

Wolf Status in Michigan
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INTRODUCTION

Wolves have been part of the Great Lakes fauna since the melting of the last glacier and as such are native to the land area known as Michigan. Stebler (1951) indicated that pioneer documents and museum specimens show wolves were once present in all counties of Michigan. Throughout the history of Native Americans living in present-day Michigan, wolves figured prominently in their culture and beliefs. For example, the wolf is a sacred clan animal among the Anishinaabek (Odawa, Ojibwe and Potawatomi people).

Settlers brought their wolf prejudices with them (Lopez 1978). Wolves were viewed as incompatible with human civilization by colonists, which resulted in the persecution of wolves in Michigan as well as the rest of the United States. This practice led to the near extermination of wolves in the contiguous United States. The United States Congress passed a wolf bounty in 1817 in the Northwest Territories, which included what is now Michigan. By the time bounties were imposed in the 1800s, wolves were nearly extirpated from the Southern Lower Peninsula. They were absent from the entire Lower Peninsula (LP) by 1935, if not sooner (Stebler 1944). In the more sparsely settled Upper Peninsula (UP), the decline was less precipitous. In 1956, the population was estimated at 100 individuals in seven major areas in the UP (Arnold and Schofield 1956). By 1973, the Michigan wolf population was estimated at only six animals in the UP. Sporadic breeding and occasional immigration of wolves from more-secure populations in Ontario and Minnesota were postulated as the factors that maintained the small number of wolves in the UP (Hendrickson et al. 1975). It is likely that a few animals persisted in remote areas of the UP and were never completely extirpated from the state.

After being listed in 1966 under the Endangered Species Preservation Act and then under the current Federal Endangered Species Act in 1974, the wolf population in Minnesota began to expand southward from its northern range. In 1975, a pack of wolves occupied a territory that spanned the Minnesota Wisconsin border (Thiel 1993), signifying the beginning of re-colonization of former wolf range in Wisconsin. Since 1975, the wolf population in Wisconsin has grown to more than 1,100 animals occupying suitable habitat in northern and central portions of the state (Wisconsin Department of Natural Resources 2021). In the 1980s, wolves from Minnesota and Wisconsin began to re-colonize the western and central portions of the UP (Thiel 1988, Mech et al. 1995, (Beyer et al. 2009). In addition, wolves from Ontario may have crossed into the UP over ice at Whitefish Bay, along the St. Mary's River, and near northern Lake Huron islands (Jensen et al. 1986, Thiel and Hammill 1988). The beginning of wolf recovery in Michigan was first documented in 1989 when documented reproduction occurred

in the central UP (Beyer et al. 2009). Only one wolf reintroduction was attempted in Michigan. Four wolves from Minnesota were released in Marquette County in March 1974 and all died because of direct human activities between July and November 1974. These wolves did not reproduce and did not contribute to the current wolf population (Weise et al. 1975). The wild wolves that currently occur in the UP are the result of natural immigration and reproduction.

STATUS OF WOLVES

The legal status of wolves in Michigan at the federal and state level has changed multiple times, which impacts the ability of all agencies in the Great Lakes to manage wolves (Table 1). The latest attempt to federally delist wolves became effective in January 2021, but this attempt was also vacated by a U.S. District judge returning wolves to the Endangered Species List in February 2022. Currently, wolves in Michigan are delisted at the state level and listed federally as an endangered species. Accordingly, management authority is at the federal level.

ABUNDANCE AND DISTRIBUTION

Upper Peninsula

Wolves have been found in every county, but wolf density is not uniform across the UP. The wolf population in the UP (excluding Isle Royale) showed mostly steady growth from 1989 to 2011 (Figure 1). From 1994 to 2007, the population grew at an average annual rate of 19%. However, from 2003 to 2007, the average annual growth rate decreased to 12%. The growth rate was expected to decline as the population moved toward the maximum level the UP can sustain (Huntzinger et al. 2005). Since 2011 the wolf population has remained stable ranging from a minimum estimate of 618 to 695 with overlapping 95% confidence limits, suggesting wolves may have reached their carrying capacity in the UP. An estimated minimum of 631 wolves occurred in the UP during the winter of 2022.

Lower Peninsula

In 2004, a female wolf that had been captured and radio-collared in the Eastern UP was captured and killed by a coyote trapper in Presque Isle County. This event represented the first verification of a wild wolf in the LP in at least 69 years. However, a targeted winter track approach based on citizen reports during 2005-2010 failed to indicate the presence of any wolves in the LP. In 2010, 3 young of-the-year canids were captured in Cheboygan County and initially were identified as wolf pups based on dentition, size (especially length of legs and size of the feet and toes) and weight (Wheeldon et al. 2012). Genetic analyses indicated; however, the pups were coyotes rather than wolves. In addition, the analyses found evidence of maternal introgression from a Great Lakes wolf (hybrid heritage from gray wolves and eastern wolves) in their pedigree.

During the 2011 targeted winter track survey, and shortly after the 2015 survey period, tracks consistent with a wolf-like animal were observed in Cheboygan and Emmet Counties, respectively; while track surveys in 2013 failed to produce any evidence of wolves. In 2014,

biologists from the Little Traverse Bay Bands of Odawa Indians captured what appeared to be a wolf on a trail camera and were able to collect a scat sample. DNA analysis of the scat confirmed that the animal was a male wolf. Although it is possible that wolves currently occur in the LP, as of April 2023, no wolves are known to inhabit the LP.

Michigan Wolf Population Estimate

Prior to the winter of 2007, we attempted to count wolves throughout the entire UP. However, as the wolf population increased it became more difficult and time consuming to separate adjacent packs. As a result, we developed and evaluated a sampling scheme to reduce the search area in order to allow more time to accurately count wolves in adjacent territories. This new approach proved to be more efficient, which saved time and associated costs. The new approach uses a geographic stratification and produces an unbiased, precise minimum estimate of total wolf abundance in Michigan's UP. This survey occurs during the winter months (tracking snow) when the population is at its smallest size in the annual wolf population cycle. The winter survey consists of intensive and extensive searches of roads and trails by truck and snowmobile for wolf tracks and other sign (Potvin et al. 2005). The integrity of the minimum population estimate is maintained by using established procedures designed to avoid double-counting of wolves (Huntzinger et al. 2005).

Currently, we are evaluating two other techniques for estimating wolf abundance in the UP. Both are contemporary statistical models (occupancy models), one relying on a similar track survey utilizing a grid system and the other would utilize trail cameras spread across the UP. If successful, both techniques may have some advantages over the current methodology, mainly by decreasing staff time. The camera model will also have the added benefit of producing a less conservative estimate because the cameras can be used outside of the winter months.

Monitoring wolf presence in the Northern Lower Peninsula (NLP) is significantly different because wolves, if present are at such low-density levels, it makes the UP-track survey protocol impractical. Instead, a targeted search approach based on citizen reports of wolves or wolf sign is used to concentrate efforts in areas more likely to have wolves. Because of the possibility of misidentification of tracks in the NLP explained previously in this document, the department should use genetic testing to validate classifications based on appearance or tracks until wolves have re-established themselves in the LP in significant numbers (Wheeldon et al. 2012).

It is important to note that dispersal of wolves to the NLP does not guarantee colonization. Habitat suitability research has suggested that there is suitable habitat for wolves in the NLP (Potvin 2003, Gehring and Potter 2005, Stricker et al. 2019). However, this suitable habitat is fragmented and the ability of wolves to traverse the landscape between habitat patches is unknown (Stricker et al. 2019). While wolves are indeed capable of long-distance dispersal the NLP is isolated from a source population of wolves by the Straits of Mackinac making it difficult for wolf immigration particularly as climate change has decreased the likelihood of a persistent ice bridge connecting the two peninsulas. A 38-year study of ice coverage has shown an overall

71% decrease in total ice coverage on the Great Lakes (Wang et al. 2011). This decrease in ice coverage also extends the ice breaking operations to maintain freighter operations further decreasing the chances of forming a persistent ice coverage at the Straits.

Further confounding the recolonization of wolves in the NLP and potentially the most important factor is the level of public tolerance with large predators in a human-dominated landscape (Mech 1989, Wydeven et al. 2001). Survey results in 2006 found that there is lower tolerance for wolves in the NLP than in the UP (Beyer et al. 2006), and in the latest public attitude study of wolves in Michigan respondents in the NLP expressed a slight preference to not have wolves within their region (MI DNR 2022a). This result is consistent with the other findings that indicate those residents living with wolves are least likely to be accepting of wolves.

Wolf Conflicts

Livestock

Wolves normally select wild ungulates including deer (*Odocoileus spp.*) and elk (*Cervus elaphus*), and secondarily smaller prey such as beaver (*Castor canadensis*) but sometimes kill or injure domestic animals (Newsome et al. 2016). Compared to rates of wolf depredation in Minnesota and Wisconsin, depredation in Michigan has been relatively rare. Approximately 1,000 livestock farms occur in the Upper Peninsula and from 1998 through 2022, 325 wolf depredation events were verified on 106 of those farms (Table 2). The number of wolf-depredation events varies annually and is often influenced by the activity of a single wolf pack. No wolf depredation has been documented in the Lower Peninsula.

Wolves are not the only cause of livestock depredations in the UP. From 2003 through 2022 wolves caused 58% (308) of the documented livestock depredation events (Table 3). Coyotes caused 38% (204) of documented livestock depredation events, with the remaining 4% (23) caused by bears or domestic dogs. Recently there have been years when we have documented more coyote depredation events than wolf events and in 2022 there were just as many wolf depredation events as there were bear depredation events. Also, sometimes the cause of death, particularly with cattle, is not caused by a predator. Young calves can be stillborn or die from nonpredator related causes and be fed on by predators. On rare occasion, the cause of death cannot be determined (B. Roell, Michigan DNR, personal communication). An undetermined cause of death is typically associated with a lack of evidence caused by the later stages of decomposition.

Indemnification

There have been multiple sources of compensation for livestock lost to predators since 1998. However, current compensation was put in place by the Michigan legislature under Public Act (PA) 487 of 2012. Administration of the rules found within PA 487 of 2012 falls with Michigan Department of Agriculture and Rural Development (MDARD). A memorandum of understanding established a cooperative and collaborative relationship between the DNR and

MDARD regarding the process and the functions of each agency while handling depredation claims. This program assists livestock producers by reimbursing them for losses attributable to wolf, coyote, or cougar depredation. For these three species, indemnification rates are the same for each animal included in the claim: 100% of the fair market value, on the date of the appraisal, for the market in which the animal was intended; not to exceed \$4,000.00 for each animal. Starting in 2012 under the law, indemnification for missing animals was available if there was a history of losses to the owner of livestock from wolves as evidenced by a prior payment by the department due to the death or injury of livestock from wolves.

From 1998 through 2022 the State of Michigan has paid almost \$207,000 for losses of livestock from wolves. Compared to other Great Lakes States with wolves the annual compensation payments have been significantly lower in Michigan than in either Minnesota or Wisconsin. There have been multiple years in Minnesota and Wisconsin when yearly totals have been over \$100,000 and in 2011 Wisconsin provided over \$250,000 in just one year. However, the number of livestock present in the UP is approximately 15% of the number present in wolf range in either Wisconsin or Minnesota (Tom Meier, U.S. Fish and Wildlife Service, unpublished data).

Dogs

Since 1996, wolves have killed or injured 157 dogs; approximately half (49%) of these incidents involved bear hounds and roughly 73% involved multiple types of hunting hounds (bear, rabbit/hare, and bobcat). Management of wolf depredation on dogs is generally more limited than for livestock depredation and focuses on prevention. Avoidance of wolves is the best way to minimize conflict, but because wolves are so widespread, total avoidance may not be possible. Although wolves have large territories, they concentrate a lot of activity in specific areas, such as the rendezvous sites. To help hunters and citizens avoid wolf conflicts we have dedicated a page on our website which includes an interactive map of confirmed dog depredations since 2009. We have also included a wolf-dog conflicts section in bear regulations pamphlet. Under PA 487 of 2012, compensation is not provided for the loss of dogs in Michigan.

MANAGEMENT RESPONSE TO DEPREDATION

An integrated approach that incorporates non-lethal and lethal control measures, providing technical assistance on animal husbandry practices, and compensating livestock growers for verified losses has been used to manage wolf depredation in Michigan. Depending on the level of federal protection placed on wolves lethal control may not be an option.

Many techniques can effectively prevent or deter depredation. However, the effectiveness of some techniques may be temporary, and some techniques may fail to work altogether in certain situations. Management of wolf depredation on livestock has included the use of non-lethal and lethal control measures implemented on a case-by-case basis. The Michigan Department of Natural Resources (DNR) takes an incremental approach to addressing wolf-

livestock conflicts scaled by the severity and frequency of conflicts (MI DNR 2022b). Over the years we have found that combination of both lethal and non-lethal methods to be the most effective means of deterring livestock depredation.

Nonlethal

Depredation risk tends to increase with herd size, distance from people and buildings, proximity to thick cover, and livestock carcasses left in the open (Sillero-Zubiri and Switzer 2004, Pimenta et al. 2017, Amirkhiz et al. 2018). Under PA 239 of 1982 livestock must be disposed of within 24 hours after death using the following methods of disposal: burial, burning, composting or rendering. Generally, for farmers in the UP this means burying at least two feet beneath the natural surface of the ground. However, this requirement lacks enforcement, generally is not followed, and predators easily can uncover these carcasses (B. Roell, Michigan DNR, personal communication). Currently the DNR is working with MDARD staff to suggest modifications to PA 239 of 1982 to help mitigate wildlife concerns. The DNR and its designated agents (i.e., USDA Wildlife Services) use many techniques which can be effective at preventing or deterring depredation (e.g., improved husbandry practices, fencing, livestock-guarding animals, scare tactics, and aversive conditioning) (MI DNR 2022a and MI DNR 2022b). Fiscal Year 2023 is the fourth year Congress has allocated funding to the USDA Wildlife Services program specifically for the implementation and further development of nonlethal methods for reducing certain types of human-wildlife conflict. Currently, there is one USDA Wildlife Services employee dedicated to the application of nonlethal deterrents in the UP. This program has been very successful and in fiscal year 2022 no large predator depredations occurred at any of the ten locations enrolled in the program (USDA APHIS 2022).

Lethal

There are few robust studies examining the effect of lethal control of wolves on livestock depredations (MI DNR 2022a). In western states, researchers found full pack removal reduced future depredations compared to no removal of wolves and depredations were influenced by the number of wolves controlled the previous year (Bradley et al. 2015, MI DNR 2022a, Wielgus and Peebles 2014). In the UP, researchers found no difference in efficacy between lethal and nonlethal wolf control for reducing livestock depredations at the section, township, or neighborhood of township scales (Santiago-Avila et al. 2018a, b). However, they noted that there were multiple limitations of the data that were available and recommended rigorous scientific evaluations before implementing interventions.

When wolves are not federally protected, lethal control methods to address livestock or dog conflicts can be implemented by the DNR. Also, in the fall of 2008, PA 290 and PA 318 became Michigan laws. These two PA's allow citizens to use lethal control on wolves that are in the act of killing or wounding livestock or a dog when wolves are not federally protected. When wolves are not federally protected, they are still a protected game species and the taking of a wolf that is not in the act of killing or wounding livestock or a dog is illegal. Additionally,

livestock producers that meet certain requirements can request livestock producer control permits to kill a specified number of wolves on their property (MI DNR 2022c).

As outlined in 6.12.1 of the Michigan Wolf Management Plan (hereafter Wolf Plan), public harvest is another method for mitigating livestock depredation. In 2013, we reviewed our records of conflicts including livestock and pet depredations and human safety issues. Then using guidance in the Wolf Plan, we recommended a wolf hunting season to the NRC, which was approved, and resulted in the harvest of 22 wolves from targeted conflict areas (Table 4). This season was the most conservative hunt for wolves in any of the six states that allowed wolf hunting. However, the laws which reclassified wolves as a game species in Michigan were repealed by voter referendums in November 2014 and shortly after wolves were returned to the federal endangered status, so a 2014 hunt could not occur.

There is scientific uncertainty relative to the use of wolf hunting as a conflict management tool because most wildlife managers do not have experience with this approach for wolves, and none of the other wolf hunts in the lower 48 States have had the same management objectives as the Michigan hunt. However, there are examples where human-wildlife conflicts have been directly reduced by decreasing population density via hunting such as in American black bears (*Ursus americanus*), (Garshelis et al. 2020) and Eurasian lynx (*Lynx lynx*), (Herfindal et al. 2005). There is also a growing body of evidence that animal behavior can be influenced by the perception of the risk of predation (MI DNR 2022a). Unfortunately, no studies have examined the behavioral response of wolves to hunting. However, studies on other species have shown that hunting by humans sometimes alters animal behavior including increasing wariness (MI DNR 2022a). Additionally, in Ontario where wolf hunting and trapping have a long history, wolves are wary of people and rarely display fearless behavior outside of protected areas where human take is prohibited (Brent Patterson, Ontario Ministry of Natural Resources, personal communication). We could not evaluate the effectiveness of using licensed hunters to control wolf conflicts in the UP because of the referendums and wolves returning to federal endangered status after a single season.

Public Wolf Harvest

Although two approaches to public wolf harvest are outlined in the Wolf Plan the public remains highly polarized on wolf management. Most of this consternation surrounds the public harvest of wolves which is perhaps the most divisive and potentially explosive issue in the entire wolf debate (Nie 2003). Members of the public could be authorized to take wolves in the absence of a designated harvest season when wolves are federally delisted with a permit (MI DNR 2022c) and under regulations in PA 290 and PA 318 of 2008. However, a public harvest during a regulated season requires that wolves be both federally and state delisted and classified as game animals in Michigan. Wolves were delisted in Michigan 2009 and PA 382 of 2016 classifies wolves as a game animal and delegates the Natural Resources Commission (NRC) the authority to classify species as game animals. Any public harvest of wolves is biologically complex because the effects of harvest on a wolf population are determined by a suite of

factors, including population size, age and sex structure, immigration and emigration rates, birth rates, and natural and human-induced mortality rates (MI DNR 2022a).

The Wolf Plan separates public wolf harvest into two categories. The first category deals with harvest that addresses a need to reduce wolf-related conflicts. Wolf-related conflicts are generally associated with livestock or hunting dog depredation. However, conflicts such as nuisance behaviors, pet depredation, human safety issues or limiting wild ungulate abundance may also be wolf-related conflicts. This first category is how the DNR developed the 2013 wolf harvest season and is described in more detail under the lethal control section in this document. The second category for a public wolf harvest deals with harvest for reasons other than managing wolf-related conflicts, which would be a form of recreational harvest (e.g., nature appreciation, harvesting a unique animal, supporting DNR objectives, spending time with friends and family, improving or testing skills and abilities, meeting utilitarian needs [e.g., fur, meat] etc.). Many species of wildlife in Michigan are sustainably harvested for reasons other than conflict management and although the public generally supports the use of licensed hunters and trappers to reduce wolf-related conflicts, it is more ambivalent on the issue of a public wolf harvest specifically for recreational purposes (MI DNR 2022a).

In the most recent public attitude survey, it was estimated that nearly half of the Michigan residents who are engaged and interested in wildlife or outdoor activities support a legal, recreational season for hunting wolves in Michigan if biologists and the DNR believe the wolf population could safely sustain such a hunting season (Riley et al. 2022). Previous research has detected general acceptability of a wolf harvest in Michigan (Beyer et al. 2006, Lute et al. 2012) and the current data are consistent in revealing splits among stakeholders and among different areas of Michigan.

Wolf Harvest Strategy

Wolves were officially classified as a Michigan game animal in 2016 under PA 382 (MCL 324.40103) which added the NRC to the entities which can add species to the list of game species and allows the NRC and legislature to establish the first open season for a game species. The legislature retained the sole authority to remove a wildlife species from the list of game species.

The NRC has exclusive authority to enact regulations pertaining to the methods and manner of public harvest of game species. Although authority regarding establishment of a harvest season lies with the NRC, the Wolf Plan offers relevant guidance to make socially and biologically responsible recommendations to the NRC regarding the public harvest of wolves. The DNR is able to set management objectives such as the number of animals that may be harvested and the location where hunting can take place.

Other details such as establishing hunting license fees (MCL 324.43528b) and the establishment of a Wolf Management Advisory Council (MCL 324.43540e) were part of PA 520 of 2012 which

were not subject to the 2014 voter referendum and in 2016 a three-judge appellate ruling found any portions of PA 520 of 2012 not amended shall be deemed to be reenacted, therefore these two items are in place if and when wolves are federally delisted.

There are many steps and hurdles to developing a wolf harvest in Michigan. The biggest hurdle is getting wolves removed from the federal Endangered Species List. This delisting should also be secure before any harvest is attempted in Michigan. Lawsuits, court rulings and legislation will play a pivotal role in the timeline behind any planned harvest. We also don't know when wolves will be delisted, it could be 5 months or 5 years, if it is the latter, it may require the DNR to do a complete review of biological and social data. Even the time of year delisting becomes official will play a role depending on where we are in the population estimate cycle. In general, we believe it would take 9 to 12 months lead time to conduct a wolf harvest season. However, because there are many unknowns the lead time required (if requested by the NRC or through legislation) to develop a season could be lengthier.

The list below details the steps below required to conduct a wolf harvest season, there may be unforeseen items as well.

1. Wolves federally delisted from the Endangered Species List – (USFWS)
 - a. Delisting should be more permanently settled
2. Request for a public wolf harvest season – (NRC)
3. Engage all federally recognized tribal governments in Michigan, as well as provide Consultation with those tribes in the 1836 Treaty Ceded Territory that are party to the 2007 Inland Consent Decree, prior to any potential wolf harvest – (DNR, Tribal governments)
4. Re-convene the Wolf Management Advisory Council – (MCL 324.43540e) – (DNR)
5. Develop a system to allow public input – (DNR)
 - a. In person meetings / online comment period etc.?
6. Review of current scientific literature – (DNR)
7. Review known Michigan biological wolf information – (DNR)
 - a. Current population estimates
 - b. Known causes of wolf mortality
 - c. Wolf conflict information
8. Use guidance in the Wolf Plan to evaluate a potential harvest – (DNR)
 - a. Evaluate conflict situations to determine whether localized reduction of wolf numbers is necessary to manage wolf-related conflicts.

- b. Evaluate the potential impacts of using licensed hunters and trappers to manage local levels of wolf-related conflicts on the local and regional wolf population.
 - c. Evaluate the potential biological effects of a public wolf harvest specifically for recreational or conflict purposes.
 - d. Evaluate the demand for, and public attitudes toward, a public wolf harvest specifically for recreational purposes.
- 9. If biologically sustainable, legally feasible, and socially responsible, develop harvest recommendations for the NRC - (DNR)
- 10. Present harvest recommendations to the Natural Resources Commission and Director of the Department of Natural Resources for their consideration – (DNR)
- 11. Establish season regulations – (NRC)
 - a. Using an adaptive management approach which integrates harvest and biological data to develop regulations to meet goals and objective – (DNR)
 - b. Establish quotas (Director)
- 12. Based on NRC regulations and DNR management objectives, develop a system to implement a public wolf harvest season – (DNR)
 - System considerations:
 - a. Develop hunting zones?
 - b. Lottery system or over-the-counter sales?
 - c. Update license sales software
 - d. Develop a preference point system?
 - e. Call in harvest registration?
 - f. Online harvest registration?
 - g. Phone and/or online open season check system?
 - h. Develop wolf registration accomplishment directive
 - i. Train staff on registration process and biological sample collection
 - j. Distribution of registration supplies
 - k. Hunting and/or trapping guidelines?
 - l. Start the conversation on CITES tag requirements?
 - m. Other?
- 13. Develop, and distribute a wolf harvest regulations summary – (DNR)
- 14. Recommend the develop of an educational information package on the biologically and socially responsible harvest of wolves for our website – (DNR)

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TABLES AND FIGURES

Table 1. Changes to protections on wolves in Michigan at both the state and federal level.

Year	Action
1817	U.S. Congress passed a wolf bounty in the Northwest Territories (included MI).
1838	A wolf bounty was the ninth law passed by the first Michigan Legislature.
1922	Michigan bounties replaced with state paid warden hunters.
1935	Michigan bounties reinstated.
1960	Wolf bounties repealed in Michigan.
1965	Afforded legal protection in Michigan.
1966	Listed as federally endangered under the Endangered Species Preservation Act.
1974	Listed as endangered under Federal Endangered Species Act.
1976	Listed as endangered in the Michigan (state level protection).
2002	Michigan down lists wolves to Threatened (state level protection).
2003	Wolves federally down listed to Threatened.
2005	Federal District court abolished 2003 reclassification (back to Endangered).
2007	Wolves federally delisted.
2008	Federal District court abolished 2007 delisting (back to Endangered).
2009	Wolves delisted in Michigan (state level protection).
2009	Wolves federally delisted.
2009	Federal District court abolished 2009 delisting (back to Endangered).
2012	Wolves federally delisted.
2014	Federal District court abolished 2012 delisting (back to Endangered).
2021	Wolves federally delisted.
2022	Federal District court abolished 2021 delisting (back to Endangered).

Table 2. The number of verified wolf depredation events by livestock type and year in the Upper Peninsula of Michigan 1998 to 2022.

Year	Cattle	Sheep/Goats	Poultry	Cervids	^a Other	Total
1998	3	0	0	0	0	3
1999	1	0	0	0	0	1
2000	2	1	2	0	0	5
2001	3	0	0	0	0	3
2002	4	0	1	0	0	5
2003	11	1	1	0	0	13
2004	7	2	0	2	0	11
2005	2	2	1	0	0	5
2006	8	1	1	0	0	10
2007	12	2	0	0	0	14
2008	10	0	3	0	1	14
2009	9	3	0	0	0	12
2010	43	2	1	0	0	46
2011	32	3	1	0	0	36
2012	31	4	0	0	0	35
2013	11	1	0	0	1	13
2014	23	0	0	0	0	23
2015	9	1	0	0	1	11
2016	22	2	0	0	0	24
2017	5	0	0	0	1	6
2018	6	0	0	0	0	6
2019	5	0	1	0	0	6
2020	5	1	0	0	0	6
2021	11	0	0	0	1	12
2022	5	0	0	0	0	5
Total	280	26	12	2	5	325

^aOther livestock include two horses, two pigs and rabbits.

Table 3. Livestock depredation events in the Upper Peninsula of Michigan by predator from 2003 to 2022.

Year	Wolf	Coyote	Bear	Domestic Dog	Total
2003	13	1	0	0	14
2004	11	4	0	2	17
2005	5	7	1	0	13
2006	10	8	0	2	20
2007	14	7	0	0	21
2008	14	12	0	0	26
2009	12	11	0	0	23
2010	46	12	4	0	62
2011	36	22	2	0	60
2012	35	16	2	0	53
2013	13	11	0	0	24
2014	23	16	2	0	41
2015	11	5	0	0	16
2016	24	9	0	0	33
2017	6	18	0	1	25
2018	6	8	0	0	14
2019	6	18	0	1	25
2020	6	8	0	0	14
2021	12	9	0	1	22
2022	5	2	5	0	12
Total	308	204	16	7	535

Table 4. Details of the 2013 Michigan wolf harvest season.

Regulation	Action
Season Length	November 15 th to December 31 st or until targeted harvest is reached.
Hunt Zones	3-Units were created in areas of concentrated wolf conflicts.
Quota	43 total wolves (Unit A – 16, Unit B – 19, Unit C – 8).
Reporting	Harvest must be reported by phone on the day the wolf was taken.
Registration	Mandatory in-person registration within 72 hours.
Season Status	Hunters must call each day to check season status.
License Cost	Resident \$100, Nonresident \$500 (set by MCL 324.43528b).
Available Tags	1,200 tags were available for purchase from Aug. 3 to Oct. 31 or until the license quota was met.
Method of Take	Hunting only.
Other	All other Michigan hunting regulations still apply.

FIGURE 1. Minimum winter estimates of the number of wolves in Michigan’s Upper Peninsula (excluding Isle Royale), 1989–2020. Prior to 2007, the entire Upper Peninsula was searched; starting in 2007, a stratified sampling plan was used. Error bars represent the 95% confidence limits on survey estimates from 2007-2022.

