Bear and Bobcat Age-at-Harvest Population Models

We are examining ways to better use information like age and harvest effort that we gain from harvested animals to improve and modernize population models and harvest frameworks for black bears and bobcats.

TIMELINE
Launch: July 2016
Completion: June 2018

FUNDING
Pittman-Robertson

DNR PARTNER BUREAU
Wildlife Management

EXTERNAL STAKEHOLDERS
Bear Advisory Committee
Furbearer Advisory Committee

Information from harvested animals can provide a wealth of information about the harvested population. For both bobcat and black bear, we collect harvest effort and ages of harvested animals. These data currently help inform our harvest frameworks, but we may be able to use them more effectively by applying advanced mathematical models.

We are exploring the usefulness of harvest data to refine our population models. Through advanced modeling techniques, we will see whether there are ways to use these data more efficiently and whether there are ways to overcome any selection bias (e.g. hunters harvesting larger animals). Similarly, we are examining what data are necessary for inferring population status and trends and if there are data we should be collecting differently, data we could stop collecting or data we should begin collecting.

We are partnering with UW-Madison to focus on these complex issues. The results of this study will help us develop harvest and monitoring frameworks for black bears and bobcats.

KEY POINTS

» We currently collect information on harvest effort and the ages of harvested black bears and bobcats. This study aims to evaluate the utility of these data and to make recommendations on what information is needed moving forward.

» The mathematical models are complex. We seek a biologically and mathematically robust way to extract as much information as possible from the data we collect.

» These are age-at-harvest models that help gather information that can feed into larger population models.

» We want to make sure the information collected from hunters and trappers is used to the fullest extent possible.

» Initial results are expected as soon as the summer of 2018.

» The results of these efforts will be incorporated into upcoming harvest and quota deliberations.

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WILDLIFE RESTORATION

WISCONSIN DEPT. OF NATURAL RESOURCES

Evaluation of Beaver Monitoring Methods

To better understand the impacts of management on beaver populations, we will study the efficacy of current monitoring methods. Helicopter surveys provide data only for the northern third of the state, but they are very expensive (>$200,000). New methods must operate statewide and be cost effective.

TIMELINE
Launch: July 2018
Completion: June 2020

FUNDING
Pittman-Robertson

DNR PARTNER BUREAU
Wildlife Management

EXTERNAL STAKEHOLDERS
Furbearer Advisory Committee
WI Trappers Assn.
Trappers and trout anglers

This study will identify beaver population trends, maximizing efficiency with defensible statistical inference, to inform beaver management decisions. The goal of Wisconsin's beaver management plan is to maintain or slightly increase the beaver population; our goal is to match beaver monitoring data to adequately evaluate our progress toward these goals.

We will evaluate multiple monitoring methods. Fixed-wing aircraft surveys will provide colony counts throughout the state. These combined with colony size estimations from trapper-collected carcasses will give us data to calculate abundance estimates in each zone. This combined approach will demonstrate a potential monitoring method capable of estimating beaver colony and population sizes.

We will also evaluate our ability to monitor population trends using a catch-per-unit effort index. We will evaluate trapper logs, allowing beaver trappers to provide us with a record of trapping effort and success. These logs can be mailed back to the department to provide more detailed information on the number of beavers trapped throughout the state and how much effort was expended to do so.

Chuck Szmurlo

KEY POINTS

» This research aligns with priorities identified in the beaver management plan and will identify the most feasible methods for gathering statewide population trend information that meet management objectives.

» We will develop a statistically robust sampling framework to implement the selected monitoring method.

» Catch-per-unit effort may be a way for trappers to contribute directly to monitoring.

» We will study catch-per-unit-effort and fixed-wing surveys for monitoring population trends and the use of trapper-collected carcasses for determining colony size.

» We will communicate about furbearer research efforts to WI trappers through direct meetings and articles in the WI Trappers Association magazine.

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WILDLIFE RESTORATION

WISCONSIN DEPT. OF NATURAL RESOURCES

Northern Wisconsin Bobcat Study

This study provides an in-depth look at bobcat population and harvest dynamics in the northern forest of Wisconsin. OAS monitors bobcats with GPS collars that allow for better estimates of population size, survivorship, harvest rates and habitat use. These data ultimately inform bobcat management strategies and the bobcat quota-setting process.

TIMELINE
Launch: July 2014
Completion: June 2019

FUNDING
Pittman-Robertson
Bobcat permit purchases

DNR PARTNER BUREAU
Wildlife Management

EXTERNAL STAKEHOLDERS
Trappers and hunters
Private Landowners
Conservation Congress
General Public

The Northern Wisconsin Bobcat Study began in 2014 in response to interest from Wisconsin sportsmen who wanted a better understanding of the state's bobcat population. Trappers and hunters advocated for a $3 increase to the bobcat permit price to go toward bobcat research, which provides partial funding for this project.

This study relies on trapper participation, with trappers voluntarily reporting animals they cannot or do not wish to keep. Researchers GPS-collar these bobcats within the 12-county study area that spans most of northern Wisconsin. OAS monitors collared bobcats' movements for the lifetime of the collar (up to three years) or until the animal's death (harvest mortality, road kill, etc.).

OAS uses the data to evaluate demographic patterns, home range size, survivorship, causes of mortality and habitat use to improve our understanding of bobcat population dynamics and density in the northern part of the state. We will use this data to refine bobcat population models and enhance sustainable bobcat management in Wisconsin.

KEY POINTS

» This study has been made possible, in large part, because of sportsmen's interest in Wisconsin's bobcat population and their willingness to participate in research.

» Study objectives include determining causes of mortality, identifying demographic patterns, actual harvest rates, home range size and overlap, movement rates and habitat use.

» The data collected from GPS-collared animals will be used to refine methods for monitoring the bobcat population and estimating population size.

» Every year, OAS contacts licensed trappers by mail before the trapping season, providing them with the phone number to call should they catch a bobcat in the study area that they cannot or do not want to keep.

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WILDLIFE RESTORATION

WISCONSIN DEPT. OF NATURAL RESOURCES

Office of Applied Science

Wolf Population Viability Analysis

The objective of this study is to conduct a population viability analysis for Wisconsin's gray wolf population and to develop a model that will help predict population change under different harvest levels.

TIMELINE
Launch: July 2018
Funded Through: June 2019

FUNDING
Pittman-Robertson

DNR PARTNER BUREAU
Wildlife Management

EXTERNAL STAKEHOLDERS
General public
Wolf Advisory Committees
Educators and students

Wisconsin is updating the Wolf Management Plan in anticipation of the species being returned to state management authority. The best available science should be used to help inform a minimum viable population size to estimate population parameters and to determine how different rates of harvest are projected to impact Wisconsin's wolf population. This data will inform the development of management population objectives and goals and will be of value to the Wolf Advisory Committee in its decision-making.

Predicting population-level responses to management actions such as harvest would guide further interventions needed to achieve population objectives. The wolf population has been closely monitored for four decades, and this information can be used to construct a baseline of annual cause of mortality and survival rates. As more information is gathered during years with harvest, we can update our harvest prediction model to rely more on current data that is specific to Wisconsin. This will ensure that the best available information is used in predicting harvest effects.

KEY POINTS

» This study aligns with the Wisconsin DNR's strategic goal of managing the wolf population using the best available science.

» This research informs the Wolf Management Plan and provides critical information to the Wolf Advisory Committee for setting population objectives and goals.

» The study quantifies the stability of and potential risks to the wolf population at different levels of mortality and overall population size.

» Results of this study will inform management decisions, such as quota levels, given defined population objectives.

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WILDLIFE RESTORATION

WISCONSIN DEPT. OF NATURAL RESOURCES

Office of Applied Science

Beaver Influence on Coldwater Stream Habitat and Trout Populations in Wisconsin

Beaver colonization and dam building may influence trout populations and habitat in low-gradient streams of the Upper Midwest, but scientific data are lacking. This study will examine the way beavers affect coldwater streams and trout populations in ecoregions and beaver management zones across Wisconsin. Results of this study will better inform beaver and trout management strategies.

The Wisconsin DNR's 2015-2025 Beaver Management Plan addresses the complex role that beavers play in coldwater ecosystems. It preserves beaver control as an important management tool for maintaining free-flowing conditions on priority trout streams, but it also highlights the need for studies of the ecological influence, both positive and negative, of beaver activity on trout streams of the Upper Midwest. The Office of Applied Science will lead a study in cooperation with Fisheries Management to quantify the effects of beaver activity and beaver control on salmonids in Wisconsin streams. This study will be statewide in scope, including wadeable trout streams in the Lake Michigan, Lake Superior and Mississippi River basins and across forested and agricultural landscapes. Study site selection began in 2018 in cooperation with regional DNR fisheries biologists. Researchers also plan to work with Wildlife Services, a program in the United States Department of Agriculture's Animal and Plant Health Inspection Service that works to resolve wildlife conflicts. Study sites include streams currently colonized by beavers and streams in which beaver activity is controlled to maintain free-flowing conditions.

TIMELINE
Launch: July, 2018
Completion: June, 2023

FUNDING
Federal Aid in Sportfish Restoration
Federal Aid in Wildlife Restoration
Pittman-Robertson
Dingell-Johnson

EXTERNAL STAKEHOLDERS
Great Lakes Indian Fish & Wildlife Commission
USDA APHIS Wildlife Services

DNR PARTNER BUREAU
Fisheries Management

Initial data collection will include habitat and fish metrics. Stream habitat will be characterized by measuring water temperature and flow, as well as physical attributes such as stream width and depth, substrate composition, and beaver dam numbers, size, and distribution. Fish surveys will include measuring indices of biotic integrity, which characterize the fish community as a measure of habitat quality, and trout abundance, size structure and demographic rate parameters such as survival and reproductive rates and movement probabilities. Historical data will also be used to compare trends in stream habitat and trout population metrics in streams maintained with free-flowing conditions versus streams with no targeted beaver control efforts.

The next phase of the study will include experimentally manipulating beaver populations on study streams. Beavers will be allowed to recolonize a select number of streams that have been maintained as beaver-free. Conversely, for a select number of streams that have not been subject to beaver control efforts, beavers and beaver dams will be removed to restore free-flowing conditions. Additional streams will remain under current management protocols as control streams.

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Office of Applied Science

Evaluation of Wolf Monitoring Efforts

We are evaluating current wolf monitoring methods and exploring alternative ways to efficiently and accurately monitor a growing wolf population.

TIMELINE
Launch: July 2014
Completion: June 2018

FUNDING
Pittman-Robertson

DNR PARTNER BUREAU
Wildlife Management

EXTERNAL STAKEHOLDERS
Wolf Advisory Committee
Conservation Congress
Interested Public

Wisconsin currently employs a minimum population count for wolves. This method provides a very defensible count of the minimum number of wolves. However, this method is very costly, both in terms of labor hours and fiscal costs.

This study will evaluate the strengths and weaknesses of the current approach. We are exploring adaptations of the snow-tracking technique to estimate and incorporate detection probability, thus providing an estimated population range that reflects inherent uncertainty. We are also exploring approaches that use a combination of snow-tracking data and telemetry data to provide an estimate, i.e. range, of population size.

These efforts include a retrospective analysis of current methods, augmentation of data with new field data (telemetry, trail cameras etc.), as well as theoretical simulations. The results of these analyses will provide a comparison of the current technique to possible alternative techniques for consideration in the long-term management of this species.

KEY POINTS

» We are evaluating the strengths and weaknesses of the current wolf monitoring method.

» We are exploring alternative monitoring and analysis techniques.

» We are quantifying the relative certainty of methods.

» We are taking a very statistically rigorous and scientifically defensible approach to our analysis.

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Office of Applied Science

Bear genetics survey: research estimating bear abundance (REBA)

The objective of this study is to estimate zone-specific population size of bears using a genetic-based spatially-explicit capture-recapture (SECR) estimator across 34 counties in Wisconsin.

TIMELINE
Launch: Summer 2018
Funded Through: Summer 2021

FUNDING
Pittman-Robertson

DNR PARTNER BUREAU
Wildlife Management

EXTERNAL STAKEHOLDERS
Interested public
Tribal partners
Farmers
Hunters
United States Forest Service (USFS)

Black bear management and harvest is of great interest to the citizens of Wisconsin. In 2019, approximately 120,926 people applied for a bear tag or bear preference points. The number of tags allocated per season requires information on population abundance, harvest, success rates and model predictions of population responses to harvest rates. Much of this information can be generated through population models, but these models require periodic calibration with a population point estimate. In the past, a tetracycline-based capture-mark-recapture population estimate was produced. However, changes in federal regulations regarding the use of tetracycline spurred investigations into new methods to produce this critical information. The goal of this project is to estimate bear density and abundance within each of the state's four bear management zones. The study encompasses the 34 counties which make up Wisconsin's primary bear range.

Biologists set 852 hair snares in late spring and early summer. Hair snares were clustered in groups of 4 to detect bear movements, and these groups of snares were systematically spaced across the state. Bears were drawn in with a non-rewarding scent attractant and hair samples were collected weekly for 4 weeks. Hair samples were sent for genetic analysis to determine individual identity and sex. Using information on number of individuals, recaptures and movements between snares, we will use spatially-explicit capture-recapture (SECR) to estimate abundance and density.

KEY POINTS

» This research aligns with priorities identified in the bear management plan to improve our ability to estimate the black bear population.

» We will use spatially-explicit capture-recapture to estimate population of bears at multiple scales (i.e., zone-level and statewide).

» Results of this study will calibrate population models that guide the quota-setting process.

» We will communicate results of our study at state and nation-wide meetings.

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