

**Wisconsin Department of Natural Resources
Natural Resources Board Agenda Item**

Item No. 6.A.

SUBJECT: Informational item on wolf population monitoring and winter 2021-22 wolf population estimate.**FOR: September 2022 Board meeting****TO BE PRESENTED BY:** Randy Johnson, Large Carnivore Specialist**SUMMARY:**

Department staff will present an informational item on the department's winter 2021-22 wolf population monitoring efforts and the winter 2021-22 wolf population estimate.

RECOMMENDATION: Information only.**LIST OF ATTACHED MATERIALS (check all that are applicable):**

- ☒ Background memo
☐ Type name of attachment if applicable

- ☐ Type name of attachment if applicable
☐ Type name of attachment if applicable

Approved by	Signature	Date
Eric Lobner, Bureau Director	<small>DocuSigned by:</small> <i>Eric Lobner</i> <small>49A5E090CF88465...</small>	9/8/2022 7:59 AM CDT
Tami Ryan, Deputy Division Administrator	<small>DocuSigned by:</small> <i>Tami Ryan</i> <small>F0F31496A01C461...</small>	9/8/2022 8:27 AM CDT
Preston D. Cole, Secretary	<small>DocuSigned by:</small> <i>Sarah Barry</i> <small>A7D70DC3770642F...</small>	9/8/2022 12:35 PM CDT

cc: Board Liaison – AD/8

DS

AB

by Sarah Barry

Sarah Barry

CORRESPONDENCE/MEMORANDUM

DATE: September 7, 2022

TO: Natural Resources Board Members

FROM: Secretary Preston D. Cole

SUBJECT: Wolf population monitoring

Summary

Department research scientists use data from winter snow tracking surveys and radio-collared wolves in a scaled occupancy model to estimate the abundance of wolves in core wolf range in Wisconsin for the winter of 2021-22. Department staff will provide an overview of methods and results. The complete 2021-22 annual wolf monitoring report will be made available on the DNR website.

Wolf Monitoring Program OverviewData Collection

The state's wolf monitoring program monitors the wolf population through a variety of science-based techniques including winter snow tracking surveys, GPS-collared wolves, assessment of mortalities, and public observation reports. Data from winter tracking surveys and GPS-collared wolves are central inputs to a scaled occupancy model which is used to estimate range-wide abundance of pack-associated wolves (Stauffer et al. 2021). See the 2021-22 annual wolf monitoring report (will be available on the DNR website) for more detailed information on the methods used to monitor the wolf population.

Snow tracking surveys are conducted across the state every winter between November and April. Survey effort is allocated by delineated tracking blocks across statewide wolf range. Tracking blocks are included in a given year's survey efforts based upon the previous four year's tracking data, verified depredation locations, and public observations of wolf pack activity. A typical survey will cover approximately 20-30 miles driven at slow speed (<10mph) with fresh snow conditions to observe and record the locations and counts of numerous carnivore species, including wolves. Participation in this collaborative effort typically involves dozens of trackers including DNR biologists, USDA Wildlife Services biologists, tribal biologists, and certified volunteer trackers.

GPS-collared wolves also provide critical monitoring data throughout the year. The department primarily works with USDA Wildlife Services to deploy GPS-collars on wolves throughout the state. The department also coordinates with private trappers to deploy GPS-collars on wolves captured incidentally while legally trapping for other species (i.e., while coyote trapping) to supplement collar deployment and data collection. The number of functioning collars continually fluctuates based on a variety of factors such as battery life, mechanical collar malfunctions and wolf mortalities.

Wolf mortality is monitored year-round through a combination of field observations (e.g., vehicle kills, public reports, etc.), radio-collars, law enforcement efforts, and reporting of any wolves removed by depredation or other agency actions. Cause of death for wolves is usually determined through field investigation or by necropsy when illegal activity is suspected, or cause of death is not evident during field investigation. All known wolf mortalities are recorded and this information is used to track population mortality patterns and evaluate any potential health threats.

Wolf observation reports are collected from the public and agency staff. Public reports are primarily collected via the Large Mammal Observation Report tool available on the department's website, direct messages to department staff, and the Snapshot Wisconsin program. Snapshot Wisconsin is a citizen-science partnership to monitor wildlife year-round using a statewide network of volunteer-managed trail

cameras. Snapshot Wisconsin data was first explicitly incorporated in the wolf monitoring program in 2018. Collectively, this data is used to help determine pack-occupied range across the state and direct winter tracking efforts.

Data Analysis

Department research scientists utilize a scaled occupancy model (Stauffer et al. 2021) to estimate the abundance of pack-associated wolves in core wolf range, defined as winter tracking blocks with confirmed pack activity during the previous four years. The scaled occupancy model has three components:

1. *Area occupied by wolves.* We use an occupancy model to estimate the total area occupied by wolves using winter track data. The model uses detections and non-detections of wolf tracks within each grid in core range, using 100 km² grid cells identified by simulation analyses as the optimal sampling unit size. When wolf tracks are detected in a grid cell, the probability that the cell is occupied is ($\psi_i=1$). When wolf tracks are not detected, or the grid was not surveyed, the model estimates occupancy probability based on landcover characteristics while accounting for survey effort and the probability of non-detection. Thus, the model accounts for areas that have wolf packs, but the wolves were not detected during the survey or the grid cell was not surveyed.
2. *Zone-specific average pack sizes.* We estimate zone-specific average pack sizes using the counts of wolves reported during winter tracking surveys within 171 km² grids. The grid size is based on the average home range of packs in Wisconsin.
3. *Range-wide average home range size.* We used location data from GPS-collared wolves in Wisconsin to estimate the range-wide average home range size using over-winter location data from the last two years.

To calculate wolf population abundance, we divide the area occupied by the range-wide average home range size and multiply by the zone-specific average pack size. The model also accounts for uncertainty, which is represented in the abundance estimate by the 95% credible interval. The estimate is defined as the over-winter abundance of pack-associated wolves.

Results

Analysis of the winter 2021-22 winter tracking data is being finalized and results will be presented to the Natural Resources Board at their September meeting.

Literature Cited

Stauffer, G.E., Roberts, N.R., MacFarland, D.M., and Van Deelen, T.R. 2021. Scaling occupancy estimates up to abundance for wolves. *Journal of Wildlife Management* 85(7) 1410-1422. <https://doi.org/10.1002/jwmg.22105>

Drafted by: Randy Johnson, Large Carnivore Specialist