

Estimating Population Size for GMU 2 Wolves

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October 2021, Southeast Federal Subsistence RAC Meeting

Estimating Abundance Using Mark-Recapture

- This is the way biologists estimate numbers of things that cannot be seen or counted.
- Mark-Recapture first developed in the 1890s.
- More advanced versions of Mark-Recapture have been developed.
- **Spatially Explicit Capture-Recapture** or **SECR** is the most advanced version of Mark-Recapture and is the most valid way of estimating the size of the GMU 2 wolf population.

How Simple Mark-Recapture Works

- Capture and mark a sample of animals. For example, 50 wolves.
 - The first time a wolf is detected at a hair board it is “marked” because we can identify that individual wolf by its DNA.
- Recapture wolves. For example, 50 wolves of which 20 were previously marked.
 - Additional times that a “marked” wolf is detected or taken by a trapper is a “recapture”.
- Math:

$$\frac{50 \text{ wolves recaptured}}{20 \text{ recaptured marked wolves}} = \frac{X \text{ Total Wolves (estimate)}}{50 \text{ wolves captured and marked}}$$

Cross-multiply: $20X = 2500$, divide each side by 20, **$X = 125$ total wolves**

Simple Mark-Recapture

Estimating an Unknown Population Size
with Johnny Ball

<https://www.youtube.com/watch?v=tyX79mPm2xY>

Assumptions for Mark-Recapture Estimate

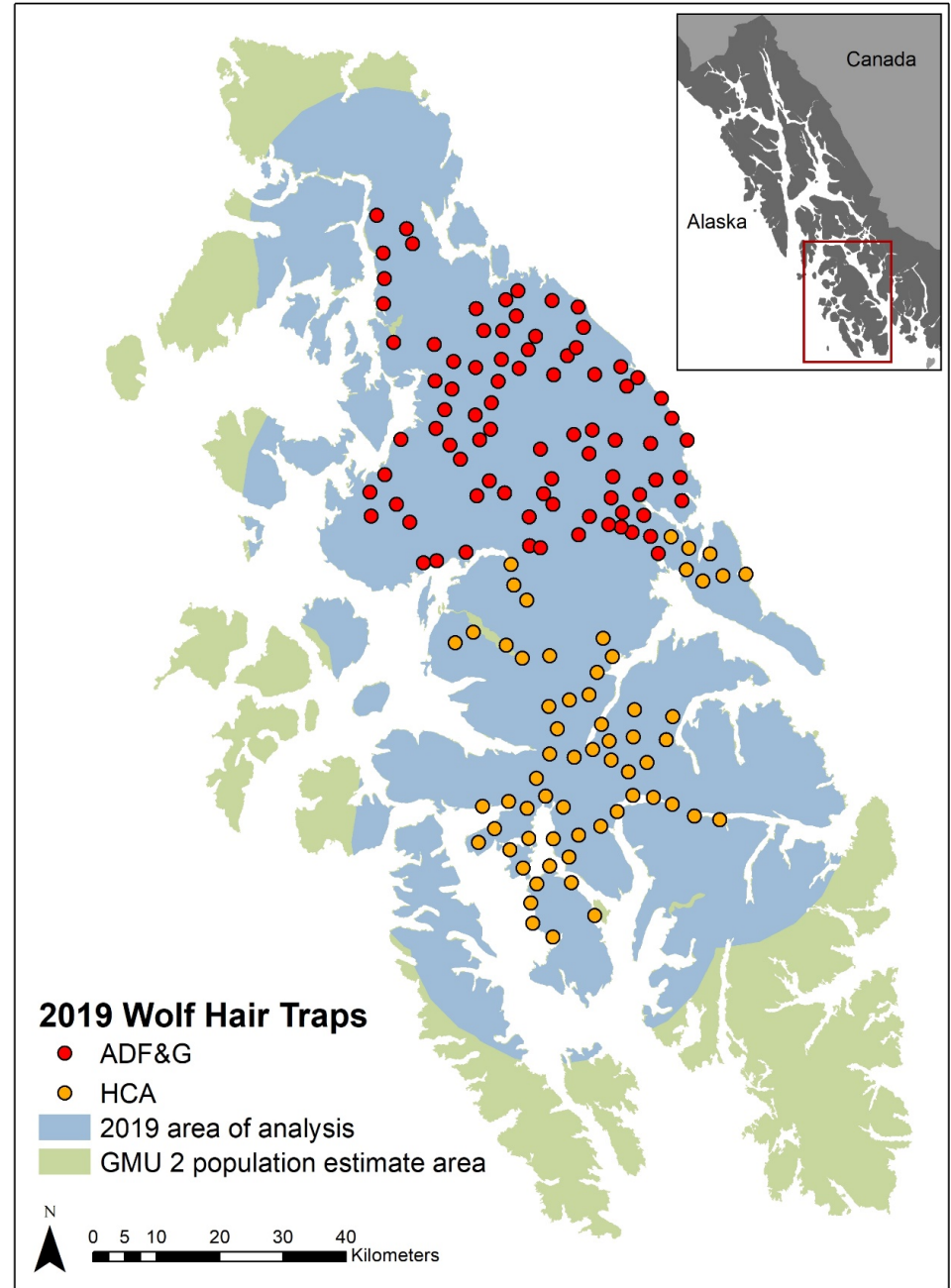
- The population is closed during the estimation period.
 - No animals enter or leave.
 - Robust to minor violations.
 - Important to know when individual wolves were trapped and no longer available to be sampled. (WP22-03)
- The density estimate is **Spatially Explicit**, it applies to a defined area.
 - Movements of individual wolves detected at hair boards define the size of the study area.
 - Outer hair boards are buffered by the diameter of wolf activity centers. Wolves outside that area are unlikely to encounter hair boards.
 - This helps ensure population closure and defines the size of the study area.

Assumptions for Mark-Recapture Estimate

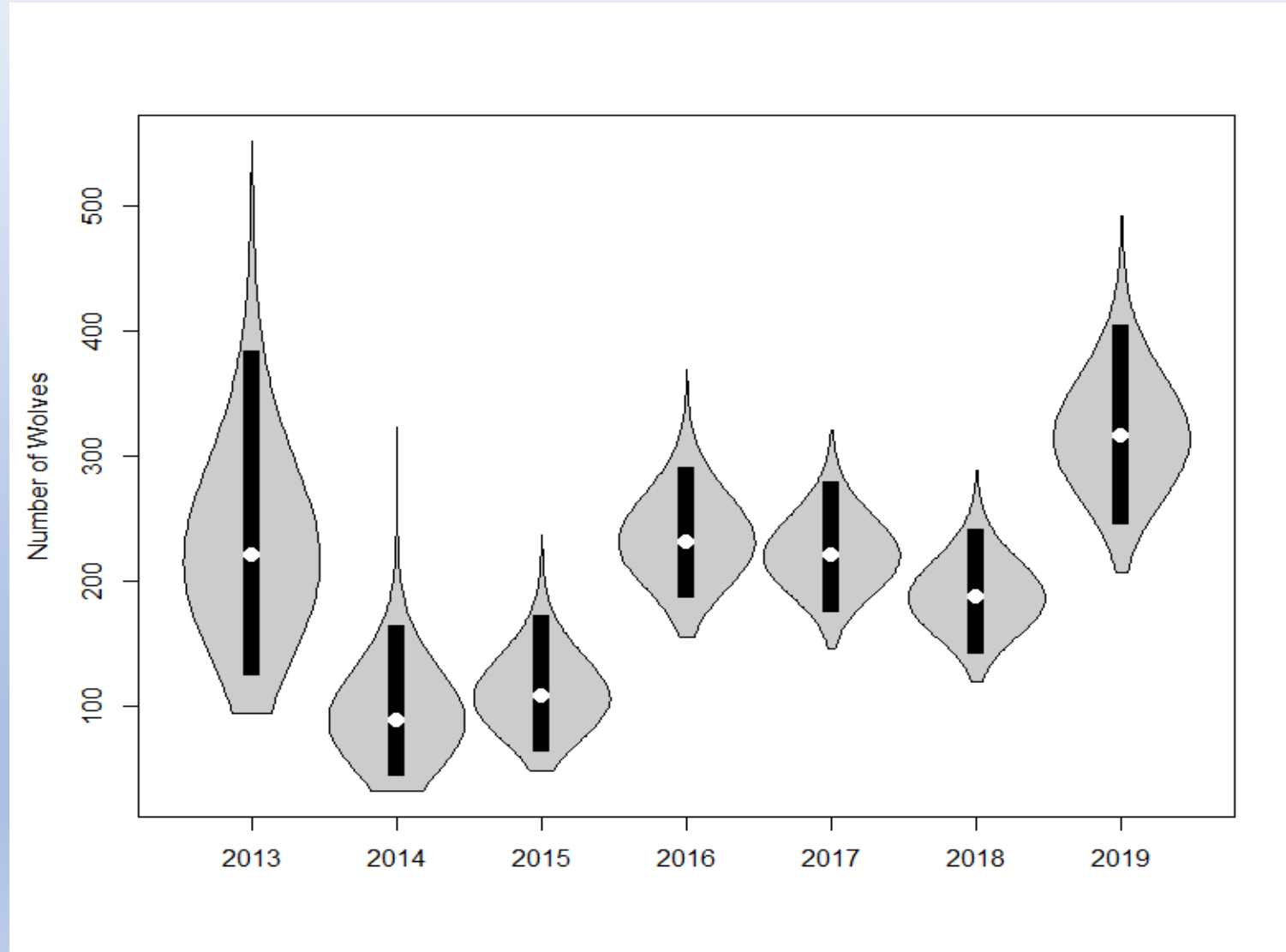
- All animals within the study area have an opportunity to encounter hair boards.
 - 83 hair board nodes (5 hair boards) are distributed throughout the study area so that all wolves living in that area have a chance of encountering at least two nodes.
 - HCA operates an additional 55 nodes in a study area adjacent to ADF&G's study area.
 - ADF&G balances the need to have many nodes distributed throughout the study area with the need to reliably check all hair boards weekly so DNA from wolf hair does not decompose.
- At least some wolves from all age and sex groups roll on hair boards.

Hair Board Nodes and Study Area Boundary

	2017	2018	2019
Unique animals (hairboards)	64	78	92
Unique animals (incl. harvest)	104	96	146
Total detections (hairboards)	173	170	173
Total detections (incl. harvest)	227	194	233



Interpreting Estimates



Fall 2020 Population Estimate

- Covid-related delays in lab work again, expect fall 2020 DNA data by mid-October.
- Calculating a population estimate usually takes about 2 weeks.
- Population estimate available late October – early November.
- ADF&G and USFS will discuss the estimate and announce a trapping season length as soon as possible.

ESA Update

- USFWS will begin the Species Status Assessment (SSA) in fall 2021 and finish by fall 2022.
- The 12-month Finding recommending whether the wolf should be listed will be based on information in the SSA.
- If recommendation is to list, a draft rule will be developed, ~12 months.
- Final Decision likely late 2023 or 2024. Could list only a portion of the Southeast population (i.e. GMU 2)

Consequences If Wolves are Listed

- ADF&G and Federal Subsistence Program lose management authority. Hunting/trapping closed. De-listing could take a decade or longer.
- A recovery plan will be developed. That will likely designate critical habitat, establish a new population objective, and designate a portion of deer harvest for wolves.
- Far greater consequences for illegal take of listed wolves.
 - Federal felony. Civil penalties also possible.
 - Up to 1 year in prison and \$50,000 fine per wolf.
 - Convicted felons are prohibited from possessing firearms.

What can you do?

- Discourage unlawful take of wolves.
- Encourage trappers to continue providing tissue and foreleg bone samples at sealing.
- Adopt WP22-03, sealing requirements for wolves in GMU 2.
 - Provides better data for ADF&G's population estimate.
 - Shows that RAC and Federally Qualified Users are doing all they can to promote sustainable wolf management.

ADF&G's GMU 2 Wolf Sealing Proposal

- Label each individual wolf with a uniquely numbered tag including the date and location where it was harvested.
 - Date - harvested wolves can be censored from population analysis on date of harvest.
 - Location – wolf movements help establish the size of the study area which influences estimated wolf density.
- Report harvest including tag number to ADF&G within 5 days of harvest.
- Seal wolves within 15 days of harvest.

Questions?