

# Western Great Lakes Distinct Population Segment of the Gray Wolf

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**2012-2014 Post Delisting Monitoring Annual Report**

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## Introduction

Under section 4(g) of the Endangered Species Act (Act), the U.S. Fish and Wildlife Service (USFWS) is to monitor, for a minimum of five years, any species that is delisted due to its recovery. In February 2008 the USFWS completed a plan to carry out the required monitoring for the Western Great Lakes Distinct Population Segment of the Gray Wolf (*Canis lupus*) (DPS) (U.S. Fish and Wildlife Service 2008); implementation of the monitoring plan was delayed, however, until delisting became effective in January 2012 (Federal Register 76:81666-81726).

This is the first of five annual reports planned by the USFWS to summarize the best available information regarding the status of gray wolves in the DPS. We plan to complete subsequent reports at approximately 12-month intervals from this report's completion date. This report covers the major data categories described in the post-delisting monitoring plan (U.S. Fish and Wildlife Service 2008:8).

The USFWS population recovery goals for gray wolves as identified in the 1992 revised recovery plan were 1251-1400 for Minnesota and 100 combined for Wisconsin and Michigan (U.S. Fish and Wildlife Service 1992). At the time of delisting, the best available population estimates were 2,921 for Minnesota and 1,469 for Michigan and Wisconsin combined, excluding Isle Royale National Park.

In the post-delisting monitoring plan the USFWS described certain circumstances that might be evidence of a serious problem with gray wolves in the DPS (U.S. Fish and Wildlife Service 2008: 10-11):

- A decline that reduces the combined Wisconsin-Michigan (excluding Isle Royale and the Lower Peninsula) late winter wolf population estimate to 200 or fewer wolves;<sup>1</sup>
- A decline that brings either the Wisconsin or the Michigan (excluding Isle Royale and the Lower Peninsula) wolf estimate to 100 or fewer wolves; and,
- A decline that brings the Minnesota winter wolf population point estimate or lower end of the 90% confidence interval to 1500 or fewer wolves.

By themselves these may not necessarily lead to a Federal regulatory action, but the USFWS will investigate the underlying cause, the likely duration of the decline, and other data relevant to wolf population viability in the DPS. Information obtained as a result of its investigations will help the USFWS determine if a proposal to relist, an emergency relisting, or other action may be warranted.

In addition to evaluating the most recent population estimates, the USFWS also stated in the post-delisting monitoring plan that it would evaluate the potential impact of any of the following events on the conservation of the DPS:

- A rapid and large decline (for example, 25 percent or more from the previous year) in the late winter wolf population estimate for Wisconsin or Michigan;

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<sup>1</sup>To calculate the total number of wolves in Michigan and Wisconsin, the Service will assume that the number of wolves in either state is equal to the lower end of the 90% confidence interval or, in the absence of any confidence intervals, the minimum value of the estimated range.

- Any wolf population decline in Wisconsin Zones 1 and 2 (with zone boundaries specified in the 1999 wolf management plan) or the Upper Peninsula of Michigan of three years or more in duration;
- A substantial and widespread increase in mortality from known or unknown causes;
- Evidence of a new wolf disease or substantial increase in virulence of a previously known wolf disease, even in the absence of noticeable demographic impacts on the wolf population;
- A substantial decline in the wolf prey base across a large portion of the occupied wolf range in the DPS; and,
- A significant adverse change in wolf, wolf prey, or wolf habitat management practices or protection across a substantial portion of the occupied wolf range in the DPS.

## **Methods**

In August 2012, in preparation for this first annual report, USFWS contacted the natural resource agencies in Michigan, Minnesota, and Wisconsin and requested updated information regarding the status, conservation, and management of gray wolves in their respective states by August 2013. Each state provided information on the most recent statewide population estimate, results of hunting and trapping seasons, wolf depredation incidents, and related information. We also reviewed any relevant information available for Illinois, Indiana, Iowa, North Dakota, and South Dakota, which lie partially within the DPS boundaries. When data from the 2013 hunting and trapping seasons became available for Michigan, Minnesota, and Wisconsin and from the 2013-2014 winter population surveys, these data were also incorporated into the report.

USFWS also requested data, on a voluntary basis, from all tribal governments in the range of the DPS (App. A) and from representatives of the following management areas, national wildlife refuges, national forests, and national park units within the DPS: Camp Ripley, Minnesota National Guard; Chequamegon-Nicolet National Forest; Chippewa National Forest; Hiawatha National Forest; Ottawa National Forest; Superior National Forest; Agassiz National Wildlife Refuge; Necedah National Wildlife Refuge; Tamarac National Wildlife Refuge; and, Voyageurs National Park.

The USFWS worked with the leader of the former Eastern Timber Wolf Recovery Team, Dr. Rolf Peterson, to form a team for the purpose of reviewing drafts of the USFWS annual post-delisting monitoring reports. The members of the review team, to whom drafts of the report were provided, are shown in Appendix B. A draft of this report was submitted to this team and USFWS reviewed comments from members of the team before completing the report. Some information that warranted inclusion in the report was received after the team conducted its review, so it should be clear that the USFWS is responsible for the final contents of the report.

## **Population Estimates, Pack Numbers and Occupied Area**

Estimates of the numbers of wolves within the boundaries of the three states that comprise the core of the DPS provide the fundamental information for assessing the species' status in the DPS. These estimates

reflect the size of the population at its annual minimum – before pups are born and before numbers rebound from mid-winter lows.

### **Michigan**

Numbers of gray wolves in Michigan have changed the least since delisting among the three states that comprise the core range for wolves in the DPS, but packs are still confined to the state's Upper Peninsula. The population estimate for Michigan during the winter of 2012-2013 was 658 wolves (+/-56, 95% confidence interval) in 126 packs with an average pack size of 5.2 (Michigan Department of Natural Resources (DNR), *in litt.*). The estimate declined slightly to 636 (+/-42, 95% confidence interval) during the winter of 2013-2014 (A. Bump, Michigan DNR, pers. comm.). These estimates represented 4% and 7% decreases, respectively, from the 2011-2012 winter estimate of 687, but the 95% confidence intervals for all years overlap (Michigan DNR, *in litt.*).

Michigan DNR reported no information to suggest any change in the extent of the state occupied by wolves. Gray wolves have been documented intermittently in the northern Lower Peninsula of Michigan since 2004 (U.S. Fish and Wildlife Service 2011), but a survey for wolf sign conducted there in 2013 found no indication of wolf presence. That is consistent with other targeted surveys of the Lower Peninsula conducted since 2005 (Michigan DNR, *in litt.*; U.S. Fish and Wildlife Service 2011).

### **Minnesota**

Since delisting became effective, Minnesota DNR has conducted two statewide wolf population surveys and two hunting and trapping seasons. The survey conducted during the winter of 2012-2013 was the first since 2007-2008. Minnesota DNR repeated the statewide survey during the winter of 2013-2014 and plans to again estimate the statewide population in the winter of 2014-2015 (Erb et al. 2014, p. 1). Below we first present the results of the 2012-2013 surveys and seasons and then summarize data from 2013-2014.

The 2012-2013 population estimate of 2,211 wolves in Minnesota reflected a 24% decline (about 700 fewer wolves) since the 2007-2008 survey, although the 90% confidence intervals for the two estimates overlapped (Erb 2008, Erb and Sampson 2013). Despite the overlap in confidence intervals, Erb and Sampson (2013) identified several factors to support the contention that the decline was real – prey density declined between the two periods; pack territories were larger; average pack size decreased; and, 413 wolves were taken during the 2012-2013 hunting and trapping season, which immediately preceded the survey. In addition, 295 wolves were killed for depredation control in 2012, the highest for any year on record (Erb and Sampson 2013).

There were some shifts in wolf distribution between 2008 and 2013, but the total area occupied by wolves in Minnesota changed little between the two surveys. The southern and western edge of the species' distribution in Minnesota appears to have expanded by about 7.6% between 2007 and 2013, but total occupied range was "1% below results from the 2007 survey" due to a decrease in occupied townships in portions of the state (Erb and Sampson 2013). To estimate occupied range, Erb and Sampson (2013) assumed that wolves occupied a township if it contained observations of a pack (i.e., >1 animal observed together) or, in the absence of wolf observations, if road density was <0.7 km/km<sup>2</sup> and human density was <4/km<sup>2</sup>, or if road density was <0.5 km/km<sup>2</sup> and human density was <8/km<sup>2</sup>.

The results of the statewide survey conducted during the winter of 2013-2014 indicated that the decline in numbers documented by the previous year's survey did not continue. To arrive at a new statewide estimate, Erb et al. (2014) assumed that occupied range did not change from 2012-2013. The two other factors that provide the basis for the statewide population estimate – average pack size and territory area – changed little from 2012-2013. The 2013-2014 Minnesota population estimate was 2,423 wolves with a 90% confidence interval ranging from 1,935 - 2,947 wolves. The 90% confidence intervals for the 2012-2013 (1,652 - 2,640) and 2013-2014 surveys overlapped considerably, suggesting that there was no meaningful change in wolf numbers between the two surveys.

A substantial decrease in human caused mortality between 2012 and 2013 likely played a significant role in the lack of any further decline in wolf numbers. The numbers of wolves killed by hunters and trappers and the numbers taken for depredation control both declined substantially. During the 2013-2014 hunting and trapping seasons in Minnesota 238 wolves were taken, down from 413 during the previous year's seasons (Minnesota DNR, unpubl. data). Likewise, after a record high of 295 wolves were taken for depredation control in 2012-2013, that figure declined to 127 in 2013-2014 (Minnesota DNR, unpubl. data).

### **Wisconsin**

After delisting, numbers of wolves in Wisconsin changed little initially until an increase in human-caused mortality in 2013 resulted in the first population decline in the state since 1993 (Wiedenhoeft et al. 2014). In April 2013, the minimum statewide wolf population in Wisconsin was estimated to be 809-834 – a slight decrease from the 2011-2012 estimate of 815-880 (Wydeven et al. 2012, MacFarland and Wiedenhoeft 2013). In April 2014, however, the number of wolves in Wisconsin fell to an estimated 660-689 – an approximate 18% decline since the previous year (Wiedenhoeft et al. 2014). Take by trappers and hunters increased from 117 in 2012 to 257 in 2013 (Wiedenhoeft et al. 2014). The increase in harvest (140) was nearly equal to the approximate decline in wolf numbers ( $\approx 147$ ). For the 2014-2015 season, the Wisconsin Natural Resources Board reduced the quota for state licensed hunters and trappers to 150 (Wiedenhoeft et al. 2014).

Trends in numbers of packs, pack sizes, and sizes of pack territories all reflected the decline in overall wolf numbers since delisting. The estimated number of packs in Wisconsin was essentially unchanged between 2012 (213) and 2013 (214), but along with overall wolf numbers it dropped to 197 in 2014 (Wydeven et al. 2012, MacFarland and Wiedenhoeft 2013, Wiedenhoeft et al. 2014). Mean pack size during the winter of 2012-2013 was about 3.8, but fell to about 3.3 in 2013-2014 (Wiedenhoeft et al. 2014)(MacFarland and Wiedenhoeft 2013). Estimated mean territory size – based on data collected from 32 (2011/2012) and 40 (2012/2013) packs, respectively – increased by about 10% from 101 square kilometers in 2012 to 112 square kilometers between 2012 and 2013, although that difference may not be statistically significant (Wydeven et al. 2012, MacFarland and Wiedenhoeft 2013). Estimated territory size increased again in 2014 to about 120 square kilometers (Wiedenhoeft et al. 2014).

Wolves appear to have now saturated the high quality habitat in Wisconsin and the statewide population may decline unless human caused mortality falls to at least about 22% (Stenglein 2014). Annual rates of human caused mortality have exceeded 25% since 2010.

## **Red Lake Reservation**

Red Lake DNR (J. Huseby, pers. comm. 2014) also provided specific population estimates for Red Lake, as follows: “Diminished Reservation”: 7-8 packs/30 individuals; Restored Ceded Lands: 6 packs/36 individuals; Northwest Angle: 3-4 packs/24 individuals.

## **Mortality Data**

### **Core Range of DPS - Michigan, Minnesota, and Wisconsin**

For each of the states in the core range of the DPS, we summarize mortality data that has been reported since delisting. Much of the information on wolf mortality, especially in Minnesota and Wisconsin, now comes from the numbers of wolves taken by hunters and trappers or from lethal control to prevent livestock depredation. Minnesota and Wisconsin have each completed two hunting/trapping seasons since delisting and Michigan has completed one.

When interpreting mortality data collected from a variety of sources it is important to be aware that some sources of mortality are likely to be underreported. Only a small proportion of wolves are captured and fitted with radio-collars. Therefore, most mortality data is from uncollared wolves. Stenglein (2014) in her recently completed dissertation work at University of Wisconsin looked at estimates of mortality causes based on data collected from collared and uncollared wolves. She found that estimates that rely on uncollared wolves are likely to underestimate natural mortality and mortality caused by illegal take and likely overestimate the proportion of overall mortality that is caused by legal take and vehicle strikes.

### **Michigan**

Before Michigan DNR implemented its first post-delisting hunting season in 2013, it recorded 73 gray wolf mortalities between the effective date of delisting, January 27, 2012, and June 30, 2013 (Michigan DNR, *in litt.*). Among those mortalities, about 47% were related to legal control of depredating or threatening wolves and about 19% and 18% of the mortalities, respectively, resulted from illegal take or vehicle strikes. The remaining mortalities were ascribed to natural or unknown causes.

During the 2013 Michigan hunting season, which ran from November 15 to December 31, hunters took 23 wolves in three management units. The target harvest for the three units combined was 43 (Michigan DNR. “Wolf Season Status.” *Wolves in Michigan*. Michigan DNR, 3 January 2014. Web. Accessed 13 Jan. 2014.).

### **Minnesota**

Mortality caused by hunting and trapping and depredation control actions declined substantially in Minnesota between the 2012-2013 and 2013-2014 reporting periods. In 2012-2013, hunters and trappers killed 413 wolves during Minnesota’s first regulated wolf hunting and trapping season and the number of wolves killed for depredation control reached a record level of 295 (Stark and Erb 2013; Minnesota DNR, unpubl. data 2014). In 2013-2014, harvest by hunters and trappers fell to 238 after Minnesota DNR decreased the targeted harvest from 400 to 220 and the number of wolves taken for depredation control fell to 127 (Minnesota DNR, unpubl. data 2014).

Hunters were substantially less likely to take a wolf than persons holding a license to trap wolves during each of the two wolf seasons in Minnesota. About 4.8% and 4.1% of hunters were successful in 2012 and

2013, respectively, whereas 29.4% and 19.5% of trappers took wolves (Stark and Erb 2013; Minnesota DNR, unpubl. data 2014). Sex ratios were approximately equal, but slightly skewed towards females, which comprised 51% and 53% of the wolves taken in 2012 and 2013, respectively. Among the females taken, 30% and 23% of females had bred in the previous summer in 2012 and 2013, respectively (Stark and Erb 2013; Minnesota DNR, unpubl. data 2014).

### **Wisconsin**

Wolf mortalities detected by Wisconsin DNR during the April to April reporting periods of 2012-2013 and 2013-2014 increased from 230 to 364 between 2013 and 2014 (MacFarland and Wiedenhoef 2013, Wiedenhoef et al. 2014). These levels of detected mortality represented 28% and 45% of the previous late winter statewide population estimates in the two years, respectively. All sources of documented mortality were similar or declined between the two years except for harvest by hunters and trappers. Illegal killing was the only of the mortality sources that declined among the 364 detected mortalities in 2013-2014 – from 21 in 2012-2013 to 11 in 2013-2014. This may be misleading, however, because human caused mortality may be higher due to unreported illegal take (Stenglein 2014). Moreover, among the eleven radio-collared wolves for which cause of death could be determined in 2013-2014, 64% were illegally killed (Wiedenhoef et al. 2014). Illegal take in Wisconsin appears to be concentrated in November when 43% of the illegal killings of wolves occurred between 1979 and 2012 (Stenglein 2014).

Of the 257 wolves harvested during the 2013 season, 70% were trapped with foothold traps and 30% were killed by hunters (Wisconsin Department of Natural Resources 2014). Among the 77 wolves harvested by hunters, 35 were hunted with the aid of dogs. No wolves were harvested with the use of cable restraints. Take of wolves for depredation control changed little between the two time periods – 64 in 2012-2013 and 65 in 2013-2014.

Harvest by hunters and trappers is disproportionately distributed among the six zones established by Wisconsin DNR (Wisconsin Department of Natural Resources 2014). The proportion of the winter wolf population that was harvested within each zone varied from 19% to 88%. The highest proportion was in Zone 6, which comprises a large and varied area of relatively low wolf density. The lowest proportions of wolves harvested were in the two northernmost zones, where about 19% and 23% of wolves were harvested, respectively.

During the 2012-2013 ‘April to April’ reporting period, at least one-third (21 of 63; 33%) of radio-collared wolves in Wisconsin died, a figure that was reported as “higher than historic averages” (MacFarland and Wiedenhoef 2013). Causes of mortality among radio-collared wolves were illegal take (7); legal harvest (4); vehicle strike (4); depredation control (4); intra-specific aggression (1); and, unknown (1) (MacFarland and Wiedenhoef 2013). In 2013-2014, 12 of 43 radio-collared wolves (28%) died – causes of death were illegal take (7); hunting or trapping (2); vehicle collision (1); and, mange (1).

## **States in DPS Outside of Gray Wolf Core Range**

### **Illinois**

One gray wolf mortality was recorded in the portion of Illinois within the DPS since delisting. In March 2013, a female wolf that had been radio-collared in Wisconsin was found dead in Jo Daviess County, which is about 170 miles WNW of Chicago (University of Illinois Extension. “Wildlife Directory: Gray Wolf.” *Living with Wildlife*. University of Illinois Extension. Web. Accessed 13 Jan. 2014.).

## **North Dakota**

Since delisting, one gray wolf death has been recorded within the DPS boundary in North Dakota. A one-year-old male was killed by a deer hunter in Richland County, which is in the state's southeastern corner (S. Tucker, pers. comm. 2014).

## **Native American Reservations**

Most tribal natural resource agencies that responded to our request for information provided copies of draft or final wolf management plans, but did not provide information on wolf mortality. The Red Lake Department of Natural Resources did provide some information on wolf mortality, which is summarized below.

### **Red Lake Reservation**

Five of the ten gray wolves captured and fitted with radiocollars since delisting by the Red Lake DNR died within one year of being collared, but none were killed during the State of Minnesota's hunting or trapping seasons (J. Huseby, Red Lake Department of Natural Resources, pers. comm. 2014). Three died of unknown causes and one each died as a result of a vehicle collision and a depredation control action (J. Huseby, pers. comm. 2014).

## **Disease or Parasite Occurrence in Wolves**

There have been no indications that diseases or parasites of wolves have increased in prevalence or virulence since delisting. None of the 67 wolves necropsied by the Michigan DNR between the effective date of delisting, January 27, 2012, and June 30, 2013 had evidence of disease, although five (7%) had mange (Michigan DNR, *in litt.*). None of the 22 wolves harvested in Michigan's 2013 season or the 25 wolves captured and radio-collared during 2013 showed signs of mange (Michigan DNR, unpublished data). Among the wolves examined in Wisconsin during a similar period (27 January 2012 to 14 April 2013), symptoms consistent with mange were recorded in 9.8% of 133 dead wolves and in 8.0% of 25 research captures (MacFarland and Wiedenhoef 2013) – in 2013-2014, the death of one of eleven radio-collared wolves was ascribed to mange (Wiedenhoef et al. 2014). Wisconsin DNR examined 17 live-captured wolves and 107 wolves that died of non-harvest related causes and found signs of mange on 6% of the 124 wolves (Wiedenhoef et al. 2014). In Minnesota, 14% of the wolves killed during the 2012 hunting and trapping seasons had evidence of mange (Erb and Sampson 2013). At Voyageurs National Park one of 21 wolves captured in 2012-2013 “appeared to be afflicted with sarcoptic mange” (Olson and Windels 2014). A wolf in the VNP study that was killed by other wolves also tested positive for Lyme disease, canine distemper virus, canine parvovirus, and west Nile virus (Olson and Windels 2014). The single gray wolf collected in North Dakota since delisting “tested negative for both rabies and parvovirus” (S. Tucker, pers. comm. 2014).

## **Verified or Probable Depredation Incidents and Follow-up Actions**

Actions to control wolf depredation of domestic animals occurred in Minnesota, Michigan, and Wisconsin. In Michigan between the effective date of delisting, January 27, 2012, and June 30, 2013, 50 depredation incidents were recorded and 26 wolves were killed (Michigan DNR, *in litt.*). During the same time period in Wisconsin, 66 livestock and 10 non-livestock depredation incidents were recorded and in response, 84 wolves were killed – 64 of those were killed during the April 2012 to April 2013

timeframe, as reported above for Wisconsin (MacFarland and Wiedenhoef 2013). During the 2013-2014 ‘April to April’ reporting period, 66 wolves were killed in Wisconsin for depredation control (Wiedenhoef et al. 2014). In Minnesota, verified complaints of wolf depredation dropped from 122 in 2012 to 70 in 2013 (Minnesota DNR, unpubl. data 2014). Numbers of wolves killed for depredation control also fell – from a record high number of 295 in 2012 to 127 in 2013.

## **Changes to Regulatory Mechanisms**

Following is a summary of regulatory changes that have occurred during the monitoring period, with a focus on hunting and trapping seasons that have been implemented by the three states that encompass the core wolf range in the DPS. We also provide a summary of regulatory changes adopted by some Native American governments.

### **Michigan**

Upon delisting of the DPS under the Endangered Species Act (ESA), Michigan 2008 Public Act 290 and 2008 Public Act 318 became effective and the two laws gave livestock and pet owners the ability to take wolves in the act of depredating livestock and pets (Michigan DNR, *in litt.*). In addition, 2012 PA 520 designated wolves as a game species, established the first season, set wolf hunting license fees, and established penalties for violations. After PA 520 was suspended due to a statewide referendum to block its implementation, additional legislation was passed in 2013 (2013 PA 21) that gave Michigan’s Natural Resources Commission (NRC) the ability to designate game species. The NRC then added wolves to the game species list and approved a limited harvest season in three areas of the Upper Peninsula.

Three Wolf Management Units were established in the Upper Peninsula for the 2013 hunting season with target harvests of 16, 19, and 8 wolves, respectively. A wolf hunting license (\$100/\$500 for residents/nonresidents) allowed the take of one wolf by firearm, crossbow, or bow and arrow on public or private lands. The season opened November 15 and ran until December 31. Hunters were required to check daily by phone or online to determine whether the management unit they hunted was closed and to report successful harvest by phone on day of harvest.

As this report was being finalized, Michigan DNR had not yet been granted the authority to carry out a wolf season in 2014 (A. Bump, pers. comm. 2014).

### **Minnesota**

In 2011, following delisting, the Minnesota State Legislature authorized the Minnesota DNR to implement a wolf season after the removal of wolves from the list of federally threatened species (Stark and Erb 2013). In 2012 the legislature further clarified the Minnesota DNR’s authority to implement a wolf season and required that it start no later than the start of deer firearms season each year (Stark and Erb 2013). Minnesota DNR divided the season into three segments – two for hunting and one for trapping – with a statewide harvest target of 400 divided among three geographic zones (Stark and Erb 2013).

After the statewide population declined to approximately 2,211 in 2013, Minnesota DNR reduced the target quota for the 2013-2014 season to 132 and to 120 for the 2014-2015 season (Erb and Sampson 2013; “Wolf hunting and trapping” Wolf hunting: Minnesota DNR. Minnesota DNR, 29 September

2014. Web. Accessed 29 Sept. 2014.). Licenses for the 2013-2014 season were \$30.00 for Minnesota residents and \$250.00 for non-residents with a bag limit of one wolf (Minnesota Department of Natural Resources 2013). Hunting was allowed with firearm or bow and arrow; traps and snares were allowed during the trapping season. In 2013, early season hunting opened on November 9 and lasted in one zone until November 24. Late season hunting and trapping ran from November 30 until January 31, 2014. Hunters and trappers were responsible for tracking season progress and closure of any season or zone by phone or by checking the Minnesota DNR wolf season harvest website (Minnesota Department of Natural Resources 2013).

## **Wisconsin**

In April 2012 Wisconsin Act 169 was enacted, which classified wolves as a game species and directed Wisconsin DNR to establish a harvest season. Legal harvest methods specified in the law include the use of electronic calls, bait, hounds, foothold traps, and cable restraints. Wisconsin DNR established harvest quotas per zone with an ultimate objective of reducing statewide wolf numbers to 350 wolves outside native American reservations (MacFarland and Wiedenhoef 2013).

The 2013-2014 wolf season in Wisconsin was scheduled to run from October 15 to February 28, but ended on 23 December when quotas were met in each zone (Wisconsin DNR. “Wolf hunting and trapping.” Wisconsin DNR. 5 March 2014. Web. Accessed 5 March 2014). Although the final zone was closed on 23 December, the actual harvest of 257 was below the statewide quota of 275 (Wisconsin Department of Natural Resources 2014). License fees were \$49.00 for residents of Wisconsin and \$251.00 for non-residents and permitted methods of hunting included firearm, bow and arrow, and crossbow; regulations also allowed the use of dogs to track or trail wolves from Dec. 2, 2013 until the last day of season (Wisconsin Department of Natural Resources 2013). For the 2014-2015 season, the quota for take of gray wolves by state-licensed hunters or trappers has been set at 150 (Wiedenhoef et al. 2014).

In July 2014 a Wisconsin Court of Appeals judge ruled that Wisconsin DNR may proceed with rules that would allow hounds may be used to track and trail wolves outside of the hunting season (Wisconsin Court of Appeals District IV Decision Dated and Filed July 10, 2014; Appeal No. 2013AP902). Trapping, including the use of cable restraints, is also allowed in Wisconsin (Wisconsin Department of Natural Resources 2013) and all persons taking a wolf were required to notify the DNR by phone within 24 hours (Wisconsin Department of Natural Resources 2013).

## **Bad River Band of Lake Superior Tribe of Chippewa Indians**

In April 2013, the Bad River Band of Lake Superior Tribe of Chippewa Indians adopted its Ma’ingan (Wolf) Management Plan, in which it established the gray wolf as a tribally protected species upon federal delisting (Hill 2013). In the plan, the Bad River Tribe established a minimum goal for the reservation of at least two gray wolf packs consisting of no fewer than three wolves each. On the reservation, lethal control of wolves may occur during the act of depredation, but the plan clearly emphasizes avoidance and mitigation of wolf-human conflicts where feasible.

## **Fond du Lac Band of Lake Superior Chippewa**

Fond du Lac Band of Lake Superior Chippewa plans to use non-lethal means whenever feasible to address depredation of livestock by wolves, although lethal control may occur. Individuals may use lethal force on any wolf observed “in the act of stalking, attacking, or killing livestock, a guard animal or a

domestic pet under the supervision of the owner” and must report any such incident within 48 hours to Fond du Lac Resource Management Division (Howes and Schrage 2012). Persons may also harass wolves within 500 yards of people, buildings, dogs, livestock, or other domestic pets or animals, to discourage wolves from contact or association with people and their animals. The means of harassment are not defined, but may not include lethal control (Howes and Schrage 2012). Hunting or trapping wolves outside of these situations is prohibited (Howes and Schrage 2012).

## **Red Lake Nation**

There has been no change with regard to wolf management in the Red Lake Nation, which remains a wolf sanctuary, per Tribal Council Resolution and Red Lake’s Wolf Management Plan (Red Lake Department of Natural Resources 2010).

## **Law Enforcement Investigations of Wolf Mortality**

During this monitoring period there were fourteen active cases under investigation involving the illegal take of wolves in Michigan (Michigan DNR, *in litt.*). In Wisconsin, population monitoring and law enforcement efforts detected 24 illegally killed wolves during the period of April 15, 2012 to April 14, 2013 (MacFarland and Wiedenhoef 2013). Investigations were conducted in 35 cases and 15 citations were issued in response to infractions related to hunting or trapping in 2012-2013 and in 2013-2014 these figures changed to 31 and 21, respectively (MacFarland and Wiedenhoef 2013). Voyageurs National Park reported an illegal shooting of one of their collared wolves during deer season in 2012 (Olson and Windels 2014). In North Dakota, a deer hunter reported killing a gray wolf in North Dakota in 2012 because he felt threatened. The USFWS investigated the incident and no charges were filed in the case (S. Tucker, pers. comm. 2014). In 2012 and 2013, respectively, there were five and three investigations of illegally killed wolves reported by conservation officers in Minnesota and that were under investigation as of July 2014 (D. Stark, Minnesota DNR, pers. comm. 2014).

## **Other Relevant Information**

### **Trends in Prey Density**

A decline in prey density in the wolf range in Minnesota may have played a significant role along with increases in human caused mortality in the decline in wolf numbers between 2008 and 2013. Between 2007 and 2012, Minnesota’s forest zone deer population declined by an estimated 23% and moose, which occur in only a portion of wolf range, declined by 65% (Grund and Walberg 2012, Erb and Sampson 2013). Despite the apparent decline in the deer population during this time, deer numbers in 2012 were at or only “slightly below goal” (Grund and Walberg 2012). Deer population trends in Minnesota wolf range are ultimately determined by winter severity and deer harvest regulations (DelGiudice et al. 2002). Winter severity increases the role that wolf predation plays in overall deer mortality and the negative effects of severe winters on deer populations may be offset by decreasing harvest of female deer (DelGiudice et al. 2002). After the severe winter of 2013-2014, Minnesota DNR has responded by reducing the number of permit areas where does may be harvested and restricting harvest of does in others (Minnesota DNR. “Conservative deer season set; hunting licenses go on sale Aug. 1.” Minnesota DNR, 23 July 2014. Web. Accessed 25 July 2014.).

In Wisconsin deer density was above management goals in all but one of the six wolf management zones in 2013, but deer density declined by about 12 in 2014 (MacFarland and Wiedenhoef 2013, Wiedenhoef et al. 2014). The deer population in the Upper Peninsula of Michigan peaked in the mid-1990s, likely exceeding 800,000 deer. A long-term declining trend has occurred since that time, driven largely by maturing forests and declining habitat conditions, bringing deer to a low of perhaps just one-third that peak in the early 2000s. Despite this reduction in deer abundance, the wolf population continued to grow suggesting prey availability was not limiting. Mild winters from 2009 through 2012 produced a short-term slowly increasing trend in deer abundance throughout much of the UP before the severity of the last two winters produced increased adult deer mortality and low fawn recruitment (B. Rudolph, MDNR, personal communication).

### **Occurrences of Gray Wolves Outside of DPS Core Range**

There is still no evidence of any established packs in the DPS outside of Michigan, Minnesota, and Wisconsin, although wolves are occasionally observed in these areas. In Illinois, a female wolf was trapped and released in Whiteside County in December 2012 and in March 2013, a female wolf that had been radio-collared in Wisconsin was found dead in Jo Daviess County (J. Kath, Illinois Department of Natural Resources, pers. comm. 2014; University of Illinois Extension. "Wildlife Directory: Gray Wolf." *Living with Wildlife*. University of Illinois Extension. Web. Accessed 13 Jan. 2014.). These locations are approximately 130 miles west and about 170 miles WNW of Chicago, respectively. In February 2014 a hunter shot a gray wolf approximately 15 miles northeast of Waterloo, IA and another wolf was shot in May 2014 about 55 miles east of Cedar Rapids, IA (V. Evelsizer, Iowa DNR, pers. comm. 2014; O. Love. 2014. Wolf found in Iowa: Hunter who shot wild gray wolf not cited. *The Gazette*. Cedar Rapids, IA).

The North Dakota Game and Fish Department (NDGFD) has recorded two verified gray wolves in the state since delisting (one carcass; one photo) and five probable unverified reports (one photo, one sign, three observations) (S. Tucker, NDGFD, pers. comm. 2014). Gray wolf reports are evenly distributed across the state from east to west, with the two verified reports coming from one county on the Montana border and one county on the Minnesota border, respectively (Tucker 2013).

### **Public Attitudes**

Surveys conducted by Naughton-Treves et al. (2013) in Wisconsin indicate that residents living in the range of gray wolves may become less tolerant of wolves over time and that hunting seasons may affect the tolerance levels of only some residents. Persons living in the range of gray wolves may become more willing to poach wolves and to favor hunting seasons and lethal measures to reduce depredation. A perception that wolves competed with humans for white-tailed deer was most highly correlated with a willingness to poach wolves. Results from surveys conducted before implementation of the 2012 wolf hunt in Wisconsin indicated that the hunt would increase tolerance for wolves. In subsequent polling conducted after the 2012-2013 hunt, however, only 14% of respondents indicated increased tolerance for wolves (Hogberg et al. 2013).

Olson (2013, p.19-21) demonstrated that during the period 2003 to 2012, illegal killing was twice as likely to occur for radio collared wolves in Wisconsin when wolves were fully protected as federal endangered species, as during period when the state had some authority to control problem wolves. This suggests that people were less likely to kill wolves illegally when state controls were in place.

## Conclusion

Numbers of wolves in the three states that contain the core range of wolves in the DPS remain above the levels that would be cause for significant concern to the USFWS. Despite a decline in numbers since 2008, the lower end of the 90% confidence interval for the Minnesota 2012-2013 winter population (1,652, Erb and Sampson 2013) was above the level of 1,500 that would trigger additional analysis by the USFWS (U.S. Fish and Wildlife Service 2008) and the population did not decline further through the winter of 2013-2014 (Erb et al. 2014). The low end of population estimates for Michigan and Wisconsin – 594 and 660, respectively (1,254 combined) – remained well above the numbers that might cause concern at the individual state level (100) or collectively (200); we expect further declines in the numbers of wolves in Wisconsin, however, unless levels of human caused mortality are reduced.

The decline in the estimated size of the Minnesota population between 2007-2008 and 2012-2013 was approximately 24-25% and was likely caused by an increase in human-caused mortality – hunting and depredation control – and an approximately 23% decline in deer density between 2007 and 2012 (see **Population Estimates, Pack Numbers and Occupied Area: Minnesota**, above and Erb et al. 2014). The State of Minnesota responded to the decline by reducing the level of take allowed during the hunting and trapping season from 400 in 2012-2013 to 220 in 2013-2014; actual take was 413 and 237 during the two seasons, respectively (Minnesota Department of Natural Resources 2001, U.S. Fish and Wildlife Service 2008, Stark and Erb 2013; Minnesota DNR, unpubl. data 2014). Following this reduction in harvest by hunters and trappers, wolf abundance in the state appeared to have not declined further in early 2014 (Erb et al. 2014).

Wolves may have saturated the high quality habitat in Wisconsin and the statewide population may continue to decline unless human caused mortality falls to at least 22% (Stenglein 2014). Annual rates of human caused mortality in the state have exceeded 25% since 2010 and were well above that figure in 2013-2014 when the population declined statewide by about 18% (Wiedenhoeft et al. 2014). Planned harvest in 2014 (150) represents about 23% of the minimum 2013-2014 winter population level of 660 (Wisconsin DNR. “Wolf hunting and trapping.” 7 July 2014. Web. Accessed 25 July 2014.). For comparison, the targeted harvest of 250 wolves set for 2014 in Minnesota would represent about 13% of the 2013-2014 minimum population estimate. If human caused mortality from other sources (depredation control, illegal take, etc.) reflects levels detected in 2013-2014 in Wisconsin, total human caused mortality may take at least 38% of wolves in the state based on the winter 2013-2014 population estimate of 660. Therefore, we expect a continued decline in the number of wolves in Wisconsin and will evaluate the status of wolves there in the next annual post-delisting monitoring report. In next year’s report we will also be able to review the effects of the 2014-2015 hunting and trapping season and changes in regulations that affect the use of dogs to trail wolves outside of hunting seasons on the numbers of wolves in Wisconsin.

Michigan wolf numbers changed from 687 in 2010-2011 to 658 and 636 in 2012-2013 and 2013-2014, respectively (A. Bump, Michigan DNR, pers. comm. 2014; Michigan DNR, *in litt.*). This may represent an approximate 7% decrease in wolf numbers from before delisting – substantially short of the 25% decline cited as a potential cause for concern in the post-delisting monitoring plan.

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## **Appendix A**

USFWS requested data, on a voluntary basis, from representatives of natural resource agencies of the following Native American governments:

- Bad River Band of the Lake Superior Tribe of Chippewa Indians
- Bay Mills Chippewa Indian Community
- Fond du Lac Band of Lake Superior Chippewa
- Forest County Potawatomi Community
- Grand Portage Band of Lake Superior Chippewa
- Grand Traverse Band of Ottawa and Chippewa Indians
- Hannahville Potawatomi Indian Community
- Ho-Chunk Nation
- Keweenaw Bay Indian Community of Chippewa
- Lac Courte Oreilles Band of Lake Superior Chippewa Indians of Wisconsin
- Lac du Flambeau Band of Lake Superior Chippewa Indians of Wisconsin
- Lac Vieux Desert Band of Lake Superior Chippewa Indians
- Leech Lake Band of Ojibwe
- Little River Band of Ottawa Indians
- Little Traverse Bay Band of Odawa Indians
- Menominee Indian Tribe of Wisconsin
- Red Cliff Band of Lake Superior Chippewa Indians of Wisconsin
- Red Lake Nation/Band of Chippewa
- Sault Ste. Marie Tribe of Chippewa Indians
- Sokaogon Chippewa Community
- St. Croix Chippewa Indians of Wisconsin
- Stockbridge Munsee Community

## **Appendix B – Reviewers**

USFWS sent a draft of this report to the following persons:

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Chequamegon-Nicolet National Forest

Mr. James Hammill  
Iron Range Consulting and Services Inc.

Mr. John Hart  
Wildlife Services/APHIS – U.S. Department of Agriculture

Mr. Neil Kmiecik  
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Mr. Daniel Stark  
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