PROGRESS REPORT OF WOLF POPULATION MONITORING IN WISCONSIN FOR THE PERIOD OCTOBER - MARCH 2004

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ABSTRACT

Gray wolf (*Canis lupus*) populations have been monitored continuously in Wisconsin since 1979 using radio telemetry, snow track surveys and collecting reports of wolf observations. The Wisconsin DNR began the state delisting process in fall 2003, and should complete delisting in summer 2004. The federal government downlisted wolves to threatened in 2003, and should begin a delisting process later in 2004. A minimum count over winter 2003-2004 consisted of 373 to 410 wolves in about 108 packs and 14 loners. A total of 361 to 398 wolves occurred outside of Indian reservations, representing the first year at the state management goal of 350

wolves outside of Indian reservations. The state wolf population increased 11% from last year's wolf population of 335 wolves. Mean winter home range of 22 adult wolves was 32 square miles. Total occupied range of territorial wolves was 5161 square miles at a density of 1 wolf per 14 square miles. An estimated 105 to 150 wolf pups were present in late winter for an average survival rate of 26%.

INTRODUCTION

Gray wolves (*Canis lupus*) were extirpated from Wisconsin in the late 1950's following a state bounty program that lasted from 1865 to 1957 (Thiel 1993). Elimination of the bounty in Wisconsin as well as in Michigan (1960) and Minnesota (1965), and endangered species designations, allowed wolves to recolonize Wisconsin in the mid 1970's (Wydeven et al. 1995). The state of Wisconsin listed the gray (timber) wolf as a state endangered species in 1975, and began formal population monitoring in 1979 (Wydeven et al. 1995). Intense population monitoring of wolves was considered an important management strategy in the 1989 recovery plan (Wisconsin DNR 1989), and the 1999 state wolf management plan (Wisconsin DNR 1999). Wolves were reclassified as a state threatened species on October 1, 1999. On March 24, 2004 the Wisconsin Natural Resources Board voted to remove the gray wolf from the state list of threatened and endangered species. Publication of state statues later this year will finalize the rule change.

The U.S. Fish and Wildlife Service listed the eastern gray wolf as an endangered species in 1967 and again in 1974 under the 1973 Endangered Species Act (U.S. Fish and Wildlife Service 1992). Wolves were reclassified to threatened in 1978 in Minnesota. Wisconsin, Michigan and the remainder of the Eastern District Population Segment were downlisted to threatened on April 1, 2003. A population of 100+ wolves in Wisconsin and Michigan for 5 or more years and a stable population in Minnesota were criteria for delisting the Eastern DPS. The combined state populations have exceeded 100 wolves for Wisconsin and Michigan since 1994, and currently there are at least 734 wolves; thus have been at the 100+ goal for 11 years. The federal delisting process for the Eastern DPS of gray wolves is expected to begin in 2004, and may be completed in 2005.

The state delisting goal of 250 wolves outside of Indian reservations was initially achieved in 2002, and after one year at that goal, the Wisconsin DNR began holding state delisting hearings in fall 2003. The state delisting process will be finalized later in 2004, and wolves will then be listed as protected wild animals in Wisconsin Statutes (NR10.02). The state management goal of 350 wolves outside of Indian reservations appears to have been achieved in 2004, and will lead to more liberal controls to keep the population near 350 once federal delisting is completed.

The present report covers surveys conducted in Wisconsin from October 2003 through March 2004, but some survey information extends from mid September 2003 to mid April 2004. This report documents the mid and late winter wolf population in the state, and represents the 25th consecutive year of these winter wolf population surveys. In addition to this traditional survey, the Wisconsin DNR, Science Bureau conducted a different survey of wolf abundance in the state relying more on wolf sign observations by agency personnel, similar to surveys conducted by Minnesota DNR every 6 –8 years (Fuller et al 1992). Tim Van Deelen and Amber Roth coordinated this survey and will present results in a separate report.

ACKNOWLEDGEMENT

Many people assisted with monitoring and documenting the Wisconsin wolf population. DNR pilots monitoring radio collared wolves from the air included Mike Weinfurter, Phil Miller, John Bronson, Joe Sprenger, Paul Anderson, Dan Cardinal, Bob Clark and Larry Waskow. Jane Wiedenhoeft monitored wolves in northwest Wisconsin and coordinated data analysis and summaries. Sarah Boles monitored wolves in northwest Wisconsin and coordinated the volunteer tracking programs. Ron Schultz monitored wolves in northcentral and northeast Wisconsin, and coordinated equipment acquisition and preparations. Adrian Wydeven monitored wolves throughout northern Wisconsin, and coordinated the state wide wolf program. Dick Thiel coordinated wolf monitoring in central Wisconsin with Wayne Hall, other DNR workers, and UW-Stevens Point graduate student Ellen Heilhecker. Randy Jurewicz coordinated carcass transport and distribution, coordinated depredation payments, assisted on surveys and addressed policy concerns. Dr. Julie Langenburg and Kerry Beheler coordinated wolf health monitoring. Wolf necropsies were performed by Dr. Nancy Thomas and Dr. Valerie Bochsler, and were coordinated through Dr. Grace McLaughlin at the National Wildlife Health Center in Madison. Other DNR personnel assisting on surveys included: Greg Kessler, Buck Follis, Nancy Christel, Gary Dunsmoor, Paul Kooiker, James Harbough, Diana Downes, Fred Strand, Lowell Tesky, Dan Hoeft, John Olson, Pat Rominski, Rick Weide, Jon Robaidek, Pat Coffen, Bill Wood, Amber Roth, Dan Haskell, Chuck McCullough, Tom Marquardt, Darryl Hardy, Rick Greene, Phil DeWitt, Angela Steward, Aaron Buchholz, Todd Naas, and Michelle Hefty. USDA-Wildlife Service personnel were involved in investigating wolf depredations, providing advice to owners of domestic animals, providing non-lethal controls, and trapping problem wolves under direction of Bob Willging (northern Wisconsin) and Dan Hirchert (southern and central Wisconsin), and included Dave Ruid, Eric Fromm, Ed Zydzik, Phil Peterson, Jim Rollman, Jeremy Irish, Jim Miller, DeWayne Snobl and Kelly Thiel. Wolf surveys were also conducted by Don Reiter on the Menominee Reservation, Tom Dolittle on the Bad River Ojibwa Reservation, and Ho Chunk members in central Wisconsin, including Randy Poelma, Adai Mann, Bill Quackenbush and April Riley. Additional assistance on wolf surveys was also provided by Pam Troxell (Timber Wolf Alliance); Dean Beyer, Brian Roell and Monica Joseph (MI DNR); Mike Pecynski, Kathy Moe, Scott Anderson and Tom Matthiae (U.S. Forest Service); Tom Gehring and Jason Hawley (Central Michigan University) and Tim Wilder (U.S. Army-Fort McCoy). One hundred and thirteen people participated in volunteer carnivore tracking surveys and are listed in Appendix 2. Volunteer coordinators Alice & John Droske, Ron Harris, Pam Troxell, Marie Ericksen, Karl Pilch, Jim Williams, Nancy & Al Warren, Norm Poulton, Chris Giese, Ron VanderVelden, Linda Nelson, Judy Ettenhofer, and Mike Ravet coordinated volunteer tracking efforts in their regions and provided tracking updates. Volunteer Jason Faunce provided assistance with CyberTracker software. Mary Singsime typed this report.

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METHODS

A territory mapping system (Fuller et al. 2002) was used to determine the Wisconsin wolf population. Radio telemetry surveys were conducted as described by Mech (1974), and were used to determine territory distribution and wolf numbers for packs with collared wolves (Fuller and Snow 1988). Aerial locations were obtained on VHF radio collared wolves about once per week. Wolves were trapped from early May to early September and attempts were made to obtain one collared wolf in about half to one third of the packs in the state (Wydeven et al. 1995, Wisconsin DNR 1999). Movements of collared wolves were assumed to represent the general movements of the pack, and maximum count obtained from the air in mid or late winter was assumed to represent the whole pack. When collared wolves moved outside of known territories in extraterritorial moves or dispersals, the collared wolves were assumed to be traveling by themselves. Wolves were rarely observed from the air in Wisconsin, except during winter when collared wolves were observed about 30% of the time, but during poor snow years, such as 2002-2003, wolves were observed 11% of the time. Pilots made special efforts to visually observe wolves from December through March. Numbers of visual observations were reported for all collared wolves in relationship to total radiolocations during the period of December through March.

Home range areas in the winter period (15 September-14 April) were calculated using the minimum convex polygon (Mohr 1947). Isolated locations more than 5 kilometers (3.1 miles) from other points were considered extra territorial moves (Fuller 1989). Areas between clusters of radiolocations more than 5 km apart were considered part of the home range area if there was regular movements between clusters.

During spring and summer 2003, Jason Hawley and Thomas Gehring of Central Michigan University conducted research testing shock collars as a means to deter wolves from specific areas. This system is being tested as a procedure for deterring wolves from areas of livestock concentration. The progress report of this activity was reported separately (Hawley 2004).

During summers 2002 and 2003, Ellen Heilhecker and Dr. Eric Anderson of University of Wisconsin-Stevens Point assessed pup mortality by capturing wolf pups and fitting with special ear pierced transmitters. These transmitters were designed to transmit for about 6 months. The pups were monitored once per week from the air, and daily on the ground until mid January, or when the signals were lost. Details of this research were reported elsewhere (Heilhecker 2003).

Snow tracking and sign surveys (Thiel and Welch 1981, Wydeven et al. 1996) were used by DNR trackers to obtain counts of wolves in packs without collared wolves, or to supplement survey information for collared packs where few observations were made from the air. Presence of raised leg urinations (RLU's) especially double raised leg urinations (urinations by both alpha male and female) were used to determine territory marking and likeliness of breeding activity (Peters and Mech 1975). Estrus blood in the snow with the RLU's of alpha females further demonstrated likely breeding activity (Rothman and Mech 1979). Breeding status was surmised for some packs based on regular breeding history in the past, or large pack size, and in some cases was determined by observation of freshly excavated den sites in late winter. Surveys were conducted by slowly driving snow covered roads within 1 to 3 days after new snow falls. During a specific survey, as many snow covered roads as possible were followed within specific survey blocks that covered about 200 square miles each (Wydeven et al. 1996, Appendix 3). Roads were followed until wolf tracks were encountered and these tracks were backtracked and forward-tracked to see where they joined and left the road. Separations of packs were

determined by distance between track and sign observations, direction of movements, timing of observations, presence of radio collared packs, historical pack use of an area, and knowledge of focal points such as den sites and rendezvous sites.

Attempts were made to conduct track surveys across most of the heavily forested areas of northern and central Wisconsin. Track surveys were especially focused on areas with historical wolf presence, recent observations of wolves, or areas of highly suitable wolf habitat (Mladenoff et al. 1995). Although emphasis was on conducting surveys in fairly recent snow, surveys in older snow did allow detection of wolf presence and of wolf breeding activity (RLU's), but older snow was less suitable for precise counts due to vehicle activity, snowplowing, melting-freezing, and perhaps multiple passages by wolf packs.

Along with DNR trackers, volunteer trackers representing other agencies or the general public helped provide additional snow track surveys. This was the ninth year for the volunteer tracking program. Most heavily forested and mixed forest areas were subdivided into 133 survey blocks (Appendix 3, Wydeven et al. 1996). Volunteers were asked to conduct at least 3 "good" surveys per block, and track about 60-100 miles of road. All volunteers were required to attend weekend wolf ecology courses and day-long track training programs.

Public and agency reports on wolf observations were also used for determining wolf abundance and distribution. Such surveys were included in the state wolf count only if verified by experienced trackers, or photos or videos, if available, to verify wolf identification and counts. Track observations were used as part of the state wolf count only from experienced trackers, or from well documented observations (photos, plaster casts, scats collected, etc.).

Wolf packs along the border with Michigan or Minnesota were included in the Wisconsin wolf count if they appeared to have more than 50% of their home range or territory in Wisconsin. Thus some Minnesota and Michigan packs that overlapped only slightly into Wisconsin were not included as part of the state count.

Area of wolf occupancy across the state was determined by summing up the area of all packs and multiplying by 1.37 to include 37% interstitial areas around the territories (Fuller et al. 1992). Current year's information on home range was used for collared packs, and the most recent values obtained within the last 3 years were used for previously collared packs. Statewide average values for territorial adult wolves were used to estimate area for non-collared packs or packs not collared in the last 3 years.

Pup estimates in packs during winter were determined by change in numbers from previous surveys, knowledge of pup presence from summer howls and observations and knowledge of pack composition from previously captured wolves. Pup survival was estimated by taking the midpoint of the range of estimated pups in winter, and dividing by the number of breeding females the previous winter, multiplied by 5.2 pups (the mean number of implanted fetuses in 5 adult females examined in Wisconsin in the 1980's and 1990's).

RESULTS AND DISCUSSION

A total of at least 108 packs were detected in Wisconsin in winter 2003-2004 (Figure 1). Wolf packs were detected in 30 Wisconsin counties including 20 counties in northern Wisconsin, and 10 counties in central Wisconsin. Radio collared wolves occurred in at least 38 packs (35%) during part of the winter survey.

Fifty-two radio tagged wolves were monitored during winter in 38 Wisconsin packs, and 2 Minnesota packs (Table 1). Twenty-two went off the air in winter including 10 that died, 2 dispersed to Michigan, 2 lost transmitters, and signals were lost on 8 wolves. The 49 wolves monitored in Wisconsin included 15 adult males, 20 adult females, 1 yearling male, 6 yearling females, 3 pup males and 4 pup females. By the end of winter, wolves remaining on the air included 9 adult males, 14 adult females, 1 yearling male, 4 yearling females and 1 male pup.

Mean home range of 28 wolves located 20 or more times was 32 square miles (Table 2). Average of 18 wolves in northern Wisconsin (zone 1) was 36 square miles, 5 wolves in zone 2 was 29 square miles, and 5 wolves in zone 3 was 19 square miles. Mean territory size for 22 adults was 32 square miles, and ranged from 8 square miles for adult female 341F (Seneca Pack), to 69 square miles for adult male 355M (Little Rice River Pack.). Wolf 341F died in mid-winter, thus the territory area was probably minimum.

Dispersing Wolves

Wolf 249F was caught as a yearling female on 24 October 2002 in the Price Creek Pack of western Price County. Her signal was lost after 10 December 2002 east of her territory. She was shot on 16 February 2004 in southern Door County, 178 miles to the east.

Wolf 426F was caught as a yearling female in the Bear Bluff Pack of eastern Jackson County on 2 July 2002. She was last in the Bear Bluff Pack on 11 December 2003. Initially she moved to the northeast into Wood County, but by 16 February 2004 she had settled into the Caves Creek area northwest of Westfield in Marquette County with one other wolf. Wolf 426F remained in the Caves Creek area, 42 miles southeast of the Bear Bluff territory for the remainder of the winter period.

Wolf 446F was captured on 13 June 2002 in the Casey Creek Pack of northern Douglas County. In winter 2003 she moved south through Shoberg Lake Pack area, and by spring 2003 appeared to have joined the Frog Creek Pack in northern Washburn County. In fall 2003, wolf 446F began to shift her home range southward, and by mid-winter occupied a home range near Springbrook, and was seen with another wolf on one flight. The home range area was east of the Tranus Lake Pack and was 40 miles south of the Casey Creek Pack.

Wolf 448F was captured as a yearling female in the Pine Lake Pack of central Iron County on 20 May 2002. She made some exploratory moves to the East Side Firelane Area in Ashland County in October and November 2003, but returned to her natal territory in early December. She was last detected near the Pine Lake territory on 19 December, but by 22 December she was 12 miles to the south of the territory in north Price County, and was lost afterwards.

Wolf 456F was captured on 12 July 2002 as a depredating wolf in northern Burnett County, and was translocated to southwest Vilas County. In winter 2002-2003, wolf 456F seemed to have joined the Somo River pack in northern Lincoln County. In December 2003 and January 2004, she gradually joined the Spirit Lake Pack six miles to the south.

Wolf 459M was captured as an adult male on 26 October 2002 in the Hoffman Lake Pack of northern Price County. In February 2003, he made several moves east of the Flambeau Flowage, east of the pack, and was last located on 7 April 2003 in the Murray Landing Pack, east of the Hoffman Lake Pack. He was rediscovered on 5 February 2004 70 miles to the northeast in Ontonagon Michigan. He was turned over to Michigan DNR for monitoring.

Wolf 464F, adult female, was captured in the Moreland Lake Pack on 16 May 2003 in western Bayfield County. It was last detected in the Moreland Lake territory on 10 November 2003. On 21 November, 464F was detected in the southern part of the Rainbow Lake Pack. On 17 December 2003 she was found dead in that pack area, apparently killed by the Rainbow Lake pack.

Wolf 466F was captured as a yearling female in the Bootjack Lake Pack area in northwest Oneida County on 2 July 2003. She was last detected in her natal territory on 22 December 2003. On 31 December she was 19 miles to the

north in Vilas County and on 5 February 2004 was 58 miles to the northeast in Houghton County, Michigan. She was turned over to Michigan DNR for monitoring after 12 February 2004.

Wolf 474M was captured as an adult male in the Dunbar Pack of northern Marinette County on 19 May 2003. He was last detected in the Dunbar Pack on 31 December 2003. He was lost for sometime afterward, but was again found on 6 April 2004 in eastern Menominee County 49 miles to the south, and west of the Oconto River group. Wolf 474M had apparently not settled down and continued moving westward.

Wolf 479M was caught as a pup male on 23 August 2003 in the Ranger Island pack in Lincoln County. He was last located in the pack area on 22 March 2004. By 30 March he had moved into Spirit Lake pack in southeast Price County. He was last located near Prentice in Price County on 6 April 2004, about 17 miles northwest of his home territory.

Wolf 481M was captured as an adult male in the Murray's Landing pack in Iron County on 6 August 2003. He was last located in that pack on 25 February, and began dispersing to the south into Price County. He was located east of Phillips in Price County on 6 April 2004, 25 miles to the south.

An *Adult male* wolf was shot in western Marinette County on 23 November 2003. The area was about 12 miles south of the Dunbar pack, the nearest pack. Thus this probably was a disperser passing through the area.

An *Adult female* wolf was killed on highway 29 in western Marathon County on 6 January 2004. The nearest pack was 15 miles to the north.

A *yearling female* wolf was killed on 28 January 2004 along I-94 in Jefferson County near Johnson Creek and the Rock River. The location was 98 miles southeast of the nearest breeding pack. A female wolf pup (11 month old) from Michigan died near the same mile marker along I-94 on 9 March 2001. Both wolves were apparently following the Rock River.

On 29 January 2004, a *yearling female* was killed by vehicle collision west of Appleton on Highway 76 in Outagamie County. The nearest breeding pack of wolves was located 80 miles to the west. On 2 March 2004 a wolf was photographed with a trail camera in a nature center 3 miles north of the location where the yearling female had died. Possibly the two wolves were traveling and dispersing together. By early spring, the second wolf seemed to have moved away, and possibly it had also been hit by a vehicle.

A *yearling female* was killed by vehicle collision southwest of Pittsville on 22 February 2004. Possibly the wolf had dispersed from the Seneca pack east of Pittsville.

On 31 March 2004 a *yearling male* was found shot to death near the Wisconsin River in northern Portage County. This wolf perhaps dispersed from the Mead pack to the west.

Wolf Telemetry Summary

DNR pilots detected a total of 99 wolves while locating radio collared wolves in the state (Table 3). Pilot observations thus represent 27% of wolves counted in the state (373 wolves). Last year (2003) pilots observed 39% of 335 wolves estimated in the state.

Percentage of time that collared wolves were observed from the air by pilots was 24% for winter 2003-2004, compared to 11% last year, but 32% in 2001-2002. In northern Wisconsin (Zone 1), 8 wolves were not observed at all, but these were located 6 or less times. In the Central Forest (Zone 2), only 2 of 8 collared wolves were observed from the air. Only 1 wolf of 8 in Zone 3 was not observed from the air. Mean size of 21 packs observed from the air was 3.9 wolves (STD 2.0), and ranged from 2 to 9 wolves.

Wolf Mortality and Disease

Twenty-one wolves were found dead in Wisconsin during the winter study period, including 10 radio collared wolves (Table 4). Overall mortality included 7 shootings (33%), 7 vehicle collisions (33%), 6 mange (29%), and 1 killed by other wolves (5%). Cause of death among radio collared wolves included 5 shootings (50%), 4 mange (40%) and 1 killed by other wolves (10%). Human caused mortality accounted for 67% of all dead wolves and 50% of the radio collared sample. No collared wolves were killed by vehicles. High rate of losses by shooting occurred on collared wolves in the central forest.

Mange was an important mortality factor, and was responsible for 40% of the deaths of collared wolves. Generally death from mange is mainly detected through radio telemetry surveys. From 34-43 packs (31-40%) had no pups surviving by mid late winter in 2004, and losses due to mange may have been a major mortality factor.

Wolf Depredation on Domestic Animals

Nine cases of wolf depredation occurred during the winter period, and involved the death of 12 animals and injured 2 animals (Table 5). The injury to one dog may have been due to attack by a wolf-dog hybrid. Depredations included death of 6 game farm deer, 4 cattle, 2 dogs killed and 2 injured. Livestock depredation occurred on 4 farms and involved one or two packs and loners. Three different packs were involved in attacks on dogs.

Total wolf complaints involving wolf depredation verification, and wolf threats with control actions included 18 cases (Table 6). Trapping was attempted at 3 locations, and non-lethal controls were applied at 7 locations (5 farms and 2 residences). USDA-Wildlife Services worked closely with farms where threats of wolf depredation occurred, or on farms that had wolf depredation in previous years.

Forty-four wolf complaints were investigated by Wildlife Services during the period (includes depredation, injury, missing animal, & threat complaints) and these included 10 confirmed wolf, 5 probable wolf, 18 unconfirmed, and 11 confirmed non-wolf (8 coyote & 3 dog)

Reported Wolf Observations

All wolf observations received by the wolf program were recorded and catalogued, and those observations considered “probable” or “possible” are reported in Table 7. Between October 2003 and March 2004, we received 145 reports of probable and possible wolf observations. This was down from 235 reports for the same period last year (Wydeven et al. 2003), but this was in part due to an additional survey conducted this winter in which agency personnel were asked to report wolf observations to Tim Van Deelen with DNR Science Bureau. Thus we expected a decline in observations by agency personnel.

Wolf observations were reported for 32 counties during winter 2003-2004, compared to 37 counties in winter 2002-2003. Most reports were from counties in Zones 1 and 2 , that contained most wolf packs, but reports of wolf observations were also received for 8 counties that were

mostly in Zone 3 (marginal habitat), and 6 counties in Zone 4 (unsuitable habitat) (Figure 2). Counties with highest rates of observations included: Oneida (17), Marinette (14), Price (13), and Washburn (12). Observations in Zone 4 were probably mainly of dispersers, and during the period wolves were killed in Door, Jefferson, and Outagamie Counties, indicating that extensive dispersal was occurring in eastern Wisconsin in that zone.

Volunteer Track Surveys

Volunteer trackers returned data for 69 survey blocks (71%) of 97 assigned blocks (Table 8). Additional DNR trackers surveyed 86 blocks, and the two groups tracked 106 of 133 designated survey blocks in the state. Blocks not surveyed included 6 blocks surveyed by radio telemetry monitoring, 5 blocks where the wolf population was estimated from wolf observation reports, 2 blocks that were tribal lands, and the remainder were blocks in areas of marginal wolf habitat. The blocks surveyed included all the areas of highly suitable wolf habitat (Mladenoff et al. 1995). Return rate of surveys by volunteers was better than 2003, when surveys were returned for only 56% of blocks assigned. Better tracking conditions in 2004 may have resulted in higher return rates. Volunteers detected 171-185+ wolves along 4869.0 miles of survey, and DNR trackers counted 279 –313+ wolves along 3655.2 miles of survey. Volunteers averaged 3.4 surveys per block, covering 70.6 miles, and 13.0 hours per block.

Forty-nine blocks were surveyed by both DNR and volunteer trackers. DNR detected 159 –180 wolves, and volunteer trackers detected 130-143 wolves in these blocks. DNR detected more wolves in 17 blocks, less wolves in 17 blocks, and the same in 15 blocks. In 19 of the 34 blocks where counts differed, the group with the higher count had tracked considerably more miles than the group with the lower count. In 5 of the 15 blocks where the counts were the same, both detected 0 wolves. Overall it appears that both groups are detecting similar numbers of wolves, and the volunteer tracking effort greatly expands the ability for the DNR to detect and count wolves.

Statewide Wolf Count

The Wisconsin wolf population estimated in mid to late winter 2004 was 373 to 410 wolves in 108 groups or packs and 14 loners (Table 9, Figure 3). This count is the minimum estimation of wolves in the state in late winter. As usual, lone wolves are probably under counted, as evidenced by road kill of wolves in areas distant from pack areas such as Jefferson, Outagamie and Door counties.

The wolf count in 2003 was 335 to 353, thus the population in 2004 had increased by 11%. The Wisconsin wolf population increased at an average rate of 20% annually from 1985 through 2002, but the last 2 years it has increased an average of about 7% annually.

A total of 361 to 398 wolves occurred in Wisconsin outside of Indian reservations. This represents the first year the wolf population has achieved the state wolf population goal of 350 wolves outside of Indian reservations. If federal delisting is completed within the next year, expanded population controls will be applied to the wolf population (pro-active government trapping, private landowner controls and possible public harvest).

An estimated 105 to 150 wolf pups survived to mid or late winter 2004. Using the midpoint of 128 pups and 94 possible breeding packs in 2003, estimated pup survival was 26% statewide.

Estimated pup survival was 27% for northern Wisconsin and 24% for central Wisconsin. Between 31 to 40 packs had no surviving pups by mid to late winter (29-37%), although some of these were packs formed in the last year. Sarcoptic mange may have reduced survival of pups in some packs, and has been fairly severe in central Wisconsin the last 2 years.

The area of occupied wolf territories was estimated for the 108 packs in the state and covered about 3767 square miles. Allowing for 37% interstitial area (Fuller, et al. 1992), total area covered by wolf packs was about 5161 square miles. Therefore 359 to 396 wolves (excluding loners) occurred at a densities 1 wolf/13.0 square miles to 1 wolf/14.4 square mile. Estimated wolf range in northern Wisconsin was 4447 square miles at densities of 1 wolf / 13.2 to 14.6 square miles, and 695 square miles in central Wisconsin at densities of 1 wolf /12.3 to 13.2 square miles. Although the population of wolves increased in 2004, area of wolf range declined because of small average home range in winter 2004, and occupied area was similar to 2002 (5200 square miles).

It appears that the Wisconsin wolf population has continued to increase, although rate of growth has declined in the last two years. Thus it appears that the wolf population may be reaching it's carrying capacity. In 2004 the wolf population goal for Wisconsin has been achieved. Future challenges on wolf management will be to maintain the wolf population near this goal. Federal delisting, which may occur within the next year, will provide a more flexible system to manage the Wisconsin wolf population.

PLANS FOR NEXT SEASON

Live trapping and radio collaring of wolves will be done by WDNR from early May through early September. A Central Michigan University study on shock collars for reducing depredation by wolves will be conducting a second season of research this summer. USDA-Wildlife Services will investigate possible depredation by wolves, provide recommendations and non-lethal controls to landowners, and attempt to trap and euthanize problem wolves. The National Wildlife Health Center and DNR Wildlife Health Lab in Madison will investigate mortality and health of Wisconsin wolves. State delisting should be completed later this summer, and the federal delisting process should start later this year. A 5-year review of the 1999 wolf plan will be conducted later in 2004.

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Note*: This report is a preliminary report and should not be construed as a finalized publication. Some of the numbers of pack sizes, composition, population figures, and other information may change, as more data becomes available. Persons wishing to cite figures within the report should consult the author.*

Table 1. Radio-collared wolves monitored in northern and central Wisconsin and adjacent areas of Michigan and Minnesota 15 September 2003 - 14 April 2004.

Wolf Number	Age[a]	Pack/Area	Counties	Date Captured	Last Date	Locations[b]
Zone 1						
G994M	A	Ranger Island	Lincoln	19 Jun 03	04 Feb 04[c]	19
M036F	Y	West Firelane	Ashland	04 May 00[d]	Ongoing	153
248M	A	Torch River	Ashland/Sawyer	28 Jun 00	Ongoing	191
332F	A	Pelican Lake	Oneida	10 May 00[e]	25 Nov 03[c]	204
336M	Y	Disperser/Pike River	Marinette/Florence	03 Jun 01	Ongoing	129
351M	A	Chippewa River	Ashland/Iron	17 Jun 00	19 Dec 03[f]	178
355M	A	Little Rice River	Oneida/Price	28 Jun 01	Ongoing	144
376F	Y	Stella Lake	Oneida	12 Jun 01	Ongoing	152
432F	Y	Butler Rock/Disperser	Marinette/Oconto	25 Jul 02[g]	22 Oct 03[c]	82
438M	A	Flag River	Bayfield	21 May 02	03 Feb 04[f]	87
439F	A	Flag River	Bayfield	22 May 02	Ongoing	96
444F	A	Hellhole Creek	Ashland/Bayfield	25 Jun 02	Ongoing	90
446F	A	Springbrook	Washburn	13 Jun 02	Ongoing	94
447F	A	Bird Sanctuary	Douglas	21 Jun 02	Ongoing	95
448F	Y	Pine Lake/Disperser	Iron/Ashland/Price	20 May 02	27 Dec 03[c]	83
456F	Y	Tripoli lone?/Disp/Spirit L.	Linc./Oneida/ Price/Taylor	12 Jul 02[h]	Ongoing	90
457M	A	Round Lake	Sawyer	10 Sep 02	11 Dec 03[c]	59
458F	A	Johnson Springs?	Forest	04 Sep 02	20 Dec 03[f]	68
461F[*]	P	North Willow	Oneida	20 Nov 02	Ongoing	71
462M	A	Black Lake	Sawyer/Ashland	01 Jun 03	Ongoing	44
464F	A	Moreland Lake/Disperser	Bayfield	16 May 03	17 Dec 03[f]	31
466F	Y	Bootjack Lake	Price/Oneida	02 Jul 03	12 Feb 04[i]	28
469M	A	Murray's Landing	Iron	06 Aug 03	Ongoing	35
472F	Y	Bearsdale	Bayfield/Douglas	07 Nov 03[j]	Ongoing	23
473M	A	Moose Lake	Douglas	29 Jun 03	Ongoing	41
474M	A	Dunbar/Disperser	Marinette/Menominee	19 May 03	Ongoing	28
479M	P	Ranger Island/Disperser	Lincoln/Taylor	23 Aug 03	Ongoing	32
481M	A	Murray's Landing/Disperser	Iron/Price	07 Jul 03	Ongoing	39
482M	A	North Willow	Oneida	10 Jun 03	14 Nov 03[c]	22
485F	Y	Averill Creek North	Lincoln	07 Sep 03	Ongoing	29
489M	P	Averill Creek South	Lincoln	23 Aug 03	25 Nov 03[f]	14
497M	A	Pine Lake	Iron	28 Feb 04[k]	16 Mar 04[f]	4

Table 1. cont.

Wolf Number	Age[a]	Pack/Area	Counties	Date Captured	Last Date	Locations[b]
Zone 2						
311F	Y	Bear Bluff	Jackson/Wood	01 Aug 03[l]	Ongoing	391
338M	P	Rattail	Juneau/Wood	28 Jul 01	Ongoing	124
340F	A	Rattail	Juneau/Wood	05 Aug 01	16 Feb 04[f]	116
341F	Y	Seneca	Wood	31 May 01	16 Feb 04[f]	128
411F	P	Dead Creek	Jackson/Monroe/Juneau	23 Jul 03	25 Nov 03[f]	21
413F	P	Bear Bluff	Jackson/Wood	05 Aug 03	15 Mar 04[m]	26
414F	P	Seneca	Wood	10 Aug 03	27 Oct 03[c]	21
415F	P	Martin Marsh	Jackson	29 Aug 03	15 Sep 03[m]	5
416M	P	Wildcat Mound	Jackson	09 Sep 03	06 Nov 03[c]	12
426F	Y	Bear Bluff/Disp./Caves Cr.	Jacks/Wood/Marq/Adams	2 Jul 02[n]	Ongoing	73
429F	A	Martin Marsh	Jackson	3 Jun 02	Ongoing	76
Zone 3						
393F	P	Long Lake	Rusk	31 Jul 01[o]	Ongoing	138
449M	P	Oconto River	Oconto/ Menominee	18 Jul 02[p]	Ongoing	91
452F	P	Oconto River	Oconto/ Menominee	22 Jul 02 [p]	Ongoing	90
454F	A	Oconto River	Oconto/ Menominee	19 Jul 02 [p]	Ongoing	82
460F	A	Clam River	Polk/Burnett	17 Oct 02[q]	Ongoing	76
465F	A	Ft. McCoy	Monroe	13 Dec 02	Ongoing	12
MN & MI						
M206M	A	MN pack	Pine, MN	30 Jun 01[r]	05 Jan 04[f]	42
388M	A	Crex Meadow MN	Pine, MN	25 Jul 01	Ongoing	145
459M	A	Disperser	Ontonagon, MI	26 Oct 02	05 Feb 04[i]	26

Zone 1: 32 wolves in 27 packs, 19 still on air at end of monitoring period
Zone 2: 11 wolves in 7 packs, 4 still on air at end of monitoring period
Zone 3: 6 wolves in 4 packs, 6 still on air at end of monitoring period
MN & MI: 3 wolves, 1 still on air at end of monitoring period

[*]Possible hybrid
[a]Age at time of capture (P = Pup, Y = Yearling, A = Adult)
[b]Total locations from the time of capture
[c]Lost signal
[d]Captured in Gogebic County, Michigan
[e]Captured in deer farm in Oneida County, translocated to Forest County
[f]Mortality
[g]Captured by Wildlife Services on farm, translocated to Price County 30 Jul 2002
[h]Captured by Wildlife Services on farm, translocated to Vilas County 30 Jul 2002

Table 1. cont.

[i]Dispersed to Michigan
[j]Captured by coyote trapper
[k]Captured in cable restraint trial
[l]Recaptured wolf; first captured as a yearling in Jackson County on 24 Sep 2000
[m]Lost transmitter
[n]Recaptured wolf; first captured as a pup in Jackson County on 28 Jul 2001
[o]Captured by Wildlife Services, translocated to Oneida County 28 Aug 2001
[p]Captured by Wildlife Services on farm, translocated to Menominee County 29 Aug 2002
[q]Captured by Wildlife Services on farm, translocated to Vilas County 1 Nov 2002
[r]Captured in Dickenson County, Michigan

Table 2. Home range of wolves monitored in Wisconsin and adjacent areas of Michigan and Minnesota during winter 2003-2004.

Wolf Number	Age[a]	Pack/Area	No. of Winter Locations[b]	Winter Home Range (Mi^2)[c]
Zone 1				
G994M	A	Ranger Island	13	13
M036F	A	West Firelane	28	31
248M	A	Torch River	29(22)	44
332F	A	Pelican Lake	11	21
336M	A	Pike River	30(28)	28
351M	A	Chippewa River	15(14)	14
355M	A	Little Rice River	30	69
376F	A	Stella Lake	30	11
432F	Y	Butler Rock/Disperser	19	50
438M	A	Flag River	21	30
439F	A	Flag River	29	29
444F	A	Hellhole Creek	29	41
446F	A	Springbrook	31	44
447F	A	Bird Sanctuary	32	35
448F	A	Pine Lake/Disperser	14	NE
456F	A	Tripoli loner?/Spirit Lake	18(13)/12(10)	17/7
457M	A	Round Lake	14	42
458F	A	Johnson Springs?	15	6
461F*	Y	North Willow	30	43
462M	A	Black Lake	29(25)	28
464F	A	Moreland Lake/Disperser	15(9)	13
466F	Y	Bootjack Lake	15	64
469M	A	Murray's Landing	30(29)	29
472F	Y	Bearsdale	25(24)	33
473M	A	Moose Lake	32(31)	34
474M	A	Dunbar/Disperser	11(10)	13
479M	P	Ranger Island/Disperser	30(27)	20
481M	A	Murray's Landing/Disperser	30(23)	29
482M	A	North Willow	8	13
485F	Y	Averill Creek North	30(27)	67
489M	P	Averill Creek South	11(10)	29
497M	A	Pine Lake	5	1
		Mean for Zone 1 (20+ locations, n =18)		**35.8**

Table 2. cont.

Wolf Number	Age[a]	Pack/Area	No. of Winter Locations[b]	Winter Home Range (Mi^2) [c]
Zone 2				
311F	A	Bear Bluff	28(23)	34
338M	A	Rattail	28	39
340F	A	Rattail	22	31
341F	A	Seneca	22	8
411F	P	Dead Creek	11(9)	3
413F	P	Bear Bluff	16	18
414F	P	Seneca	12	2
415F	P	Martin Marsh	1	NE
416M	P	Wildcat Mound	11	9
426F	A	Bear Bluff/Caves Cr.	19/10	16/8
429F	A	Martin Marsh	28	34
		Mean for Zone 2 (20+ locations, n =5)		**29.2**
Zone 3				
393F	A	Long Lake	29	19
449M	Y	Oconto River	30	13
452F	Y	Oconto River	30	15
454F	A	Oconto River	29(27)	19
460F	A	Clam River	32	31
465F	A	Ft. McCoy	5	5
		Mean for Zone 3 (20+ locations, n =5)		**19.4**
MN & MI				
M206M	A	MN pack	19	14
388M	A	Crex Meadow MN	32	46
459M	A	Disperser MI	1	NE
		Overall Mean for WI (20+ locations, n =28)		**31.7 mi^2**
		Mean for WI adults (20+ locations, n =22)		**31.7 mi^2**

[a] Age during monitoring period (P=Pup, Y=Yearling, A=Adult)
[b] Total locations 15 September 2003 to 14 April 2004
[c] Based on number of locations in parenthesis
NE = No Estimate

Table 3. Visual observation rates of radio-collared wolves by DNR pilots during December 2003 – March 2004 in Wisconsin and adjacent areas of Minnesota and Michigan.

Wolf Number	No. of Locations	Other Collared Wolf[a]	Visual Observ.	Percent Visuals	Max.Wolves Seen	Pack
Zone 1						
G994M	9		2	22%	4	Ranger Island
M036F	16		5	31%	2	West Firelane
248M	16		2/3	31%	3/3	Torch River/Black Lake
336M	17		1	6%	2	Pike River
351M	3		0	0%	0	Chippewa River
355M	17		9	53%	9	Little Rice River
376F	17		1	6%	1	Stella Lake
432F	6		0	0%	0	Butler Rock/Disperser
438M	9	W439	1	11%	2	Flag River
439F	18	W438(1)	4	22%	3[a]	Flag River
444F	16		4	25%	2	Hellhole Creek
446F	18		3	17%	2	Springbrook
447F	18		9	50%	6	Bird Sanctuary
448F	4		0	0%	0	Pine Lake/Disperser
456F	17		10	59%	3	Spirit Lake
457M	2		0	0%	0	Round Lake
458F	4		0	0%	0	Johnson Springs?
461F	17		7	41%	4	North Willow
462M	16		2	12%	3	Black Lake
464F	3		0	0%	0	Moreland Lake/Disperser
466F	7		2	29%	4	Bootjack Lake
469M	17	W481	8	47%	6[a]	Murray's Landing
472F	18		4	22%	4	Bearsdale
473M	18		7	39%	6	Moose Lake
474M	2		0	0%	0	Dunbar/Disperser
479M	17		5	29%	4	Ranger Island
481M	17	W469	4/2	35%	6[a]/2[a]	Murray's Landing/Disperser
485F	17		8	47%	7	Averill Creek North
497M	4		0	0%	0	Pine Lake
	360		**103**	**29%**	**83**	**Zone 1 wolves detected***

Table 3. cont.

Wolf Number	No. of Locations	Other Collared Wolf[a]	Visual Observ.	Percent Visuals	Max. Wolves Seen	Pack
Zone 2						
311F	10		0	0%	0	Bear Bluff
338M	10		0	0%	0	Rattail
340F	4		1	25%	2	Rattail
341F	5		0	0%	0	Seneca
413F	6		0	0%	0	Bear Bluff
426F	12		1	0%	1	Caves Creek?
429F	10		0	0%	0	Martin Marsh
	57		**2**	**4%**	**8**	**Zone 2 wolves detected***
Zone 3						
393F	16		8	50%	2	Long Lake
449M	17	W452 & W454	2	12%	3[b]	Oconto River
452F	17	W449 & W454	2	12%	3[b]	Oconto River
454F	16	W449 & W452	2	12%	3[b]	Oconto River
460F	18		4	22%	2	Clam River
465F	4		0	0%	0	Ft. McCoy
	88		**18**	**20%**	**8**	**Zone 3 wolves detected***
MN & MI						
M206M	7		1	14%	2	MN pack
388M	18		10	56%	5	Crex Meadow MN
459M	1		0	0%	0	Disperser MI
	26		**11**	**42%**	**8**	**MN & MI wolves detected***
WI Total	**497**		**121**	**24%**	**99**	**Total wolves detected***

*Includes wolves not seen, but with active signal.
[a]Does not include another collared wolf
[b]Includes 2 other collared wolves

Table 4. Preliminary* wolf mortality in Wisconsin, October 2003 - March 2004.

Date	Wolf Number	Age/Sex	County	Cause	Pack
11/23/2003	NC	A?M	Marinette	Shot	Disperser
11/25/2003	W411	P F	Jackson	Shot	Dead Creek
11/25/2003	W489	P M	Lincoln	Shot	Averill Creek
12/17/2003	W464	A F	Bayfield	Other wolves?	Disperser
12/19/2003	W351	A M	Ashland	Mange?	Chippewa River
12/19/2003	W458	A F	Forest	Mange?	Johnson Springs?
01/01/2004	NC	P?M	Bayfield	Vehicle collision	Smoky Hill
01/06/2004	NC	A F	Marathon	Vehicle collision	Disperser
01/28/2004	NC	Y?F	Jefferson	Vehicle collision	Disperser
01/29/2004	NC	Y F	Outagamie	Veh. collision/Euthanized	Disperser
01/31/2004	NC	Y?M	Oconto	Mange?	Butler Rock
02/03/2004	W438	A M	Bayfield	Mange?	Flag River
02/16/2004	W340	A M	Juneau	Shot	Rattail
02/16/2004	W341	3yr F	Wood	Shot	Seneca
02/16/2004	W249	2yr F	Door	Shot	Disperser?
02/22/2004	NC	Y F	Wood	Veh. collision/Euthanized	Disperser
03/03/2004	NC(hybrid?)	Y F	Juneau	Vehicle collision	Hybrid?
03/16/2004	W497	A M	Iron	Mange?	Chippewa River
03/16/2004	NC	A M	Oneida	Mange?	Bootjack Lake
03/26/2004	NC(hybrid?)	? ?	Marquette	Vehicle Collision	Hybrid?
03/31/2004	NC	Y M	Portage	Shot? /Mange?	Mead?

21 mortalities detected, 10 collared animals.

*Necropsies have not been completed on all of these wolves.

Table 5. Wolf depredations on domestic animals in Wisconsin, October 2003 - March 2004.

Date	Animal Lost	Pack Involved	County	Payments	Trapping?
10/01/2003	1 calf	Blue Hill?	Rusk	$600.00	No
10/02/2003	1 cow	Loner?	Burnett	$1,400.00	No
10/27/2003	1 calf	Loner?	Chippewa	$500.00	No
12/20/2003	1 dog (Walker mix)	Murray's Landing	Iron	$1,500.00	No
01/26/2004	1 dog (beagle)	Casey Cr. or L. Nebagamon	Douglas	$500.00	No
01/25/2004	1 dog inj. (G. Dane/boxer)	Beaver Dam Lake	Ashland	$1,091.45	No
03/18/2004	1 calf	Blue Hills South	Rusk	No claim	Yes
03/22/2004	6 deer (game farm)	Moquah?	Bayfield	$5,300.00	Yes
*03/29/2004	1 dog inj. (Poodle)	Possible hybrid	Bayfield	$215.01	No
9 cases	**12 animals killed** **2 animals injured** **2 dogs killed** **2 dogs injured** **3 calves killed** **1 cow killed** **6 deer killed**	**5 packs** **2 loners** **1 hybrid**	**7 counties** **4 farms** **1 deer farm**	**$11,106.46**	**0 trapped**

*Unconfirmed

Table 6. Wolf control cases in Wisconsin, October 2003 to March 2004.

Date	Complaint Type[a]	Pack Involved	Zone	County	Control Actions
10/01/03	Farm depredation	Blue Hills?	1	Rusk	None
10/02/03	Farm depredation	Loner?	3	Burnett	None
10/23/03	Farm threat	Hybrids?	3	Marquette	None
10/27/03	Farm depredation	Loner?	3	Chippewa	None
11/06/03	Farm threat (unconfirmed)	Hybrids?	3	Marquette	W.S. supplied strobe light
12/20/03	Hunting dog depredation	Murray's Landing	1	Iron	None
01/03/04	Human safety concern	Martin Marsh	2	Jackson	Trapping attempted
01/16/04 & 2/18	Human safety concern	Seneca	2	Wood	W.S. supplied strobe light, pistol launcher & pyrotechnics. Wolf killed by vehicle collision
01/16/04	Farm threat	Blue Hills South	3	Rusk	WS installed flashing lights
01/24/04	Human safety concern (unconfirmed)	Hybrids?	1	Langlade	WS provided flashing lights
01/24/04	Farm threat (unconfirmed)	Flag River	1	Bayfield	WS provided flashing lights
01/25/04	Domestic dog injured	Beaver Dam Lake	1	Ashland	None
01/26/04	Domestic dog depredation	Casey Cr. or L Nebagamon	1	Douglas	None
02/17/04	Chronic farm threat (unconfirmed)	Moquah?	1	Ashland	WS installed flashing lights
03/14/04	Chronic farm threat	Blue Hills South	3	Barron	WS installed flashing lights DOW donated new well in alternate pasture
03/17/04	Farm depredation	Blue Hills South	1	Rusk	Trapping attempted
03/22/04	Chronic deer farm depred.	Moquah?	1	Bayfield	Trapping attempted
03/29/04	Domestic dog injured (unconfirmed)	Hybrid?	1	Bayfield	None
	2 Chronic farm threat **1 Chronic deer farm depredation** **4 Farm depredation** **4 Farm threat** **1 Hunting dog depredation** **1 Domestic dog depredation** **2 Domestic dog injured** **3 Human safety concerns**		**10 Zone 1** **2 Zone 2** **6 Zone 3**		**Trapping attempted at 3 locations; no wolves trapped** **Non-lethal control attempted at 5 farms & 2 residences**

[a]Wolves were either confirmed present at the site of the complaint, or other evidence was available to suggest they were nearby. This should not be construed to mean wolves were responsible for the listed complaint in all circumstances.

Table 7. Wolf observations by the general public and resource agency personnel October-December 2003/January-March 2004. Numbers on left are 4th quarter 2003, numbers on right are 1st quarter 2004.

County	No. of Sightings	Wolves Seen	Track or Sign Observations	Total Wolf Observations
Adams*	0/0	0/0	0/2	0/2
Ashland*	0/0	0/0	2/1	2/1
Barron	0/1	0/1	0/0	0/1
Bayfield*	1/2	5/4	2/3	3/5
Brown	0/3	0/4	0/0	0/3
Dane	3/0	3/0	0/0	3/0
Door	0/5	0/8	0/0	0/5
Douglas*	1/0	2/0	3/1	4/1
Dunn	0/1	0/1	0/0	0/1
Florence	0/0	0/0	1/2	1/2
Forest*	1/2	1/2	3/3	4/5
Iron*	1/0	3/0	1/0	2/0
LaCrosse	0/0	0/0	0/1	0/1
Langlade*	1/1	1/1	1/0	2/1
Lincoln*	3/2	8-9/2	1/0	4/2
Manitowoc	0/2	0/4	0/0	0/2
Marathon	0/1	0/1	0/0	0/1
Marinette*	6/4	9/4	3/1	9/5
Marquette	1/1	6/2	0/0	1/1
Menominee	1/0	1/0	0/1	1/1
Oconto	0/2	0/3	2/0	2/2
Oneida*	2/0	3/0	13/2	15/2
Outagamie	0/2	0/2	0/0	0/2
Price*	3/2	5/2	2/6	5/8
Rusk*	1/1	2/3	0/1	1/2
Sauk	1/0	1/0	1/0	2/0
Sawyer*	0/1	0/1	0/3	0/4
Shawano	1/1	1/1	0/0	1/1
Vilas*	1/3	4/6	3/0	4/3
Washburn*	7/0	15/0	2/3	9/3
Waupaca	1/1	1/1	0/0	1/1
Wood*	1/0	1/0	0/0	1/0
Totals	**37/38**	**72-73/53**	**40/30**	**77/68**

* Counties with known breeding packs. No observations were reported from Clark, Eau Claire, Jackson, Juneau, Monroe and Taylor Counties where breeding packs are known to exist.

Table 8. Track Surveys in survey blocks by volunteer vs. DNR Wolf Monitoring Team in northern and central Wisconsin in winter 2003-2004.

			Volunteer Surveys					DNR Surveys	
Survey Block	**Main County**	**Bleed**	**Vol. Track***	**No. of Surveys**	**Miles**	**Hours**	**Wolf Est.**	**Miles**	**Wolf Pop.**
1	Douglas		P	1	6.9	1.5	0	22.6	2
2	Douglas	Y	P	3	71.6	20.4	6-7	39.8	7-10
3	Douglas	Y	P	2	63.5	7.5	3+	17.6	5+
4	Douglas		P	2	41.9	12.0	6		
6	Douglas							2.3	3
7	Douglas							4.5	4
8	Douglas		P	4	69.8	12.5	4	29.4	7-8
9	Douglas		P	3	76.9	17.0	4	34.8	6-8
10	Burnett	Y						91.1	2+
11	Burnett							20.9	5+
13	Burnett		P	2	34.2	10.5	1	15.1	1
14	Burnett							63.9	4
18	Barron		P	1	14.3	5.0	1?	137.0	0
19	Sawyer							35.2	0
20	Rusk		P	5	115.2	11.9	2-3	12.4	1+
23	Douglas							28.1	0
24	Bayfield	Y	FS/P	4	55.6	17.4	7	74.1	7-8
25	Bayfield	Y						47.2	2-3
26	Bayfield							37.4	5+
27	Bayfield							24.8	2+
28	Bayfield							59.9	5
29	Bayfield	Y	P	2	52.8	12.5	3	43.1	1
30	Bayfield							21.6	0
31	Bayfield		P	7	88.1	34.0	2	4.4	4
32	Bayfield							51.0	0
33	Bayfield		P	2	33.3	11.0	3-4	97.7	4+
34	Bayfield	Y						21.0	5
35	Bayfield	Y	P	3	48.4	6.9	1+	62.2	3
36	Ashland	Y						78.5	13-15+
37	Sawyer	Y	P	3	68.1	13.4	3-4	44.3	12-13+
38	Ashland							121.9	14-15
40	Ashland	Y						122.7	10-13
41	Sawyer	Y	P	3	12.6	2.8	3	107.6	9-12
42	Sawyer							43.7	2-3

Table 8. cont.

			Volunteer Surveys					DNR Surveys	
Survey Block	**Main County**	**Bleed**	**Vol. Track**	**No. of Surveys**	**Miles**	**Hours**	**Wolf Est.**	**Miles**	**Wolf Pop.**
43	Sawyer							11.7	2+
44	Price	Y	P	6	63.6	18.9	13-15	36.4	8-10
46	Price		P	4	108.4	32.3	2	35.5	2
47	Taylor		UWSP	1	9.1	4.5	4	46.4	6-7
48	Taylor	Y						62.1	8+
49	Taylor							28.7	9-10
50	Price							27.2	0
51	Price	Y	P	6	112.1	25.5	7-9	60.9	8
52	Price							50.7	2
53	Price		P	1	25.6	3.3	0	41.9	3
54	Iron		P	1	19.4	4.0	1	43.0	4
55	Price	Y	P	6	119.0	15.2	4-5	43.6	10-11
56	Ashland	Y						30.7	5-6
57	Iron							82.3	6-7+
58	Iron		P	2	59.3	6.0	7-8	4.2	2
59	Iron	Y	P	1	31.5	4.0	2	30.6	0
60	Iron		P	3	60.0	9.5	1		
63	Vilas							11.4	0
64	Vilas							26.7	0
65	Vilas		P	5	109.5	13.0	3	42.6	2
67	Oneida		P	6	34.8	10.0	3	9.2	0
68	Lincoln	Y						31.7	5
69	Lincoln							17.5	4-6
70	Lincoln		P	2	57.7	10.3	0	118.5	6+
71	Lincoln		P	1	11.1	2.0	1	26.9	0
72	Langlade		P	2	47.6	7.1	0		
74	Langlade		P	1	28.0	2.2	0		
75	Lincoln		P	4	12.0	10.5	0		
76	Oneida							48.9	0
77	Oneida		P	3	16.5	16.5	2	41.5	2
78	Oneida		P	1	4.5	2.0	1	24.0	0
79	Oneida							16.2	1
80	Vilas		P	3	104.7	11.2	1	24.2	0

Table 8. cont.

			Volunteer Surveys					DNR Surveys	
Survey Block	**Main County**	**Bleed**	**Vol. Track**	**No. of Surveys**	**Miles**	**Hours**	**Wolf Est.**	**Miles**	**Wolf Pop.**
81	Vilas	Y	P	5	142.1	24.5	3	40.8	2
82	Vilas		P	1	4.6	2.0	0	17.5	0
83	Vilas		P	1	18.9	1.5	0	41.1	0
84	Forest		P	1	26.2	3.0	0	38.8	3
85	Forest		P	5	164.2	25.9	0	60.5	0
86	Forest		P	1	26.2	3.5	0	48.9	0
92	Langlade	Y	P	6	77.6	27.7	2	27.8	3
93	Forest							44.4	0
94	Forest							19.4	0
95	Forest							42.2	0
96	Forest		FS	3	43.4	7.7	2	36.6	2
97	Forest		FS	3	33.3	7.8	2	11.0	0
98	Florence	Y						56.9	2
99	Florence							22.6	0
100	Florence							36.1	0
101	Forest	Y	P	3	46.9	8.0	2+	18.8	2+
102	Marinette		P	6	211.4	30.5	3+		
103	Oconto		P	3	81.8	9.8	0	19.2	0
104	Marinette		P	3	76.5	11.5	1	14.8	0
105	Marinette		P	2	80.5	10.0	0		
106	Marinette		P	2	15.8	3.0	2		
107	Marinette	Y	P	9	132.1	20.0	3	70.4	2-3
108	Marinette	Y	P	5	78.4	18.4	6-7		
109	Florence		P	1	63.0	7.0	0		
110	Marinette		P	1	17.4	6.2	1		
112	Marinette		P	4	71.9	19.0	2		
113	Marinette		P	17	414.4	53.4	2		
117	Clark	Y	P	4	65.6	17.5	4		
118	Clark		P	5	116.2	25.2	6		
119	Jackson	Y	P/TRI	3	50.0	11.5	6+	10.0	2-3
120	Jackson		TRI	8	210.7	20.4	4	19.1	2
121	Jackson	Y	P	3	111.1	17.0	5-8	59.7	11-15
123	Monroe		MIL	3	80.0	13.8	2		

Table 8. cont.

			Volunteer Surveys					DNR Surveys	
Survey Block	**Main County**	**Bleed**	**Vol. Track**	**No. of Surveys**	**Miles**	**Hours**	**Wolf Est.**	**Miles**	**Wolf Pop.**
124	Wood		P	3	78.5	10.5	2	172.8	6
125	Juneau	Y	P	3	80.1	15.0	4	32.8	2
126	Rusk		P	2	6.3	0.8	2		
127	Adams		P	6	158.9	24.5	2		
129	Juneau		P	4	103.4	17.2	1		
133	Marathon	Y	P	3	94.0	12.0	1		
		TOTAL	**69 blocks**	**235**	**4869.0**	**900.1**	**171-185+**	**3655.2**	**279-313+**

Packs may be counted in more than 1 block. Total wolf estimate and total wolf population reflects double counting of some packs.

* FS = US Forest Service employee
MIL = Military employee
P = Private citizen
TRI = Tribal members
UWSP = University of WI - Stevens Point students

Table 9. Pack and lone wolf summaries in Wisconsin, winter 2003-20004. (Map #'s refer to Figure 1.)

Map #	Pack or Area	Block	Counties	Winter Count	Pup Estim.	Evid.[1]	Collared Wolf	Breed.[2]
	Northern Wisconsin							
1	Pokegama River	1	Douglas	2	0	T	O	Y
2	Foxboro	2	Douglas	3-5	1?	T	O	Y
3	Truck Trail	2	Douglas	4-5	2	T	O	Y
4	North Empire	3	Douglas	3+	1	T	O	Y
5	South Empire	3	Douglas	2+	?	T	O	Y
6	Moose Lake	4	Douglas	6	2-4	R	473M A	Y
7	Lake Nebagamon	6	Douglas	2	0?	O	O	?
8	Shoberg Lake	6	Douglas	3	1?	O	O	?
9	Casey Creek	7	Douglas	4	1-2	T	O	?
10	Poplar River	7	Douglas	2	0	O	O	?
11	Chain Lake	8	Douglas	2-4	?	T	O	?
12	Crotte Creek	9	Douglas	6-8	4-6	T	O	Y
13	Bird Sanctuary	9	Douglas	6	2-4	R	447F A	Y
14	Riverside	10	Burnett	2	0	T	O	Y
15	Moose Road	11	Douglas	2+	0	T	O	?
16	Chase Brook	11	Burnett	3	1?	T	O	Y
17	Stuntz Brook	12	Washburn	2	0?	O	O	Y
18	Crex Loner	13	Burnett	1+		T	O	N
19	Sterling Barrens	14	Burnett/Polk	2-4	?	T	O	?
20	Clam River	17	Burnett/Polk	2	0	R	460F A	?
*	Dugan Lake	19,21	Washburn	1-2	0	O	O	N
21	Blue Hills South	20,126	Rusk/Barron	2+	0?	T/O	O	?
22	Blue Hills North	20	Rusk/Sawyer	1+	0	T	O	N
23	Tranus Lake	22	Washburn	6	4	T/O	O	Y?
24	Springbrook	22	Washburn	2	0	R	446F A	?
25	Frog Creek	23	Douglas/Wash.	5-6	2-3	T	O	Y
26	Ghost Lake	24	Bayf./Sawyer	3-4	1-2	T	O	Y
27	Seeley Hills	24	Bayf./Sawyer	3	1?	T	O	Y
28	Smoky Hill	25	Bayf./Sawyer	2+	0	T	O	Y
29	Bearsdale	25	Bayfield	4	1-2	R/T	472F A	Y
30	Moreland Lake	26	Bayfield	5	2-3	T	464F A	Y
31	Rainbow Lake	27	Bayfield	4-5	1-3	T	O	Y
32	Ino Swamp	27	Bayfield	3	1?	O	O	?
33	Bibbon Swamp	28	Bayfield	5	1-3	T	O	Y
34	Porcupine Lake	29	Bayfield	3	1?	T	O	Y
35	Moquah	30	Bayfield	2	1?	O	O	N
36	Orienta Falls	31,7	Douglas/Bayf.	4	1-2	T	O	Y
37	Flag River	31,32	Bayfield	3	1-2	R	438M A 439F A	Y
38	Siskiwit Lake	32,33	Bayfield	3	1?	T	O	?
39	Echo Valley	33	Bayfield	3	1	T	O	Y
40	Beaver Dam Lake	34,35	Ashland/Bayf.	5	3	T	O	Y
41	Hellhole Creek	35	Ashland/Bayf.	3	?	R/T	444F A	Y
42	Brush Creek	36	Ashland	3	1?	T	O	Y
43	Black Lake	37	Ashl./Sawyer	3-6	1-3?	R/T	462M A	Y
44	Round Lake	37	Sawyer	3	1	T	457M A	Y
45	Torch River	38,36	Ashland	5-7	2-3	R/T	248M A	Y
46	Shanagolden	38,36	Ashland	9-11	6-7	T	O	Y
47	Hungry Run	38,40	Ashland	6-7	2-4	T	O	Y
48	West Firelane	39	Ashland	4	1?	T/R	036F A	?

Table 9. cont.

Map #	Pack or Area	Block	Counties	Winter Count	Pup Estim.	Evid.[1]	Collared Wolf	Breed.[2]
49	Morrison Creek	39	Ashland/Iron	4	1-2?	T	O	?
50	White River	39,34	Ashland	2	0	T/O	O	?
51	Log Creek	40	Ashland	4-6	2	T	O	Y
52	Price Creek	41	Price/Sawyer	3-6	1+	T	O	Y
53	Thornapple River	41	Sawyer	3	?	T	O	Y
54	Davis Lake	41,52	Price	3	?	T	O	Y
55	Eddy Creek	42	Sawyer	2	0	T	O	Y
56	Tupper Creek	43	Sawyer	2	0	T	O	Y
57	Haystack Corner	43	Sawyer/Rusk	4	2	O	O	Y
58	Spring Creek	44	Price	5	3	T	O	Y?
59	Skinner Creek	44	Price	4-5	2-3	T	O	Y
60	Green Creek	46	Price/Rusk	2	0	T	O	Y
61	Kidrick Swamp	47	Taylor	4	1-2	T	O	Y
62	Mondeaux Flowage	47	Taylor	2-3	?	T	O	?
63	Averill Creek South	48	Lincoln	4	1-2	T	489M P	Y
64	Spirit Lake	49	Lincoln/Taylor	3	1?	R/T	456F A	Y
65	Little Rice River	51,67	Oneida/Price	9	4-6	R/T	355M A	Y
*	Loner 481M	51,52	Price	1	0	R	481M A	N
66	Bootjack Lake	53	Price/Oneida	2	0	T	466F Y	Y?
67	Miles Lake	54	Price/Vilas	2	0	T	O	Y
68	Hoffman Lake	55	Ashland/Iron	5-6	2-3	T	O	Y
69	Murray's Landing	55	Iron	5-6	2-3	R/T	481M A 469M A	Y
70	Eastside Firelane	56	Ashland	3-4	1+	T	O	?
71	Chippewa River	56	Iron/Ashland	2	0	T/R	351M A	Y
72	Augustine Lake	57	Iron/Ashland	3+	1?	T	O	?
73	O'Brien Lake	57,59	Iron	3+	1?	T	O	Y
74	Pine Lake	58	Iron	2	0	T/R	448F Y 497M A	Y?
75	Cedar Lake	62	Iron	2	0	O	O	?
76	North Willow	65	Oneida	4	1-2	R/T	461F Y 482M A	Y
77	Somo River	68	Lincoln	5	2-3	T	O	Y
78	Ranger Island	69	Lincoln	4	2	R	G664MA 479M P	Y
79	Averill Creek North	70	Lincoln	7	3-4	R/T	485F Y	Y
80	Harrison Hills Loner	71	Lincoln	1	0	T	O	N
81	Pelican Lake	76,77	Oneida	2	0?	T	332F A	?
82	Stella Lake	77	Oneida	2	0	R/T	376F A	Y
*	Bearskin Loner	78	Oneida	1	0	T	O	N
*	Stone Lake Loner	79	Oneida	1	0	T	O	N
83	Escanaba Lake	80	Vilas	3	1?	T/O	O	?
84	Nineweb Lake	81	Vilas	2-3	0?	T	O	Y
85	Giant Pine	84	Forest	3	1?	T/O	O	?
86	Ada Lake	92	Oconto/Lang.	3	1	T	O	Y
87	Alvin Creek	96,97	Forest	2	0	T	O	Y
88	Morgan Lake	98	Florence	2	0	T	O	Y
89	Camp 6	101,102	Forest/Marin.	2	0	T	O	Y
*	Shawano Creek Loner	102	Forest	1	0	T	O	N
90	Pike River	107	Marinette	3	0	R/T	336M A	Y
91	Dunbar	108	Marin./Floren.	5-7	3-5	T	474M A	Y

Table 9. cont.

	Pack or Area	Block	Counties	Winter Count	Pup Estim.	Evid.[1]	Collared Wolf	Breed.[2]
*	Pemebonwon Loner	110	Marinette	1	0	T	O	N
92	Lake Noquebay	113	Marinette	2	0	T	O	N
*	Beaver Creek Loner	114	Marinette	1	0	O	O	N
93	Long Lake	126	Rusk	2	0	R/T	393F A	Y
*	Loner 474M	130,90	Menom./Shaw.	1	0	R	474M A	N
94	Oconto River	131	Oconto	3	0	R	449M Y 452F Y 454F A	N
	Door Loner		Door/Kewaun.	1	0	O	O	N
	Northern WI Totals	**12 Loners 91 Packs**		**317-350 Total wolves 3.5-3.8 wolves/pack**				**91-127 Pups**
	Central Wisconsin							
95	Eau Claire River	117	E. Claire/Clark	4	1-2	T	O	Y
96	Iron Run	118	Clark	4	1-2	T	O	Y
97	Wedges Creek	118	Clark	2	0	T	O	Y
98	Two Korner	119	Jackson	4-5	1-3	T	O	Y
99	Noch Hanai	119	Jackson	3	0?	O	O	?
100	Martin Marsh	119	Jackson	3	1-2	R/O	429F A	N?
101	Wildcat Mound	120	Jackson	3	1	+	416M P	Y
102	Bear Bluff	121	Jackson	3-4	1-2	R/T	311F A 426F Y 413F P	Y
103	South Bluff	121	Wood	2	0	T	O	Y?
104	Dead Creek	121,122	Monroe/Jacks.	5-7	3-5	T	411F P	Y
105	Silo	122	Juneau	5	2-3	O	O	Y?
106	Fort McCoy	123	Monroe	2	0	R/T	465F A	Y
107	Seneca	124	Wood	3	1?	T	341F A 414F P	Y
*	Pittsville Loner	124	Wood	1	0	T	O	N
108	Rattail	125	Juneau	2	0	R/T	340F A 338M A	Y
109	Colburn W.A.	127	Adams	2	0	T	O	?
110	Caves Creek	128	Marqu./Adams	2	0	R/O	425F Y	?
*	Yellow River Loner	129	Juneau	1	0	T	O	N
111	Mead W.A.	133	Wood/Marath.	4	2	T/O	O	Y?
	Central WI Totals	**2 Loners 17 Packs**		**56-60 Total wolves 3.3-3.5 wolves/pack**				**14-23 Pups**
	Statewide Totals	**14 Loners 108 Packs**	**373-410 Total wolves 3.5-3.8 wolves/pack**		**12 wolves on reservations 361-398 off reservations**			**105-150 Pups**

[1] R = Radiotelemetry T = Track Surveys O = Observation Reports
[2] Y = Yes N = No Y? = Possible ? = Unknown
* Loners not mapped.

Table 10. Wolf pack territories 2003-2004. (mapped in Figure 1)

Pack Name	Map #	Year[a]	Collared Wolf	# of radio locations	# of other locations[b]	Area (Mi^2)
Zone 1						
Ada Lake	86	Approx.[c]	None	0	0	NE[d]
Alvin Lake	87	Approx.	None	0	1	NE
Augustine Lake	72	1999	W229	-	0	NE
Averill Creek North	79	2004	W485	27	5	80
Averill Creek South	63	2004	W489	12	3	35
Bearsdale	29	2004	W472	24	1	34
Beaver Dam Lake	40	Approx.	None	0	2	NE
Bibbon Swamp	33	Approx.	None	0	0	NE
Bird Sanctuary	13	2004	W447	53	7	41
Black Lake	43	2004	W370, W462	44	6	46
Blue Hills North	22	Approx.	None	0	1	NE
Blue Hills South	21	Approx.	None	0	9	NE
Bootjack Lake	66	2004	W466	25	3	89
Brush Creek	42	2002	M310	-	2	NE
Camp 6	89	Approx.	None	0	2	NE
Casey Creek	9	Approx.	None	0	8	NE
Cedar Lake	75	Approx.	None	0	0	NE
Chain Lake	11	2004	W291	15	4	43
Chase Brook	16	2002	W367	-	1	NE
Chippewa River	71	2004	W351	34	1	29
Crex Meadow	18	Approx.	None	0	0	NE
Crotte Creek	12	2002	W296	-	3	NE
Davis Lake	54	Approx.	None	0	5	NE
Dunbar	91	2004	W474	28	6	34
Eastside Firelane	70	Approx.	None	0	4	NE
Echo Valley	39	Approx.	None	0	5	NE
Eddy Creek	55	Approx.	None	0	0	NE
Escanaba Lake	83	Approx.	None	0	0	NE
Flag River	37	2004	W438,W439	91	0	41
Foxboro	2	Approx.	None	0	4	NE
Frog Creek	25	Approx.	None	0	0	NE
Ghost Lake	26	Approx.	None	0	3	NE
Giant Pine	85	Approx.	None	0	3	NE
Green Creek	60	Approx.	None	0	5	NE
Harrison Hills	80	2004	W246	14	4	38
Haystack Corner	57	Approx.	None	0	1	NE
Hellhole Creek	41	2004	W444	49	4	54
Hoffman Lake	68	2003	W459	21	16	NE
Hungry Run	47	Approx.	None	0	7	NE
Ino Swamp	32	Approx.	None	0	4	NE
Kidrick Swamp	61	Approx.	None	0	2	NE
Lake Nebagamon	7	2003	W440	29	1	NE
Lake Noquebay	92	Approx.	None	0	10	NE
Little Rice River	65	2004	W355	51	6	83
Log Creek	51	2002	W286	-	11	NE
Miles Lake	67	Approx.	None	0	0	NE
Mondeaux Flowage	62	2003	W441	15	2	NE
Moose Lake	6	2004	W473	42	6	41
Moose Road	15	2001	W155	-	1	NE

Table 10. cont.

Pack Name	Map #	Year[a]	Collared Wolf	# of radio locations	# of other locations[b]	Area (Mi^2)
Moquah	35	2004	W431	17	7	64
Moreland Lake	30	2004	W464	26	0	55
Morgan Lake	88	Approx.	None	0	1	NE
Morrison Creek	49	Approx.	None	0	0	NE
Murray's Landing	69	2004	W469,W481	70	9	49
Nineweb Lake	84	2000	W318	-	2	NE
North Empire	4	2000	W298	-	2	NE
North Willow	76	2004	G996,W461,W482	84	0	82
O'Brien Lake	73	Approx.	None	0	1	NE
Orienta Falls	36	Approx.	None	0	7	NE
Pelican Lake	81	2004	W332	32	6	55
Pike River	90	2004	W336	35	10	51
Pine Lake	74	2004	W448	29	1	87
Pokegama River	1	Approx.	None	0	10	NE
Poplar River	10	Approx.	None	0	0	NE
Porcupine Lake	34	2004	W241	15	10	64
Price Creek	52	2001	W368	-	10	NE
Rainbow Lake	31	1996	W255	-	1	NE
Ranger Island	78	2004	G994, W479	50	2	20
Riverside	14	Approx.	None	0	2	NE
Round Lake	44	2004	W457	34	4	79
Seeley Hills	27	Approx.	None	0	0	NE
Shanagolden	46	Approx.	None	0	4	NE
Shoberg Lake	8	1999	W290	-	0	NE
Siskiwit Lake	38	2003	W369	49	0	NE
Skinner Creek	59	Approx.	None	0	3	NE
Smoky Hill	28	Approx.	None	0	0	NE
Somo River	77	2004	W456	34	9	50
South Empire	5	2003	W297	40	1	NE
Spirit Lake	64	2004	W456	13	6	24
Spring Creek	58	Approx.	None	0	9	NE
Springbrook	24	2004	W446	22	0	19
Stella Lake	82	2004	W376	51	1	18
Sterling Barrens	19	Approx.	None	0	7	NE
Stuntz Brook	17	1999	W295	-	1	NE
Thornapple River	53	1997	W239	-	4	NE
Torch River	45	2004	W248	42	4	56
Tranus Lake	23	2002	W292	-	5	NE
Truck Trail	3	2004	W476	9	10	49
Tupper Creek	56	1998	W276	-	1	NE
West Firelane	48	2004	M036	48	2	35
White River	50	Approx.	None	0	1	NE

Table 10. cont.

Pack Name	Map #	Year[a]	Collared Wolf	# of radio locations	# of other locations[b]	Area (Mi^2)
Zone 2						
2-Korner	98	Approx.	None	0	0	NE
Bear Bluff	102	2004	W311,W412,W413,W426	96	1	46
Caves Creek	110	2004	W426	10	3	10
Colburn Wildlife Area	109	Approx.	None	0	2	NE
Dead Creek	104	2004	W411	19	0	11
Eau Claire River	95	Approx.	None	0	0	NE
Iron Run	96	2003	W309	45	0	NE
Martin Marsh	100	2004	W415,W429	46	1	36
Noch Hanai	99	2001	W269	-	0	NE
Rattail	108	2004	W338,W340	75	1	62
Seneca	107	2004	W341,W414	56	2	12
Silo	105	Approx.	None	0	0	NE
South Bluff	103	Approx.	None	0	0	NE
Wedges Creek	97	Approx.	None	0	0	NE
Wildcat Mound	101	2004	W416	12	1	11
Zone 3						
Clam River	20	2004	W460	52	2	56
Ft. McCoy	106	2004	W465	7	0	11
Long Lake	93	2004	W393	49	1	23
Mead Wildlife Area	111	Approx.	None	0	4	0
Oconto River	94	2004	W449,W452,W454	146	1	38

[a] Based on available radio locations between 15 April of the previous year to 14 April of the year listed.

[b] Other locations from track surveys, mortalities, depredations, & public and agency reports.

[c] Territory boundaries approximated based on track surveys, mortalities, depredations, & public and agency reports.

[d] No estimate