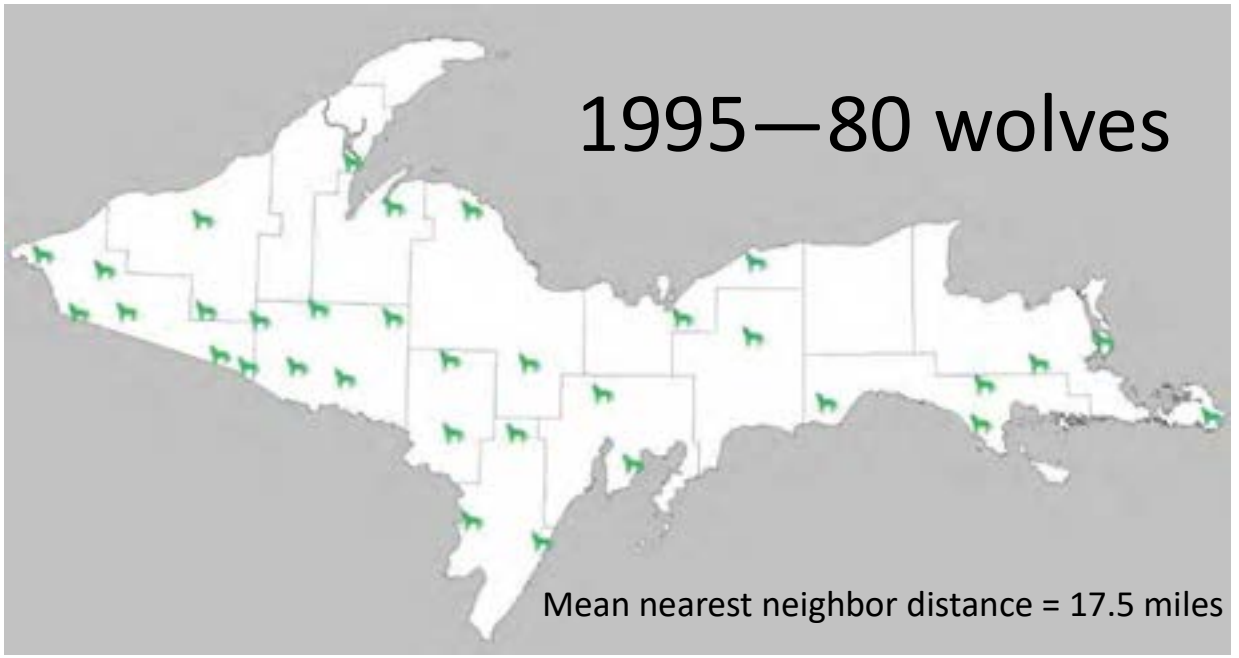
- Intensive & extensive search for wolf tracks and sign

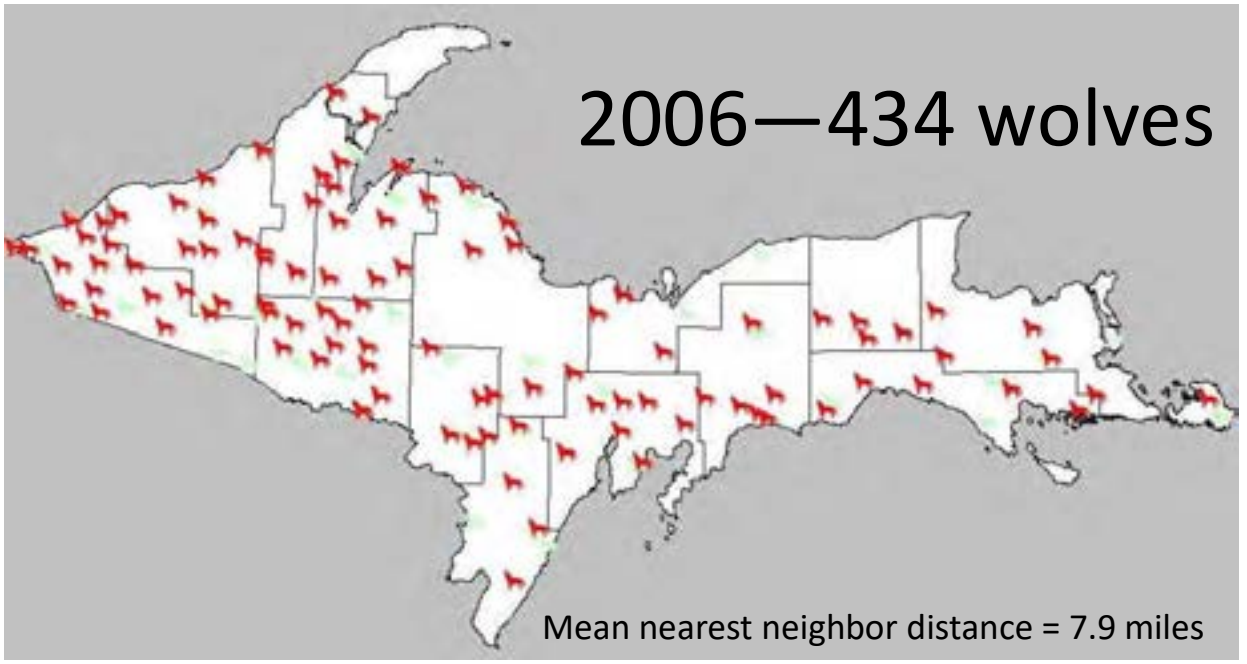
Winter Wolf Survey



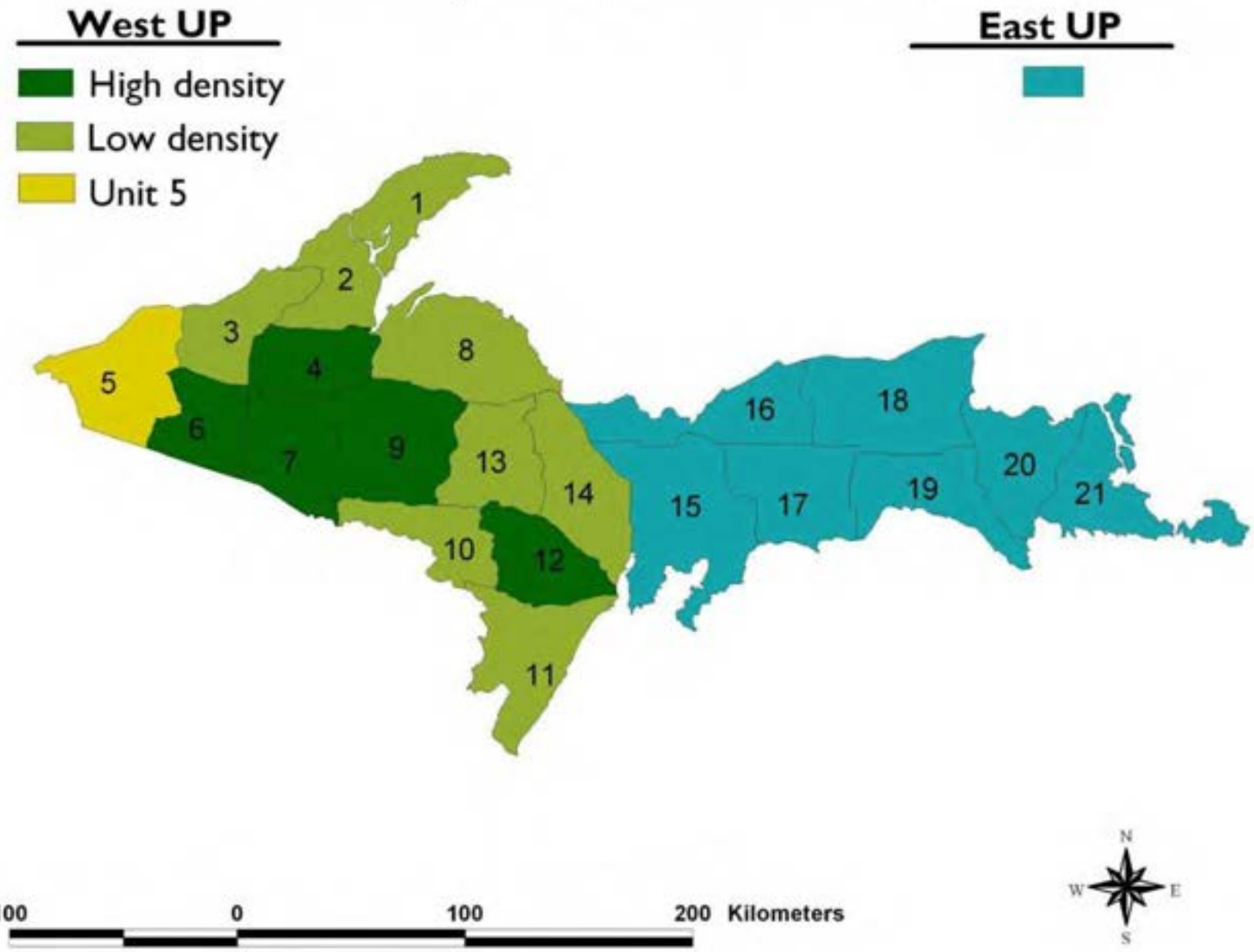
Upper Peninsula: ~16,500 mi^2 or 43,000 km^2


Houghton Co
Keweenaw Bay
Baraga Co.
10
0
10
20 Miles


1995—80 wolves
Mean nearest neighbor distance = 17.5 miles


2006—434 wolves
Mean nearest neighbor distance = 7.9 miles

Survey Unit Stratification



Sources of Error

Are we missing packs?

- Probably not--data suggests high level of effort is effective

Are we missing loners?

- Yes--(MI-1-7%; literature-10-15%)

Are we counting all members of a pack?

- To evaluate how many, we are missing:
  - Double counts
  - Independent survey crews

How accurate are the minimum population estimates?

	2001-02		2002-03		2003-04		2004-05	
Pack Area	DNR	MTU	DNR	MTU	DNR	MTU	DNR	MTU
Ewen	3	3	3	3	4	4	4	6
Baraga Plains	7	8	7	12	7	9	8	14
Sidnaw/Kenton	4	4	3	3	8	4	11	6
Trout Creek	5	5	2	2	4	6	4	5
Gardner	---	---	6	5	9	8	7	4
Curwood	---	---	9	11	3	4	5	2
Total Count	**19**	**20**	**30**	**35**	**35**	**35**	**39**	**37**


The field work is done--What are the next steps?

Final Review

Information used in wolf survey review

- Geographically where was the pack found?
- Justification for surrounding packs, which also includes packs that are not in the survey unit (or even a unit that is being surveyed)
- How many times was the pack found?
- How far were the tracks followed?
- When was the last snow fall?
- When during the survey was the pack found (January or March)
- Is telemetry available?
- Historic pack information (Telemetry and past survey locations)
- Signs of breeding (Urinations, Estrus)
- Other data when available (Predator Prey, etc.)

Track Data

MICHIGAN WOLF TRACK SURVEY DATA
2017-2018

Observers Name JEFF LUKOWSKI
Date 2/24/18 Time 4:00pm Temperture 30°F
County MENOMINEE Town 40N Range 24W Section 33
GPS Coordinates (decimal minutes, WGS84) Latitude _____ Longitude _____

SNOW TYPE:
Hard pack ✓ Crusted _____ Soft Fluff ✓ Wet Melt _____
Approximate hours since last snowfall 12HRS

TRACKS:
(Tracks)/ Sighting (circle one)
Pack Name NORTH POWER
Number of sets of tracks or animals 2
Track measurement- several by random (average)

Length 5 " Width 4 1/4 "
Length 4 3/4 " Width 4 "
Length 4 3/4 " Width 4 "
Length 4 3/4 " Width 4 "
Length 4 1/2 " Width 3 3/4 "

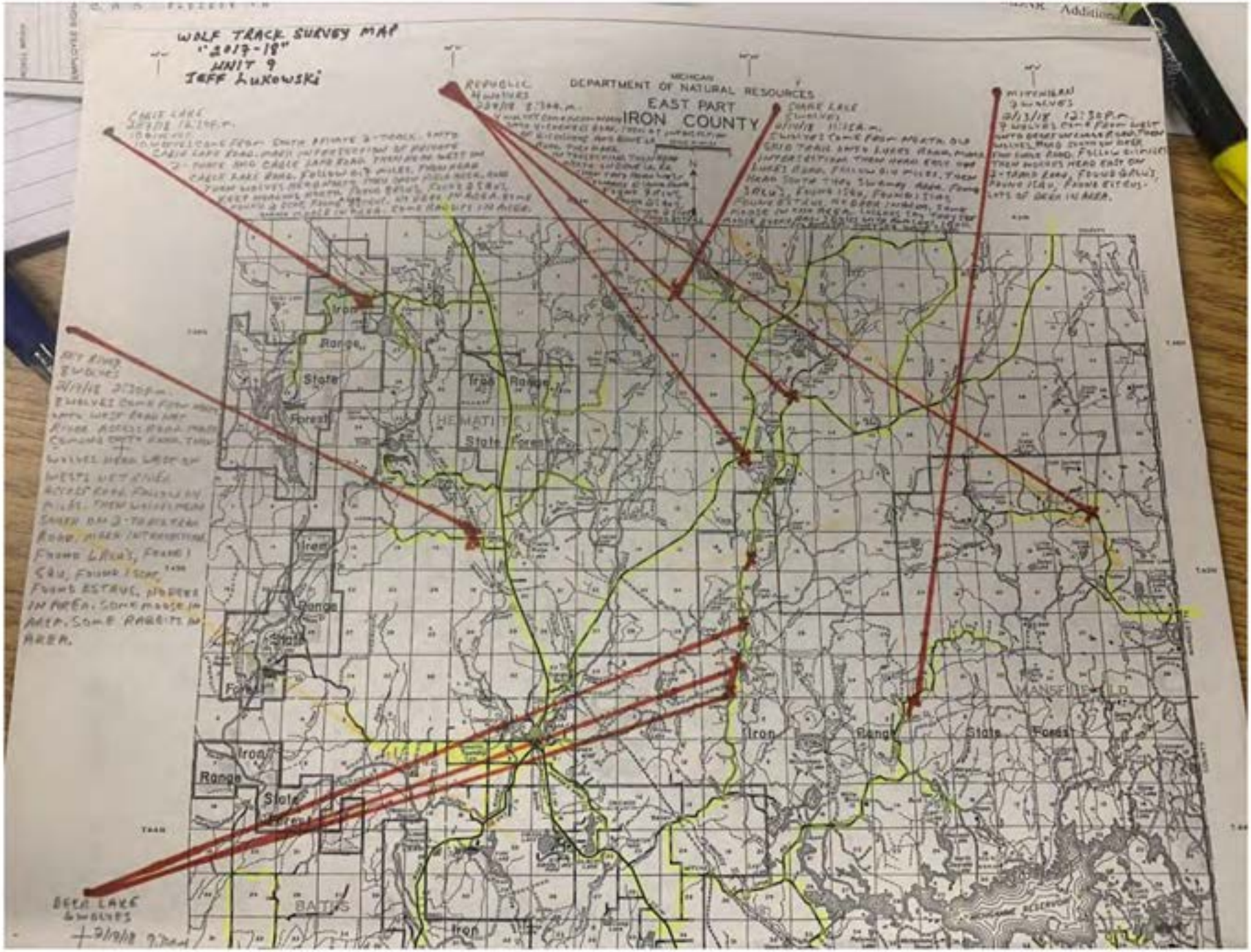
Track stride- several by random (average)
(measured from front of 1st step to front of 3rd step)

60 "

Tracks: (Straight lined)/ Staggered (circle one)

Approximate track age 1 DAY
Approximate depth of track in snow 1" - 5"
Approximate distance followed 11.6 MILES

RLU's found YES number found in area 1
SQU's found YES number found in area 2
Estrus (yes) / no
Scat (yes) / no Collected yes / (no)
Photos taken (yes) / no


WOLF TRACK SURVEY MAP
"2017-18"
UNIT 9
JEFF LUKOWSKI
MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
EAST PART
IRON COUNTY
Iron
Range
State
Forest
HEMATITE
State Forest
MANSFIELD
BATES
BEER LAKE
6 WOLVES
+ 2/19/18 9:30AM

Justifications

WINTER WOLF SURVEY
JUSTIFICIATION SUMMARY
2017-2018

Observers Name JEFF LUKOWSKI Date 2/6/18
Unit 4
County HOUGHTON Town 50N Range 35W Sec 20
Pack/Pair/Loner ID PRICKETT DAM ([redacted]) Number of Wolves 5
Breeding/Territorial Signs

Adjacent Packs/Pairs/Loners: ☐ None close

	Number of Wolves
(1) BARAGA PLAINS	5
(2) ROUSSEAU	4
(3) SIDNAW/KENTON ([redacted])	8
(4) SIX MILE ([redacted])	4
(5) STURGEON CREEK ([redacted])	3

([redacted]) **Justifications (check one or more)**

Justification (1) PRICKETT DAM vs BARAGA PLAINS

- ☐ A. Both packs observed from the air on the same day.
- ☒ B. Both packs radio-collared and telemetry shows both packs using different areas.
- ☒ C. Neighboring radio-collared pack never located in this area.
- ☒ D. No evidence of tracks found crossing roads between these two areas.

Additional Supporting Evidence

- ☒ 1. Tracks traveling opposite direction found on the same day.
- ☒ 2. Tracks found repeatedly in same locations during past track surveys.
- ☐ 3. Evidence of den sites and pups in both areas during the same year.

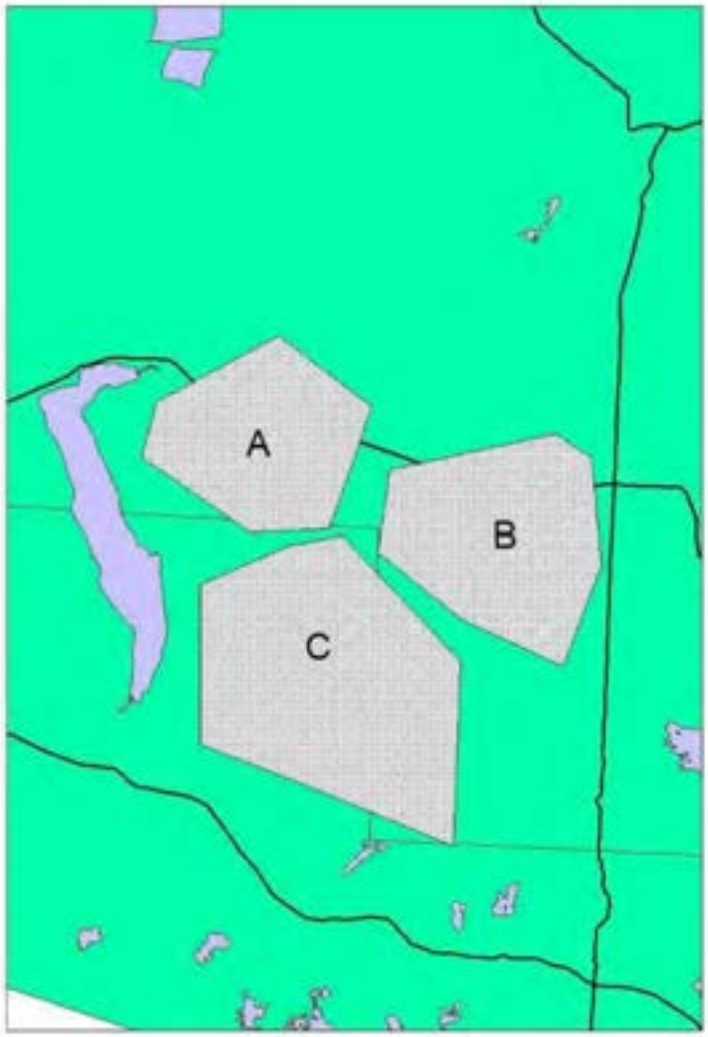
([redacted])

Justification (2) PRICKETT DAM vs ROUSSEAU

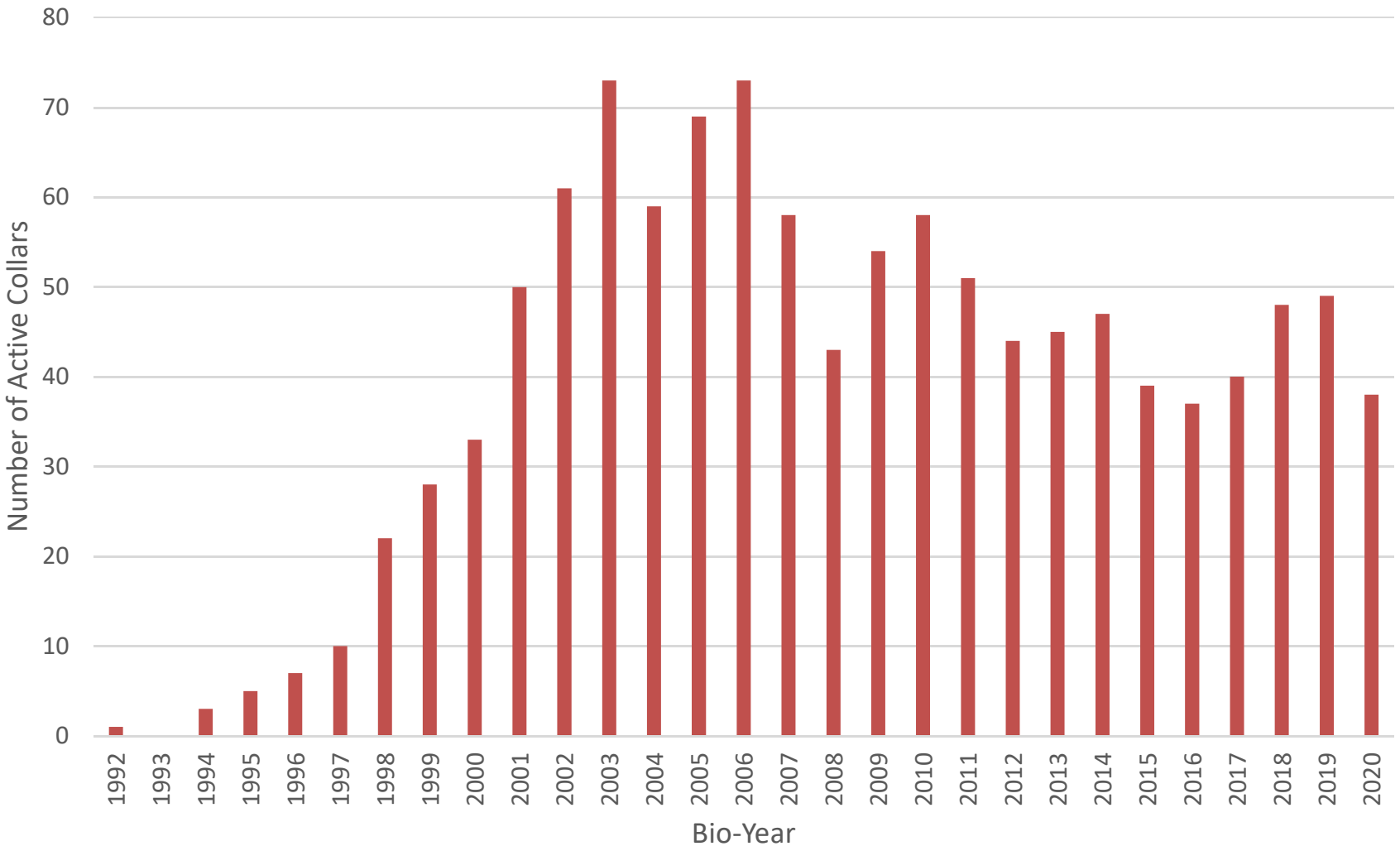
- ☐ A. Both packs observed from the air on the same day.
- ☐ B. Both packs radio-collared and telemetry shows both packs using different areas.
- ☐ C. Neighboring radio-collared pack never located in this area.
- ☒ D. No evidence of tracks found crossing roads between these two areas.

Additional Supporting Evidence

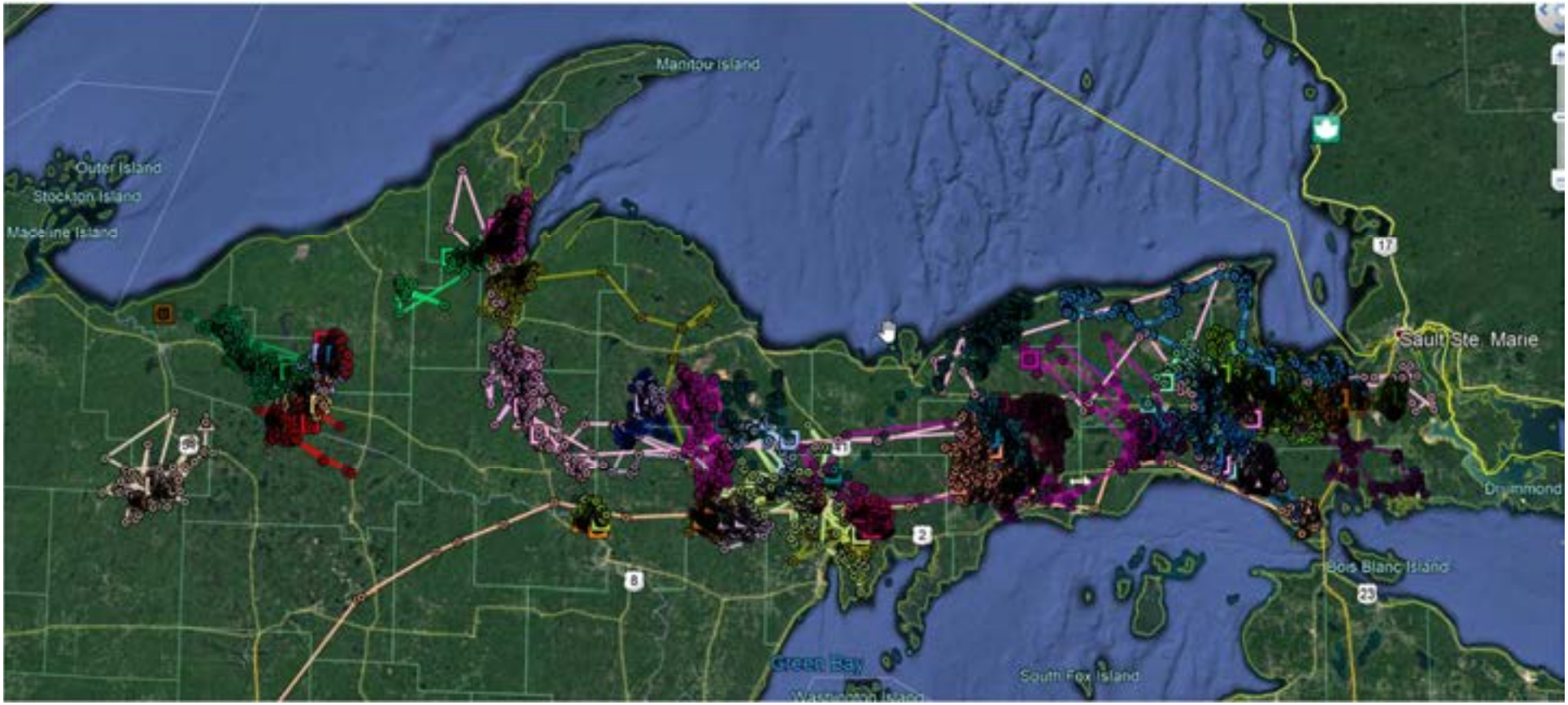
- ☒ 1. Tracks traveling opposite direction found on the same day.
- ☐ 2. Tracks found repeatedly in same locations during past track surveys.
- ☐ 3. Evidence of den sites and pups in both areas during the same year.



Number of Active Collars

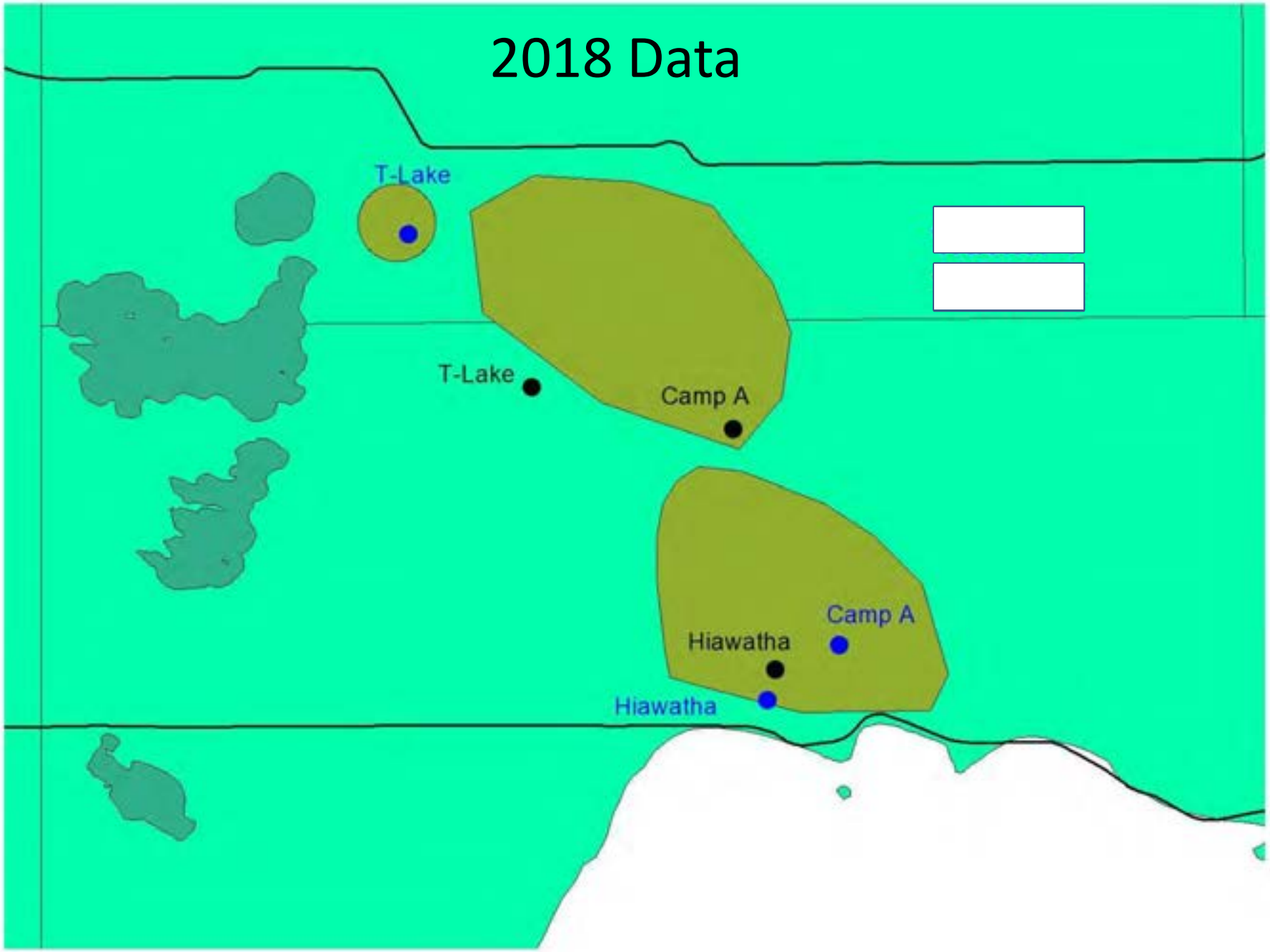


Over 50,000 individual locations in year

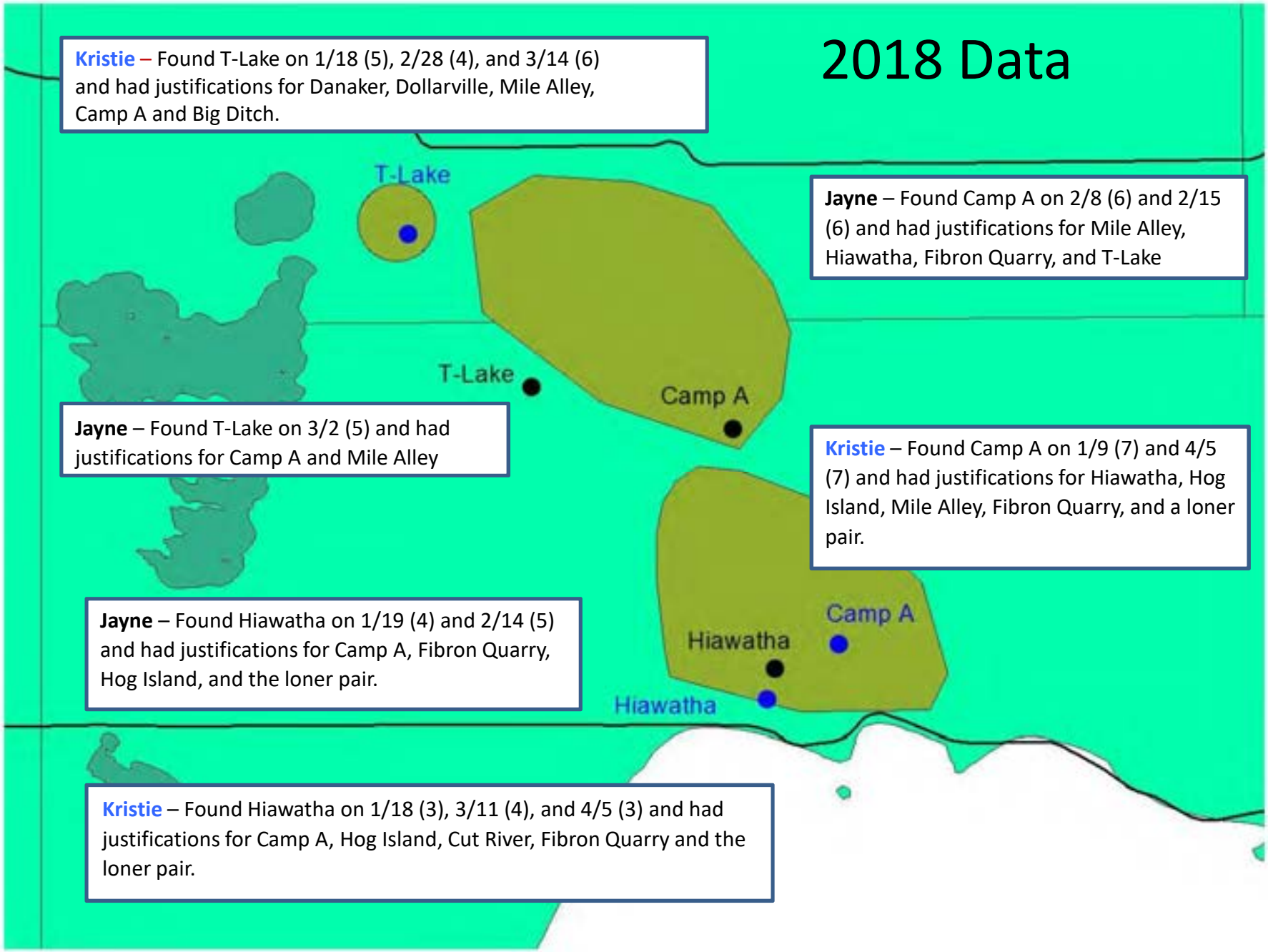


2020 Data

2018 Data



2018 Data



Kristie – Found T-Lake on 1/18 (5), 2/28 (4), and 3/14 (6) and had justifications for Danaker, Dollarville, Mile Alley, Camp A and Big Ditch.

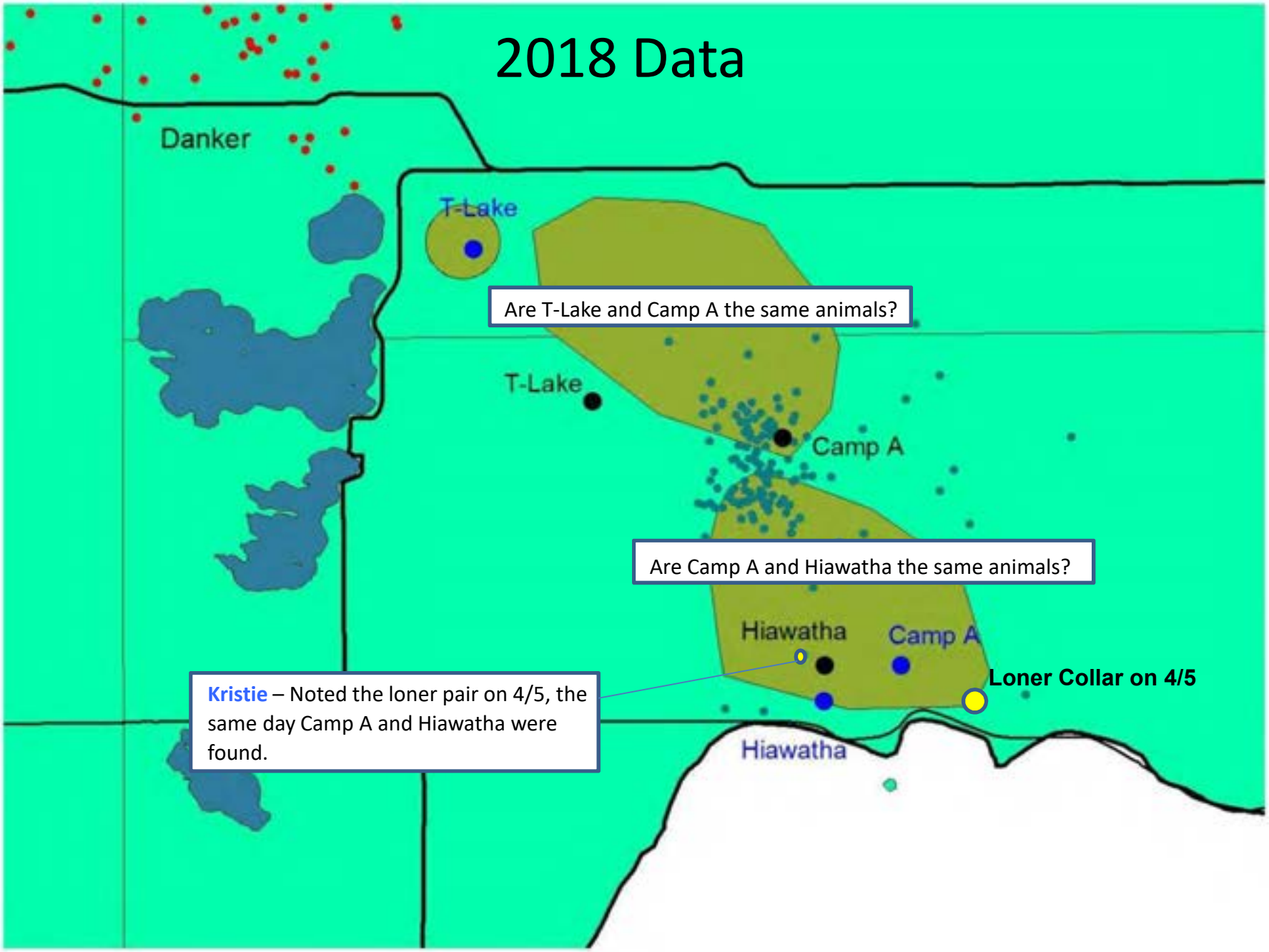
Jayne – Found Camp A on 2/8 (6) and 2/15 (6) and had justifications for Mile Alley, Hiawatha, Fibron Quarry, and T-Lake

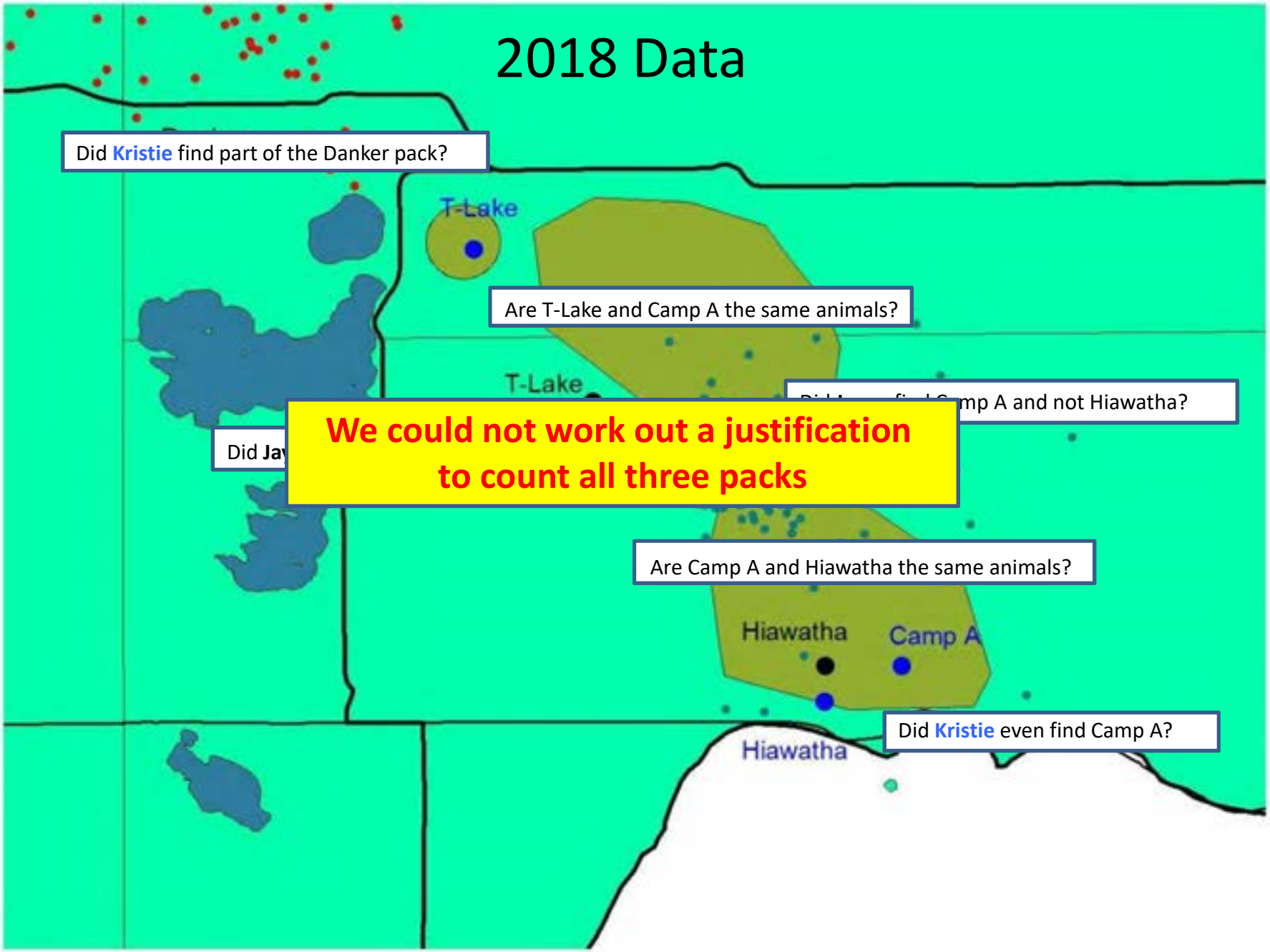
Jayne – Found T-Lake on 3/2 (5) and had justifications for Camp A and Mile Alley

Kristie – Found Camp A on 1/9 (7) and 4/5 (7) and had justifications for Hiawatha, Hog Island, Mile Alley, Fibron Quarry, and a loner pair.

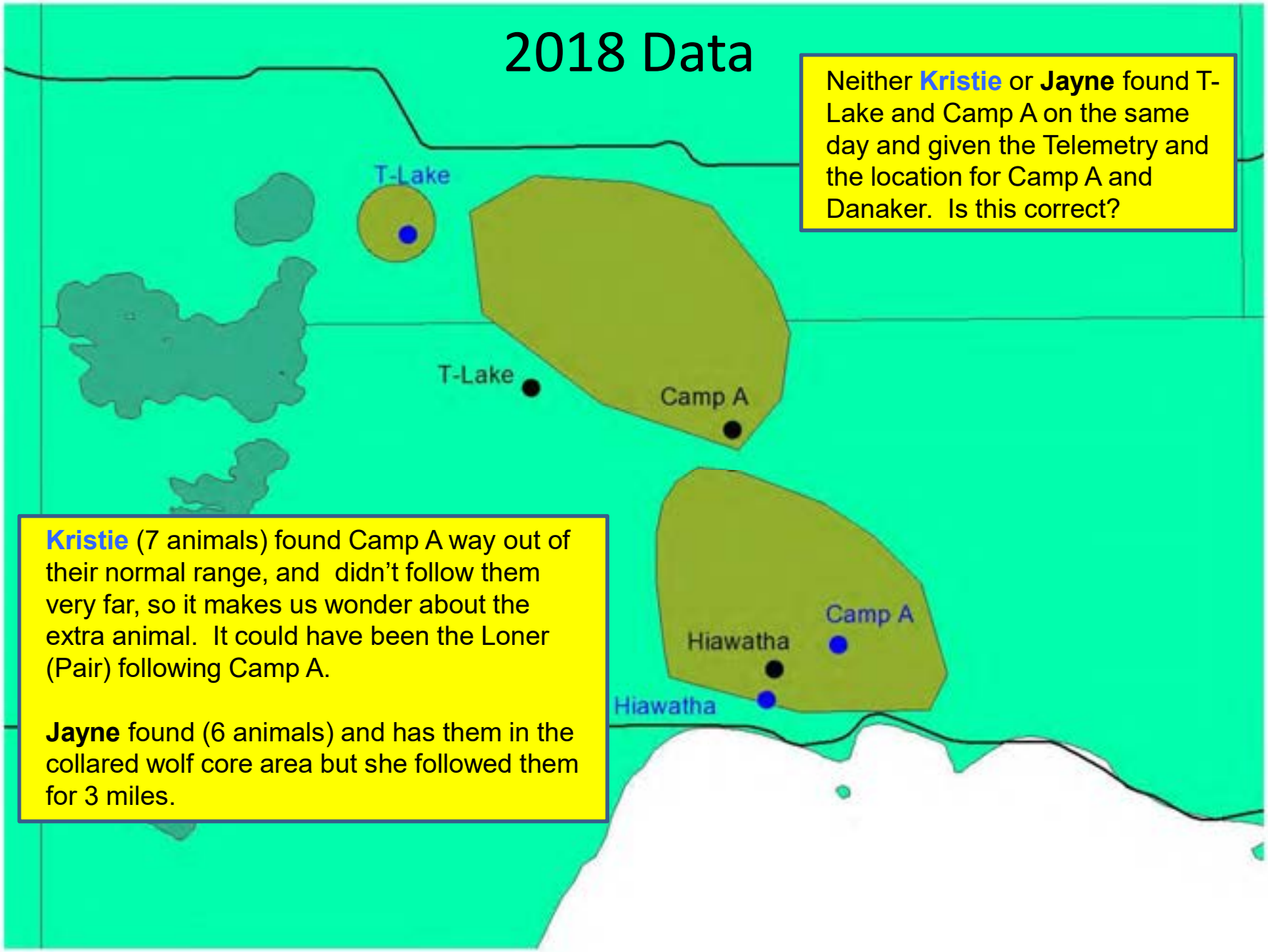
Jayne – Found Hiawatha on 1/19 (4) and 2/14 (5) and had justifications for Camp A, Fibron Quarry, Hog Island, and the loner pair.

Kristie – Found Hiawatha on 1/18 (3), 3/11 (4), and 4/5 (3) and had justifications for Camp A, Hog Island, Cut River, Fibron Quarry and the loner pair.


2018 Data
Danker
T-Lake
Are T-Lake and Camp A the same animals?
T-Lake
Camp A
Are Camp A and Hiawatha the same animals?
Hiawatha
Camp A
Loner Collar on 4/5
Kristie – Noted the loner pair on 4/5, the same day Camp A and Hiawatha were found.
Hiawatha


2018 Data
Did Kristie find part of the Danker pack?
T-Lake
Are T-Lake and Camp A the same animals?
T-Lake
mp A and not Hiawatha?
Did Jay
We could not work out a justification to count all three packs
Are Camp A and Hiawatha the same animals?
Hiawatha
Camp A
Did Kristie even find Camp A?
Hiawatha

2018 Data

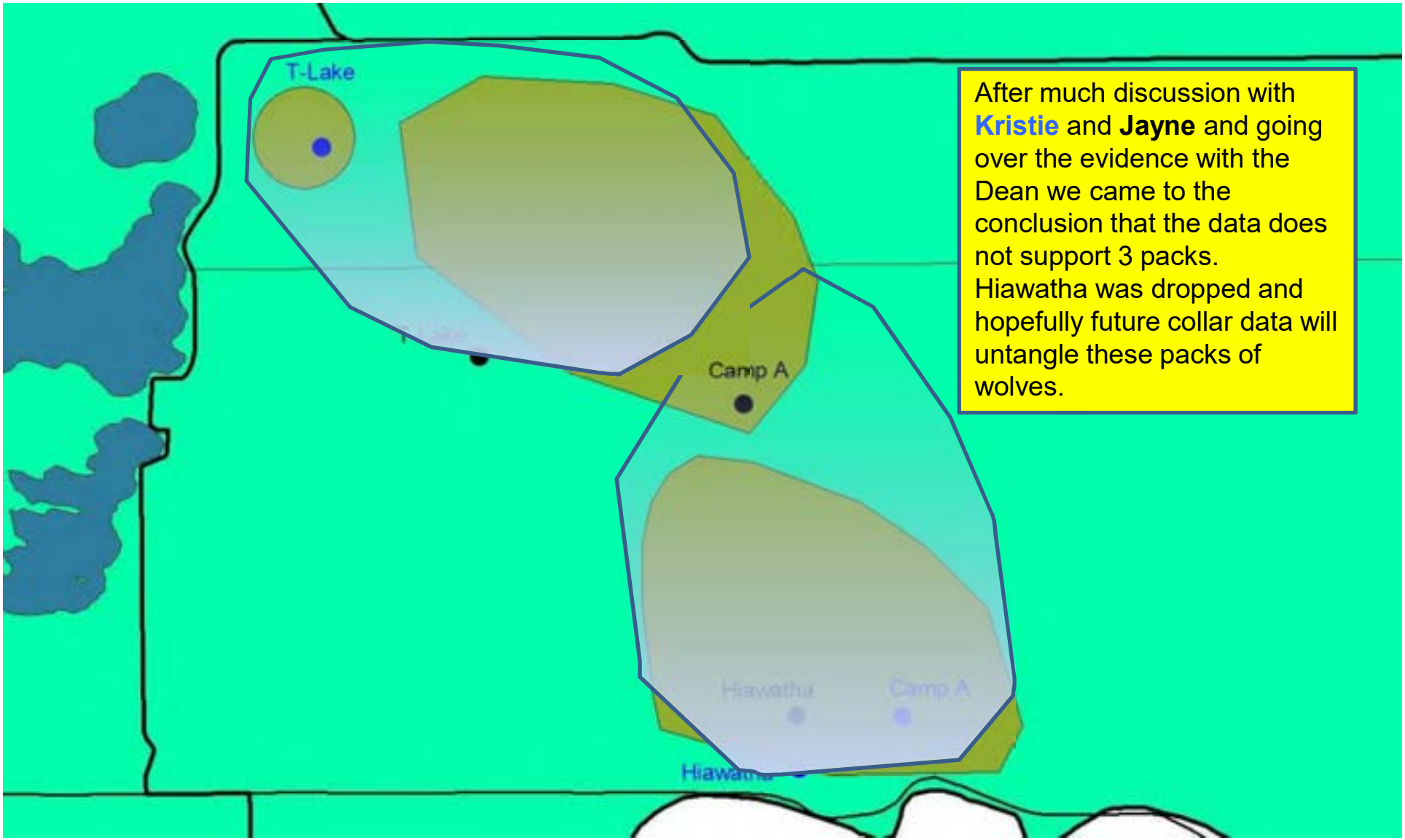


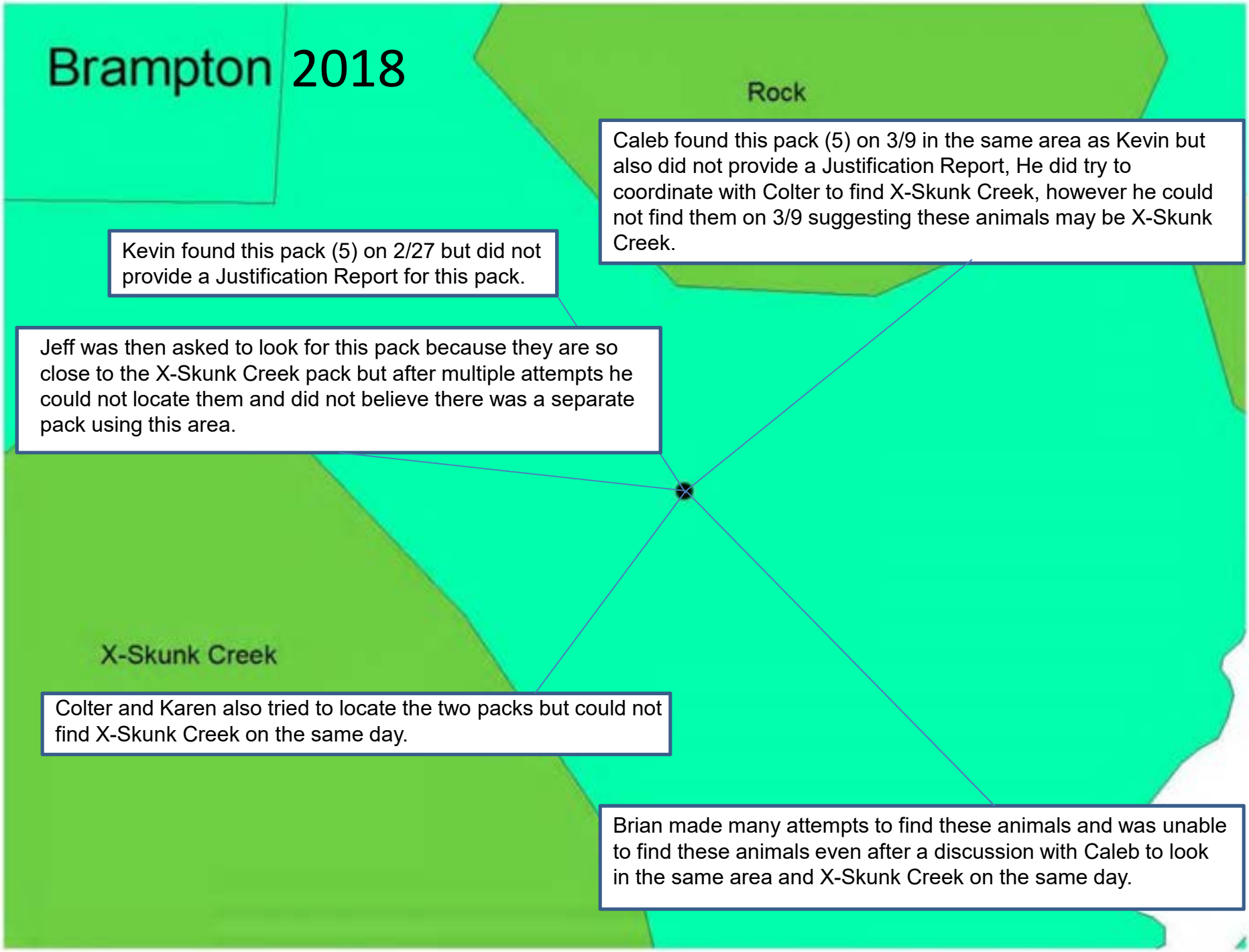
Neither **Kristie** or **Jayne** found T-Lake and Camp A on the same day and given the Telemetry and the location for Camp A and Danaker. Is this correct?

Kristie (7 animals) found Camp A way out of their normal range, and didn't follow them very far, so it makes us wonder about the extra animal. It could have been the Loner (Pair) following Camp A.

Jayne found (6 animals) and has them in the collared wolf core area but she followed them for 3 miles.

2018 Data


T-Lake
Camp A
Hiawatha
Camp A
Hiawatha
After much discussion with Kristie and Jayne and going over the evidence with the Dean we came to the conclusion that the data does not support 3 packs. Hiawatha was dropped and hopefully future collar data will untangle these packs of wolves.


Brampton 2018
Rock
Caleb found this pack (5) on 3/9 in the same area as Kevin but also did not provide a Justification Report, He did try to coordinate with Colter to find X-Skunk Creek, however he could not find them on 3/9 suggesting these animals may be X-Skunk Creek.
Kevin found this pack (5) on 2/27 but did not provide a Justification Report for this pack.
Jeff was then asked to look for this pack because they are so close to the X-Skunk Creek pack but after multiple attempts he could not locate them and did not believe there was a separate pack using this area.
X-Skunk Creek
Colter and Karen also tried to locate the two packs but could not find X-Skunk Creek on the same day.
Brian made many attempts to find these animals and was unable to find these animals even after a discussion with Caleb to look in the same area and X-Skunk Creek on the same day.

MICHIGAN WOLF TRACK SURVEY DATA
2017-2018

Observers Name K. Swanson

Date 2/27/18 Time 12:20 PM Temperture 42°

County Delta Town 41N Range 23W Section 24

GPS Coordinates (decimal minutes, WGS84) Latitude 45.[redacted] Longitude -87.[redacted]

SNOW TYPE:

Hard pack ____ Crusted ____ Soft Fluff ✓ Wet Melt ✓

Approximate hours since last snowfall ____ soft fluff over

TRACKS:

Tracks / Sighting (circle one)

Pack Name Brampton Rock or X-Skunk Creek.

Number of sets ~~of tracks~~ or animals 5

Track measurement- several by random (average)

Length	4	Width	3.5
Length	4.5	Width	4
Length		Width	
Length		Width	
Length		Width	

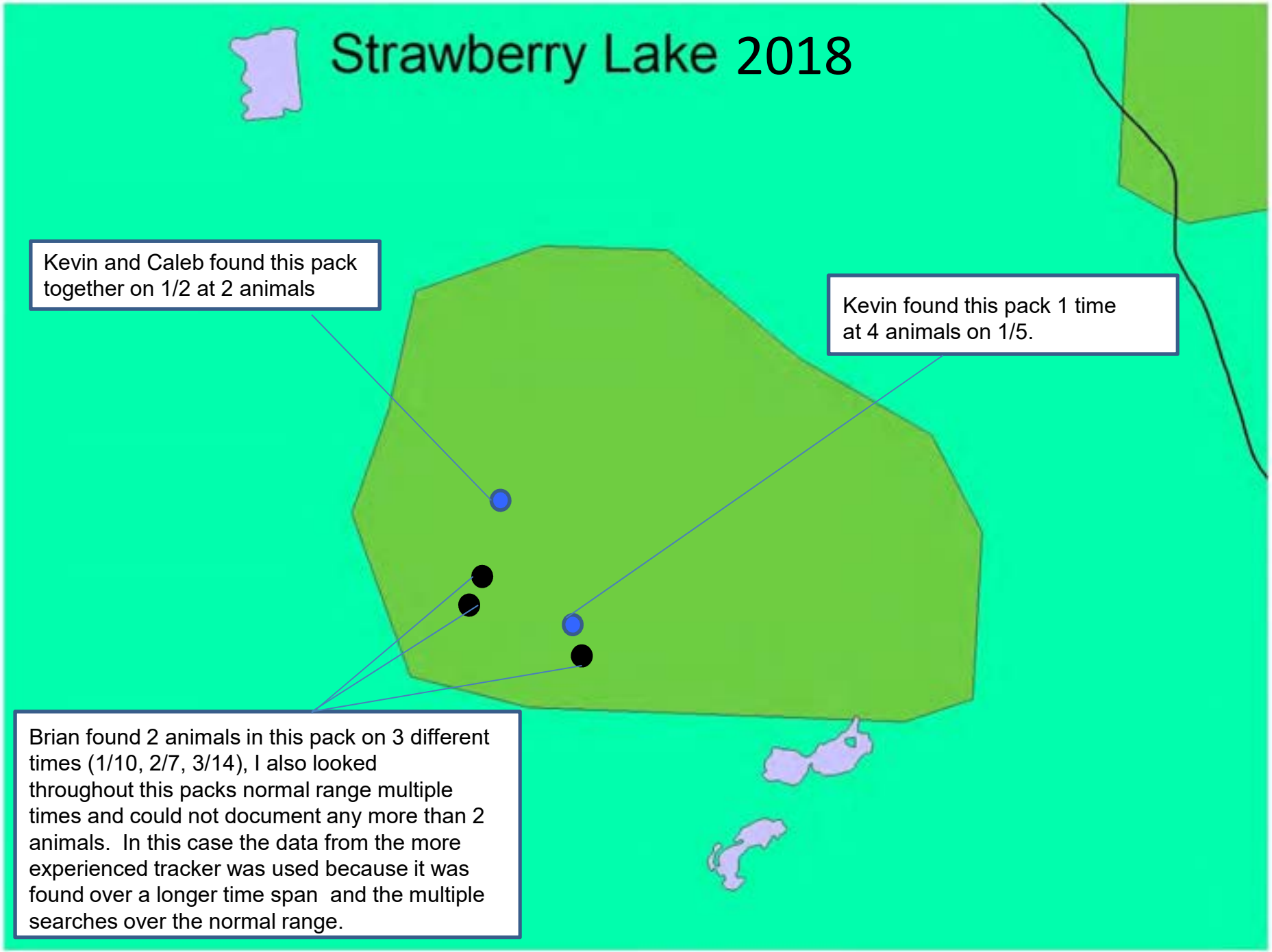
Open Agriculture (Farmland)____________

Tracks found near known pack territories (yes) / no

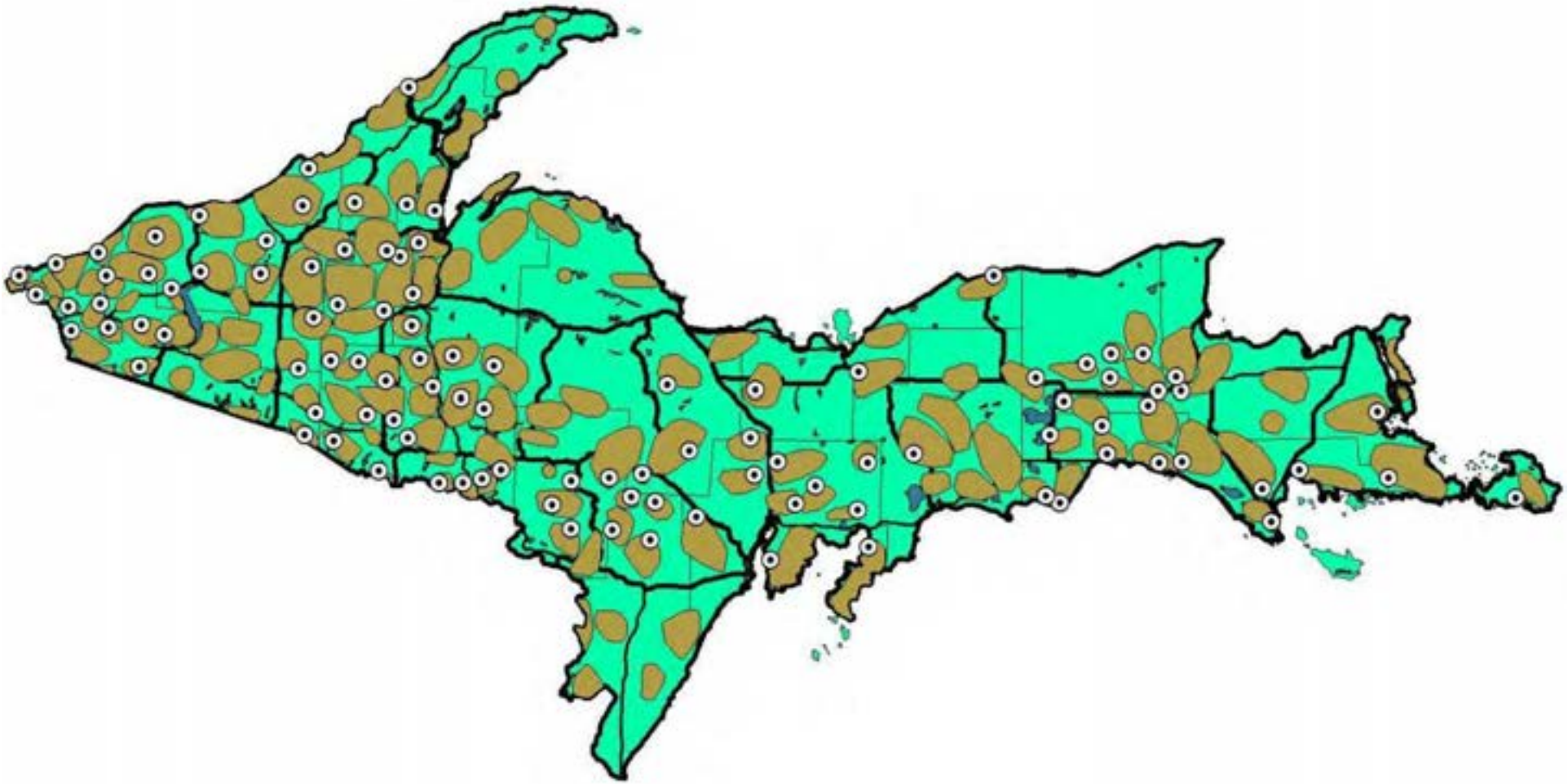
Narrative: Provide a brief description of wolf activity including the approximate distance and direction from th... location of radio-...

Recently ...
property ...
aspen tips ...
yet been ...
of sale ...
from the ...
deer carc...
Colter and ...
in this ...
it is pro...

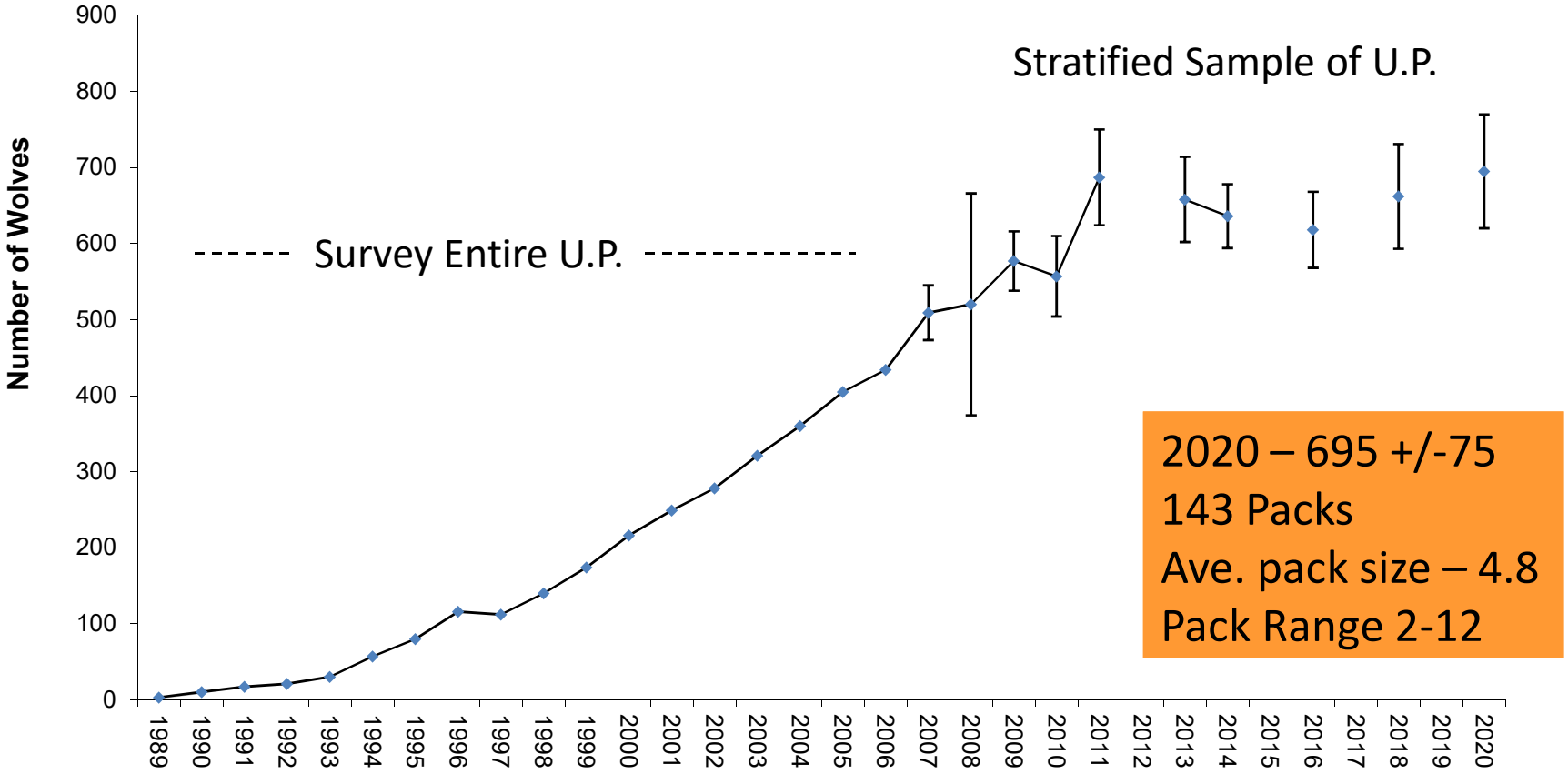
I parked and walked to north east
minimum tracks. The wolves came
headed SE after visiting two
the timber sale area. Caleb,
attempting to find all packs
area on the same day, but
ficult. This locale is within
the Brampton area but could
also be the Rock Pack, or
even X-Skunk Creek.
No collars


Strawberry Lake 2018
Kevin and Caleb found this pack together on 1/2 at 2 animals
Kevin found this pack 1 time at 4 animals on 1/5.
Brian found 2 animals in this pack on 3 different times (1/10, 2/7, 3/14), I also looked throughout this packs normal range multiple times and could not document any more than 2 animals. In this case the data from the more experienced tracker was used because it was found over a longer time span and the multiple searches over the normal range.

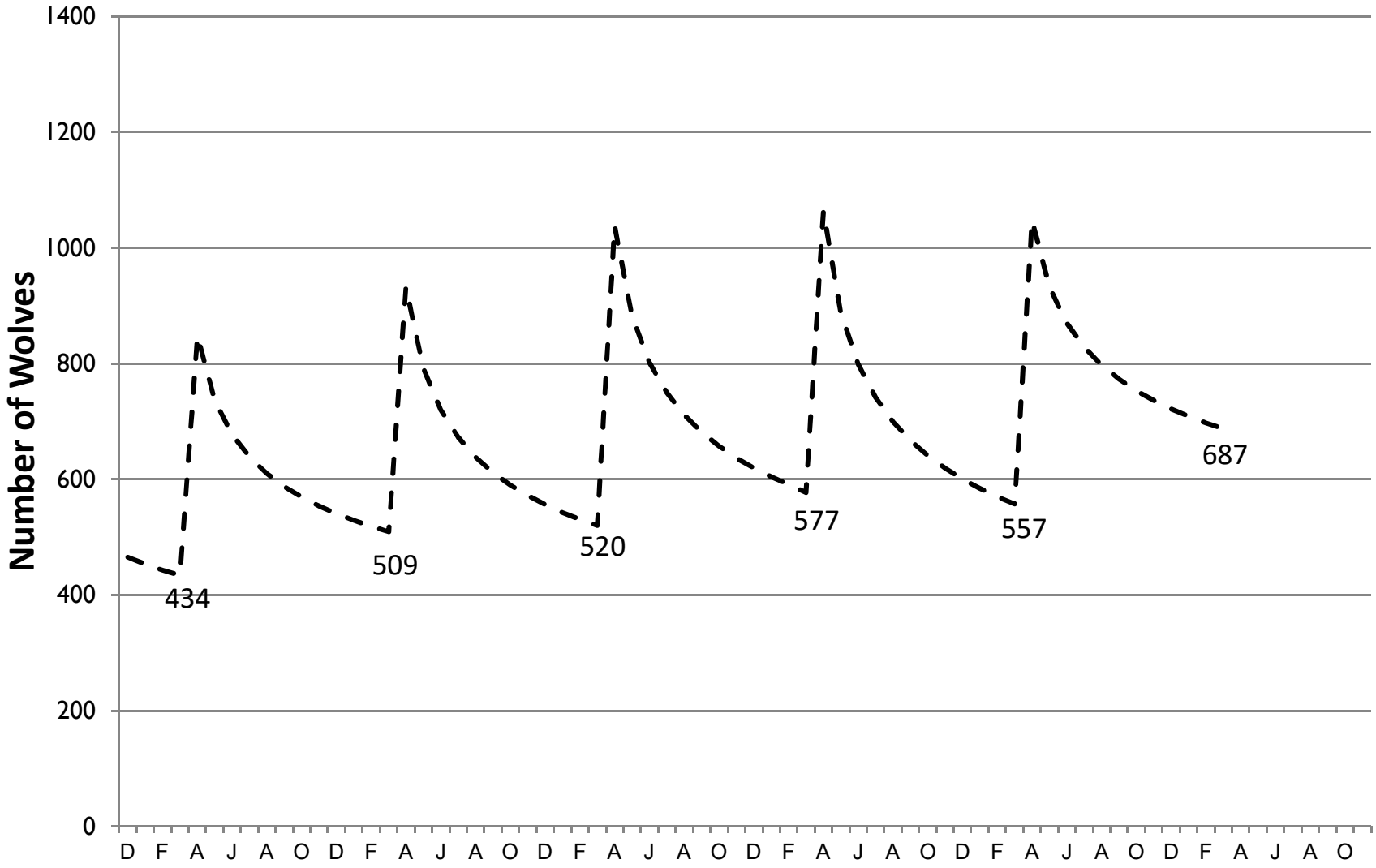
The same level of attention was given to the other 93 packs counted in the 2018 minimum wolf population survey.



Minimum Winter Estimates of Wolf Abundance in the Upper Peninsula

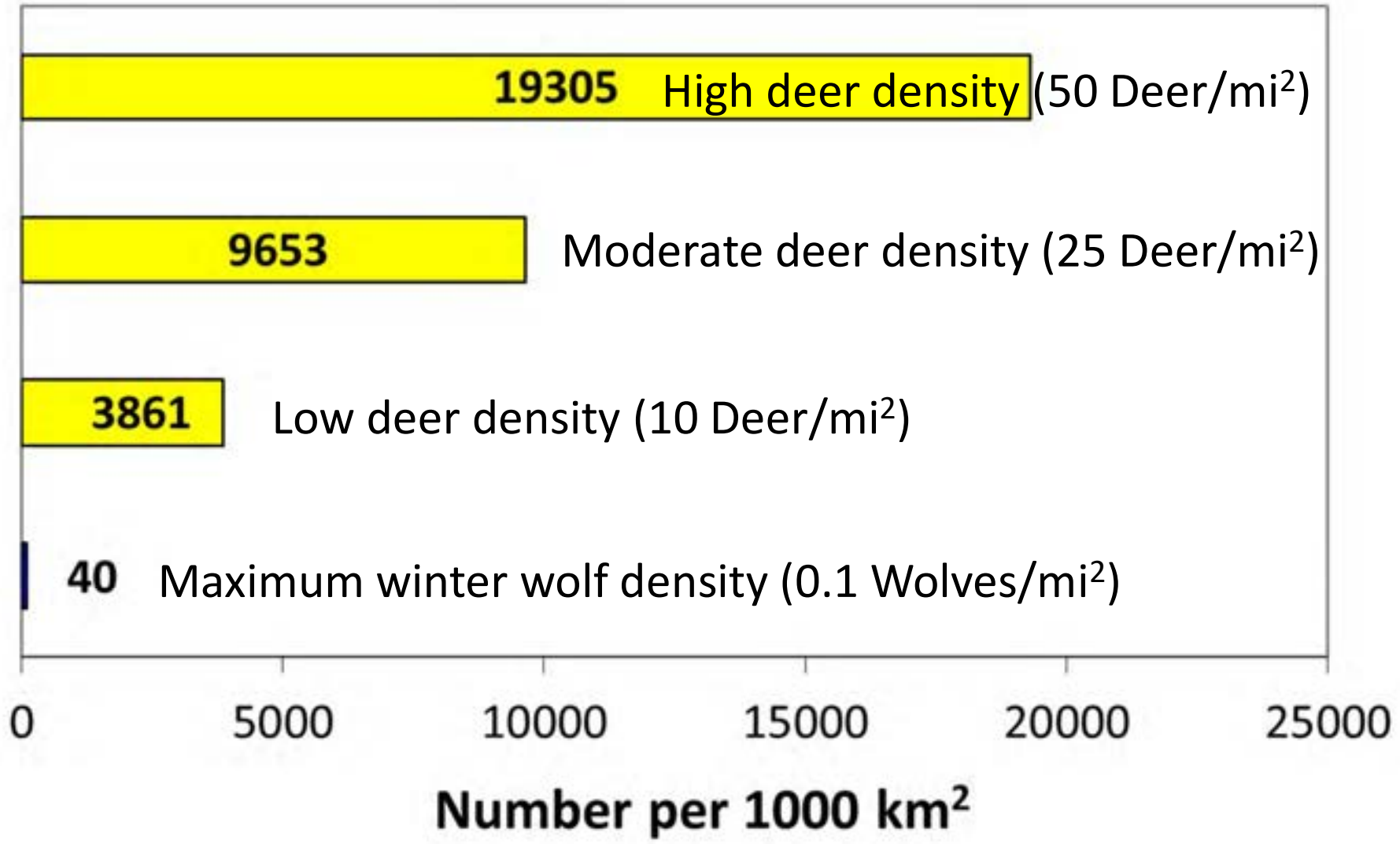


Wolf Population Annual Cycle

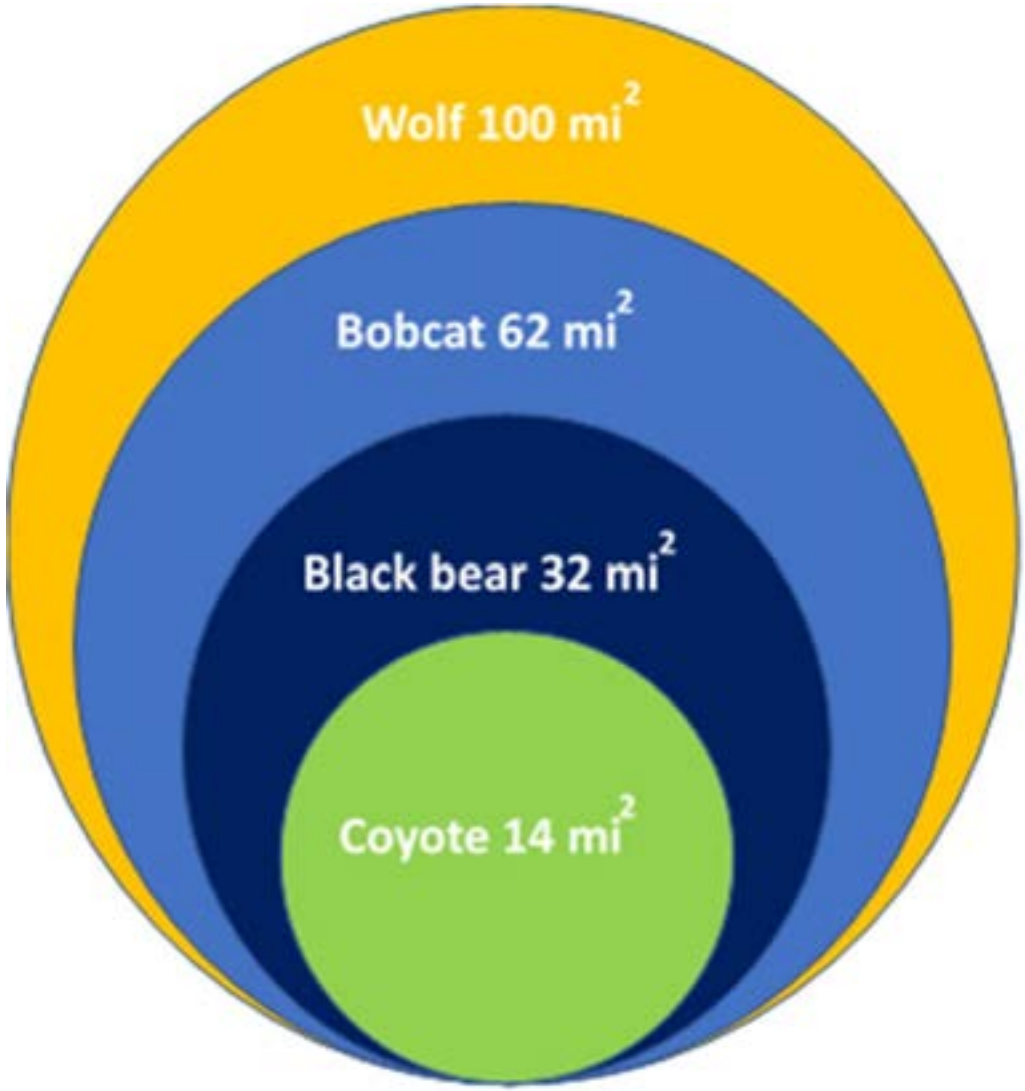



Questions?

Deer Density vs Wolf Density



Average territory/home range size of predator species in Michigan's Upper Peninsula.



Wolf Population Survey Summary

Parameter	2007	2008	2009	2010	2011	2013	2014	2016	2018	2020
Pop. Estimate	509	520	577	557	687	658	636	618	662	695
No. Packs	94	115	108	109	131	126	125	124	139	143
No. Pairs	21	27	20	21	27	24	23	23	24	16
No. Loners	5	11	4	3	4	3	3	4	1	4
$\bar{x}$ Pack Size	4.9	4.4	5.3	5.1	5.2	5.2	5.0	5.0	4.8	4.8
Hours	1801	1413	1254	1410	1330	1161	1197	1116	1402	1321[a]

[a] Estimate