PUBLIC COMMENT AND FWP RESPONSES

All 24,750 comments received were reviewed by Montana Fish, Wildlife and Parks ("FWP") personnel. A substantive public comment was defined as the identification of a specific issue or impact. Some comments received were too vague to specifically address, were claims not accompanied by citations or the citations were media releases (i.e., not peer-reviewed), or were outside of the scope of a statewide conservation and management plan. Some comments were already addressed in the 2025 Wolf Plan (the "Plan") or Final Environmental Impact Statement ("FEIS") (i.e., please use table of contents to find subject matter). In some cases, multiple individuals provided the same or similar substantive comment(s); these comments have been summarized, categorized, and a single FWP response is provided below. Please note that in some instances, FWP responded to a comment that did not result in a change to the Plan and/or FEIS but is addressed below. In other instances, FWP responded to a comment that resulted in new text or an amendment to the Plan and/or FEIS. A response that resulted in new text or an amendment to the Plan and FEIS is underlined. Please also note that references to page numbers can be associated to the Plan and FEIS. If a reviewer's comment specifically pertained to the FEIS, then reference to a specific page number is associated to the FEIS. The same context applies for the Plan (i.e., if a reviewer's comment pertained to the Plan, then reference to a specific page number is associated to the Plan). Lastly, any comments tied to ongoing litigation or lawsuits regarding wolves do not include a response. Given the fact that the litigation/lawsuits are ongoing, FWP cannot comment on those matters. More importantly, FWP cannot comment on something that has yet to be finalized/determined.

The following constitutes a synopsis of substantive public comments received and FWP's response to those comments.

The 2003 Wolf Plan

SOME REVIEWERS:

- Believe FWP violated the law by depending on an outdated wolf plan which was supposed to be formally reviewed every five years.
- Want regular review/updates of the 2025 Wolf Plan.
- Want annual specifics in wolf monitoring and management trends (population status, harvest numbers, depredations) from 2003-2022.
- Want an emphasis on coexistence.

RESPONSE:

Wildlife management plans, including the 2003 Wolf Plan are non-regulatory, and consequently using the 2003 Wolf Plan for guidance does not violate any laws. The 2003 Wolf Plan stated that it would be reviewed at least every five years and modified to ensure the document remained current and/or practical. FWP did conduct internal reviews of the 2003 Wolf Plan; however, it wasn't until recently that FWP determined the 2003 Wolf Plan required an update. FWP will not commit to a specific date and/or time that the Plan be reviewed (i.e., every five years); however, FWP does intend to review the Plan and update it when necessary.

Annual specifics in wolf monitoring and management trends have been and continue to be available via FWP's Annual Report. FWP began drafting, finalizing, and distributing the Annual Report in 2005 and has continued since then. FWP will continue to draft, finalize, and distribute the Annual Report. Annual and regional specifics regarding population status, mortality, conflict, among other topics, can be found in the Annual Reports on the wolf management webpage (https://fwp.mt.gov/conservation/wildlife-management/wolf).

The 2003 Wolf Plan states that FWP would *review* the wolf management program every five years, and, if need be, modify the document to ensure it is current and practical. FWP reviewed the 2003 Wolf Plan regularly and determined that an update wasn't necessary until recently. FWP will update the 2025 Wolf Plan as necessary, as well as supplement it with annual reports.

Using the 2003 Wolf Plan as the foundation, FWP developed the Plan. The following text has been added to the Plan (pg. 2 and 15) to emphasize FWP's commitment to coexistence of humans with wolves:

> … long-term viability of wolves and their coexistence with humans on Montana's diverse landscape.

ARMs 12.9.1301-1305

SOME REVIEWERS:

- Believe ARM 12.9.1303 should include reference to the new or an updated wolf conservation and management plan.

RESPONSE:

Reference to a new or updated (contemporary) wolf conservation and management plan was removed because the Plan is non-regulatory. On December 14, 2023, the Fish and Wildlife Commission (hereafter, commission) approved the amendment to 12.9.1303. The Secretary of State (SOS) approved the amendment to 12.9.1303 with no edits on January 12, 2024. Changes to this ARM require public rule-making processes and relative comments are thereby outside of the scope of the Plan.

A Wolf Advisory Council

SOME REVIEWERS:

- Want the development of a wolf advisory council.
- Do not want the development of a wolf advisory council.
- Want to see increased inclusivity of stakeholders.

RESPONSE:

In the past 20 years, the public has had many opportunities to comment on various components of wolf management as it was considered by the Montana Legislature, the commission, and FWP. [See pages 24-26, 82-84 of the Plan]. Inclusivity of all stakeholders was present in these processes and continues to be a top priority. For the Plan, FWP provided two public scoping opportunities and a 60-day public comment period. Given this and the current legislative direction in statute for wolf management in the state, FWP is not convening a citizen advisory group for wolf management at this time.

EIS and Alternatives

SOME REVIEWERS:

- Want the trophic-cascades alternative to be the focus of the Plan.
- Want to see an emphasis on habitat management in the Environmental Impact Statement.
- Believe there was no difference between Alternatives 1 and 2.
- Identified that the positive and negative impacts of wolves varies across the state, and that the net impact isn't consistently zero.
- Identified lack of recognition that ungulate population dynamics influence environmental and landscape quality.
- Identified lack of recognition of safety impacts from trapping/snaring in chapter 3.13.
- Identified lack of recognition that declines in hunter opportunity influences local business economies.
- Identified lack of representation for those in the ecotourism and outfitter businesses in chapter 3.17.
- Do not understand what "direct" impacts mean regarding an environmental analysis.
- Do not believe there will be positive impacts on resources analyzed.
- Recognized there was no inclusion of climate change.
- Want to see efforts of engagement with Tribal Nations and their beliefs on wolves in the Plan.
- Want to see more detail on how FWP considers management decisions of adjacent states into their own management recommendations.
- Want inclusion of the Idaho Wolf Depredation Control Board throughout.
- Want to see FWP's authority on limiting residential, commercial, and industrial developments to conserve wolf habitat.
- Believe these documents violate MEPA.

RESPONSE:

Due to direction from the legislature and statutes in place, FWP cannot consider a trophic-cascades or a no management alternative [See pages 39-40 of the FEIS]. The commission is required to establish hunting and trapping seasons for wolves with the intent to reduce the wolf population to a sustainable level, but not less than 15 breeding pairs. *See* § 87-1-901(1), MCA. Thus, a trophic-cascades alternative cannot be the focus of the Plan, as it is inconsistent with statute. Nevertheless, even if a trophic-cascades alternative wasn't in direct contradiction of the law, such an alternative would not be expected to occur with results that the public expects. Recent experimental evidence from Yellowstone National Park concluded that recovery of large carnivore populations did not affect riparian plant growth (Hobbs et al. 2024). Additionally, while reduced elk density is correlated to increased aspen recruitment in Yellowstone National Park, wolves are only one among many limiting factors on elk density, and wolf predation risk and associated behavioral responses by elk have negligible effects on aspen recruitment (Brice et al. 2024). [See page 24 of the Plan]. Given this, there is no substantial evidence that trophic-cascades occurred in Yellowstone National Park with the reintroduction of wolves, at least not to a measurable degree. Population size and density of wolf prey (elk and other cervids) as well as forests, riparian areas, and grasslands outside of National Parks is intensely debated and managed based on competing human desires, reducing the likelihood of wolf predation impacts (versus human influence) on prey density and distribution as well as cascading effects on lower trophic levels in such areas. For example, across Europe, cascading effects of wolves on ecosystems outside of protected areas, mediated by effects on prey behavior or populations, have not been documented, likely due to overwhelming effects of humans (Gerber et al. 2024).

The Montana Environmental Policy Act ("MEPA") and ARM 12.2.436 (PREPARATION AND CONTENTS OF DRAFT ENVIRONMENTAL IMPACT STATEMENTS), require an analysis of the proposed action, reasonable alternatives to the proposed action, and the no action alternative. Alternatives are different ways to accomplish the same objective as the proposed action. A reasonable alternative is one that is practical, technically possible, and economically

feasible. A reasonable alternative should fulfill the purpose and need of the proposed action and will address significant and relevant issues. "The agency is required to consider only alternatives that are realistic, technologically available, and that represent a course of action that bears a logical relationship to the proposal being evaluated." ARM 12.2.429(2)(b).

As stated in Chapter 1.3, the Plan assures ongoing, contemporaneous, sound, science-based, and flexible management methodologies through incorporation of the following elements:

- New wolf-related research and associated science-based information;
- New and available wolf management tools and methods employed by FWP;
- Ensured continued public transparency related to wolf management practices in Montana;
- Compliance with existing laws, regulations, and policies, as well as inter-governmental commitments made by FWP and the commission; and
- Recognition of the need for adaptable wolf management strategies to accommodate everchanging wolf population dynamics influenced by:
    - Changes in wolf density and distribution in response to varying human-caused mortality;
    - Environmental factors;
    - Human developments;
    - Prey availability; and
    - Contextual changes in the sociopolitical climate.

The alternatives considered but not carried forward for detailed analysis cannot accomplish these objectives and obligations. Therefore, the purpose and need for the proposed action is in fact met by the proposed action (i.e., the Plan). And, the specific objectives of the proposed action, as identified by the bullets above, are supported by the proposed action. Additionally, approval and implementation of either alternative considered but not carried forward for detailed analysis would not represent a reasonable alternative, as such an approach would indeed violate applicable law. See Chapter 2.5 for more details. However, these alternatives considered but not carried forward share the same objective of a sustainable population, although the definition of such is different. The proposed action manages for a sustainable population and thus, is a reasonable alternative.

Alternative 1 (no action) would retain the implementation of the 2003 Wolf Plan, which is outdated. However, because the 2003 Wolf Plan allows for flexible management, FWP could continue to use its reference. Alternative 2 (proposed action) is the preferred alternative because it provides continued and increased transparency on how wolves are monitored and managed in the state, specifically over the last 20 years.

The following paragraph has been added to resource chapter 3.1.4 to recognize climate change and its potential impacts on habitat availability and suitability for wolves:

> FWP's understanding of how wolves are likely to be affected by climate change indicates similar impacts regardless of the management direction under consideration in this FEIS. FWP will consider habitat variations, including those manifest in climate change, as it allocates resources or suggests regulations. FWP would continue to monitor populations as they respond to these variations and adjust management responses accordingly. However, while related, climate change is not considered in the cumulative impacts for 19 resources analyzed.

Tribal Nations were contacted regarding the draft 2025 Wolf Plan and EIS process. *See* Plan, pg. 79-81 and FEIS, Chapter 5.1.2. All eight Tribal Directors were emailed on May 8, 2023, and invited to comment on the public scoping notice with respect to their values, monitoring strategies, population objectives, opinions on harvest strategies, what activities they currently employ on their lands, and/or any other subjects they deemed appropriate. Five of the eight Tribal Directors received a follow-up phone call on May 19, 2023 (based on geographic location and overlap with wolf

distribution in the state). Two Tribal Directors stated they had read the public scoping notice and had no comments, two said they would read it and reach out if they had comments to provide, and a voicemail was left for the last Tribal Nation. Fort Peck, Little Shell, and Crow Nations did not receive a follow-up phone call. No comments were received by Tribal Nations regarding the development of the Plan or DEIS. The completed draft documents were sent to all Tribal Nations on January 24, 2024, and follow up calls were conducted on January 30 and 31, 2024. Tribal Nations also had the opportunity to comment on the Plan and DEIS with the second round of public comment that concluded March 9, 2024, at 5 p.m. Participation in review by Tribal Nations is not mandatory. While FWP manages wolves in Montana, and Tribal Nations in wolf territory have their own wolf management plans for their lands, FWP works collaboratively with the tribes regarding wolf management. FWP has a Tribal Liaison and Diversity Coordinator position to maintain positive relationships and communication with Tribal Nations regarding wildlife management.

Given the above, we feel that we have reasonably fulfilled ARM 12.2.434(2)(a) regarding invitation of participation by Tribal Nations. Further, solicitation of DEIS review and public comment by affected Tribes is not expressly required unless the Tribe has specifically requested participation. See ARM 12.2.439, Time Limits and Distribution of Environmental Impact Statements. In fact, in addition to a lack of Tribal participation in the public scoping process, none of the affected Tribes requested a copy of the DEIS. Despite this fact, FWP did make reasonable attempts to solicit comment on the DEIS from affected Tribes and did share the DEIS directly with all affected Tribes.

Throughout the FEIS, in each resource chapter, we state the following:

> Current wolf management strategies in Montana are guided collectively by various related past, present, and future actions conducted by federal and state land/resource managers, as follows:
>
> - U.S. Department of Agriculture – Forest Service
> - U.S. Department of Interior – National Park Service
> - U.S. Department of Interior – U.S. Fish & Wildlife Service
> - U.S. Department of Interior – Bureau of Land Management
> - Montana Department of Natural Resources and Conservation
> - Montana Department of Fish, Wildlife, and Parks and Fish and Wildlife Commission
> - Idaho Department of Fish and Game; Idaho Fish and Game Commission; Idaho Wolf Depredation Control Board
> - Wyoming Game and Fish Department; Wyoming Game and Fish Commission

This includes all actions, such as harvest season-setting outcomes and respective wolf management plans, among other regulatory decisions. FWP has MOUs with other Northern Rocky Mountain (NRM) states and the USFWS to conduct consistent monitoring and analysis of wolf genetics to ensure that functional connectivity and genetic variation do not decline, thus ensuring a viable, healthy wolf population with long-term persistence by maintaining that the population meets or exceeds recovery goals (as per ARM 12.9.1301, which serves as the definition of biological sustainability). Legislative sessions, commission decisions, and other management actions done by other NRM states are outside of the scope of the Plan. FWP will continue to monitor and consider such actions in its own management recommendations.

FWP does not have authority on limiting residential, commercial, and industrial developments to conserve wolf habitat. However, FWP works with other land management agencies as well as city and county governments on how to mitigate such disturbances on the landscape.

As identified in the DEIS (pg. 95), direct impacts are caused by an action and occur at the same time and place as the action. Given the fact that FWP received a comment concerning a lack of understanding regarding the definition of “direct impacts,” FWP now seeks to further clarify what direct impacts are. Here, the action is the Plan. The DEIS analyzed the direct, secondary, and cumulative impacts for 19 resources (Ch. 3.2 – 3.20). Considering that wolves have already existed on the landscape prior to this action (i.e., the Plan), have occupied Montana at a sustainable

population for many years (i.e., 15 breeding pairs which equates to 450 wolves), and wolf management would not change as a result of this action (i.e., from wolf management under the 2003 Wolf Plan), there will be no new direct impacts. Additionally, there would also be no new secondary or cumulative impacts.

Although not in response to public comments, the resource chapters in the FEIS (3.2-3.20) were modified to reflect the accuracy of direct, secondary, and cumulative impacts.

> Under the proposed action, wolf management would look mostly the same as with the No Action Alternative (i.e., the 2003 Wolf Plan) except that it would incorporate current science as it becomes available and is most practical with implementable strategies, improved monitoring methods, changes in harvest management tools, or updated depredation response and mitigation (involving lethal and non-lethal strategies), as well as provide increased transparency and understanding to the public and capture a diversity of values in regards to wolves in Montana. The proposed action would not change the status of the existing area. No new impacts due to current and future activities in the existing area would occur.
>
> FWP has demonstrated successful management of wolves through the creation and implementation of the 2003 Wolf Plan, which serves as the foundation of the 2025 Wolf Plan. Although annual wolf reports have been published since the adoption of the 2003 Wolf Plan, as a means to provide transparency of wolf monitoring and management, the 2003 Wolf Plan fails to provide details on how wolves are currently monitored and managed cohesively. While the 2003 Wolf Plan allows for contemporaneous and scientific approaches to wolf management as well as flexibility to changing biological and sociopolitical environments, ultimately allowing FWP to monitor and manage wolves using the methods and tools employed today, it does not describe the history of the Montana wolf population and the evolution of how FWP monitors and manages wolves since its publication. More specifically, the 2003 Wolf Plan does not address recent research regarding monitoring methods and management strategies (e.g., iPOM, surveys on wolf tolerance, non-lethal preventative strategies), the authority of WS in making wolf-livestock conflict decisions, current population status and trends, changes in harvest structure and statutes, new tools to provide public information (i.e., dashboards), or the transition of the population metric from breeding pairs to number of individuals. Over the last 20 years, the wolf population has recovered and remained above recovery criteria, withstanding a series of continually evolving harvest seasons adopted by the commission and new statutes developed through legislative action. Further, FWP has considered complex varying opinions on wolf monitoring and management, via public engagement processes, incorporating them as allowed within our legal bounds and as monitoring and management tools became available and were practically implementable to us.
>
> Thus, while FWP has adopted new monitoring and management strategies over time, as the affected environment required, nothing in the proposed action will change wolf management, and, as a result, there will be no new impacts. The proposed action provides the opportunity to be more transparent with the public about what has changed over time since the publication of the 2003 Wolf Plan. This includes, but is not limited to: transparency about monitoring methods; changes in harvest management tools; updated depredation response and mitigation (involving lethal and non-lethal strategies); and inclusivity of Montanans diverse values as it relates to wolves on the landscape in Montana.

Generally, the comments specific to the DEIS do not highlight procedural errors associated with MEPA, rather, they address concerns related to the depth of analysis provided for specific subjects covered by or lacking from the DEIS Alternatives Analysis (Chapter 2) and the Impacts Analysis (Chapter 3). The adequacy of depth of analysis will always be an issue with preparation of EIS-level review because it is subjective. FWP considered all pertinent data and relevant information as appropriate and substantive. FWP will continue to monitor all future pertinent data and relevant information as appropriate and substantive.

Classification of wolves and recovery criteria

SOME REVIEWERS:

- Want to relist wolves on the Endangered Species Act (ESA) and or reclassify wolves as "endangered" or "threatened" (i.e., thereby establish protection of wolves from harvest [see section below])
- Support the petitions to the USFWS to relist wolves on the ESA
- Want to keep wolves delisted
- Want FWP to manage for an increased population size/status or for a decreased population size/status
- Want to keep the current classification of wolves
- Want to maintain state management of wolves
- Want to reclassify wolves as a furbearer, game animal, non-game animal, or predator (i.e., thereby modifying the sideboards of wolf management via harvest [see section below])
- Want to change the recovery criteria of 15 breeding pairs and 450 individuals (some want these numbers increased, others want these numbers lowered to 150 individuals as in the federal register)
- Want FWP to manage for carrying capacity of wolves (biologically/ecologically)
- Want FWP to manage for a population above the 2021 population size estimate
- Want recovery criteria to mean statewide occupation of wolves
- Want specific population size and distribution objectives (statewide and or regionally) and or management to be geographically-based
- Believe FWP is managing wolves to the recovery benchmark threshold of 15 breeding pairs or 450 individuals, and it is an arbitrary number
- Want to know how FWP arrived at 450 individuals for the minimum benchmark
- Want to know how 450 wolves impacts genetic connectivity
- Want "sustainable" to be defined and reviewers define "sustainable" differently
- Want to remove Montana State Legislature's involvement on wolf management
- Believe there are different subspecies of wolves and as such, should be managed differently
- Believe that FWP is not being truthful about the details of reintroduction efforts
- Stated that FWP does not mention translocations while wolves were under federal authority
- Commented that FWP does not manage wolves for the public trust
- Commented that FWP does not manage wolves under the North American Model of Wildlife Conservation

RESPONSE:

Listing or relisting any species on the Endangered Species Act (ESA) is under the authority and discretion of the U.S. Fish and Wildlife Service (USFWS). ESA recovery criteria for wolves of the Northern Rocky Mountain (NRM) distinct population segment (DPS) were established by the USFWS. While Montana met recovery criteria in 2002, delisting did not occur until briefly in 2009 and then permanently in 2011. Since wolf delisting in the NRM, several petitions were sent to the USFWS pertaining to wolves. The first was to relist the NRM DPS on the ESA. The second was to delist wolves in the lower 48. On Feb. 7, 2024, the USFWS published their notification of finding, after an extensive peer-reviewed assessment of the best available science, identifying that the NRM is no longer a valid DPS, and that gray wolves in the Western United States constitutes a valid DPS but is not worthy of listed status under the ESA. In sum, the NRM DPS was removed and NRM wolves were combined in the Western United States DPS. This finding is not action-forcing; the legal status of gray wolves does not change as a result of this finding. Comments on these petitions and listing or wolves remaining delisted on the ESA are outside of the scope of the Plan.

The history of wolves, reintroduction efforts, and their reestablishment as it pertains to the NRM and Montana population is described in detail in the Plan. [See page 24-26 of the 2025 Wolf Plan]. Wolves from Canada, as a result of natural immigration, and locations of reintroduction efforts (i.e., YNP and central Idaho) helped established Montana's current wolf population. The USFWS did conduct translocations in the early 2000s, but only did so to and

from areas where wolves had already naturally immigrated and reestablished, and where packs were regularly being observed (e.g., wolves were translocated from GYA to the Yaak but several packs were already occupying NWMT at that time). Clarity has been provided in the text of this section as follows:

> Wolves were not released within Montana as part of the reintroduction effort. ~~, but w~~Wolf populations in YNP and central Idaho grew rapidly and soon became a source of dispersers to Montana, via natural emigration… In the early 2000s while wolves were still under federal authority, the USFWS occasionally translocated wolves in Montana to and from areas where natural immigration and reestablishment had already occurred, and where packs were regularly being observed (see Rocky Mountain Wolf Recovery Annual Reports at https://digitalcommons.unl.edu/wolfrecovery/).

At present, wolves are under state authority and classified as a "species in need of management" (§ 87-5-131, Montana Code Annotated [MCA]). FWP maintains the population baseline derived from the federal recovery definition of 150 wolves and 15 breeding pairs (50 CFR Part 17, Docket No. FWS–R6–ES–2011–0032; 92220–1113–0000; ABC Code: C6). This is what the USFWS considers to be a viable, sustainable, healthy wolf population. To be conservative in our efforts to maintain delisted status and state management of wolves, FWP will use 450 wolves as the benchmark to ensure the population maintains at least 15 breeding pairs, which also surpasses the minimum requirement of 150 wolves. That number may change if the monitoring methods or accuracy and precision of state wolf population estimates change in the future. [See page 47 of the 2025 Wolf Plan]. Should the population decline below 15 breeding pairs and 150 wolves (as per the federal register), the delisted status of wolves would likely change. FWP arrived at 450 wolves as described on page 46 of the 2025 Wolf Plan.

The minimum threshold of 15 breeding pairs or 450 wolves is NOT the population target. FWP does not recommend reducing the wolf population to 450 wolves [see Figure 16 in the 2025 Wolf Plan]. FWP does not have specific objectives for the distribution of wolves. [See page 47 of the 2025 Wolf Plan]. In fact, wolves now occupy the majority of suitable habitat in Montana [see Figure 9 in the 2025 Wolf Plan], in that they are no longer recolonizing new areas for potential establishment. FWP will strive to ensure a viable, healthy wolf population with long-term persistence by maintaining that the population **meets or exceeds** recovery goals (as per ARM 12.9.1301, which serves as the definition of biological sustainability). This includes sufficient genetic connectivity (Paetkau 2022). As such, a wolf population at or above 450 wolves is considered sustainable as it aligns with the USFWS definition of a sustainable wolf population and abides by § 87-1-901, MCA. As part of the definition of a sustainable wolf population (ARM 12.9.1301), a wolf population at or above 450 wolves will not impact genetic connectivity (more detailed responses to comments pertaining to genetic connectivity in the "Population Monitoring and Population Status Estimation" section of this document under the "Genetics" subsection).

The following phrase and sentences have been added to increase clarification:

> Further, the minimum baseline metric used will be modified to the number of wolves and wolf packs needed to sustain and maintain a viable wolf population (as per ARM 12.9.1301)…This is not FWP's declared population target. … Should the wolf population decline to the point it approaches 450 wolves (the minimum number of wolves needed to ensure 15 breeding pairs) FWP would shift management strategies. While FWP does not have a specific population objective, the wolf population may fluctuate anywhere within the estimated population size identified during the 2021 Legislative Session (*see* § 87-1-901, MCA, "with the intent to reduce the wolf population in this state to a sustainable level") to no less than a population estimate of 450 individuals depending on what is considered biologically and socio-politically sustainable. FWP does not have specific objectives for the distribution of wolves. [Pages 47, 57 of the 2025 Wolf Plan].

This plan is not prescriptive and does not specify more precise population targets. As noted above, FWP cannot manage for a population that exceeds the estimated population size of 2021. This is because the Legislature amended § 87-1-901, MCA, and requires the commission to "establish by rule hunting and trapping seasons for

wolves with the intent to reduce the wolf population in this state to a sustainable level." By virtue of amending the statute in 2021 to read as mentioned above, the Legislature indicated that the estimated population size prior to the adoption of § 87-1-901, MCA, was not at "a sustainable level." If statutes and legislative direction change via future legislation, more conservative regulations or more liberal regulations may be implemented to meet new legislative mandates. These changes will be reflected by the Fish and Wildlife Commission in their annual review of wolf regulations. Ultimately, FWP has no authority over the role the Legislature or commission plays in wolf management.

Moreover, specific population objectives were not identified in the 2025 Wolf Plan to allow for flexible management that ensures population sustainability as ecological and sociopolitical environments change. This approach in the 2025 Wolf Plan also allows for the changes in law and the incorporation of new and available science into practical and implementable management strategies. Because there are no regional population targets, there is no inherent inference about where populations are too "high" or "low." While we recognize that the prey base may be able to support higher wolf densities in some parts of the state (i.e., some areas may not be at carrying capacity), there are other biological and sociopolitical aspects that need to be considered. Given that, in addition to Legislative mandates, we cannot manage for carrying capacity of wolves. We also recognize that the benefits and the challenges of wolves may differ among areas within the state. Specific management actions and strategies do vary regionally and geographically-based considerations contribute to those decisions (see next section of this document). FWP aims to balance wolf distribution and densities with the changing and diverse needs of the public and private landowners and the various land uses in Montana, and therefore a statewide population size or distribution objective is not appropriate. The population abundance that achieves this balance will fluctuate in a range that is considered socio-politically sustainable. Achieving this would be considered successful management.

Currently, the department is managing the wolf as a species in need of management. The department and the commission will continue to manage the wolf as a species in need of management until a determination is made that it no longer needs such protections and can be managed as a game animal or furbearer. § 87-5-131, MCA. Changing the classification of wolves (§ 87-5-131, MCA) is currently under the authority of the commission. The commission may declare the wolf a game animal or a furbearer and may regulate the taking of a wolf as a game animal or furbearer. If wolves were classified as game animals, it would preclude the opportunity of a trapping season under existing statute. Similarly, if wolves were classified as a furbearer, nonresidents would not be able to hunt or trap wolves unless their state met reciprocity requirements. To provide ample recreational opportunity in wolf harvest, the classification of wolves has not changed. Decisions made by the commission and through the associated processes are outside of the scope of the 2025 Wolf Plan.

Modifying the minimum baseline metric of 15 breeding pairs (§ 87-1-901, MCA) would require official legislative processes. Legislative processes are the mechanism for adoption, amendment, or repeal of statutes, and administrative rules result from public rule-making processes intended to implement statutes. Statutes are the laws that FWP, as a state agency, is required to implement, and strategies for implementation are developed during the season-setting process under legislative authority that has been delegated to the commission. Administrative rules are mechanisms by which an agency implements or further defines and reinforces the intent of statutes. An administrative rule may not supersede a statute and a commission regulation may not supersede an administrative rule. Statutes and administrative rules work hand-in-hand allowing FWP and the commission to implement the legislature's mandates. The Montana State Legislature does and will continue to play a role in wildlife management. [See page 84 of the 2025 Wolf Plan]. FWP provides data, answers questions, and remains unbiased when informing those involved in these decision-making processes.

There are several subspecies of wolves in North America, and designation of subspecies are often based on morphological or geographical differences. Several scientifically peer-reviewed resources and references contradict one another regarding the fine-scale taxonomy of wolves. Wolf recovery in Montana began in the early 1980s, via natural immigration from Canada, and was supplemented in 1995 and 1996 via reintroduction efforts using wolves

from Alberta. Although it is possible for more than one subspecies to exist in Montana, the USFWS refers to the Western United States wolves as a DPS, and does not classify wolves to the subspecies level for the purposes of relisting and recovery. Similarly, FWP manages wolves at the species level. Colloquial terminology for subspecies of wolves do not correspond to the scientific taxonomic delineation of wolves, and thereby are not specifically considered in wolf conservation or management.

The North American Model of Wildlife Conservation is a description of how management, in general, in North American differs from places like Africa and Europe. Some of the tenets described within the North American Model of Wildlife Conservation are considered in FWP's various wildlife programs, however not all are relevant or appropriate given the subject matter. Further, the North American Model of Wildlife Conservation is non-regulatory, first described in 1995 (Geist 1995), much like the 2025 Wolf Plan. Comments pertaining to the North American Model of Wildlife Conservation are outside of the scope of the 2025 Wolf Plan.[1]

As a result, comments regarding the classification of wolves involving commission-decision processes and their recovery criteria as it relates to the federal register and statute are outside of the scope of the 2025 Wolf Plan.

In responding to comments pertaining to the public trust doctrine, its important to understand the critical distinction between the "public trust doctrine", which does not apply to wolf management, and the State's general obligation to management wolves for Montanans. The public trust doctrine is thought to be one of the oldest legal doctrines, with roots that extend as far back as ancient Rome and early Britain. Under English common law, the crown owned the beds of waters which were 1) below the high-water mark, 2) navigable, and 3) subject to the ebb and flow of tides. After the American Revolution, each of the thirteen states became a sovereign, holding absolute right to their navigable waters and the soils thereunder. States admitted to the Union thereafter obtained the same rights as the original thirteen. Thus, the State of Montana holds navigable waterways, which are subject to the public trust doctrine. Montana's examination and application of the public trust doctrine is limited to the public's use of water ways, due in no small part to the historical origins of the principle. A number of cases in Montana have examined the public trust doctrine, but none have extended the legal doctrine beyond the boundaries of the State's waterways. As recently held by the Montana First Judicial District Court in Wildearth Guardians, et al. v. State of Montana, et al., the doctrine does not apply to, or impose an obligation on, the State's management of wildlife, or wolves, for the public. While the public trust doctrine does not govern the State's management of wolves, Montana does manage wolves for all Montanans. Montana's authority to manage, control, and regulate all wildlife stems from its authority as a sovereign, and it exercises these rights as part of its "police powers." It is to that end that FWP supervises all wildlife in the state, including wolves, enforcing laws that protect, preserve, manage, and propagate the species for all consumptive and non-consumptive users to enjoy. Mont. Code Ann. §§ 87-1-201, 87-5-107.

Harvest of wolves and the Season Structure

Regulatory and Statutory Aspects of Wolf Management Outside the Scope of the 2025 Wolf Plan

[1] Geist, V. 1995. North American policies of wildlife conservation. Pages 75-129 in V. Geist, V. and I. McT. Cowan, editors. Wildlife conservation policy. Detselig Enterprises, Limited, Calgary, Alberta, Canada.

Geist, V. 2000. The club's legacy: a continental system of wildlife conservation. Fair Chase 15:15-17.

Geist, V., S.P. Mahoney, and J.F. Organ. 2001. Why hunting has defined the North American model of wildlife conservation. Transactions of the North American Wildlife and Natural Resources Conference 66: 175-185.

While FWP provides data and management recommendations to decision makers (the legislature and the commission), the agency does not have decision making authority for setting hunting and trapping seasons. FWP's role is to implement harvest seasons and regulations adopted by the commission that align with state mandates.

The legislature creates and adopts statutes that govern management of wildlife, and it is FWP's responsibility to implement those statutes. If the legislature changes existing statutes or develops new statutes pertaining to gray wolf management, FWP is required to implement wolf management within the scope of those changes. There were several changes that resulted from the 2021 Montana Legislative Session, specifically § 87-1-901, MCA. [See pages 50-51 of the 2025 Wolf Plan]. This includes changes to harvest regulations and equipment and tools available for use.

While legislative processes are the mechanism for adoption, amendment, or repeal of statutes, administrative rules result from public rule-making processes intended to implement statutes. Statutes and administrative rules allow FWP and the commission to implement the legislature's mandates. [See page 84 of the 2025 Wolf Plan]. Administrative rule(s) must not supersede statute, and commission regulation (hunting and trapping seasons) must not supersede administrative rule(s). Changes to administrative rules require adherence to the Montana Administrative Procedure Act. Comments about statutes, administrative rules, and commission regulations, as well as any court rulings, are beyond the scope of the 2025 Wolf Plan.

The 2025 Wolf Plan describes the tools available for harvest and management of Montana's wolf population. Because FWP does not have decision making authority for season setting, the plan does not dictate when or how those tools will be applied. The following sections identify public comments pertaining to wolf harvest season structure that are outside the scope of the Wolf Plan.

Using Harvest as a Tool for Wolf Management

SOME REVIEWERS:

- Want a definition of what is "Montana's wildlife heritage"
- Want to eliminate the trapping, hunting, and or harvest of wolves
- Want to see the continuation of harvest (hunting and trapping) as a management tool
- Want to see specific recommendations of harvest tools and strategies given potential scenarios
- Want wolves to be managed based on ecological function vs. sociopolitical factors
- Want increased availability to use tools that facilitate harvest success
- Want increased public involvement in wolf management
- Believe wolf hunters and trappers reap the benefits from non-wolf hunters and trappers (majority of Montana public) spending that funds wildlife management

RESPONSE:

To protect, enhance, and regulate the use of Montana's fish and wildlife resources for public benefit now and in the future (§ 87-1-201, MCA), FWP maintains healthy populations of all species and habitats that may be directly or indirectly affected by wolves. When managing large predators like bears, mountain lions, and wolves, FWP must manage populations to meet a variety of objectives which include protecting humans, livestock and pets. FWP must provide continued harvest opportunities of large game species to the public, as part of Montana's heritage (§ 87-1-107, MCA). Furthermore, in 2021, the legislature directed the commission to establish hunting seasons with the intent to reduce the wolf population to a sustainable level, but not less than the number of wolves needed to maintain 15 breeding pairs (§ 87-1-901, MCA). Harvest is an important tool used to meet these objectives and manage Montana's wolf population.

Since the congressional delisting of wolves in 2011 (and briefly in 2009), FWP developed and implemented wolf harvest strategies that maintain a recovered and interconnected wolf population, reduce wolf-livestock conflicts, reduce wolf impacts on low or declining ungulate populations and ungulate hunting opportunities, and effectively communicates to affected parties the relevance and credibility of the harvest, among other objectives. FWP acknowledges that the public holds a diversity of values about wildlife. Harvest regulations (e.g., season dates, boundaries of units, bag limits, quotas, allowed tools and equipment, establishment of a limited-draw permit or lottery system, trap check times) are developed and formally recommended for commission consideration, and FWP solicits public comment on these proposals. These recommendations consider several factors, including ecological, biological, and sociopolitical aspects. Following public comment, the commission assembles for consideration and final action.

The commission considers seasons and accepts public comment during the process. Hunting and trapping are regulated by season dates and methods of take and include licensing, harvest reporting, and tagging requirements. This process is like that used for other game and furbearing species. Regulated hunting and trapping of wolves is part of a multi-species management program, which considers interactions and impacts of multiple predator and prey species. Specific harvest objectives depend on regional wolf abundance, distribution, population trend, prey abundance, other predator abundance, and sociopolitical inputs such as big game harvest opportunity and livestock conflicts. We recognize that the perceived benefits and the challenges of wolves vary throughout the state with wolf abundance, other predator and prey abundance, and predominate land use. FWP harvest recommendations are intended to balance regional wolf distribution and densities with public perceptions and predominate land uses in Montana (i.e., season-setting parameters may vary by region). Regulations and harvest information can be found at https://fwp.mt.gov/hunt/regulations/wolf and https://myfwp.mt.gov/fwpPub/harvestReports.

FWP will continue to strive for increased public acceptance of regulated, sustainable harvest and hunter opportunity as part of wolf conservation. FWP values public input in the decision-making process regardless of how divergent that input may be. The public has the opportunity for frequent and iterative involvement/input into specific decisions about wolf management/harvest throughout the legislative and commission season-setting processes. [See pages 82-84 of the 2025 Wolf Plan]. Lastly, FWP believes that recreators of all kinds benefit from the dollars that fund wildlife management. Several funding sources (PR dollars, license dollars, donations, projects conducted by state, federal, and private agencies) contribute to wildlife and habitat management that benefit the ecosystem at large for all Montanans to enjoy.

Population Objectives/Targets

SOME REVIEWERS:

- Want to see the population size increase above previously observed/estimated abundances
- Want specifics on how we will manage wolves at different population levels and/or establish population thresholds
- Want a specific population target/size
- Want to eradicate wolves or the population size to decline to a reduced abundance
- Wants FWP to reduce the wolf population to minimum benchmarks levels (to that listed in the federal register but still maintain state authority)
- Want increased protective protocols to prevent overharvest

RESPONSE:

FWP and the commission must adhere to the Legislature's 2021 mandate that the wolf population be reduced to a sustainable level, but not less than 15 breeding pairs. Should the wolf population decline to the point where it approaches 450 wolves (a very conservative estimated minimum number of wolves needed to ensure 15 breeding

pairs), FWP would recommend shifting to more conservative management strategies. The 2025 Wolf Plan is not prescriptive and does not specify more precise population targets beyond those levels set forth in § 87-1-901, MCA, which may be subject to change by future legislation. The 2025 Wolf Plan does not specify incremental points at which regulations would become more conservative or liberal. The decision about what population level is the management objective is based on the decisions of the commission, with recommendations by the department, and legislature with public input. The commission may act on harvest recommendations annually or biennially, and these actions will include decisions on lawful methods of take, season length, and population objectives. While the commission considers FWP recommendations, they have the final decision-making authority on seasons and structures, and final actions may differ from department recommendations. [See page 84 of the 2025 Wolf Plan]. The department provides written justifications for wolf harvest recommendations when presented to the commission for action (e.g., wolf population forecast under different harvest scenarios [Fig. 15]).

As noted above, FWP develops a wolf harvest season recommendation for the season setting process. This recommendation includes a combination of tools and strategies (page 57-58 of the 2025 Wolf Plan) which may change over time based on a variety of factors including wolf population status and statutory mandates. Therefore, outlining potential wolf harvest season recommendations, as well as the tools available during those seasons, in the 2025 Wolf Plan is inappropriate.

Similarly, population thresholds and targets outside of those previously identified (15 breeding pairs, which can be conservatively ensured by maintaining a minimum of 450 wolves, and the 2021 population size estimate) are not established in the 2025 Wolf Plan. This provides flexibility in meeting multiple wolf management objectives under a dynamic biological, ecological, and sociopolitical environment while still maintaining a viable and sustainable wolf population.

Biological Impacts of Wolf Management

SOME REVIEWERS:

- Believe a population reduction will influence wolf distribution and abundance
- Believe we should manage at a pack-level scale (i.e., a % of pack dissolution)

RESPONSE:

Active management of wolf densities and distributions is desirable given their high reproductive potential and dispersal capabilities (see the Ecology section for supportive information). If increased wolf harvest resulted in a moderate reduction in wolf abundance, FWP would not anticipate a substantial change in wolf distribution or anticipate significant changes in interconnectedness among wolves in Montana. A moderate population reduction would most likely result in reduced pack sizes across the state. Should an increased wolf harvest lead to a more substantial reduction in wolf population, however, distribution could be affected. FWP will continue to monitor the wolf population to evaluate the degree of change and potential impacts on wolf distribution and connectivity.

Should the commission restrict regulations to limit wolf harvest mortality for the wolf population at its current level, wolf density may not experience substantial growth because most of Montana's high quality wolf habitat is fully occupied. Wolf density might remain stable in the currently occupied area. However, if this were to occur, the overall population (i.e., including the interconnected metapopulation of wolves across western North America) would likely continue to grow as wolves in Montana continue to reproduce and disperse to new areas, even if wolf density in the occupied portion of Montana remained unchanged. The below text has been added to page 21 of the Plan. Regardless, due to current legislative mandates, this is not a realistic scenario.

> <u>The extent to which wolf density and carrying capacity is limited by extrinsic factors (including prey density) or intrinsic factors (competition and conflict with conspecifics) has been debated for >50 years (Smith and</u>

Cassidy 2024), and in reality both intrinsic and extrinsic factors likely play a role at different wolf densities (Mech 2024). Density limitation in a given location is likely mediated by competition and conflict with conspecifics regardless of whether the ultimate cause is intrinsic or extrinsic factors, and the overall population can still increase even if density in a given location stabilizes, as wolves continue to reproduce and disperse from natal packs (Mech 2024).

FWP manages wolves at a regional and statewide scale and is unable to manage at a pack level scale. Managing at a pack-level scale (i.e., a % of pack dissolution each year) would be cost prohibitive and virtually impossible to effectively monitor. Under the current population size of wolves and liberalized public harvest opportunities, monitoring the status of individual packs is not realistic. And, not all packs dissolve as a result of harvest of a pack member. Substantial investment in surveillance (personnel, time, money) would be required to detect and observe specific pack dissolution dynamics across wolf range in Montana, and estimates would be prone to substantial error because of incomplete data. By using the total number of wolves and wolves harvested at regional and statewide scales, the department can monitor wolf occupancy, pack size, territory size, and population size (all iPOM outputs) as well as population forecasting models to evaluate the effects of varying harvest levels. The commission determines the area for each quota or threshold during season setting, based in part on information provided from FWP monitoring programs that occur at larger spatial scales.

Trapping

SOME REVIEWERS:

- Want decreased timeframes for trap checks
- Want increased timeframes for trap checks
- Want to extend/lengthen the trapping season (i.e., change floating trap dates)
- Want trapping regulation modifications based on location and or landownership

RESPONSE:

Trap check times and trapping season dates may be considered by the commission in the wolf season setting process. While FWP will continue to provide data and make wolf management recommendations, decisions pertaining to trapping regulations are made by the commission and therefore are outside the scope of the 2025 Wolf Plan.

Quotas and Bag Limits

SOME REVIEWERS:

- Want reduced bag limits and licenses per person per season
- Want no established quotas or bag limits and licenses per person per season
- Want quota modifications (i.e., no harvest of wolves around Yellowstone National Park, changes to or removal of WMU313, 316, 110) and or quotas to be area-specific (i.e., no harvest on public lands)
- Want a buffer zone around National Parks
- Want quotas and or harvest boundaries to vary regionally vs. statewide
- Want quotas to be by hunt district to align with ungulate population trends
- Want a limited-draw lottery or permit system for wolf harvest
- Believe some harvest goes unreported and thereby is not accounted toward the quota
- Want fines/penalties for destruction of game cameras FWP deploys for population monitoring

RESPONSE:

Currently, a person can take up to 20 wolves with no more than 10 via hunting and no more than 10 via trapping (maximum harvest of 20 wolves per person). Quotas and bag limits are established by the commission in the season setting process, can change based on a variety of factors, and are outside the scope of the 2025 Wolf Plan. Furthermore, buffer zones with a quota of 0 outside of National Parks are unlawful. Smith et al. 2016 recommended a reduced harvest mortality rate for trans-boundary wolf management based on an evaluation of biological, social, and economic considerations in the National Park context (5–7% of the YNP wolf population each year, and no more than 20% in any given pack).[2] The following has been added on page 61 of the 2025 Wolf Plan to provide increased clarity:

> Harvest of wolves is not permitted in National Parks, however the commission may not prohibit the hunting or trapping of wolves adjacent to National Parks (i.e., create a buffer zone where no hunting occurs; § 87-1-304(7), MCA).

The following has been added on pages 57-58 of the 2025 Wolf Plan to provide increased clarity:

> • Modify regional or WMU boundaries;
>
> The commission has the ability to regulate the distribution of harvest and amount of harvest by area to address specific management concerns. Similarly, regions and WMU boundaries may be modified (i.e., by ecoregion, geography, or based on pack distributions, chronic livestock depredations, or ungulate herd trends), or a permit system (i.e., limited-draw lottery) may be developed to further enhance or restrict wolf harvest and more appropriately manage the wolf population based on regional biological and sociopolitical contexts.

The FWP Law Enforcement Division enforces harvest regulations and rules (e.g., lack of reporting after harvest) along with other Montana statutes related to wildlife, human safety, and protection of property. This includes destruction of FWP property and equipment used to monitor populations, poaching and incidental captures, as well as enforcing regional closures where quotas have been met. Quotas only apply to legally harvested wolves. If a wolf is harvested and not reported (poaching/illegal take) it is not counted toward the harvest quota. Background mortality from natural causes and illegal take is a small proportion of total wolf mortality, while harvest and lethal conflict removals account for the majority of wolf mortality. Therefore, harvest and conflict removals are the primary data inputs for population forecasting models and harvest quota recommendations. FWP Enforcement activities and documents such as past investigations and distributed citations are outside of the scope of the 2025 Wolf Plan.

Concerns for Unethical Harvest Tools or Means of Take

SOME REVIEWERS:

- Do not support how wanton waste rules do not apply to wolves (§ 87-6-205, MCA)
- Do not support the harvest of pups
- Believe there is an economic loss when wolves with radio-collars are harvested
- Want fines/penalties associated with harvest of a radio-collared wolf
- Do not want trapping to be allowed in state parks
- Identified omission of the ban on the use of telemetry for hunting (§ 87-6-401, MCA)
- Are unaware of prohibitions of use of certain tools/technologies already established (e.g., aerial hunting)

[2] Smith, D. W., P. J. White, D. R. Stahler, A. Wydeven, and D. E. Hallac. 2016. Managing Wolves in the Yellowstone Area: Balancing Goals Across Jurisdictional Boundaries. Wildlife Society Bulletin 40:436-445.

- Want to remove tools such as spotlighting/night vision, night hunting, baiting, scopes, snaring, and believe they are unethical/inhumane and are not fair chase
- Support the elimination of thermal and infrared tools from wolf regulations
- Do not support the reimbursement of costs incurred related to the hunting or trapping of wolves and or want to see improved clarification on where that money comes from

RESPONSE:

As mentioned, § 87-1-901, MCA, which is subject to change via future legislation, must be implemented as it is a statute. Thermal/infrared tools are not legal, and this is noted in the regulation handbook. Only night vision scopes/tools are allowed, which is different and uses light rather than heat signature. The removal (or addition) of any tools that can be legally used in wolf harvest must go through the legislative session. Thereby, comments pertaining to the support or opposition of any equipment or tools that can be legally used for wolf harvest is outside of the scope of the Plan.

The commission may restrict age of harvested wolves, however inadvertent violations are likely to be common because it is virtually impossible to accurately estimate age prior to harvest by the fall season. Currently, there are no age restrictions pertaining to legal wolf harvest (i.e., a pup can be harvested during the legal hunting and trapping seasons). A trapper must immediately dispatch any wolf captured that may be legally possessed unless authorized not to do so by FWP prior to wolf trapping efforts. A radio-collared wolf legally captured by a trapper may be reported to FWP and released alive if authorized to do so by FWP prior to wolf-trapping efforts. Hunters and trappers cannot always detect if a wolf is wearing a radio collar prior to harvest, so regulations precluding their take might result in high rates of inadvertent errors.

While radio-collars are a valuable tool that provide a wealth of information on wolf movements and the space they use, they also provide important information on survival and cause of mortality, even if the mortality results from harvest. These data can be valuable regardless of how long the radio-collar is on the animal, and if harvesting animals wearing radio collars were not allowed, unbiased estimates of the mortality rate due to harvest based on radio-collared animals would not be possible. Additionally, radio-collars can often be refurbished and redeployed. However, some inferences require data collected over a more extensive time period. FWP recognizes that it takes significant resources to deploy radio-collars, and there is potential for economic losses if a radio-marked wolf mortality occurs a short time after the collaring event. However, the benefits of radio-marking wolves outweigh these potential losses.

The Secretary of State (SOS) approved the amendment to 12.12.114 with no edits on January 12, 2024. Trapping is not permitted in state parks, unless authorized by the Montana State Parks & Recreation Board. *See* ARM 12.12.114(5). However, hunting and trapping is permitted in wildlife management areas and fishing access sites, unless otherwise prohibited and posted. *See* ARM 12.12.114(1). In August 2024, the commission adopted a ban on use of telemetry to hunt wolves because hunting wolves with use of telemetry does not embrace the principles of fair chase. The current statute § 87-6-401, MCA "Unlawful use of equipment while hunting" makes it unlawful to use telemetry in the hunting of game species in Montana but does not apply to wolves since they are defined as "species in need of management." While there is little evidence to indicate hunting wolves with telemetry is currently occurring, this new commission regulation remedies that discrepancy in coverage of § 87-6-401, MCA. Wanton waste rules do not apply to wolves (§§ 87-6-205 and 87-6-603, MCA) because, as noted previously, they're not classified as a game or furbearing animal. Changes to administrative rules or statutes require either public rule-making processes, pursuant to the Montana Administrative Procedure Act, or legislative session processes, and comments pertaining to this issue are thereby outside of the scope of the 2025 Wolf Plan.

For added clarity regarding wolf harvest, the following was added to page 61 of the 2025 Wolf Plan:

> Trapping in state parks may be allowed in the future; however, any allowance must be approved by the State Parks and Recreation Board (ARM 12.12.114). The use of unmanned aerial vehicles (UAV) for the purposes of hunting wolves is prohibited, as stated in annual trapping and hunting regulations. Airborne hunting (16 U.S.C. 742j-1) of any animal is federally prohibited, unless you are operating under a license or permit. According to commission rule, it is lawful to harvest wolves that have radio collars, neck bands, ear tags, and/or other markers, but markers and radio collars must be returned to FWP. Furthermore, it is unlawful for a person while hunting to use any electronic motion-tracking device or mechanism, as defined by commission rule, that is designed to track the motions of a wolf and relay information on the animal's movement to the hunter.

The following has been added on page 51 of the 2025 Wolf Plan to provide increased clarity:

> This is not a bounty on the harvested animal. Rather, it permits private entities to reimburse hunters/trappers for costs incurred related to the hunting/trapping of wolves, without being cited/fined for the payment. Documentation of successful lawful harvest and receipts of costs incurred currently are required by the private entity prior to reimbursement. These reimbursements do not come from the wolf program fund (i.e., wolf license sales; § 87-1-623, MCA) nor from monies allocated toward wolf management (§ 87-1-625, MCA), but rather from private funds. Per statute (§ 87-1-214, MCA), the department may not disclose any information that may identify any person who obtains a permit or license to take a large predator as defined in § 87-1-217, MCA or who lawfully takes a large predator without the written consent of the person affected. Information that may not be disclosed includes but is not limited to a person's name, address, phone number, date of birth, social security number, and driver's license number. The department may publish harvest locations of large predators at the hunting district level.

Please contact Foundation of Wildlife Management for more information. There may be other groups that financially contribute to this reimbursement in the future, and the requirements by such groups involved may change.

The following has been added on pages 58-59 of the 2025 Wolf Plan to provide increased clarity:

> FWP has used population modeling to model consequences of various harvest levels on future wolf populations since 2008. These methods have been improved and adapted over time, and this process will continue as FWP continues to project consequences of wolf harvest to inform and develop season proposals to the commission. While FWP recommends methods of take described by Best Management Practice specifications established by the Association of Fish and Wildlife Agencies (AFWA 2006), other methods may be more effective at achieving a greater harvest level (Treves et al. 2015, Servheen 2022, Wakeling 2023). Lawful hunting and trapping activities as well as wildlife management practices are not considered as cruelty to animals (§ 45-8-211, MCA).

Incidental Take

SOME REVIEWERS:

- Want no wolf trapping/snaring prior to Dec. 31 in the "estimated occupied range of grizzly bears," and no wolf trapping/snaring in any connectivity areas between ecosystems
- Are concerned about the trapping of non-target and sensitive species, and want modifications to the floating start date and where it applies
- Are concerned about pet (domestic dog) safety pertaining to trapping, and had many misperceptions of the data associated with incidental captures
- Believe endangered species have been caught in wolf-intended traps and resulted in no revisitation of trapping regulations by the commission

- Believe incidental take is too high and some is unreported, and that this should be made public on the FWP website
- Want clarification on non-target capture survival, as well as specific injuries
- Want more information on how many lynx, grizzly bears, and wolverine can be "taken" from wolf trapping

RESPONSE:

The commission, via its season-setting process, adopts regulations that relate to wolf hunting and trapping. These regulations are reviewed yearly and, in some instances, change yearly to address specific situations. In adopting the wolf hunting and trapping regulations, the commission is cognizant of state and federal law. As an example, the commission has to adopt regulations that are intended to reduce the wolf population, but also regulations that ensure harvest does not exceed acceptable limits or that would risk the wolf population being in need of ESA recovery. To ensure these regulations comply with both state and federal law, the commission has regularly adopted regulations that reduce human safety concerns (setback requirements), reduce the risk of overharvest (specific quotas), and reduce the probability of take of federally protected species such as the Canada Lynx, Wolverine, and Grizzly Bear (Lynx Protection Zones, and the estimated occupied range of grizzly bears). For example, a "floating" start date has been established for wolf trapping in the "estimated occupied range of grizzly bears" (first figure below). Beginning at the end of November, an internal weekly assessment of grizzly bear activity is used to determine when the majority of grizzly bears are denned for the winter. FWP bear management specialists and regional wildlife managers evaluate radio-marked grizzly bear activity, sightings, conflicts, and other information such as black bear activity on a weekly basis. This evaluation is used to selectively open wolf trapping in areas where incidental capture of grizzly bears is unlikely. Based on this weekly review of the pertinent biological data and biologist recommendations, the Director approves which hunting districts may be opened for wolf trapping. FWP developed the Wolf Trapping Season Status Map, which provides weekly updates in November and December on trapping season start dates based on FWP evaluation of grizzly bear denning activity. The map can be found at https://fwp.mt.gov/hunt/regulations/wolf. Wolf trapping in the "estimated occupied range of grizzly bears" will open December 31st unless otherwise determined by FWP due to evidence that demonstrates the majority of grizzly bears in these areas have begun hibernation, as a means to avoid incidental take (i.e., floating season start date).

The floating season start dates for the wolf trapping season fluctuate year-to-year based on contemporary grizzly bear data. The estimated occupied range of grizzly bears habitat model is updated and revised biennially, and the commission approves the floating trapping state date area as part of wolf season-setting regulations (second figure below). Because the floating date is a commission adopted regulation and not mandated by statute, it is subject to change and may become a fixed date in the future.

Any term in the 2025 Wolf Plan and FEIS pertaining to areas where grizzly bears are considered established has been changed to the "estimated occupied range of grizzly bears" for clarity. FWP recognizes that grizzly bears may occur outside of the "estimated occupied range of grizzly bears" and areas of suitable habitat are dynamic with impacts from climate change and habitat loss, potentially warranting their inclusion in a future updated and revised "estimated occupied range of grizzly bears" map for demographic and genetic connectivity.

Lynx Protection Zones have been established and have additional trapping regulations intended to reduce the likelihood of non-target take. Additionally, wolf snaring is prohibited on public lands and baiting restrictions apply within Lynx Protection Zones. Under current commission adopted regulations, the department shall notify the commission upon the reported non-target capture of a lynx, wolverine, or grizzly bear. Non-target capture of a single grizzly bear, wolverine, or lynx shall be reported by FWP to the commission. This notice does not require a scheduled commission meeting; however, the commission may convene if it feels the situation warrants it. Additionally, the commission can adjust seasons annually, regionally, and on short notice to address harvest rate and population trajectory or concerns to species like lynx, wolverine, or grizzly bears. The USFWS has approved the allowance of an average of 1 lynx/year over a 10-year period taken specifically through wolf trapping under a Section 6 agreement of the ESA. There are currently no such allowances of incidental take for grizzly bears. As part of Montana's wolf CITES

export program, the Division of Management Authority of the USFWS will be meeting in 2024 to reassess the allowable level of take for lynx with the conclusion of a 10-year cycle and due to wolverine ESA listing. As a result, allowable take of lynx through wolf trapping may be redefined in the future. With the recent listing of wolverine on the ESA and an interim 4(d) rule, incidental take of wolverines through wolf trapping is exempt until the final 4(d) rule is published in 2024 (and as such, take allowances may change).

Figure 1. Main areas of Montana with estimated occupied range of grizzly bears (2023

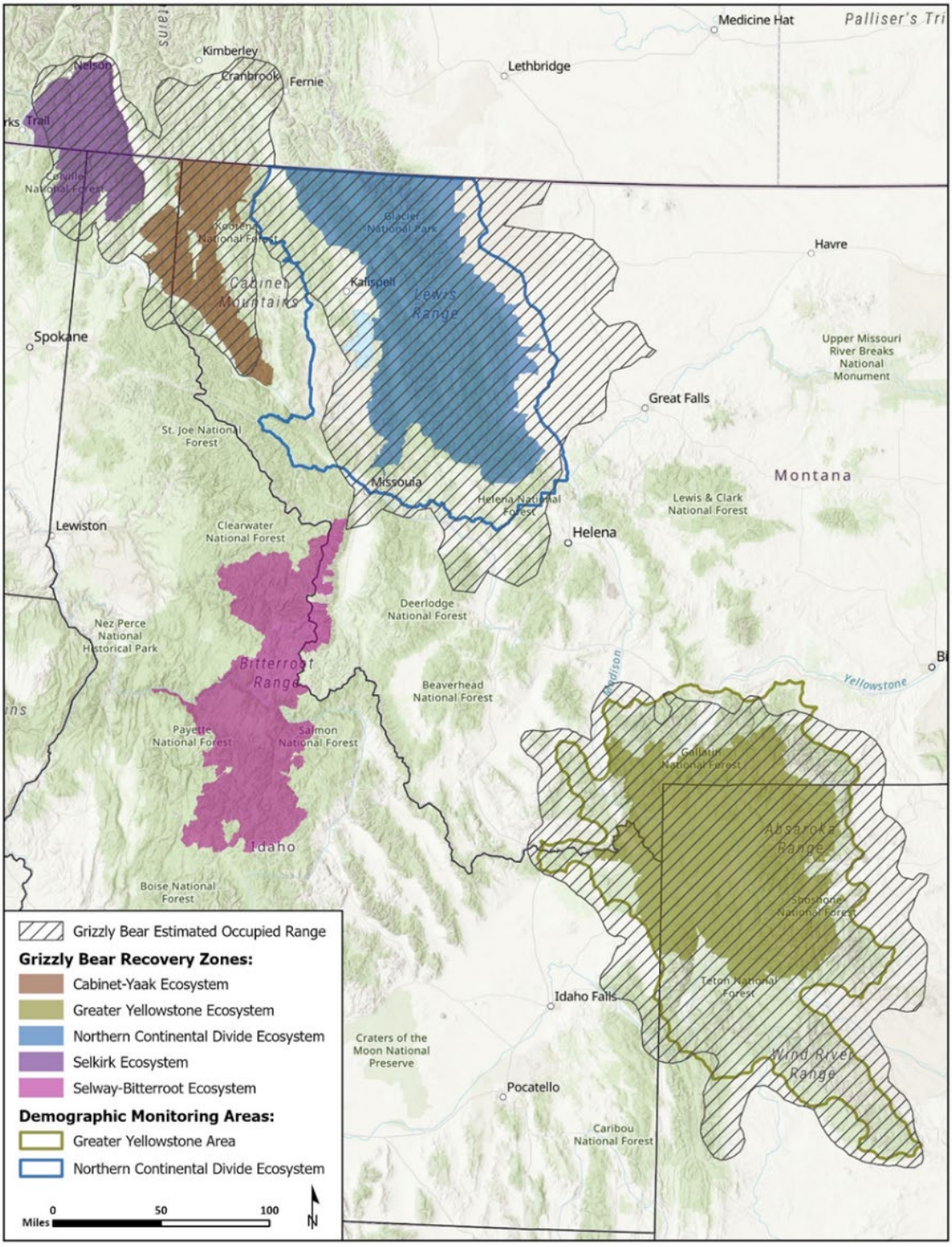
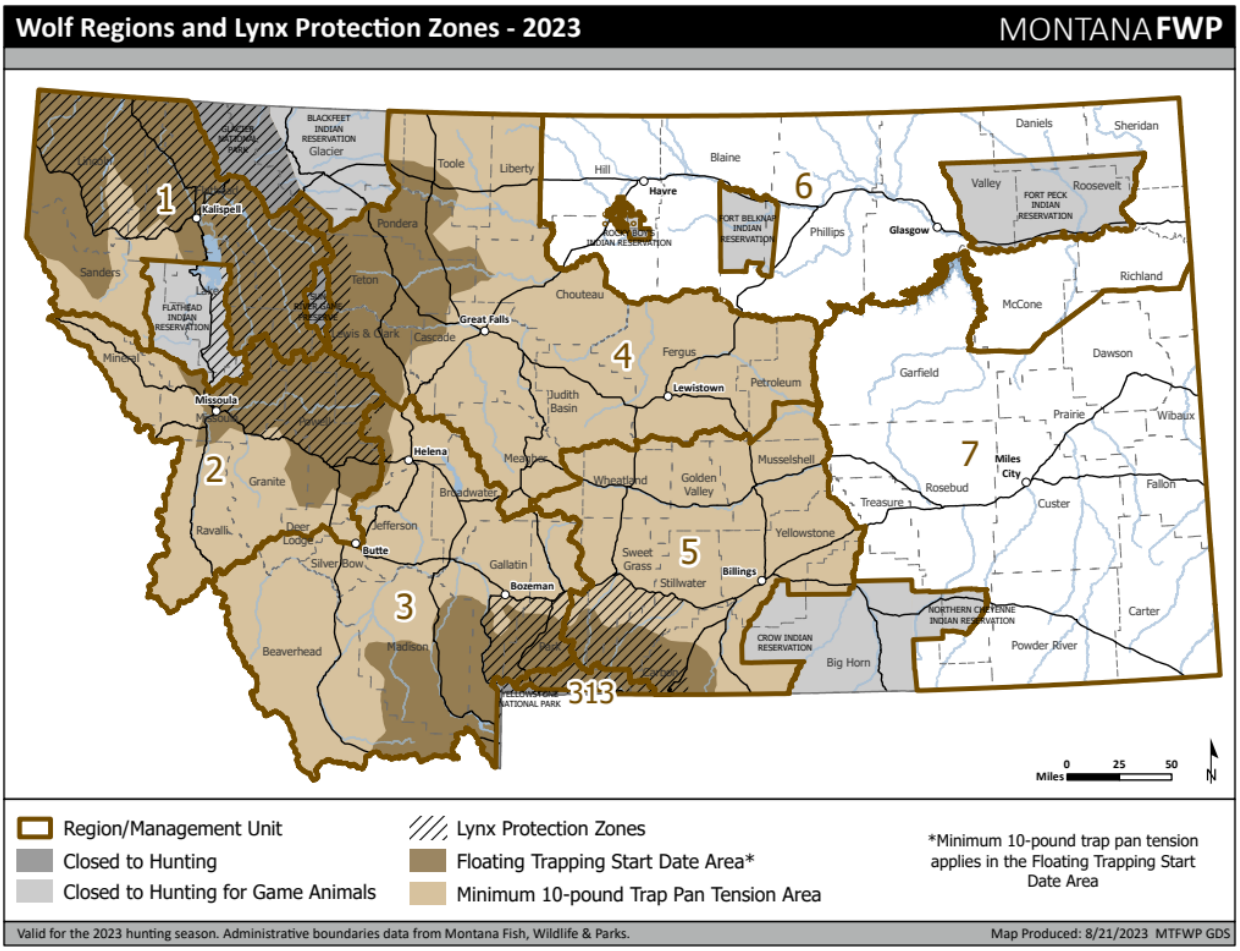


Figure 2. FWP Wolf Regions, 2023.



The 2025 Wolf Plan describes incidental captures and wolf-human conflict as it relates to pets. FWP does not require posted signage for trappers, though certain land management agencies do (e.g., DNRC). Regulations regarding closures and set back distances for wolf trapping serve as a mechanism to mitigate for public safety concerns, though these regulations vary and may change over time. [See https://fwp.mt.gov/hunt/regulations/wolf]. Domestic dogs were incidentally captured in all types of traps on 139 occasions from 2018-2022 (~28/year; Kluge 2023). Dogs were released in 98% of incidents. Non-target captured dogs were running at large in 72% of known cases (100 of 139), were beyond the set-back distance (generally 50 feet from road/trail) in 46% of known cases (64 of 139), and were out-of-sight of their owners in 65% of known cases (90 of 139). Approximately 52% of dog captures were on private land and 48% of dog captures occurred on public land. Coyote, wolf, and bobcat sets accounted for 85% of dog captures. Of the 87 cases where legality of the set was recorded, 24% were not legal and 76% were legal. Of the 139 non-target domestic dog capture occasions, 60% of dogs were not injured, 37% had minor injury, 2% died, and 1% had major injury. Dogs caught in snares (24) were not injured in 75% of cases, had minor injury in 21% of cases, and 4% of cases resulted in death. Dogs caught in footholds (108) were not injured in 54% of cases, had minor injury in 44% of cases, had major injury in 2% of cases, and <1% resulted in death. Three domestic dogs died from the non-target trap capture over this 5-year period (<1/year). These statistics include all trapping, and consequently there are fewer dogs caught in wolf traps. [See pages 56-57 of the 2025 Wolf Plan].

If non-target animals captured in traps were released, their injuries were deemed minor (FWP recognized that non-target captures could be injured). Since the start of wolf trapping in 2012, if non-target captures had serious injuries that would otherwise compromise their ability to function in the wild, they were euthanized. This internal information (as formal reports with the most accurate information) can be provided with a public records request, but the purpose

of these reports is to provide information to the commission to better inform their decision-making processes. Any finer-scale information regarding incidental and non-target captures are too detailed for the summary provided in the 2025 Wolf Plan, which speaks specifically to traps intended for wolves. Since the 2021 Montana Legislative Session, there has been no occurrence of an endangered species being caught in a wolf-intended trap or snare. The commission has not had to revisit trapping regulations mid-season. Ongoing litigation pertaining to wolf trapping and incidental take of threatened and endangered species is outside of the scope of the 2025 Wolf Plan. The following has been modified on page 56 of the 2025 Wolf Plan to increase clarity:

> The capture of any animal that cannot be lawfully trapped (i.e., non-target capture or incidental take), including domestic animals, must be reported to FWP within 24 hours. From 2012–2017, FWP documented 349 incidental non-target captures from traps intended for regulated species, 55% of which ~~survived~~ were released… Species that died or were euthanized due to major injuries… From 2018–2022, FWP documented 310 incidental non-target captures from traps intended for regulated species, 67% of which ~~survived~~ were released…(permitted beginning in 2021). Species that died or were euthanized due to major injuries… Wolf sets were not involved in a large proportion (~23%) of non-target captures, and 74% of the animals incidentally captured in wolf sets were released. A wolf captured in a trap with less than 10 pounds of pan tension, in Regions 1, 2, 3, 4, or 5, is considered a non-target capture. From 2018–2022, one wolf died in a coyote-intended trap and one wolf was released in a bobcat-intended trap (Kluge 2023).

CITES

SOME REVIEWERS:

- Believe Montana's wolf harvest regulations are in violation of CITES (i.e., don't have adequate regulatory mechanisms or appropriate measures to prevent overharvest and limit incidental take)

RESPONSE:

Montana annually requests continued export approval under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) for gray wolves legally taken by hunters or trappers within the state of Montana. These annual requests result in annual evaluation and CITES authorization by the USFWS Division of Management Authority based on current information. When requesting CITES export approval, FWP submits annual reporting data to include in a CITES report, which details use of CITES tags during the previous year, and the Montana annual wolf report, which describes population monitoring methods, population status and trends, harvest and conflict data. Additionally, FWP submits copies of any new regulations or legislation that impacts wolves in Montana.

The 2023-2024 approval letter states:

> *"Prior to approving export of species of wildlife included in Appendix II of CITES, such as gray wolf, two findings must be made. The Division of Scientific Authority (DSA) must advise the Division of Management Authority (DMA) that such export will not be detrimental to the survival of the species, and DMA must be able to make a finding that specimens to be exported have not been obtained in violation of laws for their protection.*
> *Based on the information you provided to us in your 2022 and 2023 annual reports and your CITES report for the 2021-2022 and 2022-2023 harvest seasons, we have found that the State of Montana has specific measures to control gray wolf harvest. Your regulations dictate harvest season length, harvest methods, bag limits, wolf trapper certification requirements, and mandatory reporting. Furthermore, Montana is continually reviewing its gray wolf harvest program to account for new findings and advice from experts in gray wolf management. Your gray wolf management program is designed to ensure long-term sustainable*

use of the species and support of gray wolf conservation goals. State, Federal, and tribal wildlife enforcement agents are well trained and are constantly updated about changes in wildlife laws regarding harvest, transport, and sale of gray wolves and their products.
In response to your request for continued CITES authorization for the export of gray wolves, DSA has advised us that, for the 2023-2024 harvest season, the export of gray wolves legally taken within the State of Montana during Montana's open gray wolf hunting and trapping seasons will not be detrimental to the survival of the species. The information submitted by the State of Montana to DMA and the mandatory tagging requirements for gray wolves legally harvested within Montana provide sufficient verification that gray wolves are legally taken under the jurisdiction of the State of Montana.
On the basis that both DSA and DMA criteria have been satisfied, we are approving Montana's program for gray wolf export for specimens legally harvested within Montana, under the jurisdiction of Montana…"

Judge Molloy's 2023 Ruling

SOME REVIEWERS:

- Support Judge Molloy's recent decision to limit wolf trapping to Jan. 1 to Feb. 15 in FWP Wolf Regions 1-5 and in Hill, Blaine and Phillips counties in an effort to protect threatened and endangered species
- Do not support Judge Molloy's recent decision to limit wolf trapping to Jan. 1 to Feb. 15 in FWP Wolf Regions 1-5 and in Hill, Blaine and Phillips counties in an effort to protect threatened and endangered species
- Want a 24-hour all-year hunting season (or other liberalized harvest strategies) to accommodate for Judge Molloy's recent decision (i.e., to still achieve legislative direction of a population reduction)

RESPONSE:

Any comments pertaining to court rulings such as Judge Molloy's November 21, 2023, ruling are outside the scope of the 2025 Wolf Plan.

Colorado Wolf Reintroduction

SOME REVIEWERS:

- Want FWP to provide wolves to Colorado and deduct that number from the quota

RESPONSE:

FWP is aware of the initiative in Colorado to establish a wolf population. Moving wolves to Colorado would involve an additional environmental review in Montana, a public process, and remain dependent on commission action. While this option may be exercised in the future, no interest in diverting staff from current management activities has been expressed by the legislature or commission at this time.

Population Monitoring and Population Status Estimation*

*See end of document for citations related to this section

Where Wolves Occur

SOME REVIEWERS:

- Want clarification on recolonization and suitable habitat as it pertains to wolf establishment in Eastern MT
- Want clarification on wolf occupancy on large contiguous blocks of public land

RESPONSE:

Wolves primarily occupy western Montana on large contiguous blocks of public land where there is reduced risk of conflicts with people, pets, and livestock. Because there is substantially less suitable habitat and increased private agricultural lands in eastern Montana, the greatest challenge for wolves establishing territories in this area will be avoiding conflicts with livestock. Because eastern Montana has a more open landscape and wolves are more visible, they are more vulnerable to human caused mortality (hunting, livestock protection, etc.), making it difficult for wolves to persist in high densities.

The following are minor changes to increase clarity on page 48 and 49 and of the 2025 Wolf Plan:

> In the last decade, expansion in spatial distribution (i.e., recolonization of new areas) has subsided. Amount and availability of suitable habitat is not a limiting factor to the current wolf population.
>
> Wolf presence is encouraged on large contiguous blocks of public land, managed primarily as backcountry areas (e.g., National Forest or Wilderness areas) or national parks where there is the least potential for conflict with livestock or big game hunting opportunities.
>
> However, wolf distribution would not be artificially restricted through lethal agency control efforts.

Minimum Counts

SOME REVIEWERS:

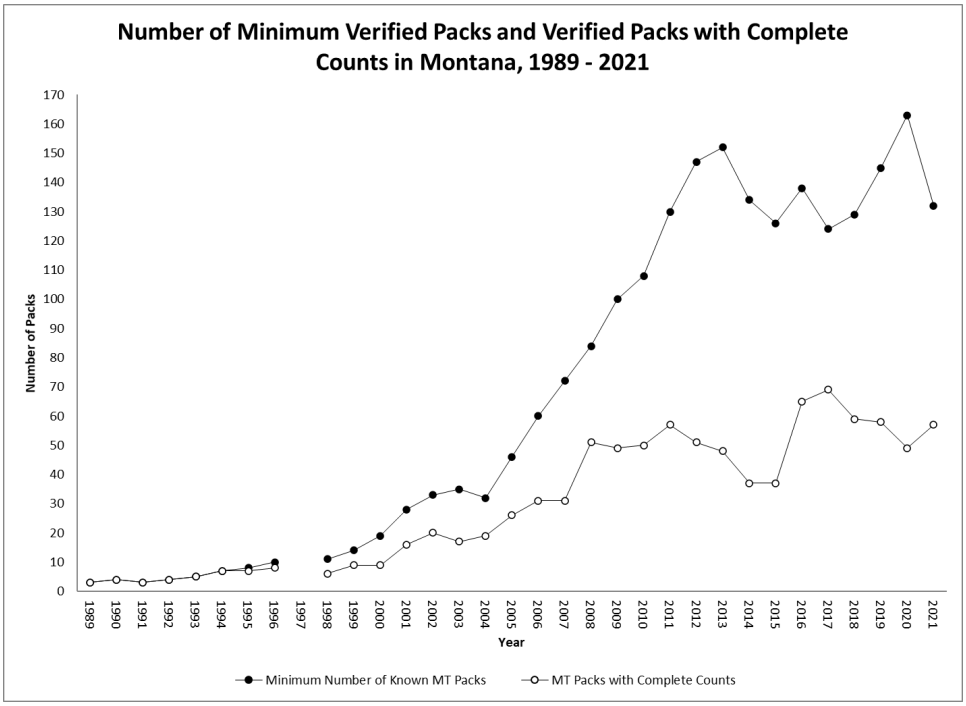
- Wanted clarification on how minimum counts reflect effort vs. abundance estimation
- Believe FWP should return to minimum counts (or document breeding pairs) to estimate population size or use these methods to ground-truth abundance estimates

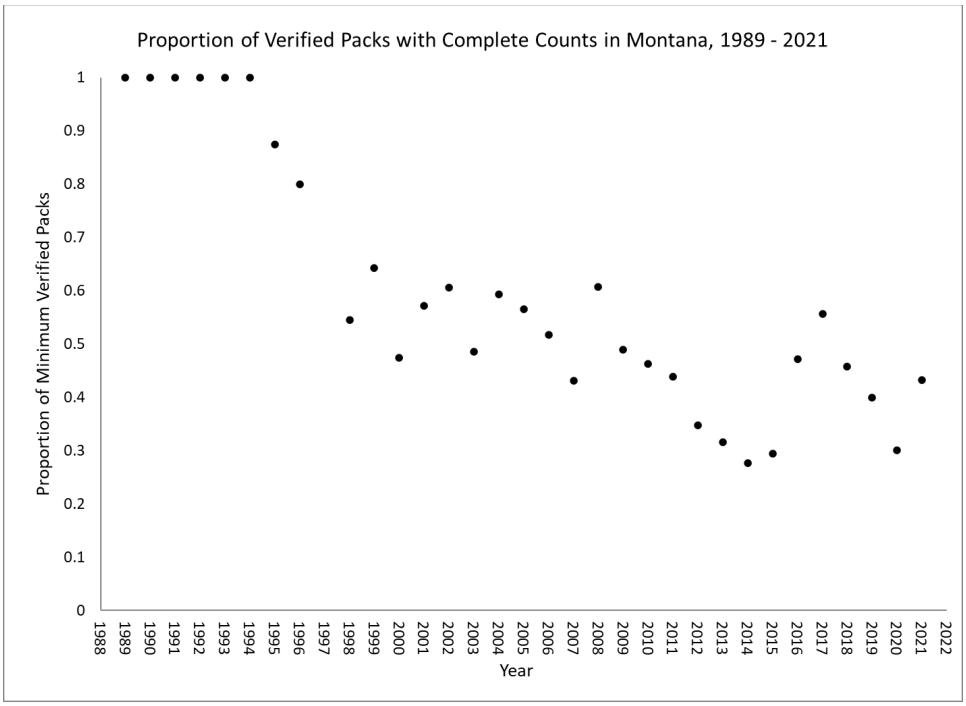
RESPONSE:

Since the early 1980s, after wolves began naturally recolonizing into Montana and after reintroductions into Yellowstone and Idaho, wolf pack numbers, breeding pairs, and total numbers of wolves were documented by attempting to locate and count all individual animals. These verified counts were presented in Pack Tables within the Montana Gray Wolf Conservation and Management Annual Reports beginning with the 2008 Report published in 2009. Prior to the 2008 Report, verified counts were tallied from pack narratives from earlier reports. Only verified observations were used, thus these counts represented minimums. It was assumed that these minimum counts provided an index to the true populations when statewide wolf numbers were small. However, the capacity for FWP personnel to monitor the wolf population began to decline given robust wolf population growth and range expansion since about 2006 (i.e., the minimum count of wolves approached or exceeded 500 individuals distributed across more than 25,000 square miles of mostly rugged and remote terrain in western Montana). Wolf field specialists were unable to locate all packs or unable to get good complete counts on many of those packs they were able to confirm. Thus, these traditional field-based methods yielded minimum counts that were conservative (low) and inevitably (and probably increasingly) below true population sizes. The degree of this undercounting was and remains unknown but comparing numbers of those packs documented in the annual reports to those with good or complete counts as

identified by the wolf specialists (Figure 3) highlights the problem. The percent of verified packs that received good or complete counts declined from 100% in the early 1990s when there were few packs to about 30% at present (Figure 4). Ultimately, wolf specialists hit maximum capacity for how many packs and wolves they could document, the population continued to grow, and funding and resources to conduct the counts did not increase. Consequently, minimum counts for recent years more closely reflect the amount of field monitoring that could be done with the available budget (effort) rather than a reliable index of the wolf population. Because our ability to count every pack, every wolf, and every breeding pair has become expensive and unrealistic, FWP explored other, more cost-effective methods that could more accurately estimate population numbers, while accounting for uncertainty in lieu of maintaining minimum counts.

Figures 3 and 4. Accuracy of minimum counts as a reflection of the overall population.





Accurate and timely information about any wildlife population is important to make informed management decisions. Although once the primary metrics to monitor wolf populations, minimum counts and breeding pairs are no longer representative of abundance, density, and overall population size because of the discrepancy between the minimum number of observations relative to the overall population size. Therefore, minimum counts will not be used as a measure of wolf abundance. While minimum counts may be used to derive limited inferences on the wolf population, they do not provide reliable "ground truthing" of population estimates developed by iPOM, other than to verify that population estimates produced by iPOM are larger than minimum counts of packs and wolves.

The following are minor changes to increase clarity on page 37 of the 2025 Wolf Plan:

> Because of the large population size, data from minimum counts today are less representative of the overall population, and are instead a reflection of ~~Contrarily, continuing to produce a minimum count when populations are large more accurately reflects~~ total effort (dollars and related resources spent) ~~than an accurate population abundance estimate~~.

Population Monitoring Methods

SOME REVIEWERS:

- Want a scientific approach to population monitoring and estimation that is contemporary and accurate
- Do not believe FWP monitors the wolf population with contemporary field techniques
- Want to see camera trapping grids to monitoring and estimate population size
- Want to see genetic sampling and spatial capture-recapture models to monitor and estimate population size
- Want clarification on how dens and rendezvous sites are monitored
- Want FWP capture and handling of wolves to be humane and ethical

RESPONSE:

FWP will continue to use the best available science, as practical and implementable. Any comment alluding to other monitoring methods that are not documented or published in scientific literature were not considered substantive (e.g., reference to this Op-Ed article written by wolf biologists: https://missoulian.com/opinion/column/douglas-smith-and-diane-boyd-wolf-management-in-montana/article_9a4d9c8e-0f7a-11ee-b12b-db69d5c3f3bd.html, https://www.bozemandailychronicle.com/opinions/guest_columnists/guest-column-wolf-management-plan-should-be-informed-by-science/article_7d372e5c-0a44-11ee-9449-47d1fcd3318a.html). We recognize that there are published critiques for other states (Treves and Santiago-Avila 2023) as well as ones specifically relevant to Montana (e.g., Creel 2022 [https://projectcoyote.org/wp-content/uploads/2023/12/2022-Creel-Critque-of-IPOM-Wolf-Population-Model.pdf] and Crabtree et al. 2023), however these critiques were not peer-reviewed. For scientific articles to be published in accredited scientific journals, they undergo a peer reviewed process which may result in the decision not to print. For reviewed processes, the journal assigns professionals and experts in the subject material to review the submitted journal article. These professionals and experts remain anonymous to the authors. After several rounds of review and edits that incorporate constructive criticisms, the scientific article may be accepted for publication. If the drafted scientific article still does not meet the scientific standards regarding study design, methodology, analyses, and interpretations, the scientific article could get rejected from publication. The references listed above (i.e., Creel 2022, Crabtree et al. 2023), did not go through this process although FWP considered the critiques they provided.

FWP has been open and transparent throughout the development and refinement of its wolf population estimation method (POM/iPOM) over the last 15+ years. We published multiple peer-refereed papers describing the method including all sub-models (Sells et al. 2020, Sells et al. 2021, Sells et al. 2022a, Sells et al. 2022b, Sells et al. 2022c) as well as the precursor models and analysis methods that were refined into the current iPOM method (Rich et al. 2012, Miller et al. 2013, Rich et al. 2013), produced annual and final reports for federal and university grants and agreements (Glenn et al. 2011, Sells et al. 2020), produced graduate student theses and dissertations (Rich 2010, Sells 2019),[3] documented changes and progress in annual reports (https://fwp.mt.gov/conservation/wildlife-

[3] Glenn, B., L. Rich, and M. Mitchell. 2011. Estimating numbers of wolves, wolf packs, and breeding pairs in Montana using hunter survey data in a patch occupancy model framework, final report. Montana Cooperative Wildlife Research Unit, University of Montana, Missoula, MT. 65 Pp.

Miller, D. A. W., J. D. Nichols, J. A. Gude, K. Podruzny, L. N. Rich, J. E. Hines, and M. S. Mitchell. 2013. Determining occurrence dynamics when false positives occur: Estimating the range dynamics of wolves from public survey data. PLoS One 8(6): E65808.

Rich, L. N. , M. S. Mitchell, J. A. Gude, and C. A. Sime. 2012. Anthropogenic mortality, intraspecific competition, and prey availability structure territory sizes of wolves in Montana. Journal Of Mammalogy 93:722–731.

Rich, L. N., R. E. Russell, E. M. Glenn, M. S. Mitchell, J. A. Gude, K. M. Podruzny, C. A. Sime, K. Laudon, D. E. Ausband, and J. D. Nichols. 2013. Estimating occupancy and predicting numbers of gray wolf packs in Montana using hunter surveys. Journal of Wildlife Management 77:1280–1289.

Rich, L. N. 2010. An assessment of factors influencing territory size and the use of hunter surveys for monitoring wolves in Montana. MS Thesis, The University of Montana, Missoula.
Sells, S. N. 2019. Mechanisms driving territorial and social behavior in a cooperative carnivore. Dissertation, The University of Montana, Missoula. 352 pgs.

management/wolf), and have fielded questions from both biologists and stakeholders through the process. As our analytical approach has advanced and become more refined, we have recalculated population size estimates for previous years using contemporary methodology (which is why a population size estimate for a given year in a past annual report [using POM] is different than the population size estimate for that same year in a more recent annual report [using iPOM]). Additionally, iPOM also recalculates all past years of data each time the model is run, using current year data to further improve past estimates. Therefore, minor changes to estimates are expected and observed each year, even for prior years. We will continue to refine the technique when improvements are warranted and will respond to valid criticisms brought forth via the scientific process in all scientific publications. We are committed to developing methods that produce population estimates that are accurate and precise, allow for informed management of the species at appropriate scales, produce estimates in a timely manner, and that are cost effective. We also continue to consider alternative methods that might be appropriate to provide population estimates coincident or concurrent with our present estimation method.

Estimation methods developed subsequent to implementation of POM/iPOM have been applied in other wolf populations (Stenglein et al. 2010, Bischof et al. 2019, Akesson et al. 2020, Milleret et al. 2022, Marucco et al. 2022). These methods were based on genetic samples (primarily from scats) and used open-population spatial capture-recapture (OPSCR) models, producing estimates of numbers of reproduction events and individuals. However, such methods come with their own unique challenges. For example, the method employed in the Italian Alps (Marucco et al. 2022), a study area less than one third the area of Montana, required 1,513 trained individuals to collect genetic samples from wolf scats collected along 1,776 transects totaling 40,725 km and visited 1-10 timed per transect. The method employed in Scandinavia (Bischof et al. 2019), an area covering about two thirds of the area of Montana, used samples collected from legal harvests, opportunistic samples, and samples from survey tracks. Over 5, 5-month collection periods, 610,000 km of survey tracks were covered. We recognize that similar non-invasive genetic sampling approaches could provide population estimates at smaller spatial scales within Montana, but would require far greater financial and human resource investments than currently available. These estimates might be limited to public lands and participating private lands. More recently developed close-kin mark-recapture (CKMR) models that use genetic samples and ages collected from harvested individuals (Bravington et al. 2016a, Bravington et al. 2016b, Delomas et al. 2023, Larroque et al. 2023) might also be able to provide estimates of reproductive events and populations. Such an approach has recently been proposed and recommended via the FWP Research Prioritization Process, and work to investigate feasibility and accuracy is currently underway. It should be noted that viability and accuracy of either OPSCR or CKMR methods have not yet been tested in Montana. Before either technique, or other techniques, could be considered as an alternative or supplement to our current estimation technique, we would need to consider and assess their feasibility to provide population estimates that are accurate and precise, feasilbilty to inform management of the species at appropriate scales, timeliness, and cost.

In the future, FWP may use other population monitoring and modeling techniques (e.g., spatial capture-recapture using genetic samples, occupancy modeling using camera trap grids) if they are well-supported scientifically while still practical and implementable. We feel the plan already sufficiently addresses these comments.

As such, the following has been added to pages 44-45 of the 2025 Wolf Plan:

> Another new project will involve analyzing the genetic samples currently collected from harvested wolves at the FWP Fisheries Conservation Genetics Lab at UM, combined with a visual inspection of carcasses and cementum annuli inspection from teeth provided from harvested wolves to estimate age, to estimate the number of reproducing packs and potentially wolf population size. The effort will utilize the wolf single nucleotide polymorphisms (SNP) panel developed by Idaho Department of Fish and Game (IDFG) and utilized at the Idaho Fish Genetics Lab to annually determine individual identity and familial relationships of harvested wolves. As samples accrue over a wolf generation, this will provide a minimum count of the number of packs that reproduced each year, analogous to the breeding pair metric that was previously

> monitored when the wolf population was smaller. This independent metric of recruitment will be useful for wolf population modeling and forecasting the effects of harvest annually. Also, when combined with age data from harvested wolves, an emerging analysis technique from marine fisheries management called close kin mark-recapture (Bravington et al. 2016a, Bravington et al. 2016b, Delomas et al. 2023, Larroque et al. 2023) might be used to estimate wolf population size. Because wolves do not have a random mating system (an assumption of model formulations to date), this technique is not guaranteed to produce accurate estimates, and if it does the precision may be low. While a measure of recruitment and an independent population estimate would be valuable for wolf management, and coordinating with IDFG will provide a seamless genetics dataset across state borders, FWP recognizes that an independent population estimate may not be realized because the methods are new, under development, and have not yet been tested in Montana, and therefore pose some risk of inconclusive results. Plans are currently being made to implement this project, including how to approach obtaining teeth from harvested wolves and how to incorporate costs associated with this project into annual survey and inventory budgets. Before this technique could be considered as an alternative or addition to our current estimation methodology, we would need to consider and assess the feasibility to provide population estimates that are accurate and precise, allow for informed management of the species at appropriate scales, produce estimates in a timely manner, and that are cost effective.

Despite the shift away from minimum counts and breeding pairs as the primary population monitoring method, wolf specialists and area biologists still regularly collect data on wolves in the field as either an input or supplement to, or a way to evaluate the accuracy of, iPOM [See Part III: Wolf Conservation and Management subsection Population Monitoring and Research of the 2025 Wolf Plan]. Wolf specialists' field monitoring efforts include radio-collaring wolves; conducting scat, track, and howling surveys; deploying remote trail cameras to document wolf activity and pack counts; conducting snowmobile surveys to get winter counts; and opportunistically documenting wolf dens and rendezvous sites using a combination of GPS collar data, remote trail cameras, and ground surveys.

FWP-IACUC review is required for FWP management activities and scientific studies involving wolves. FWP capture and handling of wolves follows the state veterinarian approved biomedical protocol to ensure all capture efforts are humane and ethical. Wolf specialists, biologists, and game wardens all participate in an FWP chemical immobilization course taught by the FWP wildlife veterinarian and receive a certificate for successful completion of the course.

Additional clarification to demonstrate FWP's commitment to humane and ethical live-capture and handling has been provided on pages 43, 64, and 74 of the 2025 Wolf Plan:

> Permits are only issued after an Institutional Animal Care and Use Committee (IACUC) approves the proposed protocols.
>
> Scientific collector permits are not required for FWP staff to capture and handle wolves. However, FWP-IACUC review is required for FWP management activities and scientific studies involving wolves. When wolves are handled in any capacity by FWP personnel (live-capture and radio-collaring to harvested check-ins), a regularly updated biomedical protocol that covers methods for handling wolves is followed. Capture and handling of wolves for emergency response (e.g., injured animal response, animals causing public safety hazard, entrapped animal response) is excluded from this IACUC requirement, but staff must work within parameters established in FWP species biomedical protocols in these instances.
>
> An IACUC process or scientific collector permits are not required for WS personnel, however, they are required to follow the protocols outlined by FWP.

Population Estimates

SOME REVIEWERS:

- Believe the method for estimating population size is flawed
- Are confused as to why past annual reports have population estimates lower than 1,087-1,260 wolves from 2011-2022.
- Believe FWP is over- or underestimating the current population size and believe the population is declining or increasing
- Believe we shouldn't call the population as "stable" but as "overpopulated" or "declining"
- Believe lone wolves are not considered in iPOM

RESPONSE:

FWP's current population estimation technique, iPOM, is a modern, scientifically peer-reviewed, and cost-effective means of monitoring wolves, and is the most efficient method to document wolf population numbers and trends accurately across the distribution of wolves in Montana. [See Part III: Wolf Conservation and Management subsection Population Monitoring and Research of the 2025 Wolf Plan]. FWP is confident the wolf population estimates and trends provided by iPOM are accurate and scientifically valid evidence that can be used to assess wolf status relative to the criteria outlined in the 2025 Wolf Plan.

Crabtree et al. (2023) recently posted a preprint of an article online (i.e., prior to peer review) to make an argument that FWP is overestimating wolf abundance using iPOM (Sells et al. 2022). However, their analysis and the resulting findings are misleading based on erroneous interpretations of iPOM and how the estimator is used. Scientific peer review is needed to help ensure rigor in monitoring program design. The scientific peer review process has been used during the development of the iPOM methodology over the last 15 years. Submission and review in a peer-reviewed outlet will address misinterpretations in the Crabtree et al. (2023) analysis prior to publication. Because the article has already been posted online ahead of the wolf plan comment deadline and distributed to the press, which led to multiple public comments on the 2025 Wolf Plan about the article, we briefly address their key arguments below.

iPOM estimates abundance of wolves in Montana using 3 submodels: an occupancy model, a territory size model, and a group size model [See Part III: Wolf Conservation and Management subsection Population Monitoring and Research of the 2025 Wolf Plan]. The occupancy model first estimates wolf distribution in Montana, based on environmental covariates and wolf observations within a statewide observation grid that consists of 600 km^2 grid cells. This model also explicitly accounts for errors in the process of observing wolves, including failing to detect wolves when they are actually present and false identification and reporting of wolves when they were not present. The territory model estimates territory sizes. Together, these models estimate the number of packs, based on how many territories could occur within the occupied area (essentially, area occupied / territory size), correcting for the various sizes of territories in occupied areas. The group size model then helps estimate the number of pack-living wolves (# territories x pack size). Based on the scientific literature, 10-40% of a wolf population may be dispersing, so iPOM incorporates a loner/disperser rate of 12.5%, which is a conservative way to estimate the proportion of the population that is dispersing and available for harvest. Total wolf abundance is calculated as the number of pack-living wolves multiplied by 1.125 to also account for lone wolves (Sells et al. 2022).

Crabtree et al. (2023) focus primarily on the occupancy and territory model components and conclude that iPOM overestimates wolf abundance by 2.5 times the true abundance. They arrive at this flawed interpretation based on a major assumption: *the entirety* of any 600 km^2 grid cell with wolf observations is included in the sum of area occupied. To illustrate the effect of Crabtree et al.'s (2023) misinterpretation, we used their methods to calculate wolf

abundance. Summing the area of any grid cell with wolf detections results in an estimated area occupied by wolves in Montana of 123,688 km^2 – 179,565 km^2, which is 1.74 - 3.38 times the area iPOM estimated was occupied each year. In fact, no grid cells in iPOM have an occupancy = 1 (average occupancy = 0.20, range 0.13 – 0.23 per year) because habitat features and survey effort in each grid cell influence the probability of wolf occupancy. This drastically reduces in iPOM the estimate of total area occupied and the resulting estimates of number of packs and wolves compared to what would be estimated using the Crabtree et al. (2023) method. (e.g., at the peak population size in 2011, Crabtree et al.'s (2023) methods[i] would estimate 402 packs and 2,310 wolves, whereas iPOM estimated 188 packs and 1,259 wolves. In 2022, Crabtree et al.'s [2023] methods estimate 302 packs and 1,738 wolves, whereas iPOM estimated 181 packs and 1,087 wolves).

If Crabtree et al.'s (2023) conclusion were true that iPOM inflates the true abundance estimate for wolves by a factor of 2.5, their estimates of wolf abundance would be well below the minimum counts of verified packs and wolves known to exist in Montana each year (Figure 5). It is important to note that minimum counts by FWP field staff represent the number of known wolves from field efforts to estimate pack and territory size and to collar packs. They do not represent a concerted effort to enumerate the total number of wolves and these counts represent an underestimate of the total number of wolves in the state.

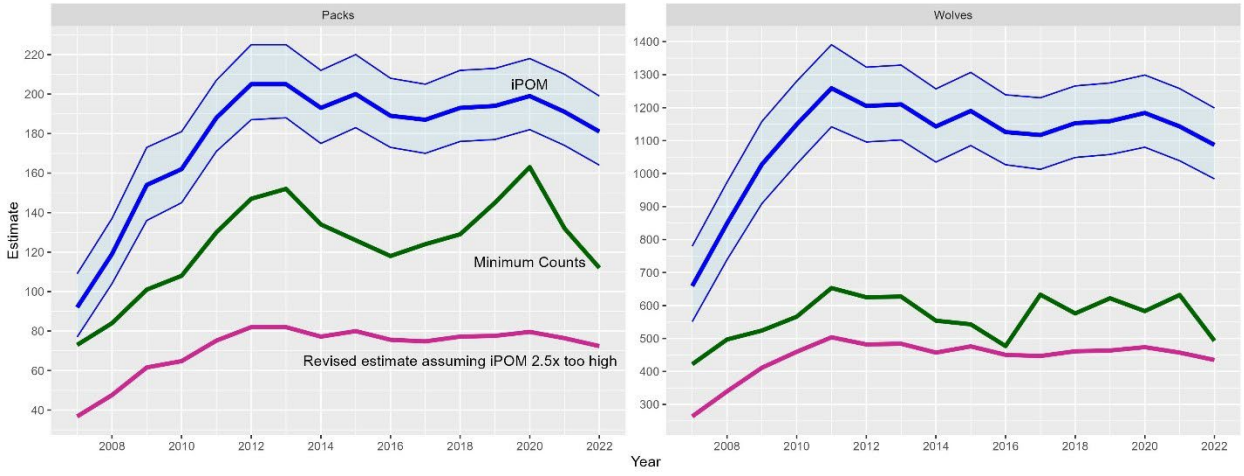


Figure 5. If iPOM overestimates true abundance by a factor of 2.5, revised abundance estimates would be as shown in pink. However, these fall well below FWP's survey results for minimum numbers of packs and wolves verified each year (green).

There are many other unsupported assumptions and flawed interpretations of iPOM in Crabtree et al.'s (2023) preprint (e.g., the means by which the territory model is used, the assertion that iPOM uses an ad hoc correction factor for territory overlap). The normal scientific process of peer review (through which 9 publications related to development of iPOM and its components have passed) of Crabtree et al.'s (2023) article would identify these misinterpretations, which would need to be corrected prior to publication. If published, we would have the opportunity to respond via peer-reviewed rebuttal. Technicalities of complex abundance estimators, their properties, and their accuracy are best discussed under this process, where errors can be preempted or debated with rigorous oversight by experts. Bypassing scientific scrutiny can lead to misinterpretation, misunderstanding, and misleading inferences that confuse rather than contribute to effective professional and public debate. We look forward to a scientific discussion of iPOM with Crabtree et al. (2023) conducted under scientific peer review . Such discussion is useful for ensuring both the rigor of science and effectiveness of management based on that science. Until that occurs,

however, the methods and conclusions of Crabtree et al. (2023) must be considered preliminary and weakly supported at best.

In response to Creel (2022), we have not described iPOM as an integrated population model (IPM). iPOM is related to an IPM only in that the errors in each stage of estimation are propogated and accounted for in the final estimate. The uncertainty in the final iPOM estimate represents compounded uncertainty from each component model, and a major reason for developing iPOM was to ensure this happened correctly. Compounding uncertainty does not render the overall estimate inaccurate or un-useful. The compounding uncertainty does reduce the precision of the final iPOM estimate, which is the objective of using these statistical methods (i.e., we needed to make sure the uncertainty is accurately portrayed and accounted for in decision making). In a decision-making context, uncertainty is only important if it affects the choice among management options. We account for the uncertainty and the uncertainty is explicitly considered when the department develops recommendations and when the commission makes decisions regarding wolf season setting. We do not agree that errors in each component model compound with each other to make the overall estimate inaccurate. Each component model is based on field data and has been thoroughly validated for accuracy and includes measures of precision. This is consistent among agency reports and peer-reviewed publications. Several of the predictor variables in iPOM are imprecisely estimated, and we included this fact in the estimation process so as to ensure this uncertainty is propagated into final estimates and accurately portrayed.

Despite varied public concerns regarding the accuracy of iPOM, rigorous scientific evaluation supports this method as a reliable population abundance estimator. Based on iPOM outputs for 2011–2023, the wolf population appears to have generally stabilized with a 5-year average of 189 packs and 1,134 wolves per year (Figures 1-3 in the 2025 Wolf Plan). [See Part II: Background subsection Current Status of Wolves in Montana of the 2025 Wolf Plan]. Despite minor fluctuations in population over this time period, these results indicate long-term overall population stability, even with the slight population decline observed from 2020–2022. This slight decline could be due to a number of factors (prey food resource availability-accessibility, landscape and environmental conditions, and pack distribution and competition), but the level of harvest and depredation removals during these years has been very close to or slightly above the threshold level we estimate would cause a population decline. This is in keeping with statute requiring seasons to be set with the intention to reduce the population and therefore expected. Other human-caused mortality is negligible (see Figure 14 in the 2025 Wolf Plan), so natural causes may be influencing wolf abundance.

Additionally, changes in population size estimates in annual program reports through time are also due to the shift from minimum counts, to POM, and then iPOM which updated previously published (and less accurate) population size estimates. As our analytical approach has advanced and become more refined, we have recalculated population size estimates for previous years using contemporary methodology (which is why a population size estimate for a given year in a past annual report [using POM] is different than the population size estimate for that same year in a more recent annual report [using iPOM]). Additionally, iPOM also recalculates all past years of data each time the model is run, using current year data to further improve past estimates. Therefore, minor changes to estimates are expected and observed each year, even for prior years. Further, the process of refining and improving iPOM will likely continue in the future as the method is improved through the scientific peer-review process, and FWP might generate other population estimates from other methods, as new methods are evaluated and published in the peer-reviewed literature. So we expect that annual wolf population estimates will continue to change in future years.

The following has been added on page 27 of the 2025 Wolf Plan to provide increased detail on population status of wolves over time:

> <u>Population estimates indicate the wolf population declined with the initiation of a harvest season, then stabilized, with a slight population decline in more recent years.</u>

iPOM

SOME REVIEWERS:

- Support or do not support iPOM and the continuation of its use
- Believe iPOM does not apply to smaller populations, such as that around YNP
- Believes iPOM only properly estimates distribution, not abundance
- Are concerned that harvest rates will not be reflected in iPOM estimations and the population decline is much greater
- Believe that because harvest numbers have not increased (nor quotas reached), despite its liberalization, iPOM estimates are inaccurate and the population size is much lower
- Believe that because the data used to inform iPOM was prior to harvest liberalization, iPOM is no longer reflective of the current population status
- Do not support hunter observations as a data input for iPOM because it may be biased and led to overestimation
- Believe FWP should use other citizen-science opportunities over hunter observations
- Believe the assumption of population closure is violated in the occupancy model
- Believes FWP does not have a large enough sample size of radio-collared wolves to inform iPOM
- Want increased resources for wolf specialists to bolster data inputs to iPOM

RESPONSE:

iPOM is a modern, scientifically peer-reviewed, and cost-effective means of monitoring wolves. Currently, it is the most efficient method to estimate wolf distribution, occupancy, and population size and trend in Montana. [See Part III: Wolf Conservation and Management subsection Population Monitoring and Research of the 2025 Wolf Plan]. FWP is confident the wolf population estimate and trends provided by iPOM are accurate and scientifically valid evidence that can be used to assess wolf status relative to the criteria outlined in the 2025 Wolf Plan. This method incorporates wolf dispersal and lone individuals. FWP uses iPOM at statewide and regional scales due to the high demographic and genetic connectivity between wolves in Montana; it is not appropriate to estimate abundance for wolves that occupy small geographic ranges or areas immediately adjacent to YNP or any other arbitrary, small-scale administrative boundary.

All of the iPOM models were developed using field data, which is still collected today, and FWP will update the models if trends in field data indicate there is a need, as analytical advancements are made, and as analytical issues are identified and resolved. For example, field-collected data on territory size and pack size were used to develop and validate iPOM, and contemporary radio-collar data are periodically used to confirm that iPOM is still predicting territory size representative of the population. Pack tables documenting opportunistic minimum counts (i.e., non-invasive surveys) are also maintained and updated annually, and are used to confirm that iPOM is still predicting group size representative of the population. FWP will continue to monitor for changes in territory and pack size through field efforts. Because territory size and group size are accurately known and estimated (Riecke et al. 2019, Stauffer et al. 2021) and the dataset is robust while accounting for detection errors (Welsh et al. 2013, more below), iPOM provides feasible and reliable estimates of abundance. If recent field-based data does not align with iPOM estimates, FWP would update iPOM inputs in those respective models so that they are representative of the current population status.

While wolf harvest data is recorded and tabulated by FWP, it is not an annually changing data input into iPOM because harvest does not significantly influence pack abundance and distribution (Bassing et al. 2019) and may include lone/dispersing wolves with higher mortality rates. However, and contrary to Treves and Santiago-Avila (2023), harvest intensity **is** a predictor in the group size model, along with control removals because pack size was

found to be negatively associated with these factors (Sells et al. 2022). Harvest intensity has been considered "liberal" since 2012. Because wolf hunter and trapper participation and harvest success are low, significant changes in harvest rates are not expected despite further liberalized strategies since 2022. If the annual hunter and trapper harvest falls within the range of harvest observed during iPOM development (which it has), iPOM performance should still reflect accurate wolf population dynamics in response to harvest and produce accurate population size estimates. Furthermore, iPOM should detect and respond to any future decreases in wolf harvest resulting from regulatory changes, such as a limited trapping season in response to a court order. If wolf harvest mortality decreased, wolf observations by big game hunters would be affected (and likely increase), which would influence predicted occupancy probability, and these changes in occupancy, territory size, and pack size will be reflected in iPOM population estimates. In light of recent events, FWP will monitor for significant changes in harvest trends as they relate court rulings on wolf trapping in grizzly bear habitat.

Timing of wolf harvest may have variable effects on iPOM estimates. iPOM estimates population size on December 31, whereas wolf harvest may occur before or after this date (spring season of one license year, fall season of the next license year). Consequently, regulatory changes that influence wolf harvest levels in one harvest season will only have a portion of that season incorporated into the iPOM estimate for that calendar year. Because there is a lag in time between when regulatory changes are approved and when the wolf harvest season occurs, it is difficult to draw inferences on the influence of harvest on the wolf population. This issue of timing has been incorporated into predictive models for the effects of harvest on wolf population size and trend, and these model predictions have been incorporated into FWP season recommendations to the commission.

While wolf harvest mortality may influence wolf population estimates, it's important to note the number of wolves harvested annually is not a clear indicator of wolf abundance. Liberalization of harvest regulations does not necessarily result in an increase in wolf harvest and the lack of an increase in harvest is not necessarily a result of a lower population size. Figures 12 and 13 in the 2025 Wolf Plan show a decline in wolf harvest participation (declines in both licenses issued and active shunters and trappers). Effort (time and finances), hunter and trapper experience and skill, and weather conditions influence harvest rates and the total number of wolves harvested. Data inputs to iPOM span from 2014–2018 for the territory model and 2005–2018 for the group size model, thus including data collected prior to liberalized harvest. Despite liberalization of wolf harvest regulations in 2021, the number of wolves harvested annually has not increased substantially, nor has it *consistently* exceeded 25-30% of the previous year's population estimate, which would result in a projected population decline (Figures 14 and 15 in the 2025 Wolf Plan; abbreviated and wolf harvest-specific table below). Human-caused mortality is expected to increase when the wolf population grows, although wolf populations often remain stable when mortality rates are between 15–68% (Keith 1983, Fuller 1989, Fuller et al. 2003, Adams et al. 2008, Creel and Rotella 2010, Gude et al. 2012, Mitchell et al. 2016).

License Year	Wolf Harvest
2018	295
2019	293
2020	327
2021	273
2022	258
2023	286

The total human-caused mortality rate over the last decade has been roughly 25-35% of the wolf population (public harvest is ~28%). Observed mortality rates are generally close to the sustainable mortality rate estimated from other areas. If harvest was reduced, population density in the occupied area in Montana may still remain stable due to intrisic (e.g., interpack strife) and extrinsic factors (Mech 2024). The observed population size and distribution may be

the effective carrying capacity of wolves in Montana (Messmer 2021, Godar et al. 2023), though if density dependence is operating, wolves may continue to reproduce and disperse to other areas (Mech 2024). However, because the increase in the human-caused mortality rate to 25-35% of the wolf population and the saturation of the western third of Montana suitable habitat occurred over the same time frame, we cannot determine the extent to which density dependence and human-caused mortality contributed to the stable-to-slightly declining wolf population over the last 10 years.

Though annual harvest is not updated annually in iPOM, one important annually changing input for the occupancy model of iPOM is big game hunter observations of wolves. Big game hunters are distributed across the state, and thereby reflect statewide surveillance, compared to if FWP used observations from wolf-centric tourists and viewers that may be concentrated in certain areas of the state. Hunter observations are less expensive than other citizen-science opportunities (e.g., time to train volunteers, money for camera traps, timely and ample effort), although other options may be considered in the future. While hunter observations are a valuable source of data, they are not perfect. Therefore, hunter observations are used as "uncertain" detections of wolves to account for potential misidentification or misreporting as well as failure to detect wolves when they are present. Centroid locations (the approximate central point in a wolf territory) of documented wolf territories represent "certain" detections to help determine probability of occupancy in each grid cell, and other field monitoring conducted by wolf specialists help verify inputs into iPOM (e.g., radio-collaring efforts as per § 87-5-132, MCA, field surveys).

Despite concerns about bias resulting from misreporting by hunters, hunter observations do not significantly bias iPOM population estimates. Only 4.4–7.5% of hunters surveyed report seeing a wolf. Of the hunters who do report a wolf observation, FWP acknowledges hunter identifications may be in error and addresses that likelihood. Wolf locations may be incorrectly identified or reported at inaccurate locations. These are addressed as false positives in the occupancy model. Conversely, wolves may occur in places where they are not detected, which are known as false negatives. In the early stages of iPOM, a hunter observation had to contain at least two wolves and be reported by at least three hunters for use in the occupancy model. If the observation did not meet these criteria, it was considered a false positive and was screened out of the dataset. More recently, statistical models have been used to examine the proximity of a hunter observation to known wolf locations and estimate the likelihood of a wolf observation to assist with identifying false positives and formally estimating a false-positive reporting rate. The false-positives model framework reduces positive bias in occupancy rate that might have been caused by observation error.

Currently, hunter observations used to populate the false-positives occupancy model are filtered to only include observations of 2-25 wolves, omitting any observations of single individuals, thereby limiting sightings to wolves more likely belonging to packs. By comparison, reliable pack sizes recorded by FWP wolf specialists range from 2-22 wolves during 2005-2018, and these data were used to build the pack size model. Therefore, the occupancy model and pack size model use almost identical distributions of pack size. But not all wolves are associated with a pack. Dispersing wolves are most commonly individual wolves, though they may pair up during dispersal (peak in Jan-Feb) prior to breeding season (Feb), when they establish a den site and territory. Because hunter observations are collected during late October through November, groups of 2 wolves are more likely to represent packs rather than mating pairs yet to establish a territory. Based on the scientific literature, 10-40% of a wolf population may be dispersing, so iPOM incorporates a loner/disperser rate of 12.5%, which is a conservative way to estimate the proportion of the population that is dispersing and available for harvest. Overall, iPOM generates reliable wolf population estimates because it accounts for false positives in the occupancy model (as opposed to standard occupancy models that assume all observations are true detections) and incorporates a conservative estimation factor for lone or dispersing wolves.

One additional concern identified in public comment pertains to the population closure assumption in the occupancy model portion of iPOM. FWP is confident that iPOM does not violate the population closure assumption for several

reasons (Steenweg et al. 2018). First, we point out that an assumption of complete closure (i.e., no movement of packs across sampling cell boundaries) is not required for occupancy modeling; instead, we must assume that movement out of cells occurs at the same rate of movement into cells. We have no reason to believe this assumption is being violated. Wolf pack occupancy data is restricted to observations from 5, 1-week periods, reducing the chances that the rate packs move out of cells differs from the rate they move into cells over that time span. Second, the observation grids are about the same size as observed mean home ranges (from radio-collar data), reducing the chance of packs moving out of cells at a different rate they move into cells. Also, the occupancy model treats observations of individuals that might move to previously unoccupied cells as false detections if there are no confirmed packs in areas with similar attributes, further addressing this concern of closure. Lastly, for an occupancy model of wolf packs, we do not need to assume the wolf population is completely stable during the sampling period, which we understand is not occurring because there is human-caused mortality during the sampling period. Instead, we assume that the number of packs is stable during the 5-week sampling period, because we are estimating occupancy of wolf packs. We do not see substantial violations of this assumption because public harvesting of wolves during the 5-week rifle season generally does not eliminate entire wolf packs.

The following has been added on pages 39 and 43 of the 2025 Wolf Plan to provide increased clarity:

> Big game hunter observations are used as “uncertain” detections of wolves to account for potential misidentification or misreporting and inform a false-positive occupancy model. Centroid locations of documented wolf territories represent “certain” detections to help determine probability of occupancy. These centroid locations are verified through radio-collaring efforts and non-invasive monitoring.
>
> These data are regularly used to confirm that iPOM is still predicting territory size representative of the population. Pack tables from opportunistic minimum counts (i.e., non-invasive surveys) are also maintained and updated internally, and are used to confirm that iPOM is still predicting group size representative of the population.
>
> Advances in technology and field methods, such as the use of drones and detection dogs, may be implemented in the future.

Public comments also suggested some individuals are concerned the sample size of radio-collared wolves is not large enough to inform iPOM. While collar data was used to inform development of the territory size model in iPOM, annual collar data is no longer used to estimate territory size. Instead, data from currently collared wolves are used to evaluate and confirm continued accuracy of territory size and pack size model predictions.

Sample sizes of radio-collared individuals to investigate territorial movements in all wolf studies are typically small, given their relatively low densities and elusive nature. Trapping and handling wolves is costly and labor intensive, deploying collars among individuals is often opportunistic or spatially biased, and behavioral and environmental requirements influencing territory sizes among individuals varies over space. Additionally, maintaining radio-collars within a population for periods long enough to produce annual territory size estimates is difficult in a harvested population.

To overcome these issues, rather than relying only on limited data available to provide a static estimate of territory size, we developed a mechanistic territory model rooted in ecological theory to estimate territory sizes that vary across space using the empirical data collected from 2014–2018. These models rely on relatively few inputs yet are predictive and compare favorably to observed field data. This approach successfully predicted the population’s distribution, territories of individual packs, and influences of prey density, competitor density, human-caused mortality risk and seasonality. We did not use the use the numbers or locations of modeled territories directly to predict numbers of packs in iPOM, but rather used the predicted territory sizes (predictive of known territories) as one of our iPOM sub-models.

Increased resources including more equipment and positions would require more money. It is not clear what additional management capacity, if any, would result. See "Funding of the Wolf Program" section of this document or Part VII: Wolf Program Funding of the 2025 Wolf Plan for more information.

Monitoring to Inform Management

SOME REVIEWERS:

- Think management should be based on research
- Want to see flexibility in monitoring and management
- Want a population metric at which monitoring strategies would change
- Want FWP to define successful management as it pertains to population size

RESPONSE:

As has been the case for over 25 years, FWP has ongoing research efforts to better understand the complexities surrounding wolf management [See Part III: Wolf Conservation and Management subsection Population Monitoring and Research of the 2025 Wolf Plan]. FWP will continue to maintain interagency coordination and initiate collaborative research projects as it relates to wolf management. [See page 82 of the 2025 Wolf Plan].

Wolf management is based in part on estimated wolf population status and trends. FWP implements flexible management strategies to ensure population sustainability and longevity in response to ecological and regulatory changes. Management actions will incorporate new scientific developments and address statutory and regulatory direction into practical and applied management strategies.

FWP will continue to monitor Montana's wolf population with iPOM, unless dramatic changes in the wolf population, the level of human-caused mortality, or scientific advances merit a new approach. If the population were to approach the minimum number of wolves necessary to sustain 15 breeding pairs (450 wolves), more intensive monitoring would be required to ensure the population remains healthy and is reproducing at an acceptable rate. This might necessitate a return to former monitoring strategies using minimum counts of wolves, packs, and breeding pairs based on intensive radio-collaring and monitoring of radio-collared animals, which, as stated, has its own limitations (i.e., bias toward underestimating population size). FWP will also continue to develop and refine the iPOM method, as well as explore other approaches to estimate population size at management-relevant scales.

FWP considers successful management of wolves to be a population managed to **meet or exceed** recovery goals (as per ARM 12.9.1301 and § 87-1-901, MCA) while balancing wolf distribution and densities with the changing and diverse needs of the public, private landowners, and the various land uses in Montana.

Genetics

SOME REVIEWERS:

- Want a viable, connected, sustainable and healthy population (e.g., genetic connectivity monitoring)
- Believe harvest outside of YNP is limiting genetic connectivity
- Believe FWP should manage for a population size that aligns with a minimum viable population
- Believe the wolf population is not large enough to support genetic and demographic connectivity
- Believe FWP should estimate and use effective population size (N_e) when making management recommendations, and that the current N_e is too low to prevent inbreeding depression and extinction

- Stated Paetkau 2022 does not evaluate genetic connectivity
- Stated that dispersal and effective dispersal (requiring breeding status and reproductive events) are not synonymous

RESPONSE:

The wolf population has maintained a population size well above that required in the federal register for delisting (50 CFR Part 17, Docket No. FWS–R6–ES–2011–0032; 92220–1113–0000; ABC Code: C6) and the predicted carrying capacity based on habitat suitability models by the USFWS. This abundance ensures a viable, sustainable, healthy wolf population with long-term persistence (as per ARM 12.9.1301). FWP has MOUs with other NRM states and federal agencies related to monitoring and analyses of wolf genetics to ensure that functional connectivity and genetic variation do not decline. This means that all NRM states consider one another's wolf management and potential impacts to genetic connectivity and diversity when developing management recommendations. Wolves in the NRM are well connected with high genetic diversity. [See page 19-21 in the 2025 Wolf Plan]. This means that harvest, including that outside of YNP, is not limiting genetic connectivity. FWP ensures Montana is contributing to a healthy NRM wolf population that meet estimated minimum viable population sizes (Reed et al. 2003, Traill et al. 2007).

Comments referring to effective population size (N_e) being too low to prevent inbreeding depression and long-term extinction generally referenced vonHoldt et al. (2024). VonHoldt et al. (2024) purportedly found that wolf genetic diversity in the Northern Rocky Mountains was lower than in other portions of North America and was declining over time, and that effective population size in North American wolves was insufficient to avoid long-term loss of genetic variation due to finite population size. Kardos and Waples (2024) challenged this analysis and interpretation, pointing out that the findings are a result of low-coverage genetic sequencing with read depth declining through time (poor data production leading to biased inference), inadequate spatial coverage of sampling (i.e., sampling only a portion of a larger, connected metapopulation; violation of methodological assumption), and samples collected over multiple generations (violation of methodological assumption). Kardos and Waples (2024) note specifically that the results concerning genetic variation and effective population size in vonHoldt et al. (2024) are biased (low) and erroneous, and should not be used for conservation and management of wolves. The 50/500 rule is used as a conservation benchmark to identify populations that may be too small to avoid immediate (inbreeding depression - Ne of 50) and long-term (loss of adaptive potential - Ne of 500) genetic threats (Jamieson and Allendorf 2012). We agree that it is in the best interest of wolves in Montana and beyond to maintain a genetic effective population size (N_e) of at least 500 (vonHoldt et al. 2024), and we believe the current N_e is greater than this value. While N_e is one of the most important parameters in conservation biology, it is also one of the most difficult to accurately estimate, especially in continuously distributed species where there is gene flow (recently reviewed in Waples 2023). In short, genetic-based estimates of N_e in continuously distributed species (or species with connectivity but some population genetic structure) violate key assumptions of linkage disequilibrium-based estimates of N_e (the method used in vonHoldt et al. 2024), resulting in biased estimates (e.g., Neel et al. 2013). When both gene flow and population structure are present, as is the case for wolves in the NRM including Canada (vonHoldt et al. 2010), estimates of N_e using the approach described above can be biased substantially low, often by orders of magnitude (Ryman et al. 2019). In this ecological and evolutionary situation, the linkage-based N_e estimates provide a "local" N_e and not a metapopulation N_e. The metapopulation N_e would include the much broader distribution of wolves that are genetically linked either directly (nearest neighbor) or indirectly via stepping-stone gene flow. While local N_e is useful for understanding local population demography (providing information about breeding population size), metapopulation N_e is the value that determines the loss of genetic variation and accumulation of inbreeding in continuously distributed species, or species with population genetic structure like wolves in the NRM (see Neel et al. 2013, Ryman et al. 2019, Waples 2023). Stated differently, the N_e value that is appropriate when invoking the 50/500 rule is the metapopulation N_e

value, not the local N_e value (Ryman et al. 2019, Allendorf et al. 2022, Waples 2023). Together, the "local" N_e estimates in VonHoldt et al. (2024) suggest that the true metapopulation N_e is much larger (Neel et al. 2013, Ryman et al. 2019).

Even if the issues involved with estimating the metapopulation N_e are ignored, the mathematical extrapolation being used in vonHoldt et al. (2024) is erroneous – there is no justifiable reason to use 3,354 as the abundance (N) in the N_e/N ratio given that wolves in the USA are genetic and demographically connected with those in Canada (i.e., 3,354 is the estimate of wolves in the USA, not USA and Canada). Indeed, the true N and N_e governing evolutionary dynamics in wolves in the Northern Rocky Mountains is much larger than the values being used in the comment, and again suggest that N_e in wolves in the Northern Rocky Mountains is almost certainly >500, and likely substantially >1000. Last, while N_e is an important consideration in wolf management, population abundance is often the more important metric in many situations, such as predator-prey interactions, wolf-livestock depredations, wolf harvest, among other management decisions.

Early genetic analyses of wolves within Yellowstone National Park showed high rates of genetic diversity and low levels of inbreeding were maintained for 10 years after reintroduction (through 2004), but no evidence of gene flow from other populations to wolves within Yellowstone National Park (vonHoldt et al. 2008), which became an issue in litigation filed to prevent delisting at that time. Subsequent genetic analyses using data from wolves across all Northern Rocky Mountain recovery areas (i.e., not only within Yellowstone National Park) over the same time frame indicated high genetic variation and low inbreeding, population structure, and genetically effective dispersal among recovery areas (vonHoldt et al. 2010). The presence of statistically significant genetic differentiation described in VonHoldt et al. (2010) does not imply an absence of gene flow throughout the region, and indeed VonHoldt et al. (2010) documented genetically effective dispersal among occurring among all of the original recovery areas. Biologically, population genetic differentiation occurs even when there is substantial genetic or demographic exchange among populations, and statistically, population genetic differentiation can occur because of sampling variation and other sampling artifacts that typically "inflate" estimates of population differentiation (Waples 1998, Waples and Gaggiotti 2005). From a conservation and management perspective, the important question is whether effective migration (gene flow) is sufficient to conserve genetic variation among populations, that is, reduce (or mitigate) loss of variation from finite population size (genetic drift). Very little gene flow is necessary to accomplish this important goal; as little as one-effective-migrant per-generation (between populations) is sufficient to minimize loss of genetic variation within populations (Mills and Allendorf 1996). The number of effective migrants per generation (5.4) identified in vonHoldt et al. (2010) is over 5 times higher than this practical and useful conservation guideline. Importantly, other lines of evidence (telemetry, other genetic studies, and other related approaches) provide further evidence that wolves are moving widely across the northern Rockies (See Ecology section of the 2025 Wolf Plan). This movement results in genetically effective dispersal and gene flow (Paetkau 2022) and supports genetic connectivity through successful movements and breeding events.

Gene flow is critical for maintaining genetic variation in wolves, as well as all other fish or wildlife species. As an agency, we take actions (e.g., direct translocation, habitat restoration, population management) to facilitate gene flow among isolated populations and strategically implement genetic rescue as a management tool to address genetic isolation (see Kovach et al. 2022, Bell 2022). However, we are not aware of any evidence suggesting that dispersal or gene flow is limited in wolves in Montana or within immediately surrounding states or provinces. In contrast, empirical evidence shows dispersal and genetically effective migration is widespread throughout the region. Finally, we agree that sequencing-based approaches to wolf genetic monitoring will be useful for wolf management and conservation. We are exploring use of a standardized SNP panel developed by IDFG (Delomas et al. 2023). Genetic monitoring in wolves will serve multiple purposes, including (but not limited to) measuring genetic dispersal across Montana and among states using the same genetic methods (for now, Idaho and Montana).

Other Specific Concerns

SOME REVIEWERS:

- Wanted to know if FWP tested for breakpoint or non-linearity in the data from Figure 16
- Believe Figure 17 should forecast for harvest levels at 0, 100, 200, 250

RESPONSE:

In Figure 16, the linear relationship was previously established in peer-refereed literature (Creel and Rotella et al. 2010, Gude et al. 2012) and agency reports (Parks et al. 2022 [2021 Annual Wolf Report]). Visual inspection of the data points supported use of the linear model, and the wide spread of the points would make detecting and differentiating a non-linear effect from a linear effect very unlikely. In a practical sense, predictions from a non-linear function of the effect of mortality on population growth would differ little from a linear effect. Therefore, we did not test for breakpoint or non-linearity. We recognize that forecasted harvest levels >450 (Figure 17) have never been reached in the state and likely will not occur due to the elusiveness of wolves and relatively low public participation in wolf hunting and trapping. The higher projected harvest levels were requested beginning in 2021 to support the commission's efforts to evaluate proposed reductions in the wolf populations to a sustainable level in compliance with the 2021 Montana legislature (§ 87-1-901, MCA; Parks et al. 2022). We used the same requested projected harvest levels for current year's forecast report and updated the projected removals to the current 10-year average. Additional projected harvest levels were run to convey a range of population responses but were not included in the report. More specifics on population forecasting can be found in Parks et al. (2022) Appendix 3 on the FWP wolf management webpage (https://fwp.mt.gov/conservation/wildlife-management/wolf). Harvest levels in this analysis may be reduced in the future.

Population Management Objectives

SOME REVIEWERS:

- Want an objective aimed at increasing social tolerance and acceptance of wolves on the landscape
- Want an objective to promote non-consumptive activities (those representing Montana households and or the ecotourism industry)
- Want an objective aimed at non-lethal and preventative measures in management
- Want to see updated objectives
- Support the current objectives
- Do not support the change to "all stakeholders"
- Do not believe FWP will use adaptive management
- Believe objectives linking wolves to big game populations and hunter opportunity imply a direct linkage of these entities
- Believe the policies enacted in the 2021 State Legislature contradict the management objectives
- Do not understand how sustainable harvest and hunter opportunity translates to wolf conservation
- Stated that mention of FWP's reputation as a result of wolf management was absent from the plan because the current harvest structure of wolves goes against broad public acceptance

RESPONSE:

The following was added to page 45 of the 2025 Wolf Plan:

FWP used a facilitated structured decision making process to develop the population management objectives internally. These population management objectives were recognized and supported by the commission after hearing public comment. Since ~~that time~~ delisting,… Adjustments to these management objectives, if needed, would similarly occur through future commission processes…to clarify the continued inclusivity ~~be inclusive~~

FWP does not believe new or updated objectives are necessary, at this time, based on the most recent human dimensions survey. In fact, FWP feels that the human dimensions survey are still representative of the Montanan public, despite a variety of concerns identified in public comment. The management objectives are as follows and specific concerns are addressed below:

1. Maintain a viable and connected wolf population in Montana.
2. Maintain authority for the State of Montana to manage wolves.
3. Maintain positive and effective working relationships with all stakeholders.
4. Reduce wolf impacts on:
    a. livestock; and
    b. big game populations.
5. Maintain sustainable hunter opportunity for wolves.
6. Maintain sustainable hunter opportunity for ungulates.
7. Increase broad public acceptance of sustainable harvest and hunter opportunity as part of wolf conservation.
8. Enhance open and effective communication to better inform decisions.
9. Learn and improve as we go.

Population management objectives 1 and 2 are outlined in federal and state mandates. FWP maintains the population baseline derived from the federal recovery definition of 150 wolves and 15 breeding pairs (50 CFR Part 17, Docket No. FWS–R6–ES–2011–0032; 92220–1113–0000; ABC Code: C6). This is what the USFWS considers to be a viable, sustainable, healthy wolf population. FWP ensures a viable, healthy wolf population with long-term persistence by maintaining that the population **meets or exceeds** recovery goals (as per ARM 12.9.1301, which serves as the definition of biologically sustainability). Population management objective 3 was modified to read “all stakeholders” to be all inclusive. This includes Montana households, the ecotourism industry, and those that seek to increase public acceptance and social tolerance of wolves on the landscape, and is not limited to those within the boundaries of the state. Population management objectives 4-6 still reflect the intentions of the Department, although FWP recognizes a complex and often confounded indirect linkage between predators and prey, and thereby big game hunting opportunity (see Ecology section of the 2025 Wolf Plan and this document).

It is still an objective of FWP to increase broad public acceptance of sustainable harvest and hunter opportunity as part of wolf conservation. However, as stated in the Harvest of Wolves and the Season Structure section of this document, FWP must implement harvest strategies that align with state mandates. FWP recognizes that § 87-1-901, MCA (which describes the liberalized methods of take established in 2021) may present challenges meeting population management objective 7. However, FWP still values this objective and will continue to consider it when making wolf season recommendations and conducting other wolf management activities. Because FWP wants to improve understanding of the Montana public’s attitudes toward wolves and wolf management, the agency again partnered with the University of Montana and conducted a third installment of their human dimensions survey. Results indicate that tolerance for wolves has increased with time and tolerance for wolf hunting is increasing (Metcalf et al. 2024, page 31-33 of the 2025 Wolf Plan). It’s also important to note that despite a range of public views on wolf harvest, wolf hunters directly fund wolf management and conservation through the purchase of wolf hunting licenses [See Part VII: Wolf Program Funding of the 2025 Wolf Plan].

As for the remaining population objectives, FWP recognizes that some members of the public do not believe we are meeting population management objectives 8 and 9. These concerns are addressed in response to similar comments in other sections of this document. Please see the Public Process and Engagement section and Population Monitoring and Population Status Estimation section of this document for more information.

There has also been confusion surrounding the concept of flexible management. The term adaptive management was used in the 2003 Wolf Plan, but adaptive management assumes formal structured decision making and formal, quantitative learning processes are incorporated. The 2025 Wolf Plan uses "flexibility" as the word to describe the general concept that the public perceives as "adaptive management." This term, along with phrases such as "best available science," "may change in the future," and "learn and improve as we go" all imply flexible management.

Socioeconomic Factors and Values Relating to Wolves

Sources and Stakeholders

SOME REVIEWERS:

- Doubt the credibility of particular sources or provided additional citations to be included
- Believe values of all stakeholders pertaining to wolves should be accounted for in the 2025 Wolf Plan

RESPONSE:

The economic and cultural values associated with wolves in Montana and the benefits and challenges of wolf presence in Montana are described on pages 66-67 and 69 in the 2025 Wolf Plan. Comments were received that included additional citations or sources. Some citations or sources bolstered this information and were incorporated as described below. Others contradict one another and were not included in the Plan but are provided in the footnote.[4]

> There are a variety of non-lethal tools and many have proven successful in certain contexts (Treves et al. 2016…vanEeden et al. 2018)
>
> Despite some findings indicating human-caused mortality or harvest results in increased livestock depredation rates (Santiago-Ávila et al. 2018, Elbroch and Treves 2023, Oliynyk 2023) or that lethal control is not effective at reducing depredation rates (Bergstrom et al. 2013, Miller et al. 2016, Eklund et al. 2017, Lennox et al. 2018, Khorozyan and Waltert 2019)
>
> This strategy increases general observability and expedites carcass or other attractant removal.
>
> …but some strategies prove that this can be reduced (Louchouarn and Treves 2023).

[4] Other sources to note but contradict:

Kompaniyets L., and M. A. Evans. 2017. Modeling the relationship between wolf control and cattle depredation. PLoS ONE 12(10): e0187264. https://doi.org/10.1371/journal.pone.0187264

Poudyal N., N. Baral, and S. T. Asah. 2016. Wolf Lethal Control and Livestock Depredations: Counter- Evidence from Respecified Models. PLoS ONE 11(2): e0148743. doi:10.1371/journal.pone.0148743.

Wielgus, R. B. and K. A. Peebles. 2014. Effects of Wolf Mortality on Livestock Depredations. PlosOne 9(12): e113505.

A list of past, present, and future stakeholders and their values are not included in the plan to avoid mistaken omission and inability to foresee how wolf conservation and management may effect these entities. FWP does not want to misinterpret, misunderstand, or mispresent the values that differing stakeholders have surrounding wolves. FWP has and will continue to encourage and actively engage and interact with the diverse public to better understand the values of all stakeholders. However, with that in mind, it is important to note that FWP must also adhere to specific legislative mandates (e.g., § 87-1-901, MCA).

Ranching and Livestock Depredations by Wolves

SOME REVIEWERS:

- Believe livestock losses are miniscule
- Believe livestock producers are already sufficiently compensated for depredations and/or they should assume the associated risks/responsibility pertaining to their industry
- Believed livestock loss compensation should be fully funded
- Want clarity on economic losses to livestock producers
- Wanted comparisons on economic losses due to wolves compared to other sources/factors
- Want to see number of livestock losses by species (i.e., wolf specific vs. predator)
- Want recognition that the livestock producer may still carry some of the financial burden of livestock-losses due to wolves
- Want requirement of proof of depredation prior to compensation
- Believe there is an inflated perception of heightened wolf depredations on livestock
- Believe more livestock are depredated than what is verified (i.e., missing animals/carcasses)
- Believe wolf harvest leads to increased livestock depredation
- Do not support public grazing allotments and livestock presence in wolf territory, and or believe grazing fees be increased
- Support livestock presence and use on public grazing allotments
- Want to know how much public vs. private land is grazed
- Wanted a discussion on negative impacts associated with ranching

RESPONSE:

The number of depredation reports received from 2016–2023 has declined from 233 in 2009 to about 100 or less (Figure 17 in the 2025 Wolf Plan, by livestock species). FWP only uses data on verified and probable wolf depredations in their reporting. This guards against inflated perceptions of heightened wolf depredations on livestock. In fact, the general decrease in livestock depredations since 2009 may be a result of several factors, including more aggressive and rapid wolf control in response to depredations, effects of public harvest on depredation rates (DeCesare et al. 2018), or the proliferation of non-lethal depredation deterrents. Targeted lethal wolf removal applied promptly after a depredation can prolong the time period between depredation events (Bradley et al. 2015). The more wolves removed, the longer the time between depredations, with full pack removal found to delay depredations by an average of 5 years (Bradley et al. 2015). While both harvest and targeted lethal removal in response to livestock conflicts are important management tools, neither are enough to completely resolve or prevent future conflicts (Bradley et al. 2015, DeCesare et al. 2018). DeCesare et al. (2018) determined that targeted removal significantly reduced the recurrence of depredations, while public harvest had significant but smaller effects. However, localized harvest can reduce group size, and wolf pack size following a depredation event and response was found to be a strong predictor of recurrent depredation events in the NRM (Bradley et al. 2015). FWP has not determined public harvest increases the frequency or number of livestock depredations, and analyses of data collected in Montana directly contradict this public comment (see DeCesare et al. 2018). The variation around this pattern might be

explained by effects on wolf pack structure, among other factors. [See Part IV: Wolf-Livestock Conflicts of the 2025 Wolf Plan].

Livestock producers are encouraged to take measures to protect their livestock and prevent wolf-livestock conflicts. While technical and financial assistance may be available to support these efforts, financial losses may still occur. [See page 69 of the 2025 Wolf Plan]. Although the number of confirmed livestock depredations by wolves have declined in recent years (Parks et al. 2023), depredations still occur, and actual losses may be greater than reported losses. While compensation is available for confirmed losses, some depredation events are never found (i.e., animals go missing) or cannot be confirmed because the carcass has been scavenged, which leaves little to no evidence for a depredation investigation. Therefore, livestock producers may continue to experience negative economic impacts from wolves. FWP and other government agencies/entities (e.g., Wildlife Services [WS] and the Montana Livestock Loss Board [MLLB]) will continue to mitigate wolf-livestock conflict through non-lethal and lethal means as described in the 2025 Wolf Plan. Efficacy and costs of such efforts are described in the citations associated with the tool or strategy. A slight change was made on page 34 of the 2025 Wolf Plan: "Management, including non-lethal and preventative strategies as well as lethal removal…" As described on pages 75-76 of the 2025 Wolf Plan, the MLLB (funded by the Department of Livestock) compensates up to 100% of fair market value for **verified** wolf-caused livestock losses (as determined by Wildlife Services). Indirect losses and costs are not covered. Veterinary bills for injured livestock that are confirmed due to wolves may be covered up to 100% of fair market value of the animal when funding is available. However, this isn't common due to funding constraints. As a result, the livestock producer may still carry some of the financial burden of livestock-losses due to wolves. The following sentence was removed to reflect statutes pertaining to the MLLB: "Veterinary bills for injured livestock that are confirmed due to wolves may be covered up to 100% of fair market value of the animal when funding is available."

The Department of Livestock requires proof of confirmed and probable livestock losses prior to funding compensation (§ 2-15-3113, MCA). The following has been added on page 75 of the 2025 Wolf Plan to provide increased clarity:

> MLLB is attached to the Montana Department of Livestock, which funds compensation for confirmed and probable livestock losses (§§ 2-15-3112 and 2-15-3113, MCA).

There is anecdotal evidence that the type of livestock (i.e., breeds), their inherent behaviors (e.g., grouping), and how livestock producers respond (i.e., reading and responding to their behaviors when on range) may lead to lower risk of depredation threats for certain herds, though more research is needed to improve our understanding of these methods and their effectiveness. As such, this sentence was removed from the Plan since there are no peer-reviewed citations to support these observations. More research evaluating the effectiveness of non-lethal tools for carnivore-livestock conflict is warranted (Kinka et al. 2021).

Livestock grazing can provide positive environmental services such as soil stability, vegetative regeneration, increased forage quality, and nutrient cycling if rotation schedules are appropriate for the allotment. Grazing permits, their fees, and the process and regulations pertaining to livestock on public land are under the discretion and authority of the associated federal or state agency based on landownership. Modifying the processes and regulations surrounding public grazing allotments would involve the respective federal or state agency for which the landownership corresponds. Decisions pertaining to public grazing allotments, even in wolf territory, are outside the purview of FWP, as are decisions regarding grazing fee increases. Therefore, comments about livestock grazing allotments on public land is outside of the scope of the 2025 Wolf Plan. Additionally, we do not know how much land was grazed by livestock (public and private) because of all the different landownerships involved. Available information pertaining to how much public land is grazed by livestock can be found on the respective federal or state agency websites.

Information on economic losses for livestock producers due to other sources/factors can be found in citations included in the Plan (some of which are reproduced below). Public comment has identified an inaccurate statistic

suggesting 0.004% of cattle are killed by wolves when in fact, that figure was calculated as a percent of the total cattle population including live animals. The correct statistic describing the proportion of known cattle mortalities that can be assigned to wolves is included in the addition of text below. It is also important to note that these statistics are presented simply as "predator" and "non-predator," and species-specific figures are not available. FWP presents the wolf-centric data that is available.

> In Montana, total cattle and calf losses from all causes cost about $55,135,000, with injuries due to predators costing an additional $223,000 in 2015… This means that in Montana, about 0.37% of cattle and 1.31% of calf total losses were attributed to wolves (USDA 2015).
>
> For comparison, the average Montana farm income in 2022 was $46,889 (USDA NASS 2022). In 2023, the Montana Livestock Loss Board reported $221,150.18 in payments for 180 documented depredation events by wolves, grizzly bears, and mountain lions (2023 Livestock Loss Statistics). Specific annual wolf-livestock depredation compensation can be found in Part IV of this document.
>
> Producers could have other losses beyond what is confirmed and documented, and it is difficult to estimate economic losses due to unconfirmed or undocumented livestock losses or the indirect economic costs associated with wolf presence. Financial expenses related to indirect impacts of wolf presence may include non-lethal predator control, increased human resources to prevent predator conflicts or mitigate behavioral responses of livestock, and stress-induced declines in livestock health and weight gain as a result of harassment by wolves (Cooke et al. 2013, 2017). ~~However,~~ While Ramler et al. (2014) found no evidence that ~~wolves~~ wolf presence had any detrimental effects on calf weights and other non-wolf factors (e.g., climate, husbandry practices) better explained variation in calf weight, occurrence of a confirmed cattle depredation was negatively associated with average calf weight.

Wolf-Livestock Conflict Mitigation and Response

SOME REVIEWERS:

- Believe take of wolves in the act of attacking/killing livestock should not need permitting or should require permitting
- Want to see an increased ability to take a wolf involved in livestock conflict on public land
- Expressed confusion regarding the connection between wolf-livestock conflict mitigation and use of a licensed wolf hunter or trapper
- Want to see the continuation of wolf-livestock conflict prevention and or response, and compensation
- Want clarification on what is considered "wolf-livestock conflict" and how livestock producers can respond
- Want FWP to take a more proactive stance on implementation of prevention measures
- Want to see emphasis on and increased use of non-lethal strategies and or demonstration of its use as a requirement prior to take (lethal control only when non-lethal and preventive measures are unsuccessful)
- Support that non-lethal and preventative measures continue to be voluntary, and the recognition on their relative effectiveness and costs
- Want more information on which methods and in what scenarios are non-lethal and preventative measures 10x the cost of lethal strategies
- Want to see guidelines or a protocol for application of non-lethal and preventative tools
- Want to see what proportion of livestock producers experiencing wolf-livestock conflict utilized non-lethal and preventative measures
- Want conflict-involved wolves to be translocated

- Want to see a cost-share program with livestock operators to opt in for non-lethal method utilization and or the development of incentive programs
- Want to see increased partnerships between FWP and NGOs regarding the implementation and outreach of non-lethal and preventative measures
- Wanted more information surrounding the following statistic: In Montana, as of 2015, the percentage of livestock operations using non-lethal methods to control predators was 14.5% (USDA 2015).
- Want to see establishment of a wolf stamp (i.e., way for non-consumptive users to financially contribute to non-lethal conflict mitigation) or do not want the establishment of such program

RESPONSE:

Wolf-livestock conflict is a broad term that encompasses a variety of scenarios that produce either direct or indirect negative impacts on livestock as a result of wolves. This term covers everything from confirmed wolf depredations on livestock to indirect impacts of wolves on livestock associated with wolf presence. Wolf-livestock conflict is formally defined in the Plan as follows: where a wolf or wolves are loitering, testing, worrying, or otherwise disrupting livestock; also, a situation where a wolf is suspected to have killed or injured livestock or guarding animals.

Wolf-livestock conflict mitigation is different than hunting/trapping. Wolf-livestock conflict mitigation is targeted to specific conflict situations, to resolve a problem. Harvest is not pack- or individual-specific, nor specific to conflict situations, and its purpose is to provide hunting and trapping opportunities and manage the wolf population size and trend. Private landowners, regardless of conflict status, can grant access and permission to licensed wolf hunters and trappers to harvest wolves on their property as long as it is within the legalities of the harvest regulations set forth by the commission. Statute states a person does not need a permit to kill or attempt to kill a wolf in the act of attacking or killing a domestic dog (§ 87-6-106, MCA). This applies on private and public land. Statue also states a landowner or their agent may lethally take a wolf on the landowner's property if the wolf is a potential threat to human safety, livestock, or dogs (§ 87-1-901, MCA). If a public land permittee has experienced livestock depredation and they would personally like to remove the depredating wolves, they must obtain a special kill permit authorized in § 87-5-131, MCA. The following has been added on page 71-72 of the 2025 Wolf Plan to provide increased clarity:

> Furthermore, if a wolf is in the act of attacking or killing a domestic dog, a citizen may lethally remove that wolf on public or private land under Montana state law known as the Lawful Taking To Protect Livestock Or Person statute (§ 87-6-106, MCA). Statute further states a person can obtain a special kill permit to mitigate livestock depredation on public lands (§ 87-5-131, MCA). … Per statute (§ 87-1-214, MCA), the department may not disclose any information that may identify any person who obtains a permit or license to take a large predator as defined in § 87-1-217, MCA, or who lawfully takes a large predator, without the written consent of the person affected. Information that may not be disclosed includes but is not limited to a person's name, address, phone number, date of birth, social security number, and driver's license number. The department may publish harvest locations of large predators at the hunting district level.

FWP does not translocate wolves to reduce wolf-livestock conflicts. The USFWS translocated wolves away from depredation sites in the 1990s when wolves were first recovering but translocated wolves in Montana had poor success at reestablishing and surviving, and often continued depredating (Bradley et al. 2005).

As of 2015, the percentage of Montana livestock operations using non-lethal methods to control predators was 14.5% (USDA 2015). This report did not include the funding sources of such efforts, and FWP assumes that it is a combination of state, federal and self-funding. This nationwide report provided statistics at the statewide level and did not include specific locations within Montana (public vs. private land). Therefore, this proportion likely includes locations within known wolf territory and outside of known wolf territory (perhaps for other predators like coyotes). The percentages of livestock operations using non-lethal methods to prevent conflict with wolves specifically, to prevent conflict with predators within known wolf territory, or to prevent conflict with predators or wolves on public or

private lands are all likely less than 14.5%. With similar statewide and all-predator species caveats, the following has been added to provide more information:

> During 2020 in Montana, USDA Wildlife Services conducted 962 non-lethal predator damage management technical assistance sessions with a total attendance of 2,463 participants, and recommended a total of 11,082 non-lethal activities to prevent or mitigate predator conflict of which 4,653 cooperators employed such tools and activities (WS 2020).

Proper application of non-lethal tools and conflict prevention strategies is highly context specific, and efficacy varies greatly based on the situation. Despite use of non-lethal and preventative measures, conflicts may still occur, particularly if tools are applied inappropriately. Effectiveness of non-lethal and preventative measures will be influenced by selection of the appropriate tool for the specific landscape and livestock involved, proper maintenance, as well as an understanding of the nuances of the selected strategy, in addition to chance. Therefore, information on which methods and in what scenarios non-lethal and preventative measures are effective (and their associative costs, which also vary based on the specific scenario but are estimated to be up to 10 times more costly than lethal strategies according to the USDA[5]) are not included in the Plan. Similarly, guidelines and protocols for application of non-lethal and preventative tools are also not appropriate because of variability in possible circumstances. However, there are several resources available online for the public to utilize. While conflict prevention strategies can be a valuable tool to mitigate wolf-livestock conflicts, the department cannot prescribe or enforce use of proactive conflict prevention tools, and some non-lethal and preventative measures cannot be implemented on public land without proper permitting or compliance with the Montana Environmental Policy Act or the National Environmental Policy Act. FWP does not have data pertaining to how many livestock producers experiencing wolf-conflict used non-lethal and preventative measures because it is variable and voluntary. Additionally, the costs of non-lethal strategies cannot be quantified because it is heavily dependent on the specifics of the livestock herd and environmental and biological landscape. The agency does provide resources for conflict prevention (see responses pertaining to education and outreach below). Requiring the use of non-lethal measures prior to lethal wolf removal or the establishment of a permit system regarding take to mitigate wolf-livestock conflict would require statutory or rule changes, and comments related to this topic are beyond the scope of the 2025 Wolf Plan.

The following has been modified to demonstrate FWP's commitment to encouraging the use of non-lethal and preventative strategies:

> FWP will continue to consider non-lethal management techniques and emphasize such measures if the wolf population is declining and approaching 15 breeding pairs or 450 wolves.

Wolf management specialists and FWP personnel work closely with livestock producers, NGOs, and other agencies to implement non-lethal strategies. FWP fully recognizes and appreciates all the efforts by these groups to fund and implement non-lethal and preventative strategies to reduce wolf-livestock conflict. A list of ongoing and future efforts (e.g., Delivering Carnivore Conflict Prevention Workshop) with NGOs and other agencies is not included in the plan to avoid mistaken omission of partnerships or projects and inability to foresee future efforts.

To obtain financial support for carnivore-livestock conflict prevention tools, private landowners and livestock producers can apply for grants (e.g., Dept. of Agriculture). [See page 76 of the 2025 Wolf Plan]. A cost-share program is also currently in development with Natural Resource Conservation Service (NRCS) to fund electric

[5] U.S. Department of Agriculture. 2015. Cattle and Calves Death Loss in the United States Due to Predator and Nonpredator Causes, 2015. USDA–APHIS–VS–CEAH #745.1217. Fort Collins, CO, USA.

fencing, carcass management, and range riding in several western states including Montana, and incentives to implement non-lethal measures (e.g., wolf stamp) could be established in the future.

The concept of a wolf stamp to fund wolf conservation efforts was proposed in 2014, by Montana Fish, Wildlife & Parks, but the proposal did not pass. Wolves of the Rockies submitted a petition for rulemaking, in 2023, to establish wolf management stamps, as well, but that also did not pass. Funding generated through sales of the stamp would be allocated to a variety of wolf conservation efforts including grants awarded through the state's livestock loss reduction program for nonlethal, preventative measures to reduce depredation; wolf monitoring; habitat protection or acquisition within occupied wolf habitat; scientific research of wolves; public education and outreach activities relating to wolves; and the hiring of additional wardens within occupied wolf habitat. Some comments from supporters of the proposed stamp suggested restricting use of any revenue from the stamp to non-lethal management and efforts to increase wolf numbers or distribution. Other commentors were concerned that limiting use of funds to non-lethal methods set a dangerous precedent. Several wolf advocacy groups opposed the stamp, claiming that funds would merely be used to supplement hunting license dollars to continue an unacceptable management regime designed to control wolf numbers through hunting and trapping. In contrast, hunters who opposed the stamp expressed concern that this could give pro-wolf interests greater influence over FWP's management of wolves, to the perceived detriment of prey populations and hunting opportunity. The intensity of the debate and nature of the rhetoric led to concerns that the department's authority to generate alternative funding through mechanisms such as the Wolf Conservation Stamp could be challenged in the next legislative session if the rule was approved. The longstanding relationship between agencies and hunters that has fueled conservation for the past century can create resistance to allowing other interests to help fund state agencies. On the other hand, the lack of relationship between agencies and non-consumptive users can lead to indifference or mistrust that undermines public support for new revenue sources. Ultimately, Director Hagener decided to postpone any decision to create the stamp in 2014, and such a program has not been considered since.

Because the 2025 Wolf Plan is non-regulatory, the establishment of cost-share programs and incentives (e.g., a cost-share program with livestock operators to opt in for non-lethal method utilization and or the development of incentive programs, and/or the establishment of a way for non-consumptive users to financially contribute to non-lethal conflict mitigation) are outside of scope and would likely involve the establishment of an MOU or contract with interested partners/funders. Interested organizations should contact FWP (or regional wolf specialist if specifically localized) to discuss partnerships and funding opportunities for trainings, education, or implementation of more non-lethal management of wolves.

Ecotourism, Big Game Spending, and other Economic Sectors

SOME REVIEWERS:

- Believe the money circulated through ecotourism is larger than that from wolf harvest
- Expressed interest in a state tax on ecotourism dollars that directly fund wildlife conservation and management
- Expressed interest in developing a wildlife conservation fund related premium associated with the sales of products
- Requested that updated information and clarity on ecotourism economics be included in the 2025 Wolf Plan and FEIS, referencing additional sources
- Want clarity on economic losses to big game hunter opportunity
- Consistency on “opportunity costs” across all revenue categories and use of a standard P&L format with consistent timelines for each category (i.e., a proper cost-benefit analysis)

- Requested that there be a discussion of additional factors that may lead to loss of big game hunter opportunity including the negative impacts of ranching and fencing (on both private and public lands), private land sub-development, human population growth, industrial development, and poaching

RESPONSE:

FWP recognizes that wildlife in Montana has contributed to increased tourist interest and visitation to the state. Positive economic benefits are expected for businesses related to tourism, outdoor recreation, and national park visitation. [See pages 35-36 of the 2025 Wolf Plan]. FWP also acknowledges that wolf license dollars go directly into a fund exclusively for the wolf program (§ 87-1-623, MCA; Figure 20 in the 2025 Wolf Plan). [See Part VII: Wolf Program Funding of the 2025 Wolf Plan]. FWP recognizes that wolf hunters and trappers are a very small percentage of the Montana public (7,457 active wolf hunters and 228 active wolf trappers [2022 Annual Wolf Report] / 1,122,878 million people in Montana [2022 US Census Bureau] = 0.66% and 0.02% of the state's population). However, fees, taxes, and other funds generated by non-wolf hunters and trappers are used for large-scale habitat and wildlife management for all species, and not exclusively for the benefit of those who participate in wolf harvest but rather for the benefit of all recreationalists alike. Development of a wildlife conservation fund may be implemented in the future but the specifics of such are not appropriate to be included in the Plan. Legislative processes to establish and implement a state tax or premium related to or associated with ecotourism dollars and purchases that would directly fund wildlife conservation and management is outside of the scope of this document.

Information included below pertains to wolves directly. The following additions have been made on pages 31 and 35-36 of the 2025 Wolf Plan to incorporate updated information, additional sources, and clarity in the Economics subsection of "Benefits and Challenges of Wolf Presence in Montana:"

> Most world-wide studies have documented positive attitudes towards wolves and wolf reintroduction efforts in the last half-century (Williams et al. 2002), as well as positive attitudes towards wolf presence and/or protections in more recent years (Slagle et al. 2017, public policy polling 2019, Niemiec et al. 2020).
>
> In 2022, about 12.5 million nonresident visitors spent an estimated $5.82 billion in Montana (Grau 2023). The 2019 Institute for Tourism and Recreational Research (ITRR) quantified that almost $237 million is spent in Park County, MT, by out-of-state visitors, creating approximately 3,270 local jobs (Grau 2020). Six and a half percent of lodging facility use taxes from local spending by visitors financially contributes to the maintenance of state park facilities (§ 15-65-121, MCA), which totaled to $3,770,489 in 2022 (Montana Dept. of Commerce).
>
> Wolf sightings were driven by population size and proximity to den sites, as well as harvest pressure outside of protected area boundaries (Borg et al. 2016, Hebblewhite and Whittington 2020).
>
> The ITRR extrapolates that $82.7 million annual visitor spending in the NRM states is attributed to wolves (Neher et al. 2022).
>
> Based on hunter harvest data, declines in the 1994 EIS prediction of annual big game hunter spending associated with ungulate declines and restrictive harvest opportunities as a result of wolf predation was estimated to be $187,000 to $465,000 in the GYA (Duffield et al. 2006). However, Trump et al. (2022) found that ungulate harvest opportunity did not decrease with increasing predator populations. Ultimately, hunter opportunity may fluctuate based on a variety of factors including prey densities and distributions as they relate to population objectives, predator densities and community composition, the occurrence and frequency of poaching, environmental conditions, habitat quality and quantity due to habitat loss and fragmentation associated with population growth and urban development, and public land accessibility,

among other causes. Big game hunting opportunity may also influence local economies based on big game hunter spending at small businesses. ~~As a result,~~

In the Economics section of "Benefits and Challenges of Wolf Presence in Montana," we used direct statistics that were reported in these publications and citations. While we base our reporting on published findings in reputable peer-reviewed sources with accredited methodologies, we did incorporate additional reference materials to include a broader range of stakeholder groups and perspectives (i.e., those sent in by the public) to avoid the perception of bias from the public. General non-resident spending was not reported because we cannot identify wolf management as an explicit driving mechanism to these data. We recognize that the sources cited in the Economics section of "Benefits and Challenges of Wolf Presence in Montana" are often not on the same timescale, and thus comparisons are difficult to draw due to lack of consistency of data collection and reporting by various agencies, organizations, and entities. Further, it is difficult to predict or model how these economies may change with the fluctuation of the wolf population since this is just one component that contributes to these sociopolitical and economic topics with influences that are difficult to parse out individually. We do not feel it is appropriate to try to run exercises that attempt to standardize or extrapolate other's results and risk doing so incorrectly. Similarly, we do not feel it is appropriate to run exercises on how changes in wolf management may impact socioeconomics since there are several factors that contribute to these changes.

The 2025 Wolf Plan is associated with an environmental impact statement (as per MEPA) in which we must consider economic impacts outside of what is reported in existing economic reports and publications. While the 2025 Wolf Plan briefly addresses economic impacts of wolves, an in-depth evaluation was not included because these economics are difficult to accurately quantify. Instead, the economics section describes the broad range of economic impacts that many stakeholders experience (positive or negative, related to wolves or influenced by wolves, both directly and indirectly), almost all of which are complex and confounded by other factors. Comments pertaining to a cost-benefits analysis highlight a potential research need that may be pursued in the future.

Wolf-dog hybrids

SOME REVIEWERS:

- Support the database of wolf-hybrids
- Want all canines with any percentage of wolf DNA to be considered a hybrid

RESPONSE:

Montana statutes (§§ 87-1-232 to 87-1-234, and 87-6-701, MCA) and administrative rules (ARM 12.6.1901-05) require the permanent tattooing of any wolf held in captivity, where "wolf" means a member of the species Canis lupus, including any canine hybrid which is one-half or more (>50%) wolf. Given the statutory construct pertaining to wolf hybrids (i.e., 50% or more hybridization requires permanent tattooing), any change to the statute, such as requiring all canines with any percentage of wolf DNA to be considered a hybrid, would require legislative change and is therefore outside of the 2025 Wolf Plan. FWP Enforcement Division maintains the database of tattooed captive wolves and wolf-dog hybrids. Changes to these statutes or rules require legislative processes and relative comments are thereby outside of the scope of the 2025 Wolf Plan.

The 2024 Human Dimensions Survey Results

SOME REVIEWERS:

- Want to see updated statistics on results from the 2024 human dimensions survey regarding values of wolves by Montanans
- Believe the human dimension survey results are biased and do not represent or reflect accurate values of wolves by Montanans (proportion of respondent group from total)
- Believe the Montana resident respondent group is the most representative of the Montanan public
- Believe there should be a non-hunters/trappers (of all species) respondent group which excludes respondents that may also belong to other respondent groups
- Want to know how human dimensions data or other values-related data will be incorporated into FWP's management strategy
- Are confused as to why Lewis et al. (2018) is cited with typology of value orientations

RESPONSE:

Typology of value orientations was included in the 2017 human dimensions survey but was not included in the Lewis et al. (2018) publication. As a result, this citation has been removed. Lewis et al. (2018) used survey methodology similar to that of Teel et al. (2005), which is why they can be compared, both of which were different than that of Manfredo et al. (2018) (i.e., they used email panel surveys versus mailback surveys, therefore creating bias toward certain demographics). Statistics from Manfredo et al. (2018) have been updated (identified by a commentor), along with inclusion of additional relevant information (voluntary), on pages 30-31 of the 2025 Wolf Plan.

Results from Metcalf et al. (2024) describing perspectives on wolf management from different respondent groups. can be found in the Values Associated with Wolves in Montana section of the 2025 Wolf Plan. The sample of each respondent group was randomly selected, and sample size was 5,000 for the general Montana resident group (response rate of 34%), 2,500 for the resident private landowners group (response rate of 33%), 1,000 for the resident wolf license holders group (response rate of 40%), and 1,500 for the resident deer/elk license holders group (response rate of 36%). FWP has worked closely with researchers at the University of Montana to conduct these human dimensions surveys. Each survey has been conducted using broadly accepted scientific survey methodologies (Dillman et al. 2014 and Vaske 2019) that include efforts to quantify potential non-response bias (Haziza and Lesage 2016) and ensure results are representative of all Montanans' views. These methodologies have evolved over time to improve the overall survey strategy, data analysis, and weighting procedures[6] to ensure the

[6] Battaglia, M., D. Dillman, M. Frankel, R. Harter, T. Buskirk, C. McPhee, J. DeMatteis, and T. Yancy. 2016. Sampling, Data Collection, and Weighting Procedures for Address-Based Sample Surveys. Journal of Survey Statistics and Methodology 4:476-500.

Berglund, P., and S. Heeringa. 2014. Multiple Imputation of Missing Data Using SAS. Cary, N.C.: SAS Institute Inc.

Dillman, D. A., J. D. Smyth, and L. M. Christian. 2014. Internet, phone, mail, and mixed-mode surveys: The tailored design method. John Wiley & Sons.

Haziza, D., and J. F. Beaumont. 2017. Construction of Weights in Surveys: A Review. Statistical Science 32:206-226.

Haziza, D., and E. Lesage. 2016. A discussion of weighting procedures for unit nonresponse. Journal of Official Statistics 32:129-145.

Kalton, G., and I. Flores-Cervantes. 2003. Weighting methods. Journal of Official Statistics 19:81-97.

2023 results are representative of all Montanans. Some comments articulated concern that past human dimensions survey results regarding wolves and wolf management were biased toward the views of deer, elk, and wolf license holders. To address this concern, while conducting the 2023 wave of the human dimensions of wolves and wolf management survey, we worked with UM's Human Dimensions Lab and Bureau of Business and Economic Research to revisit the 2012 and 2017 datasets, evaluate this potential bias, and address it if needed. This work did find an overrepresentation of hunters (both deer/elk, and wolf) in the 2012 and 2017 datasets that likely biased results toward these groups' views. To assess the magnitude of this bias and correct for it, the research team calculated more comprehensive survey weights by acquiring the total number of license holders (deer/elk and wolf) from 2011 and 2016 (the license years which were the focus of the 2012 and 2017 survey efforts) from the archived license database system and calculated a population proportion for each license-holding group based on total adult Montana residents from the US Census during the closest available census years. After calibrating weights to account for these proportions (as well as for proportions of sex and age categories), the team generated updated estimates for all 2012 and 2017 survey results. Although updated results for the general population shifted in the expected direction (i.e., "away" from hunters' views), the shift was minimal. For example, mean scores for all survey questions shifted no more than approximately 0.1 point on the 1-5 pt Likert-style scales. Based on this work and the minimal change to past survey results that it produced, we remain confident that past human dimensions survey data used to inform decisions was not misleading. FWP agrees that the Montana residents respondent group is the most representative of the general public as it contains members belonging to the other respondent groups, which are also segregated out and surveyed separately for comparison purposes. Updated results for 2012 and 2017 surveys are available on the FWP website, along with the 2023 survey data which were released in January 2024 (https://fwp.mt.gov/binaries/content/assets/fwp/conservation/wolf/final-hd-research-summary-no-56-wolves.pdf).

It is FWP's goal to increase social acceptance of wolves and their harvest. The following has been updated in the Values Associated with Wolves in Montana section to reflect the recent release of the Trends in Montanans' Views Regarding Wolves and the Management of Wolves in Montana (Metcalf et al. 2024):

> As a result, there is a large amount of contention surrounding the polarized perspectives of stakeholders. FWP has conducted regular surveys as part of human dimensions research specific to wolves and will continue to do so in systematic installments. In Montana, tolerance for wolves ~~remains relatively low but~~ has increased ~~slightly~~ with time for general Montana residents, resident deer/elk license holders, and resident

Kish, L., and M. Frankel. 1974. Inference from Complex Samples. Journal of the Royal Statistical Society. Series B (methodological), 1-37.

Lavallee, P., and J. F. Beaumont. 2016. Weighting Principals and Practicalities. In C. Wolf, D. Joye, T. Smith, & Y.-C. Fu, The Sage Handbook of Survey Methodology (pp. 460-476). Sage.

Rubin, D. B. 1987. Multiple Imputation for Nonresponse in Surveys. New York, N.Y.: John Wiley & Sons, Inc.

Sarndal, C. E. 2007. The calibration approach in survey theory and practice. Survey Methodology 39:99-119.

Valliant, R., and J. A. Dever. 2018. Survey Weights: A Step-by-Step Guide to Calculation. College Station, TX: Stata Press.

Valliant, R., J. A. Dever, and F. Kreuter. 2013. Practical Tools for Designing and Weighting Surveys. New York, New, York: Springer.

Vaske, J. J. 2019. Survey research and analysis. Sagamore-Venture. 1807 North Federal Drive, Urbana, IL 61801.

private landowners, but has remained constantly lower for resident wolf license holders. In 2023, 74% of Montana residents were tolerant or very tolerant of wolves on the landscape, compared to 41% in 2012 (Figure 5; ~~Lewis et al. 2018~~Metcalf et al. 2024). These findings echo~~ing~~ other studies in other locations that documented significant increases in positive attitudes associated with wolves (Williams et al. 2002, George et al. 2016). Tolerance for wolf hunting is high for all respondent groups, but has increased for resident wolf license holders and decreased for general residents (71% in 2012 to 58% in 2023). Tolerance for wolf trapping in 2023 was steady or decreased for all respondent groups compared to 2017, with resident license holders and private landowners ranging from 69-92% tolerant or very tolerant and general residents 49% intolerant or very intolerant. Opinions on specific regulations varied. For example, 34% of deer/elk license holders, 43% of private landowners, and 79% of wolf license holders think the wolf hunting season is too short or much too short. Similarly, 30% of deer/elk license holders, 37% of private landowners, and 66% of wolf license holders think the wolf trapping season is too short or much too short. Comparatively, 34% and 40% of general residents think the respective season lengths are too long or much too long. Thirty percent of deer/elk license holders, 45% of landowners, and 63% of wolf license holders think bag limits are too few or way too few, while 53% of general residents think bag limits are too many or way too many. In 2023, there were moderately low and largely unchanged levels of satisfaction with wolf management across all respondent groups (20.5-33.0%). Private landowners and resident wolf license holders reported the lowest levels of confidence in FWP to manage wolves, which had dropped from 2017, while general residents and resident deer/elk license holders reported the highest levels of confidence in FWP. Overall, general residents had the most positive attitudes toward wolves, followed by resident deer/elk license holders then private landowners. Resident wolf license holders held consistently negative attitudes toward wolves (Metcalf et al. 2024). ~~Although most Montanans support wolf hunting (with 47–88% of respondents stating they were very tolerant), there were varied opinions on trapping. For example, 50-63 percent of the respondents for the landowner, wolf license holder, and deer/elk holder surveys think the trapping season is not long enough while 42 percent of the respondents to the household survey think the trapping season is too long. Further, there was little agreement among Montana respondents regarding the sufficiency of and satisfaction with harvest regulations, though responses toward FWP's ability to manage wolves were favorable. Respondents of the Montana Household Survey tended to be more dissatisfied and intolerant of trapping and harvest regulations compared to resident private landowners, resident wolf license holders, and resident deer or elk license holders (Lewis et al. 2018).~~

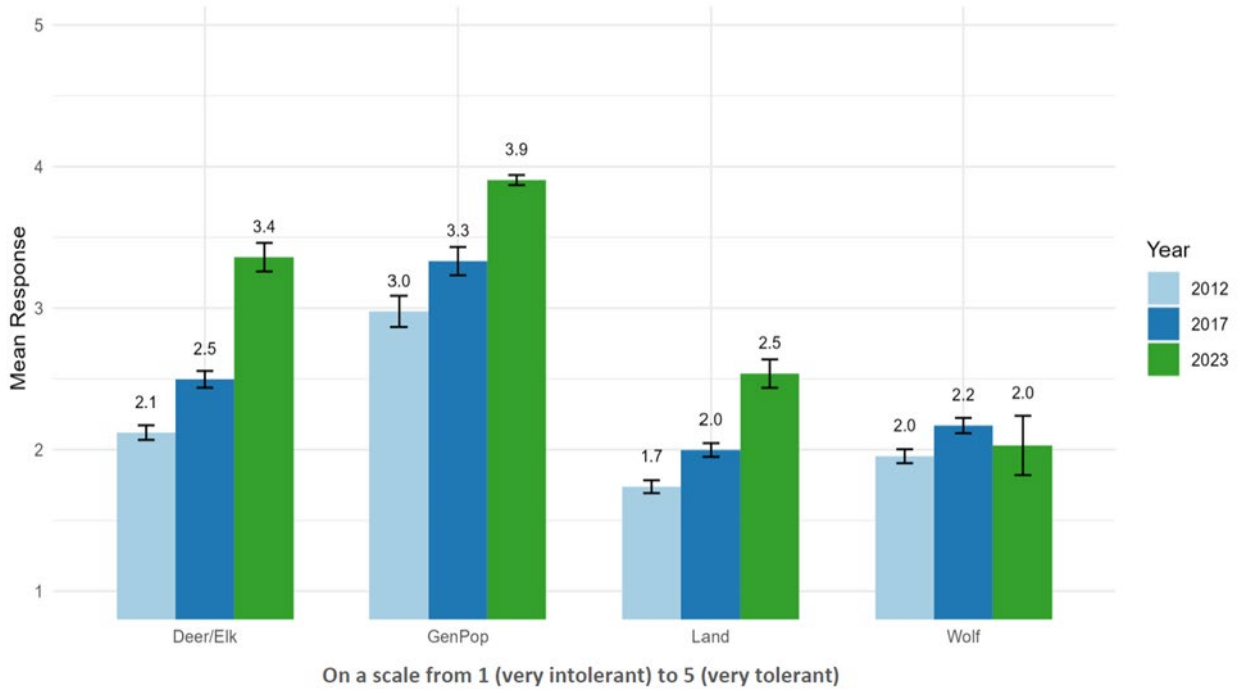


Figure 5. Response to..."On a scale from 1 (very intolerant) to 5 (very tolerant), how tolerant are you with wolves being on the Montana landscape?" (Deer/Elk = Resident Deer/Elk License Holders; GenPop = General Residents; Land = Resident Private Landowners; and Wolf = Resident Wolf License Holders. Error bars show the standard error of each estimate; Metcalf et al. 2024).~~Note: The general Montana household survey included a diverse array of Montanans (including private landowners, hunters, and non-hunters). The resident private landowner, resident wolf license holder, and resident deer or elk license holder surveys focused on specific subsets of Montanans (Lewis et al. 2018).~~

These results, along with other data presented in the Values Associated with Wolves in Montana section of the 2025 Wolf Plan, will help inform FWP management recommendations and are made available to the commission and public.

Additional sources updated in the 2025 Wolf Plan in this section include:

> Like Metcalf et al. (2024), other studies have provided evidence of an association between liberalization of harvest policies and increasing negative attitudes (Browne-Nunez et al. 2015, Hogberg et al. 2016), however these studies also showed general support for harvest of wolves.
>
> Despite diverse views toward harvest seasons and management strategies, survey results indicate widespread public misunderstanding and lack of knowledge about wolf population status, management strategies, and harvest regulations (Dietsch et al. 2018…

All sources used in the 2025 Wolf Plan were from credible, peer-reviewed publications.

The Role of Wildlife Services (WS)

SOME REVIEWERS:

- Expressed confusion on the authority of WS regarding lethal control, communication, and the baseline metric of 15 breeding pairs

- Do not support removal of up to a full pack
- Do not support lethal depredation responses on public land

RESPONSE:

FWP maintains a Memorandum of Understanding (MOU) with Wildlife Services (WS) that documents and enhances the cooperative relationship between FWP and WS for planning, coordinating, and implementing wildlife damage control programs to reduce damage caused by grizzly bears, wolves, black bears, and mountain lions to agricultural, animal husbandry, forestry, wildlife, and public health and safety. [See pages 72-75 of the 2025 Wolf Plan]. This MOU clarifies that investigations of possible livestock depredations by wolves are the responsibility of WS. WS is authorized to remove any offending individuals without prior consultation after a first offense when wounded or dead livestock are present, with clear evidence the injury or death was caused by wolves, and have discretion to decide how to respond to a confirmed depredation. When wolf numbers are low, WS may use more conservative management tools. Upon WS completing a depredation investigation and confirming wolves were the cause of injured or dead livestock, WS will notify FWP of the investigation results and planned control actions within 24 hours. Further, the MOU will be assessed to determine overall effectiveness relative to livestock losses, agency response times and related costs, and the status of the wolf population itself. If the wolf population approaches 15 breeding pairs and or 450 individuals, the parameters of the MOU may change. This MOU pertains to both private and public lands.

WS can lethally remove wolves any time of the year using any method described in the MOU, under FWP's delegated state authority. If a pack or wolf that is not radio-collared can be linked to the depredation, lethal removal up to and including a full pack of offending wolves may occur. If a pack or wolf that is not radio-collared cannot be linked to the depredation, the first priority for WS is to attempt to radio-collar at least one wolf in the immediate vicinity of the livestock depredation. In sum, the If no radio-collared pack or wolves can be linked to the depredation, ultimate goal is to identify, target, and remove offending wolves as close in space and time as possible to the depredation incident, should lethal removal be warranted. (See page 75 of the 2025 Wolf Plan). The following has been added on page 75 of the 2025 Wolf Plan to provide increased clarity:

> WS can use all approved methods to target and remove offending wolves, including aerial gunning, as outlined in protocols identified in the MOU.

Funding of the Wolf Program

SOME REVIEWERS:

- Want to see specifics of FWP's annual budget for implementation of non-lethal programs and for outreach/education as well as specifics of WS's annual budget for lethal control of wolves.
- Want clarity on which license sales are matched via federal funding (PR dollars)
- Want clarification on what licenses go into the wolf management account and what constitutes as management
- Want wolf hunting license sales to go to the Dept. of Livestock for reimbursement to livestock producers for damages caused by wolves
- Suggested the use of green bonds to fund the wolf program

RESPONSE:

Wolf program budget by fiscal year can be found in Table 2 of the 2025 Wolf Plan. FWP does not track expenditures for non-lethal conflict prevention work or outreach and education; however, a breakdown of other wolf program budget expenditures can be found below in Table 1. Unfortunately, future budgets for and expenditures of the wolf program cannot be predicted as there are many influential contributors and factors. These include but are not limited to license sales, partnerships, priorities of the state, and legislative direction. Statewide WS expenditures by federal fiscal year can be found in Table 1 of the 2025 Wolf Plan. Past and future budgets for and expenditures of WS for wolf-livestock conflict mitigation also cannot be described thoroughly as they are a federal government entity with their own protocols and processes for funding determination. Allocation of funds generated from wolf hunting license sales are outlined in statutes [See pages 79-81 of the 2025 Wolf Plan]. These funds can be used for lethal and non-lethal management of wolves, however, they cannot be transferred to the Dept. of Livestock to reimburse livestock producers for damages caused by wolves. Additionally, there is a voluntary donation option for hunters to fund wolf management involving WS. The voluntary wolf mitigation account is for private donations; collections of which are to be facilitated by FWP through the sale of a conservation license or a combination license that includes a conservation license, on the FWP and MDOL websites. The MDOL shall use money collected to contract for wolf management with WS, including but not limited to for flight time, collaring, and lethal control of wolves (§ 81-7-123, MCA). In 2023, this donation totaled $114,369.64. [See page 72 of the 2025 Wolf Plan]. Green bonds may be implemented as part of funding the wolf program in the future, although the difficulty with these is that the principles are often inaccessible.

In order to maintain FWP's eligibility to receive matching federal funding under the Federal Aid in Wildlife Restoration Act (Pittman-Robertson or PR), the Montana Legislature agreed to use hunting license revenue only for wildlife management (§ 87-1-708, MCA). Most of this funding is generated through excise taxes on firearms, ammunition, and archery equipment. State dollars are needed to match federal funding, which can be from any source that is non-federal. The Federal Aid in Wildlife Restoration Act (Pittman-Robertson or PR) does not place an excise tax on trapping equipment. Additionally, trapping licenses are not included in the formula used by USFWS to determine the states' shares of the PR funds in the annual allocation as are hunting license sales. Trapping license dollars are state funds and may be used to match other federal dollars, but the federal dollars available to match state dollars (3:1) are not tied to trapping license or revenues as are hunting licenses and taxes on factory ammunition. As such, dollars from trapping licenses are still state revenues and could be used to match available PR dollars, however they do not figure into the amount of money available from PR. To provide increased clarity, the following has been added to page 79 of the 2025 Wolf Plan:

> State dollars are needed to match federal funding, which can be from any source that is non-federal, and state hunting license sales are used in the formula to determine what the state's allocation of federal funds are. Received federal dollars along with state hunting license revenue fund wildlife surveys, research, hunter education, and other management activities (§ 87-1-601, MCA). Trapping equipment does not have an excise tax and trapping license sales are not used to determine the allocation of federal funding to the state.
>
> ..all wolf hunting license revenue be deposited into this account for wolf collaring and control.
>
> "Management" is defined in § 87-5-102, MCA, as: "the collection and application of biological information for the purposes of conserving populations of wildlife consistent with other uses of land and habitat. The term includes the entire range of activities that constitute a modern scientific resource program, including but not limited to research, census, law enforcement, habitat improvement, control, and education. The term also includes the periodic protection of species or populations as well as regulated taking."

Table 1. FWP wolf program expenditures 2011-2022.

Fund	Account Name	2011-2012	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	Grand Total
Federal	Travel	$63,672.72	$81,769.49	$4,312.19	$16,246.84	$26,094.17	$36,436.76	$5,924.99	$4,834.53	$19,374.00	$26,873.85	$40,250.91	$325,790.45
	Benefits	$107,841.53	$104,930.78	$117,793.15	$92,563.06	$63,723.45	$74,087.90	$52,273.82	$45,331.32	$30,548.02	$58,869.42	$54,822.76	$802,785.21
	Communication	$11,525.89	$15,271.05	$634.09	$12,871.43	$2,640.66	$2,276.72	$1,947.90	$1,215.34	$1,485.52	$2,180.53	$1,905.96	$53,955.09
	Contracted Services	$20,064.70	$22,469.58	$4,048.00	$50,579.02	$96,923.73	$35,028.22	$493.85	$932.32	$155.93	$460.08	$146.15	$231,301.58
	Grant - To Gov Entities						$65,963.72	$22,432.95	$55,237.98	$75,136.17	$34,266.86		$253,037.68
	Other Expenses	$1,109.45	$2,120.51	$337.40		$525.42	$520.94	$2,089.28	$985.91	$1,228.17	$8,422.61	$1,040.87	$18,380.56
	Rent	$20,223.27	$45,943.97	$1,430.44	$5,324.26	$21,621.14	$16,892.14	$3,896.86	$4,919.35	$10,986.34	$13,851.85	$49,096.94	$194,186.56
	Repair & Maintenance	$1,812.57	$3,431.68	$130.45	$24.00	$1,901.26	$872.16	$1,179.17	$486.86	$196.13	$1,100.35	$1,884.80	$13,019.43
	Salaries	$340,160.43	$272,329.91	$246,993.60	$225,405.52	$152,088.88	$171,731.92	$117,164.21	$111,005.88	$70,932.47	$155,134.19	$157,079.40	$2,020,026.41
	Supplies & Materials	$52,665.18	$36,698.65	$12,750.42	$792.44	$7,420.20	$28,910.08	$6,002.67	$6,631.25	$30,265.73	$65,806.93	$7,939.19	$255,882.74
	Utilities	$949.86	$240.62			$11.46	$25.84				$24.00	$47.38	$1,299.16
Federal Total		**$620,025.60**	**$585,206.24**	**$388,429.74**	**$403,806.57**	**$372,950.37**	**$432,746.40**	**$213,405.70**	**$231,580.74**	**$240,308.48**	**$366,990.67**	**$314,214.36**	**$4,169,664.87**
Nonbudgeted	Travel				$0.00								$0.00
	Communication			$106.00	$0.00								$106.00
	Contracted Services				$25,536.88	$25,616.82		$25,000.00					$76,153.70
	Other Expenses						$86.89						$86.89
	Rent					$21,841.50			$12,975.00				$34,816.50
	Repair & Maintenance				$0.00								$0.00
	Supplies & Materials			$12,300.00	$18,755.04	$1,171.00	$277.99	$19,307.00	$12,025.88				$63,836.91
Nonbudgeted Total				**$12,406.00**	**$44,291.92**	**$48,629.32**	**$364.88**	**$44,307.00**	**$25,000.88**				**$175,000.00**
State Special	Travel		$750.82	$81,427.65	$61,791.79	$32,197.42	$24,420.67	$55,970.58	$55,544.93	$23,586.85	$24,018.66	$19,875.01	$379,584.38
	Benefits	$2,785.26	$21,455.52	$7,670.13	$34,460.89	$49,593.54	$53,328.84	$82,493.62	$107,885.16	$92,908.45	$62,018.25	$45,841.74	$560,441.40
	Communication			$8,359.82	$10,123.75	$2,815.91	$1,614.55	$2,636.77	$1,938.77	$1,734.65	$1,258.39	$1,122.98	$31,605.59
	Contracted Services	$27,650.00	$20,321.15	$146,497.99	$135,387.02	$116,889.07	$141,364.95	$85,726.65	$114,405.24	$110,093.27	$120,153.33	$47,770.67	$1,066,259.34
	Grant - From State Source	$81,250.00	$81,250.00		$0.00								$162,500.00
	Other Expenses		$600.00	$3,871.02	$1,506.25	$175.15	$349.15	$2,917.65	$2,131.07	$2,869.77	$3,479.43	$5,035.50	$22,934.99
	Rent	$5,911.43	$3,162.01	$28,116.32	$33,928.42	$14,632.06	$9,583.96	$36,799.94	$9,865.65	$12,465.66	$18,593.45	$16,365.66	$189,424.56
	Repair & Maintenance		$65.38	$5,490.47	$3,159.80	$3,310.70	$536.97	$1,644.59	$2,047.66	$668.39	$891.47	$628.30	$18,443.73
	Salaries	$9,769.30	$84,528.51	$78,208.89	$77,240.10	$112,364.26	$122,452.24	$206,602.01	$278,593.07	$233,887.12	$157,052.59	$128,560.62	$1,489,258.71
	Supplies & Materials	$24,675.65	$24,702.13	$30,325.05	$14,535.29	$17,406.83	$9,847.57	$55,056.68	$22,162.06	$11,825.20	$23,157.25	$101,296.11	$334,989.82
	Utilities			$105.27		$29.83	$18.72			$97.80	$8.00	$15.79	$275.41
State Special Total		**$152,041.64**	**$236,835.52**	**$390,072.61**	**$372,133.31**	**$349,414.77**	**$363,517.62**	**$529,848.49**	**$594,573.61**	**$490,137.16**	**$410,630.82**	**$366,512.38**	**$4,255,717.93**
Grand Total		**$772,067.24**	**$822,041.76**	**$790,908.35**	**$820,231.80**	**$770,994.46**	**$796,628.90**	**$787,561.19**	**$851,155.23**	**$730,445.64**	**$777,621.49**	**$680,726.74**	**$8,600,382.80**

Public Process and Engagement, Transparency

SOME REVIEWERS:

- Want to see increased transparency
- Believe § 87-1-214, MCA, violates FWP's goal of increasing transparency
- Believe FWP is not transparent and the public is not meaningfully engaged
- Do not believe there is regular reporting on wolf monitoring and management
- Advocated for more educational outreach opportunities
- Want education and outreach to promote acceptance and understanding of the management strategies and goals as well as to promote an understanding and appreciation of the species and its ecology (i.e., want details on a strategy to improve sociopolitical tolerance of wolves)
- Expressed confusion on the respective authorities of the legislature, the commission, and the department
- Want information on the processes for public input
- Want the return of weekly (or monthly) wolf reports

RESPONSE:

Transparency regarding wolf management and educational outreach is important to FWP. In fact, the public can engage with FWP in many respects. The public can reach out to their local biologists and/or game wardens, participate in outreach and education opportunities, ask to meet with staff at the headquarters, and can participate in season-setting commission meetings. Despite the afore-mentioned opportunities, new strategies and tools to increase transparency and educational outreach opportunities continually evolve and are being developed and implemented. [See Part VI: Education and Outreach Program of the 2025 Wolf Plan and Annual Wolf Reports: https://fwp.mt.gov/conservation/wildlife-management/wolf]. Weekly and/or monthly wolf reports are no longer necessary as the wolf population is large and robust; trends in wolf populations reported on an annual basis are sufficient at capturing significant changes in wolf monitoring and management. The objective is to provide scientifically based information regarding wolves in their environment and their management in Montana, and to help the public become more knowledgeable about this species and its management. [See page 78 of the 2025 Wolf Plan]. The frequency of educational outreach opportunities on wolf ecology and their role in the ecosystem are based on interest and engagement by groups or members of the public and additional educational opportunities are provided by a variety of NGOs and other agencies. Through education and outreach opportunities, FWP works to promote acceptance and understanding of management strategies and goals, as well as to promote an understanding and appreciation of wolves and their ecology. Educational material pertaining to preventative wolf-livestock conflict mitigation has also been developed and distributed by FWP, although a wide range of additional resources are available through other agencies and NGOs. These resources are extensive, and an all-inclusive list is impossible to produce. FWP encourages those interested in learning more about wolf-livestock conflict prevention to contact their local wolf specialist. Ultimately, FWP aims to increase sociopolitical tolerance of wolves through continued education and outreach efforts, and the 2025 Wolf Plan and its process are a demonstration of how FWP strives to provide transparency and educational outreach opportunities to the public (e.g., page 78-79 of the 2025 Wolf Plan).

In response to comments regarding transparency and data sharing, the following paragraph on pages 51 and 72 of the 2025 Wolf Plan has been edited to provide increased clarity:

> Per statute (§ 87-1-214, MCA), the department may not disclose any information that may identify any person who obtains a permit or license to take a large predator as defined in 87-1-217 or who lawfully takes a large predator without the written consent of the person affected. Information that may not be disclosed

includes but is not limited to a person's name, address, phone number, date of birth, social security number, and driver's license number. The department may publish harvest locations of large predators at the hunting district level.

Given the Legislature's clear mandate that the department may not disclose such information, any comments pertaining to whether § 87-1-214, MCA, violates FWP's transparency is outside the scope of the 2025 Wolf Plan. FWP believes it is readily transparent when it comes to wolf management. In fact, members of the public are encouraged to comment on any changes to the policy or management pertaining to wolves. The public engagement processes (for MCAs, ARMs, and harvest season-setting) are described in Part VIIII of the 2025 Wolf Plan.

The following paragraph on page 84 of the 2025 Wolf Plan has been edited to provide increased clarity:

Legislative processes are the mechanism for adoption, amendment, or repeal of statutes, and administrative rules result from public rule-making processes intended to more precisely implement statutes. Both are based on biological and sociopolitical input. Currently, these actions are exempt from MEPA. All state authority is held by the legislature, which is composed of members elected by the public. The legislature, through statutes that set policy, direct the actions of state agencies. As such, statutes are the laws that FWP, ~~as a state agency~~, is required to implement. The legislature has set sideboards on population management and delegated limited decision-making authority to the commission and department to address finer scale management specifics. The commission or department cannot assume any authority that hasn't been delegated to them directly by the legislature. Strategies for implementation of statutes are developed during the season-setting process, within which the commission has set regulations under legislative authority that has been delegated to them. Administrative rules are mechanisms by which FWP implements or further defines and reinforces the intent of statutes. The department proposes administrative rules, which are reviewed and approved by the commission and published by the Secretary of State. Statutes and administrative rules work hand-in-hand allowing FWP and the commission to implement the legislature's mandates. While both are a result of legislation, the processes for the public to actively participate and comment differs for statutes and administrative rules. If a member of the public would like to comment on the adoption, amendment, or repeal of a statute, they would do so during the legislative session. However, if a member of the public would like to comment on the adoption, amendment, or repeal of administrative rules, they ~~would~~ may do so during the commission process, although those comments are not considered a part of the record, and ~~or~~ may do so during the Secretary of State's process, whereby those comments are considered a part of the record. FWP releases public notices on its website for any upcoming decisions to be made related to administrative rules. The duties of FWP include elements such as science and population monitoring, managing public engagement process, forming and making recommendations, and implementing the decisions made by the legislature and commission. FWP monitors the impact of management decisions, population trends, forecast future issues, and brings attention to concerns (Decker et al. 2015).

Ecology of Wolves

SOME REVIEWERS:

- Believe wolves are a keystone species and contribute to trophic-cascades (provide balance and stability in the ecosystem)
- Believe harvest negatively influences pack stability/family groups
- Want recognition that reproduction and dispersal influences population growth rates

- Identified certain factors that may indirectly influence wolf mortality rates and want clarification on human-caused vs. natural mortality as it related to National Parks
- Believe poaching rates are correlated with harvest rates, and more poaching occurs in the state than documented
- Believe wolves help to curb wildlife diseases (e.g., chronic wasting disease, brucellosis)
- Believe wolves spread zoonotic disease in their scat that can harm people
- Identified that wolf interactions with ungulates (and the influence of wolf management relating to big game hunting opportunity) was not sufficiently addressed
- Believe wolves negatively impact ungulate populations
- Believe wolves positively impact ungulate populations
- Believe most ungulate populations are at or above objective
- Believe ungulate behavior is a function of human-hunter harvest vs. predation
- Believe FWP uses insufficient methodologies to estimate prey populations
- Believe wolves negatively impact other predator populations
- Believe wolves positively impact other predator populations
- Believe wolves indirectly influence wildlife-vehicle collision rates
- Believe that if there is less deer hunting, there will be more prey available for wolves, and therefore less wolf-livestock conflicts
- Believe wolves can prevent the establishment or limit the distribution/density of feral pigs
- Stated that there was no reference or information regarding habitat protections or management efforts that may have impacts to wolf population dynamics
- Wanted the definition of "illegal mortality" to reference poaching

RESPONSE:

Habitat protections and management decisions are often implemented by the land management agency with the associated landownership. FWP is often consulted and may provide comments during the public comment periods of these processes. However, any habitat protections or land management decisions outside of state-owned lands are outside of FWP authority and FWP cannot implement habitat protections of land management actions on lands outside of the agency's landownership. Wolves are habitat generalists that can live anywhere with sufficient prey and low enough human-caused mortality. Habitat improvement and protection priorities for ungulate population conservation and management, which is a widespread activity of department employees are beneficial for wolves as well. For example, the 2023 Elk Management Plan (https://fwp.mt.gov/conservation/wildlife-management/elk/elk-management-plan) goes into detail on specific habitat improvement and protection efforts across the state, which indirectly would positively influence the wolf population in those areas.

State law authorizes FWP to collect fees from hunters, trappers, and anglers (§ 87-1-601, MCA). Most of these revenues are channeled back into management of fish and wildlife under spending authority from the Montana Legislature (§ 87-1-708, MCA). Federal funding matches state license revenue to fund wildlife surveys, research, hunter education, and other management activities. [See page 79 of the 2025 Wolf Plan]. This includes habitat management efforts that are designed to benefit entire wildlife communities, oftentimes including areas occupied by wolves. Because habitat management efforts are not always species specific, the following additional information is not included in the 2025 Wolf Plan.

License dollars contribute to wildlife and habitat management are driven by harvest opportunities, primarily that of ungulates (Table 5). Hunting license fees are matched in Pittman-Robertson funds and channeled back into management of the resources generating it. FWP has specific programs (e.g., Wildlife Habitat Improvement Grants) that focus on, but are not limited to, landscape-scale projects on lands that are open to public harvesting and involve

priority wildlife habitats, noxious weed infestations that directly impact habitat functions, broad partnerships involving multiple landowners, proposals with leveraging beyond the minimum match funding requirement, and projects that retain or restore native plant communities. Other projects include Habitat Montana, which focuses on land conservation initiatives to benefit wildlife and maintain other natural resource values of private lands, and the Forest Legacy Program, which focuses on habitat management for private forested lands. FWP owns and manages a network of WMAs across the state to benefit wildlife (wintering ungulates in particular) and public recreation. Habitat management and conservation targeted for ungulates are indirectly also benefiting wolves. From 2009–2022, the FWP forestry program has treated 11,241 acres on state lands under its jurisdiction as mandated by §§ 87-1-201, 87-1-622, and 87-1-621, MCA. From 2021–2022, habitat projects cost about $257,991.18, and as of 2023, FWP was awarded $713,485 in active grant funds to treat 7,783-11,863 acres of forested habitat (FWP 2023). From 2004–2022, FWP has established 261,197.82 acres in conservation easements costing $146,340,726.00 and 149,534.55 acres in fee acquisitions costing $148,333,637.18 statewide (FWP, pers. comm.). Protection of these public lands from fragmentation and development provide long-term habitat availability for wolves.

As per the National Environmental Policy Act (NEPA), federal land management agencies manage lands from an ecosystem-level perspective, considering all components and functional relationships. Habitat projects by acreage and dollars spent on federal lands by federal natural resource agencies, although not quantified in this document, also provide significant contributions to habitat conservation and management. Non-governmental organizations often collaborate and partner with one another, the USFS, and FWP to fund additional habitat efforts benefiting wildlife communities, including wolves and their prey. For example, the Rocky Mountain Elk Foundation, since its inception in 1984, has conserved or enhanced 930,000 acres (i.e., land acquisitions, research, and improvement of habitat quality through stewardship projects such as prescribed burns, thinning, aspen enhancement, and wildlife water developments) totaling $230 million in Montana. These kinds of habitat improvements and conservation projects may benefit many species including wolves and ungulate prey species. Designation of actual habitat linkage zones or migration corridors is impractical for a habitat generalist and highly mobile species like wolves. Therefore, habitat conservation and management across broad landscapes and land ownership designations is more important for wolf population viability because of dispersal rates and distance capabilities that allow metapopulations to remain interconnected (Fritts and Carbyn 1995). Yellowstone and Glacier National Parks can function as refuges at opposite ends of the geographic extent of wolf distribution in the NRM. The network of public lands in western Montana, central Idaho, and northwest Wyoming facilitates connectivity.

Table 2. Total revenue from license sales for harvest seasons of ungulate species in Montana from 2007–2022.

Fiscal Year	Total Revenue
2007	$7,681,543.50
2008	$7,726,602.50
2009	$8,123,746.50
2010	$7,962,468.50
2011	$11,478,456.50
2012	$10,786,709.50
2013	$13,282,821.00
2014	$13,189,905.00
2015	$14,427,086.00

2016	$15,226,295.00
2017	$16,706,523.00
2018	$16,518,787.00
2019	$19,385,640.00
2020	$19,084,776.50
2021	$19,365,223.80
2022	$18,407,667.00

The ecology of wolves is described in the Ecology section of the 2025 Wolf Plan. FWP manages wolves based on the most current and up-to-date science that improves our understanding of the ecological role of wolves in their environment. However, FWP must balance biological and sociopolitical factors, along with legislative direction, when developing wolf management recommendations for the Montana Fish and Wildlife Commission.

FWP recognizes that the findings from scientific studies may be contradictory at times, but this is often due to variation in methodology, unique facets of a specific study area, and differing sample sizes, among other factors. With significant variation across studies, it's nearly impossible to directly apply results from all studies to the wolf population in Montana. Therefore, FWP relies heavily on studies that occur within the state or those within the Northern Rocky Mountain region compared to those conducted elsewhere. That is not to say that FWP does not consider such studies, but that it is one of many considerations when evaluating wolf management.

For the following paragraphs, see Part II: Background subsection Ecology of Wolves of the 2025 Wolf Plan. The relationships between carnivores and other species, and the ecosystems in which they live, is extremely complex and dependent on ecological, environmental, and landscape factors (Estes 1996, Estes et al. 2011, Wallach et al. 2015, Bergstrom 2017, Vynne et al. 2022). The following has been modified on page 33 of the 2025 Wolf Plan to reflect updated accuracy:

> …though some ecological communities still persist without apex predators.

Despite volumes of published literature on wolves (Hebblewhite et al. 2015, Ripple et al. 2015), there is limited evidence of the precise nature, degree, and mechanisms by which wolves affect ecosystems via cascading effects across trophic levels (i.e., trophic-cascades; Silliman and Angelini 2012, Callen et al. 2013, Ripple et al. 2014b, Flagel et al. 2015, Haswell et al. 2016, Hale and Koprowski 2018). Density-dependent factors (Kauffman et al. 2010), weather and climate change (Despain 2005), landscape configuration and manipulation (Johnson-Bice et al. 2023), and independent population dynamics of other species (Wolf et al. 2007, Bilyeu et al. 2008) also influence prey population fluctuations. The term "keystone species" and the capacity to which wolves solely and directly influence entire ecosystems is not supported in the scientific literature. Also, the incidence of wolf-induced trophic cascades is more likely inside of National Parks, because outside of National Parks populations of wolf prey species (i.e., big game) are intensely debated and population targets are negotiated among competing interests. The wolf-ungulate trophic cascade concept has been intensely studied in Yellowstone National Park, and results of studies in the last several decades have been variable and inconclusive regarding the existence of such cascades. However, recent experimental evidence from Yellowstone National Park concluded that recovery of large carnivore populations did not affect riparian plant growth (Hobbs et al. 2024). Additional analyses of long-term and comprehensive data on wolves, elk, and vegetation indicate that while reduced elk density is correlated to increased aspen recruitment in Yellowstone National Park, wolves are only one among many limiting factors on elk density inside the park, and wolf predation risk and associated behavioral responses by elk have negligible effects on aspen recruitment (Brice et al. 2024). Wolves are one of many limiting factors on big game populations outside of National Parks as well, where (per

statute), FWP management recommendations for big game populations will be focused on maintaining populations at population targets outlined in management plans, rather than promoting wolf-mediated trophic cascades. Despite the lack of scientific and practical evidence indicating wolves are keystone species or induce trophic cascades, FWP recognizes the importance of wolves on the landscape.

Human-caused mortality and breeder loss can lead to an increased probability of pack dissolution, abandonment of territory, smaller group sizes, decreased denning and recruitment rates (i.e., pack persistence and reproduction, Brainerd et al. 2008, Mitchell et al. 2008, Rutledge et al. 2010, Borg et al. 2015, Milleret et al. 2017, Barber-Meyer et al. 2021, Cassidy et al. 2023), as well as the potential for the loss of learned behaviors (Haber 2013) and increased stress (Mallonee and Joslin 2004, Bryan et al. 2015) within the pack. This could, in theory, result in more smaller packs consisting of younger and inexperienced individuals that may increase wolf-livestock conflict rates. It could also, in theory, decrease wolf-livestock conflict rates because the individuals teaching this learned behavior to pack members are removed. Although there may be impacts to within-pack dynamics associated with level of harvest (i.e., potential for reduced pack size which may negatively influence dependent biological processes; Cassidy et al. 2023, increased recruitment after breeding female turnover; Ausband et al. 2017a), the abundance and distribution of packs in a population usually remains stable (Borg et al. 2015, Bassing 2017, 2019). Ausband et al. (2017a,b) found that harvest was not associated with frequency of breeder turnover or number of breeders in a pack, but rather reduced recruitment was due to the harvest of pups versus pack dynamics and reproductive success (Ausband et al. 2015). [See page 16 of the 2025 Wolf Plan]. In other words, human-caused mortality may cause pack dissolution and reduce successful dispersal rates and distances in some cases, but genetic connectivity of wolves at the population level should remain unaffected. FWP will continue to monitor pack dynamics and genetic connectivity as it relates to harvest.

Additional scientific sources have been provided via comment, and have been included in the following sentences on page 19 of the 2025 Wolf Plan:

> (e.g. sarcoptic mange; Almberg et al. 2015)
>
> …Mitchell et al. 2016
>
> For some populations, harvest pressure may negatively influence the wellbeing of individuals (Pereira et al. 2022) or larger-scale population dynamics (Adams et al. 2008, Creel et al. 2015).

Human-caused mortality (i.e., harvest, conflict mitigation) are the leading causes of wolf mortality (Parks et al. 2023). This does not include National Parks where wolves are protected, where the primary source of mortality is most often mortality caused by other wolves. Poaching is a cause of mortality for wolves and often used as the term to describe illegal mortality (definition in Appendix C of the 2025 Wolf Plan has been updated to reflect this). As such, additional citations have been added to this corrected statement on page 19 of the 2025 Wolf Plan:

> Poaching is a cause of mortality for wolves world-wide (Liberg et al. 2012, Treves et al. 2017, Louchouarn et al. 2021, Treves et al. 2021, Oliynyk 2023) and generally increases when and where hunting of other species is occurring (Santiago-Avila and Treves 2022, Santiago-Avila et al. 2022), particularly in areas where ~~the harvest of wolves is or was recently prohibited~~ governments relaxed protections (Chapron and Treves 2016, Santiago-Ávila et al. 2020).

FWP assumes that there may be some human-caused wolf mortality that is not reported. However, poaching is not a leading cause of mortality for wolves in Montana (no more than 7% of total mortality in any single year, 2005-2023; Parks et al. 2023). [See page 19 of the 2025 Wolf Plan]. FWP will continue to monitor causes of mortality and their influence on wolf population status.

There are several factors that result in habitat loss and fragmentation that may have indirect influences on wolf population dynamics, specifically wolf mortality rates. As a result, the following sentence has been added on page 19 of the 2025 Wolf Plan:

> Natural disasters/events, climate change, wildfires, and expansion of urban development may result in habitat loss and fragmentation which may have indirect influences on rates of wolf mortality.

Additional scientific sources have been provided via comment or recently were made publicly available, and have been included in the following sentences on page 21 of the 2025 Wolf Plan:

> Wolf populations increase or decrease through the combination and interaction of mortality, wolf densities (i.e., competition and conflict with conspecifics) and prey densities (i.e., food resource availability and accessibility; Mech and Barber-Meyer 2015), among a variety of other biological (see reproduction and dispersal sections above), environmental and landscape factors.
>
> The extent to which wolf density and carrying capacity is limited by extrinsic factors (including prey density) or intrinsic factors (competition and conflict with conspecifics) has been debated for >50 years (Smith and Cassidy 2024), and in reality both intrinsic and extrinsic factors likely play a role at different wolf densities (Mech 2024). Density limitation in a given location is likely mediated by competition and conflict with conspecifics regardless of whether the ultimate cause is intrinsic or extrinsic factors, and the overall population can still increase even if density in a given location stabilizes, as wolves continue to reproduce and disperse from natal packs (Mech 2024).
>
> The following resources and citations were submitted with public comments and are now included in the Ecology subsection of the 2025 Wolf Plan to supplement statements therewithin:
>
> - Anderson et al. 2005, Christianson and Creel 2014
> - Forrester and Wittmer 2013, Monteith et al. 2014
> - Predator control has positive but variable results in increasing recruitment or size of some prey populations (Clark and Hebblewhite 2021), but prey populations at carrying capacity generally do not increase with predator removal (Ballard et al. 2001). Miller et al. (2022) found no evidence that predator control influences ungulate harvest opportunity.
> - (Stahler et al. 2001, 2006, Wilmers et al. 2003, Wilmers and Getz 2005, Constible et al. 2008)
> - On the contrary, declines in wolf populations can lead to increased coyote densities, thereby decreasing ungulate neonate survival rates and increasing livestock depredations (Berger 2006). However, research in Montana and Idaho suggest that coyotes only target neonates when there is not an abundant alternative food source (Hamlin and Mackie 1989, Mackie et al. 1998, Hurley et al. 2011).
> - Cupples 2013, Dellinger et al. 2018
> - Ripple et al. 2001, 2010, 2011, 2013, 2014a
> - Beschta and Ripple 2006, 2009, 2016, Ripple and Beschta 2003, 2004, 2007, 2012…Ordiz et al. 2013

FWP continually conducts surveillance for zoonotic diseases carried by wolves. [See page 64 of the 2025 Wolf Plan]. FWP and public health officials have not identified a case of zoonotic disease in Montana wolves being transmitted to humans. If captured or harvested individuals show signs or symptoms of zoonotic diseases, further testing may be warranted and conducted. Similarly, when scat is collected by wolf specialists, it may be tested for echinococcus if warranted.

Several studies have found that ungulate behavior can be influenced by human-hunter pressure, but this is often in areas where large predators, specifically wolves, are at low densities (i.e., urban and human-developed areas) or have been extirpated.[7] Therefore, ungulate behavior can sometimes be a function of human-hunter harvest.

The influences wolves have on various components of the ecosystem are described in Part II: Background subsection Ecology of Wolves of the 2025 Wolf Plan. Wolves may have positive and or negative impacts on other predator populations depending on several other factors such as predator community composition, habitat quality and quantity, and prey community composition, densities, and distribution. Wolves may influence the abundance, densities, and distributions of other predators in the state. This is complicated by several confounding factors (i.e., harvest, habitat loss, harsh environmental conditions, disease) that influence competition. Population monitoring of mountain lions and black bears are currently ongoing to estimate population size within ecoregions.

Predator densities and diversity may influence prey abundances and distributions of any potential population (including that of invasive [e.g., feral pigs] or domestic species). Because wolves primarily prey on ungulates, wolf management and big game management are intertwined. While in certain contexts, wolves may influence ungulate populations in Montana, there are often a variety of factors to consider. Deer (white-tailed deer and mule deer) and elk populations have fluctuated, with predation by wolves being only one of many factors (i.e., harvest, habitat loss, harsh environmental conditions, disease, presence of other large carnivores) driving prey population vital rates and abundance or densities (see Interactions with Other Species subsection of the 2025 Wolf Plan). In other words, it is impossible to directly measure impacts of wolf predation on big game population dynamics exclusively. Although historical forest management practices led to habitat loss and fragmentation that negatively influenced ungulate populations in some regions of the state, predator community composition and densities may compound these effects. While ungulate populations have increased (and are at or above objective) in some parts of the state, they have decreased (and are below objective) in others, and the contributing factors to such trends are multi-faceted. Regulated hunting and trapping of wolves will take place within the larger context of multi-species management programs, rather than the context of single species management, and as such, wolf population abundance and trends are monitored concurrently with those of prey populations to evaluate populations relative to objectives and constraints of both predator and prey species. [See:

[7] Cleveland, S. M., M. Hebblewhite, M. Thompson, and R. Henderson. 2012. Linking elk movement and resource selection to hunting pressure in a heterogeneous landscape. Wildlife Society Bulletin 36:658-668.

Little, A. R., S. K. Webb, S. Demarais, K. L. Gee, S. K. Riffell, and J. A. Gaskamp. 2015. Hunting intensity alters movement behaviour of white-tailed deer. Basic and Applied Ecology 17:360-369.

Marantz, S. A., J. A. Long, S. L. Webb, K. L. Gee, A. R. Little, and S. Demarais. 2016. Impacts of human hunting on spatial behavior of white-tailed deer (Odocoileus virginianus). Canada Journal of Zoology 94:853-861.

Rhoads, C. L., J. L. Bowman, and B. Eyler. 2013. Movements of female exurban white-tailed deer in response to controlled hunts. Wildlife Society Bulletin 37:631-638.

Sullivan, J. D., S. S. Ditchkoff, B. A. Collier, C. R. Ruth, and J. B. Raglin. 2018. Recognizing the danger zone: response of female white-tailed to discrete hunting events. Wildlife Biology 2018: https://doi.org/10.2981/wlb.00455.

https://fwp.mt.gov/binaries/content/assets/fwp/conservation/deer/2023-mt-whitetail-deer-estimates.pdf, https://fwp.mt.gov/binaries/content/assets/fwp/conservation/deer/2023-mt-mule-deer-estimates.pdf, https://fwp.mt.gov/binaries/content/assets/fwp/conservation/elk/2023-montana-elk-counts.pdf].

Miller et al. (2022) found no evidence that predator control influences ungulate harvest opportunity. Antlerless harvest opportunity (for deer and elk) is either absent or very low across western and northwestern Montana where high densities of multiple carnivores occur, forage for ungulates is lower and dependent on active forest disturbance, and ungulate populations and recruitment are low. However, antlerless harvest opportunity is higher where ungulate populations are higher. In most of these cases, but not all, large carnivore guilds or populations are smaller than in western and northwestern Montana, and forage quantitty and quality for ungulates is higher. Ungulate harvest opportunity fluctuates and is a result of several contributing factors (e.g., weather, habitat quality and quantity), thereby a direct relationship with predator control is difficult to prove.

FWP estimates prey population abundances and trends, along with sex and age ratios, from survey and inventory data as well as from hunter harvest surveys. Additionally, FWP has conducted projects and continues to research ungulate survival rates (of various age classes) and causes of mortality, recruitment and fecundity rates, disease, and several other topics of interest to better inform these population models. Detailed information on these methodologies and data are outside of the scope of the 2025 Wolf Plan. FWP will continue to use the best available science, as practical and implementable, and believe these methods are sufficient for monitoring prey populations and informing management recommendations.

Monitoring any wildlife species, including ungulates, is challenging because they are not distributed randomly and actively avoid being detected, among other factors. Accuracy, precision, and bias in population estimates from monitoring efforts may be criticized when their use is misunderstood. For example, relative abundance of elk populations is generally sufficient to understand population performance, when coupled with other data like total harvest, hunter success, and recruitment and bull:cow ratios. Changes in prey distribution or disease prevalence can help inform inferences on population performance even if the population is estimated imperfectly.

Monitoring of ungulate populations influence tag allocations and quotas of harvest seasons of ungulate species. Any comment pertaining to the season setting processes of ungulate populations are outside of the scope of the 2025 Wolf Plan. Moreover, there is no strong evidence to support that the intensity of ungulate harvest (i.e., less deer hunting or less deer harvest) influences frequency and occurrence of wolf-livestock conflicts. Bradley and Pletscher (2005) found that elk can attract wolves to an area and then the overlap with livestock if in the area may lead to increased encounter rates that may result in depredations.[8] Livestock are an "easier" prey target and livestock depredation can become a learned behavior that can spread to other wolves in a pack, even in situations with ample prey populations. Therefore, a decrease in ungulate harvest, which may increase prey population densities and abundances in some areas, would not likely decrease the amount or frequency of wolf-livestock conflicts.

Wolves often select more vulnerable individuals (i.e., physically disadvantaged and older- or younger-aged prey) that might otherwise succumb to natural causes of mortality (Husseman et al. 2003, Vucetich et al. 2005, Atwood et al. 2007, Barber-Meyer et al. 2008, Metz et al. 2012), however this is likely based on individual or pack selectivity. Although the scientific literature has little evidence to support wolves influencing disease prevalence in ungulates (i.e., brucellosis; Cross et al. 2010, chronic wasting disease; Wild et al. 2011, Brandell et al. 2022), the potential is present (e.g., tuberculosis; Tanner et al. 2019, osteoarthritis; Hoy et al. 2022) especially if the disease in some way disables but does not kill the prey.

[8] Bradley, E.H. and D. H. Pletscher. 2005, Assessing factors related to wolf depredation of cattle in fenced pastures in Montana and Idaho. Wildlife Society Bulletin, 33: 1256-1265.

FWP has not investigated impacts of wolves on vehicle collision rates, but data from Montana wildlife-vehicle collisions was included below for reference (Figs. 23 and 24). Ungulates are commonly involved in wildlife-vehicle collisions. In the last decade, white-tailed deer (about 38,392 and 66%) and mule deer (about 14,041 and 24%) were involved in the vast majority of all wildlife-vehicle collisions in Montana (MDT Carcass Database, pers. comm.).

The figures, tables, and maps below depict trends in ungulate population size, population objectives, disease prevalence, and hunter harvest, and are purely informational. FWP does not assume these trends to be directly associated with wolf population dynamics. As a result, they have not been included in the 2025 Wolf Plan. Similarly, the figures below depict trends in harvest of mountain lions and black bears, and are purely informational. FWP does not assume these trends to be directly associated with wolf population dynamics. As a result, they have not been included in the 2025 Wolf Plan.

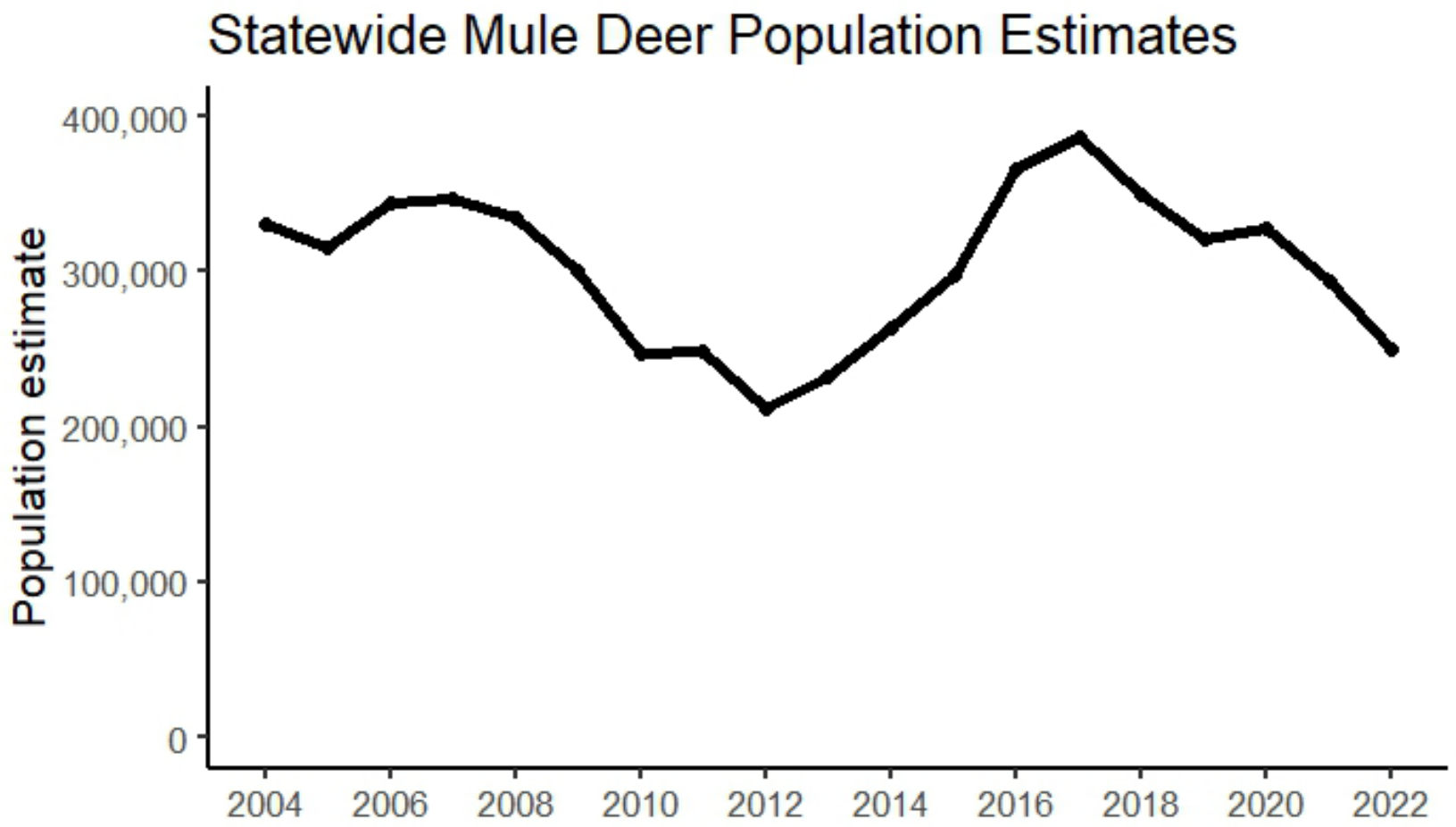


Figure 8. Statewide mule deer population estimates in Montana by calendar year, 2004–2022.

Table 3. Statewide mule deer population estimates in Montana by region by calendar year, 2004–2022.

		Region							
		1	2	3	4	5	6	7	Statewide
Year	2004	14,234	27,331	46,490	83,430	54,560	36,340	68,340	330,725
	2005	15,018	18,599	51,116	76,408	43,139	37,188	74,714	316,182
	2006	16,589	21,209	52,477	68,337	38,434	48,902	98,061	344,009
	2007	13,720	24,837	62,759	70,262	41,765	39,683	93,650	346,675
	2008	11,685	16,188	46,594	65,826	41,791	51,428	101,169	334,680
	2009	9,297	13,229	40,747	59,589	39,813	45,056	93,167	300,896
	2010	8,984	11,486	33,624	50,096	38,334	35,488	69,213	247,225
	2011	13,016	14,226	33,293	46,384	34,720	42,053	65,549	249,241
	2012	6,495	11,472	33,204	46,217	33,836	32,983	47,424	211,631
	2013	7,547	12,754	34,172	49,210	37,977	36,674	53,934	232,269
	2014	10,728	12,267	35,482	56,133	32,185	37,487	79,287	263,568
	2015	8,065	14,267	38,912	56,629	32,042	43,561	103,812	297,287
	2016	6,918	15,960	43,049	64,264	36,182	64,660	135,000	366,034
	2017	10,770	17,345	50,496	71,359	38,357	65,848	132,000	386,175
	2018	5,800	13,864	43,835	66,281	36,965	65,371	117,519	349,634
	2019	6,277	11,530	42,774	59,783	32,226	66,510	102,538	321,638
	2020	6,979	10,071	39,004	60,701	32,583	64,940	114,035	328,313
	2021	6,055	9,551	43,025	58,082	32,103	67,994	77,140	293,950
	2022	6,761	9,607	42,602	56,253	24,980	50,932	58,623	249,758

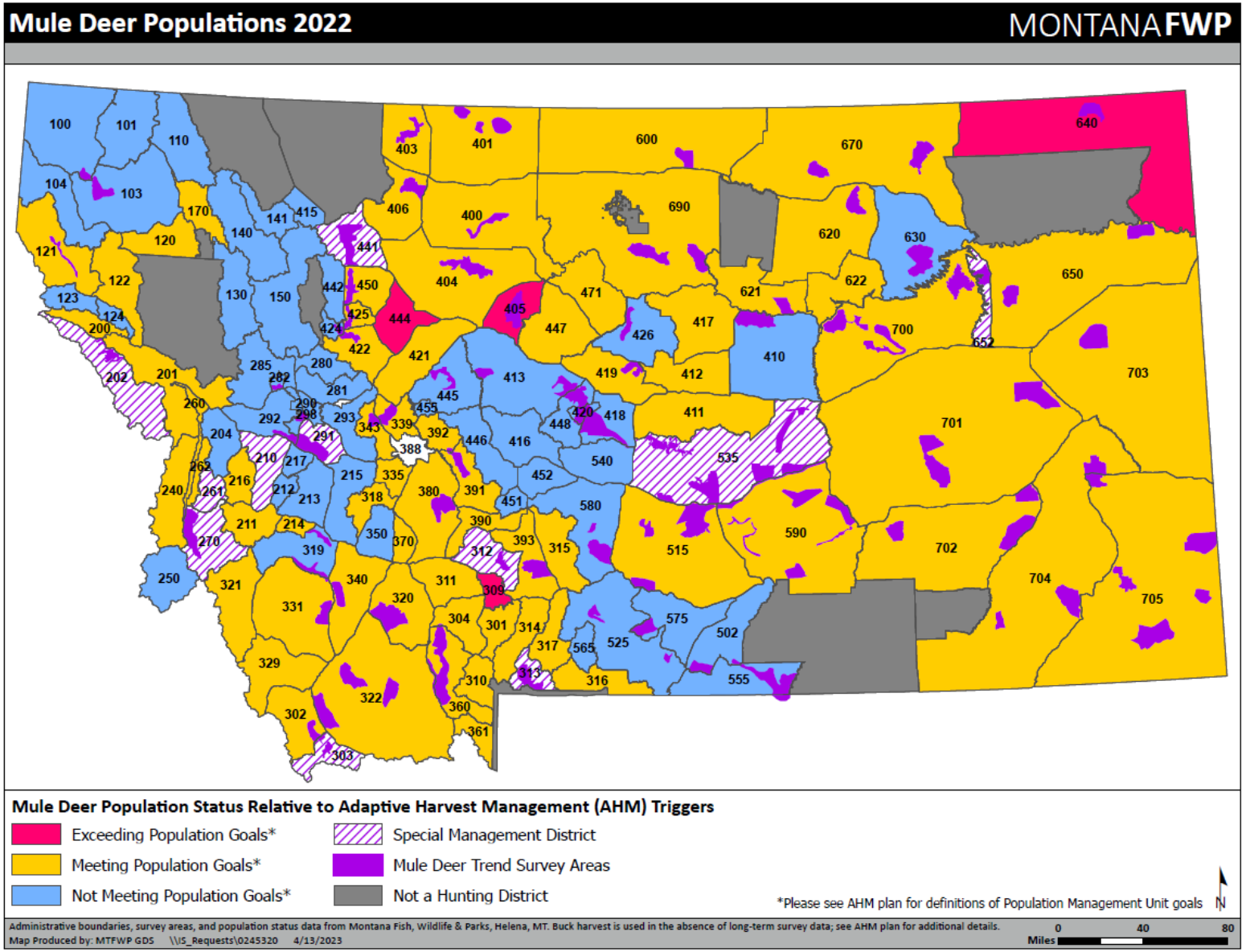


Figure 9. Most current mule deer population status relative to Adaptive Harvest Management population goals by hunting district.

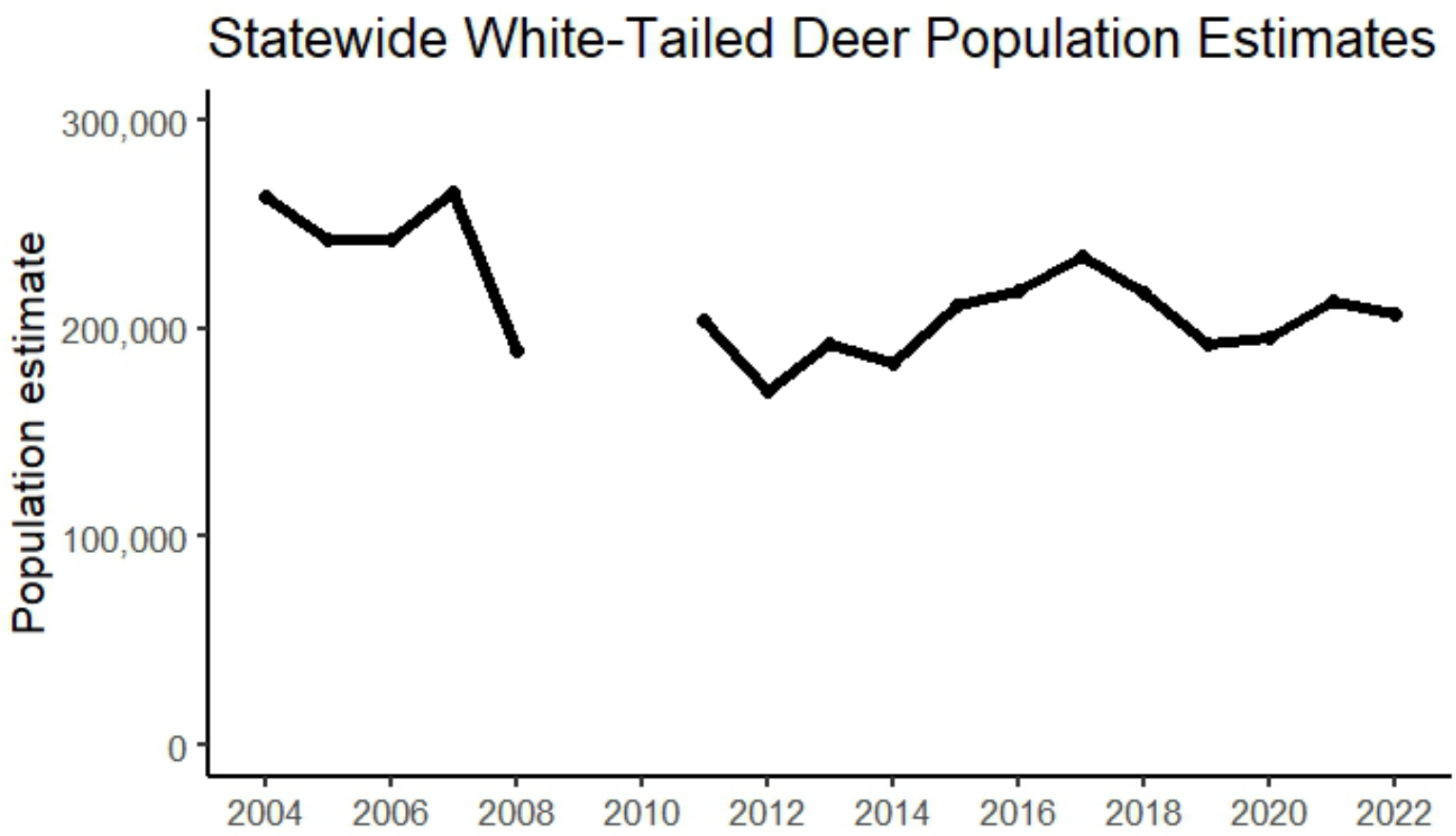


Figure 10. Statewide white-tailed deer population estimates in Montana by calendar year, 2004–2022. Gaps are due to insufficient survey and monitoring methods that could not provide an accurate statewide population estimate. Further, due to the lack of a white-tailed deer-specific management plan with defined population objectives, a map depicting population status relative to Adaptive Harvest Management population goals by hunting district could not be created.

Table 4. Statewide white-tailed deer population estimates in Montana by region by calendar year, 2004–2022. Gaps are due to insufficient survey and monitoring methods that could not provide an accurate statewide population estimate. Further, due to the lack of a white-tailed deer-specific management plan with defined population objectives, a map depicting population status relative to Adaptive Harvest Management population goals by hunting district could not be created.

		Region							
		1	2	3	4	5	6	7	Total
Year	2004	82,129	50,093	28,863	36,180	29,830	17,810	17,950	262,855
	2005	90,619	44,137	24,427	31,380	26,990	12,520	12,650	242,724
	2006	91,818	50,177	24,582	30,710	20,680	14,270	10,480	242,717
	2007	93,576	52,669	30,222	32,800	28,150	15,660	11,800	264,877
	2008	70,512	31,248	19,508	25,950	18,650	13,550	10,400	189,818
	2009	55,139	24,329	NA	NA	13,240	15,120	11,320	NA
	2010	55,239	25,549	NA	NA	8,930	12,350	9,580	NA
	2011	73,995	35,430	23,151	32,230	10,910	14,646	13,550	203,912
	2012	67,809	28,640	18,025	26,980	12,620	6,208	9,650	169,932
	2013	72,890	30,210	20,568	29,050	15,920	10,566	13,770	192,974
	2014	77,675	30,226	21,086	20,683	14,510	8,309	11,240	183,729
	2015	84,482	38,457	23,550	26,193	12,520	11,113	14,350	210,664
	2016	81,738	36,357	24,532	30,436	15,890	12,693	16,330	217,976
	2017	92,687	39,740	25,712	29,801	15,830	12,836	18,520	235,126
	2018	79,446	39,323	23,256	32,731	16,450	11,493	14,860	217,559
	2019	67,887	36,453	20,387	28,743	13,160	10,846	14,827	192,304
	2020	67,195	31,539	23,557	29,818	15,966	10,761	17,318	196,155
	2021	69,094	37,747	23,745	32,657	14,917	14,311	20,343	212,814
	2022	70,427	39,237	22,913	32,118	14,063	11,732	16,163	206,653

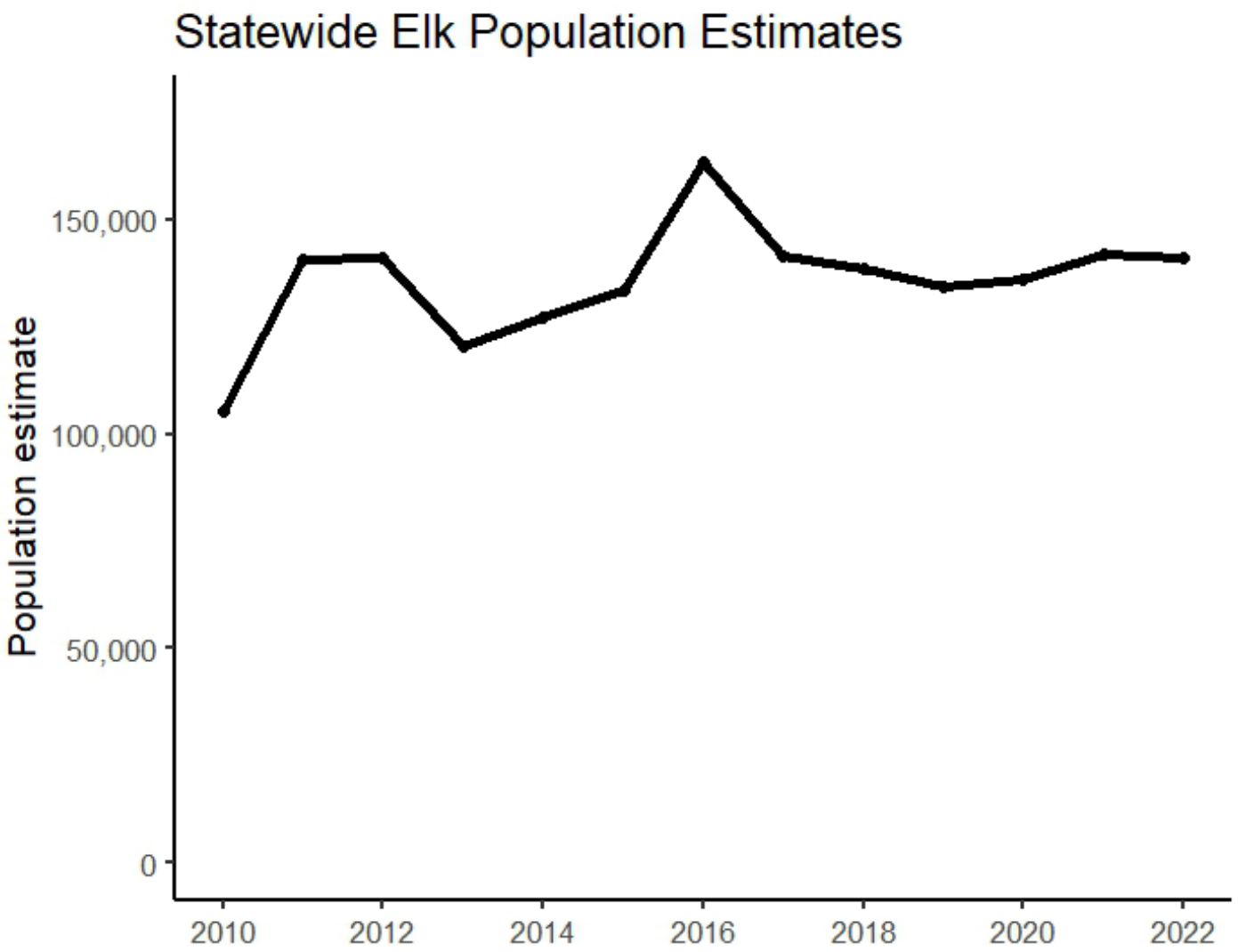


Figure 11. Statewide elk population estimates in Montana by calendar year, 2010–2022. Years not included outside of this timeframe are due to missing monitoring and survey data and or changes in hunting district boundaries.

Table 5. Statewide elk population estimates in Montana by region by calendar year, 2010–2022. Years not included outside of this timeframe are due to missing monitoring and survey data and or changes in hunting district boundaries.

		Region							
		1	**2**	**3**	**4**	**5**	**6**	**7**	**Statewide**
Year	**2011**	4,663	28,218	59,083	30,733	12,619	4,139	1,160	**140,613**
	2012	4,494	26,034	58,996	31,706	13,598	3,453	2,798	**141,078**
	2013	3,632	23,181	48,009	26,224	13,814	2,728	2,882	**120,470**
	2014	3,721	23,358	51,035	26,575	15,966	3,428	3,333	**127,416**
	2015	3,807	25,002	54,353	26,966	17,142	3,012	3,333	**133,615**
	2016	4,529	32,344	62,099	33,525	21,523	4,799	4,525	**163,343**
	2017	3,486	25,710	56,934	28,737	19,201	3,927	3,404	**141,399**
	2018	3,368	24,028	57,151	28,439	19,110	2,941	3,433	**138,470**
	2019	3,313	22,139	56,270	31,944	14,227	2,941	3,723	**134,557**
	2020	3,357	22,544	56,574	32,692	14,702	2,941	3,341	**136,151**
	2021	2,652	22,232	59,342	37,139	13,657	3,422	3,341	**141,785**
	2022	2,246	20,871	59,187	37,638	14,355	2,572	4,425	**141,294**

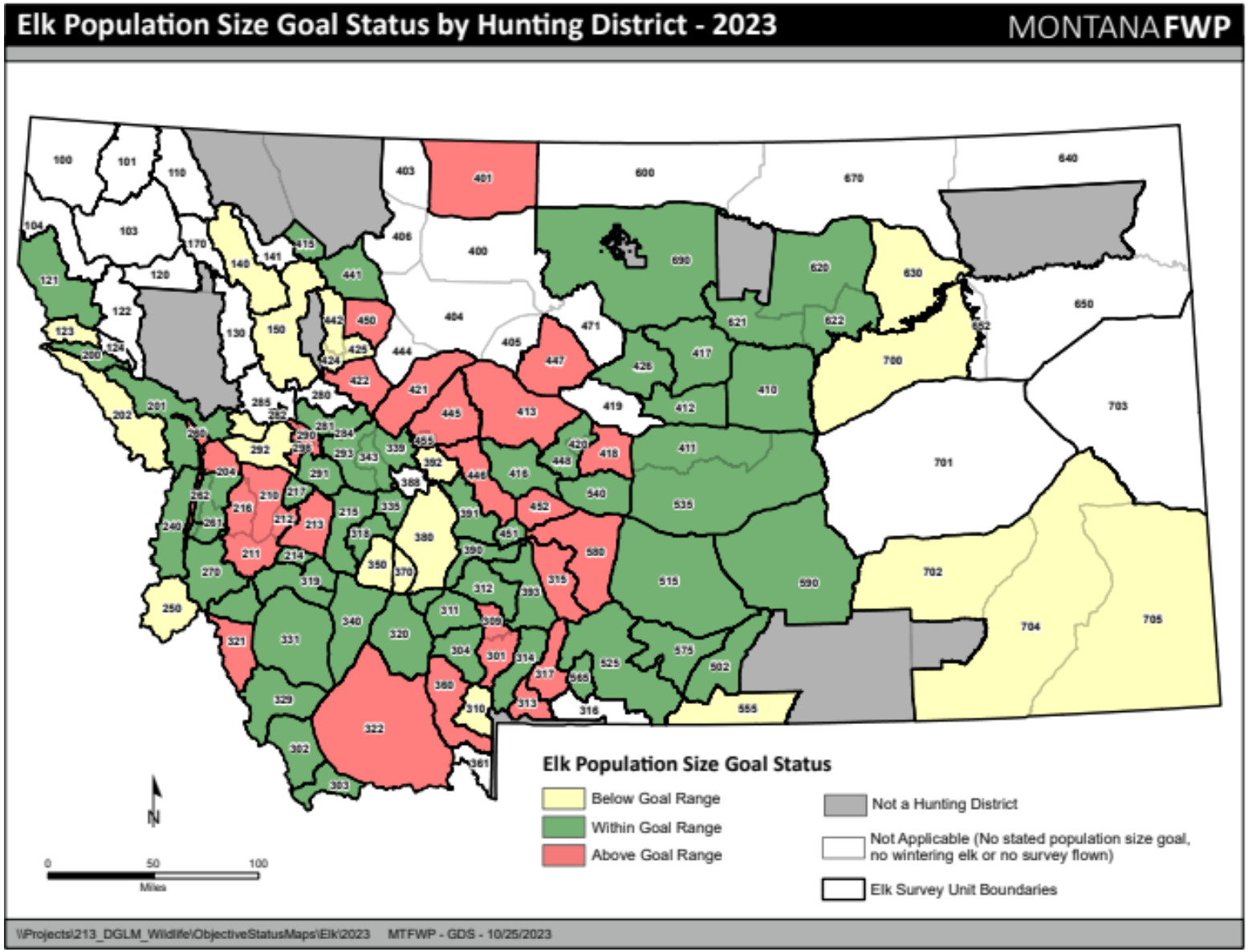


Figure 12. Most current elk objective status relative to Adaptive Harvest Management population goals by hunting district.

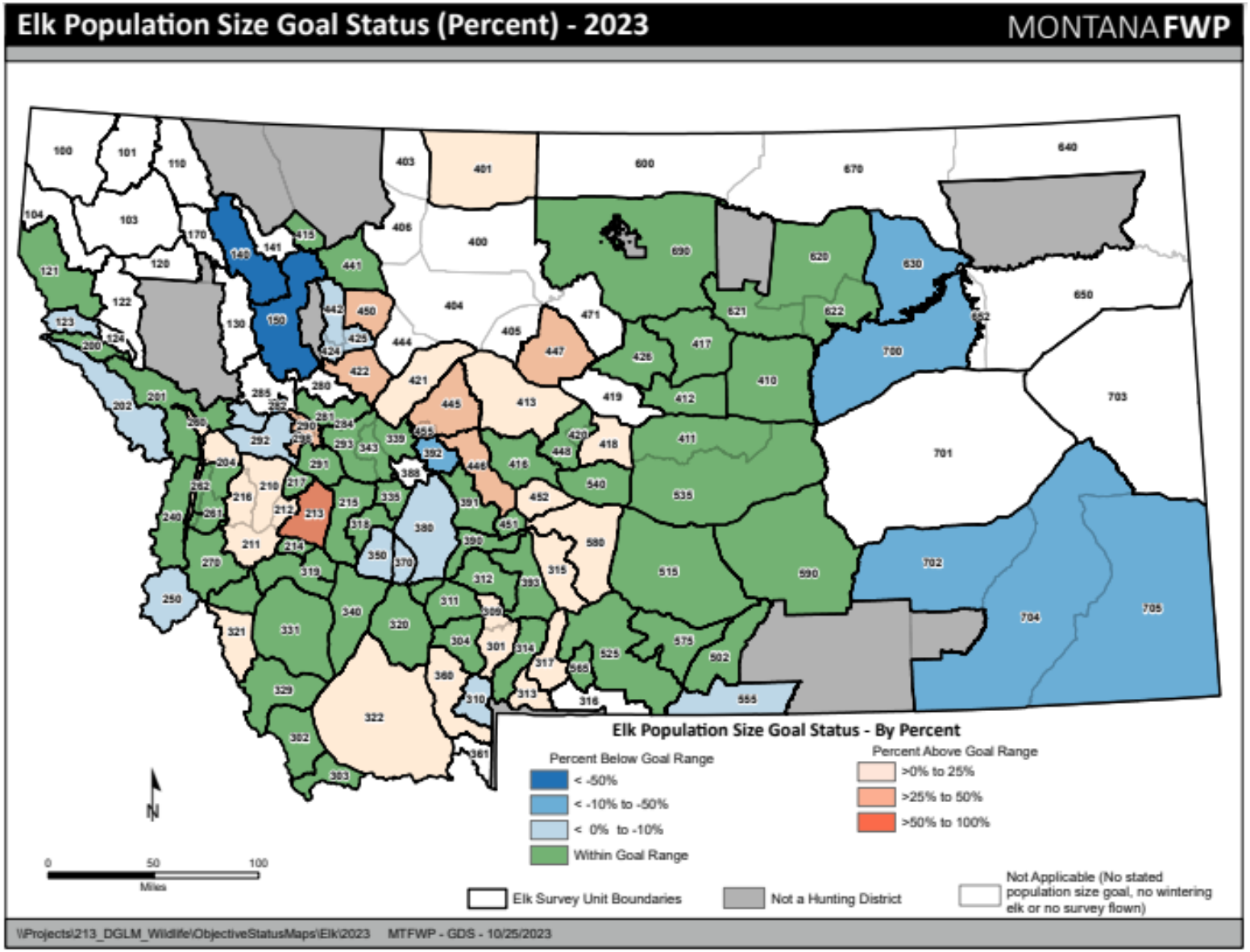


Figure 13. Most current elk objective status by percent relative to Adaptive Harvest Management population goals by hunting district.

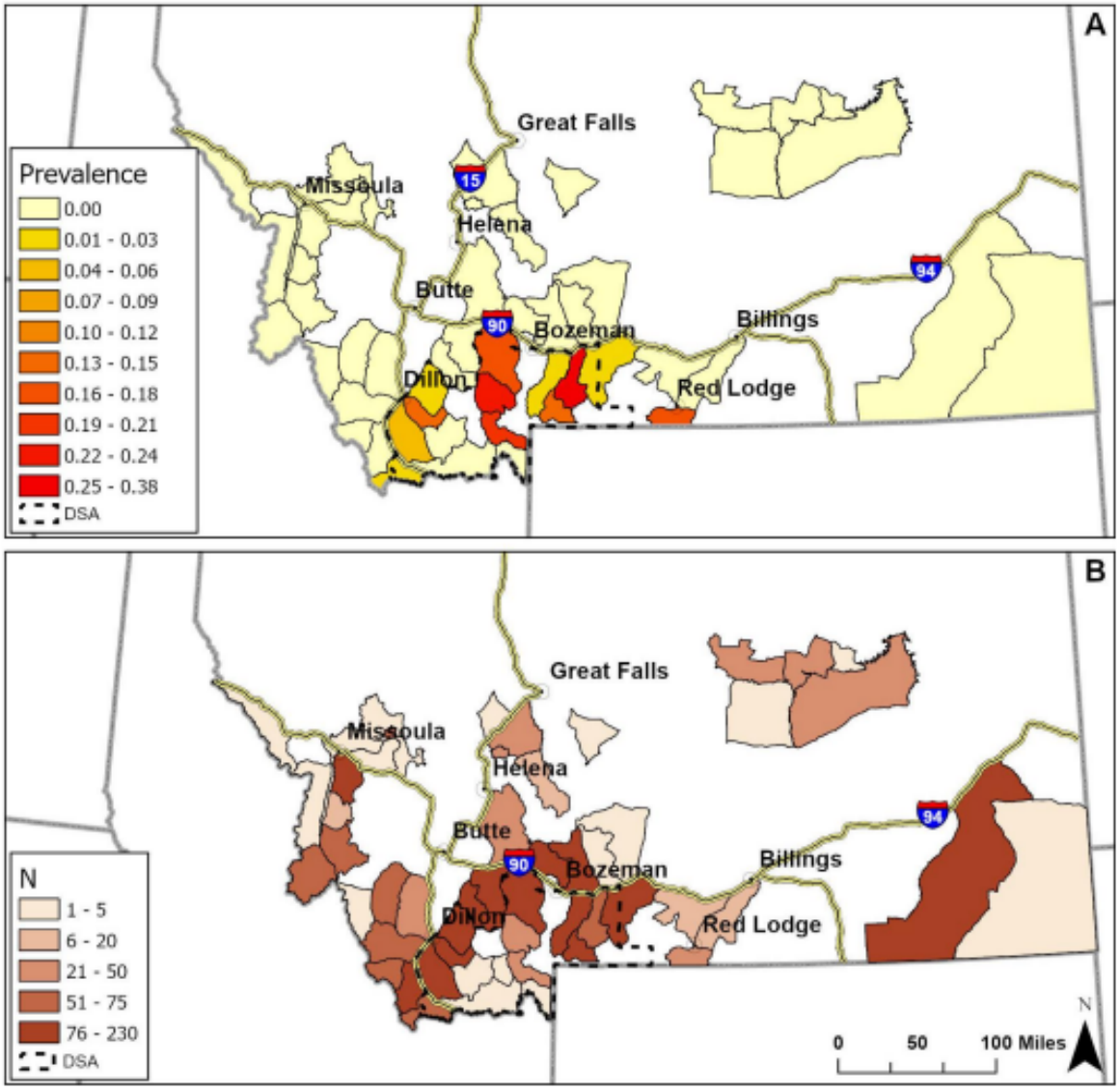


Figure 14. The estimated brucellosis seroprevalence (Panel A) and number of samples screened (N, Panel B) for adult female elk by hunting district* by fiscal year, 2010–2022. Samples include those collected opportunistically during fall hunter harvest and during targeted winter sampling. Note some seroprevalence estimates are derived from a low number of samples. The gray line denotes the boundary of the Montana brucellosis designated surveillance area (DSA). *Hunt district boundaries do not reflect the changes implemented in 2022 (FWP 2022).

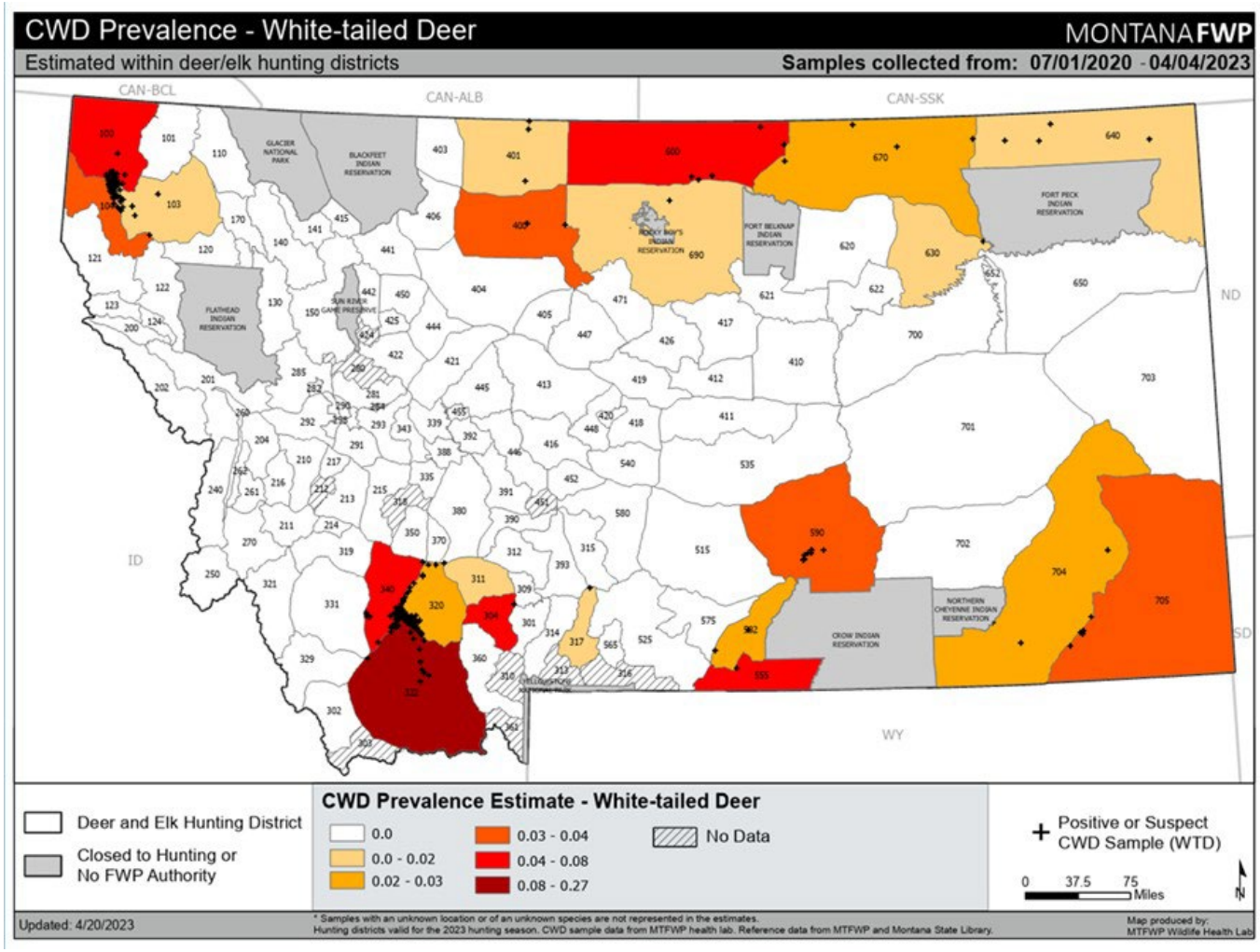


Figure 15. Statewide estimated chronic wasting disease (CWD) prevalence in white-tailed deer by fiscal year, 2020–2023. These estimates are based on a three-year average due to limited samples sizes and the slow-progressing nature of the disease. Prevalence is calculated by dividing the number of test-positives by the total number of animals sampled. Only data from hunter-harvested or agency removal/trapping were used to calculate prevalence. Where CWD has not been detected (i.e. prevalence = 0), additional sampling may still be necessary to declare the area free from disease, or below 0.01 prevalence, with 95% confidence (Wieseler et al. 2023).

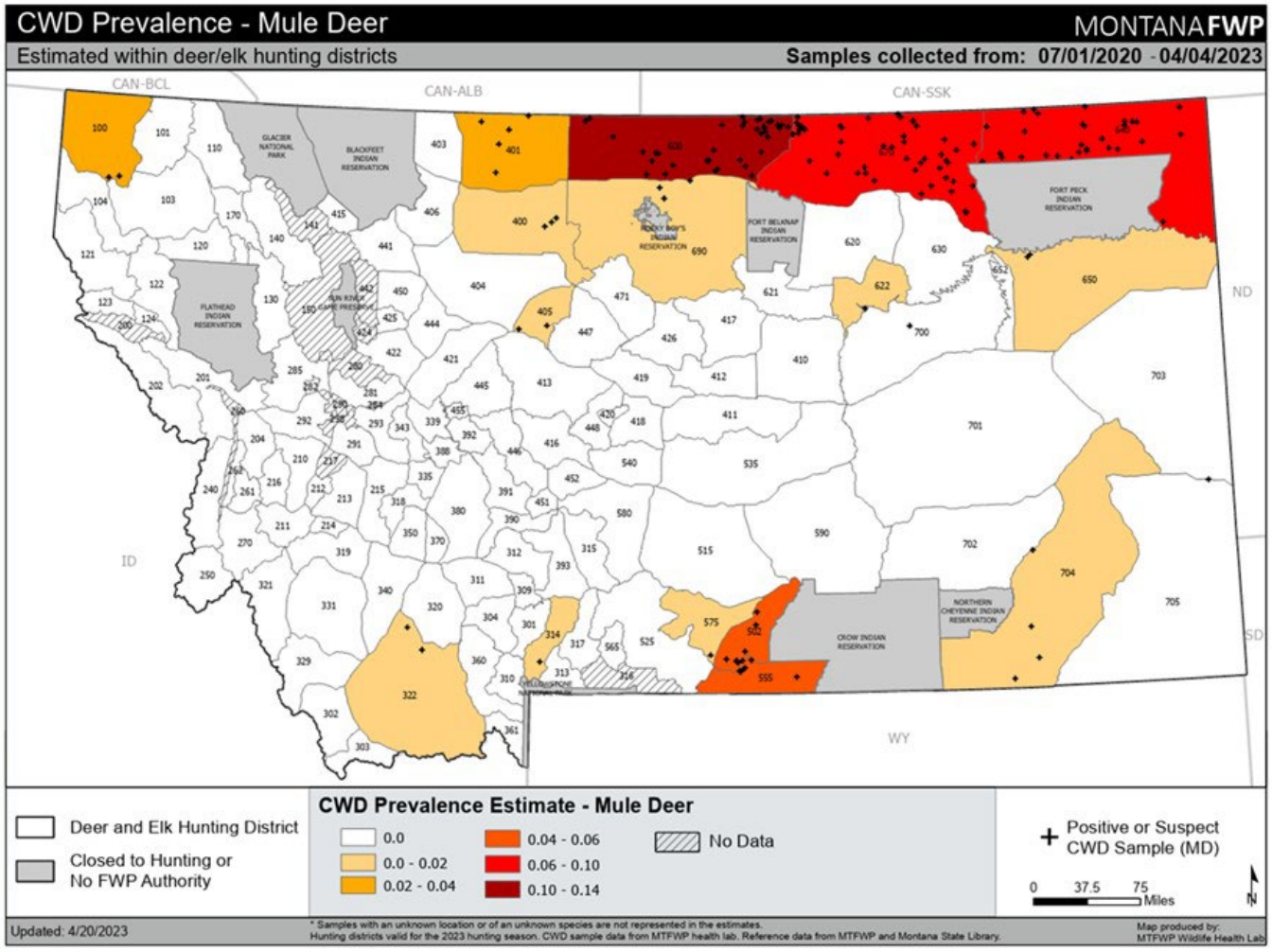


Figure 16. Statewide estimated chronic wasting disease (CWD) prevalence in mule deer by fiscal year, 2020–2023. These estimates are based on a three-year average due to limited samples sizes and the slow-progressing nature of the disease. Prevalence is calculated by dividing the number of test-positives by the total number of animals sampled. Only data from hunter-harvested or agency removal/trapping were used to calculate prevalence. Where CWD has not been detected (i.e. prevalence = 0), additional sampling may still be necessary to declare the area free from disease, or below 0.01 prevalence, with 95% confidence (Wieseler et al. 2023).

Table 6. Statewide summary of chronic wasting disease samples by fiscal year, 2017–2023.

	White-tailed Deer		Mule Deer		Elk		Moose	
Year	*Total*	*Positives*	*Total*	*Positives*	*Total*	*Positives*	*Total*	*Positives*
2017-2018	521	2	1355	9	93	0	7	0
2018-2019	482	8	1406	23	110	0	6	0
2019-2020	2752	84	3810	53	331	1	32	2
2020-2021	3924	235	2938	38	703	0	46	0
2021-2022	4129	271	3543	76	1007	0	56	1
2022-2023	3307	195	2617	68	1248	1	50	0
Total	15115	795	15669	267	3492	2	197	3

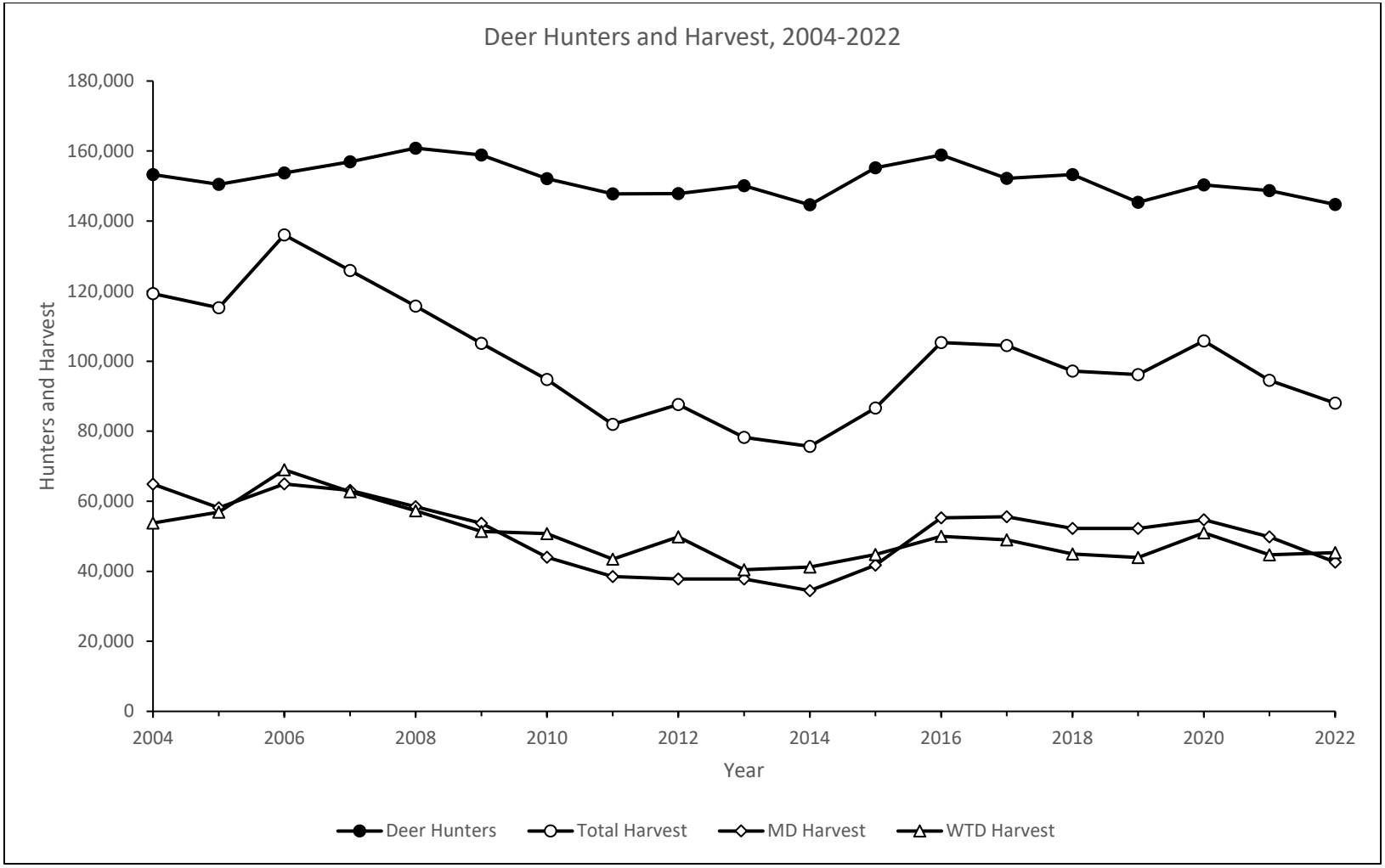


Figure 17. Statewide deer hunters and harvest for all weapon classes and all permit types in Montana by license year, 2004–2022. MD refers to mule deer and WTD refers to white-tailed deer.

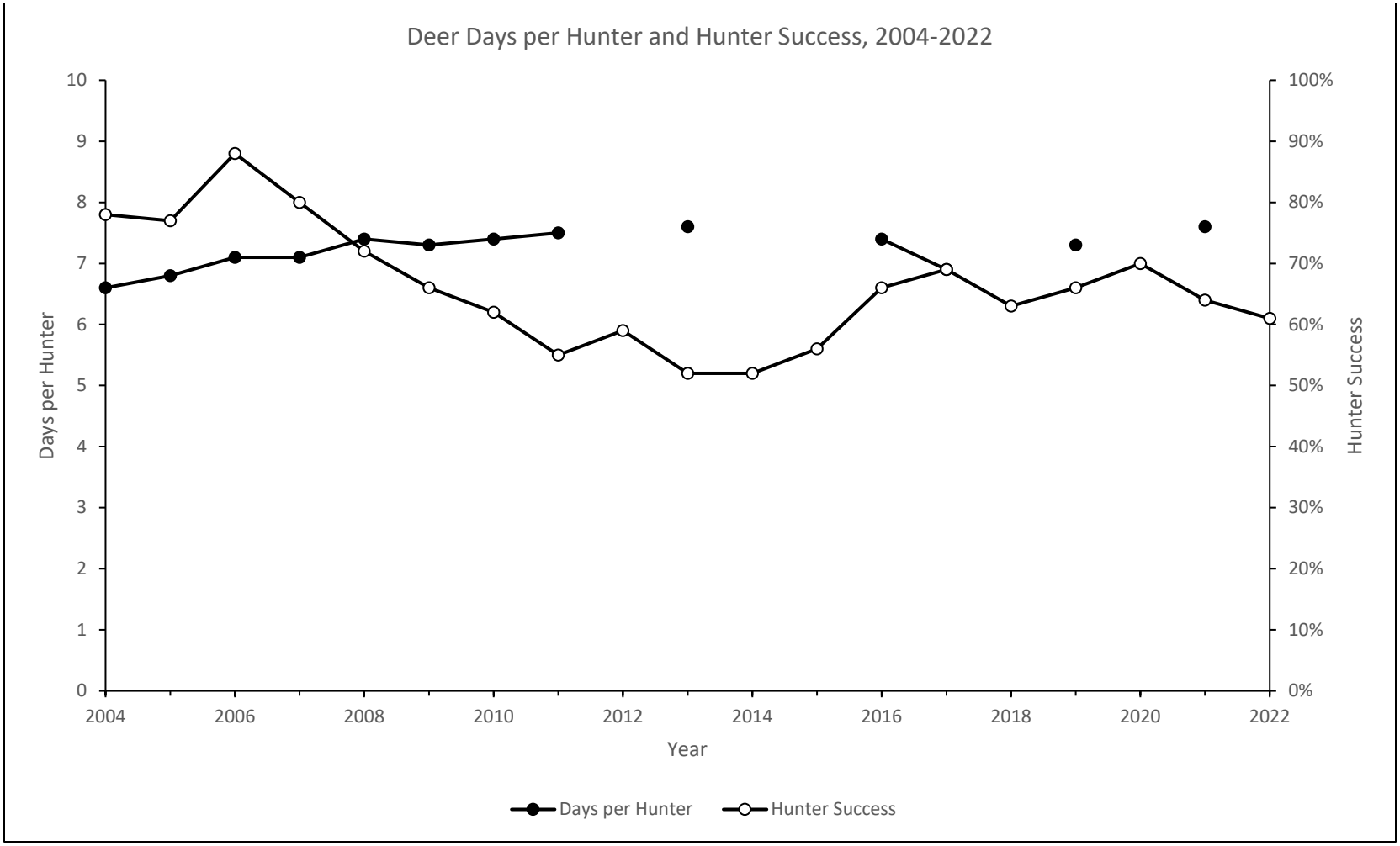


Figure 18. Statewide days spent per deer hunter and hunter success for all weapon classes and all permit types in Montana by license year, 2004–2022. Gaps are due to lack of data collected during hunter harvest surveys those years.

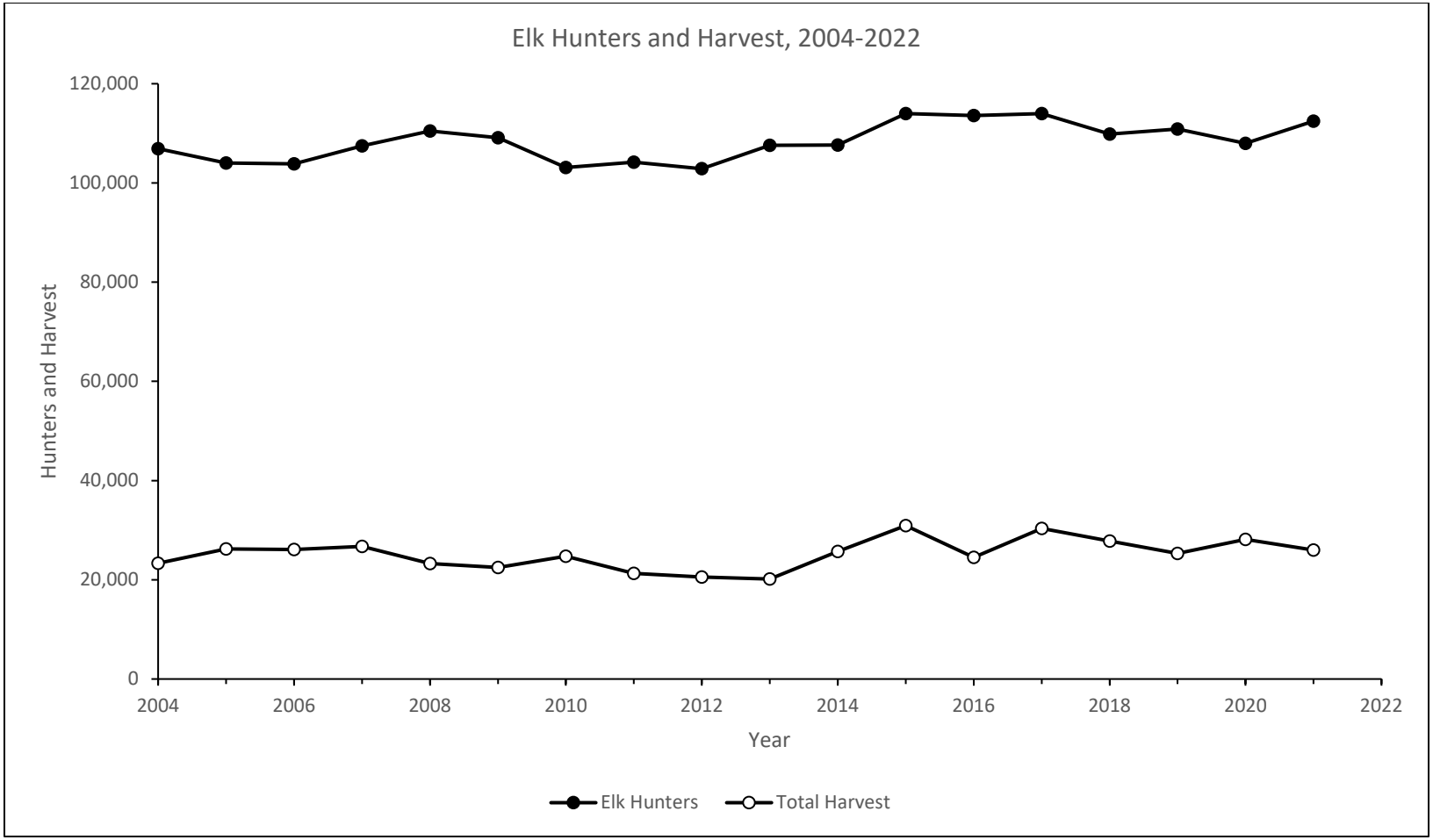


Figure 19. Statewide elk hunters and harvest for all weapon classes and all permit types in Montana by license year, 2004–2022.

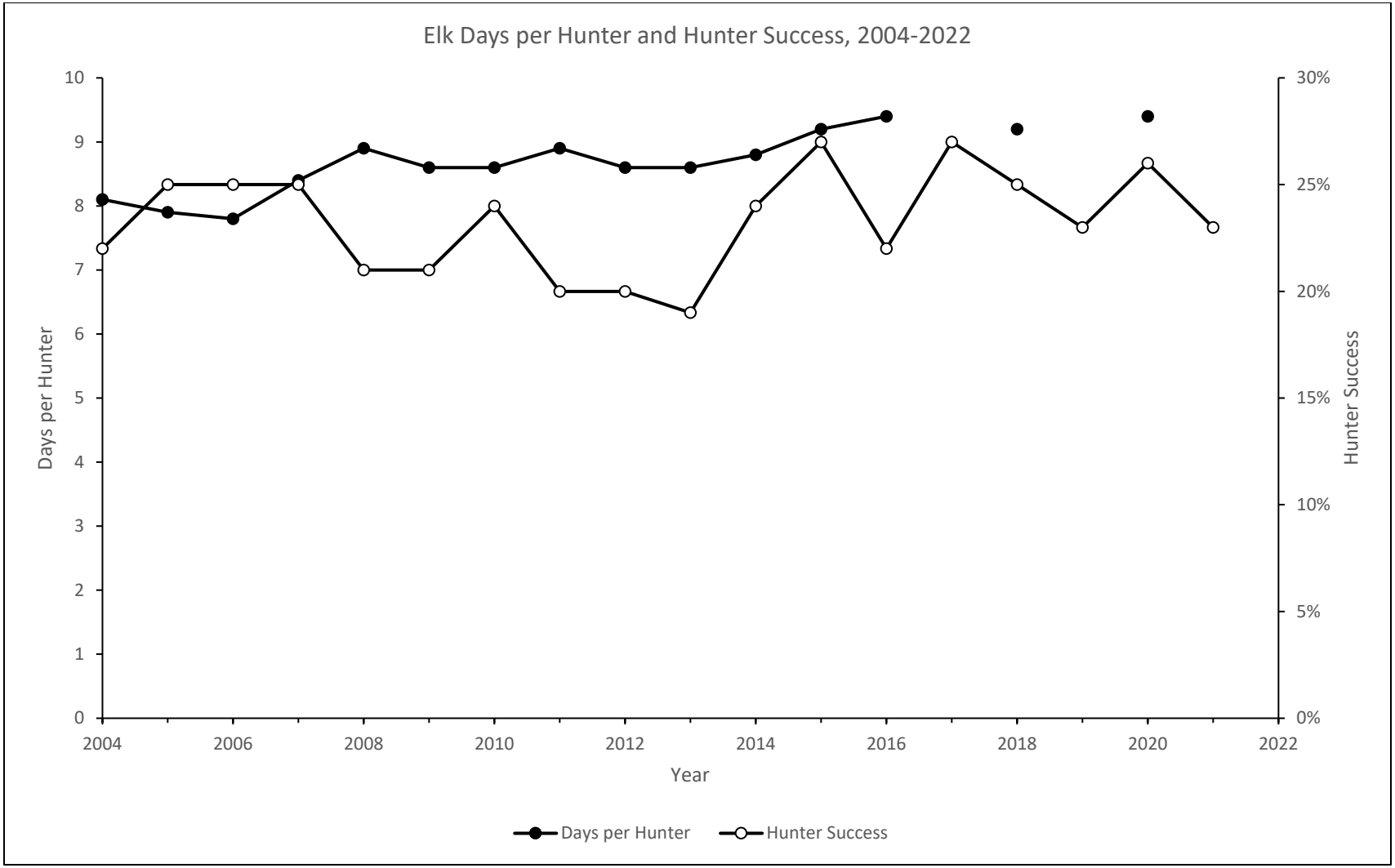


Figure 20. Statewide days spent per elk hunter and hunter success for all weapon classes and all permit types in Montana by license year, 2004–2022. Gaps are due to lack of data collected during hunter harvest surveys those years.

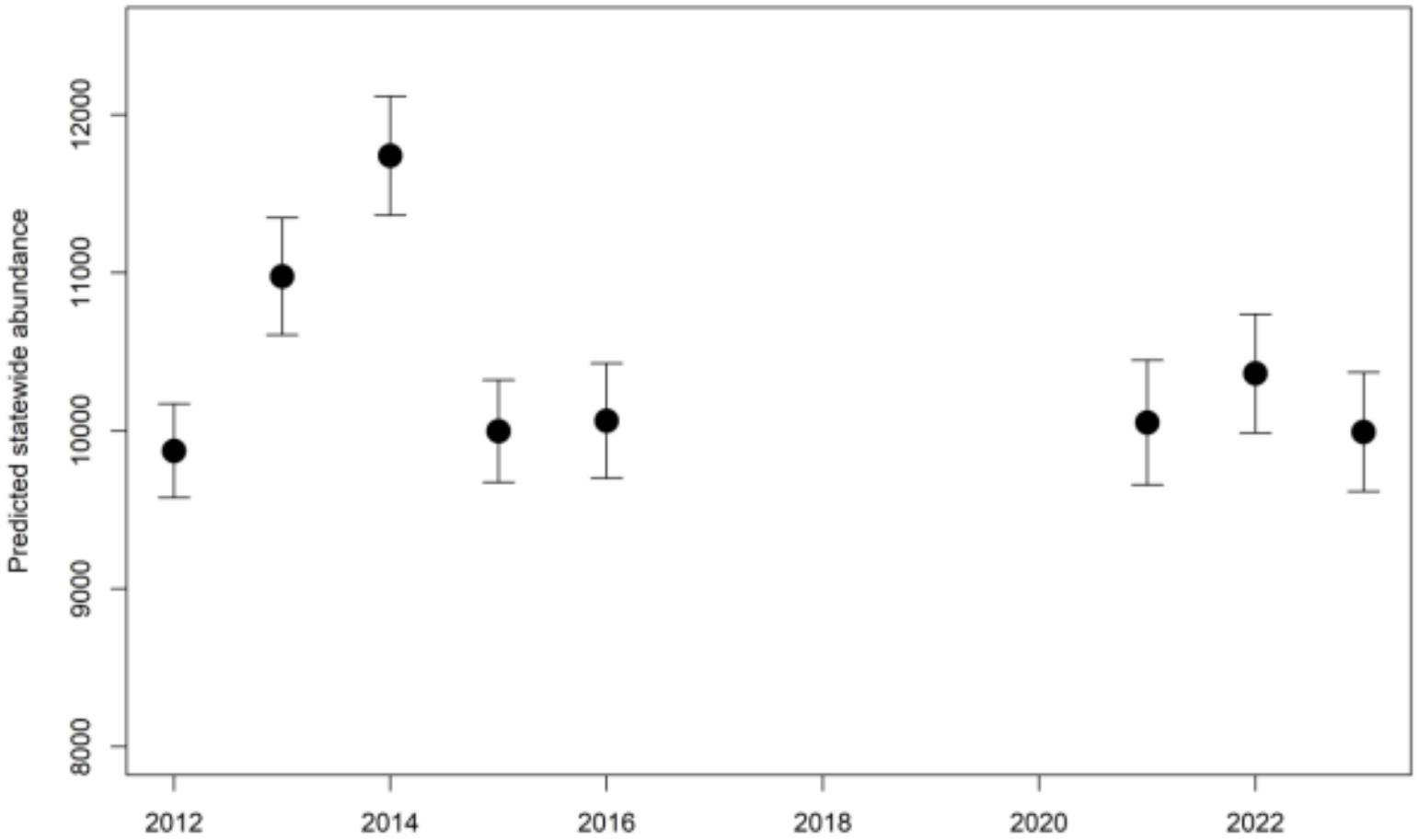


Figure 21. Predicted statewide moose abundance estimates and 95% confidence limits summarized from 10,000 Monte Carlo simulations of site-year abundance estimates according to model-estimated mean and standard deviation per site-year, Montana, 2012-2023 (DeCesare et al. 2024; https://fwp.mt.gov/binaries/content/assets/fwp/conservation/moose/mfwp_moose_w-157-r_finalreport.pdf).

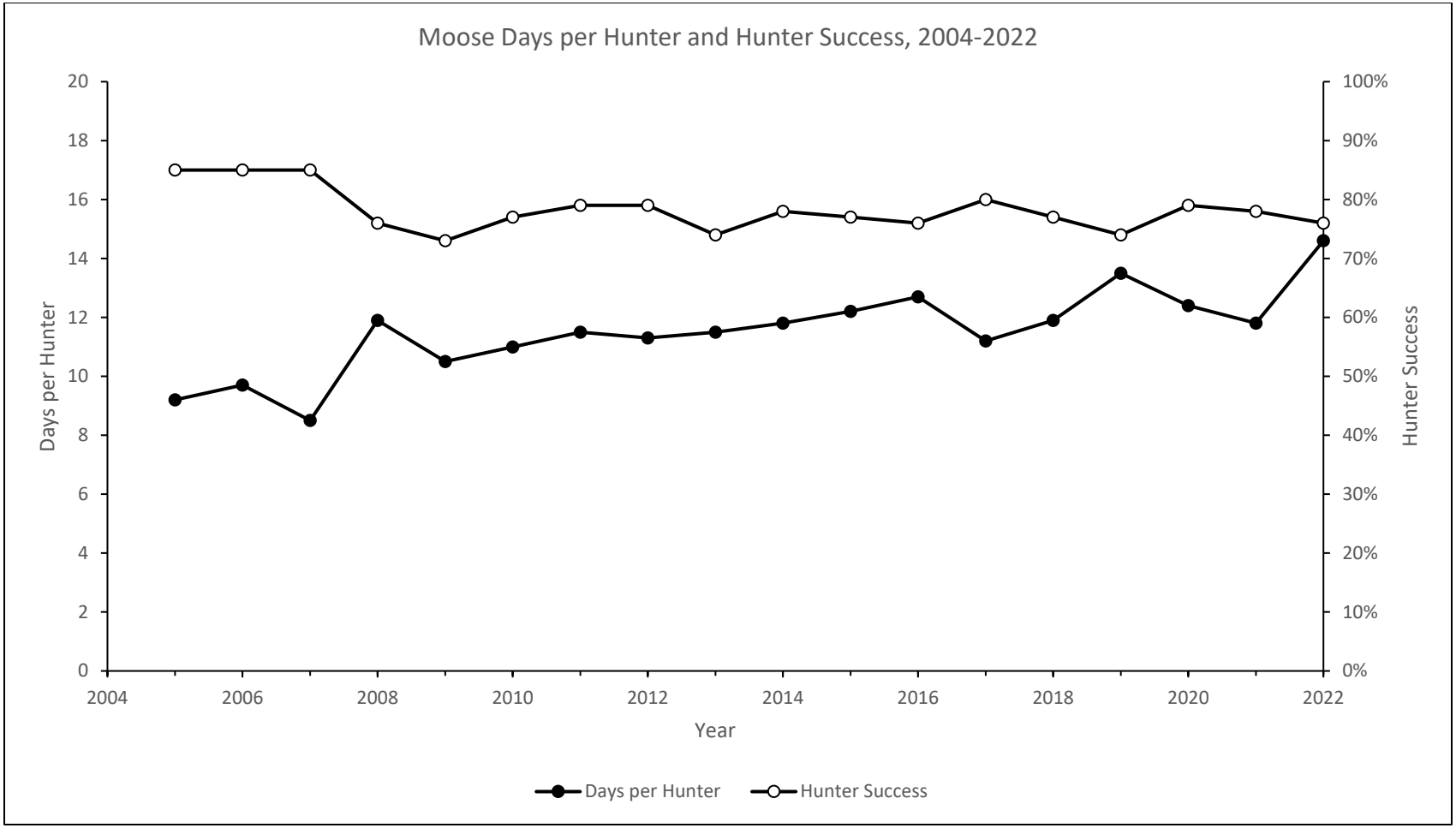


Figure 22. Statewide days spent per moose hunter and hunter success for all weapon classes and all permit types in Montana by license year, 2004–2022.

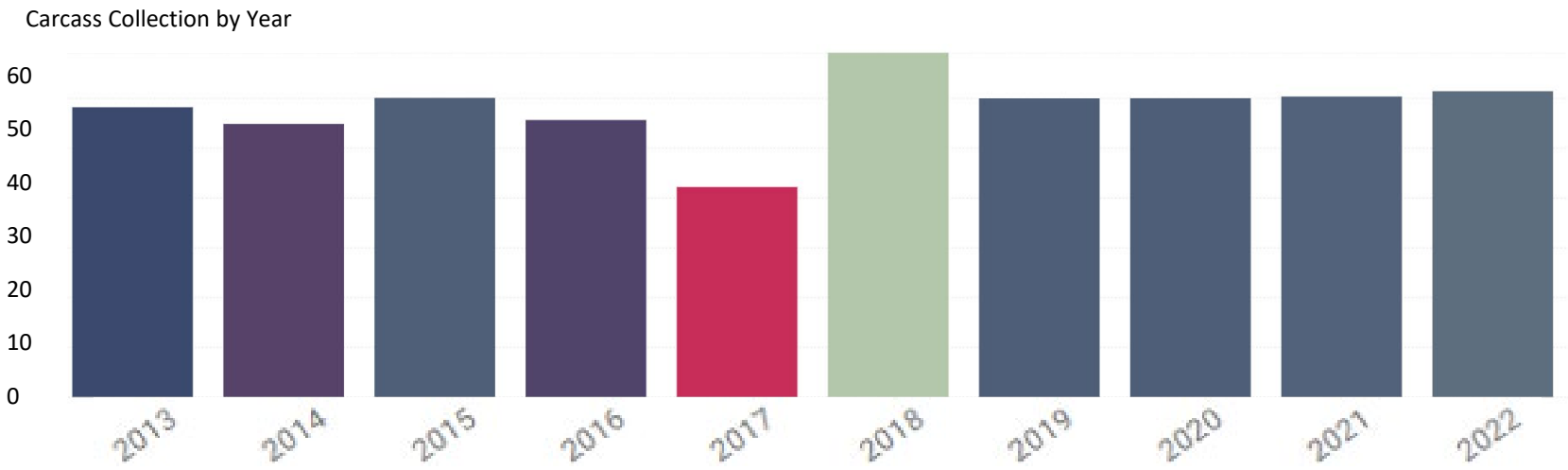


Figure 23. Number of carcasses collected from wildlife-vehicle collisions by The Montana Department of Transportation (MDT), 2013-2022. MDT has access to two databases containing information on wild animal vehicle collisions. The MDT Carcass Database contains information on carcasses collected by MDT and County maintenance personnel; however, not all carcass collection is reported consistently or on a regular schedule. This makes the information provided by the Carcass Database useful for pattern identification over space and time, but not statistically valid. It also is difficult to match a carcass report to a crash report to ensure the carcass is not counted twice in a detailed study. MDT also has access to wild animal vehicle collisions reported by or through the Montana Highway Patrol (MHP). This dataset is limited by the fact that many wild animal vehicle collisions are not reported, or if they are reported, it may be well after the crash occurrence. Additionally, the reporting officer may note in the narrative what type of animal was impacted; however, the crash form does not have a data field for the type of animal, so this information is not provided consistently.

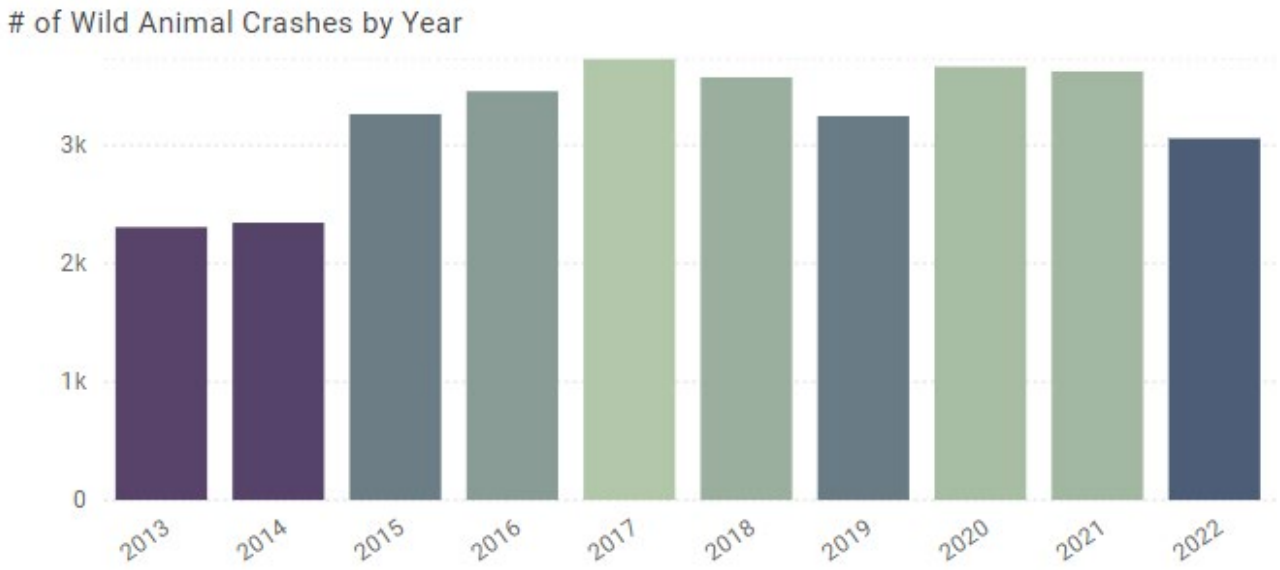


Figure 24. Number of wildlife-vehicle collisions by The Montana Department of Transportation (MDT), 2013-2022. MDT has access to two databases containing information on wild animal vehicle collisions. The MDT Carcass Database contains information on carcasses collected by MDT and County maintenance personnel; however, not all carcass collection is reported consistently or on a regular schedule. This makes the information provided by the Carcass Database useful for pattern identification over space and time, but not statistically valid. It also is difficult to match a carcass report to a crash report to ensure the carcass is not counted twice in a detailed study. MDT also has access to wild animal vehicle collisions reported by or through the Montana Highway Patrol (MHP). This dataset is limited by the fact that many wild animal vehicle collisions are not reported, or if they are reported, it may be well after the crash occurrence. Additionally, the reporting officer may note in the narrative what type of animal was impacted; however, the crash form does not have a data field for the type of animal, so this information is not provided consistently. 23 USC 407 Disclaimer: Notwithstanding any other provision of law, reports, surveys, schedules, lists, or data compiled or collected for the purpose of identifying, evaluating, or planning the safety enhancement of potential accident sites, hazardous roadway conditions, or rail-way-highway crossings, pursuant to sections 130, 144, and 148 [152] of this title or for the purpose of developing any highway safety construction improvement project which may be implemented utilizing Federal-aid highway funds shall not be subject to discovery or admitted into evidence in a Federal or State court proceeding or considered for other purposes in any action for damages arising from any occurrence at a location mentioned or addressed in such reports, surveys, schedules, lists, or data.

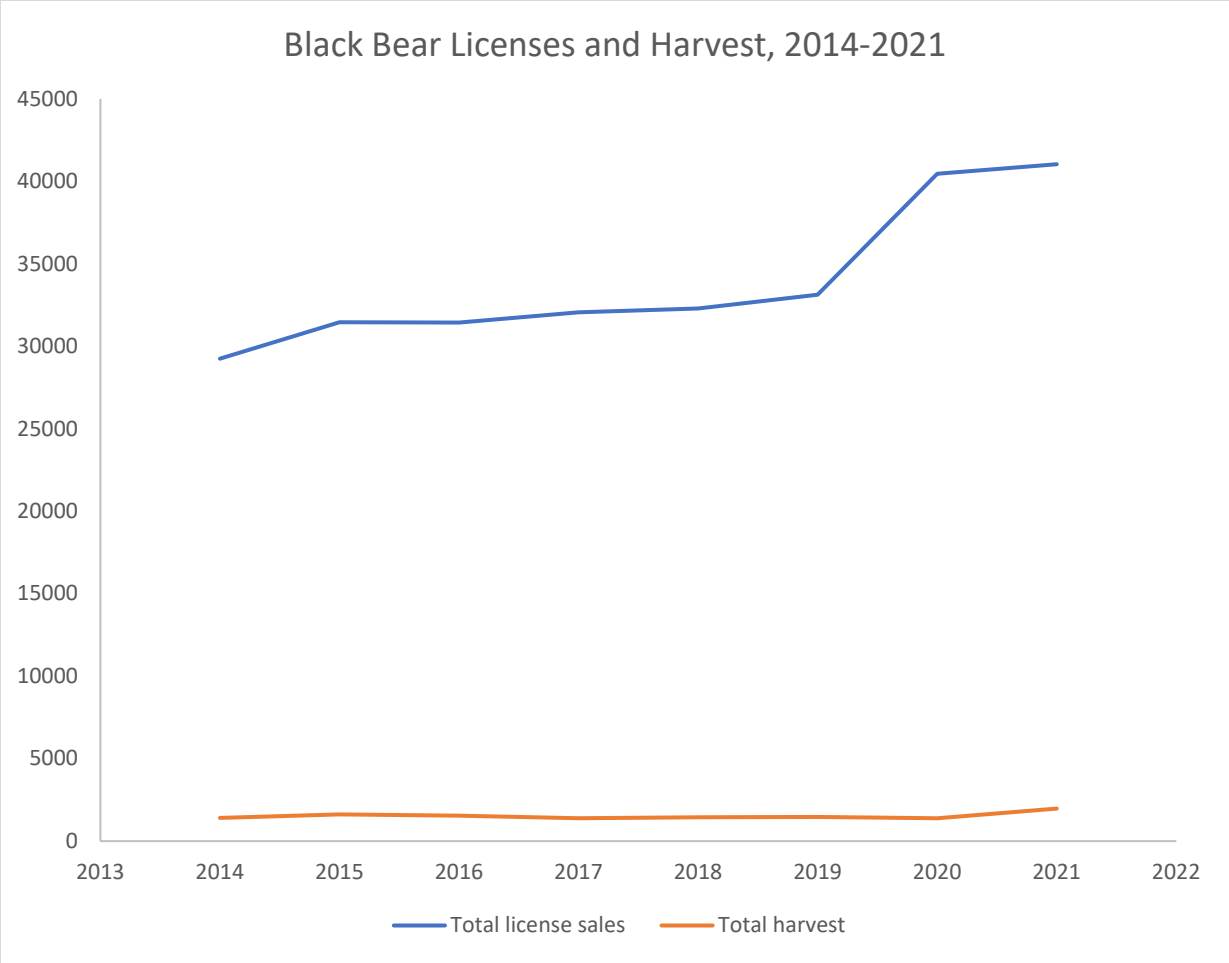


Figure 25. Statewide black bear licenses and harvest for all weapon classes and all permit types in Montana by license year, 2014–2021.

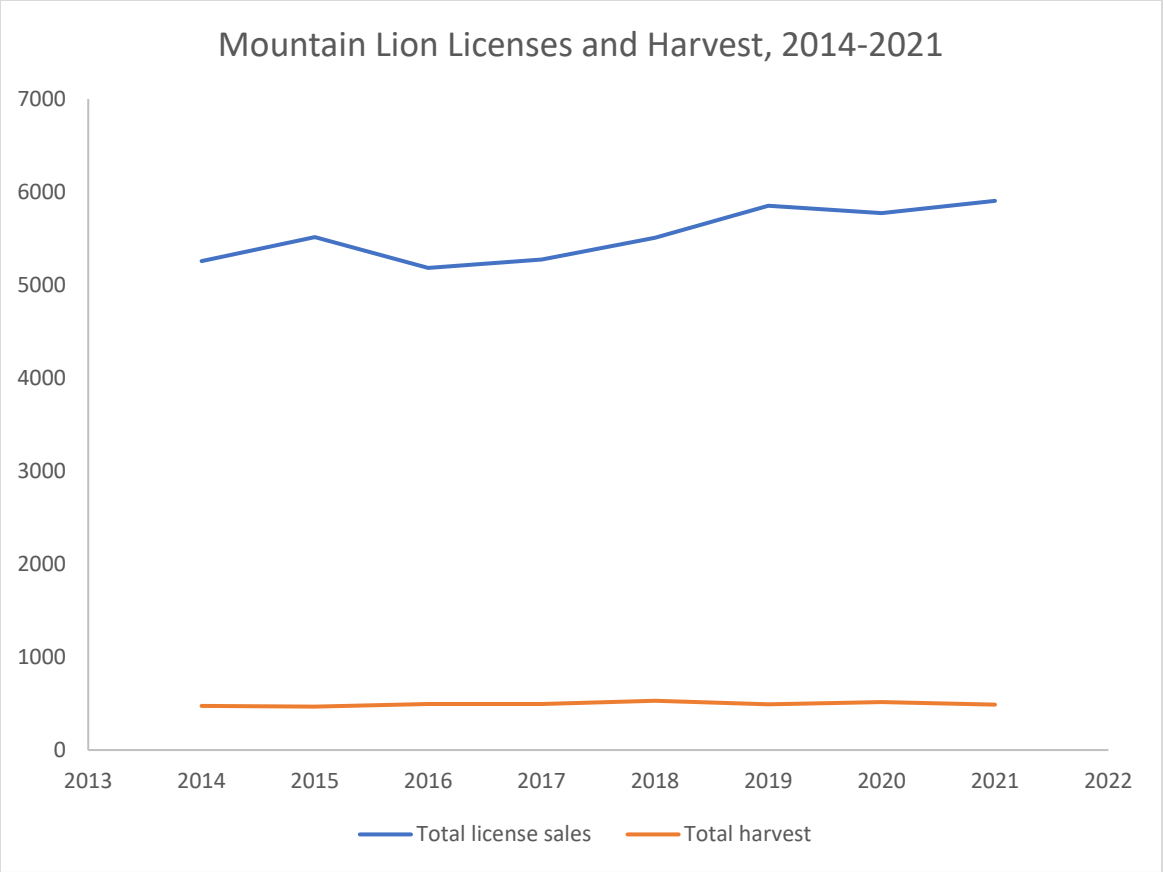


Figure 26. Statewide mountain lion licenses and harvest for all weapon classes and all permit types in Montana by license year, 2014–2021.

Citations for Population Monitoring and Population Status Estimation Section

Akesson, M., L. Svensson, O. Flagstad, P. Wabakken, and J. Frank. 2020. Wolf monitoring in Scandanavia: evaluation counts of packs and reproduction events. Journal of Wildlife Management 86:e22206.

Ausband, D. E., L. N. Rich, E. M. Glenn, M. S. Mitchell, P. Zager, D. A. W. Miller, L. P. Waits, B. B. Ackerman, and C. M. Mack. 2014. Monitoring Gray Wolf Populations Using Multiple Survey Methods. The Journal of Wildlife Management 78: 335–46.

Bell, D. 2022. Genetic Rescue of Isolated Cutthroat Trout. University of Montana.

Bischof, R., C. Milleret, P. Dupont, J. Chipperfield, M. Akesson, H. Broseth, and J. Kindberg. 2019. Estimating the size of the Scandinavian wolf population with spatial capture-recapture and conversion factors - MINA fagrapport 57. 80 pp.

Bravington, M. V., H. J. Skaug, and E. C. Anderson. 2016. Close-Kin Mark-Recapture. Statistical Science 31:259-274.

Bravington, M. V., Grewe, P. M., and Davies, C. R. 2016b. Absolute abundance of southern bluefin tuna estimated by close-kin mark-recapture. Nature Communications 7:1–8.

Crabtree, R. L.. 2023. Preprint. Misleading overestimation bias in methods to estimate wolf abundance that use spatial models. https://www.cabidigitallibrary.org/doi/10.31220/agriRxiv.2023.00215

Delomas, T. A., J. Struthers, T. Hebdon, and M. R. Campbell. 2023. Development of a microhaplotype panel to inform management of gray wolves. Conservation Genetics Resources 15:49-57.

Glenn, B., L. Rich, M. Mitchell. 2011. Estimating numbers of wolves, wolf packs, and breeding pairs in Montana using hunter survey data in a patch occupancy model framework. FINAL REPORT. Montana Cooperative Wildlife Research Unit, 205 Natural Sciences Building, University of Montana, Missoula, MT.

Jamieson I.G. and F. W. Allendorf. 2012. How does the 50/500 rule apply to MVPs? Trends Ecol Evol. 27:578-84.

Kovach, R. P., Leary, R. F., Bell, D. A., Painter, S., Lodmell, A., & Whiteley, A. R. 2022. Genetic variation in westslope cutthroat trout reveals that widespread genetic rescue is warranted. Canadian Journal of Fisheries and Aquatic Sciences, 79(6), 936-946.

Larroque, J., E. Kennedy-Overton, J. Vandel, S. Ruette, S. Devillard. 2023. Using Pedigree relations to inform capture-recapture data for the estimation of census population size. Journal of Wildlife Management 87:e22481.

Marucco, F., M. V. Boiani, P. Dupont, C. Milleret, E. Avanzinelli, K. Pilgrim, M. K. Schwartz, A. vonHardenberg, D. S. Perrone, et al. 2022. A multidisciplinary approach to estimating wolf population size for long-term conservation. Conservation Biology 37:e14132.

Mech. L. D. 2024. Wolf population density: prey biomass limits via intrinsic factors. Wildlife Biology 2024: e01358. doi: 10.1002/wlb3.01358

Miller, D. A. W., J. D. Nichols, J. A. Gude, L. N. Rich, K. M. Podruzny, J. E. Hines, and M. S. Mitchell. 2013. Determining occurrence dynamics when false positives occur: estimating the range dynamics of wolves from public survey data. PLoS ONE 8:1–9.

Milleret, C., P. Dupont, M. Akesson, H. Broseth, L. Svensson, J. Kindberg, and R. Bischof. 2022. Estimates of wolf density, abundance, and population dynamics in Scandinavia, 2013–2022 - MINA fagrapport 77. 35 pp.

Mills, L. S., & Allendorf, F. W. 1996. The one-migrant-per-generation rule in conservation and management. Conservation Biology 10:1509-1518.

Neel, M. C., K. S. McKelvey, N. Ryman, M. W. Lloyd, R. Short Bull, F. W. Allendorf, M. K. Schwartz, and R. S. Waples. 2013. Estimation of effective population size in continuously distributed populations: There goes the neighborhood. Heredity 111:189–199.

Parks, M., K. Podruzny, S. Sells, T. Parks, N. Lance, W. Cole, T. Smucker. S. Bhattacharjee 2023. Montana Gray Wolf Conservation and Management 2022 Annual Report. Montana Fish, Wildlife & Parks. Helena, Montana. 53 pages.

Reed, D. H., J. J. O'Grady, B. W. Brook, J. D. Ballou, and R. Frankham. 2003. Estimates of minimum viable population sizes for vertebrates and factors influencing those estimates. Biological Conservation 113:23-24.

Rich, L.N. 2010. An assessment of factors influencing territory size and the use of hunter surveys for monitoring wolves in Montana. Thesis, The University of Montana.

Rich, L. N., R. E. Russell, E. M. Glenn, M. S. Mitchell, J. A. Gude, K. M. Podruzny, C. A. Sime, K. Laudon, D. E. Ausband, and J. D. Nichols. 2013. Estimating occupancy and predicting numbers of gray wolf packs in Montana using hunter surveys. Journal of Wildlife Management 77:1280–1289.

Riecke, T. V., P. J. Williams, T. L. Behnke, D. Gibson, A. G. Leach, B. S. Sedinger, P. A. Street, and J. A. Sedinger. 2019. Integrated population models: Model assumptions and inference. Methods in Ecology and Evolution 10:1072-1082.

Ryman, N., L. Laikre, and O. Hössjer. 2019. Do estimates of contemporary effective population size tell us what we want to know? Molecular Ecology 28:1904–1918.

Sells, S. N., and M. S. Mitchell. 2020. The economics of territory selection. Ecological Modelling. 438:109329.

Sells, S. N., M. S. Mitchell, D. E. Ausband, A. D. Luis, D. J. Emlen, K. M. Podruzny, and J. A. Gude. 2022. Economical defense of resources structures territorial space use in a cooperative carnivore. Proceedings of the Royal Society of London B: Biological Sciences 289: 20212512.

Sells, S. N., M. S. Mitchell, K. M. Podruzny, D. E. Ausband, D. J. Emlen, J. A. Gude, T. D. Smucker, D. K. Boyd, and K. E. Loonam. 2022. Competition, prey, and mortalities influence group size in a cooperative carnivore. Journal of Wildlife Management 86: e22193.

Sells, S. N., M. S. Mitchell, K. M. Podruzny, J. A. Gude, A. C. Keever, D. K. Boyd, T. D. Smucker, A. A. Nelson, T. Parks, N. Lance, M. S. Ross, and R. M. Inman. 2021. Evidence of economical territory selection in a cooperative carnivore. Proceedings of the Royal Society of London B: Biological Sciences. 228:20210108.

Sells, S. N, K. M. Podruzny, J. J. Nowak, T. D. Smucker, T. W. Parks, D. K. Boyd, A. A. Nelson, N. J. Lance, R. M. Inman, J. A. Gude, S. B. Bassing, K. E. Loonam, and M. S. Mitchell. 2022. Integrating basic and applied research to estimate carnivore abundance. Ecological Applications: e2714.

Stauffer, G. E., N. M. Roberts, D. M. Macfarland, and T. R. VanDeelen. 2021. Scaling Occupancy Estimates up to Abundance for Wolves. Journal of Wildlife Management 85:1410-1422.

Steenweg, R., M. Hebblewhite, J. Whittington, P. Lukacs, and K. McKelvey. 2018. Sampling scales define occupancy and underlying occupancy-abundance relationships in animals. Ecology 99:172-183.

Stenglein, J. L., L. Waits, D. E. Ausband, P. Zager, and C. M. Mack. 2010. Efficient, Noninvasive Genetic Sampling for Monitoring Reintroduced Wolves. Journal of Wildlife Management 74:1050-1058.

Treves, A. and F. J. Santiago-Avila. 2023. Estimating wolf abundance with unverified methods. Academia Biology 1:2-6.

Triall, L. W., C. J. A. Bradshaw, and B. W. Brook. 2007. Minimum viable population size: A meta-analysis of 30 years of published estimates. Biological Conservation 139:159-166.

VonHoldt, B., et al. 2024. Demographic history shapes North American gray wolf genomic diversity and informs species' conservation. Molecular Ecology, 33, e17231.

vonHoldt BM, Stahler DR, Smith DW et al. (2008) The genealogy and genetic viability of reintroduced Yellowstone grey wolves. Molecular Ecology, 17, 252–274.

VonHoldt, B., et al. 2010. A novel assessment of population structure and gene flow in grey wolf populations of the Northern Rocky Mountains of the United States. Molecular Ecology 19:4412-4427.

Waples, R. S. 2023. Practical application of the linkage disequilibrium method for estimating contemporary effective population size: A review. Molecular Ecology Resources doi.org/10.1111/1755-0998.13879.

Waples, R. S. 1998. Separating the wheat from the chaff: patterns of genetic differentiation in high gene flow species. Journal of Heredity, 89(5), 438-450.

Waples, R. S. and O. Gaggiotti. 2005. INVITED REVIEW: What is a population? An empirical evaluation of some genetic methods for identifying the number of gene pools and their degree of connectivity. Molecular Ecology 15:1419-1439.

Welsh, A. H., D. B. Lindenmayer, and C. F. Donnelly. 2013. Fitting and Interpreting Occupancy Models. PlosOne 8: 10.1371/annotation/83cc3ff1-9438-4b1d-abf4-07f378ed558f