

WISCONSIN ENDANGERED RESOURCES REPORT #121
STATUS OF THE TIMBER WOLF IN WISCONSIN
PERFORMANCE REPORT 1 JULY 2001 THROUGH 30 JUNE 2002
By Adrian P. Wydeven and Jane E. Wiedenhoft

SUMMARY

This report covers activities conducted from 1 July 2001 through 30 June 2002. The Wisconsin DNR reclassified wolves to threatened in 1999, and the U.S. Fish and Wildlife Service started the process to reclassify in 2000, and should complete the process in 2002. In October 1999, the Wisconsin Natural Resources Board passed a wolf management plan which provides the outline for the current report.

Twenty four wolves from 17 different packs were live captured and radio collared in 2001. Sixty radio collared wolves were monitored during the study period. Mean territory size during winter for 24 adult wolves with VHF radio collars was 45 square miles. The minimum count for the wolf population in winter 2001-2002 was 323-339 wolves in 81 packs, including 309 to 325 wolves outside Indian reservations. Thirteen wolves being actively monitored by radio telemetry died during the period included 5 shootings, 4 intraspecific strife, 2 sarcoptic mange and 2 pneumonia. A total of 44 dead wolves were found in Wisconsin and deaths included 14 shootings, 14 vehicle collisions, 7 intraspecific strife, 6 mange, 2 pneumonia and 1 unknown. Disease testing indicated that most wolves were positive(antibody response) for canine parvovirus and canine distemper. Mange did not appear to affect the overall population, but may have caused high losses in central Wisconsin. Wolf reports by the general public and agency personnel were received from 35 counties, and was the highest level ever reported. Twenty-four cases of wolf depredation occurred during the period and involved the death of 24 cattle (23 calves), 17 dogs, 5 deer (deer farm), 18 poultry, and injury of 4 dogs. Other strategies to implement the 1999 wolf plan were also conducted during the period.

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**RECOVERY OF THE TIMBER WOLF
PERFORMANCE REPORT**

1 July 2001-30 June 2002

Prepared by Adrian P. Wydeven and Jane E. Wiedenhoft

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Timber or gray wolves (*Canis lupus*) were listed as endangered in the Great Lakes region in 1967 and 1974 by the U.S. Fish and Wildlife Service (U.S. Fish and Wildlife Service 1992). The State of Wisconsin listed wolves as endangered in 1975, but reclassified them to threatened in 1999. The Wisconsin Department of Natural Resources (WDNR) has monitored wolves since 1979. A recovery plan with a reclassification goal to threatened status of 80+ wolves was completed in 1989 (Wisconsin DNR, 1989), and a management plan was completed in 1999 (Wisconsin DNR 1999). The management plan sets a state delisting goal of 250 wolves outside of Indian reservations, and a management goal of 350 wolves outside of Indian reservations. At the management goal, proactive population control activities may be conducted by government trappers, and public harvest of wolves may be considered. The plan included 14 management strategies that represent the general outline of this report.

The 1992 Federal Recovery Plan for the eastern timber wolf established reclassification goals of 80+ wolves for 3 years in Wisconsin, and a delisting goal of 100+ wolves for 5 years for Wisconsin and Michigan (U.S. Fish & Wildlife Service 1992). Federal delisting also required a stable population of 1251 to 1400 wolves in Minnesota, and approved management plans for each state. The Minnesota wolf population was 2450 wolves in 1998 (Berg and Benson 1999), and currently probably exceeds 2600. In 2002, Michigan and Wisconsin shared about 600 wolves, and had exceeded the 100+ threshold for 8 years. In July 2000, the U.S. Fish and Wildlife Service began the process to reclassify wolves to threatened in Wisconsin, Michigan (Minnesota has been listed as threatened since 1978), and other states, and the process should be completed in late summer or fall 2002. The process to delist the District Population Segment of wolves in the western Great Lakes region, should begin late in 2002 or early 2003, and could be completed in 12 to 18 months.

Personnel and funding: Funding for wolf conservation activity in Wisconsin was from the following: Federal Aid in Wildlife Restoration Project W-154-R; U.S. Fish and Wildlife Service, Endangered Species Grants; funds from the Nicolet-Chequamegon National Forest; Wisconsin Endangered Resources Fund (tax check-off and license plate); Timber Wolf Alliance (TWA); Timber Wolf Information Network (TWIN); USDA-Wildlife Service research funds (John Shivik); funds from research grant for Brian Brost; and private donations.

Adrian Wydeven was the ecologist in charge of the project, and was assisted by project wolf technicians Ron Schultz, Sarah Boles and Jane Wiedenhoef. DNR pilots conducting aerial monitoring of collared wolves included: John Bronson, Joe Sprenger, Mike Weinfurter, Phil Miller, Paul Anderson and Dan Cardinal. Other DNR personnel that assisted extensively on wolf monitoring included Dick Thiel, Wayne Hall, Bruce Kohn, Kerry Beheler, Dr. Julie Langenburg, Michele Windsor, Randy Jurewicz, Ken Jonas, Greg Kessler, Todd Naas, Bruce Bacon, Rich Wissink, Linda Winn, and Barb Walser. Buck Follis with the USDA-Wildlife Service conducted trapping of wolves for monitoring. Dead wolves were necropsied by Dr. Nancy Thomas and others at the National Wildlife Health Center in Madison, and wolf necropsies were coordinated through Dr. Kim Miller or Dr. Grace McLaughlin. Live trapping and field investigations of wolf depredations were conducted under the supervision of Dave Nelson and district supervisors Bob Willging and Scott Beckerman of USDA-APHIS-Wildlife Services. John Shivik (USDA-Wildlife Service research) and Adrian Treves (Conservation International) conducted research on methods for excluding wolves from specific sites. Lisa Naughton (University of Wisconsin-Madison) and graduate student Rebecca Grossberg conducted attitude surveys toward wolves in Wisconsin. Over 118 volunteers conducted winter track surveys across northern and central Wisconsin.

Job 106.1 WOLF MANAGEMENT ZONES

Four wolf management zones were created in the 1999 Wolf Management Plan (Figure 1). Wolf population and management activities are summarized for each zone below.

Zone 1 (18,384 square miles) represents the northern forest wolf range in Wisconsin, and in winter 2001-2002 contained 283-301 wolves. Packs occurred in 18 of the 21 counties extending completely or partially into the zone, and 68 packs were detected in these counties. Wolf observations were reported for 20 counties in the zone. Seventeen dogs were killed by wolves in 11 cases across 5 counties in the zone, and 2 dogs were injured in 2 cases across the zone. Wolf depredation on livestock or poultry occurred on 7 farms in the zone. The average winter deer density in the zone was 26 deer per square mile (range 13 to 45 deer/mile²) and was still above the goal population of an average density of 19 deer/mile². Wolves occupied 4250 square miles of pack territory at a density of 1 wolf per 14.5 square miles.

Zone 2 (4521 square miles) represents the central forest wolf range and contained 34 to 37 wolves in 13 packs in winter 2001-2002. The zone contained portions of 10 counties, but mainly 7 counties. Wolf packs occurred in 7 counties in the zone, and wolf observations were obtained for 4 counties. Depredations consisted of injuries to 2 dogs, on two separate incidents, on the same private land in Jackson County. Deer density in Zone 2 averaged 29 deer/mile². Wolf packs occupied 760 square miles at a density of 1 wolf per 20.5 square miles.

Zone 3 (~18,000 square miles) represents dispersal habitat for wolves across central and southwest Wisconsin and included portions of 33 counties. No pack occurred completely within the zone, but a pack in the Blue Hills spread into Barron County. This pack caused depredation on 2 calves on one farm in Barron County. Wolf observations were reported for 17 counties, but mainly for counties that also occur in Zones 1 and 2. Three wolves, that were probably loners, were killed in the zone, and include 2 Michigan wolves. Wolves were found dead in Waupaca (M4902), southern Marinette (M711M), and Marquette counties. A wolf killed outside Madison in Dane County (Zone 4) probably also dispersed through this zone. In fall 2001, a Michigan wolf (M018M) from the western UP, was found dead in north central Missouri, and may have passed through Zone 3. No actively monitored collared wolves were detected moving through this zone, but the zone apparently continues to be important to dispersing wolves.

Zone 4 (~16,000 square miles) represents portions of southern and eastern Wisconsin, including 28 counties that appear to have limited potential for wolves. No wolf packs were detected in the zone, and no wolf depredations occurred in the zone. Wolf observations were reported for 7 counties, but may include misidentifications. An adult male was killed by vehicle on the west side of Madison in early April 2002. One or two wolves were reported in Door County; these could represent wolves that may have crossed the ice of Green Bay during winter. Wolves spilling over from Michigan across the ice of Green Bay could bring wolves into Door County, in an area otherwise not well suited for wolves.

JOB 106.2 POPULATION MONITORING AND MANAGEMENT

Thirty-five wolves were live captured in 2001, and collars were placed on 24 wolves (Table 1). Eight wolves were captured by USDA-Wildlife Services at a depredation site, one was released locally with a shock collar placed on it (352F), and 7 were released 116 miles (390F, 391M, 392M, 393F), or 168 miles eastward (394M, 395M and 724F). Wolves were captured from 17 Wisconsin wolf packs. Total captures included 8 adult males (av. wt 73.3 lbs), 2 yearling males (wt of 62 lbs for 1), 2 yearling females (av. wt. 58.0 lbs), 6 male pups (av. wt. 28.2 lbs, range 19 to 44 lbs) and 10 female pups (av. wt. 26.3 lbs, range 22 to 35 lbs). A total of 1573 trap nights were used by DNR to capture 27 wolves, and included 16 wolves radio collared; overall trap rate was 58.3 trap nights per wolf, and 98.3 trap nights per collared wolf.

Eighty-one wolf packs/groups were identified in 25 Wisconsin counties in winter 2001-2002 (Figure 2). Thirteen packs occurred in 7 central Wisconsin counties, and 68 occurred across 18 northern counties. Radio collared wolves were monitored in 35 (43%) of packs in the state during the winter period. Pack distribution was limited in northeast Wisconsin, but a pack was found as far east as northern Marinette and south central Florence County.

During the monitoring period, sixty radio collared wolves were monitored in 47 (58%) Wisconsin wolf packs, and one Minnesota pack (Table 2); additionally 4 radio collared wolves from Michigan were found in Wisconsin after they had died (M0029F, M0068M, M3608M and M4906M). A fifth Michigan wolf was actively tracked into Wisconsin before he died here. At least 5 of the 60 collared wolves being monitored dispersed during the study period, and at least 4 of the 5 Michigan wolves dying in Wisconsin were in the act of dispersing. Sex-age composition consisted of 24 adult males, 24 adult females, 3 yearling males, 4 yearling females, 3 pup males and 2 pup females (age during majority of the study period, or age at capture for wolves caught in 2002).

Mean winter home range for 24 adult wolves with VHF radio collars was 45 square miles, and ranged from 15 to 84 square miles (Table 2). These figures represent minimum areas roamed by these wolves, because number of radio locations are somewhat below the 30-35 recommended for winter territory assessment (Fuller and Snow 1988). Also, all radio locations were obtained during daylight hours, thus some night time movements may have been missed. An adult female in the Bear Bluff pack monitored by satellite collar had a home range of 143 square miles (130 radio locations), but satellite telemetry tends to have greater error rates that can inflate the area of a home range (Ballard et al. 1998). Actual home range areas are probably somewhere between minimum area produced by VHF telemetry, and inflated areas resulting from satellite telemetry.

Dispersing and Translocated Wolves

Wolf 341F (yearling female) was caught in the Wildcat Mound Pack of Jackson County on 31 May 2001. She remained in this territory until fall. After some preliminary moves, between 21 November and 3 December, 341F dispersed eastward 34 miles to cranberry bogs west of Wisconsin Rapids in southern Wood County. She settled into a small home range of 14 square miles with male wolf 343M.

Wolf 343M (adult male) was caught in the northwest corner of Juneau County on 21 June 2001. He was probably already dispersing at the time, and during the summer and fall he roamed extensive areas in eastern Jackson, northern Juneau and southern Wood Counties. He eventually moved to southern Wood County by 3 December where he joined female 341F, and appeared to establish a new territory 15 miles northeast of his original capture site.

Wolf 355M (adult male) was caught in the north Willow pack area on 28 June 2001. After some exploratory moves in mid November, he dispersed southwest 8 miles into the adjacent Little Rice River pack area. He occupied the western portions of the former Little Rice River territory with 2 other wolves.

Wolf 376F (yearling female) was caught in the Little Rice Lake area of Oneida County on 21 June 2001. It appeared that 376F was possibly passing through this area, but she may have been a remnant of the Little Rice River pack that seemed to die off the previous winter. In the fall, wolf 376F moved through eastern Price County and central Lincoln County, and in early winter between 18 December 2001, and 8 January 2002, she moved 29 miles to the northeast into the Stella Lake area. After 15 January 2002, she met another wolf and both settled into the Stella Lake area northeast of Rhinelander.

Wolves 390F, 391M, 392M and 393F (2 female and 2 male pups) were caught with other members of the Chase Brook pack causing depredation on cattle on a farm in northern Burnett County. The 4 pups were captured between 25 and 31 July 2001. They were placed into captivity and on 20 August 2001 were placed in a release pen in the Bootjack Lake pack in northwest Oneida County 116 miles east of their capture site. Attempts were made to cross-foster these pups with the Bootjack Lake pack, by providing deer carcasses at the release site. On 28 August, 392M and 393F were released, and on 3 September, 390F and 391F were released. Wolf 392M was found dead due to pneumonia on 3 September, wolf 390F died from pneumonia on 12 September, and 391M was found dead on 17 September from attack by other wolves. Wolf 393F remained alive and spent the winter in Price, Ashland and Iron counties. By mid winter, she was joined by another wolf, but they did not seem to form a stable pack. In spring, she headed southwest into western Price County and into Rusk County. On 18 May, wolf depredation occurred at a farm in western Price County, and 393F may have been involved. By late June 2002, 393F had moved to an area south of Ladysmith, 62 miles southwest of the release site.

Wolf 394M (yearling male) was caught on a farm in northwest Burnett County on 5 August 2001. He was released in northern Florence County on 21 August 2001, 170 miles east of his capture site. He traveled extensively across northeast Wisconsin through Forest, Florence, Langlade and Marinette counties, as well as Dickenson and Menominee counties, Michigan. By 3 December 2001, 394M settled into an area of western Menominee County, Michigan east of Wausaukee, Wisconsin. He may

have joined a pack in this area, but was found dead from a shooting on 16 January, 66 miles southeast of his release site in Forest County.

Wolf 395M (adult male) was caught on 16 August 2001 on a farm in northwest Burnett, as a member of the Chase Brook pack. He was caught with 724F (adult female). Both were released 170 miles to the east in northern Forest County in the Nicolet National Forest on 11 September 2001. He roamed extensively across Forest, Oneida, Lincoln and Langlade counties. By 3 December 2001, he rejoined 724F and the two settled into Langlade County in the Prairie River area 37 miles southwest of the release site.

Wolf 724F (adult female) was caught with 395M on 16 August 2001, but she had been on the air in northwest Wisconsin since 28 May 1997. She had been the alpha female of the Chase Brook pack from 1997 through 2000. Wolf 724F was released to the east 170 miles on 11 September 2001 in northern Forest County. For the next 3 months, she moved extensively through Forest, Oneida, Lincoln, Taylor and Langlade counties. She finally reconnected to 395M in the Prairie River area 37 miles southwest of her release site. The two established a new territory and during the winter occupied a home range of over 32 square miles.

Wolf M3608 (adult male) was caught as an adult on 12 July 1998 in western Iron County, Michigan, and was last detected east of Iron River in southern Iron County, Michigan on 24 September 2001. He was found dead near Tipler, Florence County, Wisconsin on 4 February 2002, and had apparently been shot. The death site was 29 miles southeast of his initial capture site in Michigan.

Wolf M4902 (yearling male) was caught as a pup in Mackinac County on 18 August 2000. He left his home territory some time after 21 December 2001, and was hit by a vehicle outside of Waupaca on 19 January 2002. Going around the north end of Lake Michigan, his minimum move was 220 miles in 29 days.

Wolf M4906 (adult male) was caught on 25 June 2001 in eastern Mackinac County, Michigan. He was last located in his home territory on 2 January 2002. He was found dead in northeast Menominee County, Wisconsin on 17 February 2002. The minimum distance by land across northern Lake Michigan was 212 miles in 46 days or less.

Wolf M711 (adult male) was caught on 11 July 2001 in Baraga County, Michigan. He was last located in his home territory on 13 January 2002. On 27 March 2002, M711M was found outside Marinette County, 115 miles south of his original home range. On 9 April 2002, the radio collar of M711M was found 5 miles to the southwest, and thus the wolf was probably killed.

Wolf M018 (adult male) was caught as a pup in Gogebic County, Michigan near Ironwood on 7 July 1999. The signal was lost after March 2000 near Mercer, Wisconsin. He was shot by a bow hunter on 23 October 2001 3 miles north of Trenton, Missouri, 460 miles south of his capture site. A straight line travel would have taken him through western Wisconsin, as well as portions of Iowa and Missouri. He may also have traveled through portions of Minnesota or possibly Illinois. This is the most southern movement ever detected for a wolf from the western Great Lakes region.

An adult male wolf was killed outside of Middleton, Wisconsin on 3 April 2002. The location is just west of Madison. The wolf appeared completely wild, but was 73 miles from the nearest pack. He had apparently dispersed from areas further to the north.

Door County wolf or wolves were reported in spring and summer 2002. A wolf was reported to be wearing red ear tags as used by Michigan DNR (Wisconsin DNR use yellow ear tags). Although the wolf observation was not completely verified, several observations were obtained that indicate these may be wolves. Wolves could have perhaps crossed Green Bay from Menominee County, Michigan (13-16 miles) or Garden Peninsula (26 miles), but following islands wolves could cross Green Bay with no more than 7 miles of open ice, and from Garden Peninsula with no more than 4.5 miles of open ice. Both crossings would be less than the 15 miles wolves traveled across Lake Superior to get to Isle Royale in the late 1940's (Mech 1966).

Wolf 430M (adult male) was captured on 18 May and 19 May 2002 at the same general location in eastern Taylor County after attacking and injuring a dog. His mate had a den site nearby. On 18 May, he was moved 3 miles away with the hope that the tagging experience would cause him to move his mate and their pups to a new location. But on 19 May 2002 he was recaptured at the same site. He was then translocated 52 miles to the northward into northeast Price County. At the end of the period, he was in eastern Price County 17 miles south of the release, and 36 miles from the original capture site.

Wolf Count Summary

Through radio telemetry monitoring of collared packs and snow tracking of non collared packs, a total statewide count was obtained of a minimum of 323-339 wolves in winter 2001-2002 (Table 3). Wolves occurred in 81 packs or groups, and 8 or 9 loners. The wolf count included 309 to 325 wolves outside of Indian reservations, therefore surpassing the state delisting goal of 250 wolves outside of Indian reservations in the state. Using last year's count of 257-259 wolves (including adjustments made following summer 2001 surveys), the population in 2002 had increased by 26%, and somewhat higher than the average increase of 20% observed since 1985.

Average pack size was 3.9 statewide, but generally were larger in northern Wisconsin (4.1 wolves per pack), versus central Wisconsin (2.6 wolves per pack). Wolf territories and interstitial areas covered 5014 square miles, at a density of 1 wolf per 15.2-15.9 square miles. A total of 110 wolves were counted in Wisconsin by pilots while collecting 510 radio locations of wolves, and included members of 29 packs. Non collared wolves/packs were counted along 3371 miles of snow track survey by WDNR trackers, and 3654 miles surveyed by volunteers.

An estimated 89 to 151 wolf pups survived to mid or late winter 2002. Using a mid point of 120 pups, and assuming 68 potential breeding pairs, estimated pup survival was 34% statewide, but it appeared pup survival was much higher in northern Wisconsin (37%) than central Wisconsin (16%). Of 68 packs in the state in 2001, 13 appeared not to have any surviving pups.

Forty-four wolves, including 18 radio collared wolves were detected dead in Wisconsin (Table 4). Five of the collared wolves were Michigan wolves that were not actively monitored by the WDNR (M0029F, M0068M, M3608M and M0179M), and a collared wolf that was off the air for several years (187F). Mortality of 13 actively collared wolves included 5 shootings (38%), 2 mange (15%), 2 pneumonia (15%) and 4 other wolves (31%); therefore overall mortality of actively collared wolves was 38% human caused mortality and 62% natural mortality.

Overall mortality of 44 dead wolves was 14 shootings (32%), 14 vehicle collisions (32%), 7 other wolves (16%), 6 mange (14%), 2 pneumonia (5%) and 1 unknown (2%). The overall rate for all mortalities was 64% human caused mortality, 34% natural mortality and 2% unknown. Rate of mortality for radio collared wolves, actively monitored, is less biased and probably more closely reflects overall mortality rates. No actively collared wolves were killed by vehicles, yet along with shootings, this was the highest cause of mortality for all wolves found dead. Vehicle collisions are likely to increase as wolves move into areas of higher road density (Wydeven et al 2001), and probably more likely to affect loner, dispersing wolves, that may be under represented in the population surveys. Percentage shooting was similar for actively monitored wolves and all wolves found dead (38% vs 32%). The overall number of shootings is the highest ever recorded in Wisconsin since wolves have returned, and the rate of shooting as a mortality factor on collared wolves is the highest detected in the state since the 1980's. Therefore it appears that shooting is increasing as a mortality factor and is also likely to increase as wolves expand into areas of higher road densities (Wydeven et al 2001).

Mortality of collared wolves monitored by the Wisconsin DNR from 1979 through June 2002 is shown in Table 5. Human caused mortality is 54% of the losses versus 46% for natural mortality. Death from mange and intraspecific strife are the main causes of natural mortality in recent years. Shootings had declined as a mortality factor in the 1990's, but has been on the increase in recent years. This may be partially due to wolves moving into more marginal habitats (higher road densities) or human tolerance toward wolves declining.

Statewide Wolf Distribution

Reports of 358 wolf observations from private citizens and agency personnel were collected from 36 Wisconsin counties (Table 6). Only observations judged as "probable" or "possible" were reported, although some may include coyotes, wolf-dog hybrids or wolf-like dogs. The wolf observation reporting rate exceeded last year's count by 63%, and represents the highest reporting rate ever detected on wolves in the state. The counties in which wolves were reported declined from the 40 reported last year. Wolf observations were reported for all northern counties that contained wolf packs, and for 4 of the 7 central counties with wolf packs. Highest report rates were for Bayfield (32), Iron (31), Ashland (30) and Vilas (30) counties.

JOB 106.3 WOLF HEALTH MONITORING

Disease testing was conducted for 10 wolves captured in 2000 and 24 wolves in 2001 (Table 7). Positive response to antibodies was detected for 24 of 34 (71%) for canine parvovirus (CPV), 8 of 16 (50%) for infectious canine hepatitis (ICH), 20 of 34 (59%) for canine distemper (CDV), 26 of 34 (76%) for Ehrlichia equi (EE), 11 of 34 (32%) for Lyme disease, and 0 of 34 for Blastomycosis. Test results for parvovirus and distemper were higher than previous years, but may partially reflect use of a different diagnostic lab for testing and use of low titer levels for indicating positive reactions. Several wolves did have high titer counts, indicating recent disease exposure. Titers for parvovirus were especially high for several pups from the

central forest (338M, 340F, 344F, 345F and 347F). Pup survival appeared to be fairly low for the central forest where packs in late winter averaged only 2.6 wolves per pack, and pup survival was estimated at only 16%.

Only 4 of 35 wolves captured in 2001 had severe alopecia indicating probable mange. These four wolves were all from the Suk Cerney pack in Juneau County, and included the 3 pups that had high titers for canine parvovirus. Two other wolves had slight cases of alopecia, including a pup (366M) from the Siskiwit Lake pack in Bayfield County, and a yearling female (376F) from the Little Rice River area of Oneida County. Mange seemed to be a factor in the death of 6 of 44 (14%) wolves found dead in the state. Two of 13 (15%) actively monitored wolves that died had severe mange that may have been a contributing factor (some of these wolves have not been completely necropsied, thus these assessments are preliminary).

JOB 106.4 HABITAT MANAGEMENT

Comments were made to the Chequamegon-Nicolet National Forest on management plans and proposed timber sales during the study period. The project ecologist served on a WDNR panel reviewing the new proposed management plan for the Chequamegon-Nicolet National Forests. Input was also provided to Brule River, Northern Highlands, and Flambeau River State Forest's master plans. Locations of packs throughout the state were shared with county forest administrators. Work continues on developing a wolf habitat management guide for private landowners.

JOB 106.5 WOLF DEPREDATION MANAGEMENT

Twenty-four cases of wolf depredation on livestock, poultry, dogs, and deer on deer farms occurred during the study period (Table 8). These cases included: 11 cases where 17 dogs were killed in hunting or training situations, 4 cases where dogs were injured near homes (1 case also had depredation on poultry), 7 cases where 25 cattle (24 calves) were killed at farms, 1 case where 18 poultry were killed, and 1 case where 5 deer were killed on a deer farm. Seven packs were involved in depredation on the 17 hunting dogs (all hounds used for bear and bobcat hunting). Three new packs, Siskiwit Lake, Casey Creek and Pelican Lake, accounted for the death of 11 dogs (65%).

Seven or eight packs were involved in depredation on calves or poultry on eight different farms. The Tranus Lake and possibly Moose Lake packs may have caused depredation on both livestock/poultry and dogs, but in most cases depredation on livestock/poultry are unrelated to packs that depredate on dogs.

Six attempts were made by USDA-Wildlife Services to trap problem wolves, and wolves were trapped from 2 depredation sites. Seven wolves were trapped from a farm in northern Burnett County in 2001 and 1 was trapped in 2002; all were translocated eastward. Four pups (390F, 391M, 392M, 393F) were released with another pack 116 miles eastward in Oneida County in late August 2001, but after three weeks only female 393F survived and continues to remain alive at the end of the study period. Two adults (395M, 724F) and one yearling (394M) were released into northern Forest County, 170 miles to the east in August and September. Yearling male 394M was shot to death in Menominee County, Michigan in January 2002. The two adults eventually settled into the Prairie River area of northwest Langlade County and established a new pack.

An adult male from a newly established breeding pair was trapped 2 times from a site in eastern Taylor County. The pair had attacked and injured a dog and established a den at a gravel pit nearby. Because of the threat of additional attacks to the dog and disruption of quarry activity, trapping was begun to discourage the wolves from this site. Initially the wolf was released only 3 miles away, but upon second capture, was released 52 miles to the northeast on 19 May 2002.

The Totagatic River pack alpha female (295F) was caught by USDA-Wildlife Service on 28 June 2002 on the same farm in northern Burnett County where depredation occurred by the Chase Brook pack. The removal and break up of the Chase Brook pack in 2001, allowed the Totagatic River pack to move onto this farm in 2002. At the end of June 3 calves and an adult cow were killed, but wolf depredation was still ongoing. Adult female 295F was released 59 miles to the east in southern Bayfield County west of Clam Lake.

Guidelines for conducting depredation control on wolves following federal reclassification to threatened status were developed during the period (Wisconsin DNR 2002). The guidelines were approved on 20 May 2002. Features of the guidelines included the following: emphasis on non lethal methods whenever possible; the occurrence of two verified depredations before lethal controls would occur; trapping up to 0.5 miles from farms with depredation in Zones 1 and 2, and trapping up to 1.0 mile in Zones 3 and 4; identified circumstances under which lactating females would not be dispatched at depredation sites; and no plans to conduct control trapping for wolves killing hunting dogs on public land.

A report was published in spring 2002 on analysis of wolf depredation in Wisconsin from 1976 through 2000 (Treves et al 2002). During the time period, 87 verified incidents of depredation occurred, including death and injury on 88 cattle (all calves), 12 sheep, 34 dogs and 213 poultry. Wolf depredation affected 66 property owners. Sixty-eight percent of 71 known

packs in the state caused no depredations, and only 7 packs (10%) caused 3 or more depredations. Six packs (8%) caused depredation on both dogs and livestock.

JOB 106.5 WOLF EDUCATION PROGRAMS

During the study period, the project ecologist gave 18 talks to 1169 people. Other WDNR biologists, technicians and naturalists gave an additional 38 talks to 1927 people, and were given by John Huff, Ken Jonas, Gary Dunsmore, Wayne Hall, Dick Thiel, Ron Schultz and Cynthia Mueller (16 talks, 1036 people). Three talks to 90 people were also given by Scott Beckerman and Dave Nelson of USDA-Wildlife Services. Therefore, a total of 59 talks were given to 3186 people by both agencies. Talks included training for 48 TWA volunteers in August, 115 volunteer carnivore trackers at 3 sessions during the fall, and 25 people at a TWIN workshop at Sandhill in winter. The WDNR cooperated with TWA to sponsor Wolf Awareness Week in October 2001, and over 6000 educational posters were distributed across the state. Volunteers with TWA gave 70 talks to 4726 people. The project ecologist attended 3 meetings with the TWA board to coordinate wolf educational efforts. The project ecologist had 90 media contacts during the study period including 58 newspapers, 16 radio, 11 television, 3 magazine writers and 5 independent film producers and writers contacts. Major issues were wolf depredation, especially on dogs, wolf shootings, federal reclassification and population surveys.

JOB 106.7 LAW ENFORCEMENT

Project personnel assisted Wisconsin and Michigan DNR wardens in obtaining background information, transporting wolves to National Wildlife Health Center in Madison, obtaining funding for rewards, and assisting in the preparation of news releases. Fourteen wolves were apparently shot in Wisconsin, and a Wisconsin wolf was killed nearby in Michigan. Wardens apprehended and fined a poacher who shot an adult female west of Phillips in Price County. A reward was presented to a landowner who reported the shooting; payments for the reward were from WDNR, Defenders of Wildlife, Timber Wolf Alliance, and Environmentally Concerned Citizens of the Lakeland Area. WDNR personnel assisted Michigan wardens in apprehending the shooter of a wolf in Menominee County, Michigan. Other shootings are still open cases being investigated by Wisconsin DNR conservation wardens and U.S. Fish and Wildlife Service special agents.

Closure of coyote hunting during the firearm deer season in Zone 1 seemed to have been effective in reducing illegal kills in northern Wisconsin. The coyote closure was not applied to Zone 2 in the central forest in the 1999 wolf plan (Wisconsin DNR 1999) because at the time, no wolf shootings had been detected in this zone. In fall 1999, a wolf was shot during the deer hunting season in the Necedah National Wildlife Refuge. Two more shootings occurred in Zone 2 during the 2001 firearm deer season. If illegal kills continue in this zone, the coyote closure may be applied to the central forest in the future. The project ecologist met with all northern wardens at their annual meeting on 21 August 2001.

JOB 106.8 INTERAGENCY COOPERATION AND COORDINATION

The Wisconsin Wolf Technical Committee, consisting of 22 persons from WDNR, U.S. Forest Service, Great Lakes Indian Fish and Wildlife Commission (GLIFWC), U.S. Fish and Wildlife Service, USDA-Wildlife Services, County Forest Administrators, Wisconsin Conservation Congress, University of Wisconsin-Stevens Point and a private farmer, met throughout the period to develop guidelines for depredation control and assess other aspects of wolf management. The committee met on 19 July 2001, 9 October 2001, 24 January 2002 and 16 April 2002.

A meeting was held on 13 April 2002 with the Wisconsin Wolf Stakeholders to examine a draft of depredation control guidelines and other aspects of wolf management. Based on input from the stakeholders, the guidelines were modified and the final version was presented to the Wisconsin Natural Resources Board on 26 June 2002, and the NRD accepted the guidelines.

Meetings were held with agency personnel involved in wolf surveys on 9 October 2001 and 12 April 2002. Because of concerns over high depredation on bear hunting dogs, the following meetings were attended: Wisconsin Bear Hunters executive committee 27 October 2001; DNR Bear Technical Committee 9 November 2001; Conservation Congress Bear Committee 7 December 2001; Wisconsin Bear Hunters 8 March 2002; and NW Wisconsin Bear Hunters 22 May 2002.

The Great Lakes Wolf Stewards met on 3 and 4 April 2002, discussing wolf management issues in the western Great Lakes with Wisconsin DNR, Michigan DNR, Minnesota DNR, U.S. Fish and Wildlife Service, U.S. Forest Service, U.S. Geological Survey, Michigan Technological University, University of Wisconsin, International Wolf Center, Timber Wolf Alliance, Michigan State University, Humane Society, Defenders of Wildlife, National Wildlife Federation and other organizations and universities.

A meeting was held with Ho Chunk Natural Resource Department personnel to coordinate wolf monitoring efforts in the central forest on 23 January 2002. A meeting was held with a farmer in northern Bayfield County on 13 May 2002 to discuss depredation control management with the farmer, WDNR, USDA-Wildlife Service and UW-Extension.

JOB 106.9 PROGRAM GUIDANCE AND OVERSIGHT

The third meeting was held with the Wisconsin Wolf Stakeholders on 13 April 2002. The stakeholders provide WDNR with input on guidelines for depredation control once reclassification was completed. The DNR Wolf Technical Committee met 4 times during the period with major emphasis on developing guidelines for depredation control, and determining the need to start the state de-listing process. Because the wolf population in late winter outside of Indian reservations (309+ wolves) exceeded the 250 threshold, the wolf technical committee will begin work on state delisting wolves in fall 2002.

The U. S. Fish and Wildlife Service should reclassify wolves in Wisconsin in fall 2002. Soon thereafter, the process to completely delist wolves should begin. Wisconsin DNR will be working closely with the U.S. Fish and Wildlife Service to complete this process

JOB 106.10 VOLUNTEER PROGRAMS

Forty-eight volunteers were trained at a Timber Wolf Alliance workshop on 17-19 August 2001. During fall, about 115 volunteer trackers were trained during 3 workshops in Wascott, Treehaven (Tomahawk), and Sandhill Wildlife Area (Babcock). Over 118 volunteers conducted surveys on 49 survey blocks (average about 200 square miles each), and surveyed over 3654 miles. Volunteers also assisted with trapping, radio collaring and howl surveys for wolves. Fifteen TWA volunteers gave 70 talks to 4726 people.

JOB 106.11 WOLF RESEARCH

Work continues with researchers from the University of Wisconsin-Madison on development of a model for predicting wolf depredations across Wisconsin and Minnesota using landscape features. Researchers include Andrian Treves, Lisa Naughton, Rob Rose, Dave Mladenoff and Ted Sickley of University of Wisconsin; Liz Harper with University of Minnesota; and Adrian Wydeven, WDNR. A draft of the model has been developed and a search is underway to get it published.

Paul Keenlance, Ph.D. candidate at Michigan State is continuing research on resource selection by wolves in northwest Wisconsin. Paul's research will bring together previous research on impact of highway development on wolf populations (Kohn et al 2000) and GIS analysis of wolf habitat (Mladenoff et al 1995).

Lisa Naughton and graduate student Rebecca Gossberg of UW-Madison conducted an attitude survey, examining public tolerance for recovering wolf populations in Wisconsin. Bear hunters were found to be least tolerant of wolf recovery in Wisconsin.

John Shivik of USDA-Wildlife Services and Adrian Treves of Conservation International are working with the Wisconsin DNR testing non lethal tools for diverting wolves from livestock. Testing was done on fladry (flagging) and movement activated guard devices around deer carcasses to see if these techniques could scare wolves and other predators from the site. Three plots were set (two treatments and control) in each of six wolf territories in northwest Wisconsin in spring 2002. The motion activated device reduced deer carcass consumption by 68%.

Eric Anderson and graduate student Ellen Heilhecker of University of Wisconsin-Stevens Point will start a research project on survival and movements of wolf pups in the central forest of Wisconsin. The project will start in summer 2002 with help from DNR personnel Wayne Hall and Dick Thiel, and help from Rich King, U.S. Fish and Wildlife Service.

Brian Brost and Adrian Treves from University of Wisconsin are examining source and sink relationships among Wisconsin wolf packs. They are attempting to determine if packs in the most suitable areas are "source" packs for wolves living in more marginal habitat.

The wolf project is cooperating with the Clam Lake elk restoration project to research factors affecting elk mortality, habitat use and distribution. Radio telemetry and track survey data is shared with elk biologist Laine Stowell and with University of Wisconsin-Stevens Point researcher Tim Ginnet. Tim will have a graduate student researching habitat selection by elk and will be examining the role that wolves and bear play in habitat selection.

The wolf program is cooperating on an international research project examining landscape ecology of elk in Yellowstone National Park, Wyoming; Banff National Park, Alberta; eastern Ontario; and northern Wisconsin. The researchers involved

include Peter Turchin, University of Connecticut; Monica Turner, University of Wisconsin; John Fryxell; Mark Boyce and Evelyn Merrill, University of Alberta. The researchers hope to investigate spatial patterns of landscape use by elk using spatial modeling and GIS analyses. Spatial distribution of elk in relationship to wolf territories will be one of the areas of investigation.

John Rafferty, Ph.D. student of the University of Illinois at Urbana-Champaign, will be researching impact on wolves from shrinking suitable habitat due to human developments across portions of northern Wisconsin. John will examine an extinction threshold model that will examine how wolves will respond to progressively shrinking suitable habitat.

Tom Gehring of Central Michigan University is planning to start a research project next year testing non lethal methods of reducing wolf-human conflicts in Wisconsin and Michigan. Among other things, Tom will have a graduate student testing the use of shock collars to deter wolves from certain areas (i.e. pastures, livestock concentrations).

The wolf project was also cooperating with University of Wisconsin researchers Dean Anderson, Don Waller and Tom Rooney to assess relationship among wolf densities, deer densities and dynamics of plant communities in Wisconsin and Michigan. Wolf densities will be contrasted with deer densities and compared to various attributes of the plant communities.

Several other reports were produced by the wolf program during the study period. The "Wisconsin Gray Wolf Population in 2000-2001" was published in the Wisconsin Wildlife Surveys. Progress reports on wolf population monitoring were produced in fall, end of year/mid winter, and spring. An article on "Wolf Myths" was published in International Wolf Vol 12(11): Spring 2002.

JOB 106.12 WOLF-DOG HYBRID AND CAPTIVE WOLVES

On 8 March 2002, Captive Wildlife Regulations were passed by the Wisconsin Legislature. These regulations will allow WDNR to regulate wolf-dog hybrids. Specific administrative rules that regulate wolf-dog hybrids will be developed over the next year.

Eighteen cases of suspected wolf-dog hybrid incidents were reported during the study period (Table 9). Wolf-dog hybrid problems occurred in 15 counties and these represent a minimum because some have not been reported outside of local areas, and some were handled by local law enforcement officers. Two cases included wolf-dog hybrids that killed or injured domestic animals. Five cases included deaths of wolf-dog hybrids which involved time and expense to search, retrieve, examine, identify and dispose of carcasses by DNR personnel. With new regulations, hopefully incidents of wolf-dog hybrid problems will be reduced.

JOB 106.13 WOLF SPECIMEN MANAGEMENT

A meeting was held at the National Wildlife Health Center in Madison on 21 February to discuss future necropsies and disposition of wolves. Attempts will be made to distribute wolf specimens after state downlisting and anticipated federal downlisting. Randy Jurewicz will coordinate distribution of wolf carcasses in cooperation with the U.S. Fish and Wildlife Service. Thirty-seven of the 44 dead wolves handled were made into specimens, or are planned to be used as specimens. On some specimens that were fairly decomposed, or with severe mange, only skulls or skeletons will be saved. Wolf specimens handled by DNR region included 27 in the Northern Region, 6 in the West Central Region, 3 in the Northeastern Region and 1 in the South Central Region.

JOB 106.14 ECOTOURISM

DNR participated in talks/field trips for: Natural Resource Foundation on 14 July 2002 for 47 people, Nature Conservancy on 19 July 2002 for 75 people and Timber Wolf Alliance workshop 18 August for 48 people. These activities had people travel from throughout Wisconsin and adjacent states to visit areas of wolf range in Wisconsin and made use of local facilities and businesses.

Programs on wolves were also presented at Treehaven near Tomahawk, Trees for Tomorrow in Eagle River, Sandhill Wildlife Area near Babcock and naturalist programs in state parks and forests in northern Wisconsin. The wolf exhibit at the Northern Great Lakes Visitor Center provided an additional attraction for people visiting the Ashland area. No detrimental effects of ecotourism on wolves was detected during the study period.

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Table 1. Wolves captured in Wisconsin in 2001.

Wolf Number	Sex/Age^a	Weight (lbs)	Pack/Area	County Captured	Date
269	M/A	71	Noch Hanai	Clark	13 Jul 01
300	F/A	72	Harrison Hills	Lincoln	18 May 01
312 ^b	M/P	40	Bear Bluff	Jackson	17 Jul 01
336	M/Y	~80	Bootjack Lake	Oneida	03 Jun 01
338	M/P	44	Bear Bluff	Jackson	28 Jul 01
339 ^b	F/P	35	Bear Bluff	Jackson	28 Jul 01
340	F/A	74	Yellow River	Juneau	05 Aug 01
341	F/Y	54	Wildcat Mound	Jackson	31 May 01
342	M/A	75	Suk Cerney	Juneau	16 Aug 01
343	M/A	92	Disperser	Juneau	12 Jun 01
344 ^b	F/P	23	Suk Cerney	Juneau	15 Aug 01
345 ^b	F/P	25	Suk Cerney	Juneau	15 Aug 01
347 ^b	F/P	24	Suk Cerney	Juneau	16 Aug 01
348	M/A	72	Dead Creek	Monroe	23 May 01
349 ^b	F/P	30	Bear Bluff	Jackson	25 Jul 01
350 ^b	F/P	32	Bear Bluff	Jackson	26 Jul 01
352 ^c	F/A	72	Chase Brook	Burnett	01 May 01
355	M/A	81	North Willow	Oneida	28 Jun 01
360 ^b	M/P	20	Casey Creek	Douglas	18 Jun 01
361 ^b	F/P	22	Casey Creek	Douglas	21 Jun 01
366 ^b	M/P	19	Siskiwit Lake	Bayfield	20 Jun 01
367 ^d	F/A	80	Chase Brook	Burnett	26 May 01
368	M/A	81	Price Creek	Price	12 Jul 01
369	F/A	67	Siskiwit Lake	Bayfield	25 Jun 01
370	F/A	72	Black Lake	Sawyer	30 Jun 01
376	F/Y	62	Little Rice River/Disperser	Oneida	12 Jun 01
388	M/A	80	Crex Meadow	Burnett	25 Jul 01
389 ^b	F/P	24	Crex Meadow	Burnett	25 Jul 01
390 ^e	F/P	26	Chase Brook/Relocated	Burnett	30 Jul 01
391 ^e	M/P	22	Chase Brook/Relocated	Burnett	27 Jul 01
392 ^e	M/P	24	Chase Brook/Relocated	Burnett	25 Jul 01
393 ^e	F/P	22	Chase Brook/Relocated	Burnett	31 Jul 01
394 ^f	M/Y	62	Chase Brook/Relocated	Burnett	05 Aug 01
395 ^f	M/A	78	Chase Brook/Relocated	Burnett	16 Aug 01
724 ^f	F/A	76	Chase Brook/Relocated	Burnett	16 Aug 01

^a Age at time of capture assuming birth date 1 April (P = Pup, Y = Yearling, A = Adult)

^b Not collared, too small.

^c Captured by DNR, fitted with shock collar.

^d Captured by Wildlife Services on farm, fitted with shock collar and released off farm.

^e Captured by Wildlife Services on farm, relocated to Oneida County for cross fostering.

^f Captured by Wildlife Services on farm, relocated to Forest County

Table 2. Radio telemetry data on wolves monitored from July 1, 2001 – June 30, 2002 in Wisconsin.

Wolf # & Sex	Age^a	Pack^b	Date Captured	Last Date	# of Locations^c	Winter Territory Size (mi²)	# of Wolves in Territory^d
M036F	Y	West Firelane	4 May 00 ^e	Ongoing	66	28	4
M310M	P	Brush Creek	2 Nov 97 ^f	12 Mar 02 [*]	156	33	7
M711M	A	Disperser	11 Jul 01 ^g	9 Apr 02 ^{**}	3	NE ^h	-
155M	A	Moose Road	6 May 97	27 Aug 01 [*]	326	-	3-6
241F	P	Ghost Lake	20 Nov 97 ⁱ	Ongoing	225	34	3
245F	P	Hoffman Lake	30 Jul 97	20 Nov 01 [*]	221	NE	3-5
248M	A	Torch River	28 Jun 00	Ongoing	103	39	5
250M	P	Ghost Lake	9 Sep 00	30 Jan 02 [*]	71	NE	3
268M	Y	Truck Trail	11 Jun 97 ^j	Ongoing	344	59	5
269M	P	Noch Hanai	17 Sep 99	19 Nov 01 ^{**}	125	NE	2
285F	A	Ranger Island	24 Aug 98	Ongoing	200	15	5
286F	Y	Brunet River	5 Sep 98	6 Feb 02 ^{**}	173	28	-
289F	A	Pioneer Creek	26 Apr 00 ^k	1 Nov 01 [*]	273	NE	1
291M	A	Chain Lakes	27 Jun 99	Ongoing	164	62	6
292M	Y	Tranus Lake	21 May 99	29 May 02 ^{**}	170	48	7
294M	A	Totagatic River	23 May 99	11 Oct 01 ^{**}	134	NE	-
295F	Y	Totagatic River ^l	25 May 99	Ongoing	177	82	3
296M	Y	Crotte Creek	28 May 99	20 May 02 ^{**}	166	46	4
297M	A	South Empire	2 Jun 99	Ongoing	167	49	3
298M	Y	Tamarack River	8 Jun 99	Ongoing	164	50	5
300F	A	Harrison Hills	18 May 01	Ongoing	61	22	3
309F	P	Iron Run	15 Nov 99	Ongoing	160	57	2
311F	Y	Bear Bluff	24 Sep 00	8 May 02 [*]	354	143 ^m	5-6
316F	A	Wintergreen	20 Oct 99	8 Jan 02 ^{**}	117	NE	-
332F	A	Pelican Lake	10 May 00	Ongoing	131	26	4
336M	Y	Bootjack Lake	3 Jun 01	Ongoing	55	118	10-11
338M	P	Bear Bluff	28 Jul 01	Ongoing	53	36	5-6
340F	A	Yellow River	5 Aug 01	Ongoing	51	41	3
341F	Y	Wildcat Mound/Seneca	31 May 01	Ongoing	62	NE	4-5 ⁿ
342M	A	Suk Cerney	16 Aug 01	19 Nov 01 ^{**}	18	NE	2
343M	A	Disperser/Seneca	12 Jun 01	Ongoing	61	26	2
348M	A	Dead Creek	23 May 01	19 Nov 01 ^{**}	33	NE	3
351M	A	Chippewa River	17 Jun 00	Ongoing	103	45	8
355M	A	North Willow/Little Rice R.	28 Jun 01	Ongoing	54	NE	3 ^o

Table 2. (Cont.)

Wolf # & Sex	Age ^a	Pack ^b	Date Captured	Last Date	# of Locations ^c	Winter Territory Size (mi ²)	# of Wolves in Territory ^d
367F	A	Chase Brook	26 May 01	2 Jan 02 ^{**}	37	NE	3
368M	A	Price Creek	12 Jul 01	17 Oct 01 ^{**}	13	NE	3
369F	A	Siskiwit Lake	25 Jun 01	Ongoing	52	61	4
370F	A	Black Lake	30 Jun 01	Ongoing	49	87	5
376F	Y	Little Rice River/Stella Lake	12 Jun 01	Ongoing	61	NE	2 ^p
388M	A	Crex Meadow	25 Jul 01	Ongoing	51	73	7
390F	P	Chase Brook/Relocated ^q	3 Jul 01	12 Sep 01 ^{**}	5	NE	-
391M	P	Chase Brook/Relocated ^q	27 Jul 01	17 Sep 01 ^{**}	5	NE	-
392M	P	Chase Brook/Relocated ^q	25 Jul 01	3 Sep 01 ^{**}	2	NE	-
393F	P	Chase Brook/Relocated ^q	31 Jul 01	Ongoing	49	NE	2
394M	Y	Chase Brook/Relocated ^r	5 Aug 01	16 Jan 02 [*]	31	NE	-
395M	A	Chase Brook/Rel./Prairie R. ^r	11 Sep 01	Ongoing	62	32	2
429F	A	Wildcat Mound	3 Jun 02	Ongoing	5	NE	4-5
430M	A	Rib River/Relocated ^s	18 May 02	Ongoing	7	NE	-
431F	A	Moquah	1 Jun 02	Ongoing	5	NE	3-4
433M	A	Averill Creek	5 Jun 02	Ongoing	4	NE	5
434M	A	Moose Lake	29 May 02	Ongoing	4	NE	5
437F	A	North Willow	11 May 02	Ongoing	8	NE	5
438M	A	Flag River	21 May 02	Ongoing	6	NE	2
439F	A	Flag River	22 May 02	Ongoing	6	NE	2
440F	Y	Shoberg Lake	8 Jun 02	Ongoing	4	NE	4
444F	A	Hellhole Creek	25 Jun 02	Ongoing	2	NE	5-6
446F	A	Casey Creek	13 Jun 02	Ongoing	2	NE	4
447F	A	Bird Sanctuary	21 Jun 02	Ongoing	1	NE	3-5
448F	Y	O'Brien Lake	20 May 02	Ongoing	7	NE	4
724F	A	Chase Brook/Rel./Prairie R.	11 Sep 01 ^t	Ongoing	313	32	4

^a Age at time of capture (P = Pup, Y = Yearling, A = Adult)

^b Pack during winter of the study period

^c Total locations from the time of capture

^d Number of wolves in pack during midwinter

^e Captured in Gogebic County, Michigan

^f Initial capture in Houghton County, Michigan; locations listed for Wisconsin only

^g Captured in Baraga County, Michigan

^h No estimate

ⁱ Recaptured wolf; first captured in Ashland County on 23 Jun 1997, 19 lb pup too small to collar

^j Recaptured wolf; first captured as a pup in Douglas County on 28 Aug 1996

^k Recaptured wolf, first captured in Douglas County on 5 Jun 1998

^l Recaptured by USDA-WS during depredation trapping, relocated to Bayfield County 28 Jun 2002

^m Based on satellite locations

ⁿ Wildcat Mound pack

^o Little Rice River pack

^p Stella Lake pair

^q Captured by USDA-WS during depredation trapping, relocated to Oneida County

^r Captured by USDA-WS during depredation trapping, relocated to Forest County

^s Captured by USDA-WS during depredation trapping, relocated to Price County

^t Initial capture in Douglas County 28 May 1997, recaptured by USDA-WS during depredation trapping, relocated to Forest County

* Lost signal

** Died

Table 3. Minimum estimation of Wisconsin's timber wolf population in winter 2001-2002.

Pack/Area/Wolf	Counties	Blocks	No. of Wolves	Evidence^a
<u>NORTHERN FOREST</u>				
<i>Atkins Lake*</i>	Oneida/Forest	77, 86	3	T
Augustine Lake*	Iron/Ashland	57	7	T
Averill Creek*	Lincoln	48, 70	5	T/O
Bird Sanctuary*	Douglas	3, 9	3-5	T
Black Lake*	Ashland/Sawyer	24, 37, 38	5	R/T
Blue Hills	Rusk/Sawyer	20	2	T/O
Bootjack Lake*	Price/Oneida	53, 52, 51, 67	10-11	R/T
Brush Creek*	Ashland	36, 57	7	R/T
Casey Creek*	Douglas	6, 7	4	T
Chain Lake*	Douglas/Washburn/Bayfield/Sawyer	8, 23	6	R/T
Chase Brook*	Burnett/Douglas	10, 11	3	T
Chippewa River*	Ashland/Iron	56, 58	8	R/T
Crex Meadow*	Burnett/Pine	13	7	R/O
Crotte Creek*	Douglas	9, 3, 2, 11	4	R/T
Davis Lake*	Price	41	8	T/O
<i>Dunbar Pair</i>	Florence/Marinette	108	2	T
Eastside Firelane*	Ashland	56, 57	3-4	T
<i>Eddy Creek+*</i>	Sawyer	20, 42	5	T
<i>Escanaba Lake*</i>	Vilas	80	3	T
Flag River*	Bayfield	31, 32	2	T
Ghost Lake*	Bayfield/Sawyer	24, 29	3	R/T/O
Giant Pine	Forest	85	2	T
Harrison Hills*	Lincoln	71, 75	3	R/T
Haystack Corner*	Sawyer/Rusk	43	5	T
Hellhole Creek*	Bayfield/Ashland	35, 36	5-6	T
Hoffman Lake*	Iron/Price/Ashland	55, 54	3-5	T/O
Hungry Run*	Ashland	38, 40	8	T
<i>Ino Swamp*</i>	Bayfield	27	3	T
Kidrick Swamp*	Taylor/Price	46, 47	5	T/O
Little Rice River*	Oneida	51, 67, 65	3	R/T
Log Creek*	Sawyer	40, 37	4	T/O
Moose Lake*	Douglas	4	5	T
Moose Road*	Douglas/Pine	11	3-6	T
<i>Moquah*</i>	Bayfield	30	3-4	T
Moreland Lake*	Bayfield	26	3	T
Morrison Creek+*	Ashland/Iron	39, 60	4	T
Murray's Landing*	Iron	55	5	T
Nineweb Lake*	Vilas	80, 81	3	T/O
North Empire*	Douglas	2, 3, 4	3	T
North Willow*	Oneida	65, 67, 78	5	T
O'Brien Lake*	Iron	57, 59	4	T
Orienta Falls*	Bayfield/Douglas	7, 31	3	T
<i>Pelican Lake*</i>	Oneida	76, 74	4	R

Table 3. cont.

Pack/Area/Wolf	Counties	Blocks	No. of Wolves	Evidence^a
Pine Lake*	Iron	58, 59, 61	5	T
<i>Prairie River*</i>	Langlade/Oneida	74, 76	2	R
Price Creek*	Price/Sawyer	41	3	T/O
Rainbow Lake*	Bayfield	27, 28	10	T
Ranger Island*	Lincoln	69	5	R/T
<i>Riverside</i>	Burnett	10	2	T
Shanagolden*	Ashland	38	2	T/O
Shoberg Lake*	Douglas	6, 8	4	T
Siskiwit Lake*	Bayfield	32, 33, 30	4	R/T
Skinner Creek*	Price	44	5-6	T
Smoky Hill*	Bayfield	25	4	T
<i>Somo River*</i>	Lincoln	68	5	T
South Empire*	Douglas	3, 4	3	R/T
Spirit Lake*	Lincoln/Taylor/Price	49, 70	3	T
<i>Stella Lake Pair</i>	Oneida	77	2	R
Sterling Barrens	Polk/Burnett	14	2	T
Stuntz Brook*	Washburn	12	4	T
Thornapple River*	Sawyer	41, 40	2	T
Torch River*	Ashland/Sawyer	36, 38, 37	5	R/T
Totagatic River*	Burnett/Douglas/Pine	10, 11, 9	3	R
Tranus Lake*	Washburn	22, 23	7	R/T
Truck Trail*	Douglas/Pine	2	5	R/T
Tupper Creek*	Sawyer	42, 43	2	T
W393 Pair	Price	54, 52, 55	2	R
West Firelane+*	Ashland/Iron	39, 60	4	R
Total Northern Pack Members			281-293	
68 Packs = 4.1 wolves/pack				
<u>Dispersers & Loners</u>				
<i>Long Lake Loner</i>	Washburn, Sawyer	19	1	T
Miles Lake+	Price, Ashland, Vilas	54	1	T
<i>Mondeux Loner</i>	Taylor	47	1	T
<i>Peshtigo Brook Loner</i>	Oconto	115	1	?
Pioneer Creek (W289)	Vilas	80, 82	1	O
<i>Porcupine Lake</i>	Bayfield	29	1	T
Springbrook	Washburn	22	1-2	?
Total Northern Loners			7-8	
Total Northern Wolves			288-301	

Table 3. cont.

Pack/Area/Wolf	Counties	Blocks	No. of Wolves	Evidence^a
<u>CENTRAL FOREST</u>				
Bear Bluff*	Jackson/Wood/Juneau	121, 120, 119	5-6	R/T
<i>Colburn</i>	Adams	127	3	T
Dead Creek	Jackson/Juneau	121	3	T
<i>Eau Claire River</i>	Clark/Eau Claire	117	2	?
Ft. McCoy*	Monroe	123	2	T
Iron Run*	Clark/Eau Claire	118, 117	2	R/T
Noch Hanai*	Jackson/Clark	119	2	T
<i>Seneca</i>	Wood	124, 125	2	R
South Bluff*	Wood	121	2	T
Suk-Cerney*	Juneau	122	2	T/O
Two Korner*	Jackson/Clark	119	2-3	T
Wildcat Mound*	Jackson	120, 121	4-5	T
Yellow River*	Juneau	122, 125	3	R/T
Total Central Pack			34-37	
13 Packs = 2.6 wolves/pack				
<u>Dispersers & Loners</u>				
Sandhill loner	Wood	121	1	T
Total Central Loners			1	
Total Central Wolves			35-38	

Grand Total All Wolves 323-339

Indian Reservation Wolves **14**

Wolves Outside Reservations **309-325**

^a Evidence: O = observations

R = radio-telemetry surveys

S = satellite monitored

T = track and sign surveys

*Pack with probable breeding activity

+Reservation pack or wolf

Table 4. Wolves dying in Wisconsin from 1 July 2001 to 30 June 2002.

Wolf # & Sex	Age^a	Date Captured	Date Died	County Died	Cause of Death
----F	A	-----	7 Aug 01	Price	Vehicle Collision
----M	A	-----	26 Aug 01	Price	Other wolves?
392M	P	25 Jul 01	3 Sep 01	Oneida	Pneumonia
----?	P	-----	6 Sep 01	Bayfield	Vehicle Collision
390F	P	3 Jul 01	12 Sep 01	Oneida	Pneumonia
391M	P	27 Jul 01	17 Sep 01	Oneida	Other wolves?
----?	P	-----	19 Sep 01	Iron	Other wolves?
----F	A	-----	30 Sep 01	Iron	Vehicle Collision
294M	A	23 May 99	11 Oct 01	Burnett	Shooting?
----F	A	-----	27 Oct 01	Price	Shooting
269M	2	13 Jul 01	19 Nov 01	Clark	Shooting
348M	A	23 May 01	19 Nov 01	Jackson	Other wolves?
342M	A	16 Aug 01	19 Nov 01	Juneau	Shooting
----F	A	-----	19 Nov 01	Douglas	Shooting
----M	A	-----	20 Nov 01	Lincoln	Vehicle Collision
187F	8	30 Jul 94	30 Nov 01	Douglas	Mange
M0029F	A	MI capture	18 Dec 01	Vilas	Mange?
----F	Y?	-----	27 Dec 01	Price	Shooting
367F	A	26 May 01	3 Jan 02	Douglas	Other wolves?
316F	A	20 Oct 99	8 Jan 02	Price	Mange/Trauma?
----M	Y	-----	10 Jan 02	Adams	Shooting?
----F	A	-----	11 Jan 02	Bayfield	Mange
----?	Y	-----	10 Jan 02	Juneau	Shooting
M0068M	Y	MI capture	19 Jan 02	Waupaca	Vehicle Collision
----M	A	-----	22 Jan 02	Sawyer	Vehicle Collision
M3608M	A	MI capture	4 Feb 02	Florence	Shooting?
286F	A	9 May 98	7 Feb 02	Sawyer	Mange/Other wolves?
----?	?	-----	11 Feb 02	Oneida	Shooting (archery)
M0179M	A	MI capture	17 Feb 02	Menominee	Vehicle Collision?
----M	A	-----	24 Feb 02	Oneida	Vehicle Collision
----M	A?	-----	7 Mar 02	Ashland	Vehicle Collision
----F	A	-----	26 Mar 02	Douglas	Vehicle Collision
----M	A	-----	3 Apr 02	Dane	Vehicle Collision
----F	P	-----	5 Apr 02	Juneau	Mange?

Table 4. cont.

Wolf # & Sex	Age^a	Date Captured	Date Died	County Died	Cause of Death
M711M	A	MI capture	9 Apr 02	Marinette	Shooting?
----?	?	-----	24 Apr 02	Marquette	Shooting
----F	Y	-----	10 May 02	Oneida	Vehicle Collision
296M	A	28 May 99	20 May 02	Douglas	Shooting?
----M	A	-----	24 May 02	Washburn	Vehicle Collision
----M	Y	-----	24 May 02	Oconto	Vehicle Collision
----M	A	-----	24 May 02	Bayfield	Other wolves?
292M	A	21 May 99	29 May 02	Washburn	Other wolves
----?	?	-----	15 May 02	Taylor	?
----M	A	-----	13 Jun 02	Washburn	Vehicle Collision

^a Age at time of death

Table 5. Mortality summary of radio-collared wolves in Wisconsin and adjacent areas of Minnesota from October 1979 – June 2002.

	Cause of Death	Number	% Known Mortality
Human Causes	Capture Related	3	3%
	Shot Wound*	27	29%
	Trapped	3	3%
	Vehicle Collision	13	14%
	<u>Unknown Human Causes</u>	<u>5</u>	<u>5%</u>
	<i>Total Human Causes</i>	<i>51</i>	<i>54%</i>
Natural Causes	Birth complications	1	1%
	Disease	24	26%
	Killed by Other Wolves	15	16%
	<u>Unknown Natural Causes</u>	<u>3</u>	<u>3%</u>
	<i>Total Natural Causes</i>	<i>43</i>	<i>46%</i>
Totals	<i>Known Mortality</i>	<i>94</i>	<i>100%</i>
	<u>Unknown Mortality</u>	<u>8</u>	
	Total Mortality	102	

* 25 wolves shot by firearm; 2 wolves by bow and arrow

Table 6. Probable and possible wolf observations reported by natural resource agency personnel and private citizens in Wisconsin in July 2001 – June 2002.

County	Sightings	Wolves Seen	Track or Sign Observations	Total Observations
Adams*	1	2	3	4
Ashland*	19	22-24	11	30
Barron	1	2	0	1
Bayfield*	26	66-72	6	32
Brown	1	2	0	1
Burnett*	7	19	0	7
Clark*	5	12	2	7
Dane	3	4	0	3
Door	6	9-10	0	6
Douglas*	13	25	6	19
Florence*	16	17	1	17
Fond du Lac	2	2	0	2
Forest*	5	6	0	5
Grant	1	1	0	1
Iowa	0	0	1	1
Iron*	24	44	7	31
Jackson*	4	4	1	5
Juneau*	0	0	1	1
Langlade*	23	29	0	23
Lincoln*	11	24	6	17
Marathon	1	1	0	1
Marinette*	7	7	2	9
Menominee	0	0	1	1
Oconto	7	9	1	8
Oneida*	19	26	7	26
Outagamie	1	1	0	1
Polk	2	4	0	2
Price*	16	25-26	11	27
Rusk*	6	7	2	8
Sawver*	6	8	2	8
Shawano	3	3	0	3
Taylor*	2	3	5	7
Vilas*	24	27	6	30
Washburn*	11	20+	2	13
Washington	1	1	0	1
Waupaca	0	0	1	1
Totals	273	431-441+	87	358

* Counties with known breeding packs during winter of this study period. No observations were reported from Eau Claire, Monroe, and Wood Counties where a breeding pack is known to exist.

Table 7. Disease testing of wolves captured in Wisconsin in 2000 and 2001. (Positive results in italics)

Wolf # & Sex	Age	Date Captured	Serum CPV	ICH	CDV	EE	Lyme	Blasto
W247F	P	9/4/00	1:20	1:8	1:8	<i>1:20</i>	Neg.	Neg.
W248M	A	6/28/00	<i>1:1280</i>	1:8	1:8	<i>1:40</i>	<i>Pos.</i>	Neg.
W250M	P	9/9/00	1:20	1:4	<i>1:16</i>	<i>1:40</i>	Neg.	Neg.
W269M	A	7/13/01	--	--	--	--	--	--
W289F	A	5/2/00	--	--	--	--	--	--
W300F	A	5/18/01	--	--	--	--	--	--
W310F	P	9/15/00	--	--	--	--	--	--
W311F	Y	9/24/00	--	--	--	--	--	--
W312M	P	7/17/01	1:10	--	1:16	<1:16	<i>Pos.</i>	Neg.
W318F	Y	5/11/00	<i>1:640</i>	$\geq 1:512$	1:8	<i>1:40</i>	Neg.	Neg.
W332F	A	5/16/00	<i>1:2560</i>	<i>1:192</i>	1:8	<i>1:40</i>	<i>Pos.</i>	Neg.
W333F	Y	5/23/00	<i>1:80</i>	<i>1:256</i>	1:8	<i>1:80</i>	Neg.	Neg.
W334M	A	5/23/00	<i>1:1280</i>	<i>1:128</i>	<i>1:512</i>	<i>1:40</i>	<i>Pos.</i>	Neg.
W335M	P	5/30/00	--	--	--	--	--	--
W336M	P	7/10/00	1:20	1:4	1:8	Neg.	Neg.	Neg.
W336M	Y	6/3/01	<i>1:1280</i>	<i>1:384</i>	1:8	<i>1:40</i>	Neg.	Neg.
W337M	A	7/17/00	--	--	--	--	--	--
W338M	P	7/28/01	<i>1:2560</i>	--	1:8	<1:16	Neg.	Neg.
W339F	P	7/28/01	<i>1:320</i>	--	1:8	<1:16	Neg.	Neg.
W340F	A	8/5/01	<i>1:1280</i>	--	<i>1:1024</i>	<i>1:256</i>	<i>Pos.</i>	Neg.
W341F	Y	5/31/01	<i>1:320</i>	<i>1:384</i>	<i>1:192</i>	<i>1:20</i>	<i>Pos.</i>	Neg.
W342M	A	8/16/01	<i>1:320</i>	--	<i>1:512</i>	<i>1:128</i>	<i>Pos.</i>	Neg.
W343M	A	6/12/01	<i>1:640</i>	<i>1:384</i>	<i>1:512</i>	<i>1:40</i>	<i>Pos.</i>	Neg.
W344F	P	8/15/01	<i>1:1280</i>	--	<i>1:24</i>	<1:16	Neg.	Neg.
W345F	P	8/15/01	<i>1:2560</i>	--	<i>1:24</i>	<1:16	Neg.	Neg.
W347F	P	8/16/01	<i>1:1280</i>	--	<i>1:16</i>	<i>1:128</i>	Neg.	Neg.
W348M	A	5/23/01	<i>1:1280</i>	1:4	<i>1:768</i>	<i>1:40</i>	Neg.	Neg.
W349F	P	7/25/01	1:20	--	1:8	<1:16	<i>Pos.</i>	Neg.
W350F	P	7/26/01	1:20	--	<i>1:16</i>	<i>1:16</i>	Neg.	Neg.
W351M	A	6/17/00	<i>1:640</i>	$\geq 1:512$	<i>1:256</i>	<i>1:40</i>	Neg.	Neg.
W352F	A	5/1/01	<i>1:1280</i>	1:8	<i>1:16</i>	<i>1:40</i>	Neg.	Neg.
W353M	P	9/12/00	<i>1:2560</i>	1:4	<i>1:16</i>	Neg.	Neg.	Neg.
W355M	A	6/28/01	--	--	--	--	--	--
W360M	P	6/18/01	--	--	--	--	--	--
W361M	P	6/21/01	--	--	--	--	--	--
W366M	P	6/20/01	--	--	--	--	--	--
W367F	A	5/26/01	<i>1:640</i>	1:4	<i>1:12</i>	<i>1:40</i>	Neg.	Neg.
W368M	A	7/12/01	--	--	--	--	--	--
W369F	A	6/25/01	--	--	--	--	--	--
W370F	A	6/30/01	--	--	--	--	--	--
W376F	Y	6/12/01	--	--	--	--	--	--
W388M	A	7/25/01	<i>1:1280</i>	--	<i>1:1024</i>	<i>1:512</i>	<i>Pos.</i>	Neg.
W389F	P	7/25/01	<i>1:80</i>	--	1:4	<i>1:256</i>	Neg.	Neg.
W390F	P	7/30/01	1:40	--	1:8	<i>1:512</i>	Neg.	Neg.
W391M	P	7/27/01	1:40	--	1:8	$\geq 1:512$	Neg.	Neg.
W392M	P	7/25/01	1:40	--	<i>1:12</i>	<i>1:512</i>	Neg.	Neg.
W393F	P	7/31/01	1:20	--	1:8	<i>1:512</i>	Neg.	Neg.
W394M	Y	8/5/01	<i>1:2560</i>	--	<i>1:384</i>	<i>1:128</i>	<i>Pos.</i>	Neg.

Table 7. cont.

Wolf # & Sex	Age	Date Captured	Serum CPV	ICH	CDV	EE	Lyme	Blasto
W395M	A	8/16/01	--	--	--	--	--	--
W724F	A	9/11/01	<i>1:320</i>	--	<i>1:256</i>	<i>1:128</i>	Neg.	Neg.
Positive/ Total Tests			24/34	8/16	20/34	26/34	11/34	0/34

Serum CPV = Serum canine parvovirus, positive value >1:40 (Dr. Dubovi, Cornell Diagnostic Lab, 9-10-02)

ICH = Infectious canine hepatitis, positive value >1:8

CDV = Canine distemper virus, positive value >1:8 (Dr. Dubovi, Cornell Diagnostic Lab, 9-10-02)

EE = Ehrlichia equi, >1:16

Lyme = Lyme disease

Blasto = Blastomycosis

Table 8. Wolf depredation cases on livestock and pets in Wisconsin, July 2001 through June 2002.

Date	Animal Lost	Pack Involved	County	Payments	Other Actions
7/5/01	1 dog (Plott)	Siskiwit Lake	Bayfield	\$500.00	None
7/17/01	9 calves (since May)	Chase Brook	Burnett	Pending	7 livetrapped & translocated
7/18/01	2 dogs (Walker, Plott)	Siskiwit Lake	Bayfield	\$4,500.00	None
7/21/01	1 dog (Walker)	Shoberg Lake	Douglas	\$2,500.00	None
7/29/01	1 dog (Walker)	Shoberg Lake	Douglas	\$2,500.00	None
8/4/01	1 calf	Spirit Lake	Price	\$475.00	None
8/6/01	1 calf	Tranus Lake	Washburn	\$600.00	None
8/13/01	1 dog (Walker)	Kidrick Swamp	Taylor	\$2,500.00	None
8/21/01	1 dog injured (Terrier) 9 chickens 8 turkeys 1 guinea	Moose Lake or Loner	Douglas	\$290.98	None
9/7/01	5 dogs (4 Plott, 1 Walker)	Casey Creek	Douglas	\$12,000.00	None
9/9/01	1 dog (Bluetick)	Bird Sanctuary	Douglas	\$1,500.00	None
9/16/01	1 dog (Redbone)	Siskiwit Lake	Bayfield	\$2,000.00	None
9/22/01	2 dogs (Walker)	Tranus Lake	Washburn	\$5,000.00	None
12/17/01	1 dog (Redbone)	Pelican Lake	Oneida	Refused	None
12/25/01	1 dog (Walker)	Pelican Lake	Oneida	\$1,651.60	None
1/03/02	1 dog (injured)	Bear Bluff	Jackson	\$53.00	None
1/03/02	3 calves	Moquah	Bayfield	\$2,150.00	None
1/28/02 & 4/16/02	5 deer (deer farm)	Loner?	Bayfield	\$8,100.00	Trapping attempted
2/15/02	1 dog (injured)	Bear Bluff	Jackson	\$85.00	None
4/18/02	2 calves	Blue Hills	Barron	\$1,400.00	Trapping attempted
5/11/02	2 calves	Unknown	Taylor	Pending	
5/13/02	1 dog (injured)	Unknown	Taylor	No claim	1 trapped & translocated
5/18/02	2 calves	Skinner Creek?	Price	Pending	Trapping attempted
6/27/02	4+ calves 1 cow	Totagatic River	Burnett	Pending	Trapped & translocated W295
24 cases	63 animals killed 4 animals injured	18+ packs 1-2 loners	9 counties 8 farms 1 deer farm	\$47,805.58	9 livetrapped & translocated
	24 calves killed 1 cow killed 5 deer killed 17 dogs killed 4 dogs injured 9 chickens killed 8 turkeys killed 1 guinea killed				

Table 9. Suspected wolf-dog hybrid incidents and problems in Wisconsin, 1 July 2001 – 31 June 2002.

Date	County	No. of wolf-dogs Age/Sex	Problem	Outcome
7/10/01	Sheboygan	1 A/M	Obtained by shelter	Unknown
7/16/01	Marathon	3 ?/?	Running lose	Recaptured by owner
8/7/01	Wood	1 A/?	Running lose	Unknown
8/24/01	Washington	1 A/?	Running lose	Unknown
9/18/01	Marathon	? A's & P's/?	Running lose	Unknown
10/13/01	Kenosha	1 A/M?	Died at home Picked up by warden	Returned to owner?
10/29/01	Barron	1 A/F?	Left behind at house Picked up by warden	Turned over to shelter
12/10/01	Jackson	1 A/?	Killed chicken	Unknown
1/3/02	Vilas	1 P/?	Running lose	Unknown
1/12/01	Washington	1 ?/?	Died in wild	Owner buried
2/7/02	Juneau	2 A/?	Running lose	Unknown
2/22/02	Price	1 A/?	Threatening chickens	Unknown
2/25/02	Price	1 A/M	Shot to death Picked up by warden	Made into study specimen
3/5/02	Dane	1 A/? w/"red" collar	Running lose	Unknown
4/10/02	Racine	1 A/?	Running lose	Unknown
4/16/02	Oconto	1 A/?	Found dead	Left to decompose
5/20/02	Forest	1 A/M	Hanging close to school; mangy	Shot by warden
6/12/02	Ashland	Unknown	Killed 1 calf, Injured 1 calf	Unknown

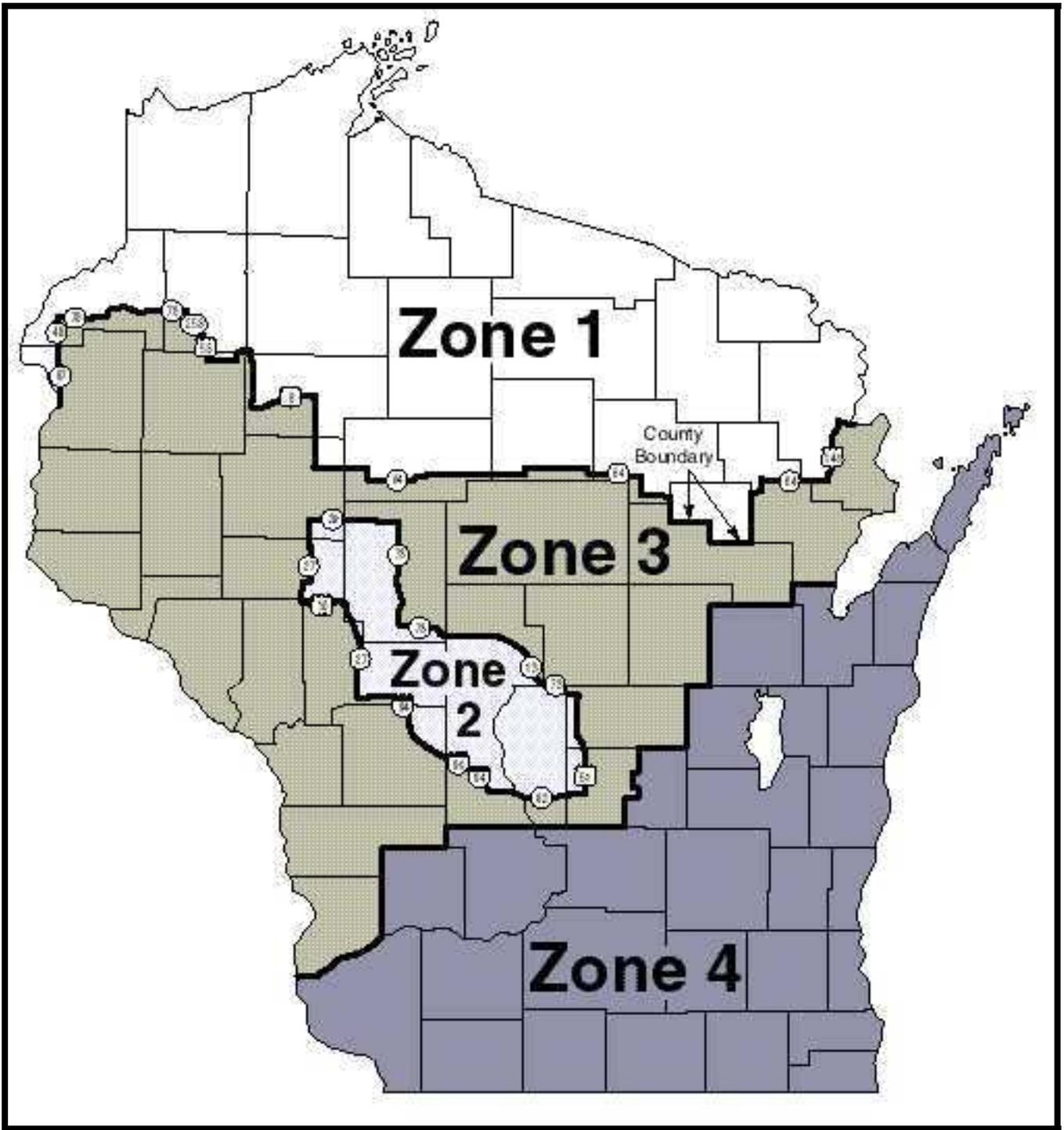


Figure 1. Wisconsin Wolf Management Zones as established by the 1999 State Wolf Management Plan.

Figure 2. Gray Wolf Distribution in Wisconsin: Winter 2001-2002

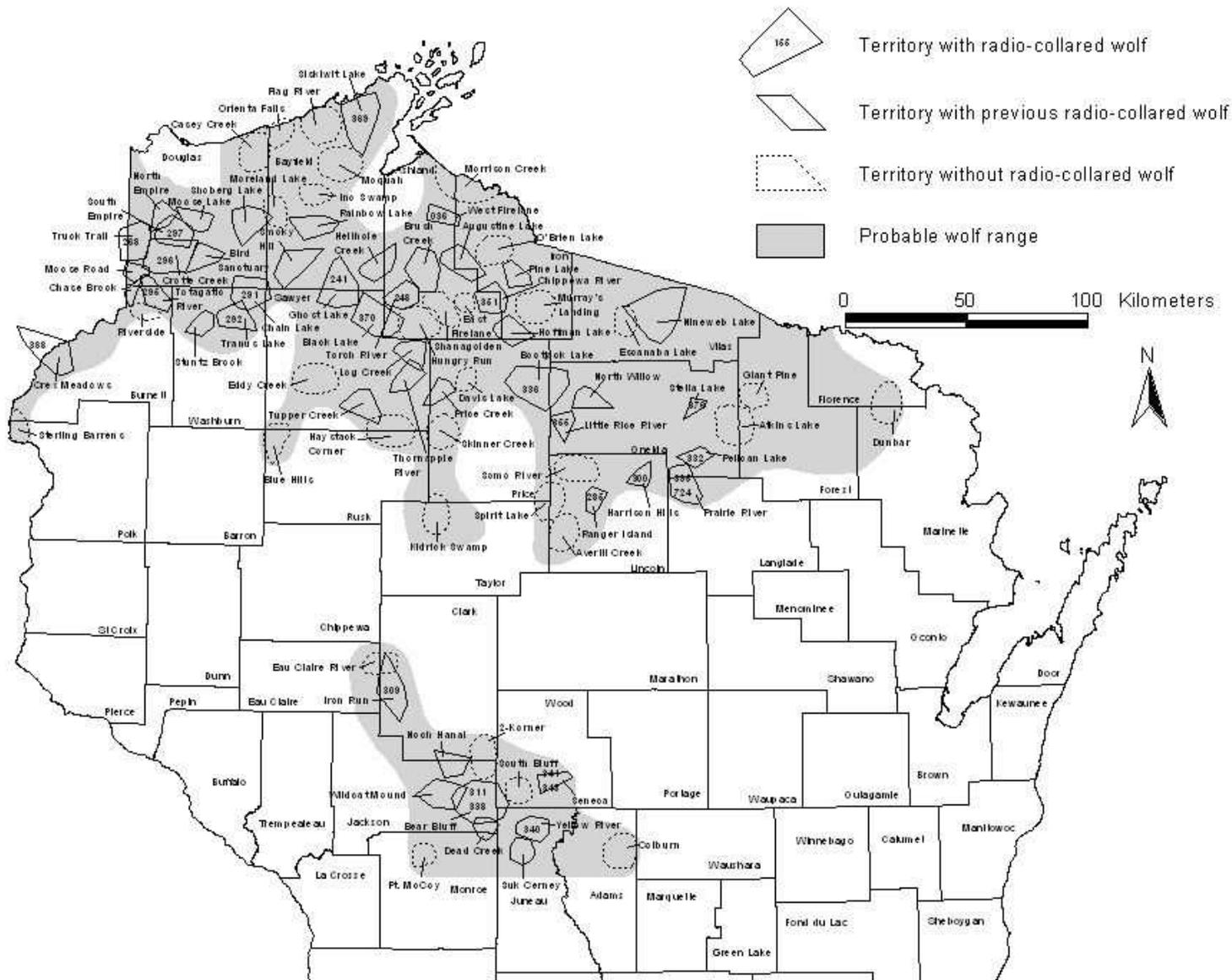


Figure 3. Changes in Wisconsin Gray Wolf Population: 1980-2002

