

**WISCONSIN ENDANGERED RESOURCES REPORT # 116**  
**STATUS OF THE TIMBER WOLF IN WISCONSIN**  
**PERFORMANCE REPORT, 1 JULY 1996 THROUGH 30 JUNE 1997**  
**By Adrian P. Wydeven and Nancy M. Cervantes**

**SUMMARY**

This report covers activities conducted from July 1 1996, through June 30, 1997. The Wisconsin wolf population was at its goal of 80 wolves or more for the third year, and the process to reclassify the population from endangered to threatened should begin in fall 1997.

Twelve wolves from 11 different packs were live-captured and radio-collared in 1996. Thirty-seven radio-collared wolves were monitored during the period. Winter territories of 21 Wisconsin wolves averaged 46 mi<sup>2</sup>. Territorial wolves occupied 2200 mi<sup>2</sup> at a density of 1 wolf per 15 mi<sup>2</sup>. The minimum count for the wolf population in winter 1996 - 1997 was 148 - 151 wolves in 33 or more packs. Three radio-collared wolves died including intraspecific strife, complications from birthing, and one shooting. Wolf observations were reported from 26 Wisconsin counties. Wolf disease testing included 4 of 9 positive for parvovirus, and 4 of 9 positive for Lyme. One wolf of 9 captured showed some sign of mange. Work has progressed on developing a new wolf management plan.

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**Wisconsin Department of Natural Resources**  
**P.O. Box 7921**  
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**1997**

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**RECOVERY OF THE TIMBER WOLF  
PERFORMANCE REPORT**

July 1, 1996 to June 30, 1997

Prepared by Adrian P. Wydeven and Nancy M. Cervantes

Job:	106.1	Direct educational activities
	106.2	Provide legal protection
	106.3	Cooperative habitat management
	106.4	Monitor statewide wolf population
	106.5	Initiate disease abatement
	106.6	Evaluate progress
	106.7	Implement livestock damage control action
	106.8	Coordinate with other agencies
	106.9	Citizen participation
	106.10	Volunteer programs
	106.11	Develop reclassification criteria
	106.12	Review translocation

Background: The timber wolf (*Canis lupus*) was included in the first list of Federal Endangered Species in 1967, and was again listed after the enactment of the Federal Endangered Species Act of 1973. The state of Wisconsin listed the timber wolf as a state Endangered Species in 1975. The Wisconsin Department of Natural Resources (DNR) has monitored the state wolf population since 1979. The Wisconsin Timber Wolf Recovery Plan was approved in 1989, and set a minimum population goal of 80 wolves for the state. Down listing to Threatened Status would be considered if the state maintained a minimum of at least 80 wolves for three consecutive years. This report covers the period July 1, 1996 through June 30, 1997; this is the third year at which the wolf population has exceeded its goal of 80 animals. Efforts should begin this fall to reclassify Wisconsin's wolves from Endangered to Threatened.

**JOB 106.1 DIRECT EDUCATIONAL ACTIVITIES**

The project biologist (Wydeven), and technician (Ronald N. Schultz) provided training for 43 people at Timber Wolf Alliance (TWA) workshops in August and November 1996. Project personnel provided training for 84 volunteer carnivore trackers at Treehaven December 5 - 8, 1996. The project biologist and data base manager (Nancy Cervantes) prepared 4 quarterly reports on the progress of wolf population monitoring in the state. Reports were prepared for the Defenders of Wildlife, Wolves of America Conference; Wisconsin Wildlife Surveys; Great Plains/Mountain Wildlife Damage Conference (with Robert Willging), Wisconsin Biodiversity Conference, Mammal Status (with Scott Craven, Charles Long and Frank Iwen), and submitted paper to American Midland Naturalist (with Ronald Schultz and John Stewart). Work was also

done on a paper verifying GIS wolf habitat classification with David Mladenoff, Ted Sickley, and Bruce Kohn.

#### JOB 106.2 PROVIDE ADDED LEGAL PROTECTION FOR WOLVES

Areas closed to coyote hunting during the firearm deer hunting season was carefully monitored. News release on the closed coyote hunting season was published statewide prior to the firearm deer season. Richard Thiel, Wayne Hall, Ken Jonas and other Wildlife Management personnel, as well as volunteers placed posters and talked to hunters in central Wisconsin where coyote was not closed during the deer season. One wolf was killed in northern Washburn County (260F), and project personnel assisted in the investigation, but no arrests have been made.

The Wisconsin wolf advisory committee had proposed expansion of the area closed to coyote hunting during the firearm season for central Wisconsin. Sportsmen and women rejected the proposed expansion by 1539 to 1317 (38 counties against and 34 in favor) during the Spring Conservation Hearings across the state. The Wisconsin Conservation Congress also rejected the expansion at their statewide meeting in May 1997. The DNR decided to table the proposed expansion until the completion of a new wolf management plan.

#### JOB 106.3 COOPERATIVELY MANAGE HABITAT WITH LANDOWNERS

Comments and management recommendations were sent to the Nicolet and Chequamegon National Forests on project plans, especially for proposed timber sales in the Glidden District of the Chequamegon National Forest. Training was provided for foresters and technicians at Glidden in April 1997. Training was also provided for personnel of Consolidated Paper at Manitowish Waters.

A cooperative research project with Wisconsin Department of Transportation (DOT) has been ongoing since 1992 on the impact of highway development on wolf activity. Bruce K. Kohn has directed the study on U.S. Highway 53 and 4 M.S. graduate studies have been completed on the project. The intensity of research declined in Fall 1996 after the first two phases of the project were completed. These phases consisted of evaluating impacts before and during highway reconstruction. The final phase will be conducted after the construction is completed. Currently the project has been reduced to general population monitoring. The research will improve the ability of DOT/DNR to plan future highway developments, while reducing impact on wolves and other large mammals.

#### JOB 106.4 MONITOR STATEWIDE WOLF POPULATION

Fourteen wolves were live-captured in Wisconsin and adjacent areas of Minnesota in 1996; 12 wolves were large enough to fit with radio-collars (Table 1). Captured wolves were members of 10 Wisconsin packs, one Minnesota pack, and one lone wolf. Captures included 3 adult males, 3 adult females, 5 yearling females, 2 pup males, and 1 pup female. Two pups were too small to fit with collars, but the male pup in the Empire Pack was 46 pounds in late August.

At least 35 wolf territories were identified in Wisconsin in 1996-1997 and at least 33 showed evidence of breeding activity (Figure 1). One of these packs (Tranus Lake) disbanded in spring

1997 when the breeding female died. Packs were distributed mainly in northwest and northcentral Wisconsin, and a small cluster of packs occurred in the central part of the state. Wolf territories occurred in part of 13 Wisconsin counties. No wolf territories occurred in heavily forested areas of northeast Wisconsin.

Thirty-seven collared wolves were monitored during the period, the most ever monitored in Wisconsin (Table 2). Collared wolves included 35 wolves in 20 Wisconsin packs, 2 wolves in 1 Minnesota pack, and 1 lone wolf. Sex-age composition of monitored wolves included 14 adult males, 12 adult females, 2 yearling males, and 9 yearling females (age during the majority of the study period except wolves captured since May 1997 are listed by age at capture).

Winter wolf home range varied from 6 mi<sup>2</sup> (occupied 2 months) to 80 mi<sup>2</sup>, and averaged 46 mi<sup>2</sup> for 21 Wisconsin wolves.

A summary of wolf activity and monitoring efforts within specific regions and specific packs are listed below.

#### Douglas County

Three collared wolves were monitored in the Truck Trail Pack along the Minnesota border (191M, 263F, 174F). Alpha male 191M had been monitored since July 1993, and went off the air in February 1997. Yearling female caught in 1996 continued to be monitored, and in May 1997 yearling female 174F (pup born in 1996) was also collared in this pack. The pack size during winter was 7 and probably included 3-4 pups. Wolf 191M occupied 55 mi<sup>2</sup>, but yearling female 263F occupied a larger area (74 mi<sup>2</sup>).

Alpha male 267M and pup/yearling male 268M were monitored in the Empire Pack centering on the Empire Swamp in west central Douglas County. Wolf 268M was caught as a healthy 46 pound pup in August 1996, but lost his collar after a few weeks. He was recaptured as a large 86 pound yearling in June 1997. Six wolves including 3-4 pups occupied this 69 mi<sup>2</sup> territory overwinter. Breeding was again detected in 1997.

Four different collared wolves were monitored in the Crotte Creek Pack along the St. Croix River in southern Douglas County (194M, 266F, 277M, 500M). Adult male 500M monitored since May 1993 went off the air in August 1996. Adult male 194M dispersed out of the territory in January 1997, and was lost after May 1997. Yearling female 266F was caught in the pack in August 1996, and adult male 277M was caught in June 1997. It was not clear if 277M is the new alpha or perhaps if 500M is still around. Eleven wolves occupied the 36 mi<sup>2</sup> territory over winter prior to the dispersal of 194M. The pack probably included at least 6 pups, and again showed breeding activity in 1997.

Two collared wolves were monitored in the Moose Lake Pack during the period (210F, 260F), but 260F dispersed out of the territory after October 21. The pack of three wolves occupied a 45 mi<sup>2</sup> territory northwest of Solon Springs in midwinter. One of these wolves was probably a surviving pup from last year. Breeding again occurred in 1997.

Three collared wolves were monitored in the Moose Road Pack over winter (155M, 187F, and 230M). These 3 adults were apparently the only wolves in the pack over winter, therefore no pups survived from last spring. The 54 mi<sup>2</sup> territory was surrounded by 4 packs in Wisconsin and Minnesota. Breeding activity apparently occurred in February 1997. Wolf 230M was thought to be the alpha male, but recent capture of adult male 155M, makes that assessment less clear.

Three collared wolves were monitored in the Chase Brook Pack of the southwest corner of Douglas and northwest Burnett County (185F, 724F). Adult female 185F, the original founder of this pack went off the air in March 1997. She had not produced any surviving pups in this pack. Three wolves were detected in the 72 mi<sup>2</sup> territory in early winter but only 2 were observed the rest of the winter. It appeared that 185F had been replaced by 724F, who was caught in late May 1997, and showed sign of recent lactation. Therefore pups were apparently produced in spring.

Sign of a single wolf was located in the northeast corner of Douglas County and northwest Bayfield County near the Brule River. Wolf 209F had dispersed into this area from the Moose Lake Pack in spring 1996, but she apparently was killed by 1 or more other wolves in December 1996. A single wolf remained in the area during the rest of the winter.

#### Burnett County

Wolf 195F had dispersed from the Crex Meadow Pack area in December 1996, although her movements since spring 1996 had been extensive in this territory and adjacent areas. Tracks of 3-4 wolves was detected on the Crex Meadow Wildlife area, over winter 1996-1997, but breeding activity was not confirmed.

Wolf 195F dispersed into the Riverside area of northern Burnett County in late January 1997. She apparently established a new territory along the St. Croix River in this area. On June 28, 1997 wolf 195F and male 242M were caught on a farm suffering depredation. It was not clear if wolf 242M was her mate because he was only 1 to 2 years old. Wolf 195F was placed east of the farm with her 3 pups, but 242 M was moved 170 miles east to northern Forest County.

#### Washburn County

Although 2 collared wolves were monitored in the Stuntz Brook Pack (199M, 265M), no wolf was on the air during the winter survey period. Alpha male 199M went off the air in August 1996, and a new adult male (265M) was caught in May 1997. He perhaps has replaced wolf 199M as the alpha. Five wolves, probably including 2-3 pups, occupied the territory in winter. Last year this pack occupied only 8 mi<sup>2</sup>, but at the time only 2 wolves were present. There was some evidence that the pack roamed more widely in winter 1996-1997. The pack continued to occupy wildland west of Highway 53 and south of Minong.

Two collared wolves were monitored in the newly formed Tranus Lake Pack of northeastern Washburn County (194M, 255F). Wolf 194M who had recently dispersed from the Crotte Creek Pack, joined with 255F in mid February. Wolf 255F had left the Rainbow Lake Pack in April 1996, and had traveled extensively in Bayfield, Douglas, Washburn, and Sawyer County.

Breeding occurred, but 255F died in late April 1997 from peritonitis when she was unable to expel one of two fetus in her abdomen. Wolf 194M went off the air a month later.

### Bayfield County

Yearling female (259F) was monitored in the Smoky Hill Pack since July 1996. A pup was also caught in this pack at the time, but he was too small to collar (19 lbs). A total of 7 wolves occupied this 80 mi<sup>2</sup> territory in southwest Bayfield County during winter. The pack included 3-4 pups, and apparently again bred in 1997.

No collared wolves were monitored in the Rainbow Lake Pack. Sign of 3-4 wolves were found in this territory through snow tracking. An adult female, apparently the alpha female was found on March 8, 1997. She apparently was suffering from a severe case of mange, lacking hair on much of her body. Wolf 255F also had a severe case of mange when caught as a pup in September 1995. The dead female may have been the mother of 255F. Probably only 1 pup had survived from last year in the pack, and no pup production was anticipated in spring 1997.

Two wolves showing some breeding activity were tracked in the Flag River Pack of northern Bayfield County. Apparently no pups had survived from last year. Sign to determine likely trapping areas were limited during summer. This pack perhaps migrates somewhat with deer that summer in the center of the Bayfield Peninsula, but winter along the Lake Superior shoreline.

### Ashland/Iron Sawyer Counties

Adult male 257M was collared in June 1996 and remained in the Hellhole Creek Pack territory until late November when he dispersed to the east. During winter, 3 wolves showing breeding activity were tracked in this area. Probably this included single pup from 1996. Wolf 257M had occupied a 32 mi<sup>2</sup> territory north of Clam Lake.

No collared wolves occurred in the Brush Creek Pack northeast of Clam Lake, although 257M had spent time on the western side of this territory. Snow tracking indicated 5 wolves, including a breeding pair occupied the area. Apparently 2-3 pups had survived from 1996.

Alpha female 258F was monitored in the Torch River Pack southeast of Clam Lake, and her yearling daughter was caught in June 1997. The pack occupied a 69 mi<sup>2</sup> territory and consisted of 6 wolves in winter. Wolf 258F had been seen with 8 pups in summer 1996, and it appeared 4 pups were still present in winter. Breeding activity was again detected in 1997.

A pair of wolves frequented the Black Lake area east of Moose Lake and west of County Hwy. GG in Sawyer County. The pair showed breeding activity, and had apparently established a new territory. The pair may roam as far north as the recently released elk herd just south of Clam Lake.

A pair of wolves roamed areas near Ghost Lake west of Clam Lake in southeast Bayfield and northeast Sawyer Counties. Some breeding activity was detected for the two wolves.

No collared wolves occurred in the Log Creek Pack in the corner of Ashland, Sawyer and Price Counties. The Log Creek Pack is the longest existing pack in the Glidden District of the Chequamegon National Forest (present since 1989), but consisted only of a pair during the period. Marking behavior indicated breeding activity. The pair apparently also visited the northern portions of the Flambeau River State Forest.

Sign of 5 wolves were snow tracked in the Thornapple River Pack territory south of Draper. Probably 2-3 pups survived from 1996, and breeding activity was again apparent. Yearling female 239F was caught in this territory on June 6, 1997.

A new pack of 6-7 wolves was detected in the Tupper Creek area and other portions of southeast Sawyer County. The Tupper Creek Pack may have split off from Thornapple River Pack. It apparently contained 4-5 pups during midwinter and breeding activity again occurred in 1997. Wolf pup 262M caught in this pack in August 20, 1996 suffered from mange and weighed only 14 lbs; he was not radio-collared. Yearling male 276M was caught in this territory on May 23, 1997 weighed only 52 lbs, and perhaps had suffered from the affects of mange as well.

Wolf 229F, the alpha female, continued to be monitored in the Augustine Lake Pack. Although 3 pups were observed in the territory during summer 1996, only the breeding pair remained by midwinter. The pack had been involved in depredation on bear hunting dogs in late summer and early fall 1996, including death of 2 dogs and injury to 2 others. These dogs had apparently traveled close to the packs rendezvous site while pups were present. The pack occupied a winter territory of 20 mi<sup>2</sup> north of Glidden and northwest of Augustine Lake.

Five wolves were snow tracked near the headwaters of the Chippewa River northeast of Butternut in eastern Ashland and western Iron County. The pack apparently contained 3 pups from last year, and breeding occurred in 1997. The Chippewa River Pack was apparently involved in some surplus killing in early March when 6 deer were killed at a timber sale. The deer were very concentrated and hampered by deep snow.

Wolf 253F (adult female) was the sole collared wolf in the Pine Lake Pack. The pack's 27 mi<sup>2</sup> territory was centered on Moose Lake in central Iron County. Two or three wolves occurred in the pack but probably did not include any pups. Breeding activity was again detected.

A single wolf was snow tracked in the Hoffman Lake Wildlife Area in southeast Ashland and southwest Iron Counties. This wolf may also have been involved in surplus killing of deer. Eleven deer that had died or were killed over a short period of time, were found near a timber sale.

Tracks of 4 wolves of the West Firelane Pack were followed in the western and southern portions of the Bad River Indian Reservation. The pack probably included 2 pups and showed breeding activity during winter.

The Morrison Creek Pack of 4 wolves was snow tracked in the northeast portion of the Bad River Reservation in northern Ashland and Iron Counties. Apparently 2 pups survived from last year, and breeding activity occurred in 1997.

### Price/Oneida/Vilas Counties

Adult female 237M roamed the 67 mi<sup>2</sup> Price Creek Pack territory in western Price County in the eastern Flambeau State Forest, Kimberly Clark Wildlife Area, and large swampland in the area. Two other wolves were with 237F, but apparently no pups were present. Breeding activity was detected, and 237F may have become the new breeding female in this pack.

Two or three wolves were tracked in the Wilson Flowage area of the Chequamegon National Forest east of Fifield. No pups apparently survived from last year. Only a single wolf marked in this territory, therefore breeding evidence was limited.

Tracks of a single wolf were followed in the Randall Lake/Miles Lake area of northeast Price, southeast Iron, and southwest Vilas Counties. Only one wolf was detected and no sign of breeding was found in winter 1996-1997. Subsequent live trapping in summer 1997 indicated that a pack with pups occurring in this area, but they were not detected during the winter survey. Probably the pack had established by late winter, but had gone undetected.

Alpha female 225F occupied the 34 mi<sup>2</sup> Bootjack Lake Pack territory in eastern Price and western Oneida county. The pack consisted of 6 wolves including 4 pups during winter, and they again bred in 1997.

A new breeding pair of wolves was detected on the North Willow Flowage. The pack southwest of Minocqua, perhaps split from the Bootjack Lake Pack to the west.

Three wolves were snow tracked in the Little Rice River Pack south of the Willow Flowage. Probably one pup survived from last year, and breeding activity was detected in this pack in western Oneida County.

### Lincoln/Taylor Counties

Sign of 6 wolves were detected in the Averill Creek Pack of western Lincoln County during winter. Apparently 3-4 pups survived from last year and breeding activity was detected in 1997.

Several reports of possible wolf activity were also obtained in the Taylor/Lincoln County area. A volunteer reported a possible set of wolf tracks in northwest Lincoln County. Several reports of one or more wolf were received in the Harrison Hills and Treehaven areas of northeast Lincoln County. Tracks of a single wolf was detected in the Medford District of the Chequamegon National Forest.

### NE Wisconsin:

No wolf sign was found along 234 miles of snow tracking in, and near the Nicolet National Forest of northeast Wisconsin by DNR surveyors. Volunteers examined an additional 775 miles, without finding any wolf sign.

Central Wisconsin:

Adult males 238M and 274M were monitored in the Wildcat Mound Pack in the Black River State Forest in central Jackson County. The pack occupied a 46 mi<sup>2</sup> territory during winter and consisted of 7 wolves including 4-5 pups. Breeding activity was detected in 1997. Wolf 238M remained in the territory until his signal was lost in May 1997. Wolf 274M dispersed from the Wildcat Pack in late October 1996, moving eastward to cranberry bogs west of Wisconsin Rapids in Wood County. He traveled extensively in eastern Jackson and western Wood Counties, but by late February rejoined the Wildcat Mound Pack.

A pack of 7 wolves with 3-4 pups was snowtracked in the Bear Bluff Pack area of eastern Jackson County during winter. The pack again showed sign of breeding activity. An adult female (275F) was caught in northwest Juneau County in early May 1997, appeared to be a member of this pack. Initially, she was thought to be a member of the adjacent South Bluff Pack, but she moved into the Bear Bluff area soon after capture.

Five wolves were detected in the South Bluff Pack of southwest Wood, and northwest Juneau Counties. The pack included 2-3 pups during winter, and again showed breeding activity.

Sign of a single wolf was detected in the Trow Mound area of southern Clark County. Wolf 501M (noncollared) that was inadvertently released to the 13 mi<sup>2</sup> Sandhill Wildlife Area, continued to roam the fenced wildlife area.

Dispersing Wolves:

Seven of the radiocollared wolves showed dispersal behavior during the period including 3 adult males, 2 adult females, and two yearling females. Only one was known to successfully settle into a territory and produce pups. Two wolves died while dispersing, one died after establishing a territory, two probably dispersed out of range, and one returned to his home territory after an absence of 4 months.

Wolf 195F (adult female) had been caught in the Crex Meadow Pack in May 1995. She remained within a compact area of that pack in summer 1995 and winter 1995-1996. In spring 1996, 195F began to roam over a much larger area after the demise of the Five Corner Pack and Sand Creek Pack to the north in Minnesota. Until late December 1996, 195F roamed portions of all 3 territories. In late December 1996 and early January 1997, 195F moved 31 miles eastward to the Lampson area in Washburn County (near U.S. Highway 53). From Lampson, the wolf moved back west to the Webster area (26 miles), and by late January moved northward to the Riverside area (19 miles). After late January, 195F settled along the St. Croix River near Riverside in northern Burnett County. She was with her mate through February and March, but he was no longer seen after March. Wolf 195F was caught near wolf 242M on a farm suffering depredation on June 28, 1997. Because she had 3 pups nearby she was released back to her home site, but the male was moved to the Nicolet National Forest 170 miles eastward.

Wolf 194M (adult male) of the Crotte Creek Pack made a sudden move 20 miles southeast in late January 1997. He moved into an area where yearling female 255F had roamed. Wolf 255F had left her natal home, the Rainbow Lake territory in early April 1996, and had roamed widely in

Bayfield, Douglas, Washburn and Sawyer Counties. By February 20 the two wolves had joined together in the Tranas Lake area of northeast Washburn County. On April 28, wolf 255F was found dead due to birthing complications. The male disappeared after May 22, and perhaps dispersed out of range.

Wolf 209F had dispersed 18 miles north of the Moose Lake Pack to the south shore of Lake Superior in late May 1996. Between May and December she roamed a broad area from Wisconsin Point to Port Wing (24 miles). She spent a lot of time near the mouth of the Brule River. On December 11, 1996 wolf 209F was found dead, half submerged in a small creek in northwest Bayfield County. She was apparently killed by another wolf or large dog.

Wolf 260F (yearling female) dispersed south from the Moose Lake Pack to northeast Washburn County (about 27 miles) in late October 1996. She remained in northern Washburn throughout late October and all of November, crossing U.S. Highway 53 at least 7 times. She was found dead from gunshot wounds suffered during the firearm deer season on December 2.

Wolf 257M was caught in the Hellhole Creek Pack on June 5, 1996 and remained on the territory until November 27, 1996. He dispersed eastward into Iron County near the Giles Flowage in late November and on December 26 he was 29 miles east of his natal territory. The last location for 257M was 6 miles northwest of Mercer in Iron County on January 14, 1997 (33 miles east of his home territory). His signal was lost after that date and he probably dispersed further eastward into nearby Michigan.

Wolf 274M was a subordinate male monitored in the Wildcat Mound Pack of Jackson County. He dispersed 30 miles eastward into the cranberry bogs between Dexterville and Wisconsin Rapids, Wood County in late October. Between early January and mid-February he returned three times to central Jackson County and back each time to western Wood County (20-30 miles). Finally, in late February he returned to the Wildcat Mound Pack and remained in the territory through the rest of the study period. He had been mostly absent from his home territory for 4 months, before rejoining the pack.

#### WINTER WOLF POPULATION:

The minimum count of the Wisconsin gray wolf population in winter 1996-1997 was 148-151 wolves (Table 3). At least 35 wolf groups occurred in the state, and breeding activity was determined for 33 packs. Average size for 33 packs was 4.2 wolves (range 2-10 wolves). Areas covered by wolf territories, and adjacent interstitial areas covered about 2200 mi<sup>2</sup> at a density of 1 wolf/15 square miles.

The 1996-1997 wolf population represents a 49% increase above the wolf population of 1995-1996 (99-105 wolves). This represents the third year that the wolf population has been at 80+ wolves, and therefore indicates that reclassification work can begin this fall. This represents the fourth year that the wolf population in Michigan and Wisconsin have exceeded 100 wolves, with a current bi-state population of 260 wolves (112 in Michigan).

## WOLF MORTALITY:

Only 3 radio-collared wolves were known to have died during the study period (Table 4). Possibly some of the collared wolves that went off the air were killed and radios destroyed, but none disappeared under suspicious circumstances. The crude survival rate of 37 collared wolves was 92%, suggested excellent survival. Even if some of the lost radio signals were due to mortality, survival still would have been very high. The cause of death for the 3 collared wolves were intraspecific strife (other wolves), peritonitis due to birthing complications, and illegal killing. Two of the 3 mortalities were dispersing wolves, a status that may increase risk of mortality.

Mortality from noncollared wolves is not used for estimating survival/mortality rates because the observations are biased toward samples easily observed by people. But noncollared wolves do provide additional insight into mortality factors affecting wolves. Three noncollared wolves were found dead during the period including the following: yearling male killed by vehicle on U.S. 8 in Lincoln County (July 1996); yearling male killed by vehicle on Interstate 90 Juneau County (December 20, 1996); and adult female died with severe mange in Bayfield County (March 8, 1997).

Estimates of the number of pups present in winter was 56 to 66; using the midpoint, estimated pup survival would be 40% (61 pups/29 females x 5.2 pups per female). Although this rate is low compared to other areas of North America it represents some of the best production in Wisconsin's wolves in a long time. Despite the improved pup production, 7 or 8 packs lost all their pups by midwinter.

A summary of mortality for radiocollared wolves in Wisconsin and Pine County, Minnesota are shown in Table 5. Human caused mortality seems to be declining.

## STATEWIDE WOLF DISTRIBUTION

Wolf observations were obtained from natural resource agency personnel and private citizens from July 1, 1996 through June 30, 1997. All observations were classified as "probable", "possible", and "not likely". A total of 163 probable and possible observations were received (Table 6); this represented a 22% increase above last year (134) but still less than reports in 1994-1995 (190). These observation reports seemed to not track the wolf population as well in recent years as in periods of much lower numbers. The novelty of wolves is perhaps wearing off as the population continues to increase. Observation rates were generally greatest for counties with wolf packs, although none were reported for Juneau County that contained portions of one or two pack territories. Highest observation rates were for Sawyer (22), Ashland (18), Price (15), Oneida (14), and Lincoln Counties (14). Reports were received from 26 counties, mostly in the north, but also several in central Wisconsin. Marathon had the highest report rate for a county without breeding packs, perhaps due to dispersers traveling through from Lincoln County to the north.

### Job 106.5 INITIATE DISEASE ABATEMENT

Nine wolves captured in 1996 were tested for 4 viral and 1 bacterial diseases, and were judged by characteristic sign as to likeliness of having sarcoptic mange. The values for determining exposure to disease agents has been modified since 1994, and test results reported for 1994 through 1996 captured wolves are thus stated in Table 7.

Exposure to canine parvovirus (serum) was 3 of 9 in 1994, 7 of 13 in 1995, and 4 of 9 in 1996. Results for the same period for fecal canine parvovirus tests was 2 of 6, 4 of 7, and 3 of 6 captures. It appears there may be an increase in parvovirus since the early 1990's, but some of the differences may also be due to change in test procedures. Of 28 wolves tested from 1991 to 1993, 25% tested positive for exposure, but 14 of 31 (45%) tested positive from 1994 through 1996.

Positive results of exposure in the other 4 diseases for 1994, 1995, and 1996 was as follows: infections canine hepatitis was 4/9, 4/13, and 5/9; canine distemper virus was 3/9, 1/13, and 3/9; heartworm was 0/10, 0/13, and 0/9; and Lyme Disease was 4/9, 2/13, and 4/9. Heartworm continues to be a rare disease among wild wolves, but Lyme Disease generally is positive in about half of Wisconsin's wolves, although it was much lower in 1995.

Sarcoptic mites were detected in only 1 of 3 skin scrapings. The mites are often difficult to detect in skin scrapes. Based on general appearance, the number of animals that seemed to be infested with mange were 3 in 1994, 2 in 1995, and 1 in 1996. Four of the mange suspected wolves were pups. In the severe winter of 1995-1996 four collared adult males died with severe cases of mange, although one was also shot. No collared wolves died with mange in winter 1996-1997, but a noncollared adult female was found dead in March with a severe case of mange. Although some wolves continue to be affected by mange, especially pups, the disease does not appear to be limiting the growth of the wolf population.

Because the wolf population has shown satisfactory growth, vaccination of individual captured wolves with a general canine vaccine was discontinued in 1996. Vaccination of individual wolves does not seem to have been a factor in the increase of the population.

### JOB 106.6 EVALUATE PROGRESS

Meetings were held by the Wisconsin Wolf Advisory Committee on August 27, 1996, December 12, 1996, January 7, 1997, February 5, 1997 and April 23, 1997. Much of the focus of these meetings was work on a new wolf management plan, especially the citizen participation process. The goal population (80) for federal and state reclassification had been met for the third year, and the need for a new wolf management plan increased.

Federal delisting procedures will probably begin in 1999. The current population for Michigan and Wisconsin of 260 wolves represented the fourth year at the goal of 100+ wolves. Totally federal delisting could occur after this population is held for 5 years, and a stable population exists in Minnesota.

### JOB 106.7 IMPLEMENT LIVESTOCK DAMAGE CONTROL ACTIVITIES

Seven cases of wolf depredation involving 10 calves and 6 dogs (4 killed), occurred during the period. Depredations included the following: one blue tick dog killed on July 31, 1996 in Jackson County by the Bear Bluff Pack; one plohound killed on August 24, 1996 in Ashland County by the Augustine Lake Pack; one plohound killed in Ashland County on August 30, 1996 by the Augustine Lake Pack; two plohouds injured in Ashland County on September 25, 1996 by the Augustine Lake Pack; one hound killed on September 25, 1996 on Sawyer County by the Thornapple River Pack; one calf and possibly up to 3 killed on April 4, 1997 by the Price Creek Pack in Price County; and up to 9 calves killed (probably not all wolf kills) in May and June 1997 by the Riverside and/or Chase Brook Pack. All 4 dogs killed had gotten separated from their groups and were within 1/2 mile of den or rendezvous sites. All dog depredations were reimbursed except the dog killed in Sawyer County where the owner refused to fill out a tax form needed for the reimbursement. Reimbursements on calf losses are still pending because of negotiation on reasonable payment rates.

Wolf 195F and one or two-year old male 242M were caught on the farm with 9 calf losses in Burnett County on July 28, 1997 by USDA-ADC trappers. Plans were to release the female with her 3 pups away from the farm, and move the male 170 miles across the state to the Nicolet National Forest.

### JOB 106.8 COORDINATE WOLF MANAGEMENT WITH OTHER AGENCIES

Several meetings were attended with other agencies personnel to discuss wolf management issues, and the project biologist served on a new federal recovery team for Gray Wolf Population in Eastern United States. Five Wisconsin wolf advisory committee meetings were held and these included members from USDA-ADC, Great Lakes Fish and Wildlife Commission, U.S. Forest Service, U.S. Fish and Wildlife Service, County Forests, as well as DNR personnel. Federal Recovery team meetings were held on September 27, April 1 and April 21. Other cooperator meetings included the following; U.S. Fish and Wildlife Service Endangered Species concerns August 6; Great Lakes Endangered Species Coordinators October 9 - 10; County Forest Administrators November 1; Defenders of Wildlife Wolf Conference Albany NY November 14 - 16; Maine Dept. of Inland F&W March 21; Minnesota Wolf Management Planning March 26; Forest Service personnel April 8; USDA-ADC training April 29; Consolidated Paper personnel April 30; and Voight (Chippewa Tribe) Task Force June 5.

The Wisconsin DNR continued to cooperate with Wisconsin DOT on evaluating the impact of development on U.S. Highway 53 on wolves.

### JOB 106.9 CITIZEN PARTICIPATION

Presentations on wolves were given in 33 talks to 1411 people by Wydeven. Others also giving talks included Ron Schultz, Sheri Bulter, Dick Thiel, Randy Jurewicz, Sarah Boles, and other DNR personnel.

On October 15 through October 17, 10 forums were held across Wisconsin to discuss concerns and issues of wolf management. A total of 228 people attended the forums and 122 make

comments. Additionally, 98 written and e-mail comments were received during the comment period in October and November. Information on wolf management planning was sent to 1200 media outlets and individuals, and a "White Paper" on wolf management was sent to 800 groups and individuals. An Issues Report on the concerns and comments was nearly completed at the end of the period.

#### JOB 106.10 VOLUNTEER PROGRAM ACTIVITIES

Twenty volunteers assisted on DNR wolf population monitoring. Over 132 people assisted on volunteer carnivore track surveys across northern and central Wisconsin. Training was provided for 43 TWA volunteers and speakers bureau persons.

#### JOB 106.11 DEVELOP RECLASSIFYING CRITERIA

Reclassification criteria was one aspect of concern that was explored with the citizens at public forums. Additional discussions and evaluations were made at wolf advisory committee meetings. A draft wolf management plan will be prepared in fall 1997 that will include criteria for state reclassification and delisting.

Wydeven served on the Federal Recovery team that reviewed federal criteria for wolf reclassification and delisting in eastern United States. Modification for reclassification and delisting will probably occur so that Great Lakes wolves can be treated as a Discrete Population Segment.

#### JOB 106.12 REVIEW TRANSLOCATION

The current wolf population growth in Wisconsin drastically reduces any need to translocate wolves across the state. Translocations currently would be used only for relocating depredating wolves to remote areas away from depredating sites. An adult female (195F) and a yearling or two-year old male (242M) were captured at the end of the period, and were considered for relocations during the next biennium. Work was done on developing a more thorough protocol on translocation of individual depredating wolves.

Table 1. Capture data on wolves caught in Wisconsin and adjacent areas of Minnesota in 1996.

Date	Weight	Sex	Age <sup>a</sup>	Wolf #	Study Area	
					Pack	County
05/23/96	70 lbs.	F	Y	W198	Loner	Douglas
05/31/96	~70 lbs. <sup>b</sup>	F	A	W210	Moose Lake	Douglas
06/05/96	76 lbs.	M	A	W257	Hellhole Creek	Ashland
06/13/96	74 lbs.	F	A	W258	Torch River	Ashland
07/15/96	58 lbs.	F	Y	W259	Smoky Hill	Bayfield
08/27/96	79 lbs.	F	Y	W260	Empire	Douglas
07/14/96	19 lbs.	F	P	W261 <sup>c</sup>	Smoky Hill	Bayfield
08/20/96	14 lbs.	M	P	W262 <sup>c</sup>	Tupper Creek	Sawyer
07/15/96	66 lbs.	F	Y	W263	Truck Trail	Douglas
07/25/96	72 lbs.	F	A	W264	Tamarack River	Pine (MN)
08/07/96	~60 lbs. <sup>b</sup>	F	Y	W266	Crotte Creek	Douglas
08/28/96	~85 lbs. <sup>b</sup>	M	A	W267	Empire	Douglas
08/28/96	46 lbs.	M	P	W268	Empire	Douglas
08/28/96	78 lbs.	M	A	W274	Wildcat Mound	Jackson

<sup>a</sup> Age: P = Pup (<1 yr); Y = Yearling (>1 yr and <2 yr); A = Adult (≥2 yr)

<sup>b</sup> Not weighed

<sup>c</sup> Not radio-collared

Table 2. Radio telemetry data on wolves monitored from July 1, 1996 - June 30, 1997 in Wisconsin and eastern Minnesota.

Wolf # & Sex	Age <sup>a</sup>	Pack <sup>b</sup>	Date Captured	Last Date	No. of Locations <sup>c</sup>	Winter Territory Size (mi <sup>2</sup> )	Wolf No. in Territory <sup>d</sup>
155M	A	Moose Road	05/06/97	Ongoing	17	NE <sup>f</sup>	3
174F	Y	Truck Trail	05/12/97	Ongoing	15	NE <sup>f</sup>	7
185F	Y	Chase Brook	06/23/94	3/20/97 <sup>e</sup>	276	72	2-3
187F	Y	Moose Road	07/30/94	Ongoing	286	54	3
191M	A	Truck Trail	07/29/93	02/13/97	380	55	7
194M	A	Crotte Creek/ Tranus Lake	06/16/94	05/22/97	308	36 7	11 <sup>1</sup> 2
195F	A	Riverside	05/11/95 <sup>g</sup>	Ongoing	213	34	2
197M	A	Tamarack River	07/28/95	08/28/96	102	NE <sup>f</sup>	8
199M	A	Stuntz Brook	06/11/95	09/06/96	126	NE <sup>f</sup>	5
209F	P	Disperser	08/29/95	12/11/96	123	18	1
210F	A	Moose Lake	05/31/96	Ongoing	109	45	3
225F	Y	Bootjack Lake	05/25/93	Ongoing	166	34	6
229F	Y	Augustine Lake	07/09/93	Ongoing	232	20	2
230M	P	Moose Road	09/05/93	Ongoing	404	54	3
237F	Y	Price Creek	05/04/95	Ongoing	124	67	3
238M	Y	Wildcat Mound	05/21/95	05/01/97	138	46	7
239F	Y	Thornapple River	06/06/97	Ongoing	5	NE <sup>f</sup>	5
240F	Y	Torch River	06/21/97	Ongoing	2	NE <sup>f</sup>	6
242M	Y	Riverside(?)	06/28/97	Ongoing	1	NE <sup>f</sup>	2
253F	A	Pine Lake	06/12/95	Ongoing	113	27	2-3
255F	P	Tranus Lake	09/03/95	04/28/97 <sup>i</sup>	148	6	2
257M	A	Hellhole Creek/ Disperser	06/05/96	01/14/97	30	32	3
258F	A	Torch River	06/13/96	Ongoing	56	69	6
259F	Y	Smoky Hill	07/15/96	Ongoing	53	80	7
260F	Y	Moose Lake/ Disperser	08/27/96	12/02/96 <sup>j</sup>	26	NE <sup>f</sup>	3
263F	Y	Truck Trail	07/15/96	Ongoing	98	74	7
264F	A	Tamarack River	7/25/96	1/21/97 <sup>e</sup>	48	49	8
265M	A	Stuntz Brook	05/27/97	Ongoing	11	NE <sup>f</sup>	5
266F	Y	Crotte Creek	08/07/96	Ongoing	91	36	11 <sup>1</sup>

267M	A	Empire	08/28/96	Ongoing	85	69	6
268M	Y	Empire	06/11/97 <sup>k</sup>	Ongoing	17	NE <sup>f</sup>	6
274M	A	Wildcat Mound/ Disperser	08/28/96	Ongoing	53	45	7
275F	A	Bear Bluff	05/12/97	Ongoing	6	NE <sup>f</sup>	7
276M	Y	Tupper Creek	05/23/97	Ongoing	6	NE <sup>f</sup>	6-7
277M	A	Crotte Creek	06/10/97	Ongoing	7	NE <sup>f</sup>	11 <sup>l</sup>
500M	A	Crotte Creek	05/14/93	08/15/96	348	NE <sup>f</sup>	11 <sup>l</sup>
724F	A	Chase Brook	05/28/97	Ongoing	11	NE <sup>f</sup>	2-3

<sup>a</sup> Age at time of capture (P = Pup, Y = Yearling, A = Adult).

<sup>b</sup> Pack during winter of the study period.

<sup>c</sup> Total locations from the time of capture.

<sup>d</sup> Midwinter wolf number.

<sup>e</sup> Lost signal.

<sup>f</sup> NE = no estimate.

<sup>g</sup> Date of first capture; recaptured at depredating site in Burnett County on 06/28/97.

<sup>h</sup> Wolf found dead, presumably killed by other wolves.<sup>l</sup> Death due to birthing complications.

<sup>j</sup> Wolf found dead, shot illegally.

<sup>k</sup> Recaptured wolf; first captured as a pup in Douglas County on 08/28/96.

<sup>l</sup> Number of wolves before W194 dispersed and formed the Tranus Lake Pack.

Table 3. Minimum estimation of Wisconsin's timber wolf population in winter 1996-1997.

<b>Pack/Area/Wolf</b>	<b>Counties</b>	<b>No. of Wolves</b>	<b>Evidence<sup>a</sup></b>
Crex Meadows	Burnett	3	T
Truck Trail	Douglas	7*	R&T
Moose Road	Douglas	3*	R&T
Chase Brook	Douglas	2*	R&T
Riverside	Douglas	2*	R
Empire	Douglas	6*	R&T
Crotte Creek	Douglas	10*	R&T
Moose Lake	Douglas	3*	R&T
Stuntz Brook	Washburn	5*	T
Tranus Lake	Washburn	2*	R&T
Brule River	Bayfield/Douglas	1	T
Flag River	Bayfield	2*	T
Rainbow Lake	Bayfield	3*	T
Smoky Hill	Bayfield	7*	T
Ghost Hill	Bayfield/Sawyer	2*	T
Black Lake	Bayfield/Sawyer	2*	T
West Firelane	Ashland	4*	T
Morrison Creek	Ashland/Iron	4*	T
Hellhole Creek	Ashland/Bayfield	3*	T
Brush Creek	Ashland	5*	T
Torch River	Ashland	6*	R&T
Augustine Lake	Ashland/Iron	2*	R&T
Pine Lake	Iron	2-3*	R&T
Chippewa River	Ashland/Iron	5*	T
Log Creek	Ashland/Sawyer	2*	T

Table 3. (continued)

Pack/Area/Wolf	County(ies)	No. of Wolves	Evidence <sup>a</sup>
Hoffman Lake	Ashland/Price	1	T
Randall Lake	Iron/Price/Vilas	1	T
Thornapple River	Sawyer	5*	T
Tupper Creek	Sawyer	6-7*	T
Price Creek	Price	3*	R&T
Wilson Flowage	Price	2	T
Bootjack Lake	Price/Oneida	6*	R&T
North Willow	Oneida	2*	T
Little Rice River	Oneida	3*	T
Averill Creek	Lincoln	6*	T
Medford District	Taylor	1	T
Trow Mound	Clark	1	T
Wildcat Mound	Jackson	7*	R&T
Bear Bluff	Jackson	7*	T
South Bluff	Wood/Juneau	4-5*	T
<b>Total</b>		<b>148-151</b>	

<sup>a</sup> Evidence: R = radio-telemetry surveys  
T = track and sign surveys

\* Pack with breeding activity.

35 groups average size = 4.1 wolves  
33 breeding packs average size = 4.2 wolves  
5 loners

Table 4. Mortality during July 1, 1996 - June 31, 1997 of radio-collared wolves.

<b>Wolf # &amp; Sex</b>	<b>Age<sup>a</sup></b>	<b>Date Captured</b>	<b>Date Died</b>	<b>Cause of Death</b>
W209F	P	08/29/95	12/11/96	Other wolves
W255F	P	09/03/95	04/28/97	Birthing complications
W260F	Y	08/27/96	12/01/96	Shot illegally

<sup>a</sup> Age of wolf at time of capture.

Table 5. Mortality summary of radio-collared wolves from Wisconsin and adjacent areas of Minnesota, October 1979 - June 1997.

	<b>Cause of Death</b>	<b>Number</b>	<b>% Known Mortality</b>
Human Caused	Capture Related	1	2%
	Shot Wound <sup>a</sup>	16	34%
	Trapped	3	7%
	Vehicle Collision	4	9%
	Unknown-Human Causes	3	7%
	<b>Total Human Causes</b>	<b>27</b>	<b>59%</b>
Natural Caused	Birthing Complications	1	2%
	Disease	9	20%
	Killed by Other Wolves	6	13%
	Unknown Natural Causes	3	7%
	<b>Total Natural Causes</b>	<b>19</b>	<b>42%</b>
<b>Total Known Mortality</b>		<b>46</b>	<b>101%</b>
Unknown Mortality		5	
Total Mortality		51	

<sup>a</sup> 15 wolves shot by firearm; 1 wolf by bow and arrow.

Table 6. Wolf observations reported by natural resource agency personnel and private citizens in Wisconsin in July 1996 - June 1997.

County	Sightings	Wolves Seen	Track or Sign Observations	Total Observations
Ashland*	10	21	8	18
Bayfield*	7	11	2	9
Burnett*	1	2	-	1
Chippewa	1	2	-	1
Clark	2	2	-	2
Columbia	2	3	-	2
Douglas*	5	5	3	8
Eau Claire	1	1	-	1
Florence	1	1	-	1
Forest	1	1	1	2
Iron*	6	8	6	12
Jackson*	-	-	3	3
Langlade	8	13	-	8
Lincoln*	12	23	2	14
Marathon	5	5	1	6
Oconto	3	3	1	4
Oneida*	12	19	2	14
Portage	1	1	1	2
Price*	10	14	5	15
Rusk	1	1	1	2
Sawyer*	15	23	7	22
Taylor	3	5	1	4
Vilas*	4	6	2	6
Washburn*	3	10	1	4
Waushara	1	1	-	1
Wood*	1	1	-	1
<b>Totals</b>	<b>116</b>	<b>182</b>	<b>47</b>	<b>163</b>

\* Counties with known wolf packs during portions of this study period.

**Table 7.** Disease Test of Wolves in Wisconsin and Adjacent Areas of Minnesota 1994-1996

<u>Wolf &amp; Sex</u>	<u>Age</u>	<u>Date</u>	<u>Serum CPV</u>	<u>Fecal CPV</u>	<u>ICH</u>	<u>CDV</u>	<u>HW</u>	<u>Lyme</u>	<u>Mange</u>
182F	A	08/28/94	1:80	1:32	1:20	<:5	Neg.	Pos.	-
187F	Y	07/30/94	1:160	1:128	<1:5	<1:5	Neg.	Neg.	-
194M	A	06/16/94	1:320	1:32	<1:5	<1:5	Neg.	-	-
231M	Y	05/13/94	1:80	1:32	1:40	1:40	Neg.	Pos.	-
232M	Y	05/13/94	1:80	-	<1:5	<1:5	Neg.	Neg.	-
233M	Y	05/13/94	1:80	1:256	1:40	1:5	Neg.	Pos.	<sup>b</sup>
234M	A	05/21/94	1:80	1:32	1:5	1:10	Neg.	Neg.	-
235M	P	09/05/94	1:80	-	1:5	1:5	Neg.	Pos.	Yes
236F	P	09/05/94	1:320	-	1:5	<1:5	Neg.	Neg.	No <sup>b</sup>
184M	A	05/04/95	1:320	1:512	<1:5	1:5	Neg.	Neg.	-
186M	A	06/08/95	1:80	-	<1:5	1:5	Neg.	Neg.	-
195F	A	05/11/95	1:320	-	1:5	1:5	Neg.	Neg.	-
196M	Y	05/09/95	1:160	1:32	1:10	<1:5	Neg.	Pos.	-
199M	A	06/11/95	1:160	1:32	1:10	1:5	Neg.	Neg.	-
200M	P	09/01/95	1:40	-	1:5	<1:5	Neg.	Neg.	-
237F	Y	05/04/95	1:80	-	1:20	1:5	Neg.	Neg.	-
238F	Y	05/21/95	1:160	1:256	1:20	1:20	Neg.	Pos.	-
251M	A	05/23/95	<1:20	1:512	Neg.	<1:5	Neg.	Neg.	<sup>b</sup>
252M	A	06/11/95	1:80	-	1:5	1:5	Neg.	Neg.	-
253F	A	06/12/95	1:80	-	1:5	1:5	Neg.	Neg.	-
255M	P	09/03/95	1:160	<1:16	1:5	1:5	Neg.	Neg.	<sup>b</sup>
501M	A	05/21/95	1:320	1:256	1:5	<1:5	Neg.	Neg.	-
198F	Y	05/23/96	1:320	-	<1:5	<1:5	Neg.	Neg.	-
210F	A	05/31/96	<1:20	1:64	1:10	<1:5	Neg.	Pos.	-
257M	A	06/05/96	1:80	-	1:10	1:5	Neg.	Neg.	-
258F	A	06/13/96	1:80	1:1024	<1:5	1:5	Neg.	Neg.	-
259F	Y	07/15/96	<1:20	1:32	1:10	1:20	Neg.	Pos.	-
261F	P	07/14/96	1:320	1:32	1:10	1:10	Neg.	Neg.	No <sup>b</sup>
263F	Y	07/15/96	1:80	1:256	<1:5	1:5	Neg.	Pos.	-
264F	A	07/25/96	1:160	-	1:10	<1:5	Neg.	Neg.	-
274M	A	08/28/96	1:320	1:2048	1:5	1:20	Neg.	Pos.	-

<sup>a</sup>Age at Capture: P=Pup (<1 yr.); Y=Yearling (>1 yr. & <2 yrs.); A=Adult (≥2 yrs.)

<sup>b</sup>Sarcoptic mite not detected but sign suggested mange.

Disease Tests: CPV = Canine Parvovirus Serum:  $\geq 1:160$  is positive  
Canine Parvovirus Feal:  $\geq 1:128$  is positive  
ICH = Infectious Canine Hepatitis:  $\geq 1:10$  is positive  
CDV = Canine Distemper Virus:  $\geq 1:10$  is positive  
HW = Heartworm: Neg. = negative; Pos. = positive  
Lyme= Lyme Disease: Neg. = negative; Pos. = positive

(Disease tests conducted by Kerry Beheler-Amass WDNR Wildlife Diagnostic Lab).

