

WISCONSIN ENDANGERED RESOURCES REPORT # 50

WISCONSIN TIMBER WOLF RECOVERY PLAN

By: Wisconsin Timber Wolf Recovery Team

EXECUTIVE SUMMARY

The Eastern Timber Wolf was listed as an endangered species in Wisconsin by the U.S. Fish and Wildlife Service in 1967 and by the WDNR in 1975. This plan reviews the species' former and current status and distribution, its life history, limiting factors, and a summary of recent population investigations within Wisconsin. A Recovery Goal of 80 wolves in 10 packs (4 - east of hwy 13) by the year 2000 has been established by the State Recovery Team as the Wisconsin contribution to federal recovery objectives for the species in the upper Great Lakes region.

Wolves are controversial predators that prey on ungulates and occasionally livestock. The species was believed to have been eliminated from Wisconsin in the late 1950's and reappeared during the early 1970's from population centers in neighboring Minnesota. Wolves have a complex social order within their individual family units, or packs, and usually one adult female per pack bears a single litter of 5 or 6 pups per year. In recent years Wisconsin wolves have suffered from a mortality rate of 38 percent. Humans are the major source of wolf mortality in Wisconsin, with gunshot deaths accounting for 43 percent of all mortalities. Since 1980 the wolf population in Wisconsin has ranged from 15 to 30 in 3 to 6 packs.

Public and inter-agency input was sought by the Team as it developed recovery management strategies. In 1986 the Team invited public participation via 9 statewide forums to get to know affected interest groups and share information on needs and concerns. Over 70 meetings, 25 talks, 8 statewide DNR news releases, 5 major mailings, and 30 interviews with the print and electronic news media were conducted by the Team.

Recovery Strategies include: (1) Public education programs, (2) Increased protective measures, (3) Cooperative ventures with landowners to maintain quality habitat, (4) Monitor statewide wolf populations, (5) Monitor diseases, (6) Conduct periodic program evaluations, (7) Implement livestock depredation control and compensate for losses, (8) Increase inter-agency cooperation, (9) Continue public participation activities, (10) Develop volunteer assistance programs, (11) Establish criteria for managing a "recovered" wolf population, and (12) Translocate individual Wisconsin wolves if progress has not been made by year 5, providing there is public support.

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Prepared by: Wisconsin Timber Wolf Recovery Team

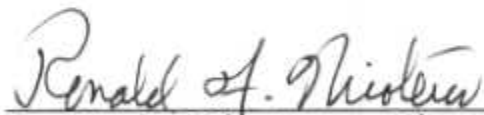
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The Department of Natural Resources determined in April 1988 that it should conduct a review of this recovery plan under the Wisconsin Environmental Policy Act, Section 1.11, Stats. and Chapter NR 150, Wisconsin Administrative Code, to determine whether this management plan is a major state action requiring an environmental impact statement. The environmental assessment was completed on November 14, 1988, and determined that an environmental impact statement was not required for this management plan.

APPROVED:



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2/22/89

Date



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March 7, 1989

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The Team also thanks the many citizens and agency staffs of the DNR and U.S. Forest Service for their comments and contributions in the development of the Wisconsin Timber Wolf Recovery Plan.

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- Wisconsin Timber Wolf Recovery Team
Madison, WI April 1988



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PART I.

LIFE HISTORY NOTES, CHANGES AND CAUSES OF WISCONSIN WOLF POPULATION DECLINES

A. INTRODUCTION

The purpose of this recovery plan is to review the processes that have caused significant declines in the number and distribution of Eastern Timber Wolves (Canis lupus lycaon Schreber) within Wisconsin and to propose measures to recover this species. The Eastern Timber Wolf was listed as an Endangered Species within Wisconsin by the U.S. Department of Interior, U. S. Fish & Wildlife Service in 1967 and by the State of Wisconsin, Department of Natural Resources in 1975.

B. STATUS AND DISTRIBUTION

U.S./Continental

Former Range: Prior to widespread settlement and agricultural development, gray or timber wolves were found almost everywhere north of central Mexico on the North American continent. The Eastern Timber Wolf, one of many recognized races of wolves, formerly occurred in the eastern seaboard states from Maine to Georgia and west through northeast Alabama, eastern Tennessee, to northeastern Iowa and eastern Minnesota (Jorgensen 1970).

Current Range: Within the past 300 years wolf range has declined by 50% in North America. Continental wolf populations are largely confined to Canada and Alaska. In the United States, Eastern Timber Wolf populations are restricted to northeastern Minnesota, Isle Royale National Park, Michigan, scattered areas of Wisconsin, and perhaps Upper Peninsula Michigan (Jorgensen 1970, Mech 1977, Thiel and Hammill 1988, Hendrickson et al. 1975). This represents a 97% reduction in distribution of this race within the United States (Jorgensen 1970).

WISCONSIN

Former Numbers and Distribution: The Eastern Timber Wolf occurred throughout the state of Wisconsin during pre-settlement times (Jackson 1961:293). Jackson (1961:293), who probably used Seton's (1929) popular pre-settlement density estimate of 1 wolf per 3 square miles, estimated Wisconsin's pre-settlement wolf population at 20-25 thousand animals. Prior to settlement wolves were more prevalent in southern Wisconsin where a variety of prey lived in abundance. Undisturbed expanses of old-age northern forest supported fewer prey and fewer wolves.

By the late 1940's wolves were confined to, "less than a dozen suitable areas..." primarily east of Bayfield County (Thompson 1950:42). Keener (1955) reported that wolves were restricted to perhaps 4 or 5 localities in the north and, using Thompson's (1952) density estimate of 1 wolf per 42 to 50 square miles, he estimated 50 individuals occupied 2,000 square miles of occupied habitat by 1953-55. Thiel (1978) felt that the breeding population of wolves had been extirpated by 1960, but documented occasional activity of lone wolves within the state between 1968 and 1975.

Recent Numbers and Distribution: A pack of wolves was identified within the Nemadji State Forest along the Wisconsin border in Pine County, Minnesota by 1974 and rapid proliferation occurred into adjacent areas of Douglas County, Wisconsin (Mech and Nowak 1981). Breeding of at least 2 wolf packs in the border country of Douglas County was documented during 1978 (Thiel & Welch 1981). Two wolves were killed by humans in Lincoln County, Wisconsin in 1979 (Mech & Nowak 1981, Thiel unpubl. data) and during the following winter a pack of wolves was confirmed there (Thiel & Hale 1980). Annual winter track surveys, summer howl surveys and radio telemetry work indicate an average statewide mid winter population of 15-25 timber wolves (Table 1).

Packs are scattered across several areas of northwestern and north central Wisconsin, and several lone wolves are found in the northeast (Map 1).

TABLE 1. Number of wolves and wolf packs in Wisconsin, 1979-80 to 1987-88.

Year	No. Packs	No. Wolves (mid-winter)
1979-80	5	25-27
1980-81	5	20-22
1981-82	4	23-27
1982-83	5	19+
1983-84	4	16-17
1984-85	4	14-16
1985-86	4	15
1986-87	5	18-22
1987-88	6	27-29

Reasons For Change of Status: Indiscriminate killing of wolves, fueled by various state and county financed bounties and intense negative attitudes, caused the demise of the wolf in the state by 1960. A state bounty existed from 1865 to 1957. This paralleled a nationwide trend in wolf extinctions (Flader 1974).

Habitat alterations were the proximate cause of the decline of wolves within the state. As settlement progressed wolves' native prey (elk, buffalo, moose and deer) were reduced or eliminated and replaced by livestock. Wolves were exterminated from the prairie regions of the state before 1880 but they persisted in northern forested tracts where they were less visible and thus less vulnerable. Eventually with increased human activity and improvements in access, humans over-exploited the species and by 1960 wolves disappeared from northern Wisconsin (Thiel 1985).

C. NATURAL HISTORY (Taken from Mech 1970, unless otherwise stated.)

Characteristics: Pelt color seldom varies in Eastern Timber Wolves; grizzled gray and brown predominate, while a few black or white individuals are occasionally noted (Mech & Frenzel 1971, Fritts & Mech 1981). The winter pelage in general is grayish and sometimes heavily overlain by black on neck, shoulders and back; head and underparts cinnamon, with latter grading into a pinkish buff. The summer pelage is similar though paler or washed with less black prominent on upper parts (Young and Goldman 1964).

Size: Adult Eastern Timber Wolves weigh from 45-100 pounds. Most females weigh 60-65 pounds and males average around 70-75 pounds.

Adult wolves are 4.5 -6.5 feet long from tail tip to nose tip and stand 28-34 inches at the shoulder.

Social System: Wolves live in family groups called packs. Packs generally consist of a dominant breeding pair, called Alphas, surviving offspring produced in the previous year (yearlings), and the current year's pups. Occasionally an older offspring may remain with its natal pack and sometimes an unrelated adult wolf may be a member of the pack. In areas such as Wisconsin where deer are the primary prey, pack size tends to range from 6 to 10 wolves in unmolested packs during winter months. Each family group occupies an exclusive territory ranging in size from 45-160 square miles, averaging 100 square miles. Territories of adjacent packs sometimes overlap but core areas are defended against other wolves (Peters & Mech 1975).

Between August and March (median October - November) many yearling wolves emigrate alone from their natal packs, seeking a mate and a territory. Occasional dispersal of adults has been noted (Fritts & Mech 1981). Dispersers may travel up to 500 miles in less than 10 months time (Fritts 1983).

Reproduction: Wolves are sexually mature at 22 months. The breeding season is from late January to early March and gestation is 60-63 days. The average litter size is 5-6 pups. Usually the dominant or Alpha pair produce the pups and they inhibit sexual contact between all other mature members of the pack.

The litter is born in April in a den usually excavated by the Alpha pair. They will live at that site for their first six weeks. After weaning, the pups are moved to a homesite (rendezvous site). Denning sites and homesites are usually located near a source of water such as a wooded stream or beaver pond. During the summer months the pack may periodically move their pups to new homesites as occupied ones become soiled with droppings and prey remains. Around September or October when the pups are large enough to travel with the adults, the homesites are abandoned and the pack moves as a single unit throughout their territory until the next denning season.

Mortality: Wolves are susceptible to starvation, diseases, predation (mainly human), and accidents. Where limited harvests are allowed and even where the species is totally protected, killings by man can account for 50-75% of the

total mortality (Fritts & Mech 1981, Berg & Kuehn 1982). When annual mortality rates exceed 30-40 percent wolf populations decline (Keith 1983). Marginal wolf populations such as Wisconsin's may be especially vulnerable to mortality exceeding 30 percent.

Habitat Requirements: Wolves formerly existed throughout Wisconsin (See Status & Distribution). Wolves are habitat generalists and can survive anywhere where they are not persecuted. At present vast portions of the state are unsuitable to wolves because of direct conflicts with human land uses; however many areas in Wisconsin's northern forest region could potentially support wolves (Map 1) (see Reasons for Change in Status).

Sizes of individual pack territories range from 45 to 160 square miles. Individual pack habitat requirements currently recognized by biologists are areas of at least 100 square miles (average pack territory size) containing low human densities, limited public accessibility and confined to areas where livestock production is absent or minimal (Bailey 1978, Thiel 1985, Mech 1979). At least 2,700 square miles of habitat in Wisconsin meet these criteria (Map 2).

Food: B. A. Mandernack (1983), who analyzed 334 scats of Wisconsin wolves from 1980-82, determined that the relative estimated bulk diet was composed of deer, 55 percent; beaver, 16 percent; and snowshoe hare, 10 percent. Miscellaneous items accounted for an additional 20 percent. Domestic animals (hog & dog) were found in 2 percent of the scats.

Densities of wolves are related to prey densities. In northeast Minnesota (where moose is a minor source of the wolf's diet) Mech (1986) reported a density of one wolf per 15 square miles in an area with deer densities of about one deer per square mile (Nelson and Mech 1986). In north-central Minnesota wolf densities of one wolf per 8 square miles were found in an area supporting 10 deer per square mile (T. Fuller, pers. comm.). In the northern forest region of Wisconsin, which includes 44 deer management units, average deer densities vary from 10 to 25 deer per square mile overwinter between individual units. In units where wolves presently exist, deer densities range from an average of 10 to 25 deer per square mile. (For a discussion of anticipated wolf impacts on the northern deer population see Appendix 1).

Beaver are abundant throughout northern Wisconsin and are a common food item of Wisconsin's wolves in spring, summer and fall. During spring as much as 30 percent of the wolf's diet is beaver (Mandernack 1983).

D. WISCONSIN HABITAT

Potential Habitat: Many areas within the northern forest region of Wisconsin are considered potential wolf habitat because of an abundance of deer, their primary prey (Map 1). Wolves are capable of surviving anywhere within this region where they are not molested by humans. The impact of persecution by humans is relative to the proximity of wolves to humans and their activities. More inaccessible or relatively remote areas may have greater potential in sustaining packs of wolves.

Suitable Habitat: Fairly remote areas are scattered throughout the northern tier of counties (Map 2). These areas, of varying size, have relatively low resident human densities and minimal levels of access, and they have correspondingly lower amounts of human activity. Because of this these areas may be especially well suited to support wolves. Of the 2,700 square miles of relatively remote country that has been identified, about 720 square miles (or 27 percent) is currently occupied by wolves.

E. LIMITING FACTORS

Past and Present: Historically only two factors have limited wolf populations: 1.) availability of ungulate prey, and 2.) the presence of people, the wolf's only significant predator. Presently wolf distribution in Wisconsin is governed by (1) human uses of land, and (2) the level of mortality caused by humans.

Diseases and parasitism are known to suppress wolf populations. In Wisconsin, where wolves have nearly been eliminated because of human activities, the presence of disease can have a profound impact on the survival of the few isolated breeding packs that remain. Wisconsin wolves have been exposed to such diseases as Canine Distemper, Canine Parvovirus, Lyme Disease (Thiel, unpubl. data) and Blastomycosis (Thiel et al. 1987). Parasites include protozoans and numerous intestinal worms, Dermacentor ticks, lice and heartworm (Mech et al. 1985, Archer et. al. 1986, Thiel, unpubl. data).

The presence and actions of people are considered significant in limiting wolf distribution in Wisconsin. Negative attitudes and misconceptions perpetuate human caused deaths to this day (Hook & Robinson 1982, Knight and Thiel in prep.) despite laws protecting the species. Surveys of people in Michigan and Wisconsin indicate that approximately 15 percent display anti-predator attitudes and believe wolves should be eliminated. Human persecution of wolves probably suppresses their re-establishment in Upper Peninsula Michigan and Wisconsin (Robinson and Smith 1977, Mech and Nowak 1981, Thiel and Hammill 1988).

Accidental and intentional deaths by people account for about 70 percent of all known Wisconsin wolf deaths (Table 2.).

TABLE 2. Summary of 21 known Wisconsin wolf-mortalities, 1975-1986.

	Man Caused				Natural	Unknown	Total
	Shot	Trapped*	Other	Subtotal			
No. Wolves	9	3	3	15	5	1	21
Percent	43	14	14	71	24	5	100

*In addition, single wolves were trapped and released in 1982, 1985, and 1986 by private trappers with the help of DNR officials.

An annual adult wolf mortality rate of 38 percent was calculated for radio-collared Wisconsin wolves between 1979 and 1984 using the method described by Heisey and Fuller (1985). Only three types of mortality-natural, unknown and shot- were identified based on necropsied radioed wolves. Shootings, the major source of mortality, were highest in fall, while natural deaths occurred only during winter.

The total known number of pups present during winter in Wisconsin has ranged from 2 to 8 per year (Table 3). No mortality data is available for pups. However, data on survival of litters to winter are provided in Table 3. Litter survival was lowest in 1983 and 1984, averaging 43 percent survival vs. 65 percent survival for all other years combined. Disease is implicated in the losses of at least 8 litters from 1981 to 1986. Litter losses can be especially harmful to Wisconsin's fragmented population which depends on reproduction as a major source of population recruitment.

Wolves from Minnesota's major wolf range occasionally disperse into Wisconsin. Despite this, the maintenance of Wisconsin's wolf population depends primarily on natural production. Immigration is beneficial to the recovery of wolves in Wisconsin because it can offset problems of low productivity, and provide gene pool diversity.

TABLE 3. Annual survival of Wisconsin wolf pack litters in winter.

Litter status	Year								Total Percent	
	1980	81	82	83	84	85	86	87		
Total litters	4	4	3	4	4	3	3	5	30	-
Litters lost	2	1	1	3	2	1	1	1	12	40
Litters survived	2	3	2	1	2	2	2	4	18	60
Percent survival	50	75	67	25	50	67	67	80	60	-
Pups present		>7	>2	4	6	3	5	8		

F. CRITICAL FACTORS

The federal Eastern Timber Wolf Recovery Plan (Bailey 1978) identified four major factors critical to the survival of wolves. They are:

"(1) availability of adequate wild prey, (2) large tracts of wild land with low human densities and minimal accessibility, (3) ecologically sound management, and (4) adequate understanding of wolf ecology and management."

These four items bring together the biological requirements (1 & 2) and human socio-political elements (3 & 4) necessary to support a viable wolf population.

Wolves need an available prey base and sufficient areas of land to roam in. Conflicts frequently result from the rather large land requirements of wolves and the diverse use of land by humans. Examples of direct conflict over land use by humans include livestock production, urban areas, and intensive recreational opportunities. Conflicts may also arise anywhere people have the opportunity to encounter and kill wolves either accidentally or intentionally.

In 1955 Wisconsin Conservation Department game manager, John Keener, commented, "One advance, which has hurt the wolf, is the greatly improved access in heretofore untraveled areas. ... This has caused the wolf to pull himself into the few areas that are least frequently used by man." (Keener 1955). These words, written by a man who would become Director of DNR's Bureau of Wildlife Management, are as pertinent today as they were over 30 years ago. Recent studies have confirmed a relationship between public access and relative wolf abundance (Thiel 1985, Jensen et al. 1986, Mech et al. 1988). In these studies, wolves were found in areas of Wisconsin, Minnesota and Ontario, Canada where public accessibility was limited. Roads, which provide humans with the means to "access" areas, were used to measure "accessibility". The amount, or density, of improved roads where wolves were found was below about one mile of road per square mile in area (For more detailed information on road standards and road densities see Appendix 2).

Public education about wolves has been identified as an overriding factor in the ultimate success of any wolf conservation program. The federal Eastern Timber Wolf Recovery Plan also stressed the need for public support by an informed public. Information must be made available to the public and managers alike through a well coordinated educational program.

Wolf populations are not adversely affected by humans where no direct conflict with human land use occurs, and/or where human densities are low and public accessibility is minimal. As the level of human tolerance towards wolves increases, access will have less affect on wolf populations.

G. CURRENT RESEARCH AND MANAGEMENT

Research on Status and Biology: Since 1979 the DNR, US Forest Service and the U.S. Fish & Wildlife Service (FWS) have been conducting an investigation (Study 101) into the population biology of wolves in Wisconsin in an effort to identify problems the species is facing in their environment (Thiel & Hale 1980, Thiel 1981, 1982, 1983, 1984). During this period forty-one wolves in four regions of the state have been radio-collared and studied. Other major work included investigations of food habits (Mandernack, 1983), parasite (Archer et al. 1986 Mech et al. 1985) and disease surveys (Thiel et al. 1987).

Monitoring Programs and Their Adequacy: The current investigations (See research on Status and Biology, above) are adequately monitoring wolf numbers and distribution within Wisconsin. Expansion in the species' distribution, however, will require additional manpower and financial support to be effective.

Eastern Timber Wolves, formerly found throughout Wisconsin, suffered from indiscriminate killings inspired by government bounties until they were considered extirpated by 1960. A resurgence in wolf activity occurred by 1975 and the current population, estimated at 27-29 wolves (1987-88), exists in several areas of northern Wisconsin. Although the wolf is a federally and state listed Endangered Species, deaths persist largely due to negative attitudes about wolves. Maintaining remote habitat, continuation of wolf population investigations, and an extensive public education program are key requirements for the long-term survival of Eastern Timber Wolves in Wisconsin.

RECOVERY STRATEGIES AND STEP-DOWN OUTLINE

Appendices and a Glossary are provided to give the reader pertinent background information. The first time a technical term appears in the narrative section it is underlined and it appears in the Glossary.

RECOVERY GOAL:

- (1) A SELF-SUSTAINING POPULATION OF 80 TIMBER WOLVES IN NORTHERN WISCONSIN.
- (2) RECLASSIFY THE WOLF TO STATE "THREATENED" WHEN A SELF-SUSTAINING POPULATION IS ACHIEVED.
- (3) CONTRIBUTE TOWARDS A FEDERAL RECLASSIFICATION TO "THREATENED" THROUGHOUT THE UPPER GREAT LAKES STATES.

The Wisconsin Department of Natural Resources (DNR) is directed by state statute 29.415 (7a) to implement programs "directed at conserving, protecting, restoring and propagating selected state endangered and threatened species to the maximum extent practicable." The Eastern Timber Wolf is listed as an endangered species in Wisconsin by the U.S. Fish & Wildlife Service (FWS) and the Wisconsin DNR. The purpose in developing a Wolf Recovery Plan is to

comply with state statute by restoring this species to a secure population level. The option to "do nothing" is not consistent with the intent of state law, and should not be considered unless Wisconsin's wolf population fails to respond to practical management activities.

Wisconsin's wolf population was considered extirpated between 1960 and 1970 (Thiel 1978), but by the mid 1970's wolves reappeared in northwestern and north-central Wisconsin. The wolves most likely came from Minnesota. Despite the lack of any special management programs, wolf packs formed in several areas. Between 1970 and 1980 the population grew from just a few to approximately 15-25 wolves in 4 to 5 breeding packs between. Ear-tagging and telemetry studies indicate that wolf populations in Wisconsin and wolves existing in western upper Michigan are an extension of Minnesota's population (Berg and Kuehn 1982, Thiel 1988, Fritts pers. comm., Thiel unpubl data). Recent studies indicate that persecution of wolves, combined with the chronic loss of wolf litters due to disease during the early 1980's, have affected the population growth witnessed during the 1970's.

In 1986 and 1987 various service, industry and conservation groups, and interested citizens participated in informational exchanges with the Wisconsin Timber Wolf Recovery Team. The public generally supports wolf restoration activities provided that such measures are practical and reasonable. The most favored management activities are those which assist Wisconsin's existing wolf population to survive and grow. Moderate support was expressed for translocation of individual wild Wisconsin wolves as a means of assisting population growth. The least favored were wolf pack stocking activities. Stocking entire wolf packs (as from Minnesota) into areas of northern Wisconsin is not presently publicly acceptable.

The Team has established a recovery goal of 80 wolves. The population goal is based on densities of wolves presently existing within the state and the estimated amount of occupied habitat projected to exist in the future.

Wolf distribution in northern Wisconsin could be improved by enhancing existing populations in northwestern and north-central Wisconsin, and encouraging the natural re-establishment of packs in suitable habitats within northeastern Wisconsin.

The Wisconsin goal complements a Fish and Wildlife Service regional wolf recovery goal of establishing at least one viable population of at least 100 wolves in a 5,000 square mile region within 100 miles of the established Minnesota wolf population (Bailey 1978). The essential factors in determining viable populations of Eastern Timber Wolves are: (1) availability of wild prey, (2) large tracts of wild lands and minimal accessibility (3) ecologically sound management, and (4) adequate understanding of wolf ecology (Bailey 1978).

This Recovery Plan consists of various management activities selected to assist the expansion of the existing Wisconsin wolf population to the Recovery Goal of 80 wolves. The following activities are recommended: (1) increase public education activities, (2) reduce the incidence of human caused killings through increased protective measures and improved law enforcement actions, (3) enter into cooperative habitat management with landowners, (4) monitor population changes annually, (5) curb losses of litters due to

disease, (6) conduct periodic program evaluations, (7) implement an acceptable livestock damage control program, (8) increase cooperation/coordination of activities with other agencies and interested organizations, (9) continue a Citizen Participation program, (10) use of volunteers to assist in educational and population monitoring activities, (11) establish criteria for delisting the wolf and establish an inter-disciplinary committee to develop a wolf management program following delisting, and (12) consider translocations of individual wild Wisconsin wolves after year 5 if necessary.

RECOVERY ACTIONS

The following narrative provides rationale and activities for each of the above listed steps.

- (1) Educational Activities: The timber wolf population can become self-sustaining only if people allow it to recover. Knowledge will help alleviate unfounded fears and will reduce rumors and myths.

Both adults and children can benefit from knowledge about wolves; the biological requirements of the species, its role in the ecosystem, and its value in our natural heritage.

The Department of Natural Resources will work with other agencies such as the U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Department of the Interior, and private organizations to develop and distribute information and educational materials about the timber wolf.

With the input and direction of cooperators, a clear, unbiased educational program can be developed using a variety of tools including slide/tape shows, videotape programs, curriculum projects and publications.

An effort will be made to involve teachers from the northern part of Wisconsin in cooperation with education staff specialists from DNR and the Dept. of Public Instruction (DPI) in the development of educational materials. The DNR will work with private organizations in evaluating existing educational materials and developing new ones.

Cooperative educational program activities include:

- (a) developing the slide/tapes, curriculum guides, youth wolf ecology projects, and acquiring any existing educational materials for distribution to K through 12th level school and adult audiences.
- (b) DNR will: (1) periodically update its "Eastern Timber Wolf Life Tracks" publication, (2) provide guidelines for distinguishing differences between coyotes and wolves, and include information on wolf ecology status in the hunter and trapper educational curricula, (3) provide technical advice to groups, agencies and organizations interested in educational efforts, and (4) also conduct periodic surveys to measure the effects of educational efforts on human attitudes towards this species.

- (2) Protective Measures: In addition to state and federal penalties provided to protect wolves from illegal killings, the following protective measures will enhance wolf survival:
- (a) Continue the coyote season closure in northern Wisconsin during the annual deer gun season to eliminate hunter mistakes in differentiating between wolves and coyotes.
 - (b) A cooperative DNR/ Wisconsin Trappers Association program encouraging trappers to report and assist in releasing wolves caught accidentally.
 - (c) Revise penalties for the destruction of Endangered and Threatened Species under Chapter 29.415 (5a), making penalty provisions equal to the illegal take of big game (deer, bear).
 - (d) Improve law enforcement surveillance and cooperation between state and federal authorities in successfully apprehending and prosecuting violators of state and federal endangered species laws.
 - (e) Develop a reward fund in conjunction with various organizations to offer a reward for information that would lead to the arrest and conviction of persons who have killed wolves.
- (3) Cooperative Habitat Management Objectives: The Wisconsin Endangered and Threatened Species law (section 29.415, Wis. Stats.) states "the Department [of Natural Resources] may enter into agreements with federal agencies, other states, political subdivisions of this state, or private persons with respect to programs designed to conserve endangered or threatened species of wild animals or plants". Major portions of the northern forest region of Wisconsin (Map 1) are not owned by the state. National forests, County forests, tribal lands, industrial forests, and private lands make up the majority of land ownership. Wolf recovery would be enhanced through the cooperation of these landowners. The DNR will work with individual landowners and public agencies in developing habitat management programs tailored to the management styles of the respective land managers.

Forest Management: Wolves require deer, beaver and other prey to survive. Deer and beaver are most abundant in early successional forest environments. Historically, disturbances were created through windstorms and fires, but in recent times disturbances have been maintained through timber cutting and other forest management practices.

Managing for deer within the context of current forest management benefits not only deer and wolves, but sport hunters, recreationists, and the forest products industry, among others (see Appendix 1).

Habitat management objectives for wolves include maintaining an abundance of prey species, by managing for an early successional forest environment.

Access Management: Wolf populations can be affected by the level of human caused mortality (see Appendix 2). Education (see Section 1) and access management can address this problem. Managing the amount, type and level of open public access can minimize encounters between humans and wolves that may result in accidental or intentional wolf deaths. In deciding upon an access management program variables such as administrative, economic and recreational land use, human population demographics, attitudes of the local population towards wolves, and historic trends in wolf mortality need to be taken into account. Access management practices serve to reduce forest road maintenance and fire abatement costs, and they would benefit not only wolves, but sensitive species such as bear, lynx, bobcat, fisher, marten, warblers and various plant species and communities, and certain types of recreation and sport hunting activities.

So long as wolves are not harmed by people, restrictive access management practices are not necessary. Past research has looked at how improved roads, open to public travel are related to wolf distribution and the level of human caused wolf mortality (see Appendix 2). These studies suggest that wolves exist primarily in areas with less than or up to one mile of open, improved road per square mile. The Team recognizes that lower-standard, minimally maintained roads may also have an impact on wolves in addition to the improved road systems that were studied (see Appendix 2).

The focus of access management will be to hold access at present levels by encouraging landowners to (1) manage for the minimum amount of access necessary to fulfill multiple use objectives, and (2) limit motorized public access on lower standard roads wherever possible through gating, berming, etc. This should not be construed as recommending the closure of existing improved roads or motorized recreational trails such as snowmobile trails, ATV trails, etc.

Cooperative Management: The DNR will seek to cooperate on a voluntary basis with landowners. Habitat management can be accomplished within the framework of multiple use management. The type and manner of deer habitat and access management activities will be mutually determined by each of the parties on a case-by-case basis.

- (4) Population Monitoring: Wolf population surveys are necessary to provide information on changes in wolf numbers and distribution in Wisconsin. This information is vital to the success of management activities. It may also indicate if and when management activities need to be modified and whether translocation activities (5 below) may be warranted.
- (a) Annual radio telemetry work on selected packs is necessary to provide data on pack size trends, mortality rates, dispersals and re-colonization rates as well as to provide general information on wolf distribution, food habits and disease problems.
 - (b) Intensive winter track surveys will be run every other year in coordination with cooperating agencies and volunteers to provide detailed wolf distribution data.

- (c) Annual summer howling surveys will be coordinated with cooperating agencies and volunteers to determine reproductive status of existing packs.
- (d) Carcasses will be retrieved, necropsied at FWS's National Animal Health Lab, and deposited in recognized scientific museums or utilized for educational purposes.
- (5) Disease Abatement: Blood and fecal samples of wolf carcasses and wolves captured for telemetry purposes will be tested for signs of disease and parasitism. Captured wolves will be routinely examined and vaccinated against common canine diseases. Oral vaccines will be developed and administered via baits if necessary to curtail pup mortalities.
- (6) Periodic Evaluations: DNR will periodically evaluate the progress of wolf recovery activities. Program reviews should take place in years 3,5,8 and 10. Each review will assess the progress of each of the 12 management activities, compare these with the anticipated wolf population response and include, if necessary, recommended revisions in plan programs (Table 4).

TABLE 4. Anticipated wolf population growth during plan implementation period.

Plan Yr.	Fiscal Yr.	Winter Population ¹ Estimate	No. of ² Packs	Program Review Check-Point
1	1988-89	22	5	
2	89-90	25	5	
3	90-91	29	5-6	1
4	91-92	33	6	
5	92-93	38	6-7	2
6	93-94	44	7-8	
7	94-95	51	8	
8	95-96	58	8	3
9	96-97	67	9-10	
10	97-98	78	10	4

¹ Finite rate of increase = 1.15; based on literature and recent growth rate of 1.23 observed in Wisconsin (1985-86 to 1987-88).

² Finite rate of increase = 1.083 as observed in Wisconsin between 1979-80 (3 packs) and 1987-88 (5 packs).

- (7) Livestock Damage Control Activities: Wolves occasionally prey on livestock, and any wolf recovery program must provide a fair and effective damage abatement and compensation program. It is important, however, to keep this issue in proper perspective. Neighboring Minnesota is home to an estimated 1,000 to 1,200 wolves. There are more than 12,000 livestock operations in Minnesota's wolf range; yet between 1979 and 1984 an average of only 23 farms per year lost livestock to wolves. Wisconsin has had a population of 15 to 25 wolves for the past decade or more, and only two cases of wolf depredation on livestock have been confirmed. Livestock depredation by wolves will probably not be a serious problem in Wisconsin even if the population Goal is attained.

The DNR, US Department of Agriculture, and FWS will cooperatively agree upon a livestock damage control program to remove individual wolves causing damage. DNR or federal agents will verify losses and carry out nonlethal or lethal actions necessary to curtail depredations, following procedures established in Minnesota. A federal permit will be necessary to control wolves causing livestock damage pursuant to Section 10 (A and B) Endangered Species Act, 1982 Amendments (see Appendix 3).

Three percent of the annual check-off revenue is placed in the Endangered Resources Fund which establishes money for paying damage caused by endangered species. If wolf depredation becomes a problem, legislation will be drafted recommending that a fund be established for a wolf damage abatement program providing 100% compensation for verified livestock losses.

- (8) Inter-Agency Cooperation/Coordination: Our efforts to achieve a population of 80 wolves should be viewed as the Wisconsin contribution to a regional wolf population involving Minnesota, Michigan, Wisconsin, and Ontario. Efforts in Wisconsin should mesh with those of the FWS Eastern Timber Wolf Recovery Team, our neighboring states, and the Province of Ontario, Canada. The Team recommends creation of a Coordinating Committee consisting of representatives of various federal government agencies, Indian tribes, the states of Minnesota, Michigan and Wisconsin, and the Province of Ontario. Activities that would be enhanced in a coordinated, cooperative atmosphere include population surveys, law enforcement investigations, education, control programs, protective measures, and monitoring changes in wolf use of dispersal corridors in east-central Minnesota and the St. Mary's River region in Ontario.
- (9) Continued Citizen Participation: From the outset the Team has asked for and received public assistance in the development of this wolf recovery plan. That openness to citizen participation will continue through the implementation and evaluation phase of wolf recovery.
- (10) Volunteer Program: Many Wisconsin citizens have offered their assistance to the DNR in wolf recovery efforts. Obtaining active participation of citizens is important in maintaining public commitment to wolf recovery activities. The Team has identified two areas where volunteer involvement is recommended:

- (a) Developing educational materials and giving educational presentations to interested parties, and
- (b) Assisting in winter tracking and summer howling population assessment activities.

(11) Reclassifying Criteria and Future Population Management:

The Team must provide a set of recommendations for reclassifying the wolf if restoration activities are successful. Furthermore, once the Team's Goal has been accomplished provisions must be established to wisely manage Wisconsin's wolf population.

The Team will consider Wisconsin's wolf population recovered and recommend delisting the wolf to the state "threatened" classification when these conditions have been met: (a) a minimum of 80 wolves are present during winter population surveys in each of 3 consecutive years, (b) a minimum of ten packs are present in each of 3 consecutive years and (c) a minimum of 4 packs are present east of Highway 13.

The Team recommends that Wisconsin, Minnesota and Michigan DNR's petition FWS to declassify the wolf to federal "threatened" classification within these states if joint surveys reveal more than 100 wolves in Wisconsin and Michigan, based on federal criteria for re-establishing a viable wolf population for these 2 states (Bailey 1978, Bailey to Nelson September 15, 1981).

The Team recommends the establishment of an inter-disciplinary committee to work in concert with key interest groups to provide recommendations for a wolf management program to maintain a "recovered" population. This committee should be established in year 5.

- (12) Translocation Activities: All management activities should be evaluated at planning year 5 (1992-93) to determine wolf population response to restoration activities. Citizen participation will be an important part of that evaluation process. If the wolf population has not shown signs of growth (Table 4), translocation of individual wild Wisconsin wolves into other areas of suitable wolf habitat where lone wolves are known to occur will be considered to promote wolf recovery. DNR will also consult with resource user groups and local citizens in implementing translocation activities if evaluations indicate such action is advisable. Federal permits will also be necessary to translocate individual Wisconsin wolves.

SECTION 2. STEP-DOWN OUTLINE

1. Direct Educational Activities on Wolf Ecology.
 - 1.1 Develop audio/visual materials for use and distribution.
 - 1.1.1 Develop two 20-minute videotapes on wolf ecology; one suitable for K through 8th level and the other for high school and adult audiences.
 - 1.1.2 Develop two 20-minute slide tape programs on wolf ecology.
 - 1.1.3 Prepare a minimum of 50 copies and distribute to the 12 Cooperative Educational Service Agencies (CESA's), 6 DNR Districts, and private volunteer citizens.
 - 1.2 Develop wolf ecology supplements for elementary and secondary level Project Wild guides.
 - 1.3 Develop a list of suggested wolf projects for youth groups (Scouts, 4-H, etc.)
 - 1.4 Acquire six copies of the film "Wolf Pack" to be used under DNR direction.
 - 1.5 Update, reprint, as necessary, and distribute to CESA's, DNR and volunteers the DNR "Life Tracks" publication, Eastern Timber Wolf (Publication ER-500).
 - 1.6 Include wolf ecology information in hunter and trapper educational/informational materials.
 - 1.6.1 In the hunting regulations booklet, include a map showing the area closed to coyote hunting during the gun-deer season explaining the wolf's legal status in Wisconsin.
 - 1.6.2 Include information on wolf ecology and management in the hunter and trapper education curricula. Stress individual responsibility in the recovery of endangered or threatened species.
 - 1.7 Conduct surveys to measure the effect of education efforts on attitudes towards the wolf and wolf recovery in Wisconsin.
 - 1.8 Provide technical advice to organizations and agencies interested in developing and distributing information on the ecology of wolves in Wisconsin.
2. Provide added legal protection to wolves.
 - 2.1 Continue the coyote hunting season closure in the northern one-third of Wisconsin during the annual November deer gun season.
 - 2.2 Enact legislation providing increased penalties for killing Endangered and Threatened Species. Fines should be comparable to the illegal killing of big game.
 - 2.3 Seek improved law enforcement surveillance and investigations by conducting wolf management workshops.
 - 2.4 Increase cooperation between DNR, U.S. Forest Service and Fish and Wildlife Service law enforcement authorities by conducting wolf management workshops.
 - 2.5 Work with organizations to establish a "reward fund" for information that would result in the apprehension of persons who have killed wolves.
 - 2.6 Work cooperatively with the Wisconsin Trappers Association to reduce accidental trapping.

3. Cooperatively Manage Habitats with Landowners.
 - 3.1 Identify areas where existing land management practices do or can support wolves.
 - 3.2 Cooperatively manage habitats with (a) industrial forests, (b) county forests, (c) state properties, (d) national forests, (e) tribal nations, and (f) private landowners (via Managed Forest Act Cooperators, etc.).
 - 3.2.1 Identify and agree on deer habitat improvement practices.
 - 3.2.2 Identify and agree on appropriate access management practices (gating, berming of new roads, use of temporary access to fulfill management objectives, etc.)
 - 3.2.3 Identify specific management activities that may be cost-shared through Pittman-Robertson, Citizen Tax Check-off Revenues, Segregated Funds, Forest Service Challenge Grant Programs or Donations.
4. Monitor the annual population trends and distribution of wolves in Wisconsin via:
 - 4.1 Annual techniques capable of censusing wolves and determining population changes.
 - 4.1.1 Conduct annual summer night howl surveys to determine productivity rates.
 - 4.1.2 Monitor wolf activity, behavior, population trends, territory size, dispersal and survival rates by live-trapping, and radio-collaring wolves.
 - 4.1.3 Collect carcasses and submit to the FWS National Wildlife Health Lab for necropsy to determine age, productivity, disease and parasitism.
 - 4.1.4 Deposit specimens in qualified museums or salvage as educational materials.
 - 4.2 Conduct bi-annual winter track surveys to determine wolf distribution and to supplement telemetry data on wolf population trends.
5. Initiate disease abatement activities.
 - 5.1 Assess prevalence/impacts of disease-parasitism through necropsies of dead wolves and examinations, blood and fecal sampling of wolves captured for telemetry monitoring.
 - 5.2 Routinely vaccinate wolves captured for telemetry monitoring.
 - 5.3 Develop and administer effective oral vaccines via baits at summer homesites.
6. Evaluate progress of each management activity and compare with population response.
 - 6.1 Review work activities and compare with changes in wolf population.
 - 6.2 Develop recommendations to change activities in order to achieve a positive population response.

7. Implement livestock damage control activities.
 - 7.1 Develop a cooperative agreement with FWS on livestock damage control program that permits DNR to take individual wolves when necessary.
 - 7.2 Institute a livestock depredation compensation program.
 - 7.2.1 Obtain special funds to compensate fully the appraised value of verified livestock losses.
 - 7.2.2 Compensation will be based on an appraisal by the County Agriculture Agent and an independent livestock breeder.
8. Coordinate wolf management activities with federal, state and county agencies.
 - 8.1 Seek establishment of a regional Lakes states wolf recovery coordinating committee and secure representation from Wisconsin.
 - 8.2 Develop interstate dispersal corridor management guidelines to maintain conditions suitable for the natural movement of wolves between northern Minnesota, Wisconsin, Upper Michigan and Ontario.
 - 8.3 Maintain formal (via workshops, conferences, etc.) and informal (via personal communications) contact with others involved in regional wolf recovery efforts.
9. Continue citizen participation activities.
 - 9.1 Continue to provide regular wolf (recovery) status reports to interested citizens, citizen groups and agencies.
 - 9.2 Obtain periodic citizen input on management activities.
10. Volunteer Program Activities:
 - 10.1 Maintain a list of volunteers and determine qualifications and availability of volunteers to assist in various projects.
 - 10.2 Conduct volunteer workshops to train volunteers on project objectives, and provide volunteers with the information and experience necessary to fulfill objectives.
 - 10.3 Provide coordinator services to supervise and coordinate volunteer activities.
 - 10.4 Volunteer projects will consist of assistance in (a) education, and (b) monitoring winter populations and summer reproductive success.
11. Reclassifying Criteria
 - 11.1 Reclassify the wolf to state "threatened" when wolf population of more than 80 wolves in 10 packs have been identified as present in each of 3 consecutive years.
 - 11.2 Work with Michigan and Minnesota DNR to successfully petition FWS to federally reclassify wolf to "Threatened" when at least 100 wolves are present in Wisconsin and upper peninsula Michigan.
 - 11.3 Establish a DNR committee to develop a management program for a recovered Wisconsin wolf population.

- 11.3.1 Initiate committee activities at plan implementation year 5 (Program Review 2; Table 4) or as soon thereafter as population progress meets expectations.
 - 11.3.2 Seek advice and consult with resource user groups, conservation and environmental groups and interested citizens in developing a wolf management program.
12. Determine whether translocation activities are warranted by assessing wolf population response to management activities (via Program Review; Table 4) at year 5 (1992-93 if plan implemented in 1988-89).
- 12.1 Determine where lone, resident wolves exist.
 - 12.2 Determine the sex, home range, and other ecological parameters of lone wolf candidate.
 - 12.3 Seek advice and support of resource user groups, conservation organizations and local citizens in the translocation of potential mates for lone, resident wolves.
 - 12.4 Obtain the necessary federal permit to translocate a wolf as a potential mate for the lone, resident wolf.
 - 12.5 Obtain permission from landowners where wolf capture and release will take place.
 - 12.6 Construct a release pen at the release site.
 - 12.7 Capture an appropriate wolf from a Wisconsin pack.
 - 12.7.1 Examine wolf to determine health status.
 - 12.7.2 Retain the wolf in an interim holding facility until after fall hunting seasons and then place it in the release site pen.
 - 12.8 Train appropriate volunteer personnel and provide 24 hour surveillance of wolf while in release site.

PART III.

SCHEDULE OF PRIORITIES, RESPONSIBILITIES AND COST

INTRODUCTION:

Part III delineates the major Agency and Bureau responsibilities and proposes a fiscal year budget for each of the major management actions listed in Part II. Part III is presented in tabular form. Table 5 summarizes expenditures by source for wolf project activities 1979-80 through 1986-87. Table 6. provides a budget estimate to carry out the most important management activities prescribed in this plan. Table 7 provides a list of agency responsibilities and projected manpower needs and expenditures for each job activity presented in the Step-down outline (Part II, Section 2).

Funding sources for Timber Wolf Recovery in Wisconsin could be a combination of Endangered Resource funds, Federal Endangered Species Act funds, Pittman-Robertson funds, direct donations and Wildlife Management Segregated funds in the form of wildlife managers salary to help implement the plan. The BER should develop a funding strategy to insure an adequate budget for the implementation of this plan.

The recovery actions described in this plan, represent many hours of work and will require, as in the case of population monitoring, the application of special knowledges and skills.

The recovery team believes it is essential to wolf recovery that the Bureau of Endangered Resources within DNR continue to provide the services of a biologist to guide the recovery program and carry out certain specialized recovery activities.

TABLE 5. Wisconsin Timber Wolf Management Budget From 1979-80 to 1986-87.

Fiscal Year	Funding Source				Totals
	Checkoff ¹	SEG ² /GPR ³	S-6 ⁴	P-R ⁵	
1979-80	0	5,000	15,000	0	20,000
1980-81	0	5,425	16,275	0	21,700
1981-82	0	7,734	35,000	0	42,213
1982-83	13,013	?	0	35,200	48,213
1983-84	27,905	?	0	51,440	79,345
1984-85	11,804	?	0	28,125	39,929
1985-86	16,842	6,783	30,800	29,800	84,225
<u>1986-87</u>	<u>36,554</u>	<u>7,575</u>	<u>18,000</u>	<u>38,305</u>	<u>100,434</u>
<u>TOTALS</u>			<u>115,075</u>	<u>182,870</u>	<u>436,580</u>

¹ Endangered Resources Checkoff Funds.

² Segregated Fish & Wildlife Funds.

³ General Purpose Revenue.

⁴ Section 6 Funds.

⁵ Pittman-Robertson Funds.

TABLE 6. Most Important Management Activities.

Activity	Job	Description	Cost	Totals
Education	1.1.2	Wolf Ecology Slide-tapes	500	
	1.1.3	Distribute 50 slide-tapes	2,500	
	1.5	Reprint "Life Tracks"	6,000	
	1.6.2	Hunter/trapper education	2,000	
	1.8	Technical advice	1,500	12,000
Protection	2.5	Reward fund	1,000	1,000
Agreements	3.2	Establish cooperative Agreements	1,000	1,000
Monitoring	4.1.1	Howl surveys	4,000	
	4.1.2	Telemetry work	20,000	
	4.1.3	Carcass necropsies	1,000	25,000
Disease Work	5.1	Disease Surveys	1,500	
	5.2	Vaccinations	500	2,000
Evaluation	(Priority given in years 5 and 10)			
Depredation	7.2	Livestock compensation	3% of tax checkoff	
Inter-Agency	8.2	Corridor management	1,000	1,000
Citizen Participation	9.1	Status updates	500	500
Volunteer 1	10.2	Volunteer workshops	1,500	1,500
	10.3	Coordinate volunteers	1,500	
Total			49,500	49,500

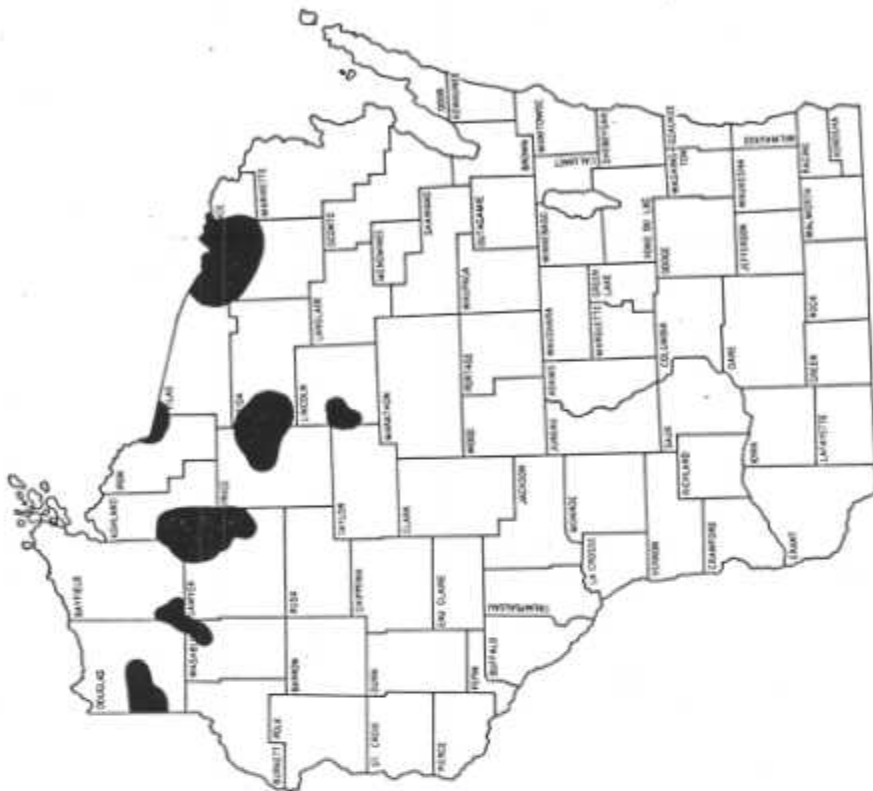
TABLE 7 - SCHEDULE OF MANPOWER AND COST (in 1,000s) FOR IMPLEMENTING THE WISCONSIN TIMBER WOLF RECOVERY PLAN BY FISCAL YEAR¹.

ACTIVITY	OUTLINE NUMBER	(1) 1988-89		(2) 1989-90		(3) 1990-91		(4) 1991-92		(5) 1992-93		(6) 1993-94		(7) 1994-95		(8) 1995-96		(9) 1996-97		(10) 1997-98	
		HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$
1. EDUCATION																					
	1.1.1	20	1.0		.6																
	1.1.2	10	.5	20	2.5																
	1.2			20	.5		.5														
	1.3				.3																
	1.4		.8		.8		.8														
	1.5	10	2.0	10	2.5		2.0			2.0											
	1.6		NC																		
	1.6.2	10	.4	10	.4	10	.4	10	.4	10	.4										
	1.7									20	5.0		20	10.0							
	1.8	400	3.0	400	2.3	300	1.5	300	1.5	200	1.5										
2. PROTECTION																					
	2.1		NC																		
	2.2		NC																		
	2.3			20	.5					20						.5					
	2.4			20	.5					20						.5					
	2.5	40	.2	10		10		10		10		10		10		10		10		10	
	2.6	40	.2	40	.2	40	.2	40	.2	40	.2	40	.2	40	.2	40	.2	40	.2	40	.2
3. HABITAT MANAGEMENT																					
	3.1	40	.1	40	.1	40	.1	40	.1	40	.1	40	.1	40	.1	40	.1	40	.1	40	.1
	3.2.1	100	.5	100	.5	60	.5	40	.1	40	.1	40	.1	40	.1	40	.1	40	.1	40	.1
	3.2.2	300	.7	300	.7	200	.5	100	.1	100	.1	100	.1	100	.1	100	.1	100	.1	100	.1
	3.2.3	40	.1	40	.1	10		10		10		10		10		10		10		10	
4. MONITORING																					
		500	25	400	25	400	25	400	25	400	25	400	25	400	25	400	25	400	25	400	25
5. DISEASE ABATEMENT																					
		40	2.0	40	2.0	40	2.0	40	2.0	40	2.0	40	2.0	40	2.0	40	2.0	40	2.0	40	2.0
6. EVALUATION																					
						40	1.0			80	1.0					40	1.0			80	1.0
7. DAMAGE CONTROL																					
	7.1	10	.2																		
	7.2.1	20	.1	20	.1	20	.1	20	.1	20	.1	20	.1	20	.1	20	.1	20	.1	20	.1
	7.2.2	20	.1	10	.1	10	.1	10	.1	10	.1	20	.1	20	.1	20	.1	20	.1	20	.1

¹ Hours are for project coordination; salary costs for project coordinator and intra-agency cooperation are not included in the cost estimates. Coop salary are not in dollar costs but costs of project coordinator are included.

TABLE 7 - SCHEDULE OF MANPOWER AND COST (in 1,000s) FOR IMPLEMENTING THE WISCONSIN TIMBER WOLF RECOVERY PLAN BY FISCAL YEAR¹.

ACTIVITY	OUTLINE NUMBER	(1) 1988-89		(2) 1989-90		(3) 1990-91		(4) 1991-92		(5) 1992-93		(6) 1993-94		(7) 1994-95		(8) 1995-96		(9) 1996-97		(10) 1997-98	
		HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$	HRS.	\$
8. COORDINATION																					
	8.1	20	.3	10		10		10		10		10		10		10		10		10	
	8.2	10	.3	10	.3	10	.3	10		10		10		10		10		10		10	
	8.3	40	.5	40	.5	40	.5	40	.5	40	.5	40	.5	40	.5	40	.5	40	.5	40	.5
9. CITIZEN PARTICIPATION																					
	9.1	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0
	9.2	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0	100	1.0
10. VOLUNTEERS																					
	10.1	60	.2	40	.2																
	10.2	160	2.0	160	2.0	80	1.0	40	1.0	40	1.0	40	1.0	40	1.0	40	1.0	40	1.0	40	1.0
	10.3	50	2.0	50	1.0	50	2.0	50	1.0	50	1.0	50	1.0	50	1.0	50	1.0	50	1.0	50	1.0
	10.4		NC																		
11. RECLASSIFICATION																					
	11.1																		160	.5	
	11.2																		160	.2	
	11.3.1																		160	.1	
	11.3.2																		160	.5	
12. TRANSLOCATION (If Necessary)																					
	12.1									NC											
	12.2									NC											
	12.3									360	2.0										
	12.4									10	NC										
	12.5									80	.5										
	12.6													20	2.5						
	12.7.1														NC						
	12.7.2													10	1.0						
	12.8													80	10.0						
TOTALS		2130	43.2	2010	43.9	1570	39.5	1370	34.1	1860	45.6	1190	55.7	1060	32.2	1100	34.2	1060	32.2	1780	34.5



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GLOSSARY

EASTERN TIMBER WOLF RECOVERY TEAM - A team of eight individuals appointed by the Director of the U.S. Fish & Wildlife Service to develop a recovery plan for this sub-species of wolf. This federal team consists of representatives from the Fish & Wildlife Service, U.S. Forest Service, National Park Service, and the states of Michigan, Minnesota and Wisconsin. The team's Eastern Timber Wolf Recovery Plan was approved by the Fish & Wildlife Service in 1978. This federal plan is used primarily as a guideline to direct the activities of various federal agencies in promoting wolf conservation.

ENDANGERED RESOURCE CHECKOFF FUNDS (CHECKOFF) - Voluntary state donations from Wisconsin income tax used to fund endangered resource programs such as the timber wolf program.

GENERAL PURPOSE REVENUE (GPR) - General state taxes and other monies which we collected by state agencies and deposit into the general fund, and are available for appropriation by the legislature.

IMPROVED ROADS - Travelways allowing motorized vehicles that are sloped, drained, graded, surfaced or paved (See Appendix 1 for a complete discussion on roads).

LOW-STANDARD ROADS - Travelways allowing motorized vehicles that are unimproved, are not generally surfaced, are narrow and designed for specific use, and are minimally maintained. Travel is usually slow and tedious (See Appendix 1 for a complete discussion on roads).

LIVESTOCK - any domesticated animal owned and raised as stock, including poultry, swine, sheep, goat, cattle, horses and kin, cats and dogs.

LIVESTOCK DAMAGE CONTROL PROGRAM - A program to (1) provide educational aid to livestock owners in minimizing wolf depredations, (2) provide assistance through nonlethal means where possible, and trapping/removal activities when necessary (including euthanasia) and (3) a compensation program to cover 100% of the assessed value of verified livestock losses.

MOTORIZED ACCESS - Access designed to accommodate conventional 4 wheeled vehicles (e.g. cars, pick-ups).

PITTMAN-ROBERTSON FUNDS - (PR) - An 11% federal excise tax on rifles, shotguns, ammunition and archery equipment and a 10% excise tax on handguns. Receipts are allocated to the Wisconsin DNR on basis of the size of the state and its number of licensed hunters.

POTENTIAL WOLF HABITAT - Major forested areas of northern Wisconsin where there is suitable wolf habitat. Forests generally cover more than 50 percent of the region, and resident human populations are lower than other regions of the state. Suitable wolf habitat is scattered throughout this region. Additional areas of suitable wolf habitat may also be present within this region (See Map 1).

ROAD - An avenue that creates or allows uncontrolled motorized access by the public (See Appendix 1 for a complete description of roads).

SECTION 6 FUNDS (S-6) - Federal refunds obtained from federal endangered resource revenue.

SEGREGATED FISH AND WILDLIFE FUNDS (SEG) - State funds generated from license sales (hunting, fishing and trapping) that are used to fund fish and wildlife programs.

SERVICE LEVEL ROADS - The major traffic characteristics and operating conditions that determine the design standards of a road. Roads service many different transportation needs. Each is designed to accommodate a variety of needs, depending on the purpose and intended use. For example roads that will serve greater volumes of traffic at increased speeds have higher design standards and are rigorously maintained. See Appendix 1 for further information on roads.

STOCKING - The technique of capturing wolf packs and transplanting them into another area (either inter or intra state transplants are possible).

SUITABLE WOLF HABITAT - Wolves can live in any area where ungulate prey is available on a sustained basis, and where human caused deaths are not excessive. In Wisconsin white-tailed deer are present in sufficient numbers and prey availability is not considered a likely limiting factor. However, people can be considered a potential limiting factor since Wisconsin is well populated by people. In Wisconsin livestock is largely absent within suitable wolf habitat, and areas capable of sustaining individual packs must be at least 100 square miles in size with less than one mile per square mile of open, publicly used roads.

TRANSLOCATION - The technique of capturing a single wolf and transplanting it into another area.

WISCONSIN TIMBER WOLF RECOVERY TEAM - A team of twelve people within Wisconsin established by the Secretary of the Wisconsin DNR in January 1986 to develop a recovery plan for the wolf. Representing DNR are five Wildlife Managers, two Endangered Species Biologists, one Public Information Specialist, one Wildlife Staff Specialist and one Forester within DNR. Non DNR members include one U.S. Forest Service Biologist and the Executive Secretary of the Wisconsin County Forests Association. The state team was given the task of developing a recovery plan to guide and direct management activities for restoring a wolf population in Wisconsin. When completed the recovery plan will be presented to Wisconsin DNR administration for their review and approval.

APPENDIX 1

IMPACT OF WOLVES ON DEER IN WISCONSIN

Wolves feed primarily on hoofed mammals. In Wisconsin the major diet of wolves is white-tailed deer. At present Wisconsin's wolf population is estimated at 15 to 25 animals, and the Recovery Team has established a recovery goal of 80 wolves. Concerns over the impact of wolves on deer populations in northern Wisconsin have been raised by 1). deer hunters, 2). the tourist industry, and 3). persons who enjoy viewing deer.

Biologists studying wolves and deer in Minnesota believe that wolf predation generally poses no serious threat to deer herds. In Minnesota legal and illegal harvesting by humans and severe winters (which occur about every 4 years), have the greatest impact on deer numbers, even where wolves are common. Wolves can impact deer populations especially during and following a series of severe winters. Biologists believe that wolf predation "compensates" for other forms of mortality to deer during severe winters. Wolf predation rates of 8 adult deer per wolf per year, and 4 fawns per wolf from October through May were determined from a recent radio telemetry study in north-central Minnesota (T. Fuller, pers. comm.).

In an effort to determine the affects of wolf predation on deer in Wisconsin, deer management unit data for several units occupied by wolves were compared to data from similar units without wolves. Deer densities, buck harvest rates and hunter densities were similar for units 4 and 14, and units 32 and 38. Wolves are present in units 4 and 32, but are absent from units 14 and 38. Wolves occupy about 75% of unit 4 and less than 25% of unit 32. Deer habitat in unit 4 is similar to habitat in unit 14. Habitat conditions between units 32 and 38 are similar to each other. However, deer densities are lower in units 4 and 14 and higher in units 32 and 38 (Table 8).

TABLE 8. Comparison of deer population characteristics in 2 deer management units with wolves vs. 2 units without wolves.

Unit	Wolves Present	Unit Wolf Density	Unit Overwinter Deer Density	Hunter Density	Annual Gun Season Buck Kill
Lower Deer Density Units:					
4	Yes	1/30 mi ²	10.5/mi ² (8-15)	5.8/mi ² (4-7)	1.0/mi ² (1)
14	No	N/A	11.0/mi ² (8-16)	5.0/mi ² (3-6)	1.0/mi ² (1-2)
Higher Deer Density Units:					
32	Yes	1/52 mi ²	18.7/mi ² (13-24)	15.1/mi ² (11-17)	1.9/mi ² (1-2)
38	No	N/A	23.7/mi ² (17-34)	9.8/mi ² (8-14)	2.8/mi ² (2-3)

Figure 1, shows trends in the deer population deer densities for units 4 (wolves present) and unit 14 (wolves absent). Both units 4 and 14 are in northwestern Wisconsin. The fluctuations are very similar. Unit 4 does not deviate from trends in areas without wolves, or from regional population trends. Wolf impacts on deer management unit populations do not appear to be appreciable.

The Recovery Plan wolf population goal of 80 individuals represents a three to four fold increase over existing numbers of wolves in Wisconsin. As the wolf Population increases (under proposed management activities), wolf distribution in Wisconsin will also change. Wolves will spread out and occupy other deer management units. However, the impact of wolves on deer even within any additional units will probably be negligible because of the unlikelihood that any one unit would be 100% occupied by wolves.

The Team believes the presence of wolves will not affect deer populations in general. Northern Wisconsin overwinters approximately 265,000 deer. If 80 wolves each eats 18 deer per year, 1450 deer would be required. Even if all these deer were removed from the wintering herd (the low point in the annual population trend) wolves would take less than 1/2 of 1 percent of the northern forest deer herd. Wolves may impact deer numbers on a local basis during and following especially severe winters but a population of 80 wolves will not affect northern Wisconsin's deer population.

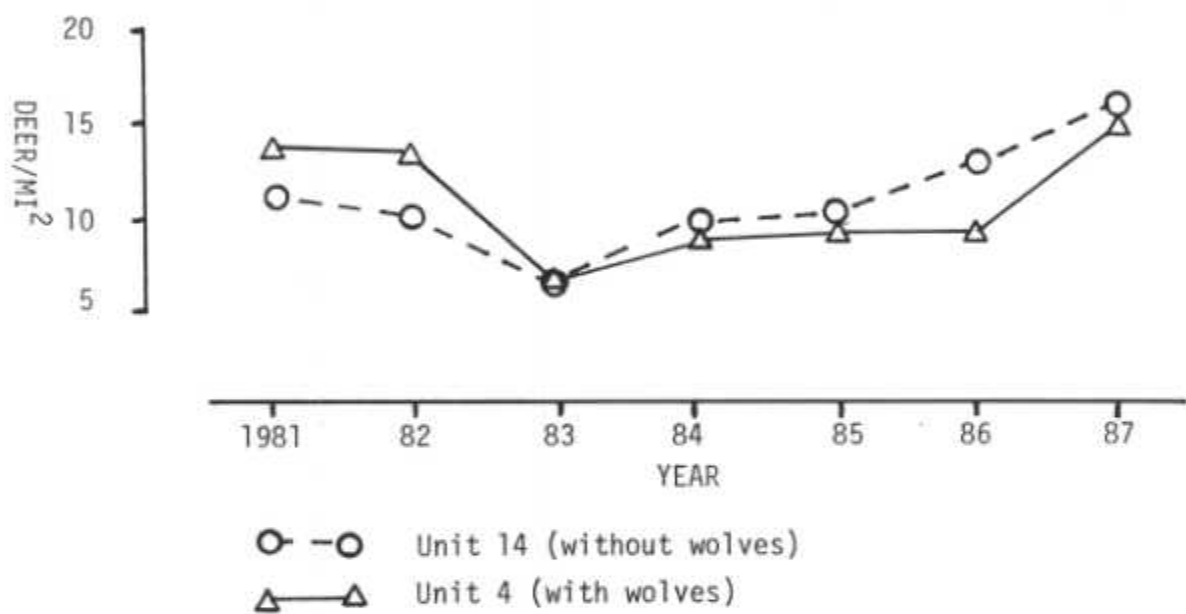


Fig. 1 Comparison of deer population trends in Northwest Wisconsin.

APPENDIX 2

ROADS AND THEIR IMPACTS ON WOLVES

Wolves are found wherever prey is available and where they are not over-exploited by humans. Major wolf populations only exist in regions sparsely populated by humans. The present day continental wolf population is confined to nonagricultural regions of Canada and Alaska. Today, people are the predominate limiting factor of wolf populations.

Wolves occur sparingly in areas proximate to higher human populations or areas frequently used by humans. These occur along the farm-fringe areas of Canada and a few of our northern states that border the vast northern forests of the continent. In some of these areas wolves fare well; in other areas people (and/or their activities) make life very difficult or impossible for wolves.

Wolf range is determined by the degree and intensity of human activity in any area. As human activity increases, wolf mortality increases, either through accidental or intentional killings by humans.

Human activity is conditioned by access. As access (principally via roads) improves, so does the use of roads by people. And as use increases (for whatever reason) so, too, the likelihood of encounters between wolves and people.

Roads don't kill wolves; people do. The simple truth is that if the roads weren't there fewer people would be there also. Roads increase wolf-human encounters that can potentially result in accidental or intentional deaths.

Recently scientists learned that levels of roads greater than one linear mile of open, improved road per square mile seems to impact adversely on wolf populations.

People, specifically those with negative attitudes towards wolves, who use roads in wolf country pose the greatest hazard to wolves. In order to use the road system, they must be open to public use.

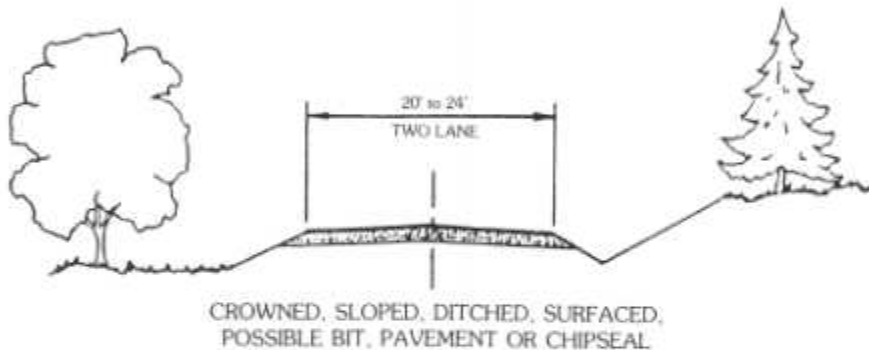
Given current attitudes, improved roads open to public travel that are easily used and receive a fairly high and consistent level of use, make it possible for humans to over-exploit wolves. Autumn is the critical period for wolves in the upper Great Lakes states. The majority of deaths, caused by humans, occur during this season.

The following diagrams provide information on the types of road design standards that are discussed in the recovery plan. Improved roads generally include the A, B, and C service level standards. In suitable wolf habitat areas, these combined service levels are below one linear mile per square mile. Our knowledge on service level D roads is very limited. These roads (which are usually designed for single purposes) should be kept to a minimum, and public access (other than the intended use) on these roads should be discouraged.

Road Classifications as Defined by the U.S. Forest Service

Traffic Service Level A

- *Normally higher standard road
- *Generally two lane, gravel or blacktopped
- *Clearing limits 25' to 45'
- *All needed facilities--ditches, culverts, signs, etc.
- *Normally open year round to public
- *Load limits posted during spring break-up
- *Frequent road maintenance

ALL WEATHER ROAD**A**Traffic Service Level B

- *Considered medium standard road
- *May be single or double lane, usually gravel surfaced
- *Clearing limits 20' to 40'
- *All needed facilities--ditches, culverts, signs, etc.
- *Normally open year round to public vehicles but may be closed seasonally
- *Load limits posted during spring break-up
- *Typically maintained monthly or quarterly

ALL WEATHER ROAD**B**

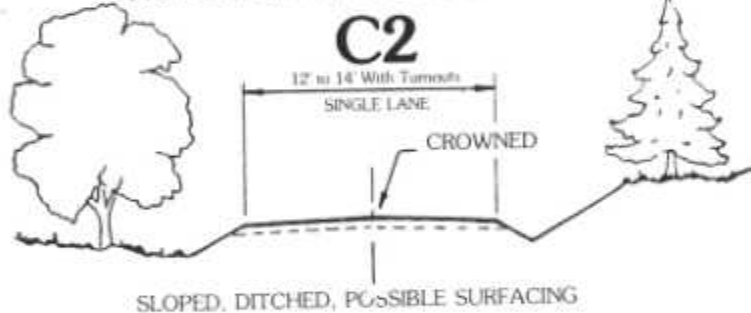
Traffic Service Level C

- *Considered medium to low standard
- *Single lane may be graveled or of native soil
- *Clearing limits 20' to 35'
- *All needed drainage facilities--ditches, culverts, etc.
- *Normally opened seasonally
- *May be open or closed to public vehicles to meet management objectives
- *Maintenance every other month to semi-annual

ALL WEATHER ROAD



SUMMER NORMAL ROAD

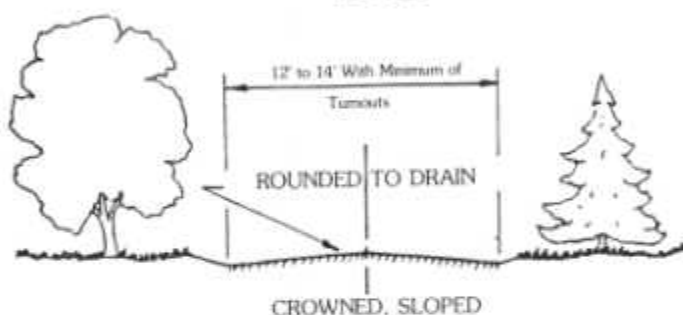


Traffic Service Level D

- *A low standard road
- *Single lane not surfaced--soft areas may be stabilized
- *Clearing limits 18' to 24'
- *Culverts in continuous drains only, or outlet ditches and dips
- *Normally operated during limited season
- *Generally public vehicle travel prohibited or restricted through gates, berms, rocks, etc. or signing
- *Maintenance performed only as needed each time road is open for specific use

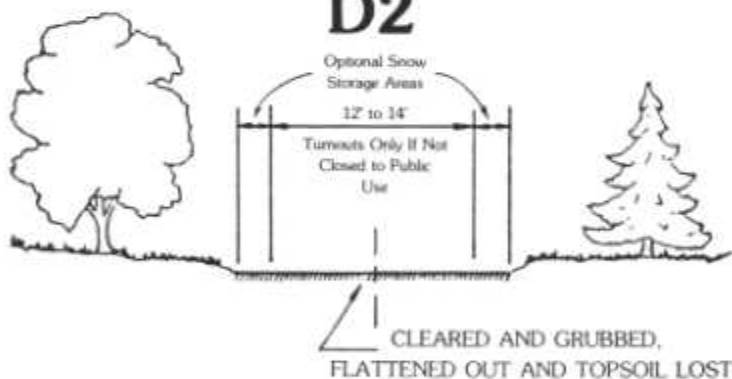
DRY SUMMER, WINTER ROAD

D1



WINTER ROAD

D2



APPENDIX 3

"EXPERIMENTAL POPULATION" AND ISSUE OF "TAKE"

Experimental Population:

During the initial stages of the planning process, the Team made it known to the public that in order to act responsibly in the case of depredating wolves it would be necessary to "take" individuals. In recent communications with the US Fish and Wildlife Service, the Team learned that Experimental Population status can not be granted in Wisconsin because the wolves existing here live in proximity to wolves occurring in Minnesota. A condition of the Experimental Population clause is that such populations must be totally isolated from existing populations.

Take:

However, pursuant to provisions of the federal Endangered Species Act, even in situations where a species is endangered, a permit to "take", as in the case of depredating wolves, may be issued provided that such activities would be in the best interest of the survival of the species. The Team recommends that appropriate action be taken to secure such permits in the event such action may ever become necessary.

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