2023

Missouri Black Bear Program

Missouri Department of Conservation

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Cover photo: Trail camera photo of research bear 2221 with her yearling cubs.

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Black Bear Program Mission

The mission of Missouri Department of Conservation's (MDC) Black Bear Program is to use science-based methods to manage a self-sustaining population of black bear (a native species), increase bear awareness, minimize human-bear conflict, and provide recreational opportunities for all Missourians. To enact this mission, the Black Bear Program is guided by three management goals:

Goal 1) Bear Research and Monitoring **-** Use science-based methods to manage a self-sustaining population of black bear, focusing on research and monitoring, population management, and habitat management.

Goal 2) Education and Outreach **-** Increase statewide awareness of Missouri's black bear population and management program through coordinated outreach and public education.

Goal 3) Human Bear Conflict **-** Minimize and address human-bear conflicts.

The Black Bear Program is managed by MDC's Science Branch Black Bear/ Furbearer Biologist in collaboration with many MDC staff, who are responsible for monitoring and managing the state's black bear population and developing annual regulation recommendations based on: annual bear sighting reports, harvest data, hunter surveys, MDC staff surveys, public comments, population models, and ongoing research studies. The conservation of Missouri's black bear population along with all other wildlife species is made possible by the one-eighth of one percent Conservation Sales Tax, permit sales, and income generated by fish and wildlife tourism. In addition, conservation efforts would not be possible without the help of a wide range of MDC staff, university researchers, Missouri citizens, and support from local landowners. The bear program would not be able to complete the mission set forth by the MDC without this assistance. **Thank you!!!**



Equal Opportunity to Participate

Equal opportunity to participate in, and benefit from, programs of the Missouri Department of Conservation is available to all individuals without regard to their race, color, nationality, sex, age, or disability. Questions should be directed to the Department of Conservation, PO Box 180, Jefferson City, MO 65102, 573-751-4115 (voice) or 800-735-2966 (TTY), or to the U.S. Fish and Wildlife Service Division of Federal Assistance, 4401 N. Fairfax Drive, Mail Stop: MBSP-4020, Arlington, VA 22203.

Introduction

Black Bear History in Missouri

Black bears were historically abundant in Missouri but became seemingly nonexistent by the early 1900s. Many early county histories contain notes and reports of the remarkable number of bears in all areas of the state. Bears were a staple item for early settlers and were widely used for food as well as for their fat and skins. In fact, bears were more commonly harvested by pioneers and early travelers than any large mammal, other than deer. However, by the 1830s and 1840s, bears were rare in northern Missouri, and by 1894, bears were almost extirpated from the Ozarks. Bears were still present in southeastern Missouri in the 1920s, however by the 1930s and '40s few, if any, bears could be found in the state.

Trail camera photo of bear #1009 and her cub #2114

The Arkansas Game and Fish Commission initiated a black bear restoration program in 1958. From 1958 to 1968, 254 black bears were captured in Minnesota and Manitoba, Canada and released in the Ozark and Ouachita mountains of western Arkansas. The Arkansas population has expanded in both size and distribution since that time, and thereafter, sightings of black bear began to rise in Missouri, likely from the crossing of bears into the state of Missouri from Arkansas.

From 1950–1972, there were 54 reported occurrences of bears in 27 Missouri counties. In 1990, a request for sighting information published in the June Conservationist magazine resulted in 55 reports of sightings in 26 counties. Over the last two decades, reports have increased substantially. From 2000–2010, MDC received 512 bear reports in 75 counties. Intensive research studies including Missouri's Black Bear Hair Snare study and collaring study were started in 2010. These studies have allowed for better understanding and tracking of the bear population. In 2023 alone, MDC has received 332 bear reports in 68 counties. Overall, black bears have been reported in 107 counties, although it should be noted that reports are not verified and likely include some percent that are misidentified, but in general, the distribution and number of bear reports is steadily increasing. This demonstrates that the once nearly extirpated bear population is successfully recolonizing the state.

Black Bear Management Plans

To guide the continued conservation and management of Missouri black bear population, a black bear management plan was first developed in 1993 by MDC, in partnership with the Missouri Department of Natural Resources, the National Park Service, and the U.S. Forest Service. As the black bear population continued to grow and conservation objectives changed, new management plans were developed in 2008 and most recently in 2020. The plans identified critical components of a multifaceted approach to bear management in Missouri with the goal of providing a strategic direction for the MDC bear management program to follow. To stay on top of changes to the bear population and conservation efforts, new management plans will be generated every 10 years. The 2020-2030 Missouri Bear Management Plan can be found on the MDC website Missouri Bear Management Plan (2020-2030).

Trail camera photo from the Missouri Black Bear Research Project. Howell County, 2017.

Purpose Statement

This annual report summarizes the efforts completed by the Missouri Department of Conservation Black Bear Program in pursuit of managing a self-sustaining black bear population in Missouri. The scientific study and management of black bears in Missouri are overseen by the Missouri Department of Conservation Black Bear Program, housed within the Game and Regulations Unit of the Science Branch. The black bear program is headed by the State Black Bear and Furbearer Biologist and is advised by an inter-branch Black Bear Working Group. All regulatory actions must be proposed and ultimately approved by the Conservation Commission. The following sections include updates on black bear research, the 2023 harvest season, and other management activities throughout the state.

Questions regarding the content of this report can be directed to Nate Bowersock at Nathaniel.Bowersock@mdc.mo.gov or visit https://mdc.mo.gov/discover-nature/field-guide/american-black-bear.

Using Science to Manage a Self-Sustaining Population

Previous Research

Starting in 2010, research began to further MDC's understanding of the expanding black bear population in Missouri. To estimate the bear population at the time, a hair snare study was conducted. Hair snares are barbed-wire enclosures that are baited with a scent lure to encourage bears to crawl over or under a single strand of barbed-wire, with the goal of collecting hair from bears. The hair samples collected from snares were used to identify unique individual bears with DNA analysis and was used in population models. From this initial population study, it was estimated there were around 300 bears in Missouri in 2012.

Black bear hair that was caught on a barbed wire hair snare. Image is from MDC Bear Hair Snare project.

Current Research

Survival, Recruitment, and Movement

Due to black bears' cryptic nature and the dense forest cover they prefer to inhabit, focal studies of bears can be quite difficult to conduct. Therefore, researchers have found that much can be learned about bears and other wildlife by capturing them and fitting them with radio tracking collars. Starting in 2010, MDC in conjunction with university researchers, began capturing bears using large box traps and fitting them with GPS radio tracking collars. When bears are captured, they are chemically immobilized and sedated so they can be safely handled by MDC staff. Once a bear is immobilized, a series of biological measurements (i.e., body weight and length) and samples (i.e., hair and blood) are collected. In addition, each bear is marked with both a set of uniquely numbered ear tags and a PIT tag (microchip) so bears can be identified if they are seen or captured again. Capture operations have been conducted continually for over a decade now as part of the long-term research and monitoring objectives of the bear program. Data collected from GPS radio collars has been used to study bear survival, recruitment, and movement rates. As of 2023, 200 black bears (176 female and 24 males) have been collared and the data collected from these animals has helped MDC better understand the ecology of bears in Missouri.

Trail camera photo of a bear examining a research bear trap.

Trapping – In 2023, we captured a total of 32 individual bears (14 females, 16 males, and two were of unknown sex that were released before handling). Seventeen of the 32 bears were recaptures from previous years. Eleven new bears were handled and marked (Seven females and

four males), and 4 new collars were deployed. The 2023 trapping season started late May and continued through early August. The rate of bears trapped daily was somewhat consistent with 1-4 individuals being trapped a day. There were two spikes in capture; on June 14th, where eleven bears were capture in one day, and on July 12th with six captures in one day.

Denning – To study the recruitment rates of bears (number of young born each year compared to how many survive within a year), MDC tracked GPS collared females to their dens to try to count the number of cubs they have each year. When possible, staff attempted to sedate females to safely enter dens to check the physical condition of both the collared females and their cubs. Cubs found at dens were measured, had genetic samples taken, and marked with PIT tags so they could be identified in the future if found through capture or mortality events. If dens could not be safely entered, females were left alone, and trail cameras were set up outside of dens to count the number of cubs that emerge. In the following year, MDC staff try to relocate females to count the number of yearling cubs they have to assess the survival rate of cubs. The survival estimates gained from this study are used in population studies and help assess the overall health of the bear population.

Trail camera photo of a female black bear #1923 and her unmarked cub, March 2023

In 2023, staff located 19 dens, six of which were worked, and 12 cubs (4 females and 8 males) were marked. Overall, MDC has visited 229 dens, counted 159 cubs, and marked 138 cubs.

Bear Mortalities – MDC responded to a total of 27 confirmed bear mortalities in 2023, eight of which were previously marked research bears and the remaining 19 were unmarked bears. Nine of the mortalities were caused by vehicle collisions, two bears were poached, one conflict bear and one bear with mange were euthanized. Twelve bears were legally harvested by hunters.

Abundance and growth rate estimates - Using the initial population estimate of 300 black bears in 2012, along with data collected from collared bears such as their annual survival and reproductive rates, a population model is used to track trends in the bear population over time (Figure 1). In 2023, we estimated the black bear population to be approximately 900 black bears in the state with an annual growth rate of 8%, which indicates continual growth of the bear population. The increase in bear numbers is also reflected in the increased number of bear sightings we have received, including increasing sightings outside of the core black bear range in southern Missouri.

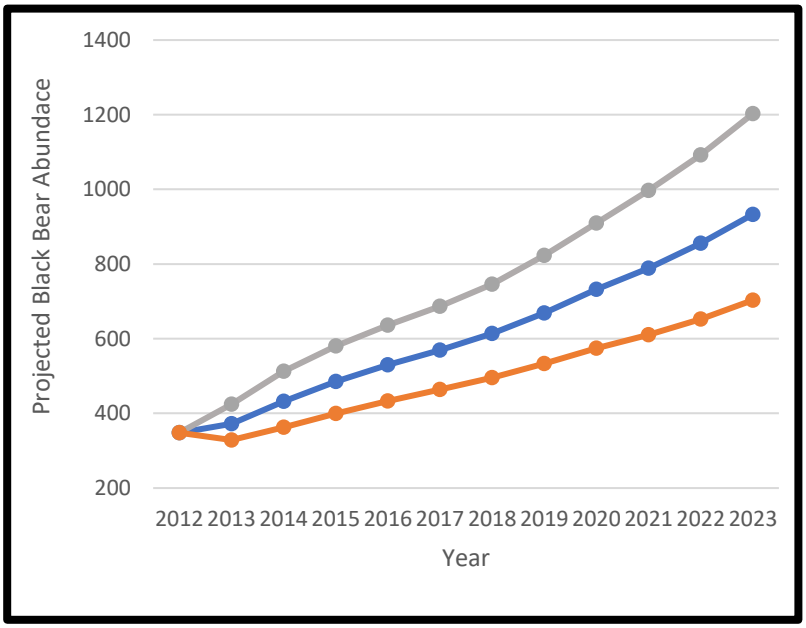

Figure 1. Annual black bear population abundance estimates for Missouri (blue), based on predictive population models. Estimates based on the initial population estimate of 300 bears in 2012 and upper (gray) and lower (orange) limits of population trend lines.

Population abundance and density distribution - The 2-year hair-snare study that started in 2022 wrapped up data collection in the summer of 2023. Over 500 hair snares were deployed across 48 sampling sites (Figure 2) and more than 1,000 hair samples were collected. Hair samples were collected at all but 9 sampling sites. The goal of the study is to generate a new population abundance estimate for Missouri. In addition, this study will explore questions looking into how landscape features might influence the density distribution of bears to further our understanding of how bears are distributed across the state to help focus future management efforts.

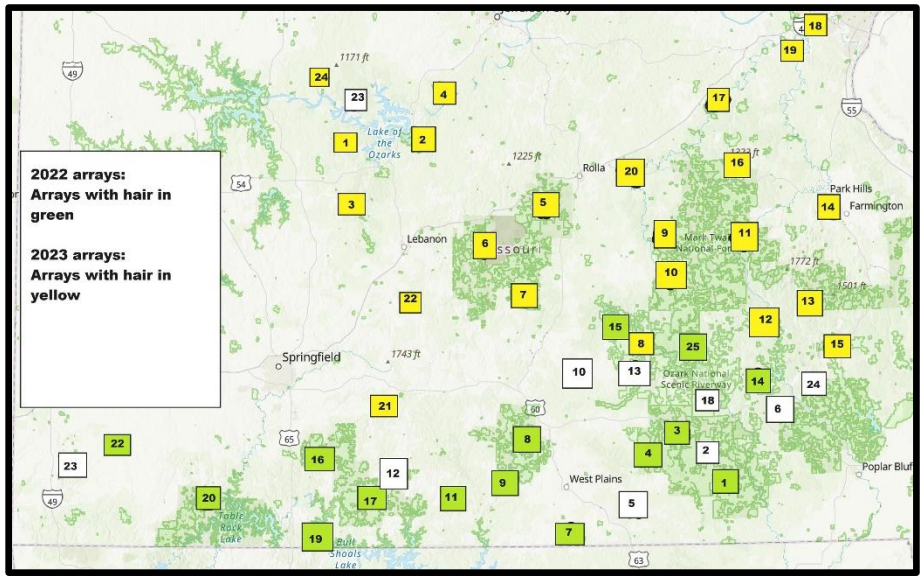

Figure 2. Map of hair snare sampling site locations in core bear range in the southern half of Missouri, 2022-2023. Green and yellow boxes represent locations hair samples were collected and white boxes are locations no hair samples were collected.

Other Missouri related research **-** Genetic samples taken from Missouri black bears were used to assess the color variation seen in American black bears found across North America. In Missouri, black bear coat color can range from black to blonde, with dark and reddish brown (cinnamon) variations also seen. Results from this study found that Missouri black bears traditionally had black coats, but after the population restoration work that Arkansas conducted in the 1960's, bringing bears from Minnesota and Canada down to the region, brown and other coat color genetic variations were introduced into region which explains the broad coat color variation in Missouri.

Bear Sightings Reports

The MDC has been collecting reports of bear sightings throughout the state of Missouri since the late 1980's (Figure 3). These reports include in-person sightings, photos captured on remotely triggered cameras, and any evidence of bear activity (e.g., tracks, scat, or damage).

Maintaining a record of bear sightings helps the MDC understand trends in bear observations over time. These trends are especially useful in tracking human-bear conflicts to focus public outreach and mitigative actions. Reports are collected through an online reporting system, which can be found at mdc.mo.gov/reportbears. These reports are then cataloged and categorized by Black Bear Program staff. In 2023, the Department received 332 sighting reports from members of the public, MDC staff, and partnering agencies throughout the state. Sightings were reported in 68 (59%) of Missouri counties (Figure 4).

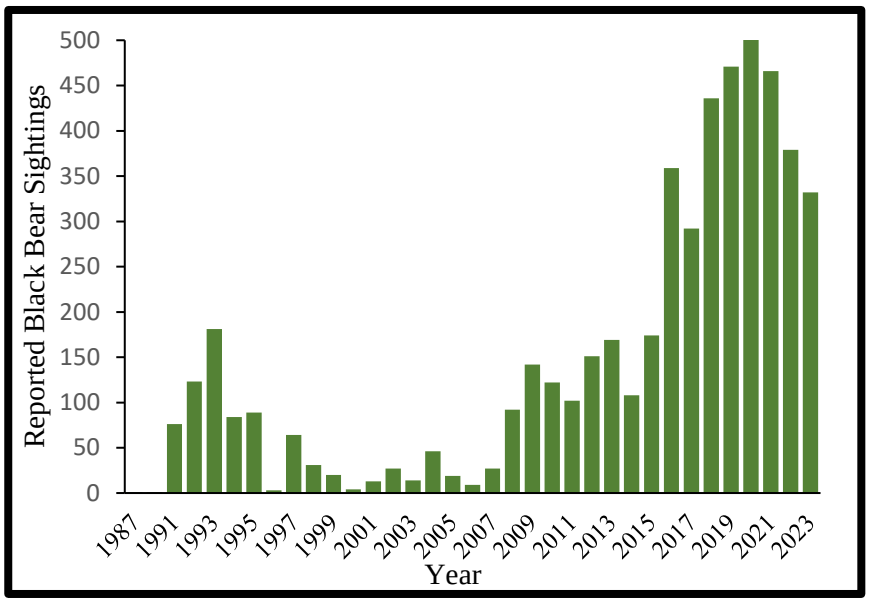

Figure 3. Count of bear sightings reported to MDC since 1987 – 2023.

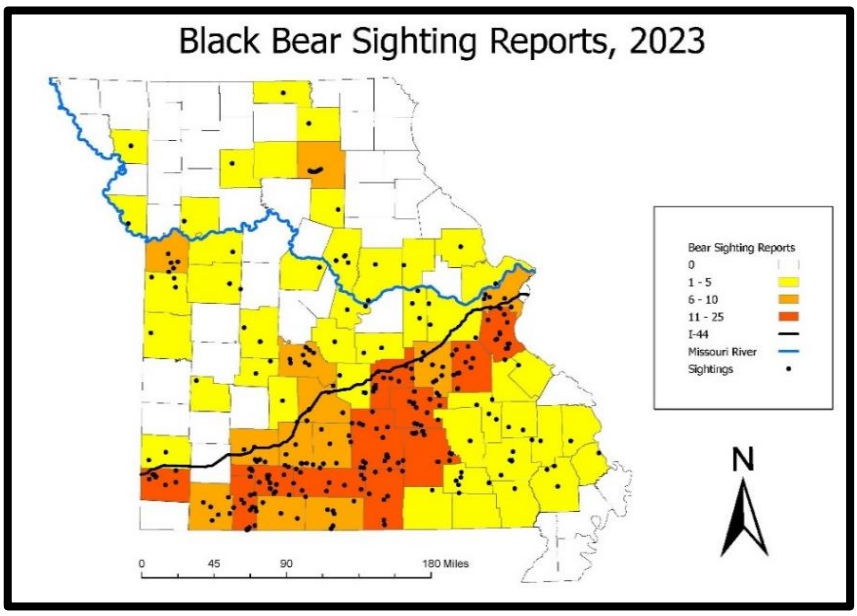

Figure 4. Maps of the black bear sightings by county in 2023. The black line that crosses the state from the SW corner to the eastern portion of the central region depicts Interstate 44.

Hunting

Season Parameters

The 2023 bear hunting season began the third Monday in October and ran for 10 consecutive days from October 16-26 within 3 Bear Management Zones, or BMZ (Figure 5). A total of 400 permits (BMZ 1: 200, BMZ 2: 150, BMZ 3: 50) were made available, with 10% of permits in each zone being awarded to approved resident landowners whose qualifying property was within the zone they applied.

Harvest quotas for each BMZ were determined based on black bear population growth and harvest simulations, and a 10% hunter harvest success rate, with caps on harvest being set as follows for each zone: BMZ 1 – 20 bears, BMZ 2 – 15 bears, BMZ 3 – 5 bears. These values are not a target harvest, but a cap on harvest that allows for maximum hunter opportunity while preventing impact on population growth.

All methods of harvest acceptable for deer are permitted for black bear except for atlatl. In addition, the use of dogs and baiting were not permitted, consistent with other large game hunting regulations in the state. Those awarded bear hunting permits were not allowed to be assisted by another individual during their hunt, unless the other individual(s) had also drawn a permit (with exceptions for minors and those with disabilities requiring assistance).

Harvest Report

In 2023, a total of 5,374 (BMZ 1: 2,179, BMZ 2: 2,120, BMZ 3: 1,075) Missouri residents applied for a bear permit, and at the end of the season a total of 12 bears (9 females, 3 males) were harvested (Figure 5). In 2023, all bears were harvested using firearms. The age range of harvest animals was 1.5 to 16.5 years and three of the nine females harvested were marked individuals that had been tracked previously as part of MDC research studies. Harvest increased this season from the previous year's eight bears harvested, which was likely due to an average or below average acorn crop that resulted in higher bear movements compared to 2022, leading to more hunter-bear interactions.

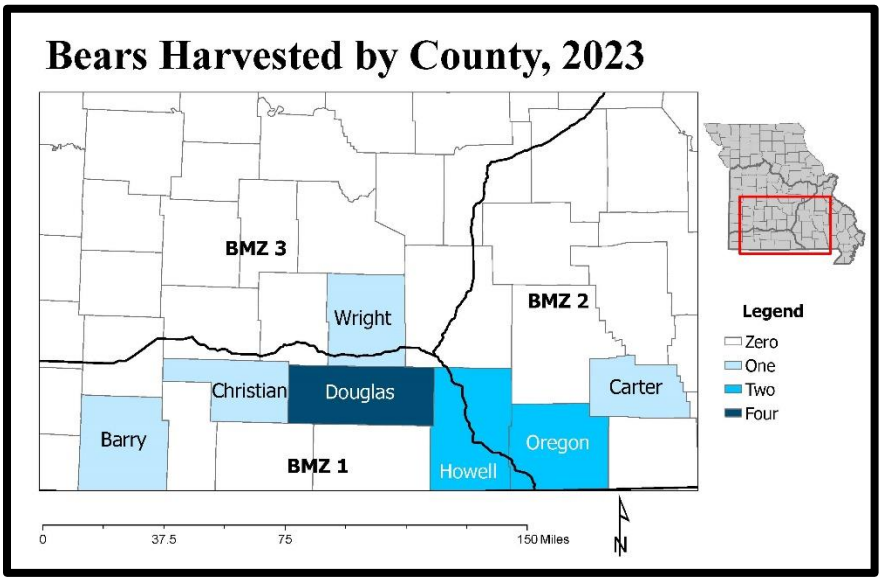

Figure 5. Map displaying Missouri's bear management zones (BMZ 1-3) and the number of bears harvested per county in each zone in 2023. Bear were harvested in BMZ1 and 2 in 2023.

Following each hunting season, a post season survey was sent out to all hunters that were drawn to assess overall effort and satisfaction. Questions included asking hunters about where they hunted, if they were able to find bear sign before or during the bear season, did hunters see bears while hunting, overall hunter satisfaction with the hunting season, and more. Of the hunters that responded to the survey, 40% of hunters attended a bear hunting class in 2023, while 45% of hunters attended a bear hunting class in 2022. In both years, over half of hunters found bear sign before going out hunting, but few hunters both years (9% in 2022, 11% in 2023) saw a bear while hunting that they did not harvest. Overall, hunters were more satisfied with their hunting experience in 2023 compared to 2022 (Figure 6).

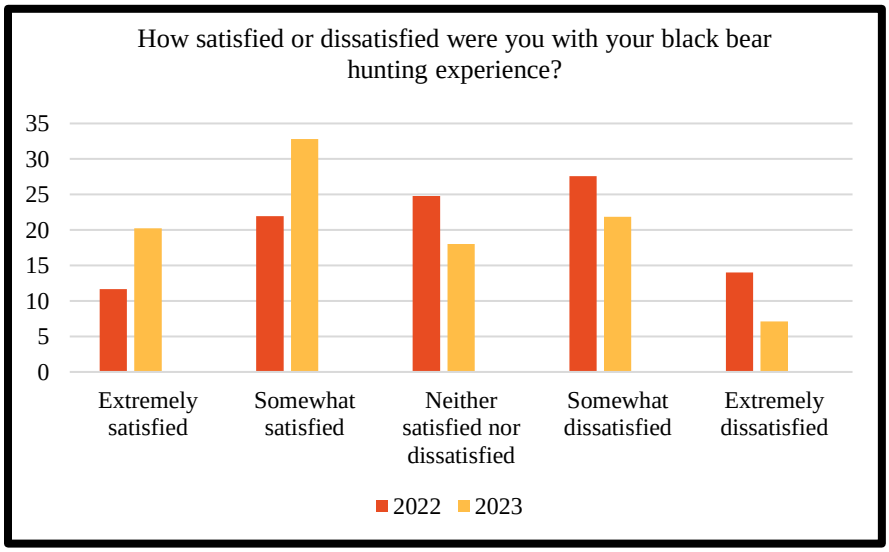

Figure 6. Post-season survey results regarding hunter satisfaction with the bear hunting experience from the 2022 and 2023 hunting seasons.

In addition, in both years when asked what would have made their hunting experience better, hunters most common responses were having harvested a bear or seeing a bear while hunting (Figure 7). The lower hunter satisfaction in 2022 is likely related to the acorn crop and the lack of bear movement during the hunting season compared with the 2023 season.

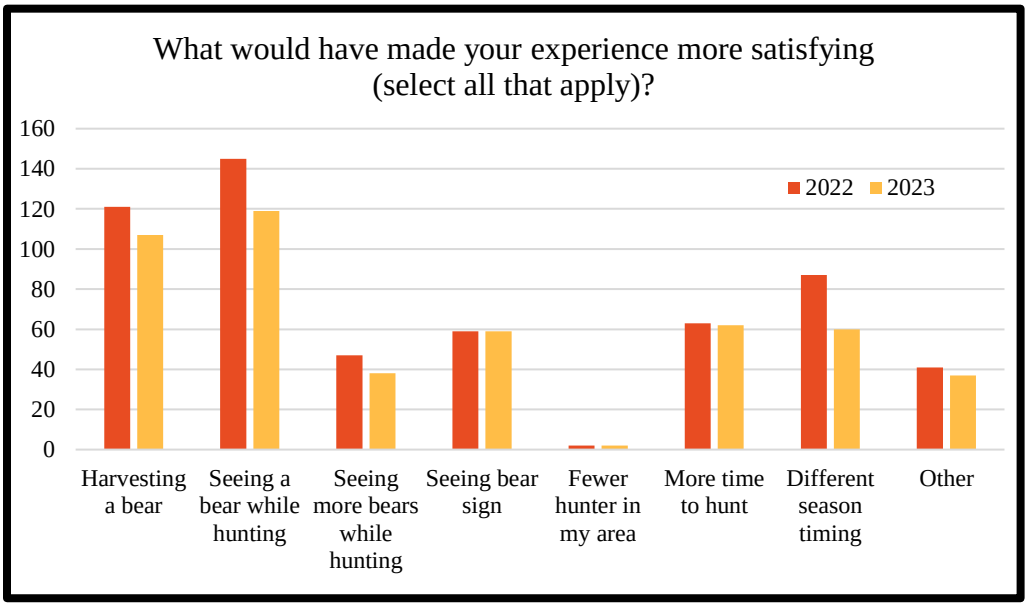

Figure 7. Post hunting survey results regarding what would have made bear hunters hunting experience better from the 2022 and 2023 hunting seasons.

Increasing Public Awareness

Outreach and Public Engagement

We continued to engage the public to increase their awareness of our ever growing and expanding black bear population through a series of educational programs, news articles, radio interviews, and podcasts. Our hope is that as more people become aware that Missouri is bear country, citizens can learn how to live responsibly with bears.

Black Bear Hunting and Ecology Classes

Since the establishment of Missouri black bear hunting season, MDC has put on bear hunting classes (Black Bear Hunting: Basics) for those that might be interested in learning more about Missouri's black bear season. Attendees learned about wildlife identification, habits and habitats, regulations, safety, hunting strategies, equipment, and game care. Furthermore, MDC also held a more in-depth training class (Black Bear Hunting Beyond the Basics) for those individuals that were drawn for the opportunity to purchase a bear hunting permit. This class touched on the same topics but expanded on a number of hunting related topics such as scouting, hunting logistics, and time for Q&A for hunters.

Be Bear Aware & BearWise

As the bear population started to grow and expand across the state, MDC saw a need to begin intensive educational and outreach actives to help Missourians learn how to live in newly recolonized bear country, which led to the development of the Be Bear Aware program. The Be Bear Aware program (found on the MDC website: https://mdc.mo.gov/wildlife/wildlife-facts/be-bear-aware) provides information about what to do if you were to encounter a bear in the wild or near your place of residence. In addition, the program provides suggestions on how to properly secure food items, such as bird or animal feed, to reduce conflict with bears.

Be Bear Aware Tips…

1) Don't feed bears – intentionally or accidentally. A fed bear is a dead bear – when bears lose their fear of people (often by receiving food), they may become bold in search of food. Bears that exhibit bold behavior are often euthanized. Therefore, it's important to remove or secure food attractants, such as bird feeders, garbage, pet food, and grills/smokers. If you are camping or hiking in bear country, be bear aware. Store food in secure containers, keep a clean camp and keep cooking and sleeping areas separate.

2) If you see a bear, enjoy the encounter from a distance, give the bear room to escape and never run. Bears retreat up trees when they feel threatened. If you see a bear up a tree, leave the area and let the bear come down when it is ready. Bears may explore tree stands out of curiosity or attraction to cover scents or food. If you are hunting and a bear approaches the base of your tree stand, immediately alert the bear of your presence – make noise, stand up to be more visible.

BearWise

More recently, Missouri has become a member of the BearWise program, meaning the state is starting to utilize information developed by BearWise to help continue to educate the public. BearWise is a nation-wide education program developed by black bear biologists and supported by state wildlife agencies, such as MDC, that provides consistent messaging about how to live responsibly with bears, whether you live in Missouri or are going on vacation to Montana or Tennessee. BearWise shares ways to prevent conflicts and encourages community initiatives to keep bears wild. You can learn more about this program at bearwise.org.

If you see a bear in Missouri or find bear sign, we encourage the public to report these sightings to MDC at mdc.mo.gov/reportbears. In addition, if you are regularly seeing bear activity on your property or are experience conflict with a bear, it is important to contact your MDC Regional Office, local Conservation Agent, or regional Damage Biologist.

Addressing and Mitigating Stakeholder Conflicts

A trail camera photo of a black bear attempting to access an unsecured dumpster in southern Missouri.

Black bears are an important species in Missouri for their intrinsic value and their contributions to local biological diversity. However, sometimes bears may be considered a problem by some members of the public when involved in human-bear conflicts. These interactions are likely to increase over time as the black bear population and their geographic distribution expands. For the continuation of our healthy bear population and assuring public safety, it is imperative to deploy a comprehensive strategy addressing and mitigating human-bear conflicts across their range.

Bear Wildlife Damage Response

MDC's Wildlife Damage Management Program employs a team of Wildlife Damage Biologists/ Human-Wildlife Interaction Specialists that provide technical information and assistance with wildlife damage prevention and control. These damage biologists use flyers, door hangers, and one-on-one interactions to address prevention issues. Human bear conflicts are most common outside the bear hibernation periods and typically peak in the early summer. Since 2010, damage biologists have responded to a long list of conflict issues, most of which related to food storage or livestock (such as chicken coops or beehives) related issues (Figure 8).

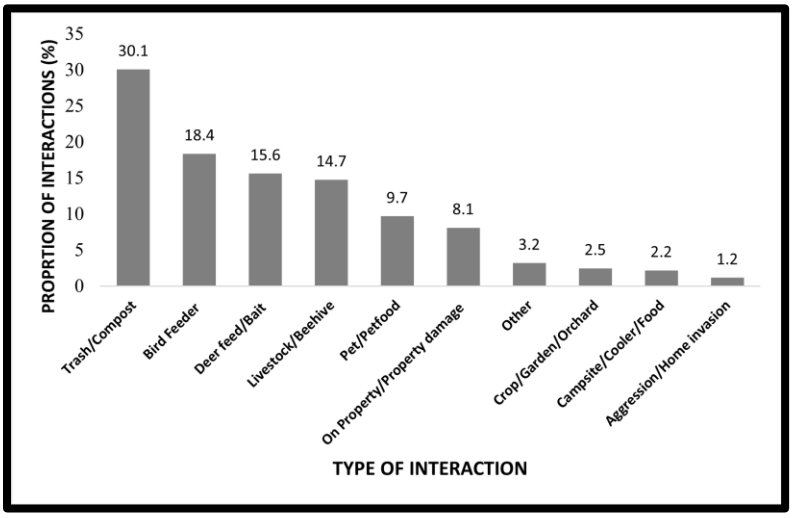

Figure 8. The proportion of bear–community conflicts reported to MDC from 1991 – 2023. The other category includes events such as vehicle collisions and city/town interactions without property damage.

In 2023, we continued to see an increase in conflict situations, with trash and feed storage being the most common issues, followed by interactions caused by bears cutting through more densely populated cities or towns (Figure 9). To help deal with these issues, damage biologists regularly recommend removing any food attractants from areas of conflict and secure trash cans and other attracts with electric fencing. These resolutions help mitigate many conflict issues.

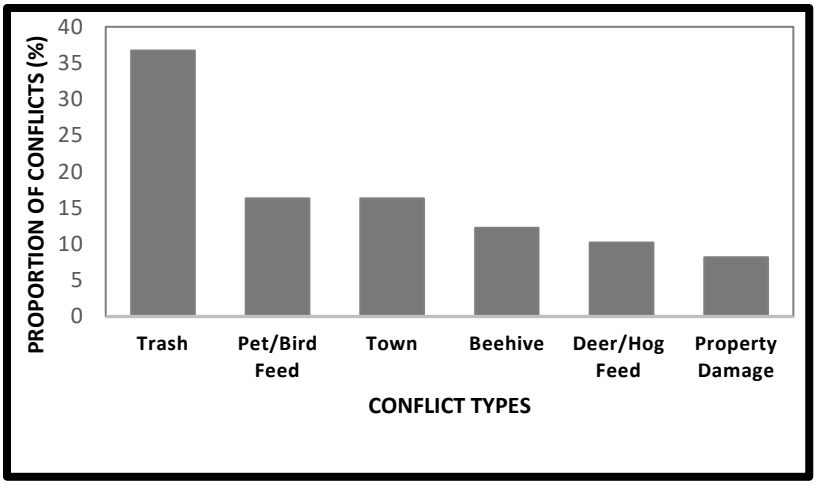

Figure 9. The proportion of reported bear–community interaction during 2023 in Missouri related to sources of food or direct interactions with property, pets or livestock, trash or feed of different types.

Acknowledgements and Publications

Acknowledgments

The Program recognizes the efforts by all its collaborators and would like to extend the utmost appreciation towards the stated and unstated herein. These include countless Missouri landowners that graciously allow the Program access to their property for research activities. Department staff and external agency partners (e.g., U.S. Forest Service, USFWS Wildlife Restoration Program) provide exceptional service to the Program throughout the year. University collaborators (e.g., the State University of New York, Mississippi State University, Michigan State University) collaborate with MDC on the high-quality research that informs management decisions. Thank you!

Publications (from 2010-present)

From the research conducted starting in 2010, more than 21 peer reviewed publications were published in scientific journals. We hope to continue to share our results of future studies in scientific publications as these studies are completed.

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