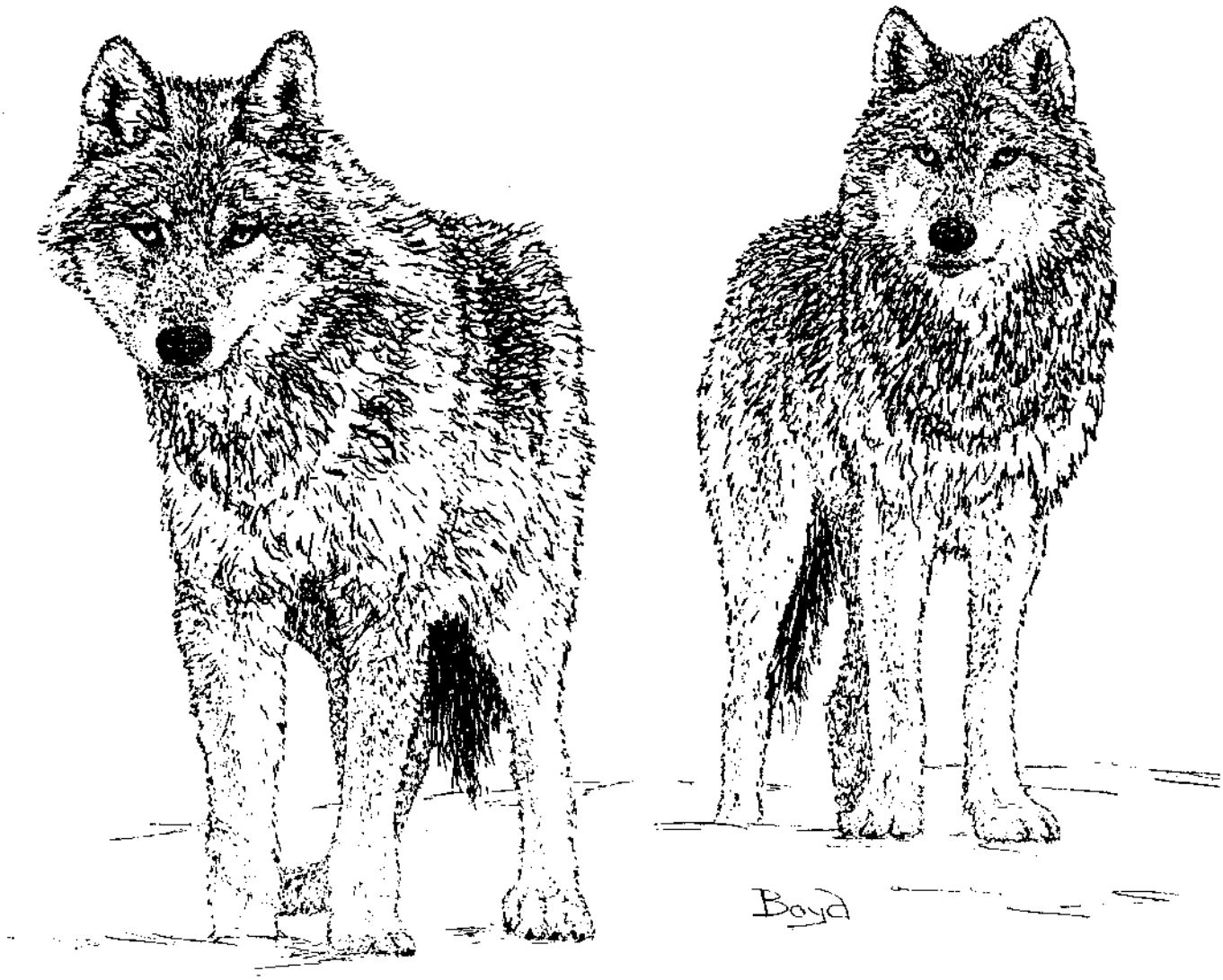
NORTHERN ROCKY MOUNTAIN WOLF RECOVERY PLAN



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Prepared by the

U.S. Fish and Wildlife Service in cooperation with the

Northern Rocky Mountain Wolf Recovery Team

APPROVED

DATE: 3 August 1987

U.S. Fish and Wildlife Service: John L. Spinks, Jr.

Deputy Regional Director

This is the completed Northern Rocky Mountain Wolf Recovery Plan. It has been approved by the U.S. Fish and Wildlife Service. It does not necessarily represent official positions or approvals of cooperating agencies and does not necessarily represent the views of all recovery team members/individuals who played a role in preparing this plan. This plan is subject to modification as dictated by new findings, changes in species status, and completion of tasks described in the plan. Goals and objectives will be attained and funds expended contingent upon appropriations, priorities, and other constraints.

Acknowledgements should read as follows:

The Northern Rocky Mountain Wolf Recovery Plan, dated August 3, 1987, prepared by the U.S. Fish and Wildlife Service in cooperation with the Northern Rocky Mountain Wolf Recovery Team.

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Cover by Diane Boyd

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PREFACE

As enacted by Congress, the purposes of the Endangered Species Act are to provide a program for the conservation of such endangered and threatened species as well as a means whereby the ecosystems upon which such species depend may be conserved. The Act also mandates that the Secretary of the Interior shall develop and implement plans for the conservation and survival of endangered and threatened species. It is further declared to be the policy of Congress that all Federal departments and agencies shall seek to conserve endangered and threatened species and shall utilize their authorities in furtherance of the purposes of the Act.

The Northern Rocky Mountain Wolf Recovery Plan outlines steps for recovery of gray wolf (Canis lupus) populations in portions of their former range in the Northern Rocky Mountains of the United States. Historical evidence documents the presence of gray wolves throughout the Northern Rocky Mountains of the contiguous United States. This subspecies (Canis lupus irremotus) was a predator on native ungulates under pristine conditions and later, as European Americans spread westward, on domestic livestock. Substantial declines in wolf numbers resulted from control efforts to reduce livestock and big game depredations. Currently, no viable populations of wolves occur in the Rocky Mountains south of Canada, however, at least one pack and several individual animals are known to be present.

This plan emphasizes gray wolf recovery through natural processes (dispersal southward from western Canada) where possible. Where this is not possible because of distance from "seed" populations, translocation is the only known way to establish a population. Either philosophy necessitates conservation of suitable habitat in appropriate recovery areas. Establishing and maintaining wolf populations in three separate areas is believed necessary for recovery at this time. The probability of recovery through natural recruitment is high in northwestern Montana, moderate in Idaho, and remote in Yellowstone National Park. Characteristically, the recovery areas that have been identified are large and remote, where the potential for conflict situations would generally be limited to their periphery. However, resolution of such conflicts is requisite to successful natural reestablishment and thus is an essential element for recovery.

This recovery plan is intended to provide direction and coordination for recovery efforts. State responsibility for many plan items is proposed because the Endangered Species Act (Act) of 1973, as amended, provides for State participation/responsibility in endangered species recovery. Task responsibilities outlined in the implementation schedule are suggestions contingent upon appropriations, priorities, and personnel and funding constraints.

The plan is a guidance document that presents conservation strategies for the Northern Rocky Mountain wolf. It is not a decision-making document. Implementation of some tasks outlined in the plan, such as the reintroduction of wolves, will require further analysis under the National Environmental Policy Act as well as public involvement.

A glossary of terms used in the recovery plan is included as Appendix 1.

EXECUTIVE SUMMARY

The Northern Rocky Mountain Wolf Recovery Plan represents a "road map" to recovery of the gray wolf in the Rocky Mountains. The primary goal of the plan is to remove the Northern Rocky Mountain wolf from the endangered and threatened species list by securing and maintaining a minimum of 10 breeding pairs of wolves in each of the three recovery areas for a minimum of three successive years.

The three recovery areas identified for the Northern Rocky Mountain wolf include northwest Montana, central Idaho, and the Greater Yellowstone Area. Each recovery area will be stratified into wolf management zones. Zone I is the area where wolf recovery will be promoted due to the low potential for conflict with other land uses. Zone III (all land area outside the recovery area) is the area where wolf recovery will not be promoted due to the high potential for conflict with existing land uses. Zone II represents a buffer between Zone I and Zone III.

Management guidelines will be developed for the different wolf management zones. These guidelines will then be applied to Federal lands in order to coordinate multiple use activities with wolf management objectives.

Recovery through natural recolonization will be relied upon for the northwest Montana and central Idaho recovery areas. If monitoring efforts in these recovery areas do not indicate satisfactory progress (two breeding pairs) toward recovery through natural recolonization within five years after approval of the recovery plan, other conservation strategies will be identified and implemented.

Due to its geographic isolation from areas with established wolf populations, recovery in the Yellowstone area will likely involve the reintroduction of wolves into Yellowstone National Park. However, before any reintroduction effort is initiated, the appropriate National Environmental Policy Act documents will be prepared with full public involvement. In addition, a proposed rulemaking must be developed and finalized to designate the Yellowstone population as an "experimental population." Such designation will increase the Fish and Wildlife Service's flexibility to manage these translocated populations. Under such designation, experimental populations of species otherwise listed as endangered may be treated as threatened with regard to specific take provisions of the Act and promulgation of special rules. Designation of an experimental population involves preparation and publication in the Federal Register of a proposed rule detailing the geographic location of the experimental population and identifying procedures to be utilized in its management. The rule may also authorize activities designed to contain the population within designated boundaries or to remove nuisance animals.

A control plan(s) will be developed for resolving wolf depredation problems. The goal of the control program is to reduce and prevent livestock losses to wolves while removing the minimum number of wolves necessary to resolve the conflict yet still progress toward recovery. Control will include live-capturing and relocating, holding in captivity, or killing the offending animal(s). If initial efforts to trap a problem wolf are unsuccessful and

depredations continue, or if transplanted wolves return, lethal control using approved methods may be used. If predation on big game herds is determined to be in significant conflict with management objectives of a State wildlife agency, wolf control that would not jeopardize recovery will be considered.

A program of research and monitoring will be implemented to track the progress of recovery, gather information upon which to base management decisions, and determine the impacts upon ungulate populations. Public information and education will be an important aspect of the recovery effort and are key to the overall success of the program.

ACKNOWLEDGEMENTS

The participation of all the advisers and individuals who attended recovery team meetings is appreciated. Particular appreciation is expressed to Dr. L.D. Mech for his contributions as a team adviser; to Wayne Brewster, James Gore, Dale Harms, and Jane Roybal, U.S. Fish and Wildlife Service; to Stan Boyd, Maurice Guerry, and Joe Helle of the National Woolgrowers' Association; and to Rich Harris and Timm Kaminski, University of Montana. Renee Askins prepared an excellent slide and tape program on wolf ecology and management that will be very useful for public information/education programs. Team member John Weaver prepared most of the information on habitat requirements, zone management, ecology and behavior, and wolf-livestock relationships. The cover is a pen and ink drawing by Diane Boyd.

PART I

INTRODUCTION

The Northern Rocky Mountain wolf (Canis lupus irremotus) is one of 32 subspecies of the gray wolf recognized by some taxonomists (Mech 1970). Twenty-four of these subspecies once inhabited North America, with the Northern Rocky Mountain wolf occurring throughout Idaho, the eastern third of Washington and Oregon, all but the northeastern third of Montana, the northern two-thirds of Wyoming, and the Black Hills of South Dakota (Hall and Kelson 1959) (Fig.1). This subspecies was listed as endangered by the Secretary of the Interior in 1973 (38 Federal Register 14678, June 4, 1973). However, based on the probability of enforcement problems and because the trend among taxonomists was to recognize fewer subspecies of wolves, the entire species was listed as endangered throughout the lower 48 States, except Minnesota, in 1978 (43 Federal Register 9612, March 9, 1978). Thus, in this plan, Northern Rocky Mountain wolf refers to gray wolves in the northern Rocky Mountains of the contiguous 48 States, rather than to a specific subspecies. During recent years, wolves have been reported and verified in central and northern Idaho and in western Montana. Wolves have been protected in Montana since 1975, and in Idaho since 1977. Wyoming currently (1987) classifies the wolf as a predator, although the protection afforded wolves under the Endangered Species Act supersedes State laws.

Historical Range

During the latter half of the 19th century, buffalo hunters, settlers, and others decimated the buffalo herds and other ungulates that provided prey for wolves roaming the plains and northern Rocky Mountains (Ream 1982, Mattson 1983). Concurrent with the decline in native ungulates was an increase in domestic livestock. This shift occurred rapidly and, not surprisingly, some wolves turned to alternative prey--livestock. Many buffalo hunters became "wolfers." Bounties for wolves were initiated by local governments and ranchers. The Federal government also hired professional trappers. A few wolves became notorious livestock killers (Curnow 1969), and large bounties were offered for their capture. These wolves, by becoming accustomed to domestic stock as their prey, created fear and hatred against all wolves.

Weaver (1978) provided a historical account of wolves in the Yellowstone region. Wolves inhabited the area in unknown but seemingly low densities during the latter 1800's, but they were subject to early exploitation (1870's) and later control (1914-1926) which was triggered by a noticeable population increase of wolves in northeast Yellowstone Park about 1912. During 1914-1926, a minimum of 136 wolves, including about 80 pups, were killed. Post-whelping populations of 30-40 wolves may have occurred around 1920. After wolf control within Yellowstone National Park ceased (1926), 35 "probable" reports involving 58 large canids were recorded from 1927 through 1966. Observations of single wolves or pairs constituted 83 percent of the reports, most of which came from the northeast and northwest areas of the Park. Resident wolf packs did not persist after the 1930's (Weaver 1978).

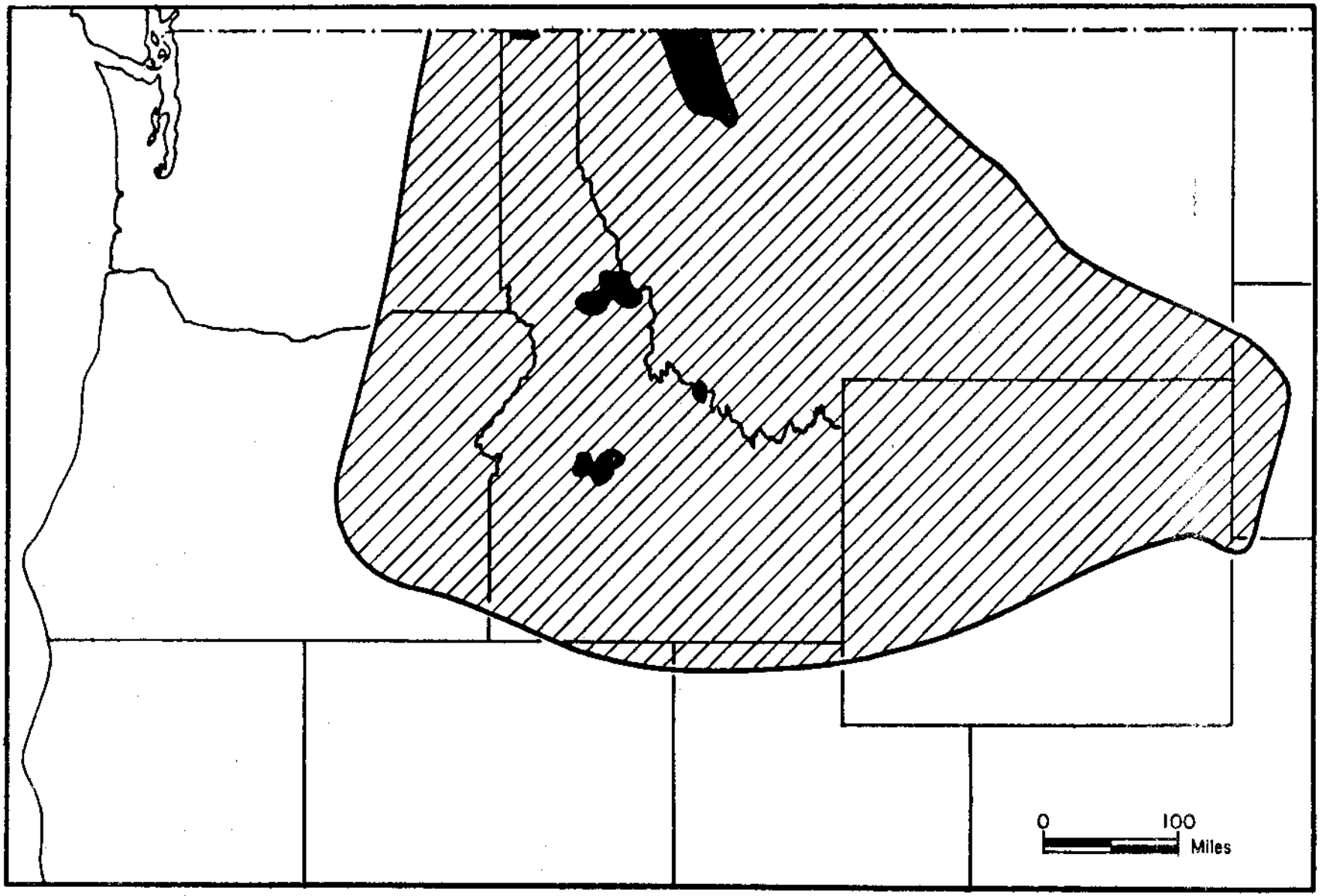

Figure 1. Historical distribution of the northern Rocky Mountain wolf (Canis lupus irremotus) in the United States according to Hall and Kelson (1959). The black areas represent the current approximate distribution of wolves in the northern Rocky Mountains of the contiguous 48 states.

Glacier National Park was created in 1910, but active predator control programs, including strychnine poisoning, occurred through the early 1930's (Singer 1975a). Wolves were taken regularly and in fair numbers within Glacier National Park through 1926. The peak of control efforts, particularly with strychnine, occurred during the early 1920's in National Parks, National Forests, and other lands throughout the Rocky Mountain region. Although wolf populations were apparently decimated, the few wolves left in the Western States probably inhabited wild areas within the National Parks and Forests.

Historical information on the distribution of wolves in Idaho is described by Kaminski and Hansen (1984). Nearly all of Idaho is within the former range of the Northern Rocky Mountain wolf (Fig. 1). Young and Goldman (1944) examined 45 wolf carcasses from Idaho, all but one from the southeastern part of the State. A review of wolf populations in Idaho (Kaminski and Boss 1981) suggests that pack activity occurred primarily in the south-central and east-central parts of the State.

During the early 1900's, the Idaho Department of Fish and Game was authorized by State legislation to "devise and put into operation such methods and means, as would best serve to attain extermination of wolves, coyotes, wildcats and cougars" (Idaho Department of Fish and Game Biannual Report in Kaminski and Boss 1981). Between 1919 and 1928, 258 wolves were poisoned, trapped, or shot. Intensive predator control was maintained throughout the 1950's; yet, few wolves were reported in the predator kill statistics (Kaminski and Boss 1981).

Reasons for Decline

According to Young and Goldman (1944) and Mech (1970), the population decline of the eastern timber wolf was a result of: (1) intensive human settlement, (2) direct conflict with domestic livestock, (3) a lack of understanding of the animal's ecology and habits, (4) fears and superstitions concerning wolves, and (5) the extreme control programs designed to eradicate it. These factors caused the decline in all the wolf populations within the United States, including those in the Northern Rocky Mountains. Threatened Wildlife of the United States (U.S. Fish and Wildlife Service 1973) lists land development, loss of habitat, poisoning, trapping, and hunting as reasons for decline of the Northern Rocky Mountain wolf.

Current Status

The recovery team has gathered information on the current status of wolves in the Northern Rocky Mountains from data generated by team participants as well as from reports collected and evaluated by personnel of other groups and agencies.

Participants in the Wolf Ecology Project, University of Montana (initiated by Robert Ream in 1973) and the Weaver (1978) survey, together with the recovery team, developed standard observation forms for use in recording field data and interviewing observers. One form was used for wolf sightings and the other for observations of wolf sign. The two were combined into one form in 1983 and modified for computer storage and retrieval (Appendix 2). Observations have been reported by local residents, outfitters, hunters, backpackers, trappers, loggers, and agency personnel. Weaver (1978) and Day (1981) discussed the biases inherent in this approach and the limitations of using

observations provided by others. Criteria used to determine acceptance of a report included experience and reliability of the observer, circumstances of the observation, and description of the animal and/or sign that would distinguish it from other animals.

Despite the biases and limitations, wolf observations were consistently made in certain areas by well-qualified individuals. Some areas produced reports that corresponded in terms of color and number of animals involved. Such reports cannot be used to determine the actual numbers of wolves in the Northern Rockies but, if used carefully, they can indicate areas where wolves occur.

Status in Montana

The Wolf Ecology Project collected 315 wolf reports between 1973 and 1977. An additional 109 reports were rejected as questionable but possible. Day (1981) analyzed 278 of the 315 good reports and found them to be clustered in two areas. Northwestern Montana produced 190 of the reports while the areas in southwestern Montana yielded 84 reports, and only 4 reports occurred in the intervening 90 miles. Included in the 278 reports analyzed were 5 reports of wolves killed in northwestern Montana, 3 of which were verified by taxonomists after examining cleaned skulls. Reports through 1979 are included in Ream and Mattson (1982).

Singer (1975a and b) and Kaley (1976) collected 130 reports of wolf observations for Glacier National Park and vicinity beginning in 1910. The area around Glacier National Park and south along the Rocky Mountain Front has consistently produced more reliable reports than any other part of Montana.

In the spring of 1979, a female wolf was captured and radio-tagged by the Wolf Ecology Project near the U.S.-Canadian border in the North Fork Flathead River drainage (Boyd 1982, Ream and Mattson 1982). During the almost 2 years she was intensively monitored, there was no evidence of other wolves occupying the Flathead drainage (Boyd 1982, Ream et al. 1985). In the fall of 1981, larger tracks (one foot was three-toed) were found in the area. During that winter, a pair of wolves was tracked in the snow in Glacier National Park and followed into British Columbia, and in the spring of 1982, seven wolf pups were observed several miles north of the U.S.-Canadian border. Since 1982, there has been an increased number of wolf tracks, sightings, and sign in the North Fork area, particularly south of the Canadian border (Ream et al. 1985). During the winter of 1983-84, wolves were observed and photographed in Glacier National Park, and tracks were found 15-20 miles south of the Canadian border. In the winter of 1984-85, an estimated 7-10 wolves were present in the area (Ream et al. 1985). Two wolves, a young male (W8401) and an alpha female (W8550) were captured and radio collared in 1985. The female, a member of a pack of five to six wolves, was trapped north of the Canadian border and radio-collared. She was later observed nursing seven pups. One of her seven pups was shot by hunters in October 1985 and soon after, the pack of 12 (six adults and six pups) moved south into Glacier National Park and remained there through February 1986. A female pup (W8551) was captured and radio collared in September 1985, and wolf W8401 was recaptured and fitted with a new radio in October 1985. Two more pups captured in September slipped out of their radio collars soon after. During the winter of 1985-86; the Wolf Ecology Project estimates 15-20 wolves inhabited areas in and near Glacier National

Park including the pack of 12 animals, a probable pair on the east side of the Park, wolf W8401, and several other lone wolves.

In neighboring Alberta, Canada, wolves have periodically expanded their range southward since the mid-1950's (Stelfox 1969). Small packs now inhabit Banff National Park, about 150 miles north of the Montana border (unpubl. Park files 1982). In 1976, a pack of nine animals was documented in the Porcupine Hills, about 50 miles north of the border. Following livestock depredations, six were poisoned (Cole et al. 1977) and a seventh was shot. Continued reproduction and the presence of small packs in the same area through 1981 were reported by Harris (1981). Wolves can be legally harvested on public lands in Alberta during 9 months of the year and on private lands throughout the year. Harris (1983) considered liberal hunting regulations the primary reason for the low wolf density in southwest Alberta.

The status of wolf reports in southern Montana for the period 1968-1978 was reported by Flath (1979). The number of reports peaked at 23 in 1975, and declined to 8 in 1978. During the period 1979-1985, 38 reports were received. Based on the recent reports, wolf activity appears to be occurring primarily along the Continental Divide from the Big Hole Divide area south to Bannock Pass. However, the reports present no evidence of reproduction or pack activity in this area.

Status in Yellowstone National Park and Vicinity

During 1967-1977, 81 "probable" reports of 109 large canids were recorded, with 60 (74 percent) of them occurring from 1968 through 1971 (Weaver 1978). Singles or pairs comprised 91 percent of the observations. Sightings were clustered in four areas: the northeast section of the park, Hayden Valley, the northwest portion of the park, and Sunlight Basin east of the park. Although up to 10 of these canids may have been present around 1970, no sustained pack activity was detected. Sustained pack activity in Yellowstone National Park and vicinity has not been documented for many years.

Lemke (1978) gathered five reports of large canids or their sign seen east of the park during 1978. Five more reports for 1978 were received by the Worland District Office of the Bureau of Land Management. During the period 1980-1985, four reports were received from the Worland District and four from the Shoshone National Forest.

Approximately 15 reports of large canids have recently been recorded on the southern Bridger Teton National Forest and adjacent lands over the period 1982-1985. However, there is no indication of resident or sustained pack activity or reproduction to date.

Status in Idaho

Goldman (1944) believed wolves were historically distributed throughout most of Idaho. Recent Idaho data support his supposition. Wolves occurred in Idaho in unknown but seemingly stable populations during the early to mid-1800's. Limited data suggest that wolf numbers may have peaked around 1840, particularly in the southeast and central part of the State where ungulate prey was diverse and abundant.

In the north and central Idaho mountains, wolf packs were first recorded in 1812 in the Clearwater River drainage and were distributed from the Canadian border south. Wolf packs of 4 to 10 animals appear to have ranged widely in the mountains accompanied by smaller groups and lone wolves.

A significant decline of native ungulates and subsequent depredations on livestock in the southeast were followed by control of wolves and their near eradication by the 1920's. In 1927, the Biological Survey (U.S. Fish and Wildlife Service) concluded "Large gray or lobo wolves have been almost cleared from livestock ranges . . . only a few scattered individuals remain" (U.S. Department of Agriculture 1927).

The Forest Service estimated that 38 wolves remained in the Central Idaho Area forests during 1939. This estimate is thought to have been high with little evidence found for its support. The existence of a significant breeding population of wolves during the late 1930's and 1940's seems improbable due to isolation and continued control of wolves and other predators in the Central Idaho Area. Nonetheless, some wolves appear to have survived or returned from Canada.

Study of the present status of wolves in the Central Idaho Area involved review of wolf reports received since 1975 from hunters, recreationists, and outfitters and guides combined with field studies in areas of consistent reports (Kaminski and Hansen 1984). Over 600 reports were received. An analysis of 238 probable wolf reports from 7 National Forests during the past 10 years indicate a minimum of 17 and a maximum of 40 wolves. These data suggest the presence of more wolves in the Central Idaho Area than do field investigations. However, percentages of single wolves, pairs, and groups of three or more are similar to reports and information on wolves prior to 1974 and continue to support the presence of predominately lone wolves. The present number of wolves in Idaho lies between the maximum estimate from field investigations and the minimum estimate from wolf reports. No more than 15 wolves are believed present in central Idaho at this time.

Ungulates comprise the major component of wolf diets throughout central Idaho. Elk, mule deer, white-tailed deer, and moose where available, are the primary prey species. Columbian ground squirrels, snowshoe hare, and grouse are available to wolves in central Idaho as an alternate prey source. Beaver, an important alternate prey source for wolves in some areas of North America, are scarce over most of central Idaho.

Idaho National Forests in the north-central (Clearwater, Nezperce, Bitterroot) and west-central (Payette, Boise) part of the Central Idaho Area support more natural prey-biomass per wolf than do other forests (Challis, Sawtooth, Salmon) at this time, and thus would probably support more wolves with fewer conflicts. Also, fewer livestock are grazed on north and west-central forests within or near the Central Idaho Area resulting in less potential for livestock conflicts in key areas (Kaminski and Hansen 1984).

Habitat evaluations were conducted in the Central Idaho Area during the summers of 1983 and 1984. Much of the area, particularly that portion that is wilderness (with the exception of Chamberlain Basin), consists of steep, rugged terrain. Results of the study generally showed a strong relationship between habitat parameters for summering elk and wolves (Kaminski and Hansen

1984, Idaho Department of Fish and Game Unpubl. Rpt.). High mountain complexes and basins of gentle topography, particularly in the upper one third of the drainages received the highest values for elk summer range, and were frequented by summering elk, deer, and moose. Habitat evaluations for wolf homesites were, with few exceptions, also high in these areas, especially where secluded from human disturbances.

Information from this study also suggests a strong relationship between key ungulate summering areas, including traditional calving or fawning areas, and reliable reports of wolf activity. Key summering areas for ungulates, especially elk, are of particular importance in managing for wolf recovery.

Habitat Requirements

Historically, wolves utilized a broad spectrum of habitats. These had two specifics in common: an abundance of natural prey and, more recently, minimal conflict with human interests/uses. Present and future requirements necessary on a year-round basis include establishing or maintaining areas of public land that provide the two essential elements listed above.

Key habitat components for wolves are those components, both physical and biological, that are considered essential to the conservation of the species. Information on key components facilitates delineation of management zones and biological assessments/evaluations of proposed projects as well as formal consultations with the Fish and Wildlife Service. Knowledge of key habitat components can be derived from studies on the behavior and ecology of the species and should address the food, cover, reproductive, and spatial needs of a species.

Several points should be kept in mind when considering and applying the concept of key habitat components. First, different wolf social units (pairs/packs) may use different combinations of key habitat components. Second, the same wolves may use a slightly different combination of key habitat components or find them in different areas of their territory or shift territories from year to year. Third, while distinct patterns of habitat utilization exist (which we can perceive and place into separate categories), it is the holistic sum of these "parts" to which wolves respond.

The key components of wolf habitat are fairly simple: (1) a sufficient, year-round prey base of ungulates (big game) and alternate prey, (2) suitable and somewhat secluded denning and rendezvous sites, and (3) sufficient space with minimal exposure to humans. Because the needs of wolves relate so directly to ungulates, and because the habitat needs of different ungulate species in the Northern Rocky Mountains are well known but variable between regions, the following information is deliberately simplified. Refinement of these basic components is a task best accomplished in each wolf recovery area.

Wolf Denning Sites

Wolves may dig out and/or visit whelping dens weeks before the birth of pups. In the Northern Rockies, wolf pups are born any time from late March to late April or possibly early May. Some particular dens or denning areas may receive traditional use by a wolf pack over time. Most wolves appear

particularly sensitive to human activity near den sites and may abandon them if disturbed. Additional information on wolf ecology and behavior is provided in Appendix 3.

Ungulate Calving/Fawning Areas

Wolves prey selectively upon the newborn and young of moose, bison, elk, and deer in calving/fawning areas during May and June. Although the actual locations of such areas may vary from year to year, depending on weather and snow conditions, many receive traditional use by ungulates.

Wolf Rendezvous Sites

Wolf rendezvous sites are specific resting and gathering areas occupied by wolf packs during summer and early fall after the whelping den has been abandoned. They are characterized by matted vegetation in a meadow, a system of well-used trails through the adjacent forest and across the meadow, and resting beds adjacent to trees. A wolf pack will usually move from the whelping den (or occasionally a second den) to the first rendezvous site when the pups are 6 to 10 weeks of age (late May-early July). The first rendezvous site is often within 1 to 6 miles of the whelping den. A succession of rendezvous sites are used by the pack until the pups are mature enough to travel with the adults (September - early October). Rendezvous sites--especially the first one--may receive traditional use by wolf packs. It is also the initial rendezvous site at which wolves appear most sensitive to prolonged or substantial human disturbances (Appendix 3).

Riparian Habitat

Wolves commonly prey on beaver during ice-free times (spring-fall). Beaver may serve as an important alternate prey source during summer, in part buffering or reducing wolf predation on young ungulates. In some wolf-prey systems, survivorship of wolf pups may be linked to beaver abundance.

Ungulate Summer/Fall Range

On a biomass basis, ungulates comprise the bulk (more than 90 percent) of wolves' diets during summer and fall in the Rocky Mountains. Mule and white-tailed deer, elk, and moose are the principal prey species (Appendix 3).

Ungulate Winter Range

During winter, wolves in the Rocky Mountains prey almost exclusively upon deer, elk, and moose. Winter range is often the limiting factor for ungulate populations. Thus, maintaining productivity of winter ranges and ungulate numbers is important.

Cover

If the term "cover" is defined as areas secure from human disturbance and with vegetation that hides an animal, then wolves do need cover per se at certain times of the year. Den and rendezvous sites are often characterized by having forested cover nearby and by being distant from human activity. The wolf's need for cover is also related indirectly to the cover requirements of its principal prey in a particular area.

Space

As social carnivores at the top of the ecological pyramid, wolves need comparatively large spaces in which to find sufficient vulnerable ungulates and alternative prey for food.

Factors Affecting Recovery

A few places, mostly National Parks and other wild areas, still exist in the Northern Rocky Mountains where wolves can survive. Although maintenance and improvement of suitable habitat may be the key long-term factor in wolf conservation, an important factor limiting wolf recovery in the Northern Rocky Mountains is human-induced mortality. The wolf traditionally has been feared and maligned by many people. If wolves increase in the Northern Rocky Mountains and livestock depredations occur, immediate steps must be taken to alleviate the problem.

As proposed by this plan, control actions will be undertaken to trap and relocate depredating wolves (or, if this is not possible, lethal control may be used as a last resort) only in the case where verified wolf depredation occurs on lawfully present domestic livestock. Control actions will serve to enhance the overall survival of the wolf by demonstrating to those concerned about the impact of wolf recovery on the livestock industry that responsible Federal agencies will act quickly to alleviate depredation problems. Timely response to depredation problems will serve to alleviate the perception of government inaction that often results in the indiscriminate killing of wolves. In addition, control actions will focus on removal of only offending wolves, and in doing so will resolve wolf-human conflicts by taking the minimum number of wolves necessary. Thus, by enhancing the survival chances of those nonoffending animals now present in Montana, the control program will actually contribute to the ultimate recovery of the wolf in the Northern Rocky Mountains.

An information and education program based on factual information concerning wolves is requisite to public acceptance and support of the recovery effort. Such programs should stress that a few remaining wild areas do still exist where wolves and wolf habitat can be maintained or enhanced in conjunction with the balanced use of other resources. Recovery of the wolf, whether through natural reestablishment or translocation, cannot succeed without public support and acceptance. In the past, fear, lack of knowledge of wolf ecology, and misinformation have been very real factors in inhibiting wolf recovery. Livestock operators and the industry as a whole will not support such a program without some assurance that depredating wolves can and will be controlled. Wolf recovery areas should not be superimposed over major livestock-producing areas, and provisions should be established for controlling problem wolves. Development and implementation of wolf management zones and a specific wolf control plan are necessary elements for wolf recovery in the Northern Rocky Mountains. Further information on wolf-livestock relationships is presented in Appendix 4.

Recent studies have shown gray wolves, especially juveniles, are susceptible to canine parvovirus and distemper. Because survival of juvenile wolves is

critical to successful recovery, developing a comprehensive health monitoring program for translocated and naturally-reestablishing wolves is essential to minimize the risk of diseases adversely affecting recovery.

Wolf-Human Interactions

Until 1944, when Adolph Murie's The Wolves of Mount McKinley was published, no unbiased ecological treatise on wolves existed. Even "scientific" works mixed science with folklore (Lopez 1978). Although Native Americans admired and emulated wolves, Europeans seemed universally to associate wolves with the Devil, pagan worship, evil, and man's bestial nature. Wolves, along with werewolves, became tied to man's baser emotions with debauchery, sacrilege, witchcraft and sorcery. This traditional view of the wolf came to the New World with the first colonists and persists in television productions today.

The natural reestablishment of wolves in Glacier National Park and wilderness areas in Montana, Wyoming, and Idaho, and reintroduction of the wolf into Yellowstone National Park raise the question of how wolves and humans will interact in wild country visited by large numbers of recreationists. Researchers in Denali (Mount McKinley) National Park, Alaska (Murie 1944), Algonquin Provincial Park, Ontario (Pimlott 1970), Prince Albert National Park, Saskatchewan, Jasper National Park, Alberta, Riding Mountain National Park, Manitoba (Carbyn 1974, 1980), and Isle Royale National Park, Michigan (Peterson 1979), all document that, far from being a threat to humans, healthy, wild wolves actually avoid humans. In fact, no case of modern North Americans being seriously injured by wolves can be documented (Mech 1970, Lopez 1978). The challenge, then, is to protect wolves from humans, rather than people from wolves.

In the last 40 years, after centuries of fantasy and superstition, wildlife research has yielded a new picture of the wolf as a social creature and an important member of natural ecosystems. Surveys of public attitudes in Minnesota show broad support, except among farmers, for protection and conservation of the wolf (Kellert 1985). Visitors to Yellowstone National Park, when questioned, overwhelmingly (six to one) indicated that having wolves would improve the Yellowstone experience (McNaught 1985).

Summary

Occurrence of wolves in the Northern Rocky Mountains of the United States has recently been documented. A pack of 12 wolves is now known to occupy an area in northwestern Montana. Reproduction was documented in this area in 1982, 1985, 1986, and 1987. However, the prognosis for the species in this and other recovery areas remains uncertain. The plight of Canadian wolves in the border region will strongly influence the ecology and recovery of wolves in the United States. Proposed and ongoing development in the area threaten these wolves, which represent the only source for natural reestablishment into Montana and Idaho. Protection and improvement of habitat in recovery and corridor areas and north of the border is fundamental to the recovery effort as it will enhance wolf dispersal from western Canada as well as reintroduction efforts. Prevention of livestock depredations by wolves,

public education regarding wolves and wolf management, and development of a control plan to deal with problem wolves are also essential if wolf recovery is to be accepted and coordinated with alternate resource uses.

The probability of natural reestablishment of wolves in the Yellowstone Ecosystem is extremely remote. Translocation of healthy wolves into the area appears to be the only viable method of establishing and recovering a population at this time. The 1982 Amendments to the Endangered Species Act (Pub. L. 97-304) provide for the designation of "experimental populations," a special category allowing endangered and threatened species to be reintroduced within their historic range with provisions for additional management flexibility. Such designation would include formulation of a special rule identifying procedures to be utilized in management of the species. These regulations may also authorize activities designed to contain the population within the original boundaries set out in the regulation and to remove problem animals (See Appendix 5).

PART II

RECOVERY

PRIMARY OBJECTIVE: To remove the Northern Rocky Mountain wolf from the endangered and threatened species list by securing and maintaining a minimum of 10 breeding pairs in each of three recovery areas for a minimum of 3 successive years.

SECONDARY OBJECTIVE: To reclassify the Northern Rocky Mountain wolf to threatened status over its entire range by securing and maintaining a minimum of 10 breeding pairs in each of two recovery areas for a minimum of 3 successive years.

TERTIARY OBJECTIVE: To reclassify the Northern Rocky Mountain wolf to threatened status in an individual recovery area by securing and maintaining a minimum of 10 breeding pairs in the recovery area for a minimum of 3 successive years. Consideration will also be given to reclassifying such a population to threatened under similarity of appearance after the tertiary objective for the population has been achieved and verified, special regulations are established, and a State management plan is in place for that population.

STEP-DOWN OUTLINE: (This Section outlines those actions (Tasks) needed to recover the species. Further details on each task are provided in the Narrative Section page 19.)

1. Determine the present status and distribution of gray wolves in the Northern Rocky Mountains, and devise a systematic approach for compiling observations and other data on the Northern Rocky Mountain wolf.

    11. Encourage State and Federal agencies to use standard reporting procedures.

    12. Make information on standard procedures for reporting wolf observations available to the public.

    13. Designate personnel to forward reports.

    14. Develop a quantitative wolf report evaluation technique.

2. Evaluate and verify the population goals for a threatened and fully recovered population established in the current objectives.

    21. Reclassify to threatened status when the tertiary and/or secondary objectives are reached.

22. Consider reclassifying a population to threatened under similarity of appearance after the tertiary objective for the population has been achieved and verified, special regulations are established, and a State management plan is in place for that population.

23. Delist when the primary objective is reached.

3. Delineate recovery areas and identify and develop conservation strategies and management plan(s) to ensure perpetuation of the Northern Rocky Mountain wolf.

31. Establish criteria for selecting potential wolf recovery areas.

32. Describe and map potential wolf recovery areas.

321. Delineate northwestern Montana recovery area.

322. Delineate Idaho recovery area.

323. Delineate Yellowstone recovery area.

33. Identify conservation strategies for each recovery area.

331. Promote wolf conservation in the northwest Montana recovery area via natural recolonization from Canada.

331-1. Establish a cooperative program with Canada to promote wolf immigration to the northwest Montana recovery area.

331-2. Delineate and maintain suitable movement/travel corridors between Canada and the Montana recovery area.

331-3. Monitor the status of dispersing Canadian wolves.

331-4. Secure and promote establishment of colonizing wolves in the recovery area.

332. Promote wolf conservation in the central Idaho recovery area via natural recolonization from southwestern Canada, northwestern Montana, and possibly Yellowstone National Park.

332-1. Establish a cooperative program with Canada to promote wolf immigration to the central Idaho recovery area.

332-2. Delineate movement corridors between Canada and the Idaho and the northwestern Montana recovery areas.

332-3. Monitor the status of dispersing Canadian wolves.

332-4. Secure and promote the establishment of colonizing wolves in the recovery area.

333. Promote wolf conservation in the Greater Yellowstone area.

333-1. Promote public understanding and acceptance of the reestablishment program.

333-2. Designate wolves to be translocated into the Yellowstone wolf recovery area as an experimental population.

333-3. Develop and promulgate special regulations for management of an experimental wolf population in the Greater Yellowstone area.

333-4. Develop a detailed reestablishment plan that considers a variety of translocation techniques and prepare the appropriate National Environmental Policy Act documents, allowing for public involvement.

333-41. Identify a reliable source of wolves for transplant on a sustained basis.

333-42. Evaluate and select appropriate transplant methods.

333-43. Evaluate and apply other methods as they become available.

333-44. Evaluate and select optimum transplant site(s).

333-45. Outline responsible agencies and timetables for transplanting and monitoring of released wolves.

333-5. Monitor health of and immunize wolves captured for translocation.

333-6. Translocate wolves to Yellowstone National Park.

333-7. Monitor reestablishment efforts and effects.

34. Establish management zones to provide for wolf recovery and minimize wolf-human conflicts.

35. Delineate wolf management zones in each of the three recovery areas.

36. Develop management guidelines for wolf management zones and dispersal corridors.

37. Develop and implement a wolf control/contingency plan for dealing with wolf depredation problems.

371. Develop criteria for determining problem wolves.

372. Develop criteria for disposition of problem wolves.

373. Develop techniques and expertise in conducting wolf control.

374. Identify and prioritize potential release sites and obtain advance authority from involved land management agencies to release wolves captured in control actions.

375. Control wolves determined to be a problem by live-capturing and relocating or by lethal methods.

376. Designate a Task Force for identifying and evaluating different alternatives for a compensation program and determining their feasibility.

38. Coordinate multiple-use activities with wolf biological requirements.

381. Promote wolf recovery objectives in the land-use planning process.

381-1. Inform land managers of existing or potential wolf range.

381-2. Eliminate or minimize conflicts between the Northern Rocky Mountain wolf and other land uses in land management plans.

382. Apply guidelines developed under Task 36 to wolf management zones developed under Task 35.

382-1. Coordinate/integrate wolf management objectives with State big game management objectives.

382-11. Manage wildlife/prey habitat.

382-22. Monitor wildlife harvests and ungulate population demographics.

382-2. Monitor animal damage control programs.

382-3. Monitor range management.

382-4. Monitor timber harvesting and fire management.

382-5. Monitor recreation including recreational/commercial trapping.

382-6. Monitor minerals, energy exploration/development.

382-7. Monitor special use activities.

382-8. Assess cumulative effects.

383. Identify private lands that may be necessary for the survival and recovery of the wolf and secure management authority through development of Memorandums of Agreement, conservation easements, or cooperative agreements or through purchase, exchange, or lease.

39. Provide concerted law enforcement effort.

4. Monitor gray wolf populations, habitat, and prey.

41. Monitor population recovery.

411. Use a report monitoring system to determine presence of wolves, particularly in areas that may be or become newly occupied.

412. Conduct wolf surveys in areas of consistent wolf reports to verify the presence of wolves and their relative abundance.

412-1. Encourage reporting of wolf observations by the public.

412-2. Conduct winter surveys during breeding season to determine presence and distribution of wolves.

412-3. Conduct summer surveys.

413. Monitor known wolf populations.

413-1. Determine size of home range for packs, pairs, and individual wolves.

413-2. Estimate numbers of packs, pairs, or individual wolves in each area.

413-3. Estimate pup/adult ratios.

413-4. Estimate numbers of litters and litter sizes.

413-5. Determine population trends over time.

42. Periodically review wolf management zones and revise as necessary.

43. Obtain knowledge concerning wolf populations, their use of prey, habitat requirements, health status, and interactions with and effects on other carnivores.

431. Obtain information on areas occupied by wolves.

431-1. Determine locations of dens and other critical areas.

431-2. Determine relationships of territories to each other.

431-3. Determine relationships of territories to the seasonal ranges of prey species.

431-4. Determine characteristics of areas used by wolves.

431-5. Determine relationships of known wolf-use areas to types of human activity taking place in or near those areas.

431-6. Determine effects of wolves on other carnivores.

431-7. Determine effects of other carnivores on wolves.

431-8. Estimate wolf carrying capacity in each area.

432. Examine wolf ecology and prey information from other areas and determine suitability for use in the Northern Rocky Mountains.

432-1. Conduct a literature search and maintain a literature and information file of all related material.

432-2. Exchange information and data with biologists involved in wolf and prey management and research.

433. Obtain knowledge of natural prey requirements of wolves and effects on prey species.

433-1. Determine prey requirements, prey composition, rate of predation, and seasonal variation in predation and predatory behavior.

433-2. Determine effects of wolves on prey, structure of prey population(s), and structure of kill.

434. Assemble a knowledge of environmental requirements of prey species.

434-1. Determine carrying capacity.

434-2. Determine seasonal ranges.

434-3. Determine population trends.

434-4. Determine needs for habitat improvements.

435. Obtain information about the health status, diseases, and causes of mortality in wolves.

44. Develop special regulations for threatened populations or those listed under similiarity of appearance.

45. Develop State regulations for delisted populations.

5. Develop and initiate information and education programs.

51. Demonstrate to the public that the wolf is part of the natural history of the Northern Rocky Mountains and is endangered.

511. Produce and distribute movies, TV programs, slide series, and popular literature.

512. Provide factual information to interested groups and organizations regarding wolf ecology and management.

513. Publish technical data available on wolf ecology, current status, and history.

52. Educate the public and other agencies concerning the Endangered Species Act and State laws.

521. Publicize the legal protection provided listed species under the Act and penalties involved for killing an endangered wolf.

522. Identify States or other political subdivisions where wolves are in nonprotected categories.

523. Encourage States to enact wolf management measures.

53. Inform the public of recovery efforts and progress.

54. Reassure and work with the livestock industry, sportsmen, trappers, and other affected publics to integrate their interests and concerns with wolf recovery objectives in a positive manner.

55. Encourage States to enact laws discouraging private individuals or organizations, etc., from holding (in captivity) and releasing tame wolves or wolf-dog crosses into the wild.

NARRATIVE

PRIMARY OBJECTIVE: To remove the Northern Rocky Mountain wolf from the endangered and threatened species list by securing and maintaining a minimum of 10 breeding pairs in each of three recovery areas for a minimum of 3 successive years.

SECONDARY OBJECTIVE: To reclassify the Northern Rocky Mountain wolf to threatened status over its entire range by securing and maintaining a minimum of 10 breeding pairs in each of two recovery areas for a minimum of 3 successive years.

TERTIARY OBJECTIVE: To reclassify the Northern Rocky Mountain wolf to threatened status in an individual recovery area by securing and maintaining a minimum of 10 breeding pairs in the recovery area for a minimum of 3 successive years. Consideration will also be given to reclassifying such a population to threatened under similarity of appearance after the tertiary objective for the population has been achieved and verified, special regulations are established, and a State management plan is in place for that population.

Delisting the Northern Rocky Mountain wolf will be contingent upon the species being classified as a game animal, furbearer, or other protected status by the States (refer to Task 45).

The above goals were developed based on the most current information and the opinions of recovery team members, other "experts" on the species, and the Fish and Wildlife Service. They represent the best available estimate of the minimum numbers and populations necessary to recover and ensure perpetuation of the wolf. These goals will be revised as necessary as, or if, new information becomes available.

The goal of 10 breeding pairs in each of three recovery areas was established after extensive literature review and consultation with a number of U.S. and Canadian biologists/wolf researchers. Goals established in the earlier approved recovery plan called for reestablishment and maintenance of at least two separate populations before down-listing to threatened status. However, based on the most current information, it was determined that establishment or maintenance of a minimum of three separate, viable, self-sustaining populations would be necessary before delisting of the Northern Rocky Mountain wolf could be considered.

Establishment of three geographically separate populations would offer some assurance that one or two

populations would survive in the case of an unexpected catastrophic event. Review of the former range of the Northern Rocky Mountain wolf has identified three geographic areas where wolf occurrence and recovery is feasible. Thus, it seems a natural progression and biologically appropriate to require establishment of three distinct populations as criteria for delisting the Northern Rocky Mountain wolf. The potential for wolf recovery does exist in the Yellowstone area. However, for the wolf's chances of survival to be maximized, land and wildlife management agencies need solid, clear-cut direction in order to adequately consider wolf recovery objectives in their own planning and management processes.

As part of the tertiary goal, consideration will also be given to reclassifying a population to threatened by similarity of appearance after the tertiary objective for the population has been achieved and verified, special regulations are developed for the specific population, and a State management is in place to ensure protection of the population. This action would provide the opportunity for additional management activities, including control, thus allowing the State greater management flexibility.

1. Determine the present status and distribution of gray wolves in the Northern Rocky Mountains, and devise a systematic approach for compiling observations and other data on the Northern Rocky Mountain wolf. Obtaining a clear understanding of where and under what conditions wolves currently occur is essential to implementation of management efforts and development of long-range plans.

    11. Encourage State and Federal agencies to use standard reporting procedures. State and Federal agencies should be encouraged to use standard reporting procedures in order to facilitate tracking and following up on wolf sightings. Standard reporting forms have been developed and distributed.

    12. Make information on standard procedures for reporting wolf observations available to the public. Agencies should inform interested groups, organizations, and individuals on standard reporting procedures and encourage their participation in reporting reliable observations.

    13. Designate personnel to forward reports. Each National Forest, National Park, Bureau of Land Management district, State agency, etc., should designate a qualified person to forward wolf reports to the Fish and Wildlife Service for evaluation.

    14. Develop a quantitative wolf report evaluation technique. A computerized wolf data storage and retrieval system has been

established in one central location. However, the existing quantitative rating procedure is in need of additional peer review and critique.

2. Evaluate and verify the population goals for a threatened and fully recovered population established in the current objectives. Population goals have been developed that the Service and recovery team currently believe, when achieved, will provide for reclassification of the Northern Rocky Mountain wolf from endangered to threatened status and eventual delisting. These population goals may need to be revised as, or if, new information on the number of wolves necessary to maintain a viable, self-sustaining Northern Rocky Mountain wolf population becomes available. The Northern Rocky Mountain wolf should be reclassified or delisted when the population levels and/or parameters are verified and achieved.

   Reclassifying may be proposed through petitioning of the Service by the recovery team, resource agencies, or private individuals when the population parameters are reached. Delisting may also be proposed through petitioning of the Service by the recovery team, resource agencies, or private individuals when the population parameters described in the primary objective are achieved.

   21. Reclassify to threatened status when the tertiary and/or secondary objectives are reached. The Northern Rocky Mountain wolf will be considered eligible for reclassification to threatened status over its entire range when two wolf recovery areas each have populations consisting of 10 breeding pairs for a minimum of 3 consecutive years. The wolf population in an individual recovery area will be considered eligible for reclassification to threatened status when it consists of 10 breeding pairs for a minimum of 3 consecutive years.

   22. Consider reclassifying a population to threatened under similarity of appearance after the tertiary objective for the population has been achieved and verified, special regulations are established, and an acceptable State management plan is in place for that population. The recovery plan identifies three distinct recovery areas that are geographically isolated from one another. Downlisting a population in one recovery area to threatened status when that population reaches its recovery goals takes advantage of the management flexibility provided under the Endangered Species Act without sacrificing protection of the species. Using the same thinking, it makes little sense to keep managing a population as endangered or threatened after it has reached population levels identified in the recovery plan. The option of reclassifying to a "listed under similarity of appearance" designation could be considered after the tertiary objective for the population has been achieved and verified, special regulations for management of the population have been developed, and an acceptable State management plan is in place to assure sufficient protection. This action would recognize that the population is not biologically threatened, a legal status defined for species believed likely to become endangered within the foreseeable future, and would also provide the State with additional

management flexibility including control options. Such classification would still provide some protection for the population while ensuring protection for the species as a whole.

23. Delist when the primary objective is reached. The Northern Rocky Mountain wolf will be considered eligible for delisting when a total of 30 breeding pairs of wolves are established in three recovery areas for a minimum of 3 successive years. A minimum of 10 breeding pairs must be present in each of the three recovery areas.

3. Delineate recovery areas and identify and develop conservation strategies and management plan(s) to ensure perpetuation of the Northern Rocky Mountain wolf. Specific areas should be identified as wolf recovery areas based on the various criteria and considerations outlined under Task 31. Management plans should be developed to provide guidance to land and wildlife managers on managing habitat, prey species, and wolves.

31. Establish criteria for selecting potential wolf recovery areas. Basic criteria that should be used in selection of recovery areas include: (1) presence of an adequate natural prey base on a year-round basis; (2) a minimum contiguous area of 3,000 square miles, or a lesser area if adjacent available lands that could support wolves exceed 3,000 square miles in the aggregate; (3) no more than 10 per cent private land, excepting railroad grant lands; (4) if possible, absence of livestock grazing or little possibility for conflict; and (5) sufficient isolation to protect 10 breeding pairs.

32. Describe and map potential wolf recovery areas. General descriptions and maps should be used to delineate the areas, based on biological parameters, within which recovery of viable wolf populations should be confined. An interagency group would be assembled to draft zone lines. Compilation of extensive data on ungulate seasonal ranges, livestock allotments, alternate prey bases, and potential conflicts would also be required as well as coordination with involved State and Federal agencies. Copies would be provided to and informational meetings held with the public to allow for input.

321. Delineate northwestern Montana recovery area. Glacier National Park, designated wilderness areas (Bob Marshall, Great Bear, Lincoln-Scapegoat), and adjacent public lands on which the majority of recent wolf reports originate appear suitable (Fig. 2).

322. Delineate Idaho recovery area. Designated wilderness areas (Selway-Bitterroot, Gospel Hump, Frank Church River of No Return, Sawtooth), plus proposed wilderness areas (Mallard-Larkin, Moose Buttes, Great Burn), and adjacent lands (mostly Federal) on which the majority of the recent wolf reports in Idaho originate appear suitable (Fig. 2).

323. Delineate Yellowstone recovery area. Yellowstone National Park, designated wilderness areas (Absaroka-Beartooth, North Absaroka, Washakie, Teton), and adjacent public lands appear suitable (Fig. 2).

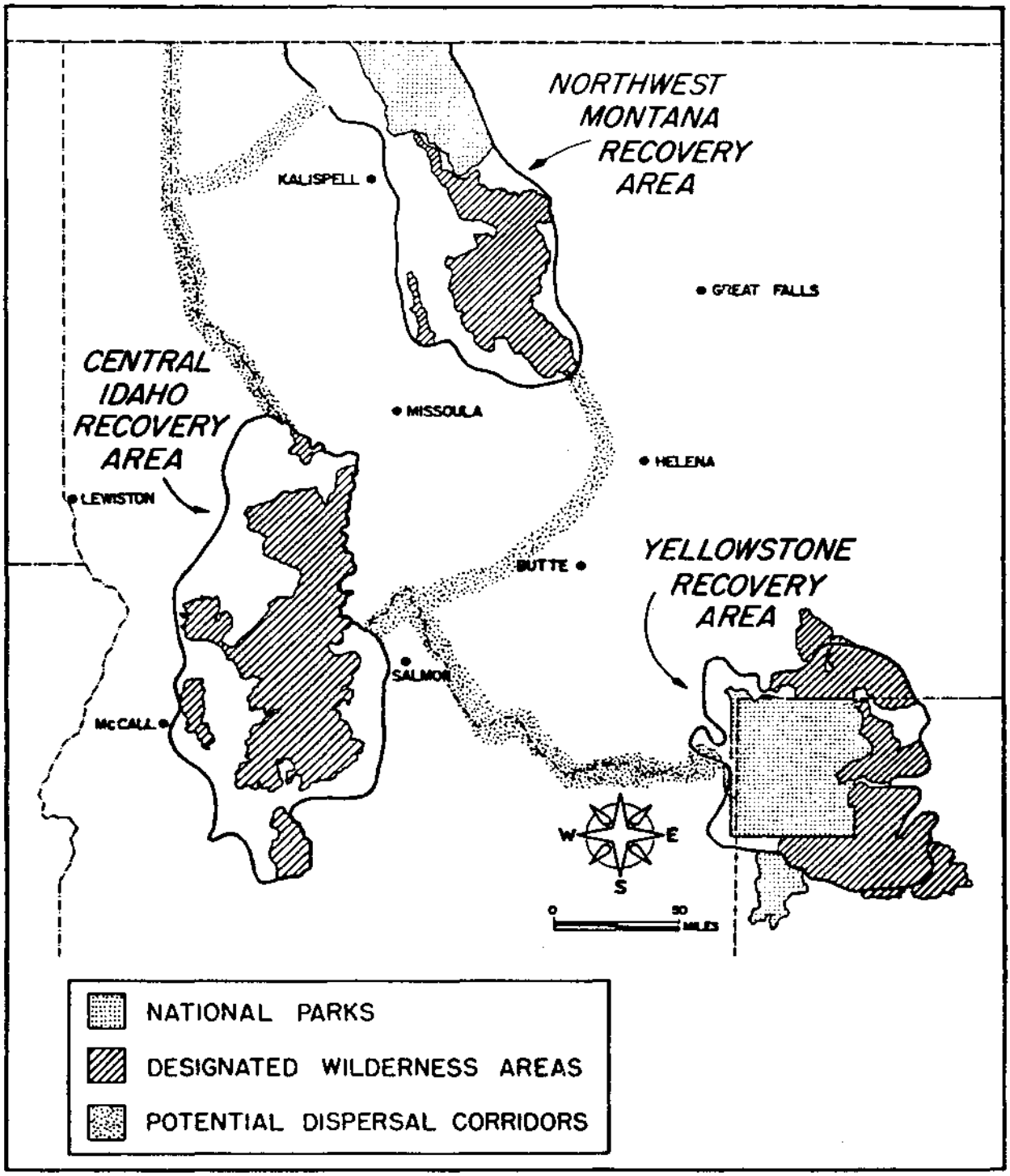

FIGURE 2. *RECOVERY AREAS*

33. Identify conservation strategies for each recovery area. Viable wolf populations have been absent from the Northern Rocky Mountains for 40-50 years. Natural recolonization of appropriate areas by wolves would be a desirable means for achieving wolf recovery. However, the few wolves immigrating periodically from southwestern Canada have apparently not been successful in effectively recolonizing central Idaho or northwestern Montana up to this time, although pack activity has now been noted in Montana. If wolf populations in southeastern British Columbia and/or southwestern Alberta increase sufficiently to promote a number of dispersers and if travel corridors are maintained, natural recolonization of central Idaho and northwestern Montana assumes a much greater probability. Regardless, natural recolonization of the Yellowstone area remains an extremely remote possibility. From a wolf recovery perspective, translocating wolves to the Yellowstone area is appropriate now. If monitoring of wolf status in northwestern Montana and/or central Idaho does not indicate satisfactory progress (two breeding pairs) by natural recolonization within 5 years of approval of this revised plan, then other conservation strategies should be identified and implemented for these areas as well.

331. Promote wolf conservation in the northwest Montana recovery area via natural recolonization from Canada. Recovery in northwest Montana will likely lead the way to recovery in other areas as well as provide the basis for rational and sound judgments about the wolf recovery program.

331-1. Establish a cooperative program with Canada to promote wolf immigration to the northwest Montana recovery area. A cooperative effort should be established with Canada to encourage management practices favorable to the wolf (i.e., providing sufficient wolf habitat, travel corridors, and populations in southeastern British Columbia and/or southwestern Alberta to promote wolf immigration into the northwest Montana recovery area).

331-2. Delineate and maintain suitable movement/travel corridors between Canada and the Montana recovery area. Maintenance of suitable habitat on both sides of the United States/Canadian border is essential to promote natural recolonization by Canadian wolf populations.

331-3. Monitor the status of dispersing Canadian wolves. Dispersing wolves should be carefully monitored by both Canadian and U.S. biologists to assure proper management and protection policies are implemented.

331-4. Secure and promote establishment of colonizing wolves in the recovery area. Habitat should be managed to maintain or increase prey species and thus promote establishment of wolf populations. Public information programs should be initiated to inform individuals/ agencies of the facts on wolf biology and requirements,

etc.(see Tasks 431, 432, 433, and 434). Once wolves are reported in the area, increased monitoring and law enforcement efforts will be necessary.

332. Promote wolf conservation in the central Idaho recovery area via natural recolonization from southwestern Canada, northwestern Montana, and possibly Yellowstone National Park. The possibility for natural recolonization of this area does exist if corridors are maintained and Canadian and Montana wolf populations and habitat are managed to promote such movement into Idaho or if wolves should be reintroduced or become established in Yellowstone National Park.

332-1. Establish a cooperative program with Canada to promote wolf immigration to the central Idaho recovery area. A cooperative effort between the U.S. and Canada is essential in order to encourage management practices favorable to the wolf and thus provide sufficient wolf habitat, travel corridors, and populations in Canada to promote wolf immigration into central Idaho.

332-2. Delineate movement corridors between Canada and the Idaho and the northwestern Montana recovery areas. Identification and maintenance of suitable travel corridors is essential to natural recolonization by Canadian wolf populations. Management to maintain the essential qualities of such areas should be encouraged.

332-3. Monitor the status of dispersing Canadian wolves. See Narrative Task 331-3.

332-4. Secure and promote the establishment of colonizing wolves in the recovery area. See Task 331-4.

333. Promote wolf conservation in the Greater Yellowstone area. The probability of natural reestablishment of wolves in the Yellowstone ecosystem is extremely remote. Translocation of wolves into the area appears to be the only viable method of establishing and recovering a population at this time. The 1982 Amendments to the Endangered Species Act (16 U.S.C. 1531 et seq.) provide for the designation of "experimental populations," a special category allowing endangered and threatened species to be reintroduced within their historic range with provisions for additional management flexibility (See Appendix 5).

Designation as an experimental population would be applicable for Yellowstone because Section 10(j) of the Act authorizes more discretion in devising an active management program for an experimental population than for a regularly listed species, a critical factor with regard to public and agency acceptance of

any such proposal. An experimental population would be treated as threatened for the purposes of sections 4(d) and 9 of the Act, even though the donor population may currently be listed as endangered. Treatment as threatened would allow the Service to impose less restrictive taking prohibitions. Such designation would include formulation of a special rule identifying procedures to be utilized in management of the species. These regulations may also authorize special activities designed to contain the population within the original boundaries set out in the regulation and to remove problem animals (refer to Appendix 5).

Experimental populations found to be or designated as "nonessential" to the survival of a species would be treated as as a proposed species with regard to Section 7 of the Act, and thus would not be subject to the formal consultation requirement of Section 7(a)(2) of the Act unless the population is found on a National Wildlife Refuge or National Park (in which case the full protection of Section 7 would apply). Thus, other Federal agencies would only be required to informally confer with the Service with regard to Section 7. Experimental populations determined to be "essential" to the survival of a species would remain subject to all of the provisions of Section 7. Further evaluation of the various options for establishing an experimental population, including the issue of "essential or nonessential", will be and are more appropriately addressed during promulgation of the proposed rulemaking and preparation of National Environmental Policy Act documents on the proposal.

333-1. Promote public understanding and acceptance of the reestablishment program. Public understanding and support is critical to the wolf recovery program. Implementation of recovery actions, especially a translocation program, cannot succeed without public acceptance. Until now, lack of knowledge and misinformation have been very real factors in inhibiting the wolf recovery effort. Thus, it is essential that the public is kept informed and involved in such programs. This can be accomplished through issuing news releases and articles, holding community or public meetings, and otherwise informing people of the facts about the wolf, its ecology and needs, and the transplant program.

333-2. Designate wolves to be translocated into the Yellowstone wolf recovery area as an experimental population. Under the 1982 Amendments to the Act, translocated populations can now be designated, at the discretion of the Fish and Wildlife Service, as experimental. Such designation will increase the Fish and Wildlife Service's flexibility to manage these translocated populations, because under such a

designation, experimental populations of species otherwise listed as endangered may be treated as threatened (with regard to specific take provisions and promulgation of special rules). The Fish and Wildlife Service has much more flexibility in devising management programs for threatened versus endangered species, especially with regard to control actions.

Designation of an experimental population involves preparation and publication in the Federal Register of a proposed rule detailing the geographic location of the experimental population and identifying procedures to be utilized in its management. The rule may also authorize activities designed to contain the population within the designated boundaries or to remove nuisance animals. After the time period allotted for public and agency comment, a final rule should be developed for approval and publication in the Federal Register.

333-3. Develop and promulgate special regulations for management of an experimental wolf population in the Greater Yellowstone area. As part of the program establishing an experimental population of wolves in Yellowstone, special regulations would also be promulgated to authorize management provisions including those allowing for control of problem animals and for containing the population within the designated habitat boundaries. Problem wolves outside of desired areas would be captured and returned to the recovery area or removed according to the guidelines developed under Task 37.

As discussed briefly under Task 333, several management options exist for dealing with experimental populations. Management options that may be considered when the scoping process is initiated on possible reintroduction of wolves into Yellowstone include:

(1) Establishing under certain circumstances the authority for livestock owners to take depredating wolves. - Such control would be allowed if verified* wolf depredations occur on lawfully present domestic livestock on private lands within Management Zones II and III. Control actions would be limited to within 1 mile of the depredation site.

(2) Delisting of wolves located outside of established recovery zones.

* Verified as used above means those depredations caused by wolves as confirmed by authorized State or Federal personnel.

(3) Reclassifing wolves located outside of established recovery zones as "listed under similarity of appearance".

(4) Conducting/implementing control actions early on in the recovery effort to reduce/prevent major impacts to prey (ungulate) populations.

(5) Implementing wolf management/control on those packs that follow ungulate herds outside of National Park or wilderness areas.

Specific details regarding the above and other possible management options will be outlined and included in the special rule for the experimental population. The special rule, as proposed, will then be published in the Federal Register for public comment. In addition, applicable National Environmental Policy Act documents will also be prepared to further evaluate any proposed reintroduction along with the various management strategies.

333-4. Develop a detailed reestablishment plan that considers a variety of translocation techniques and prepare the appropriate National Environmental Policy Act documents, allowing for public involvement. A detailed plan and appropriate National Environmental Policy Act document(s) should be developed outlining the various technicalities of conducting a transplant or reintroduction program. This plan should contain specifics on, and agency responsibilities and timeframes for, obtaining wolves for release, release techniques, release site selection, and monitoring of transplanted wolves. The process of plan and National Environmental Policy Act document development will provide opportunity for agency and public input and outline specific steps to inform the public, etc., about wolf recovery efforts.

333-41. Identify a reliable source of wolves for transplant on a sustained basis. Whatever transplant techniques are implemented, a reliable source of wolves will be needed to sustain such a program. Proper coordination and authorizations must also be initiated. Interagency and international coordination will be essential to ensure that viable wolf populations are maintained to serve as a source.

333-42. Evaluate and select appropriate transplant methods. Existing literature on past transplant efforts involving wolves (in Minnesota or other areas) should be reviewed in order to determine the best techniques. Various methods to be considered include hand-rearing pups at selected sites, holding wolves on site until acclimated, and saturation transplants, as well as using artificial scent marking to contain transplanted animals. Initially, various methods may be used to determine which is most successful.

333-43. Evaluate and apply other methods as they become available. Research regarding techniques to improve the success of transplant efforts should continue. This would include manipulating the timing of release (seasonally) as well as the sex, age, and number of wolves released, or quick versus slow release.

333-44. Evaluate and select optimum transplant site(s). To assure optimum success, sites with those characteristics determined essential through study and management of existing wolf populations will be used as transplant sites.

Basic criteria have been developed for selection of transplant sites obtained under Task 31. However, these criteria should be refined as more information becomes available. Transplant sites should be selected based on these criteria as well as on the security of the site and the possibility of human-related disturbance. Once selected, sites should be prioritized based on how well they meet the established criteria as well as alternate land uses/management on or surrounding the area, proposed or potential impacts, and adjacent land ownership/management.

333-45. Outline responsible agencies and timetables for transplanting and monitoring of released wolves. The reestablishment plan should identify responsible agencies and timetables for all tasks involved in the transplant effort. All reintroduced wolves will be monitored in order to gain knowledge of their habits and to ensure that they remain in the recovery area.

333-5. Monitor health of and immunize wolves captured for translocation. Wolves, especially juveniles, are susceptible to canine parvovirus and distemper. Because survival of reintroduced wolves is critical to successful recovery, only healthy, immunized wolves should be used.

333-6. Translocate wolves to Yellowstone National Park. Once a reliable source of wolves has been identified and appropriate actions outlined in the management plan have been implemented, the process of reintroducing wolves should be initiated. Identification of relocation sites, coordination with involved agencies and the public, and finalization of release and monitoring procedures should be completed. After being tagged, tattooed, and radio-collared, each wolf should be given a thorough physical examination. Physicals should include examination for external parasites, obvious wounds, broken teeth, etc. Blood samples should be taken for basic blood chemistry and detection of viral, bacterial, and parasitic canine pathogens. Fecal samples should be retained for identification of viral and parasitic pathogens. Supportive fluids, antibiotics, and vaccines should be administered as necessary. Wolves prepared for reintroduction should be released via the techniques developed under Tasks 333-42 and 333-43.

333-7. Monitor reestablishment efforts and effects. Reintroduced wolves should be monitored continually during and after release. Released wolves should be tagged and fitted with radio collars. Aerial as well as ground tracking will then be used to determine movements, habitat use, and prey utilization. Radio-collars will facilitate prevention of depredations until pups born to the collared animals leave the pack. Recent development of a radio-triggered anesthetic-dart collar (Mech et al. 1984) may provide researchers/managers with the control needed to deal with problem wolves.

The capture collar, which contains immobilizing darts that can be activated by a radio signal, enables researchers to recapture reintroduced animals at will, thus expediting/enhancing the ability to respond to depredation problems. However, the immobilizing collars have only been tested for periods up to a month. Development and testing is continuing, and they are expected to be dependable for longer periods of time. Monitoring of prey species and other carnivores should also be conducted in order to determine the effect of introduced wolves on prey species and their interactions with other predators.

34. Establish management zones to provide for wolf recovery and minimize wolf-human conflicts. This plan segment outlines a management strategy for recovery of wolf populations. Basic to this segment are the protection of wolves and their habitat along with minimization of wolf-human conflicts. Every attempt should be made to eliminate situations/practices in wolf habitat that may encourage depredations and/or create problem wolves. Recognizing the problems and gaining the support of the livestock industry is extremely important to wolf recovery. To gain that support, responsible State and Federal agencies should seek additional funding for monitoring and control measures to adequately protect livestock, while still allowing for wolf recovery. Management zones should be established based on the following criteria.

Management Zone I: This zone should contain key habitat components in sufficient abundance and distribution on an annual basis to sustain 10 breeding pairs of wolves. It should generally be an area greater than 3,000 contiguous square miles with less than 10 percent private land (excepting railroad grant lands) and less than 20 percent subject to livestock grazing.

Management Zone II: This zone should be established as a buffer zone between Zone I and Zone III. It should contain some key habitat components but probably not in sufficient abundance and distribution on an annual basis to sustain a viable wolf population. Zone II boundaries may be changed according to demonstrated wolf population and habitat needs, provided the change does not bring wolves into conflict with existing livestock areas/allotments.

Management Zone III: This zone contains established human activities such as domestic livestock use or other human activities or developments in sufficient degree to render wolf presence undesirable.

Dispersal Corridors: Due to topographical features, these areas are the logical routes wolves may use in moving from Canada into Idaho or Montana, or in between recovery areas. Such corridors may or may not be currently occupied by transient or resident wolves. Wolf management in these areas would not be geared toward establishing minimum viable population levels because of the potential for conflicts with other land uses. These areas are particularly important in association with recovery areas where natural recruitment is relied upon to meet recovery objectives. Corridors may also be important in maintaining gene flow between populations in the future. Monitoring of the recovery program may over time indicate a need for analyzing the costs/impacts of maintaining the integrity of dispersal corridors versus reintroducing wolves into a recovery area and periodically augmenting the population to promote gene exchange. Identification of dispersal corridors in Zone III is not expected or intended to curtail multiple-use management.

Management emphasis will be directed at preventing human-caused mortality and adhering to existing big game management guidelines.

35. Delineate wolf management zones in each of the three recovery areas. Delineation of such zones can be accomplished by committees/working groups composed of Fish and Wildlife Service and other agency personnel, recovery team members, or technical experts on the species, local land managers, and resource users. These groups would point out potential conflicts and make recommendations regarding management zones and dispersal corridors, as necessary, in each wolf recovery area to the concerned land management agencies. The process of delineating management zones would include opportunity for public involvement/input and may involve review under the National Environmental Policy Act as well.

36. Develop management guidelines for wolf management zones and dispersal corridors. Management guidelines developed in this section should be applied to Federal lands to make multiple-use activities compatible with wolf management objectives. On private lands, agencies and field personnel of agencies involved in wolf management should communicate the intent of the "Guidelines" as a cooperative extension effort.

The following criteria for developing management guidelines are suggested for public lands. The definition of "controlled" as it is used in the following paragraphs includes capture and relocation into the wild or captivity, or lethal control.

Zone I: Wolf population stabilization, wolf habitat maintenance and improvement, and wolf-livestock conflict minimization will be primary management objectives. Management decisions will favor the needs of the wolf when wolves or wolf habitat needs and other land-use values compete. Management practices and land uses should be planned and managed to enhance recovery of the wolf (see Tasks 431, 432, 433, and 434). Wolves determined to be a problem under criteria for Zone I outlined in the wolf control plan may be controlled, but only as a last resort and as directed by the Regional Director, Fish and Wildlife Service, Region 6.

Zone II: The wolf is still an important but not the primary use on the area. Management will be provided to at least maintain the habitat conditions that resulted in the area being classified as Zone II. When wolf populations and/or wolf habitat use and other high-priority land uses are mutually exclusive, the other land uses may prevail in management considerations. If wolf population and/or habitat use represents needs that are so great (necessary to the normal needs or survival of the species or a segment of its population) that they should prevail in management considerations, then the area should be reclassified

under Management Zone I. Reclassification to Management Zone I should not occur, however, if the change in status can be expected to result in wolf-livestock conflicts in existing livestock areas/allotments. Wolves determined to be a problem under criteria for Zone II in the Wolf Control Plan may be controlled as directed by the Regional Director, Fish and Wildlife Service, Region 6.

Zone III: Maintenance and improvement of habitat solely for wolves and coordination of multiple use activities with wolf management are not management considerations. Minimization of wolf-livestock-human conflicts is a high priority. Any wolf involved in a livestock depredation would be controlled. Any wolf frequenting a livestock area and representing a threat to livestock as determined by qualified State wildlife agency or Fish and Wildlife Service personnel may be controlled.

37. Develop and implement a wolf control/contingency plan for dealing with wolf depredation problems. This plan is to fully recognize the interests of the public and the western livestock industry. The goal of the control program is to reduce and prevent livestock losses to wolves while removing the minimum number of wolves necessary to resolve the conflict while still progressing toward recovery. If predation on big game herds is determined to be in significant conflict with management objectives of a State wildlife agency, wolf control that would not jeopardize wolf recovery would be considered. Wolves in all zones would be controlled if they present a hazard to public health and safety (because of disease, etc). See definition of control under Task 36. The following criteria are suggested.

Zone I: Application of guidelines and objectives for Management Zone I is requisite before problem criteria and subsequent control can be applied to offending wolves. For example, wolves preying on livestock that were beyond allotment boundaries or where livestock carcass disposal had not followed prescribed procedures would not be classified as problem wolves and would not be controlled. Management decisions in Zone I would favor the wolf, and removal or resolution of the attractant or problem would be the first course of action. A wolf may be determined to be a problem if depredations on lawfully present domestic livestock occur in areas/habitat components that are not critically important to wolves in time or space and if all other options for resolving the conflict have been exhausted. "Depredation" is defined as the killing or maiming of a domestic animal by wolves accompanied by the threat of additional domestic animals being killed or maimed by wolves. "Area/habitat components of critical importance" include, for example, ungulate calving/fawning areas from May 1 to July 1 and ungulate winter ranges from December 1 to April 15.

Zone II: A wolf will be determined to be a problem if depredations occur on lawfully present domestic livestock. Application of guidelines and objectives for Management Zone II is requisite before problem criteria and subsequent control can be applied to offending wolves.

Zone III: Any wolf that preys on livestock will be controlled. Any wolf frequenting a livestock area and representing a threat to livestock as determined by authorized State or Federal personnel may be controlled.

371. Develop criteria for determining problem wolves. Before a problem is considered to exist in wolf-livestock relationships in Management Zones I and II, wounded livestock or some remains of a livestock carcass must be present with clear evidence (Roy and Dorrance 1976) that wolves were responsible for the damage. Also, there must be reason to believe that additional livestock losses would occur if the wolves were not controlled. Criteria should be developed with the State wildlife agencies for determining when wolf predation may constitute a problem with ungulate populations/ management objectives. Before a problem is considered to exist in wolf-ungulate relationships, the ungulate population must be declining and evidence must be provided indicating wolves are primarily responsible for the decline.

372. Develop criteria for disposition of problem wolves. Usually, only a few individual wolves are actually involved in verified depredations and many wolves may live near livestock without causing depredations (if wild prey is available). Thus, control actions should be directed towards the capture of specific offending wolves rather than local populations. Investigation of complaints should occur immediately, but no later than 2-3 days after a reported incident. Control, if necessary, by trained and qualified Animal Damage Control personnel should be limited in area and duration and should be selective. Control efforts should be limited to within 1 mile of the depredation site, unless the offending animal can be identified, and to a 10-day period. If depredations recur in that area within 3 months in Management Zone II, control efforts may be conducted for up to a 21-day period.

Every attempt will be made to relocate problem wolves from any zone to a predetermined area in Zone I approved by the involved State and Federal wildlife and land management agencies. Such wolves should be tattooed, ear-tagged, radio-collared, and relocated as soon as possible after capture. The radio-triggered anesthetic dart collar would also prove useful in this situation, as it would allow management personnel to capture at will any translocated wolf returning to the site of original depredation or near livestock areas before additional depredations occur. If initial efforts to trap a problem wolf

are unsuccessful and depredations involving problem wolves continue or if transplanted wolves continue to return to the original site and no other facilities are willing to accept such wolves, lethal control using approved methods may be used. Any wolf determined to be a problem a second time will be removed from the wild and placed in captivity or lethally controlled. If wolf populations increase beyond the capacity of available habitat and prey, consideration will be given to reclassifying the populations or otherwise liberalizing these measures based on experience. Such a proposal would be covered under an amendment to this document and undergo the appropriate review (See Task 44).

373. Develop techniques and expertise in conducting wolf control. In advance of potential conflicts, clear-cut policy procedures should be established under the authority of the Regional Director, Fish and Wildlife Service, that allow authorized Federal and State personnel to live-capture and relocate, remove, or lethally control problem animals. Necessary tags, radio collars, traps, nets, cages, and immobilizing equipment needed for such actions should be stockpiled for immediate use. Key personnel should be trained in use of equipment and wolf capture techniques. It should also be noted that while trapping efforts in Minnesota and other areas indicate little incidence of serious injury to captured animals, all trapping activities will be consistent with recovery objectives and will be conducted in such a way as to minimize the risk of injury or mortality.

374. Identify and prioritize potential release sites and obtain advance authority from involved land management agencies to release wolves captured in control actions. Arrangements/ agreements should be made with the appropriate State or Federal land management agencies to establish release sites for wolves involved in control actions. Sites should be designated well in advance and all arrangements made before any wolf problems arise so that such problems can be handled immediately before any further negative impacts result.

375. Control wolves determined to be a problem by live-capturing and relocating or by lethal methods. Every attempt will be made to relocate problem wolves or to place in captivity those animals which must be removed from the area. Before control actions are initiated, problem status must be determined by the criteria listed in the control plan. Criteria for determining the method of disposition of problem wolves will also be outlined in the control plan developed under Task 37. This course of action is essential for acceptance of the recovery program and survival of the wolf in the Northern Rockies.

376. Designate a Task Force for identifying and evaluating different alternatives for a compensation program and determining their feasibility. Reparations may be less expensive than relocation efforts and may be intermittent. Such a program could be funded by Federal-State agencies or private organizations. One possible scenario would be implementation of such a program in association with establishment of an experimental wolf population exclusively. It must also be recognized that a compensation program cannot be viewed as the sole solution to depredation problems. It represents only one part of the necessary control program.

38. Coordinate multiple-use activities with wolf biological requirements. Every effort should be made to coordinate multiple-use activities (that may limit wolf populations through direct or indirect mortality, direct or indirect adverse habitat modifications, and/or reductions of prey species) with wolf habitat and biological requirements either through coordination between involved individuals/agencies or in consultation with Fish and Wildlife Service under Section 7 of the Act. Section 7 of the Act requires all Federal agencies to ensure that any actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of their critical habitat.

381. Promote wolf recovery objectives in the land-use planning process. Encourage appropriate land management agencies to incorporate objectives set in this recovery plan for the NRMW into their land-use planning systems.

381-1. Inform land managers of existing or potential wolf range. Keep land management agencies and personnel informed of occupied and potential habitat and the habitat needs for the Northern Rocky Mountain wolf for consideration in their long-range and short-term planning efforts.

381-2. Eliminate or minimize conflicts between the Northern Rocky Mountain wolf and other land uses in land management plans. Provide the necessary management guidelines (Task 36), or, where applicable, coordinate requirements (Task 38) to enhance or maintain habitat for the Northern Rocky Mountain wolf with regard to other uses and activities prescribed in various land management plans.

382. Apply guidelines developed in Task 36 to wolf management zones developed under Task 35.

382-1. Coordinate/integrate wolf management objectives with State big game management objectives. Wolf management

must, out of necessity, be closely coordinated with State big game management objectives. Monitoring of ungulate and wolf populations and the effects of wolf predation on such prey populations will be essential. Baseline information on prey population dynamics, etc. must also be available (See Task 433.). Using this knowledge, a predictive model can be developed to estimate the effects of wolf predation on specific prey populations under different management scenarios (wolf and prey population levels).

382-11. Manage wildlife/prey habitat. Assure that habitat for big game and secondary prey species, including riparian areas, are managed to sustain (1) an adequate prey base for a recovered wolf population based on information obtained under Tasks 431, 432, 433, and 434.; and (2) accommodate State ungulate management objectives.

382-12. Monitor wildlife harvests and ungulate population demographics. Assure that big game and secondary prey populations are maintained at population levels adequate to maintain 10 breeding pairs of wolves in each recovery area. This goal must also be integrated with State management goals for ungulate management/hunter harvest rates. These uses/demands should not be viewed as mutually exclusive. However, successful integration will require a coordinated program between Federal and State wildlife and land managers.

382-2. Monitor animal damage control programs. Assure that Animal Damage Control (now under the Department of Agriculture) activities are compatible with wolf management objectives. Generally in Zone I, traps for coyote control should be No. 2 (No. 3N with offset jaws in Zone II) and should be checked once every 24 hours. Aerial shooting should be limited to October through May and snares should not be used. Use of toxicants should be limited to those that avoid killing wolves either because of the selectivity of the delivery system or the toxicant.

382-3. Monitor range management. Coordination and monitoring are essential to assure that livestock operations and wolf management are compatible. If unauthorized grazing or other illegal actions by permittees place wolves in jeopardy, every effort should be made to remedy the situation including cancelling grazing permits or filing charges in Court.

382-4. Monitor timber harvesting and fire management. Make logging and fire management compatible with wolf spatial and habitat requirements.

382-5. Monitor recreation including recreational/commercial trapping. Coordinate recreational activities with wolf spatial and habitat requirements. Recreational/ commercial trapping of predators (primarily coyotes and bobcats) in compliance with State regulations should not conflict with wolf recovery. In order to minimize the potential for injury or wolf mortality, it is recommended that traps no larger than No. 2 be used in designated wolf recovery areas. It is also recommended that traps be checked once every 24 hours and that snares not be used. While the chances of a trapper accidentally capturing a wolf are relatively low due to the recommendations listed above, there is still a possibility that a wolf may be trapped accidentally. In such cases, the Fish and Wildlife Service and local Animal Damage Control personnel should be notified immediately, and every attempt made to release the subject animal, unharmed, as soon as possible. If prior notification of government personnel cannot be made in a timely fashion, a trapper may release the subject wolf unharmed. However, the release will be reported to appropriate personnel as soon as possible, thereafter. A list of Service and Animal Damage Control personnel is included in Appendix 6.

382-6. Monitor minerals, energy exploration/development. Make mining and energy operations compatible with wolf spatial and habitat requirements.

382-7. Monitor special use activities. Assure that activities requiring special use permits are made compatible with wolf spatial and habitat requirements.

382-8. Assess cumulative effects. Coordinate, in time and space, multiple-use activities to avoid adverse cumulative impacts.

383. Identify private lands that may be necessary for the survival and recovery of the wolf and secure management authority through development of Memorandums of Agreement, conservation easements, or cooperative agreements or through purchase, exchange, or lease. Areas such as key ungulate winter ranges that may be threatened by subdivision and development should be considered as high priority for such actions. Condemnation of private lands would do little to stimulate support for wolf recovery and would not be considered as a method for achieving management authority over essential habitat.

39. Provide concerted law enforcement effort. Prosecute those persons that carry out illegal actions.

4. Monitor gray wolf populations, habitat, and prey. Monitoring of wolf populations, habitat, and prey species is critical if we are to adequately manage and recover the wolf.

41. Monitor population recovery.

411. Use a report monitoring system to determine presence of wolves, particularly in areas that may be or become newly occupied. Sightings should be solicited from the public as well as from biologists/outdoorsmen working in the area.

412. Conduct wolf surveys in areas of consistent wolf reports to verify the presence of wolves and their relative abundance. Surveys should be conducted in areas where wolf sightings have occurred consistently or where wolf presence is highly suspected.

412-1. Encourage reporting of wolf observations by the public. Maintain contacts with local residents and enlist their aid in reporting observations of wolves and wolf sign.

412-2. Conduct winter surveys during breeding season to determine presence and distribution of wolves. Winter surveys should be conducted to detect evidence of pairs, packs, estrus females, and mating or pairing activity.

412-3. Conduct summer surveys. Summer surveys should be conducted in areas of suspected mating activity. Howling surveys and presence of tracks will help to verify breeding success.

413. Monitor known wolf populations. A substantial research effort involving radio tracking will be required to estimate population sizes and trends.

413-1. Determine size of home range for packs, pairs, and lone/individual wolves.

413-2. Estimate numbers of packs, pairs, and individual wolves in each area.

413-3. Estimate pup/adult ratios.

413-4. Estimate numbers of litters and litter sizes.

413-5. Determine population trends over time.

42. Periodically review wolf management zones and revise as necessary. Stratification of the various zones in each of the three recovery areas should be periodically reviewed to determine if adjustments are required to meet wolf recovery objectives and to avoid wolf-livestock conflicts.

43. Obtain knowledge concerning wolf populations, their use of prey, habitat requirements, health status, and interactions with and effects on other carnivores. Studies in the core of each recovery area are essential because performance there will determine what happens in outlying areas. These data will be needed for proper management. Long-term studies are essential, as relatively little is known concerning wolves in the Rocky Mountains.

    431. Obtain information on areas occupied by wolves. Knowledge concerning territory sizes, seasonal patterns of use, and relationships to prey ranges and areas of human use is important, particularly in a minimally populated wolf range. Ecological studies utilizing radio-tagged wolves are needed.

        431-1. Determine locations of dens and other critical areas.

        431-2. Determine relationships of territories to each other.

        431-3. Determine relationships of territories to the seasonal ranges of prey species.

        431-4. Determine characteristics of areas used by wolves.

        431-5. Determine relationships of known wolf-use areas to types of human activity taking place in or near those areas.

        431-6. Determine effects of wolves on other carnivores.

        431-7. Determine effects of other carnivores on wolves.

        431-8. Estimate wolf carrying capacity in each area.

    432. Examine wolf ecology and prey information from other areas and determine suitability for use in the Northern Rocky Mountains. A knowledge of population parameters of prey species in areas where wolf predation is significant will be helpful in developing guidelines for prey management in selected recovery sites.

        432-1. Conduct a literature search and maintain a literature and information file of all related material.

        432-2. Exchange information and data with biologists involved in wolf and prey management and research.

433. Obtain knowledge of natural prey requirements of wolves and effects on prey species. Little is known about the prey requirements of wolves in the northern Rocky Mountains. Although some information can be predicted from other studies, none are comparable in terms of prey availability.

433-1. Determine prey requirements, prey composition, rate of predation, seasonal variation in predation and predatory behavior. Monitoring of wolves can be conducted through radio tracking, aerial surveys, etc., to determine prey requirements as well as composition and seasonal variation in predation.

433-2. Determine effects of wolves on prey, structure of prey population(s), and structure of kill. Monitoring and survey efforts should be conducted to determine the effects of wolves on prey species. Such information is essential to implementing sound management practices to maintain wolves.

434. Assemble a knowledge of environmental requirements of prey species. Information on environmental requirements of prey and potential prey is available and will not need to be researched further. An accumulation of these data, however, will have to be made on an area-by-area basis.

434-1. Determine carrying capacity.

434-2. Determine seasonal ranges.

434-3. Determine population trends.

434-4. Determine need for habitat improvements.

435. Obtain information about the health status, diseases, and causes of mortality in wolves. A health monitoring program should be coordinated with live-capture and radio-telemetry activities. Document diseases, parasites, and causes of mortality by complete post-mortem examinations of all carcasses. Coordinate carcass collection and analysis with the National Wildlife Health Center and appropriate Fish and Wildlife Service Law Enforcement Office.

44. Develop special regulations for threatened populations. Once the wolf is downlisted, special regulations should be promulgated to allow "take" of problem wolves in populations that are reclassified as threatened.

45. Develop State regulations for delisted populations. State regulations should be developed and implemented to govern the regulated hunting/trapping of delisted wolves. Upon delisting, if the wolf has not already been classified as a game animal or furbearer (or protected species), the State wildlife agencies should

do so. State biologists should develop draft regulations for seasons, limits, and methods of take and submit these regulations to the appropriate State conservation commission(s) for approval. Regulations should be implemented and enforced and monitoring of numbers of permits issued, animals taken, locations of take, etc., initiated. Adjustments should be made, as necessary, in the State regulations for "taking."

5. Develop and initiate information and education programs. Success of recovery efforts hinge, to a large degree, on the support and acceptance of the plan's objectives by the public. A strong information and education effort is necessary if public support is to be obtained. Not all segments of the public will support the concept of wolf recovery. Opposition can be reduced, however, by pointing out the plan's objectives which are aimed at coordinating wolf management and recovery with other multiple use interests (livestock industry, timber industry, etc.).

   51. Demonstrate to the public that the wolf is part of the natural history of the northern Rocky Mountains and is endangered. An information program is essential to inform the public and involved agencies on the realities of wolf ecology and recovery. The task of funding, developing, and disseminating newsletters, films, news releases, etc., may be coordinated through the Fish and Wildlife Service Public Affairs Office, State Conservation Offices, or private conservation groups.

      511. Produce and distribute movies, TV programs, slide series, and popular literature. Such programs and materials, stressing the realities of wolf ecology and management, should be produced and distributed to all interested and affected publics, agencies, etc.

      512. Provide factual information to interested groups and organizations regarding wolf ecology and management.

      513. Publish technical data available on wolf ecology, current status, and history.

   52. Educate the public and other agencies concerning the ACT and State laws. Few people are truly aware of Act (16 U.S.C. 1531 et seq.) and its provisions. Efforts should be made to educate other agencies and the public regarding the protection supplied by the Act and their responsibilities under it.

      521. Publicize the legal protection provided listed species under the ACT and penalties involved for killing an endangered wolf. The public must be made aware of the legal protection afforded wolves in and adjacent to the former range of C. l. irremotus and that killing an endangered wolf can involve a fine of $20,000 and 1 year in prison plus loss of equipment, leases, licenses, or permits for use of public land.

Only a small segment of the public is aware of the endangered status of the Northern Rocky Mountain wolf or the consequences of killing one. A concerted effort must be made to inform the public that wolves are fully protected by Federal law. Protection afforded wolves under the Act is extensive. Prohibitions against possession, transportation, taking, sale, or receipt of wolves or parts thereof are further outlined in the Code of Federal Regulations (50 CFR 17.21).

522. Identify States or other political subdivisions where wolves are in nonprotected categories. Work with States where wolves are classified as predators or other nonprotected categories, and notify appropriate officials concerning the ACT and its legal implications.

523. Encourage States to enact wolf management measures. Full cooperation by the States is essential to success of recovery efforts. As such, States must assume an active role in wolf management and recovery efforts. Section 6 monies may provide one source of funding for such State programs. States should be encouraged to pursue this and other funding alternatives to accomplish wolf related programs.

53. Inform the public of recovery efforts and progress. Public support for the wolf recovery program is critical. Every effort should be made to assure that the public is kept up to date on ongoing recovery actions and provided with the facts on the wolf and proposed activities.

54. Reassure and work with the livestock industry, sportsmen, trappers, and other affected publics to integrate their interests and concerns with wolf recovery objectives in a positive manner. Effecting a viable wolf recovery program also depends on the cooperation of and coordination with local ranchers, sportsmen, trappers, as well as the livestock industry. Land and wildlife managers must keep all affected publics informed of their responsibilities under the ACT and how wolf management can be integrated with other land users. The public should be informed that wolves are not a physical threat to humans and that resource extraction activities can occur in recovery areas. Existing grizzly bear and big game management guidelines currently being followed by Federal and State agencies indicate that few if any additional restrictions will be needed to promote wolf recovery. The possibility of hunting or trapping wolves after down-listing/delisting, even if on a limited basis, should be recognized and stressed.

55. Encourage States to enact laws discouraging private individuals or organizations, etc., from holding (in captivity) and releasing tame wolves or wolf-dog crosses into the wild. Tame wolves or wolf-dog crosses, if they are released or if they escape, are more likely to come into conflict with people, their pets, and livestock than wild genetically pure wolves. As such, they are a threat and hindrance to

a valid, officially sanctioned wolf recovery program. Release of these animals should be strictly prohibited. States should enact laws requiring anyone that is holding tame wolves or wolf-dog crosses to have them tattooed and kept in an enclosure that would preclude accidental escape. Owners of such animals should be held responsible for any pets or livestock killed or maimed by them and a large fine should be imposed on anyone releasing a wolf or wolf-dog cross into the wild. Animals released in nonrecovery areas and/or of unknown genetic stock will be deleterious to the recovery effort.

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PART III

IMPLEMENTATION SCHEDULE

Definition of Priorities

Priority 1 - All actions that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future.

Priority 2 - All actions that must be taken to prevent a significant decline in the species population/habitat quality, or some other significant negative impact short of extinction.

Priority 3 - All other actions necessary to provide for full recovery of the species.

Abbreviations Used in Implementation Schedule

Abbreviation	Agency
ADC	USDA, Animal Damage Control
BIA	U.S. Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
CRU	Fish and Wildlife Service, Cooperative Research Unit
FS	U.S. Forest Service
FWS	U.S. Fish and Wildlife Service
IDFG	Idaho Department of Fish and Game
LE	Fish and Wildlife Service, Law Enforcement
MFW&P	Montana Department of Fish, Wildlife and Parks
NPS	U.S. National Park Service
PAO	Fish and Wildlife Service, Public Affairs Office
SE	Fish and Wildlife Service, Endangered Species Office
WG&F	Wyoming Game and Fish Department

Definition of Task Duration

Ongoing — Task which is now being implemented.

Continuous — Task or action which will be required over very long or undetermined period of time.

Costs

Costs outlined in this implementation schedule are estimated annual costs for implementing each task in general. They are not meant to represent cost to a specific agency or program.

GENERAL CATEGORIES FOR IMPLEMENTATION SCHEDULES

Information Gathering - I or R (research)

1. Population status
2. Habitat status
3. Habitat requirements
4. Management techniques
5. Taxonomic studies
6. Demographic studies
7. Propagation
8. Migration
9. Predation
10. Competition
11. Disease
12. Environmental contaminant
13. Reintroduction
14. Other information

Management - M

1. Propagation
2. Reintroduction
3. Habitat maintenance and manipulation
4. Predator and competitor control
5. Depredation control
6. Disease control
7. Other management

Acquisition - A

1. Lease
2. Easement
3. Management agreement
4. Exchange
5. Withdrawal
6. Fee title
7. Other

Other - O

1. Information and education
2. Law enforcement
3. Regulations
4. Administration

WOLF RECOVERY PLAN IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY FWS REGION	RESPONSIBLE AGENCY FWS PROGRAM	RESPONSIBLE AGENCY OTHER	ESTIMATED COSTS (K=$1,000) YEAR FOLLOWING PLAN APPROVAL 1st	2nd	3rd	Comments
(1)	(2)	(3)	(4)	(5)	(6)	(6a)	(7)	(8)			(9)
I1	Determine present status and distribution using standard reporting forms	1 (All Tasks)	2	ongoing	1 & 6	SE	IDFG, MFW&P, WG&F, BIA BLM, FS NPS	6K	5K	5K	Standard forms being used. Centralized data storage and retrieval system established.
04	Evaluate and verify population goals. Down-list and delist when objectives are verified and met	2 21 22 23	3	ongoing	1 & 6	SE		--	--	--	Administrative costs
04	Establish cooperative program with British Columbia and Alberta to promote wolf immigration to United States	331-1 332-1	1	1 year	1 & 6	SE*	IDFG, MFW&P	4K	--	--	
I1, R1	Monitor status of dispersing Canadian wolves	331-3 332-3	1	continuous	1 & 6	SE	IDFG, MTW&P	24K	24K	24K	
M2	Secure and promote establishment of colonizing wolves	331-3 332-4	1	continuous	1 & 6	SE	BIA, BLM, FS, NPS	—	--	--	No cost assignment--Costs included as part of Tasks 35, 36, and 38
01	Promote public understanding and acceptance of reestablishment	333-1	1	continuous	1 & 6	SE*	NPS*, FS IDFG, MFW&P, WG&F, BLM, FS	40K	20K	20K	Wolves and Humans Exhibit displayed in Yellowstone NP and Boise, 1985.
03	Designate wolves to be translocated to Yellowstone area as an experimental population, and promulgate special regulations	333-2 333-3	2	2 years	6	SE		--	--	--	Administrative costs

WOLF RECOVERY PLAN IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY FWS REGION	RESPONSIBLE AGENCY FWS PROGRAM	RESPONSIBLE AGENCY OTHER	ESTIMATED COSTS (K=$1,000) YEAR FOLLOWING PLAN APPROVAL 1st	2nd	3rd	Comments
(1)	(2)	(3)	(4)	(5)	(6)	(6a)	(7)	(8)			(9)
M1	Develop reestablishment plan and NEPA documents	333-4 (All Tasks)	2	2 years	6	SE*	NPS*, IDFG, MFW&P, WG&F	30K	--	--	
I11, M6	Monitor health and immunize wolves used for translocation	333-5	2	2 years	6	SE*, CRU*	NPS*, IDFG, MFW&P WG&F	--	--	--	Costs included in 333-6
M2	Translocate wolves to Yellowstone	333-6	2	2 years	6	SE*, CRU*	NPS*, IDFG, MFW&P, WG&F	--	--	125K	
I13, R13	Monitor reestablishment efforts and effects	333-7	2	continuous	6	SE, CRU	NPS, IDFG, MFW&P, WG&F	--	--	75K	
M7	Delineate wolf management zones in the three recovery areas (to be completed before reintroductions are made)	35	1	1 year	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	--	--	--	Administrative costs Completed on Flathead National Forest
M3-5	Develop guidelines for wolf management zones and dispersal corridors	36	1	2 years	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	--	--	--	Administrative costs Completed on Flathead National Forest
O4	Develop wolf control plan	37 371 372	1	1 year	1 & 6	SE*	ADC	--	--	--	Administrative costs
R14	Develop technique and expertise in wolf control	373	2	continuous	1 & 6	SE*	ADC* IDFG, MFW&P, WG&F	5K	3K	3K	Training session held Feburary 1986

WOLF RECOVERY PLAN IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY			ESTIMATED COSTS (K=$1,000) YEAR FOLLOWING PLAN APPROVAL			Comments
					FWS		OTHER	1st	2nd	3rd	
					REGION	PROGRAM					
(1)	(2)	(3)	(4)	(5)	(6)	(6a)	(7)	(8)			(9)
I13	Identify release sites and obtain advance authority to release wolves	374	2	continuous	1 & 6	SE*	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS ADC,	--	--	--	Administrative costs
M5	Control problem wolves	375	1	continuous	1 & 6	SE*	ADC*, IDFG, MFW&P, WG&F	10K	10K	10K	
I4	Identify and evaluate alternatives for a compensation program	376	2	1 year	1 & 6	SE	NPS, FS IDFG, MFW&P, WG&F, Conserv. Groups	--	--	--	Administrative costs
M3	Promote wolf recovery objectives in land use planning	381	2	continuous	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	--	--	--	Administrative costs
M7	Apply management guidelines to coordinate multiple use activities	382 (All Tasks)	2	continuous	1 & 6	SE	FS, NPS, MFW&P, WG&F, IDGF, ADC, BIA, BLM,	--	--	--	Administrative costs
A1-7	Secure habitat through development of Memorandums of Agreement, conservation easements, cooperative agreements or purchase, exchange, lease.	383	3	continuous	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, FS, BLM, NPS	--	--	--	Costs Undetermined

WOLF RECOVERY PLAN IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY FWS REGION	RESPONSIBLE AGENCY FWS PROGRAM	RESPONSIBLE AGENCY OTHER	ESTIMATED COSTS (K=$1,000) YEAR FOLLOWING PLAN APPROVAL 1st	2nd	3rd	Comments
(1)	(2)	(3)	(4)	(5)	(6)	(6a)	(7)		(8)		(9)
02	Provide law enforcement	39	2	continuous	1 & 6	LE* SE	FS, NPS, IDFG, WG&F MFW&P,	25K	25K	25K	
I1, R1	Monitor population recovery	411 412	2	continuous	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	25K	25K	25K	
R1	Monitor known populations	413 (All Tasks)	1	5 years	1 & 6	SE	IDFG, MFW&P, WG&F BIA, BLM, FS, NPS	40K	40K	40K	Ongoing on NW Montana population
M7	Review management zones and revise as necessary	42	2	continuous	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	--	--	--	Administrative costs
I1-14 R1-14	Study wolf populations, use of prey, habitat requirements, health status and effects on other carnivores	431, (All Tasks)	1	5 years	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	40K	40K	40K	Ongoing on NW Montana population
I2	Compare with knowledge from other areas	432-1 432-2	3	continuous	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	5K	5K	5K	
I5 R5	Study prey requirements and effect on prey	433-1, 433-2	2	5 years	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	15K	15K	15K	

WOLF RECOVERY PLAN IMPLEMENTATION SCHEDULE

GENERAL CATEGORY	PLAN TASK	TASK #	PRIORITY #	TASK DURATION	RESPONSIBLE AGENCY			ESTIMATED COSTS (K=$1,000) YEAR FOLLOWING PLAN APPROVAL			Comments
					FWS		OTHER				
					REGION	PROGRAM		1st	2nd	3rd	
(1)	(2)	(3)	(4)	(5)	(6)	(6a)	(7)	(8)			(9)
I2 R2	Study requirements of prey species	434 (All Tasks)	2	5 years	1 & 6	SE	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	10K	10K	10K	
I11	Study health status, disease, and cause of mortality	435	2	continuous	1 & 6	SE*, CRU*	NPS, IDFG, MFW&P, WG&F	--	--	--	Costs included in 333-7 and 432
03	Develop special regulations for threatened populations or those listed under similarity of appearance	44	2	1 year	1 & 6	SE		--	--	--	Administrative costs
03	Develop State regulations for delisted wolves	45	3	1 year			IDFG, MFW&P, WG&F	--	--	--	Administrative costs
01	Develop and present information and education programs	5 (All Tasks)	1	continuous	1 & 6	SE*, PAO*	IDFG, MFW&P, WG&F, BIA, BLM, FS, NPS	60K	40K	30K	Wolves and Humans Exhibit displayed in Yellowstone National Park and Boise, 1985. Slidetape program being prepared.

* Denotes lead agency

APPENDICES

APPENDIX 1

GLOSSARY - NORTHERN ROCKY MOUNTAIN WOLF RECOVERY PLAN

Carrion: Dead or decaying flesh.

Carrying capacity: The number of animals that can be supported by the biomass available in a given area (i.e., browse for deer, prey for wolves, etc.).

Confirmed wolf report: A wolf report accompanied by objective, scientifically analyzed evidence, such as a skull, verifying that the animal is a wolf.

Contiguous: Adjoining each other--as the lower 48 states.

Control: Any attempt to regulate wolf numbers, distribution, or predation. May involve lethal or nonlethal methods.

Decimate: To nearly eliminate; to reduce to very low numbers.

Delist: Removal of the wolf from the Federal threatened/endangered species list.

Depredation: Killing or maiming of domestic livestock by wolves accompanied by the threat that additional livestock will be killed or maimed.

Down-list: (refer to reclassify)

Ecosystem: Refers to a system or community of interacting, living organisms in a particular area and the nonliving factors that affect these organisms such as temperature, soil type, rainfall, etc.

Endangered species: Any species in danger of extinction throughout all or a significant portion of its range and listed pursuant to the provisions of the Endangered Species Act.

Endangered Species Act of 1973: Congressional act which provides for the identification and protection of endangered and threatened fish, wildlife, and plants.

Extirpate: To eliminate from an area; to destroy.

Habitat: The physical surroundings/native environment in which a species lives.

Highly probable wolf report: Wolf report in which the evaluator, using established criteria, ascertains the extreme likelihood the report involves a wolf.

Home range: The geographic area an organism moves within to satisfy its biological requirements.

Management: To provide direction with which to utilize, control, enhance, or protect a species and/or its habitat.

Management guidelines: Management direction designed to integrate wolf management with other resource and human management.

Natural prey: The animal species a wolf selects for prey in a natural situation. For example, native ungulates such as deer, elk, and moose.

Niche: The position or function of an organism in a community of plants and animals.

Northern Rocky Mountain wolf: One of 32 subspecies of the gray wolf, Canis lupus. This subspecies, C. l. irremotus, was historically found in the northern Rocky Mountain region.

Northern Rocky Mountain Wolf Recovery Plan: A document prepared by a team of individuals with expertise regarding the biological and habitat requirements of the wolf, outlining the tasks/actions necessary to recover the species within parts of its former range in the Rocky Mountain region.

Northern Rocky Mountain Wolf Recovery Team: A group of individuals appointed by the Regional Director, Fish and Wildlife Service, Region 6 and assigned the task of preparing a biologically sound plan for establishing and achieving recovery goals for the wolf. The main objectives of the recovery team are: (1) to develop strategies for meeting recovery plan goals established pursuant to the Endangered Species Act, (2) develop and evaluate criteria to identify areas in which wolf populations can be recovered, (3) develop a plan which, when implemented, will allow for recovery of the wolf within recovery areas, and (4) develop wolf management guidelines based upon the "zone management" concept.

Pack: A group of wolves, usually consisting of a male, female, and their offspring.

Pair: Two wolves traveling together, not necessarily of the opposite sex.

Pair-breeding: Two wolves of opposite sex and adequate age, capable of producing offspring.

Pioneering wolf: A lone wolf found in an area with no resident wolf packs.

Population parameter: Specific information collected to determine the status and/or condition of a population of animals. In this instance, number of packs, number of animals per pack, mortality rates, etc.

Prey biomass: The total weight of living organisms in an area that constitute prey. For example, the elk biomass for an area is the total weight of elk in the area. As referred to in this plan, the prey biomass for an area is the total weight of ungulate species and important secondary prey species in that area that constitute prey for the wolf.

Prey species: Any species of wild animal killed and eaten by a wolf.

Primary prey species: An animal species that makes up the majority of a wolf's diet, excluding domestic livestock. For example, deer, elk, and moose.

Probable wolf report: A wolf report in which the evaluator is fairly certain, based on established criteria, the animal is a wolf.

Problem wolf: A wolf which is known to have preyed on (killed or maimed) domestic livestock and under the established criteria (Task 372) is determined to be a nuisance.

Public land: Land owned by the Federal government or an individual State.

Reclassify: To move a species from one ACT classification to another. For example, reclassifying the wolf from endangered status to threatened status.

Recovered wolf population: A population of northern Rocky Mountain wolves that displays the population parameters specified in the recovery plan allowing for removal of the northern Rocky Mountain wolf from the endangered and threatened species list.

Recovery: Natural and/or assisted restoration of the Rocky Mountain gray wolf populations to specific levels established in this recovery plan pursuant to the ACT.

Reintroduce: To bring animals of a species that has been extirpated from an area back into that area.

Remnant wolf population: An isolated population of wolves that has persisted in low numbers despite the extirpation of wolves in surrounding areas.

Rendezvous site: A gathering site for members of a wolf pack used primarily for pup rearing during the summer and occasionally for security during the fall or early winter.

Secondary or alternate prey species: Any animal species that is an occasional food source for the wolf, but which cannot, by itself, support wolves on a year-round basis (for example beaver and snowshoe hare).

Single lethal dose: The amount of a toxicant that will be fatal to the individual ingesting and/or coming in contact with that quantity of toxicant.

Species requirement: The physical and biological requirements an organism needs for survival and reproduction.

Subspecies: A subdivision of a species. A geographical race, or population occupying a discrete range and differing genetically from other geographical races of the same species. For example, the wolf (*C. l. irremotus* found in the Rocky Mountains is considered a different geographic race than the wolf of the eastern United States (*C. l. lycaon*).

Take: As outlined in the Act and for the purposes of this recovery plan, the term means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in such conduct.

Taxonomy: The science of classifying organisms.

Territory: The geographic area an organism defends against others of the same species and/or other species by scent marking, vocalizations, fighting and/or other means.

Threatened species: Any species that could potentially become endangered within the foreseeable future throughout all or a significant portion of its range.

Translocation: Capturing and moving animals from one area to another, usually for the purpose of establishing a new population.

Transplant: Translocate from one area to another.

Ungulate: Animals that have hooves. For example, deer, elk, mountain goats, bighorn sheep, moose, antelope, caribou, bison, and horses.

Viable wolf population: A self-supporting population of wolves with sufficient numbers to ensure the species will not become threatened, endangered, or extinct. For this document, a viable wolf population shall exist in the northern Rocky Mountain area when 30 breeding pairs of wolves are maintained in three designated recovery areas for a minimum of 3 successive years. A minimum of 10 pairs must be maintained in each of the three recovery areas.

Whelp: Give birth to pups.

Zone management concept: A management concept by which management priority and concern is de-emphasized beyond a central core area. For this document there will be three management zones: Zone I will give strong emphasis to wolf recovery; Zone II will be a buffer zone; and Zone III will contain established human activities such as domestic livestock use or developments in sufficient degree as to render wolf presence undesirable. Maintenance and improvement of habitat for wolves are not management considerations in Zone III.

Revised 5/87

WOLF OCCURRENCE REPORT

ST. Year - No. in Year

	Observer	Reporter
Name		
Address		
Telephone	(___)_____	(___)_____
Occupation		

Date of Observation ___/___/___ (Year Mo. Day) Time: _____

State: MT ID WY Township _____ UTM Zone _____

County: _____ Range _____ OR UTM East _____

Section _____ UTM North _____

Land Ownership: USFS ( ) Forest _____ State _____

BLM ( ) District _____ Private _____

NPS ( ) Park _____ _____

BIA ( ) Reservation _____ Other _____

Name and Description of Location/Habitat: _____

_____

Elevation: _____ Hydro Unit: _____

Observation Type: Live Animal ( ) Howling ( ) Tracks ( ) Scat ( )

Dead Animal ( ) Scentpost ( ) Kill ( ) Den ( ) Other ( )

Observation By: Binoculars ( ) Riflescope ( ) Magnification _____ X

Naked Eye ( ) Other ( ) _____

Number of Animals: Seen _____ Esitmated _____

Description of Animal(s):	1	2	3	4	5	6
Color/Markings:						
Est. Shoulder Height:						
Est. Weight:						
Position of Tail: (down, straight out, high, curled)						

Distance Between Observer and Animals: _____ Length of Observation: _____

	1	2	3	4	5	6
Track Size:						
Length:						
Width:						
Claws Distinct?:						
Length of Stride:						

Diameter of Scat _____

Length/Description of Howling: _____

CHARACTERISTICS TO INDICATE WOLF RATHER THAN DOG OR COYOTE: _____

_____

_____

_____

DETAILED ACCOUNT OF OBSERVATION: _____

_____

_____

_____

_____

Rating: 1 2 3 4

----------fold here----------

From: _____

_____

_____

PLACE
STAMP
HERE

U.S. Fish and Wildlife Service
Endangered Species Field Office
Federal Building, U.S. Courthouse
301 South Park, P.O. Drawer 10023
Helena, Montana 59626-0023

APPENDIX 3

WOLF ECOLOGY AND BEHAVIOR

AN OVERVIEW

WOLF ECOLOGY AND BEHAVIOR

AN OVERVIEW

The purpose of this overview is to present a sketch of wolf ecology and behavior with an emphasis on those aspects having direct management implications. The intent is not to produce an exhaustive treatise on the subject but rather to provide a range of data and references on this adaptable species. Mech (1970) in his book, The Wolf: The Ecology and Behavior of an Endangered Species, synthesized the wolf literature through 1969. Research on wolves increased dramatically in the 1970's, both in North America and in Eurasia. This overview incorporates findings from the more recent studies in addition to the information in Mech's volume. Particular emphasis is given to the sparse but important data on the ecology and behavior of wolves in the Rocky Mountains of Canada and the United States.

Niche

The niche or ecological role of the wolf is that of the preeminent predator of large ungulates in the Northern Hemisphere. From its sensory capabilities and social organization to its travels and hunting behavior, the wolf is superbly adapted for this role (Mech 1970, Pimlott 1975). No other carnivore in the western United States has the ecological role of the wolf. Although the coyote occasionally preys upon young, old, and vulnerable ungulates, its main diet consists of primarily rodents and lagomorphs. The coyote does not prey year-round on large ungulates. Other animals (besides man) that regularly prey on large mammals in the Northern Hemisphere include the mountain lion, black bear, and grizzly bear (Chatelain 1950, Hornocker 1970, Cole 1972, Reynolds 1980, Knight et al. 1984, Weaver 1986). Although the mountain lion or puma preys regularly on large ungulates, its methods of hunting (primarily "ambush") and social organization (solitary) contrast sharply with the socially cooperative methods of the wolf (Hornocker 1970). Consequently, both the quantitative impact and the evolutionary pressure of mountain lion predation upon ungulates is different. Black bears and grizzly bears, usually solitary by nature, also stalk and kill caribou, moose, and elk, taking mostly calves but also some vulnerable mature adult ungulates. In Yellowstone, Mattson et al. (in press) report that "Ungulates became increasingly important during the study years (1977-1983) as predatory behavior developed amongst bears..." Both the hunting methods and the evolutionary pressure of such hunting by wolves, mountain lions, black bears, and grizzly bears differ species to species. With regard to the impact of reestablishing wolves on other carnivores, Weaver (1986) notes that, "as wolves resume their natural role in certain Rocky Mountain ecosystems, grizzly bears could find more ungulate carcasses during larger portion of the year.

Physical Characteristics

The wolf is the largest wild member of the dog family Canidae. Adult males average 90-100 lbs (range 43-175 lbs) whereas adult females average 75-85 lbs (range 39-125 lbs). Males are usually 5-6.5 feet from nose to tail tip, while females range from 4.5 feet to 6 feet in length. Most wolves stand 26-32 inches tall at the shoulder. With its long legs and deep, narrow chest, the wolf is well suited for fast and far-ranging travels (Mech 1970).

Goldman (1944:404) pointed out that gray wolves ". . . are all very similar in the more essential features and are believed to intergrade through the vast range of the species on the North American mainland." Recent multivariate analysis of wolf skulls tend to confirm this (Jolicoeur 1975, Skeel and Carbyn 1977).

Wolves have keen senses of smell and hearing (Mech 1966 and 1970). They can hear other wolves howling from 6 miles away (Harrington and Mech 1978). Their vision, at least in detecting movement, also seems sharp (Mech 1970).

Population Biology and Dynamics

Density

Throughout much of their occupied range in the Northern Hemisphere, wolves typically occur in relatively low densities of 1 (wolf)/40-80 square miles. Until the early 1970's, reported densities on mainland areas varied from 1 /10 square miles to 1 /150 square miles (Pimlott 1967 and Mech 1970 for review). The concept of "intrinsic limitation," that wolf populations reach a "saturation point" at a density of 1/10 square miles even with abundant food presumably available, was generally accepted at one time (Pimlott 1967, Mech 1970). However, more recent studies (Kuyt 1972, Parker 1973, Van Ballenberghe et al. 1975, Bibikov 1982--mainland; Peterson 1977--island) have revealed wolf densities reaching 1/5 square miles when prey increased or became more vulnerable. This led Packard and Mech (1980) to question the concept of intrinsic limitation in wolf populations. They concluded that both social and nutritional factors operate in the regulation of wolf numbers.

Organization

The basic unit of wolf populations is the pack--a cohesive group of two or more individual wolves traveling, hunting, and resting together throughout the year (Mech 1970). Most packs include a pair of breeding adults, pups, and often yearlings and/or extra adults (Murie 1944, Fuller and Novakowski 1955, Joslin 1967, Rausch 1967, Mech 1970). Packs are formed when two lone wolves of the opposite sex find each other, develop a pair bond as breeders, and produce a litter of pups (Mech 1970, Rothman and Mech 1979, Fritts and Mech 1981). In a newly protected and expanding population in northwestern Minnesota, such pairing occurred in the fall and within a month after instrumented wolves dispersed from their natal packs (Fritts and Mech 1981).

The proportion of lone wolves in established wolf populations typically is quite low (1-15 percent) (Mech 1970, Mech 1973, Peterson 1977, Carbyn 1980, Fuller and Keith 1980, Bjorge and Gunson 1983). The number of wolves in a pack varies from 2 to a reported high of 36 in Alaska (Rausch 1967). Variation in pack size depends on factors such as mortality and reproductive rates. However, there appear to be four factors that may regulate the limits within which pack sizes vary: (1) the smallest number of wolves needed to locate and kill prey safely and effectively, (2) the largest number that could feed effectively on prey, (3) the number of other pack members each wolf could form social bonds with, (4) the amount of social competition that each pack member could accept (Mech 1970).

Average pack size in a newly protected and expanding population remains small as nonbreeders quickly disperse and establish their own packs (Fritts and Mech 1981). As vacant areas become occupied and food supply permits, wolf packs may increase in size and actually reflect population size (Rausch 1967). There may be a positive relationship between pack size and the size of principal prey species. For example, wolves preying on white-tailed deer are commonly organized into packs of 2-9 (Pimlott et al. 1969, Mech 1973), Fritts and Mech 1981); those on elk, 5-16 (Carbyn 1974b, Weaver 1978, Carbyn 1980); and those on moose, 6-22 (Jordan et al. 1967, Peterson 1977, Fuller and Keith 1980). Human exploitation or control of wolves obviously can reduce wolf packs to smaller units (Carbyn 1980, Bjorge and Gunson 1983). With large packs, (more than 10 animals), social strife among members can lead to permanent splitting of the pack (Wolfe and Allen 1973, Peterson 1977). Finally, it should be noted that wolf packs may split up temporarily for several days in either summer or winter (Mech 1970, Haber 1977, Peterson 1977).

Sex/Age Ratios

Sex ratios in wolf populations from several areas of the Northern Hemisphere are biased toward males (Mech 1970). Mech (1975) analyzed sex ratios for both wild and captive wolf pups. Captive wolves showed a slight (53:47) excess of male pups. Packs from the high-density wolf range in northeastern Minnesota had a significant disproportion (66:34) of males. In contrast, packs from other areas of Minnesota with lower wolf densities had equal sex ratios of pups or slightly more females. Thus, the percentage of male wolf pups appeared proportional to population density and perhaps inversely related to estimated levels of nutrition.

Age ratios of wolf populations are strongly influenced by the degree of human exploitation. Pup:adult ratios in exploited wolf populations range from 55:45 to 73:27 (Fuller and Novakowski 1995, Kelsall 1968, Weaver 1978, Carbyn 1980). In unexploited populations, pup:adult ratios of 13:87 to 31:69 have been reported (Fuller 1954, Kelsall 1968, Pimlott et al. 1969). Thus, exploited wolf populations are characterized by a relatively high proportion of pups.

Natality

The breeding season of wolves occurs from late January through April, with those wolves living in the highest latitudes generally having the latest season (Mech 1970). Wolves in Yellowstone National Park (45^{0} latitude) bred any time from late January to late February and possible early March (Weaver 1978). Wolf pups are born in late March to May after a 63-day gestation period (Brown 1936, Woolpy 1968, Mech 1970). In Yellowstone, wolf pups were born any time from late March though April (Weaver 1978).

Litter sizes of wolves usually range from four to seven (Mech 1970). The average size of 10 presumably complete wolf litters taken from dens in Yellowstone National Park was 7.8 pups and varied from 5 to 13. Litters of 10 and 11 were found following several years of exploitation (Weaver 1978), which is not uncommon for exploited populations (Mech 1970).

Although female wolves in captivity have bred successfully at 10 months of age (Medjo and Mech 1976). Wild wolves typically do not breed until 22 months (Rausch 1967, Mech 1970). Two-year-old female wolves have slightly smaller litter sizes on the average than older animals (Rausch 1967).

Mortality

Apparent mortality rates of wolf pups in exploited populations from birth to the period of exploitation (snaring, poisoning, or hunting from October-March) or to the age of 5-11 months vary from 12 to 80 percent (Mech 1970) with rates around 50 percent being common (Rausch 1967, Pimlott et al. 1969, Van Ballenberghe et al. 1975, Fritts and Mech 1981).

Minnesota wolf pups with relative body weights less than 65 percent of standard (Kuyt 1972) had a poor chance of survival, whereas pups of at least 80 percent of standard weight had a high survivorship rate (Van Ballenberghe and Mech 1975). Body weights appeared related to available food supply. Wide differences have been noted among members of a litter, members of different litters born in a given year, and individuals born in different years to a particular pack (Van Ballenberghe and Mech 1975).

Fall and winter may be critical periods for wolf survival. Wolves die from a variety of causes: malnutrition (Van Ballenberghe and Mech 1975), disease (Chapman 1980, Carbyn 1982), debilitating injuries (Mech 1970), interpack strife (Van Ballenberghe and Erickson 1973, Mech 1977b, Peterson 1977), and human exploitation and/or control. Beginning in the autumn, wolf mortality rates depend upon the degree of exploitation and/or control by humans. In areas with no or minimal exploitation, mortality rates for yearlings were about 45 percent and 20 percent for adults (Pimlott et al. 1969). In Minnesota during the period 1969-1972, September appeared to be a critical month for malnourished wolf pups to survive (Van Ballenberghe and Mech 1975). Hunting and trapping seasons pose additional hazards for wolves (Van Ballenberghe et al. 1975, Mech 1977b, Robinson and Smith 1977, Carbyn 1980, Fritts and Mech 1981).

Overwinter (October-March) mortality rates within packs ranged from 0 to 33 percent for a minimally exploited population (Mech 1977b, Fuller and Keith 1980, Fritts and Mech 1981) to 14 to 88 percent for a heavily exploited population (Carbyn 1980). Established wolf populations apparently can withstand mortality rates of 30 to 50 percent (Mech 1970, Keith 1983). Protected wolf populations can increase at rates of 20 to 50 percent (Rausch 1967, Fuller and Keith 1980, Fritts and Mech 1981).

Dispersal

The nature, extent, and role of dispersal in wolf populations appears related to wolf density and prey resources (Zimen 1976, Packard and Mech 1980, Fritts and Mech 1981). Wolves dispersing from a pack may facilitate a population decline in dense populations (Mech 1977b, Carboy 1980) and contribute to a population increase in sparse populations (Mech 1973, Peters and Mech 1975, Rothman and Mech 1979, Fritts and Mech 1981). Wolves may disperse at ages ranging from 9 to 28 months, or more (Packard and Mech 1980). Dispersal in the fall by yearlings (17 to 20 months old) is common (Fritts and Mech 1981). In low-density populations, these animals may disperse just out of their natal pack's territory into an unoccupied area, find another lone wolf of the opposite sex, and form a new pack (Fritts and Mech 1981). In high-density populations, such animals may stay in the pack, if possible, and wait for changes in the rank order and opportunities to mate (Packard and Mech 1980). If forced out, these loners may trail a pack (Mech 1966, Peterson 1977) or

live between packs (Mech and Frenzel 1971, Mech 1977c, Rothman and Mech 1979, Carbyn 1980). In some situations, subordinate wolves may disperse hundreds of miles (Van Camp and Gluckie 1979, Fritts and Mech 1981, Berg and Kuehn 1981, Fritts pers. comm.). However, mortality is often high among dispersing animals and thus, the chances of finding a mate and successfully establishing a new pack are low.

Movements and Territories

In most wolf populations, reproductive packs occupy exclusive territories, and nonbreeding loners either live in the buffer zones between territories or avoid the packs (Mech 1972, Mech 1973, Van Ballenberghe et al. 1975, Mech 1977c, Peterson 1977, Carbyn 1980, Fritts and Mech 1981, Bjorge and Gunson 1983). Exclusive wolf territories are a means of partitioning the food resources in those areas where prey is randomly distributed and does not undergo major seasonal movements. Territoriality is maintained through a variety of behaviors (see section on Behavior). Wolf pack territoriality may not manifest itself in areas with clumped and mobile prey species (e.g. caribou, bison), although wolf packs may practice mutual avoidance (J. Van Camp, R. Stephenson pers. comm.).

In low-density wolf populations, new breeding pairs are able to establish territories (Fritts and Mech 1981). In wolf populations that are saturated relative to food resources, it is very difficult for new breeders to become established unless major disturbances occur in the system (Packard and Mech 1980).

The amount of vulnerable prey biomass relative to numbers of pack members is important in determining the size of territories (Packard and Mech 1980). Pack territories have ranged in size from 20 square miles for a pack of five wolves in Minnesota (Van Ballenberghe et al. 1975) to at least 685 square miles for a pack of 8 to 10 wolves in Alberta (Fuller and Keith 1980). Sizes of many reported territories for packs of five or more wolves fall in the range of 50 to 200 square miles (Mech 1970, Van Ballenberghe et al. 1975, Peterson 1977, Carbyn 1980, Fritts and Mech 1981, R. Bjorge and J. Gunson pers. comm.). Home ranges for large wolf packs in Alaska approach several thousand square miles (Murie 1944, Burkholder 1959, Haber 1977). Lone wolves, too, may have territories of 1000 square miles or larger (Mech and Frenzel 1971, Mech 1973, Carbyn 1980, R. Bjorge and J. Gunson pers. com.).

The size and location of a pack's territory may be stable over time (Mech 1973, Van Ballenberghe et al. 1975, Haber 1977, Fritts and Mech 1981), or it may be unstable and shifting (Carbyn 1980, Fritts and Mech 1981, R.Bjorge and J. Gunson pers. comm.). Instability of pack territories may result from changes in the distribution and abundance of prey (Mech 1977c, Peterson 1977), interpack aggression (Carbyn 1982), human-induced wolf mortalities which disrupt pack hierarchies (Carbyn 1980), and/or expanding wolf populations and the formation of new packs (Peterson 1977, Fritts and Mech 1981).

Some wolf packs have been reported to use a smaller portion of their territory during summer than winter (Mech 1970, Mech 1977c, Carbyn 1980, Fritts and Mech 1981, R. Bjorge and J. Gunson pers. comm.), while others--in response to winter concentrations of prey--have compressed their territories during the winter (Cowan 1947, Kuyt 1972, Parker 1973, Van Ballenberghe et al. 1975,

Fritts and Mech 1981). During the year, a wolf pack may differentially use portions of its territory (Van Ballenberghe et al. 1975, Mech 1977c). It may consistently avoid certain areas while shifting its use of or prefer other areas, usually in response to yearly variation in distribution of vulnerable prey (Mech 1977c, Peterson 1977, Carbyn 1980).

Pack wolves usually exhibit a certain pattern of movement during the course of a year (Mech 1970). During the breeding season in late winter, the pack may move extensively. During spring and summer, a reproductive pack's movements are centered around den and rendezvous sites. By October, pups are mature enough to travel with the adults, and the pack's movements are extensive, perhaps at a maximum (Van Ballenberghe et al. 1975, Fritts and Mech 1981). Wolf packs in Yellowstone National Park apparently followed the ungulates in their altitudinal migrations to and from summer and winter ranges (Weaver 1978).

Daily travel distances for wolf packs are in the range of 1 to 9 miles, while distances between successive kills vary from 8 to 34 miles (Burkholder 1959, Mech 1966, Mech and Frenzel 1971, Kolenosky 1972, Fuller and Keith 1980, S. Oosenburg and L. Carbyn pers. comm.).

During summer, wolves travel along game trails and ridges; in winter, they use frozen waterways, windswept ridges, and broken game trails (Mech 1970). Some wolves use secondary roads (if plowed in winter) even though the probability of harmful contact with humans is increased considerably (Fritts and Mech 1981, Mech pers. comm.). Wolves on Isle Royale avoid recreation trails during summer (Peterson 1977).

Predation

Food Habits

The food habits of wolves in the wild has probably been the most-studied aspect of their ecology (see Literature Cited). In general, wolves depend upon ungulates for food in the winter and supplement this during spring-fall with beaver and smaller mammals (Mech 1970, Pimlott 1975). Ungulate prey include elk, mule deer, moose, white-tailed deer, bison, sheep, mountain goat, caribou, and perhaps antelope. In various areas during years of abundant beaver populations, beaver comprised 25-75 percent of the spring-fall diet of wolves and may have buffered or reduced wolf predation on ungulate young (Voight et al. 1976, Peterson 1977, Theberge et al. 1978, Carbyn 1980, Fuller and Keith 1980). Nonetheless, when these percent occurrence figures for beaver are converted to a biomass basis (Floyd et al. 1978), ungulates probably constitute the bulk of the summer diet and certainly of the annual diet. In other areas, where beaver are not so abundant, ungulates usually account for more than 90 percent of the biomass consumed by wolves (Cowan 1947, Carbyn 1974a, Haber 1977, Weaver 1979, Fritts and Mech 1981, Holleman and Stephenson 1981, R. Bjorge pers. comm., Oosenburg and Carbyn pers. comm.). In the Rocky Mountains of North America, elk, moose, and deer (mule and white-tailed deer) are the principal prey species (Cowan 1947, Carbyn 1974a, Weaver 1979, R. Bjorge pers. comm.).

Prey Consumption Rates

Captive wolves have been maintained on 3-5 lbs food/wolf/day or approximately 0.06 lb/lb wolf/day (Mech 1970, Kuyt 1972, Lentfer and Sanders 1973). Calculations for food consumption by free-ranging wolves vary from 2 to 20 lbs/wolf/day, or approximately 0.04-0.34 lb/lb wolf/day (Mech 1966, Mech and Frenzel 1971, Kolenosky 1972, Mech 1977a, Peterson 1977, Weaver 1979, Fuller and Keith 1980, Fritts and Mech 1981, Oosenburg and Carbyn pers. comm.). Consumption rates on the order of 6-13 lb/wolf/day or approximately 0.10-0.20 lb/lb wolf/day, are common (see above references). Mech (1977a) proposed that a pack as a whole requires an average of at least 8 lb/wolf/day or about 0.13 lb/lb wolf/day during winter for all members to survive and for new pups to be reared successfully the following spring.

Although the wolf is capable of eating large quantities of food in a short time, such quantities are not always available. Thus, wild wolves may have to go for several days at a time without eating. Wolves probably could fast for periods of 2 weeks or more while searching for vulnerable prey and then when food is available, replenish themselves and be prepared for another period of fasting. The wolf, with its large stomach capacity, seems well adapted for this cycle of feasting and extended fasting (Mech 1970). The value of such an adaptation to any predator is obvious.

Kill Rates

How often a wolf pack kills its prey varies tremendously, depending on numerous variables: (1) number of wolves in the pack, (2) diversity, density, and population structure of the prey complex (as related to differences in biomass), (3) snow conditions, and (4) degree of utilization of the carcasses, to mention only a few. As a hypothetical example, consider:

A. A pack of six wolves in winter: one adult male, one adult female, and four pups. The adult male weight 100 lb; the adult female, 81 lb; and each of the pups 75 lb. The food consumption rate for this pack is 0.15 lb/lb wolf/day, or 72 lb/pack/day.

B. The pack preys entirely on elk at a ratio of two calves: one cow: one bull. The calves with 215 lb apiece; the cow, 510 lb; and the bull, 629 lb. Thus, a composite elk would weigh 405 lb.

C. Then, each wolf would kill "composite elk" every 34 days. The pack of six wolves would kill "composite elk" every 5.6 days during winter.

Obviously, a multitude of different predation scenarios could be simulated using computers. For comparison, Fuller and Keith (1980) recorded two wolf packs in Alberta killing moose in winter at a rate of one moose/wolf/37 to 48 days. Because the wolf's prey varies in size from beaver to bison, the kill rate of each species varies according to the amount of food each provides (Mech 1970).

Prey Selection

Wolves basically are opportunistic predators (Mech 1970). Nonetheless, prey selection of various types of wolves is apparent.

In areas with two or more prey species, wolves tend to select for the smaller of the species or the easiest to catch rather than the species in greatest abundance (Mech 1970, Mech and Frenzel 1971, Carbyn 1974a, Holleman and Stephenson 1981). Wolves select for the most vulnerable individuals of a particular prey species. Vulnerability is influenced by several factors: (1) age and sex, (2) condition due to nutrition, disease, and infirmity, (3) behavior, and (4) snow conditions. Wolves typically will prey differentially on the following:

--young-of-the-year or yearlings (depending on maternal defense),

--older individuals (more than 6-10 years, depending on the species),

--prime-age individuals whose early development was stunted by inadequate nutrition,

--individuals weakened by disease or infirmities, and

--solitary or rutting adult males (Pimlott et al. 1969, Mech 1970, Mech and Frenzel 1971, Carbyn 1974a, Peterson 1977, Fuller and Keith 1980, Fritts and Mech 1981, Oosenburg and Carbyn pers. comm.).

It is also apparently more efficient for the wolf to prey on larger species even though they are more difficult to kill and less abundant. The wolf's large size may make it an ineffective/inefficient predator on hares, for example, which can dodge and dash through small openings. Although wolves are certainly capable of capturing such prey, they probably expend less energy per pound of meat obtained by hunting larger animals (Mech 1970).

Geographical Distribution of Kills

The geographical distribution of kills by wolf packs within their territory may shift from year to year (Mech 1977c, Allen 1979, Fuller and Keith 1980). Also, researchers in northeastern Minnesota have documented the significant fact that white-tailed deer living in the buffer zones along the edges of wolf pack territories have a higher survivorship than deer living elsewhere (Hoskinson and Mech 1976, Mech 1977c, Nelson and Mech 1981).

Influence of Wolf Predation on Ungulate Populations

The question of the effect of wolf predation on ungulate populations has been considered by Pimlott (1967), Mech (1970), and Keith (1982). Most of the literature on wolf-prey relations indicates that wolves usually do not deplete their prey populations (Murie 1944, Mech 1966 and 1970, Pimlott et al. 1969, Kolenosky 1972, Carbyn 1974a).

However, recent studies in three different areas have indentified wolf predation as a contributing factor in the decline of a local ungulate

population. These studies involved white-tailed deer in Minnesota (Mech and Karns 1977), moose in Alaska (Rausch and Hinman 1977), and black-tailed deer in British Columbia (H. Langin pers. comm.).

It should be noted, however, that special and similar circumstances occurred which accentuated the role of wolf predation in these documented declines (see Mech and Karns 1977). Decreasing quality and quantity of habitat (forage), harsh weather (winter), and decreasing alternate prey combined over several consecutive years to enable the wolf population to exert considerable influence on the population of the principal prey species in the local area.

Analysis of wolf/ungulate population data by Keith (1982) suggests that: (1) wolf predation is a major component of total annual mortality in many ungulate populations, (2) such losses are often largely additive to other kinds of mortality, and (3) wolf predation is therefore a significant controlling factor and may at times be regulatory. Keith's analysis demonstrates that when the wolf/ungulate ratio exceeds a certain level, and depending on the finite rate of annual increase in the ungulate population and the proportion of annual increment removed by hunters, wolf predation can have a regulatory effect on the ungulate population. His work provides a model for establishing a wolf/ungulate ratio that will result in a non-declining ungulate population.

A key management consideration in achieving recovery of a declining the ungulate population, should that occur, is whether to regulate wolf numbers or hunter harvest. In the long-term view, a systematic program of vegetation treatment will benefit the ungulate species, wolves, and hunters.

Livestock Depredation

Weaver (1981) (see Appendix 4) reviewed studies of wolf-livestock relationships in Minnesota and Canada and concluded:

--Most wolves living near livestock areas where native prey is available do not prey on livestock. In some situations, offending animals more likely are lone wolves rather than pack members. In other areas, pack animals seem to be chronic offenders.

--Wolf depredations on livestock are not as widespread or as serious as generally believed. Only a small percentage of farms or grazing leases in wolf range are affected annually, and a minute fraction (less than one-half of 1 percent) of the livestock in the area are killed or maimed by wolves. Indeed, verified wolf depredations appear low in view of the proximity of wolves and livestock--especially in areas where husbandry practices may predispose animals to wolf predation.

--Nonetheless, a few farmers or permittees may sustain serious wolf depredations and monetary loss in a given year. However, even at chronic problem sites, losses are sporadic--both between and within years. Wolf problems appear localized, and few wolves are involved.

--Wolves prey on both sheep and cattle, but may select for sheep. Wolves definitely select calves and yearlings over cows and bulls (Bjorge 1980, Carbyn 1980, Fritts and Mech 1981, Tompa 1981, Fritts 1982, Bjorge and Gunson 1983, Gunson 1983).

Hunting Methods

This section discusses methods used by wolves in hunting elk (Weaver 1979) which are similar to their techniques for other ungulate prey (Mech 1970).

Three techniques employed by wolves in hunting elk may be identified from the accounts provided by Cowan (1947) and Carbyn (1974a):

(1) chance encounters followed by a quick rush, often downhill, for the prey;

(2) coursing, or running a herd to separate a vulnerable individual; and

(3) driving a target animal towards other wolves.

Wolves may use a single technique or a combination of techniques in bringing down prey, depending upon the circumstances.

Long pursuits of elk by wolves were not common in the Canadian studies, "probably because the varied terrain usually permitted a quick termination of the chase one way or another" (Cowan 1947:159). Carbyn (1974a) recorded five chases which averaged 384 yards. One chase in which a cow elk was injured but not immediately killed covered 1128 yards. Cowan (1947) reported that a small pack of wolves pursued a yearling elk at Pyramid Lake 1.5 miles before finally making the kill.

The initial point of attack was usually the rear and/or sides of the elk, but the nose and throat were sometimes grabbed too (Cowan 1947, Carbyn 1974a). No evidence of hamstringing of elk by wolves has been reported in the scientific literature.

Cowan (1947) reported from second hand sources that single wolves killed adult elk, but the age and physical condition of the victims were not recorded. Carbyn (1974a:131) stated that two wolves killed an "apparently healthy" cow elk. Their 7-month-old pups accompanied but did not actively participate in the kill. In most instances, though, five to nine wolves were involved. Carbyn (1974a) postulated that 8-14 wolves may represent an optimum pack size for killing adult elk.

Habitat Ecology

Habitats

Wolves have occupied nearly all habitats in the Northern Hemisphere except for true deserts (Mech 1970, Pimlott 1975). "Habitat" for wolves is an adequate supply of vulnerable prey (ideally in an area with minimal opportunity for exploitation of wolves by humans).

Dens

Wolves may dig out dens weeks in advance of the birth of pups (Young 1944, Haber 1977). Certain physiographic features appear characteristic of wolf

denning sites (Bailey 1930, Murie 1944, Mech 1970, Carbyn 1974a, Stephenson 1974, Peterson 1977). Dens are commonly located on southerly aspects of moderately steep slopes in well-drained soils (or rock caves/abandoned beaver lodges), usually within 400 yards of surface water and at an elevation overlooking surrounding low-lying areas.

Some particular dens receive traditional use by a wolf pack from year to year (Murie 1944, Mech 1970, Carbyn 1974a, Peterson 1977). Also, certain specific areas (on the order of 5 square miles in size) may contain several den sites which are used in different years by the pack (Carbyn 1974a, Haber 1977, Weaver 1978).

Most wolf packs appear particularly sensitive to human disturbance near den sites and may abandon the den (Joslin 1967, Carbyn 1974a, Chapman 1979). Most active wolf dens are located at least 1 mile from recreation trails and 1 to 2 miles from backcountry campsites (Carbyn 1974a, Peterson 1977, Chapman 1979).

Rendezvous Sites

Murie (1944) used the term "rendezvous sites" for specific resting and gathering areas occupied by wolf packs during summer and early fall after the natal den was abandoned. These were usually complexes of meadows and adjacent hillside timber, with surface water nearby (Joslin 1967, Kolenosky and Johnston 1967, Carbyn 1974a, Peterson 1977, Weaver 1978). They were often bogs, abandoned and revegetated beaver ponds (with water still available nearby), and streams. Rendezvous sites are characterized by matted vegetation in the meadow, a system of well-used trails through the adjacent forest and across the meadow, and resting beds adjacent to trees in the forest (Joslin 1967, Carbyn 1974a, Peterson 1977). Pup and adult wolf scats are prevalent. Rendezvous sites vary in size from 0.5 acre to a drainage 0.6 mile long (Peterson 1977), but most are small (approximately 1.0 acre) (Joslin 1967, Kolenosky and Johnston 1967).

A wolf pack will usually move from the natal den site (or occasionally, a second den site) to the first rendezvous site when the pups are 6-10 weeks of age which is late May-early July (Mech 1970, Carbyn 1974a, Van Ballenberghe et al. 1975, Peterson 1977). The first rendezvous site is usually within 1-6 miles of the natal den site (Carbyn 1974a, Fritts and Mech 1981). A succession of rendezvous sites are used by the pack until the pups are mature enough to travel with the adults. This usually occurs in September or early October (Van Ballenberghe et al. 1975, Peterson 1977, Fritts and Mech 1981). These successive rendezvous sites are usually 1-4 miles distant from the previous site (Carbyn 1974a, Peterson 1977). Occupancy times vary from 10-67 days (Carbyn 1974a, Van Ballenberghe et al. 1975, Peterson 1977).

Movements of adult pack members around rendezvous sites is variable (Van Ballenberghe et al. 1975, Peterson 1977, Fritts and Mech 1981). The maternal female is usually at the rendezvous site more than other adults, but she too may range several miles away (Fritts and Mech 1981).

As with dens, rendezvous sites--especially the first one--may receive traditional use by wolf packs year after year (Carbyn 1974a, Weaver 1978). Wolves appear less sensitive to human disturbance at later rendezvous sites than they do at the first one.

Cover

If the term "cover" includes areas secure from human disturbance as well as vegetation that hides an animal, then wolves do need cover per se at certain times of the year. Den and rendezvous sites are often characterized by both forested cover nearby and distance from human activity (Joslin 1967, Carbyn 1974a, Peterson 1977, Weaver 1978, Mech pers. comm.). Wolves in open terrain are conspicuous and vulnerable to shooting. The wolf's needs for cover, too, are related indirectly to the cover requirement of its principal prey in a particular area.

Behavior

Dominance Hierarchies

Behavioral interactions within a wolf pack occur in an established but dynamic framework of hierarchical dominance relationships or social roles (Schenkel 1947, Rabb et al. 1967, Mech 1970, Fox 1973, Zimen 1975, Lockwood 1979). A dominant (alpha) male and female are the central members of the pack, and the other pack members (usually related to the alpha pair) constantly reaffirm their subordinate status through postures and expressions of submission directed toward the dominant wolves (Schenkel 1947, Rabb et al. 1967, Schenkel 1967). Males and females have separate social hierarchies, and the subordinates have definite (albeit less well-defined) dominance relationships among themselves. Aggression is channeled into ritualized behavior patterns within the social hierarchy. However, as the young members approach sexual maturity, they may challenge the dominant animals. This may result in heightened intrapack agonistic behavior, leading to disruption of the social order and eventual dispersal of the individuals from the pack.

This social hierarchy dominated by alpha individuals plays an important role in the travels, hunting and feeding, and reproduction of a wolf pack (Mech 1970, Haber 1977, Peterson 1977). The alpha pair, through their strong leadership, maintains social order within the pack and promotes pack stability during their tenure (Jordan et al. 1967, Peterson 1977). Alpha wolves usually lead the pack and choose the direction and specific routes of travel. They also provide leadership in hunting, encountering and responding to novel stimuli, and perhaps when contacting neighboring packs (Peterson 1977).

Social rank may play an important role in the feeding behavior of the individual wolf. The order in which pack individuals gain access to food may not always be an accurate indicator of rank because food possession and acquisition is often complicated by alliances between individuals (Zimen 1971). However, in most packs, the alpha wolves often have first priority at the carcass (Mech 1970). Jordan et al. (1967) suggested that in times of stress due to low food supply, rank may become an important determinant of the order in which individuals feed on a carcass.

The standard reproduction model developed by Schenkel (1947) is for the alpha male and female to mate while preventing subordinates from mating through active harassment. Although enough exceptions to the rule have been observed to require careful qualifications, there is also considerable evidence in support of the theory that the alphas of the pack do have the best chance of reproducing successfully (Rabb et al. 1967, Zimen 1975, Klinghammer et al. 1977). Even in captive packs with abundant food available, it is the exception rather than the rule for more than one mature female to reproduce successfully (Mech 1970). Years of study of wild wolves also confirm this pattern of exclusive breeding (Packard and Mech 1980).

The existence of social hierarchies in wolf packs dominated by alpha individuals has obvious implications for: (1) genetics and determination of minimum viable populations, (2) population dynamics (productivity, mortality, dispersal, etc.) and possible regulation, (3) translocations, and (4) control programs (Woolpy 1968, Mech 1970, Weise et al. 1975, Packard and Mech 1980, Weaver 1981, Bjorge and Gunson pers. comm.).

Communication

Communication is the exchange of information between members of a wolf pack and between wolf packs. It plays an important rule in minimizing social stress within the pack and in maintaining exclusive territories and avoiding direct conflicts between packs. Two important means of communication for wolves are howling and scent-marking.

Within a wolf pack, howling serves in the identification, location, and assembly of separated pack members (Theberge and Falls 1967, Mech 1970, Peterson 1977). It may be particularly useful in facilitating the movements of pups and adults from one rendezvous site to the next (Carbyn 1974a, Peterson 1977). Howling may also serve another social function when pack members rally around the alpha individuals and greet each other (Murie 1944, Joslin 1967, Peterson 1977). Howling is also a means of advertising the presence of the pack within its territory, thereby maintaining the benefits accruing from territoriality and avoiding direct conflicts between packs (Joslin 1967, Mech 1970, Harrington and Mech 1978).

Scent-marking, the application of an animal's odor to its environment, is another behavior used by wolves to communicate information regarding territory, location of food, and even behavioral/physiological condition of the animal (Peters 1973, Peters and Mech 1975). Scent-marking may involve urinating, defecating, or rubbing certain areas of the body on either familiar or novel objects in the animal's environment. Peters (1973) summarized scent-marking by wolves in northeastern Minnesota.

> "Wolves often travel on established routes including game and logging trails, roads, and frozen waterways, occasionally cutting across country from one such route to another. While traveling on habitual routes, they leave (and encounter) eliminative sign every 240 meters on the average, including a raised leg urination (RLU) every 450 meters. Scent-marks are produced at significantly higher rates along habitual routes than on

> cross-country excursions, and are concentrated at the junction of routes and along territorial edges, where occasional encounters with foreign sign raise the rate of scent-marking drastically. The high frequency of scent-marking along habitual routes, at junctions, and along the edges of the territory means that wolves can always tell whether or not they are in their territory and can probably tell when they are approaching its edge on the basis of olfactory cues. Scent-marking is done primarily by dominant animals and seems to be associated with an assertive mood. Lone wolves, who are generally nomadic, rather than territorial, may be using this information when traveling through saturated wolf populations, for their wanderings tend to follow the borders of established territories (Mech 1972, Carbyn 1980, Fritts and Mech 1981). Invariably, the response to sign of other packs includes an increase in rate of scent-marking; following the other pack's tracks; continuing on original course for a kilometer or more, sometimes into the edge of a neighboring pack's territory, then heading back into their own. Aversion to unfamiliar wolf-sign is not innate. When it occurs, it may be due to previous agonistic encounters with foreign wolves. Trespasses are rare, but seem to be most frequent when prey populations are low."

Wolves are able to detect, and respond differently to, scent marks of varying degrees of freshness. Accumulation of a certain density of marks may trigger a response to travel to another part of the territory. The implications of this could be especially important for newly formed pairs or loners in the establishment of a new pack. If a territory were too large to "patrol," the frequency and density of marks could reflect this. Newcomers could detect the information and "colonize" the available space (Peters and Mech 1975). Scent-marking may also play an important intra-pack function, especially during the summer when pack members often hunt separately. By "reading" the urinations and defecations of fellow pack members, individuals may be able to determine which areas have been hunted recently, the proximity of a pack member, or who is traveling with whom (Peters and Mech 1975).

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APPENDIX 4

WOLF-LIVESTOCK RELATIONSHIPS: A PROFILE AND PERSPECTIVE

This overview of wolf-livestock relationships was prepared by John Weaver, USDA Forest Service, Missoula, Montana as a member of the Northern Rocky Mountain Wolf Recovery Team. It is an information document to aid in developing wolf management guidelines and a wolf management plan.

Introduction

Wolves have interacted with livestock since historical times in areas of Eurasia and North America where their ranges overlap. Indeed, depredation by wolves on livestock was a major reason for the virtual extermination of wolves in the western United States.

Wolf-livestock relationships, however, received scant scientific scrutiny until recently. During the 1970's, wildlife biologists in western Canada and Minnesota investigated interactions between wolves and livestock (see Literature Cited).

Wolf recovery in certain areas of the northern Rocky Mountains (U.S.A.) will depend, in part, upon enlightened management which recognizes and addresses the ecological, ethical, and economic aspects of the relationship.

The purpose of this report is to present a profile of wolf-livestock relationships and to offer a perspective for management. Information sources include the literature cited and personal interviews with wolf biologists in Alberta and Minnesota. For stimulating discussions of this topic, I thank R. R. Bjorge, W. Brewster, L. N. Carbyn, S. H. Fritts, J. R. Gunson, D. Harms, T. J. Kaminski, L. D. Mech, and W. J. Paul. Shortcomings of this report, of course, are mine.

Profile

Study Areas, Wolf Populations, and Livestock Availability

General assessments of wolf-livestock relationships have been made for western Canada (Gunson 1983) and northern Minnesota (Fritts 1982). More intensive studies of wolf-livestock interactions have been conducted in northwestern Alberta (Bjorge and Gunson 1983), Riding Mountain National Park in western Manitoba (Carbyn 1980), and in Beltrami Island State Forest in northwestern Minnesota (Fritts and Mech 1981). As this overview of wolf-livestock relationships relies on the findings of those studies, it seems appropriate to describe the areas, their wolf populations, and the availability of livestock.

Widespread government wolf control (for big game and rabies management) in the four provinces of western Canada was reduced or eliminated in the latter 1960's and 1970's. Wolf populations expanded in distribution and abundance once again. For the most part, however, wolves are still segregated from livestock in much of western Canada. In certain areas, though, zones of overlap occur along the forest-agriculture fringe (Gunson 1983).

In Manitoba, this fringe occurs as perimeters around limited islands of wolf habitat. Riding Mountain National Park, for example, is an approximately 1,150-square mile wilderness area completely surrounded by agriculture. The transition fringe is about 222 miles long. Wolf populations there in 1975-1979 ranged from 52 to 120 (1/22 square miles to 1/10 square miles. Wolf-ungulate ratios were high, ranging from 1:43 to 1:131 (elk and moose) (Carbyn 1980).

In Alberta, the fringe is linear and extensive along the western mountains and forests of the Peace River region (Gunson 1983). Field research on wolf-livestock interactions was conducted by Bjorge and Gunson (1983) on 58 square miles of remote cattle grazing leases along the Simonette River in northwestern Alberta during 1976-1981. All seven leases either bordered the forest-agriculture boundary or were 2.5-12.4 miles within the forest area. Number of cattle grazed during the May-October season varied from 1,984 to 2,228 or 34 to 39/square mile during a period of no wolf control. Wild ungulates were common, especially moose (3.4/square mile elk, white-tailed deer, and mule deer were locally abundant (Bjorge and Gunson 1983).

In British Columbia, production of livestock occurs along narrow cultivated river bottoms surrounded by forests with populations of wild ungulates and wolves and large grasslands in the remote interior. Wolf numbers in British Columbia increased during the 1970's following cessation of concentrated wolf control (Gunson 1983, Tompa 1983).

In northern Minnesota, livestock occurs primarily along the southern and western edges of the 30,000-square mile region inhabited by wolves. About 9,800 farms produce 234,000 cattle and 91,000 sheep. Whereas cattle are present on farms throughout the wolf range, most sheep production is in the northwestern sector. From May to October, these livestock graze in both areas near farm buildings. About 1,000-1,200 wolves inhabit northern Minnesota (Fritts 1982).

During 1972-1977, Fritts and Mech (1981) investigated the dynamics, movements, and feeding ecology of a newly protected wolf population in northwestern Minnesota. The primary study area was the 1,050-square mile Beltrami Island State Forest (BISF) which is bordered on three sides by farmland. Livestock was produced on most of the many small farms there, and the transition from forest to agriculture is relatively sharp. Cattle, sheep, and hogs were available at a ratio of about 23:6:1. Wolves increased from 1-10 to 58 (1/17 square mile during the study. Densities of wild ungulates were moderate at 10-15 white-tailed deer/square mile and 0.8 moose/square mile (Fritts and Mech 1981).

Wolf-Livestock Interactions

Several studies indicate wolves may live near farms/grazing leases without killing livestock.

Only 3.5 percent of 2,813 wolf scats collected in and near livestock areas in western Canada and northwestern Minnesota contained livestock remains--predominantly cattle. According to Fritts and Mech (1981), much of the livestock scats from BISF probably was eaten as carrion. In northwestern Alberta, Bjorge, and Gunson (1983) documented wolves scavenging on at least 15

of 34 cattle carcasses. Many of the scats containing livestock remains had a clumped distribution, both geographically and temporally (Carbyn 1980, Fritts and Mech 1981). During the 4 years of intensive studies of wolves in Riding Mountain National Park, there were two unconfirmed and one confirmed reports of wolf depredations on cattle adjacent to the park. These interactions occurred when the wolf population level was high (Carbyn 1980).

Radio-collared wolves and their associates in northwestern Minnesota were located occasionally near farmland and livestock. Follow-up interviews with the farmers revealed no losses at the time. Instrumented wolves could have made forays into farmland at night, but the scarcity of depredation complaints along the fringe suggested that they rarely did so. Several farmers repeatedly observed wolves with their cattle without any losses. Also, 13 farmers who raised cattle at the edge of wolf range for several years did not believe they had lost any animals to wolves (Fritts and Mech 1981).

The Canadian studies suggest that wolf packs associate less often and/or less closely with livestock than do lone wolves or pairs. The implication is that singles/pairs, rather than packs, may be responsible for many of the livestock depredations. Nonetheless, packs--especially in Minnesota--may cause the more serious and chronic depredations (Fritts 1982).

In the BISF, Minnesota, territories of at least five instrumented wolf packs bordered farmland where livestock (primarily cattle) were produced. However, only one instance of depredation by these packs was verified in a 5-year period. From a larger area of northwestern Minnesota, packs were involved in 6 of 12 instances of depredations by wolves (Fritts and Mech 1981).

In Riding Mountain National Park, Carbyn (1980) tallied 13 "pack-years" (one pack radio-tracked for approximately 1 year). A pack was responsible for one of the three reported depredations.

On the Simonette River area, lone wolves and one pair were located significantly more often than packs on or within 1 mile of cattle on summer grazing leases. Following removal of cattle in late October, these lone wolves would leave the grazing leases shortly thereafter and move to other areas. During winter, they were radio-located commonly within 1 mile of farmyards with cattle.

Illegal removal of wolves from one pack left two wolves, and depredations subsequently increased. Six or less cattle were missing at roundup from within territories of radio-collared wolf packs in five of seven summers in the Simonette River area. Of 21 "pack-years," only one pack regularly associated with cattle during one summer. About 80 percent of 39 scats collected from a rendezvous site of that pack that year contained cattle remains. (The possible extent of scavenging was unknown.) The summer range of that pack lay almost entirely (86 percent) within grazing leases (Bjorge and Gunson 1983).

Magnitude of Depredations

The level of livestock losses reported by producers on or near occupied wolf range is quite low, with verified depredations by wolves even lower.

In Alberta during 1972-1981, there was an average of 140 wolf depredation complaints (range 74-180) per year. Approximately 44 percent (61) of these complaints were approved for compensation. During 1974-1980, 365 claims were approved: 67 percent confirmed, 18 percent probable, and 15 percent missing (Gunson 1983). In the Simonette River area, Bjorge and Gunson (1983) recorded that, of 9,425 cattle grazed during 1976-1980, a total of 299 (3.17 percent) were lost. Known wolf kills and maulings totaled 16 (0.17 percent) and 51 (0.54 percent), respectively. Annual wolf depredations (kills/maulings) averaged 13 cattle (range 6-27). It is likely that additional wolf kills, especially of calves, were not detected.

In British Columbia during 1978-1980, 144 wolf depredation complaints (range 133-174) were confirmed per year (Tompa 1983). Recorded "complaints" in western Canada include harassment, missing animals, and maulings in addition to kills (Gunson 1983). Verified wolf-related losses in all stock classes were consistently less than 0.1 percent of the respective provincial stock populations.

In Minnesota during 1979-1981, average verified losses to wolves were 5 cows, 15 calves, and 56 sheep per year. Greatest losses verified were 30 cattle (representing 0.12/1000) and 110 sheep (1.20/1000) in 1981. About 10 percent of the complaints involved coyotes (C. latrans) rather than wolves (Fritts 1982).

Spatial Distribution of Depredations

Only a small fraction of all the farmers and permittees in remote wolf country sustain verified livestock losses to wolves.

In Minnesota during 1979-1981, for example, the number of farms with cattle and/or sheep in wolf range that suffered losses to wolves (verified by Fish and Wildlife Service personnel) averaged 22 (range 12-38) per year, or about 0.2 percent of the farms in the wolf range. Often, only a single farmer sustained serious losses. In 1977, one sheep farmer received 65 percent of the total compensation paid by the State of Minnesota that year; in 1978, a single cattleman received 42 percent, and the same individual was paid 51 percent of the total the following year (Fritts 1982).

In the Peace River area of northwestern Alberta, where grazing leases are common, approximately 75 percent of 129 confirmed wolf attacks on cattle during 1975-1980 occurred on grazing leases. These depredations happened on 35 different grazing leases and on 44 private pastures (Bjorge 1980). About 63 percent of 46 recorded wolf attacks on cattle there occurred with 5 miles of the forest-farmland boundary (Bjorge pers. comm.).

In the rest of Alberta and in British Columbia, however, approximately 32 percent of 723 confirmed and/or probable wolf depredation claims occurred on leased public lands (Gunson 1983).

Temporal Distribution of Depredations

In both western Canada and Minnesota, most wolf depredations occurred in late summer (July-August). This coincides with the period when wolf pups are gaining weight rapidly, and a normal litter would have high food requirements. Only a few farms and grazing leases sustained more than one wolf depredation incident during any one grazing season. Nonetheless, at a few farms in Minnesota, multiple incidences do occur.

Also, only a few farms have a history of livestock losses to wolves occurring at least once every 3 years. Others have infrequent losses happening once or twice over a period of several years. Fritts (1982) termed these Type I and Type II farms, respectively. About six or seven Type I farms occur in Minnesota. Only two livestock farms out of 9,800 in Minnesota's wolf range have had regular (annual) wolf depredations since 1975 (Fritts 1982).

In the Peace River area of Alberta, wolf attacks on livestock occurred during 3 or more years during 1975-1980 on seven grazing leases and on no private pastures (Bjorge 1980) (partially due to wolf control).

Livestock Selection by Wolves

In Alberta during 1972-1981, approximately 85-90 percent of the 1,257 depredation complaints involved cattle and 5 percent sheep (Gunson 1983). About 64 percent of the 402 livestock losses to wolves in British Columbia during 1978-1980 were cattle and 17 percent were sheep (Tompa 1983). It could not be ascertained from these reports whether actual selection for a particular livestock class (cattle vs. sheep) had occurred.

In Minnesota, approximately 7 percent of the verified livestock losses were cattle and 19 percent were sheep. In view of available data, sheep apparently were selected over cattle by wolves (Fritts and Mech 1981, Fritts 1982). Turkeys and sheep were vulnerable to wolves (Fritts 1982).

Wolves definitely selected calves and yearlings over cows and bulls (Bjorge and Gunson 1983). There did not appear to be any selection of lambs over ewes (Fritts and Mech 1981, Gunson 1983).

Wolf Management Programs - Control and Compensation

Control

Minnesota and the western provinces of Canada have wolf management programs involving control and compensation of varying emphasis and intensity. The programs of Minnesota and Alberta will be examined here because of the similarity of Federal laws/management direction and ecological contexts, in this area to that involved in wolf management in the northern Rocky Mountains. The material from Minnesota basically is excerpted from Fritts (1982).

In August 1974, wolves in Minnesota were afforded complete protection as an endangered species under the Act. Thereafter, farmers were dependent on the Fish and Wildlife Service for protection from wolf depredations. Beginning in early 1975, Fish and Wildlife Service trappers responded to wolf-livestock complaints by live-trapping wolves on or near the problem farms.

The Service was prohibited by the Act from killing these wolves. Therefore, Federal personnel tried translocating the wolves into remote reaches of northern Minnesota. Altogether, from 1975 through early 1978, 108 wolves were translocated. Approximately 10 percent were subsequently relocated. Radio-tracking of 19 instrumented wolves revealed that most of them left their release sites within a few days and eventually drifted back into or through areas containing livestock. It should be noted, however, that the release areas already had wolves.

Classification of the wolf in Minnesota was changed from "endangered" to "threatened" in April 1978, following recommendations of the Eastern Timber Wolf Recovery Team. This rule making allowed livestock-depredating wolves to be killed by authorized State or Federal personnel after the wolves had committed "significant depredations on lawfully present domestic animals" and "only if the taking is done in a humane manner." "Significant depredation" was later defined by the Fish and Wildlife Service as "the killing or seriously maiming of one or more domestic animals by wolves where the imminent threat of additional domestic animals being killed or severely maimed by wolves is apparent."

In 1978, 40 wolves were captured, and 26 of those were killed. During 1975-1978, 78 (47 percent) of 167 wolf captures by the Fish and Wildlife Service were at or within 5 miles of one cattle ranch.

During the summer of 1978, several environmental groups filed suit against the Fish and Wildlife Service, claiming that the Fish and Wildlife Service was not following its own regulations.

Subsequently, a Federal judge clarified what already had been implied in the Federal regulations by ordering that control trapping and killing of wolves must be done only after a significant depredation occurred and that the trapping must, as nearly as possible, be directed toward the capture of the wolf or wolves responsible (Federal Judge P. McNulty court order, July 14, 1978). To reduce the chances of catching nondepredating wolves, the Federal Court restricted trapping to 0.5 miles of the affected farms. Furthermore, killing of pups was prohibited because the judge did not consider them depredating animals. To comply as much as possible with the court order, the Fish and Wildlife Service required that three specific conditions be met before trapping could be initiated: (1) presence of a wounded animal or some remains of a livestock carcass, (2) evidence that wolves were responsible for the damage, and (3) reason to believe that additional losses would occur if the wolves were not removed. The Service's trapping program was adjusted in compliance.

During 1979-1981, the Fish and Wildlife Service initiated a new wolf program in Minnesota. The objective was to reduce livestock losses and yet take the minimum number of wolves necessary to do so.

Complaints of wolf-livestock problems were investigated by the Fish and Wildlife Service biological technicians within 24 hours to increase the chances of confirming or disproving wolf involvement. After finding livestock remains to verify that a loss had occurred (or observing wounded livestock), and obtaining hard evidence of wolf involvement, an intensive effort was made to trap the offending wolves during a 10-day period. Trapping was then

terminated if no further losses occurred, whether or not the number of wolves thought involved in the depredations were caught. This policy was based on the assumption that if no additional livestock were lost during the 10-day period, it was questionable whether the wolves would return and kill again. If further losses did occur during the period, trapping was extended an additional 10 days after each loss. In 1980, this policy was changed to allow trapping for up to 21 days in the few instances where depredations recur at a farm within the same year.

In compliance with court orders, trapping was restricted to within 0.25 miles of the farm on which the losses had occurred. Limiting the duration and area of trapping greatly increased chances that any wolf captured would be an offender. Adult wolves captured in traps were euthanized and necropsied.

Pups were released, as required by court order. Beginning in 1980, young-of-the-year captured after September were euthanized, however. By October, these young are approaching adult size and beginning to travel with their packs. They may be capable of participating in the killing of some livestock, especially sheep, by this time.

During 1979-1981, the Fish and Wildlife Service investigated 155 complaints of wolf-livestock problems. In 99 (64 percent) of these, involving 67 farms, wolves had killed or wounded livestock. Fish and Wildlife Service personnel trapped in response to 97 of the complaints. Of 83 wolves captured, 56 were killed and 27 released as pups.

Did this wolf control result in fewer losses of livestock to wolves? The results are equivocal, as no (or few) wolves were trapped at some farms, yet these same farms suffered no additional verified losses. In 1979, six farms sustained losses but no wolves were trapped; none of these farms reported verified losses in 1980. Three of six farms where wolves were trapped 1979 were the scene of losses again in 1980. Also, among 17 farms where wolves were trapped in 1979 and 1980 combined, additional losses following the trapping were verified at eight during the same year. Depredations at some farms may stop on their own even though few or no wolves are removed. At other farms, depredations continue despite wolves being captured regularly.

Alberta does control primarily during winter following the summer of depredations using strychnine baits (Gunson 1983). In the Simonette River area, the wolf population was reduced in the winter of 1979-1980 from 40 to about 13. The total number of cattle killed and/or mauled by wolves dropped from 27 to 11 as the number per wolf decreased slightly (Bjorge and Gunson 1983). Private citizens in Alberta can trap and shoot wolves under certain regulations, but use of poisons by unauthorized persons is prohibited (Gunson 1983).

British Columbia practices programs involving both site-specific, reactive control as well as some preventive control (Gunson 1983, Tompa 1983).

Compensation

Minnesota has a State law enacted in 1978 whereby up to $400 per animal is provided for livestock killed or injured by wolves. Responsibility for verifying claims of wolf depredation was given to the local conservation officer of the Department of Natural Resources. The county extension agent of the University of Minnesota Agricultural Extension Service determines the market value of the livestock.

From 1977 through 1980, the Minnesota Department of Agriculture paid farmers a total of $72,381.82 on 86 of 93 claims. On the average, about $18,100 (range $8,667-22,482) was paid to 16 farmers (range 7-22) for 21 claims (range 7-31), or approximately $865 per claim. From 1975 through 1980, total number of complaints, number of verified complaints, and the number of farms with verified losses remained fairly stable. In 1981, however, they increased.

Verifying wolf depredations on livestock can be difficult due to dense vegetation, infrequent checks of livestock, other predators, and the wolf's habits of scavenging. About 73 percent of the calves for which compensation was paid in 1979 were calves that could not be accounted for. No remains were found, and no wolf involvement was verified. Since fewer than 20 percent of the beef cattle herds in northern Minnesota are pregnancy tested, some of the calves claimed missing probably were never born (Fritts 1982).

Of the four western Canada provinces, only Alberta compensates farmers for losses of food-producing livestock to wolves. Livestock market values are established annually, and claims must exceed $100. Claims are reviewed by regional committees of private farmers and governmental representatives from animal health, production, and wildlife. Alberta pays 80 percent of assessed value for confirmed losses and 50 percent for probable losses. "Loss" includes fatality, injury from which recovery is deemed improbable, and disappearance of animals in conjunction with (present or past) confirmed kills or injuries.

Of 365 claims during 1974-1980, 244 (67 percent) included confirmed kills, with 67 (18 percent) as probable and 54 (15 percent) as missing. Of 2,347 animals approved for payment because of wolf depredations, 1,636 (70 percent) were missing.

During 1975-1980, a total of $304,993 was paid on 319 claims. On the average, $50,832 (range $29,828-85,122) was paid on 53 claims (range 44-64 per year, or about $956 per claim) (Gunson 1983).

Perspective

In review, the evidence I have examined suggests the following:

--Most wolves living near livestock areas where native prey is available do not prey on livestock. Offending animals may be either lone wolves or pack members, with lone animals perhaps showing a greater tendency to cause depredations.

--Wolf depredations on livestock are not as widespread or as serious as generally believed. Only a small percentage of farms and grazing leases in wolf range are affected annually, and a minute fraction of the livestock in the area are killed or maimed by wolves. Indeed, verified wolf depredations appear remarkably low in view of the proximity of wolves and livestock-especially in areas where husbandry practices may predispose animals to wolf predation.

--Nonetheless, a few farmers/permittees may sustain serious wolf depredations and monetary loss in a given year. However, even at chronic problem sites, losses are sporadic--both between and within years. Wolf problems appear localized, and few wolves are involved.

--Wolves prey on both sheep and cattle. There may be some selection for sheep. Wolves definitely select calves and yearlings over cows and bulls.

--Capture and removal of wolves seems to reduce losses at some farms and grazing leases, but the extent of control necessary in a particular area is not always readily apparent. At some sites, depredations cease even though few or no wolves are removed. At others, depredations recur through the years despite regular removal of wolves. Such differences may be related to (1) proximity and density of wolves to a farm or grazing lease, (2) whether a pack or transient single wolf is involved, and (3) farms or range management practices (Fritts 1982).

--Minnesota and Alberta compensate livestock producers for losses to wolves. These programs are financed by State or provincial appropriations. Some claims of livestock losses to wolves are based on the disappearance of animals. Verification can be difficult for other reasons, too.

What, then, is a responsible course of action towards wolf recovery which also reduces potential for--and resolves--conflict with livestock?

The three areas--Yellowstone, Northern Continental Divide, and central Idaho--proposed by the Northern Rocky Mountain Wolf Recovery Team for wolf recovery are primarily national park and/or wilderness areas. Typically, they have an abundance of wild ungulate prey and very few grazing leases. For the most part, wolves would be segregated from livestock.

Within these three recovery areas, a zone management system that favors wolves in a core zone while providing for control of problem wolves in all zones would appear promising. Similar zone management programs are being practiced for wolves in Minnesota and grizzly bears in the Yellowstone area.

Because few wolves are involved in verified losses and many wolves live near livestock without depredations, control should be directed toward the capture of specific offending wolves rather than local populations. Control by trained State and/or Federal personnel should be prompt, limited in area and duration, and selective.

Results of the Fish and Wildlife Service's depredation control program in Minnesota during 1979-1981 indicate that depredations can be controlled without taking large numbers of wolves.

As wolf recovery in the northern Rocky Mountains progresses, some wolf depredations on livestock may occur. Offending animals can be judged "problem" according to established criteria and controlled (either relocated or killed) according to established guidelines. The legal and operational means for accomplishing this should be in place.

In conclusion, wolf recovery in selected areas of the northern Rocky Mountains would be a manageable situation. A zone management system with an accompanying set of guidelines would provide desirable flexibility. This profile of wolf-livestock relationships should aid in developing sound guidelines.

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APPENDIX 5

PROCEDURE FOR DESIGNATING EXPERIMENTAL POPULATIONS

AUGUST 27, 1984, FEDERAL REGISTER (49 FR 33885-33894)

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; Experimental Populations

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: The U.S. Fish and Wildlife Service amends Part 17 of Title 50 of the Code of Federal Regulations in order to comply with certain changes made in the Endangered Species Act of 1973 (Act) by the Endangered Species Act Amendments of 1982 (Amendments). Part 17 is hereby amended to establish procedures for: (1) The establishment and/or designation of certain populations of species otherwise listed as endangered or threatened as experimental populations; (2) the determination of such populations as "essential" or "nonessential"; and (3) the promulgation of appropriate protective regulatory measures for such populations. This final rule is issued by the Service to amend Part 17 and implement section 10(j) of the

Endangered Species Act. This rule outlines the procedure to be utilized in designating experimental populations of listed species.

DATE: The effective date of this rule is September 26, 1984.

ADDRESSES: Questions concerning this action should be addressed to the Associate Director—Federal Assistance, U.S. Fish and Wildlife Service, Washington, D.C. 20240, Attention: Experimental populations. Comments and materials relating to this rule are available for public inspection by appointment during normal business hours (7:45–4:15 p.m.) at the Service's Office of Endangered Species, 1000 North Glebe road, Suite 500, Arlington, Virginia.

FOR FURTHER INFORMATION CONTACT: Mr. John L. Spinks, Jr., Chief, Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. 20240 (703/235–2771).

SUPPLEMENTARY INFORMATION:

Background

The Endangered Species Act Amendments of 1982, Pub. L. 97–304, became law on October 13, 1982. Among the significant changes made by the 1982 Amendments was the creation of a new section 10(j), which established procedures for the designation of specific populations of listed species as "experimental populations." Prior to the 1982 Amendments, the Service was authorized to translocate listed species into unoccupied portions of their historic range in order to aid in the recovery of the species. Significant local opposition to translocation efforts often occurred, however, due to concerns over the rigid protection and prohibitions surrounding listed species under the Act. Section 10(j) of the 1982 Amendments was designed to resolve this dilemma by providing new administrative flexibility for selectively applying the prohibitions of the Act to experimental populations of listed species.

As a result of the 1982 Amendments, the provisions of section 7 and section 9 may now be discretionarily applied to an experimental population. Section 9 stringently prohibits the taking of endangered species of fish and wildlife. The 1982 Amendments provide new flexibility under that section by authorizing the treatment of an experimental population as "threatened" even though the donor population from which the experimental population came is currently listed as endangered. Treatment of the experimental population as threatened enables the Secretary to impose less restrictive taking prohibitions under the authority of section 4(d) of the Act. As for section 7, subsection 7(a)(2) of that section prohibits Federal agencies from authorizing, funding, or carrying out any activity which would be likely to jeopardize the continued existence of an endangered or threatened species or adversely modify their critical habitats. Under the 1982 Amendments, however, experimental populations that are not "essential" to the continued existence of a species in the wild (and not located within a unit of the National Part System or National Wildlife Refuge System) are excluded from protection under section 7(a)(2) of the Act. For such species, Federal agencies would only be required under the Act to informally confer with the Fish and Wildlife Service (treating the species as if they were proposed species) under the terms of section 7(a)(4). (The provisions of section 7(a)(1) would also apply to "nonessential" experimental populations.) On the other hand, experimental populations determined to be "essential" to the survival of a species would remain subject to all of the provisions of section 7. The individual organisms comprising the designated experimental population would be removed from an existent source or "donor"s population only after it has been determined that their removal would not violate section 7(a)(2) of the Act and would comply with the permit requirements of section 10(a)(1) (A) and (d). This rule would add a new subpart to 50 CFR Part 17 governing designations of experimental populations and would allow for the identification of special rules governing experimental populations in the lists of endangered and threatened wildlife and plants.

The 1982 Amendments specified a regulatory procedure to be followed for the designation of experimental populations of listed species. In addition, the Conference Report accompanying the Amendments also provides for the conservation of experimental populations by means of written agreements or memoranda of understanding (MOU) between the Service and other Federal land managing agencies. The Conference Report indicates, however, that MOU, which may be used to address special management concerns, cannot be used as a substitute for the rulemaking process outlined in this rule to identify the location of an experimental population, to determine its essentiality, and to determine whether the establishment of the population will further the conservation of the species. The use of MOU without the promulgation of section 10(j) regulations would not relieve any of the restrictions under sections 7 and 9 otherwise applicable to the species. However, MOU may be used in appropriate cases as a substitute for additional protective regulations under section 4(d) if the Federal land managing agency has an effective management program in place that satisfies the standards of section 4(d). See H.R. Conf. Rep. No. 835, 97th Cong., 2d Sess. 34 (1982).

The designation of an experimental population would include the development of special rules to identify geographically the location of the experimental population and identify, where appropriate, procedures to be utilized in its management. The special rule for each experimental population would be developed on a case-by-case basis. It is expected that some regulations to designate an experimental population may also authorize special activities designed to contain the population within the original boundaries set out in the regulation. This will avoid law enforcement problems stemming from the inability to distinguish between fully-protected specimens of the donor population from lesser protected specimens of the experimental population.

Regulations for the establishment or designation of individual experimental populations will be issued in compliance with the informal rulemaking provisions of the Administrative Procedure Act (APA), 5 U.S.C. 553, in order to secure the benefit of public comment and address the needs of each particular population proposed for experimental designation. A rulemaking under section 10(j) will provide a minimum 30-day comment period. Because it does not involve an actual determination of endangered or threatened biological status for a species, section 10(j) rulemaking is not required to follow the usual section 4 regulatory process for listing under the Act. (However, if critical habitat is proposed, then the section 4 listing process would apply.) An experimental population is by statute given the classification of "threatened," and the section 10(j) process is primarily involved with legal determinations and the promulgation of "special rules" that can be issued under the informal rulemaking process of the APA.

Summary of Comments and Recommendations

The Service received comments from the following: Delaware Department of Natural Resources and Environmental Control; Illinois Department of Conservation; Maryland Department of

Natural Resources; Michigan Department of Natural Resources; Montana Department of Fish, Wildlife and Parks; New Mexico Department of Game and Fish; North Carolina Wildlife Resources Commission; Puerto Rico Department of Natural Resources; South Dakota Department of Game, Fish and Parks; Texas Parks and Wildlife Department; Utah Resource Development Coordinating Committee; Wisconsin Department of Natural Resources; Colorado River Water Conservation District; Oregon Department of Transportation; Texas Department of Water Resources; U.S. Department of Interior, Bureau of Reclamation (BOR); U.S. Department of Interior, Bureau of Land Management (BLM); U.S. Department of Agriculture, Forest Service (USFS); Marine Mammal Commission (MMC); Defenders of Wildlife (DW); Environmental Defense Fund (EDF); Friends of the Sea Otter; National Wildlife Federation (NWF); Wildlife Management Institute (WMI); American Mining Congress; Conoco Inc.; Northern Colorado Water Conservancy District, Colorado Water Congress (provided by Davis, Graham and Stubbs); Ecological Analysts, Inc.; National Forest Products Association (NFPA); Standard Oil Company (Indiana); Utah International Inc.; and Western Oil and Gas Association (WOGA).

Many comments expressed overall approval of the proposal. Comments of a general nature are addressed below. More specific recommendations and responses follow, organized by the section of the proposed rule to which they refer.

General Comments

Comments received from Colorado, Utah, and the USFS indicate that they find the entire designation/listing process too cumbersome and complex. According to these agencies, the procedure to be used for experimental designation was not clearly stated. The Service regrets this confusion but believes that the guidance stated in section 10(j) and the accompanying Conference Report has been followed as clearly as possible in developing these regulations. The USFS also states that Memoranda of Understanding (MOU) between agencies would be more effective in encouraging species recovery. The Service agrees that MOU are useful/viable tools in species recovery efforts, but that they should not serve as a substitute for the actual designation of an experimental population in the first instance if an experimental designation is considered the best approach for enhancing the recovery efforts. Once designated, however, MOU can be used to implement or supplement the various conservation programs for an experimental population, and under the right circumstances this would be encouraged.

WOGA requested clarification of the phrase "special management concerns" used to describe a possible use for MOU. The Service considers "special management concerns" to refer to a situation that could exist between a Federal land management agency and the Service in which some specific action, such as building a fence, providing a buffer, diverting water flow, or maintaining timber activities at a specific distance from breeding areas, would promote the conservation of a listed species. MOU could be used to implement such actions.

Concern was voiced by the Colorado River Water Conservation District (CRWCD) that an Environmental Impact Statement (EIS) should have been prepared for these proposed regulations to insure a more comprehensive analysis. BLM suggested that public involvement would strengthen the development of future experimental population regulations by utilizing the procedures identified under the National Environmental Policy Act (NEPA), and NFPA stated that an EIS should be required for the release of experimental populations on public land. In addition, comments received by WOGA recommended that criteria be established in the regulation to determine whether an EIS should be prepared with regard to the establishment of an experimental population. As for the comment from CRWCD, the Service believes that an environmental assessment is adequate and that an EIS is not required for this rulemaking. This generic regulation is procedural in nature and as such no significant impact on the quality of the human environment is anticipated. Subsequent regulations dealing with the designation and establishment of specific populations will be evaluated as to the need for the preparation of an EIS as they are developed. Moreover, there is no need to encumber these regulations with an additional section on NEPA compliance; the regulations promulgated by the Council on Environmental Quality will be followed by the Service as it complies with NEPA on future section 10(j) rulemakings. See 40 CFR Parts 1500–1508.

Several commenters discussed the scope of environmental reviews that must be prepared for "nonessential" experimental populations. DW argued that nonessential populations should be considered in NEPA analysis, in section 7(c) biological assessments, and in other environmental reviews. EDF agreed that nonessential populations, which are treated for purposes of section 7 requirements as species proposed for listing, must be discussed in biological assessments. The Service concurs with DW on the point that Federal agencies should analyze impacts on nonessential experimental populations, along with other populations of fish and wildlife, when complying with the requirements of NEPA. However, the Service notes that biological assessments under section 7(c) are not required to cover impacts to species proposed for listing. Although the Service must provide a list of all listed and proposed species that may be present in the action area to the requesting Federal agency, the biological assessment itself need only identify listed species that are likely to be affected by the action.

The purpose of the biological assessment is to facilitate compliance with section 7(a)(2)—the "jeopardy" prohibition—that applies only to listed species. The Service encourages Federal agencies to include proposed and candidate species in their biological assessments, because the early identification of project impacts may lead to the orderly resolution of potential section 7 conflicts. Nevertheless, the Service acknowledges that the inclusion of nonessential experimental populations (that are outside the boundaries of any unit of the National Wildlife Refuge System or the National Park System) in biological assessments performed under section 7(c) is at the discretion of Federal agencies.

Extensive comments were received which addressed the essential/nonessential categorization of experimental populations. New Mexico and the Colorado Water Congress/Northern Colorado Water Conservancy District believe that once a population has been designated nonessential and reintroduced into the wild, reclassification to essential and/or endangered status should not be permitted. The Service cannot categorically state that such reclassification will never occur; however, the Service deems it highly unlikely that any such action would proceed without full cooperation with the affected parties. In conjunction with this discussion, Standard Oil of Indiana commented that as populations of the same species are established, the essentiality of subsequent reintroductions would decrease. The

Service agrees with this position and believes this best describes the intent of the experimental designation, that is, to increase the recovery potential of listed species. Montana stated that the status of a population should be determined prior to its establishment. The Service concurs with this position, and through the regulatory process for each experimental population designation will require that all determinations on essentiality be made prior to any action being taken.

Colorado River Water Conservation District, BOR, and NFPA suggested that all reintroduced populations be nonessential. BOR believes all populations are being reintroduced as an "experiment" to see if expansion of the population into historic range is possible. The Colorado River Water Conservation District suggests that Congress intended that all populations be nonessential, while NFPA contends that a nonessential designation will insure flexibility and encourage cooperation. The USFS stated that they would be reluctant to enter into a management agreement with the Service for the reintroduction of an essential population. While the Service cannot agree in advance of specific rulemakings that all experimental populations will be designated as nonessential, it nevertheless concurs with the general observation that a nonessential designation would be the most advantageous to encourage cooperation and should be most actively pursued. However, the Service feels that the requirement of a determination of "essentiality" in section 10(j) indicates Congress's intent that such a designation be given consideration and that, under some circumstances, essential status is justified. Where the biological facts support an essential designation, the Service intends to make this determination. In a situation where an affected agency, organization, or individual refuses to cooperate on a reintroduction because of an essentiality designation, the Service will reevaluate the designation and, if the status remains unchanged, may withdraw the proposal.

Contrary to the comments discussed above, Ecological Analysts, Inc. and the USFS state that no species classified as endangered could have populations that are biologically nonessential to their survival. The Service disagrees with this statement, because there can be situations where the status of the extant population is such that individuals can be removed to provide a donor source for reintroduction without creating adverse impacts upon the parent population. This is especially true if captive propagation efforts are providing individuals for release into the wild. The commenters also ignore Congressional intent in explaining the "essential" determination:

> • • • The Secretary shall consider whether the loss of the experimental population would be *likely to appreciably reduce the likelihood of survival of that species in the wild.* If the Secretary determines that it would, the population will be considered essential to the continued existence of the species. The level of reduction necessary to constitute "essentiality" is expected to vary among listed species and, *in most cases, experimental populations will not be essential.*

H.R. Conf. Rep. No. 835, *supra* at 34 (emphasis added). An "essential" experimental population will be a special case, not the general rule.

Several commenters (BLM, Texas Department of Water Resources, Utah International) have stated that the proposed regulations limit the participation of affected agencies, organizations, and private landowners from taking part in the procedures utilized to designate experimental populations. The Service regrets that the proposed regulation gave this impression since this is not, and never has been, the intent of the Service. The Service encourages and seeks full participation in these procedures, and Congress obviously intended it by requiring the development or regulations which include a public comment period. The Service intends to make every effort to contact the affected parties during the development of the experimental regulation and to seek input from *all* such parties during the official comment period following publication of the proposed rule.

Comments from the Texas Department of Water Resources suggest that experimental population designations could be used to stop pending development projects which could be avoided if the Governors of each State had the right to veto inappropriate species translocations. Without question, a State may impose more restrictive taking prohibitions than those enforced by the Service. See section 6(f) of the Act. The Service acknowledges the States' authority to establish more stringent conservation measures for resident species. This section 6(f) authority reserves for the States the power to implicitly control translocation activities within their borders to the extent those activities involve takings of resident listed species which would first have to be approved by the State.

South Dakota suggests that this rule could be used as a special tool to benefit private industry or special interest groups. Conoco recommends not locating experimental populations in, or adjacent to, areas that could be subjected to development activities. In addition, the NFPA believes that experimental populations should only be located on public land.

The Service recognizes the concern expressed in these comments that section 10(j) may not be appropriately or judiciously applied. The Service can only restate that its primary concern in the application of this regulation is the recovery of listed species. It is not the Service's intent to use section 10(j) as a short-cut to be applied in every circumstance where a translocation or reintroduction has been identified as a viable recovery action. Section 10(j) will only be considered in those instances where the involved parties are reluctant to accept the reintroduction of an endangered or threatened species without the opportunity to exercise greater management flexibility on the introduced population. When selecting a site for reintroduction, biological concerns will be given primary consideration; however, all relevant factors, including economic considerations, will be weighed before any action is proposed. Additionally, the Service does not believe that private lands should be summarily excluded from consideration. If a private landowner is willing to cooperate and the site is biologically feasible, the Service believes that the site should be given full consideration.

Friends of the Sea Otter, DW, and EDF expressed concern that the Service would use section 10(j) exclusively and abandon traditional reintroduction policies, whereas Standard Oil (Indiana) believes that this Section should be used for conservation purposes only.

WOGA also believes the Service should further clarify the relationship between the prior propagation and enhancement permit authorizations in section 10(a) and the new provisions of section 10(j) of the ESA: Is section 10(j) the only authority the Service will use to establish a separate population of a listed species? The Service does not believe that the Secretary's authority to take action to enhance the recovery of a listed species is limited to the establishment of experimental populations as described in section 10(j). As discussed above, the Service believes that adequate authority, apart from section 10(j), exists to authorize translocation efforts for listed species and could be exercised in those

instances where the administrative flexibility of section 10(j) is not required. Section 10(j) was added by Congress to expand, not to limit, the Service's existing authority and range of options on the issue of transplantation.

WOGA also requested that these regulations explain the relationship of section 10(j) of the ESA to other wildlife protection statutes that may hinder the establishment of experimental populations. It must be noted that an experimental population established under section 10(j) of the ESA does not exempt that population from the restrictions imposed by other applicable Federal wildlife laws. Thus, to the extent that these rules only set forth how management flexibility can be achieved under section 10(j) for purposes of ESA (sections 7 and 9) compliance, there is no need to address any further the applicability of other Federal wildlife laws which cannot be affected by an experimental population designation under section 10(j).

The Colorado River Water Conservation District and the Colorado Water Congress/Northern Colorado Water Conservancy District have expressed concern about the stocking of endangered and threatened fish and how this relates to the experimental population regulation. The Service does not consider fish stocking per se as a method of establishing experimental populations and stocking as traditionally used by the Service is not covered by these regulations. Stocking to augment existing populations could be viewed, in some cases, as a separate activity from an experimental population reintroduction. Stocking, as traditionally used by the Service and referred to in the comments discussed here, is a method of adding additional numbers of individuals into an existing population. In most cases, this would not apply to an experimental population since geographical isolation is a prerequisite for the introduction of an experimental population, and authorized release by the Secretary must be outside the current range of the species.

New Mexico has proposed that under some circumstances experimental populations could be designated for purposes other than recovery of a listed species. For example, they suggest that certain species of listed fish could be introduced into areas for use in mosquito control. While the Service recognizes that some of the activities carried out by experimental populations could incidentally benefit the public in ways unrelated to the recovery of the species, the intent of section 10(j) was that an experimental designation only be applied when necessitated by the conservation and recovery needs of a listed species. See section 10(j)(2)(A). Consequently the Service would not support an experimental designation based on nonconservation purposes.

South Dakota asked what would happen to a State listed species if the Federal listing changed as a result of an experimental nonessential designation. For the reasons stated above regarding section 6(f), the Service believes that State laws regulating take may continue to apply and that an experimental designation will not mandate an amendment to the State list.

USFS and NWF raised concerns over the impact of the recent decision in *Sierra Club* v. *Clark*, Civil No. 5–83–254 (D. Minn. Jan. 5, 1984), *appeal pending*, on the less restrictive taking prohibitions that could apply to an experimental population under section 10(j). In the above-cited case, the court rejected the Secretary's assertion of authority to allow regulated taking of threatened species absent a showing of the need to reduce population pressures in an ecosystem which "cannot be otherwise relieved." The Service notes that Congressional intent behind authorizing an experimental population release was not to relieve pressure on an existing ecosystem but to enhance the recovery potential of a listed species. Section 10(j)'s essential purpose was to provide the Secretary sufficient flexibility so that public opposition to the release of experimental populations could be avoided:

> The [House] Committee [on Merchant Marine and Fisheries] also expects that, where appropriate, the [experimental population] regulations could allow for the directed taking of experimental populations. For example, the release of experimental populations of predators, such as red wolves, could allow for the taking of these animals if depredations occur *or if the release of these populations will continue to be frustrated by public opposition.*

H.R. Rep. No. 567, 97th Cong., 2d Sess. 34 (1982) (emphasis added). Thus, based upon the legislative history behind this section, the Service believes that the taking provisions adopted under section 10(j) would not be restricted by the ruling in *Sierra Club* v. *Clark*.

Section-by-Section Analysis

Section 17.80 Definitions.

Section 17.80(a)—WOGA and MMC have commented on the restrictive nature of the definition of "experimental population" used in the proposed regulation. WOGA expressed concern that migratory species are being excluded from the application of this regulation. They state that those situations which result in excessive overlap of experimental and nonexperimental species or, in situations which may exist after the expansion of the first generation of introduced species, are not adequately addressed in the regulation as presently stated. Their suggestion is to reword the definition to identify an "experimental population area" as an area within which all individuals will be considered experimental and outside of which they will be considered nonexperimental. The Service supports this concept but believes that if the present definition is carefully examined, it will be shown that the criterion for an experimental population area is being met in the current definition without it being expressly stated. An "experimental" designation, in conjunction with § 17.81(c)(1), requires that there be included within the regulation establishing an experimental population a description of the area in which the species will be found and where it will be identified as experimental. This establishes, in effect, an experimental population area. The Service believes that this occurs without changing the wording of the proposed regulations. Boundaries will be identified and the population within these boundaries will be experimental.

Should individuals move outside this area and commingle with nonexperimental individuals of the same species, the experimental designation will no longer apply outside the boundaries of the experimental zone. In reference to a migratory population, the entire population could be identified as experimental and thereby the location where that population is found would be the experimental population area. If a species has fixed migration patterns, then its location (including periods of overlap) is predictable.

The MMC comments focused on what they believed to be the narrow interpretation of the current definition. Their main concern was the use of the phrase "during specific periods of time" which they stated does not take into account those situations in which migration patterns may vary in such a way that separation, even though predictable, may not occur at specific periods of time. They also identify the phrase "during a portion of the year" as too restrictive and not accounting for those species which may not overlap on an annual basis. Additionally MMC recommended that the word "treated" be inserted in the fourth sentence of § 17.80(a) to add consistency to the definition. The Service concurs with

these suggestions and has made changes in the final rule accordingly.

The Colorado Water Congress/ Northern Colorado Water Conservancy District included a comment that the introduction of an experimental fish population into a river system with natural populations would result in an unacceptable implementation of this regulation in regards to separating natural and experimental populations. The Service concurs that this would result in an unreliable application of this regulation and therefore intends to review carefully all such proposals to insure that compliance with the regulation is attained.

Section 17.80(b)—Several commenters (DW, EDF, Friends of the Sea Otter) requested a wording change in the definition applied to an essential designation, by inserting the phrase "would be likely to," which was used in the Conference Report accompanying section 10(j). They suggest that this reduces the restrictive nature of the definition and corresponds more accurately with the intent of Congress. The Service concurs and the final rule has been altered to reflect this change. The American Mining Congress has commented that the Conference Report also included the statement that most experimental populations will be nonessential. The Service is aware of this statement and has earlier stated agreement with this position. However, the Service does not feel that this is an appropriate statement to include in the definition of essential/nonessential and, as such, will not amend the definition.

MMC comments suggest that other conditions may be applied to determine the essential/nonessential status of an experimental population and that standards should be used to make this determination. Although it is true that "likelihood of survival in the wild" may not be the only factor to be considered in determining essentiality and other factors could be applied, the Service chooses to abide by the language in the statute and not expand the scope of essentiality beyond "likelihood of survival." By the same token, the Service also does not choose to narrow the scope of "essentiality" by adopting the phrase "imminent danger of extinction" as suggested in the comments from WOGA. The Service believes that "likelihood of survival of a species in the wild" encompasses the possibility of extinction and that this factor will of necessity be considered in making a determination of essentiality. Also inherent in this determination is the consideration of what the potential loss of the experimental population will have on the species as a whole.

Section 17.81 Listing.

Section 17.81(a)—Comments by NWF and BOR question the restrictions put on reintroduction of experimental populations by limiting reintroduction sites to areas within probable historic range. They suggest that this is an unnecessary constraint to apply to this statute (Ecological Analysts, Inc. takes the opposite view) and that ESA contains no such restrictions. Long-standing Service policy provides that the relocation or transplantation of native listed species outside their historic range will not be authorized as a conservation measure. For conservation measures involving the transplantation of listed species, it is Service policy to restrict introductions of listed species to historic range, absent a finding by the Director in the extreme case that the primary habitat of the species has been unsuitable and irreversible altered or destroyed. The Service believes this is the most biologically acceptable approach to utilize in species introductions. Further, the purposes and policies of the Act would be violated if the Service were to regularly permit the introduction of listed species into new habitat areas as exotic species. Under sections 2(b) and 2(c)(1) of the Act, the Service must commit itself to ecosystem protection and to programs for the conservation of listed species in their natural habitats. Generally, the transplantation of listed species to non-native habitat abandons the statutory directive to conserve species in native ecosystems. Transplantation of listed species beyond historic range would subject the population to doubtful survival chances and might result in the alteration of the species' gene pool—results that are clearly contrary to the goals of the Act. Additionally, the concept of releasing any species into non-native habitat runs afoul of the spirit of Executive Order 11987, which prohibits the introduction of exotic, foreign species into the natural ecosystems of the United States. The final rule reflects the above considerations.

MMC has pointed out that the use of the word "may" is inconsistent with the regulatory requirements identified in sections 10(j)(2)(B) and 10(j)(3). The Service has clarified the final rule to plainly show that all designations of experimental populations must comply with the rulemaking requirements of 5 U.S.C. 553 and the provisions of Subpart H.

Several commenters asked whether the Service has an affirmative duty under section 10(j)(3) to evaluate for experimental status all populations of listed species that were released prior to the effective date of the 1982 ESA Amendments. The Service is clearly authorized under section 10(j)(3) to grant experimental status to populations released in areas separate from parent stock prior to the 1982 Amendments, but this authority *shall* be exercised only through the rulemaking process. The authority to undertake the review is discretionary; the regulatory process required for exercising the authority is mandatory. Therefore, although the Service may be petitioned to designate a previously-released population as experimental under section 10(j)(3), the ESA does not compel the Service to approve such a request. Such a petition would be handled in accordance with the requirements of the Administrative Procedure Act and 43 CFR Part 14.

WOGA asked whether actions taken by the Service to enhance the habitat of a listed species, which intentionally or unintentionally result in the natural expansion of that species' range, would constitute a release of an experimental population covered by section 10(j). Although proposals to establish experimental populations may include habitat improvement efforts in areas geographically separate from a species' current range, expansion of the species' range by habitat enhancement only is not eligible for section 10(j) treatment. Before a new population is released as "experimental," there must be a likelihood that the times of geographic separation are reasonable predictable for the released stock and the parent stock. The Service can not reduce protections for fish, wildlife, or plant species that expand naturally into contiguous habitat areas under authority of section 10(j).

In addition, DW suggests that the biological conditions for a release outside a species' current natural range be more clearly stated. The Service concurs with this comment and has added the phrase "into suitable natural habitat" in the final rule.

Section 17.81(b)—As a result of the comments received on this section, the Service has made several modifications in the wording. These modifications reflect suggestions by Friends of the Sea Otter, WMI, DW, and The American Mining Congress that findings by the Secretary be based on the best data available.

Other comments by WOGA and EDF indicate that the items to be considered before authorizing the release of experimental populations need to be more fully elaborated. This includes

additional findings, other than those already noted in the proposed regulation, prior to making a release. For example, both organizations suggest that experimental populations should not be authorized for release unless a reintroduction need has been identified in an approved recovery plan for that species. The Service appreciates this suggestion since recovery plans are the planning document used by the Service to track species recovery efforts. However, the Service recognizes that the writing/revision of a recovery plan is a time consuming effort and initial experimental population designations may not be identified in current plans. Moreover, now that the management option of an experimental designation is available, the Service anticipates that plans under development and scheduled for revision will begin to address this option if applicable. In any event, the Service retains the option of proposing the release of an experimental population, regardless of whether the release is documented in an approved recovery plan, if the Service determines that such action fulfills the immediate conservation need of the species.

WOGA has also identified the risk factor in releasing a population. That is, a risk to the species from a possible unsuccessful release attempt and risk to a released population because of anticipated human activity. The Service notes that the risk factor for a released population is continually under consideration. Factors relating to the success of a release effort will be reviewed in discussions with all parties involved in the project. No release will be attempted if the risk to the species is so great that it has little chance to succeed. Assessing the risk factor is inherent in the entire regulatory process. Carrying capacity of the release site, population dynamics, behavioral criteria, all items that WOGA suggests be recorded in the risk analysis, are all factors to be considered in the assessment conducted by the Service prior to proceeding with the action. The Service believes that this risk assessment analysis is covered by the finding in § 17.81(b)(s) and by its compliance with NEPA on each reintroduction proposal. WOGA also recommended the inclusion of a 17.81(g) requiring the maintenance of an administrative record. The Service contends that the regulation developed for each experimental population, along with its associated record of supporting data, analysis, and other materials, represents an adequate administrative record of the Service's assessment of an experimental population release.

WOGA and the American Mining Congress believe the Service should consider, prior to the release of a population, the effect activities being carried out by public and private organizations will have on the experimental population. Site selection for a release should take into consideration human activities. The Service concurs that this is an important factor and should be incorporated into findings assessing the potential of a release site. Paragraph (4) is added in the final rule to accommodate this concern.

Section 17.81(c)—Recommendations were made by EDF, DW, WOGA, and Friends of the Sea Otter to alter wording in several of the procedures found in this section. Both EDF and DW reiterated the position regarding section 10(j)(2)(B) that requires the Secretary to utilize the best information available in making a determination of essentiality. The Service concurs and § 17.81(c)(2) is altered to reflect this position. Friends of the Sea Otter, DW, Illinois Department of Conservation, and WOGA have suggested wording changes in § 17.81(c)(3) which the Service recognizes as helpful in clarifying the intent and has incorporated them in this section (especially the phrase "isolate the experimental population from the natural population" provided by DW which accurately represents the position of the Service). WOGA requested a provision be added to require a map of the release site. Inasmuch as the Service does not recognize the need to establish an "experimental population area" per se as discussed previously, this change will not be made.

EDF, DW, and WOGA have all recommended a provision be added to the regulation to require a periodic review and assessment of the release in terms of the conservation and recovery of the species. The Service concurs with this comment and a provision expressing this action has been added in the final rule.

Section 17.81(d)—Comments were received from New Mexico Department of Game and Fish, Oregon Department of Transportation, MMC, Utah International Inc., Conoco, Colorado Water Congress/Northern Colorado Water Conservancy District, BLM, Standard Oil (Indiana), American Mining Congress, Friends of the Sea Otter, DW, EDF, WMI, and WOGA on this section. All comments, with the exception of WMI, recommended expanding the scope of the consulting procedures during the development and implementation of the experimental population regulation. The service is anxious to assure all commenters that no affected party will be knowingly excluded from the process. The Service feels the primary cooperators in this effort would be the States and affected Federal land managing agencies, and the Service concurs with New Mexico that the State wildlife agencies would be a primary contact in this endeavor. The Service believes that in most instances the State wildlife agencies would take the lead in the implementation of these regulations. By the same token, the Service will seek the involvement of all interested parties. Comments on proposed experimental populations will be sought from the public, concerned governmental agencies, the scientific community, industry, private interest, and other interested parties. To encourage and insure participation in this activity, the Service generally accepts the recommendations provided and has amended the final rule accordingly.

WOGA requested that several specific procedures be added to the experimental population regulations. Among these were: (1) A requirement that actual notice of a proposed experimental population be given to certain interested parties not less than 6 months before the publication of the proposed rule; and, (2) the requirement of a public meeting at least 60 days before publication of a proposed rule to establish an experimental population. The Service notes that these suggested procedures are not provided for in section 10(j), which only requires that the Service proceed "by regulation" (*i.e.*, in accordance with 5 U.S.C. 553). Because the Service does not want to unnecessarily complicate the experimental population regulatory process with specific notice and hearing requirements, WOGA's suggested procedures have not been adopted. However, the Service emphasizes that notice of all proposed experimental populations will be disseminated in a manner that encourages full involvement of interested parties in the rulemaking process. Section 10(j) was added by the 1982 ESA Amendments to give the Service more flexibility in establishing new populations of listed species; the Service intends to implement this Congressional goal while consulting with all interested parties throughout the experimental population process.

WMI recommended the work "wildlife" be substituted for the work "game." The Service concurs in the final rule.

The American Mining Congress stated that MOU are an excellent way to foster

cooperation and involvement in the experimental population regulatory process and suggests that their use be encouraged in the regulation. The Service feels that there is nothing in the regulation that restricts the use of MOU other than to state that they cannot be used as a substitute for an experimental population regulation in the first instance. MOU can be developed in cooperation with an organization (public or private) or individuals that are working with the Service toward the management of an experimental population. The Service favors the use of MOU for purposes of implementing management programs, and under some circumstance would encourage them, but does not feel that they should be required by regulation. The Service regrets any misunderstanding concerning the use of MOU but does not believe their use should be specifically required in this section.

Section 17.81(f)—DW suggests that this section is confusing and unnecessarily restricts the designation of critical habitat for essential experimental populations. The third sentence of this section restricts the designation of critical habitat in areas of overlap. The Service believes that this is a valid restriction and should not be modified. New Mexico expressed concern that the designation of critical habitat be based on the strict interpretation of the Act and that no critical habitat be designated for nonessential experimental populations. The Service concurs with this view and intends to strictly adhere to the provision outlined in section 4 of the Act when designating critical habitat. The Service restates that no critical habitat will be designated for a nonessential population. The wording of this section has been modified in the final rule for the sake of clarity.

Section 17.82 Prohibitions.

MMC expressed concern that by stating "all the applicable prohibitions" this regulation may be inadvertently excluding pertinent applicable prohibitions from other statutes. The Service agrees and amends the final rule accordingly. The Colorado Water Congress/Northern Colorado Water Conservancy District are concerned that prohibitions discussed in this section might interfere with stocking efforts and may result in an imposition on development activities. The Service can only restate that fish stocking as a traditional management tool would not be applicable to an experimental designation. In those circumstances where fish can be introduced into the wild as experimental, the prohibitions implemented under Section 4(d) of the Act would apply.

Section 17.83 Interagency Cooperation.

MMC recommended that the regulation take into account the possibility of Park systems and Refuge systems expansion. On the other hand, WOGA urged the Service to restrict this Section to only those areas of the National Park System and National Wildlife Refuge System in existence as of the effective date of any rule establishing an experimental population. The Service concurs with the MMC comment as fulfilling Congressional intent and amends the final rule accordingly.

BOR requests clarification of the specific section 7 requirements for a nonessential population determined to be in the project area. The Service believes that an informal "conference" (section 7(a)(4)) with the Service is proper and § 17.83 follows this interpretation. DW notes that the provisions of section 7(a)(1) apply to nonessential experimental populations. The preamble has been amended to reflect this coverage.

WOGA has presented a detailed discussion on the dichotomy of the use of the term "species" relating to section 7 of the Act. When used in § 17.80(b), the term represents the entire population (existing population plus proposed experimental population), and when used in § 17.83, it is limited to experimental populations. They believe this contradiction limits the practical utility of these regulations and may result in increased conflicts under section 7. The Service's intent was to consider experimental populations and nonexperimental populations as one listed species for the purposes of section 7 analysis. The Service regrets this confusion and has clarified § 17.83 accordingly.

Executive Order 12291, Paperwork Reduction Act, and Regulatory Flexibility Act

The U.S. Fish and Wildlife Service has determined that this is not a major rule as defined by Executive Order 12291; that the rule would not have a significant economic effect on a substantial number of small entities as described in the Regulatory Flexibility Act (Pub. L. 96-354); and that the rule as proposed does not contain any information collection or recordkeeping requirements as defined in the Paperwork Reduction Act of 1980 (Pub. L. 96-511).

The rule is procedural in nature and principally implements the 1982 Amendments to the Endangered Species Act. In so doing, the final rule conforms agency practice to new requirements of the Amendments. Any potential effects of such compliance stem directly from legislation and cannot be evaluated as independent effects of the final rule.

National Environmental Policy Act (NEPA)

An Environmental Assessment (EA) under NEPA has been prepared and is available to the public at the Office of Endangered Species, U.S. Fish and Wildlife Service at the address listed above. Based upon the information considered in the EA, a decision has been made that the preparation of an Environmental Impact Statement is not required for this action.

Author

The principal author of this proposal is Peter G. Poulos, Office of Endangered Species, U.S. Fish and Wildlife Service, Washington, D.C. (703/235-2760).

List of Subjects in 50 CFR Part 17

Endangered and threatened wildlife, Fish, Marine mammals, Plants (agriculture).

Proposed Regulation Promulgation

Accordingly, it is proposed to amend Part 17 of Chapter I of Title 50 of the Code of Federal Regulations as set forth below:

PART 17—(AMENDED)

1. The authority citation for Part 17 reads as follows:

Authority: Pub. L. 93-205, 87 Stat. 884; Pub. L. 94-359, 90 Stat. 911; Pub. L. 95-632, 92 Stat. 3751; Pub. L. 96-159, 93 Stat. 1225; Pub. L. 97-304, 96 Stat. 1411 (16 U.S.C. 1531 *et seq.*).

2. Part 17 is amended by adding to the table of contents the following new Subpart H:

* * * * * *

Subpart H—Experimental Populations

Sec.
17.80 Definitions.
17.81 Listing.
17.82 Prohibitions.
17.83 Interagency cooperation.
17.84 Special rule—vertebrates. [Reserved]
17.85 Special rule—invertebrates. [Reserved]
17.86 Special rules—plants. [Reserved]

3. Part 17 is amended by revising § 17.11(f)(2) to read as follows:

§ 17.11 Endangered and threatened wildlife.

* * * * *

(f)(1) * * *

(2) The "Special Rules" and "Critical Habitat" columns provide a cross

reference to other sections in Parts 17, 222, 226, or 227. The "Special Rules" column will also be used to cite the special rules that describe experimental populations and determine if they are essential or nonessential. Separate listing will be made for experimental populations, and the status column will include the following symbols: "XE" for an essential experimental population and "XN" for a nonessential experimental population. The term "NA" (not applicable) appearing in either of these two columns indicates that there are no special rules and/or critical habitat for that particular species. However, all other appropriate rules in Parts 17, 217–227, and 402 still apply to that species. In addition, there may be other rules in this Title that relate to such wildlife, e.g., port-of-entry requirements. It is not intended that the references in the "Special Rules" column list all the regulations of the two Services which might apply to the species or to the regulations of other Federal agencies or State or local governments.

* * * * *

4. Part 17 is further amended by revising § 17.12(f)(2) to read as follows:

§ 17.12 Endangered and threatened plants.

* * * * *

(f) * * *

(2) The "Special Rules" and Critical Habitat" columns provide a cross reference to other sections in Parts 17, 222, 226, or 227. The "Special Rules" column will also be used to cite the special rules which describe experimental populations and determine if they are essential or nonessential. Separate listings will be made for experimental populations, and the status column will include the following symbols: "XE" for an essential experimental population and "XN" for a nonessential experimental population. The term "NA" (not applicable) appearing in either of these two columns indicates that there are no special rules and/or critical habitat for that particular species. However, all other appropriate rules in Parts 17, 217–227, and 402 still apply to that species. In addition, there may be other rules in this Title that relate to such plants, e.g., port-of-entry requirements. It is not intended that the references in the "Special Rules" column list all the regulations of the two Services which might apply to the species or to the regulations of other Federal agencies or State or local governments.

5. Part 17 is further amended by adding a new Subpart H as follow:

Subpart H—Experimental Populations

§ 17.80 Definitions.

(a) The term "experimental population" means an introduced and/or designated population (including any off-spring arising solely therefrom) that has been so designated in accordance with the procedures of this subpart but only when, and at such times as the population is wholly separate geographically from nonexperimental populations of the same species. Where part of an experimental population overlaps with natural populations of the same species on a particular occasion, but is wholly separate at other times, specimens of the experimental population will not be recognized as such while in the area of overlap. That is, experimental status will only be recognized outside the areas of overlap. Thus, such a population shall be treated as experimental only when the times of geographic separation are reasonably predictable; *e.g.*, fixed migration patterns, natural or man-made barriers. A population is not treated as experimental if total separation will occur solely as a result of random and unpredictable events.

(b) The term "essential experimental population" means an experimental population whose loss would be likely to appreciably reduce the likelihood of the survival of the species in the wild. All other experimental populations are to be classified as "nonessential."

§ 17.81 Listing.

(a) The Secretary may designate as an experimental population a population of endangered or threatened species that has been or will be released into suitable natural habitat outside the species' current natural range (but within its probable historic range, absent a finding by the Director in the extreme case that the primary habitat of the species has been unsuitably and irreversibly altered or destroyed), subject to the further conditions specified in this section; *provided*, that all designations of experimental populations must proceed by regulation adopted in accordance with 5 U.S.C. 553 and the requirements of this subpart.

(b) Before authorizing the release as an experimental population of any population (including eggs, propagules, or individuals) of an endangered or threatened species, and before authorizing any necessary transportation to conduct the release, the Secretary must find by regulation that such release will further the conservation of the species. In making such a finding the Secretary shall utilize the best scientific and commercial data available to consider:

(1) Any possible adverse effects on extant populations of a species as a result of removal of individuals, eggs, or propagules for introduction elsewhere;

(2) The likelihood that any such experimental population will become established and survive in the foreseeable future;

(3) The relative effects that establishment of an experimental population will have on the recovery of the species; and

(4) The extent to which the introduced population may be affected by existing or anticipated Federal or State actions or private activities within or adjacent to the experimental population area.

The Secretary may issue a permit under section 10(a)(1)(A) of the Act, if appropriate under the standards set out in subsections 10(d) and (j) of the Act, to allow acts necessary for the establishment and maintenance of an experimental population.

(c) Any regulation promulgated under paragraph (a) of this section shall provide:

(1) Appropriate means to identify the experimental population, including, but not limited to, its actual or proposed location, actual or anticipated migration, number of specimens released or to be released, and other criteria appropriate to identify the experimental population(s);

(2) A finding, based solely on the best scientific and commerical data available, and the supporting factual basis, on whether the experimental population is, or is not, essential to the continued existence of the species in the wild;

(3) Management restrictions, protective measures, or other special management concerns of that population, which may include but are not limited to, measures to isolate and/or contain the experimental population designated in the regulation from natural populations; and

(4) A process for periodic review and evaluation of the success or failure of the release and the effect of the release on the conservation and recovery of the species.

(d) The Fish and Wildlife Service shall consult with appropriate State fish and wildlife agencies, local governmental entities, affected Federal agencies, and affected private landowners in developing and implementing experimental population rules. When appropriate, a public meeting will be conducted with interested members of the public. Any regulation promulgated pursuant to this section shall, to the

maximum extent practicable, represent an agreement between the Fish and Wildlife Service, the affected State and Federal agencies and persons holding any interest in land which may be affected by the establishment of an experimental population.

(e) Any population of an endangered species or a threatened species determined by the Secretary to be an experimental population in accordance with this subpart shall be identified by special rule in § 17.84–§ 17.86 as appropriate and separately listed in § 17.11(h) (wildlife) or § 17.12(h) (plants) as appropriate.

(f) The Secretary may designate critical habitat as defined in section (3)(5)(A) of the Act for an essential experimental population as determined pursuant to paragraph (c)(2) of this section. Any designation of critical habitat for an essential experimental population will be made in accordance with section 4 of the Act. No designation of critical habitat will be made for nonessential populations. In those situations where a portion or all of an essential experimental population overlaps with a natural population of the species during certain periods of the year, no critical habitat shall be designated for the area of overlap unless implemented as a revision to critical habitat of the natural population for reasons unrelated to the overlap itself.

§ 17.82 Prohibitions.

Any population determined by the Secretary to be an experimental population shall be treated as if it were listed as a threatened species for purposes of establishing protective regulations under section 4(d) of the Act with respect to such population. The Special rules (protective regulations) adopted for an experimental population under § 17.81 will contain applicable prohibitions, as appropriate, and exceptions for that population.

§ 17.83 Interagency cooperation.

(a) Any experimental population designated for a listed species (1) determined pursuant to § 17.81(c)(2) of this subpart not to be essential to the survival of that species and (2) not occurring within the National Park System or the National Wildlife Refuge System, shall be treated for purposes of section 7 (other than subsection (a)(1) thereof) as a species proposed to be listed under the Act as a threatened species.

(b) Any experimental population designated for a listed species that either (1) has been determined pursuant to § 17.81(c)(2) of this subpart to be essential to the survival of that species or (2) occurs within the National Park System or the National Wildlife Refuge System as now or hereafter constituted, shall be treated for purposes of section 7 of the Act as a threatened species. Notwithstanding the foregoing, any biological opinion prepared pursuant to section 7(b) of the Act and any agency determination made pursuant to section 7(a) of the Act shall consider any experimental and nonexperimental populations to constitute a single listed species for the purposes of conducting the analyses under such sections.

§ 17.84 Special rules—vertebrates. [Reserved]

§ 17.85 Special rules—invertebrates. [Reserved]

§ 17.86 Special rules—plants. [Reserved]

Dated: July 17, 1984.

G. Ray Arnett,

Assistant Secretary for Fish and Wildlife and Parks.

[FR Doc. 84–22870 Filed 8–24–84; 8:45 am]

BILLING CODE 4310–55–M

APPENDIX 6

FISH AND WILDLIFE SERVICE
AND
ANIMAL DAMAGE CONTROL CONTACTS

U.S. Fish and Wildlife Service	Office Phone #	Home Phone #
Wayne Brewster, State Supervisor Fish and Wildlife Enhancement	(406) 449-5225 (FTS 585-5225)	(406) 443-7348
Dale Harms, Senior Staff Biologist Fish and Wildlife Enhancement	(406) 449-5225 (FTS 585-5225)	(406) 475-3810
Joel Scrafford, Law Enforcement Senior Resident Agent	(406) 657-6340 (FTS 585-6340)	(406) 656-0056
Terry Grosz, Assistant Regional Director, Law Enforcement, Denver	(303) 236-7540 (FTS 776-7540)	(303) 674-1653

Animal Damage Control		Telephone #
IDAHO		
State Animal Damage Control Office		
C. Joe Packham State Director	Boise, Idaho	208/334-1440
Western District Office		
Michael V. Worthen Assistant State Director	Boise, Idaho	208/334-1440
Central District Office		
William L. Bell District Supervisor	Twin Falls, Idaho	208/733-4531
Eastern District Office		
Richard H. Phillips District Supervisor	Pocatello, Idaho	208/236-6921
MONTANA		
State Office and (Warehouse)		
William W. Rightmire State Director	Billings, Montana	406/657-6464 FTS 585-6464
Jeanne C. Swich Staff	Billings, Montana	406/657-6464 FTS 585-6464
Grace M. Englund Staff	Billings, Montana	406/657-6464 FTS 585-6464

Larry E. Lundquist Pilot	Billings, Montana	406/657-6464 FTS 585-6464
<u>District 1</u>		
Paul J. Hoover District Supervisor	Columbus, Montana	406/322-4303
John E. Bouchard ADC Specialist	Harlowton, Montana	406/632-5829
Paul E. Bucklin ADC Specialist	Chinook, Montana	406/357-2422
Richard R. Martin ADC Specialist	Columbus, Montana	406/322-5287
Dale R. Meeks ADC Specialist	Hubson, Montana	406/423-5598
James L. Rost ADC Specialist	Springdale, Montana	406/932-6749
Michael H. Thomas ADC Specialist	Roundup, Montana	406/323-2145
<u>District 2</u>		
James M. Laughlin District Supervisor	Miles City, Montana	406/232-2536
Alan G. Brown ADC Specialist	Kinsey, Montana	406/232-4165
John P. Maetzold ADC Specialist	Jordan, Montana	406/557-6261
John A. Pachl ADC Specialist	Forsyth, Montana	406/356-7300
Thomas L. Ryan ADC Specialist	Jordan, Montana	406/557-2421
Wesley T. Scott ADC Specialist	Glasgow, Montana	406/228-8577
(INT) Daniel C. Thomason ADC Specialist	Terry, Montana	406/637-5535
<u>District 3</u>		
Carter C. Niemeyer District Supervisor	E. Helena, Montana	406/449-5468 FTS 585-5468
Dennis R. Biggs ADC Specialist	Belgrade, Montana	406/388-6800

Roy R. Carpenter ADC Specialist	Dillon, Montana	406/683-2497
(INT) Michael S. DeMers ADC Specialist	Helena, Montana	406/227-5434
Jerry G. Lewis ADC Specialist	Missoula, Montana	406/777-3151
Henry L. Overcast ADC Specialist	Sheridan, Montana	406/842-5748
James O. Stevens ADC Specialist	Helena, Montana	406/458-9281
Kenneth E. Wheeler ADC Specialist	Valier, Montana	406/279-3687

WYOMING

Casper

Robert Reynolds State Director	Casper, Wyoming	307/261-5340
Lyle Crosby Asst. State Director	Casper, Wyoming	307/261-5341

Lusk

Larid Johnson District Supervisor	Lusk, Wyoming	307/334-2478
Kelly Artery ADC Specialist	Wheatland, Wyoming	307/322-9333
Arnie DeBock ADC Specialist	Laramie, Wyoming	307/742-0910
Chuck Graf ADC Specialist	Upton, Wyoming	307/468-9276
Dale Greenough ADC Specialist	Lusk, Wyoming	307/334-3603
Casey Hunter ADC Specialist	Yoder, Wyoming	307/532-5303
Mark Huseby ADC Specialist	Hulett, Wyoming	307/467-5367

Natrona

Kelly Glause ADC Specialist Supv.	Evansville, Wyoming	307/234-8940

Andy Van Patten ADC Specialist	Powder River, Wyoming	307/472-7055
<u>Rock Springs</u>		
Craig Maycock District Supervisor	Rock Springs, Wyoming	307/362-7238
Glen Bredthauer ADC Specialist Pilot	Rock Springs, Wyoming	307/362-3656
Jed Edwards ADC Specialist	Rock Springs, Wyoming	307/382-3488
Val Erickson ADC Specialist	Afton, Wyoming	307/886-3738
Kent Officer ADC Specialist	Lyman, Wyoming	307/786-2861
Kent Robb ADC Specialist	Rock Springs, Wyoming	307/382-2570
<u>Worland</u>		
Dennis Goyn District Supervisor	Worland, Wyoming	307/347-2027
Ralph Braddock ADC Specialist	Lysite, Wyoming	307/876-2672
Chuck Bunch ADC Specialist	Thermopolis, Wyoming	307/864-2602
Jack Clucas ADC Specialist	Shell, Wyoming	307/765-2946
Ken Deromedi ADC Specialist	Worland, Wyoming	307/347-4621
Ken Metzler ADC Specialist	Shoshoni, Wyoming	307/856-4965
Glenn Morris ADC Specialist	Sheridan, Wyoming	307/674-6760
Sherman Patrick ADC Specialist	Worland, Wyoming	307/347-4794
Harold Weeks ADC Specialist	Basin, Wyoming	307/568-2403

APPENDIX 7

Northern Rocky Mountain Wolf Recovery Plan

List of Reviewers

December 30, 1986, Draft

Code
State-Category-Number

Categories

I = Industry
N = Individual
E = Environmental
G = Government

Group I = Industry

MT-I-1	Jack Eidel, Montana Stockgrowers Assoc. Inc.
MT-I-2	Jim Courtney, Montana Public Lands Council
MT-I-3	Bob Gilbert, Montana Wool Growers Assoc.
ID-I-4	Stan Boyd, Idaho Wool Growers Assoc.
WY-I-5	Carolyn Paseneaux, Wyoming Wool Growers Assoc.
UT-I-6	Jeff Siddoway, National Wool Growers Assoc.
ID-I-7	David Mabe, Idaho Farm Bureau Federation

Group N = Individual

CO-N-1	Ron McFarland, Durango, CO
NY-N-2	Tom McNamee, New York, NY

Group E = Environmental

DC-E-1	Joyce Kelly, Defenders of Wildlife
MT-E-2	Ken Frazier, Montana Wildlife Federation
MT-E-3	Ed Lewis, Greater Yellowstone Coalition
WY-E-4	Linelle Wagner, Wyoming Chapter-Sierra Club
CO-E-5	Kerry Rydberg, Sierra Club Legal Defense Fund, Inc.
MT-E-6	Albert Harting, National Wildlife Federation
CT-E-7	Renee Askins, The Wolf Fund
NY-E-8	Clifford Rice, New York Zoological Society
DC-E-9	Whitney Tilt, National Audubon Society
ID-E-10	Scott Ploger, Idaho Environmental Council

Group G = Government
(F)=Federal; (S)=State

MT-G(F)-1	Gilbert Lusk, USDI, National Park Service, Glacier National Park, MT
WY-G(F)-2	Robert Barbee, USDI, National Park Service, Yellowstone National Park, WY
WY-G(S)-3	Francis Petera, Wyoming Game and Fish Department
WY-G(F)-4	Jack Stark, USDI, National Park Service, Grand Teton National Park, WY

Group G = Government (cont.)

MT-G(F)-5	James Overbay, USDA, Forest Service, Reg. 1, MT
ID-G(S)-6	Jerry Conley, Idaho Fish and Game
MT-G(S)-7	Ted Schwinden, Gov. and Montana Fish, Wildlife and Parks
MT-G(F)-8	John Moorhouse, USDI, Bureau of Land Management, Billings, MT
MD-G(F)-9	Russell Hall, FWS, Patuxent NWR Center
DC-G(F)-10	Bert Hawkins, USDA, Animal and Plant Health Inspection Service, Washington, D.C.

APPENDIX 8

CHANGES/ADDITIONS
TO THE
NORTHERN ROCKY MOUNTAIN WOLF RECOVERY PLAN

BASED ON THE

CONTENT SUMMARY ANALYSIS

OF

FINAL REVIEW COMMENTS

May 1987

Background

The Service has revised the recovery plan for the Northern Rocky Mountain wolf based on new information that has become available since the original plan was approved in 1980. The revised draft plan was distributed to technical "experts" and involved agencies and individuals during the technical and agency draft review periods. However, wolf recovery and, more specifically, the proposed reintroduction of wolves into Yellowstone remain extremely sensitive and controversial issues. Because of the controversial nature of the program and the many possible or perceived impacts and concerns associated with it, additional review and evaluation of the draft recovery plan were necessary. On December 30, 1986, the Fish and Wildlife Service (Service) distributed the draft revised Northern Rocky Mountain Wolf Recovery Plan to interested or affected groups and agencies for review. To facilitate the incorporation of comments received during the review period, a Content Summary Analysis was conducted. The content analysis was then used to help identify appropriate changes/additions needed in the plan. The following summarizes the substantial changes/additions made to the recovery plan (by recovery issue) as a result of the comments received during the latest review period.

Recovery Goals

- Change/Addition: The tertiary objective was revised to incorporate a provision allowing for possible consideration of reclassifying an individual population to threatened under similarity of appearance once recovery goals are met and verified, special regulations are promulgated, and a suitable management plan is in place for that population.

  Rationale: The recovery plan identifies three distinct recovery areas that are geographically isolated from one another. Downlisting a population in one recovery area to threatened status when that population reaches its recovery goals takes advantage of the management flexibility provided under the Endangered Species Act without sacrificing protection of the species. Using the same logic, it makes little sense to keep managing a population as endangered or threatened after it has reached population levels identified in the tertiary objective of the recovery plan. The option of reclassifying such a population to a "listed under similarity of appearance" designation could be considered once recovery levels have been established and verified, special regulations for management of the population have been developed, and an acceptable State management plan is in place to ensure sufficient protection. This action would recognize the population is not biologically threatened, a legal status defined for species believed likey to become endangered within the forseeable future, and would also provide the State with additional management flexibility including control options while still providing/ensuring some protection for the subject population as well as for the species as a whole.

- Change/Addition: A new Task 22 was added that states: "Consider reclassifying a population to threatened under similarity of appearance after the tertiary objectives for the population have been achieved and verified, special regulations are established, and an acceptable State management plan is in place for that population."

  Rationale: See rationale above.

- Change/Addition: The definition of breeding pair in the Glossary was revised to, "two wolves of the opposite sex, that mate and produce offspring."

  Rationale: Some reviewers felt the term and definition of "breeding pair" was misleading as it pertained to wolves. A breeding pair was defined as "two wolves of opposite sex, capable of producing offspring." The word capable was in question, as in a wolf pack, one pair may actually breed, but several pairs could be termed capable of breeding. Thus, the definition was revised for clarification.

Reintroduction

- Change/Addition: A brief discussion of the "essential" and "nonessential" categories of experimental populations was added.

  Rationale: The narrative section under Task 333 provided some discussion on the "essential" category of experimental populations. Additional details on protection and management of a "nonessential" population was added to balance discussion of the two options. Further evaluation of these options will be (more appropriately) addressed during promulgation of the proposed rulemaking and preparation of National Environmental Policy Act documents on the reintroduction proposal.

- Change/Addition: The section on the different management options and possible levels of protection to be afforded any experimental population established in Yellowstone was expanded. (See Tasks 333 & 333-3.)

  Rationale: Concern was expressed that the level of protection to be offered any experimental population established in Yellowstone was unclear. Since there are a variety of possible management options for dealing with an experimental population and further evaluation of these options will, and rightfully should, occur during formulation of a special rule and preparation of any National Environmental Policy Act documents, a brief summary of possible options was added under Task 333-3.

Control

- Change/Addition: Task 382 was restructured to emphasize the need for close coordination/integration of ungulate management programs and wolf management and control.

  Rationale: Concern was expressed regarding what actually constitutes "significant" conflict between wolf predation and State big game management objectives and that, in reality, there would be little chance of such control being implemented. Wolf management must be closely coordinated with State management of ungulate populations. Monitoring of ungulate populations will be essential to track predation rates, calf survival rates, population trends, etc. In addition, modeling can be used to provide insight into the effects of wolf predation under different management scenarios (wolf and ungulate population levels). Specific wolf management objectives should be incorporated into ungulate management

scenarios including provisions for regulated control of those wolf populations preying on specific ungulate populations, as necessary. As with management of any large predator, even though the actual number of wolves may be below recovery levels, socioeconomic factors must be considered in setting management goals to maximize public support and acceptance of coexistence with this predatory and ecologically important species. One of the major threats to the Northern Rocky Mountain wolf is illegal killing, and such malicious killing often stems from fear, hostility, and misinformation. This threat can be somewhat ameliorated through public information and education programs. However, implementation of a practical management program fully integrated with ungulate management is essential as well. In this case, recovery can best be accomplished through a flexible management program which allows for limited control of wolves. This would still involve taking of only the minimum number of wolves, thus allowing progress toward recovery and at the same time ensuring survival of the species.

- Change/Addition: A statement was added to the narrative under Task 373 that, "While trapping efforts on wolves in Minnesota indicate little incidence of serious injury to captured animals, all trapping activities will be conducted in such a way as to minimize the risk of injury or mortality."

  Rationale: Concern was expressed that techniques utilized in any trapping activities be consistent with recovery objectives and thus minimize the chances of injury or mortality of wolves during such handling. Reports from Minnesota and other areas where extensive trapping of wolves has been conducted indicate little incidence of permanent injury to trapped animals.

- Change/Addition: General information was added to the narrative under Task 382-5 regarding procedures for dealing with the accidental trapping of a wolf (as in the course of conducting coyote control). A list of Service and Animal Damage Control contacts was also added as a new Appendix.

  Rationale: While the chances of a trapper accidentally capturing a wolf are relatively low due to the differing trap size, there is still a chance that a wolf may be trapped accidentally. In such instances, clearcut guidelines need to be established (and made known to all trappers in potential wolf areas) on what to do in the case of such an accidental trapping.

- Change/Addition: The narrative under Task 382-5 was restated in the form of recommendations for making recreational/commercial trapping more compatible with wolf recovery.

  Rationale: Previous language under this task apparently was interpreted to mean more restrictive State trapping regulations. It is unlikely that State regulations and statutes would be altered. However, if such changes were imposed, it would undoubtedly bring about strong resistance and resentment from local trappers and, thus, would probably have a negative impact on wolf recovery. Since much of the area to be designated for wolf recovery will probably have little or no coyote trapping activity, the chances of potential conflict appear to be minimal. Recommendations provided under this task are simply provided as guidance for minimizing potential injuries or wolf mortality.

- Changes/Additions: Task 377 was modified and restated under Task 333-3 along with several different options for management of an experimental Yellowstone wolf population. These options will be further evaluated during the scoping process for any proposed reintroduction.

  Rationale: Considerable concern was expressed regarding Task 377 which called for allowing livestock owners to take depredating wolves, under certain circumstances, as part of establishment of an experimental population in Yellowstone. Many respondents opposed the provision due to the potential for abuse, the fact that the restrictions would not be enforceable, and that other provisions were in place already to deal with problem wolves. Others felt the boundaries (allowing control only within 1 mile of the depredation site) were too restrictive. Several different management options will be considered in association with establishment of an experimental population in Yellowstone. Each of these options will be fully evaluated during the scoping process with ample time for public input provided during publication of a proposed rule in the Federal Register and preparation of the necessary National Environmental Policy Act documents.

Compensation

- Change/Addition: A statement was added under Task 376 concerning the possibility of developing a compensation program specifically in association with establishment of an experimental population in Yellowstone. A sentence was also added to clarify that any such compensation program would not, could not, be viewed as the sole solution to the depredation problem.

  Rationale: There is mixed support for establishment of a compensation program. One possible scenario would be to implement such a program in association with establishment of an experimental population in Yellowstone. Compensation for livestock lost to wolves may serve to dispel some of the negative attitudes toward wolf recovery but cannot be viewed as the sole solution to the problem. Necessary control actions must be implemented in a timely manner to deal with any reoccurring problems.

Effects on Other Species

- Change/Addition: As mentioned earlier, Task 382 was restructured to emphasize the importance of integrating/coordinating wolf management objectives with ungulate management and the possible options/scenarios to be considered in managing prey species.

- Rationale: Wolf management must be closely coordinated with State management of ungulate populations. Monitoring and modeling of ungulate populations will be essential to track predation rates, calf survival rates, population trends, etc. It must be noted that in the initial stages of wolf recovery, wolf numbers will, of course, be very low, and, as a result, it is expected they will have little impact on prey populations. As wolf numbers increase and goals for the individual populations are reached, such populations may be reclassified to threatened allowing for additional management flexibility in controlling wolves. In addition, once

wolf populations reach sufficient size, they may be considered for reclassification to threatened by similarity of appearance (if special regulations are promulgated and a State management plan is in place). This classification, or possible delisting once all populations reach recovery levels, will provide even greater management options including possible initiation of sport trapping or hunting of wolves.

- Change/Addition: The discussion of the effects of wolf predation on ungulate populations on page 73 was expanded.

- Rationale: See rationale above.

Management Zones

- Change/Addition: Additional language was added under Task 34 to further clarify the distinction between management zones and travel corridors.

- Rationale: Concern was expressed that dispersal corridors would unnecessarily restrict multiple use. Other respondents felt corridors received only scant treatment in the plan and/or that the distinction between travel corridors and management zones should be clarified. The Service and recovery team believe that such areas are important, particularly to those recovery areas relying on natural reestablishment to meet recovery objectives. Corridors may also play an important part in maintaining gene flow between otherwise isolated populations in the future. Identification of dispersal corridors is not expected or intended to change multiple-use management. Management in such corridor areas will be directed at preventing human-caused mortality and adhering to big game management guidelines.

National Environmental Policy Act

- Change/Addition: The timeframe for development/preparation of appropriate National Environmental Policy Act documents was revised from 1 to 2 years.

- Rationale: Due to the controversial nature of wolf recovery and, more specifically, reintroduction of wolves into Yellowstone National Park, the timeframe needed for full evaluation of options, allowing for public input and comment will, in all likelihood, exceed 1 year.

Other

- Change/Addition: A statement was added to Task 383 noting that condemnation would not be a desirable method of securing private lands essential for wolf recovery.

  Rationale: Considerable concern was expressed regarding the securing of management authority over private lands considered essential for recovery of the wolf. Proposing or leaving the impression that lands would be obtained through possible condemnation of private property would do little to promote support of the recovery effort and would stir up resentment and opposition.

- Change/Addition: pg. 70 - Dispersal - An addition was made to clarify the rigors facing colonizing wolves.

- Change/Addition: pg. 75 - Habitat Ecology - Dens. The statement regarding the elevations of dens and surrounding low-lying areas was clarified.

- Change/Addition: pg. 89 - Magnitude of Depredations section was updated.

- Issue: Concern was expressed by some commentors regarding how wolf management and control will differ from that applied to grizzly bears.

  Response: There are several reasons to expect differences between grizzly bear and wolf management. Perhaps the most critical difference is the much greater breeding potential of the wolf. While wolves can start breeding in the wild at about 3 years of age and produce an average annual litter of six pups, grizzly bears do not mate until they are between the age of 4 and 7 years and then normally only produce an average of two cubs every third year. This means that the loss of individual wolves will have less of an effect on the breeding potential of the entire population than would loss of an individual grizzly bear (especially a female bear). In other words, with wolves there would be greater management flexibility for controlling problem individuals without negatively impacting the entire population and thus the recovery effort.

  Wolves present little danger to humans. In fact, there have been no serious attacks by nonrabid wolves on humans documented anywhere in North America. Thus, there would be no need to close camping areas or impose closures in wolf range because of human safety concerns. In addition, once wolves are well established, there should be little need to restrict present land uses to protect them short of continuing management of prey populations and possibly short-term protection of denning or important rendezvous sites.

- Issue: Some commentors expressed concern regarding what effect the Minnesota wolf case (Sierra Club vs. Clark) would have on the Service's ability to control problem wolves.

  Rationale: The question of management flexibility as pertains to controlling problem wolves has largely revolved around the question of under what condition can a threatened or endangered species be killed. The court's decision in the Minnesota wolf case, Sierra Club v. Clark, and a threatened law suit against the Montana grizzly bear hunt in 1984 have made State wildlife agencies fearful of being sued should they attempt to control wolves. While no panacea is offered here, there are two important stepping stones. First, all parties must recognize that there will be times when wolves must be killed to protect lawfully present livestock. Second, fears of animal protection groups successfully bringing suit against a control program that is backed by sound biological information and built on a sound administrative record are largely unfounded. The Minnesota wolf dispute addressed in Sierra Club v. Clark arose over a proposal for the sport trapping of wolves by the general public while the Montana grizzly bear hunt controversy revolved around the issue of allowing limited sport hunting of grizzly bears by the general public--not the

control of specific "problem" animals by Federal or State Animal Damage Control personnel. The court struck down Minnesota's proposed sport trapping season because of the Fish and Wildlife Service's failure to show that the wolf population was exceeding the ecosystem's carrying capacity and population pressures within the ecosystem could not otherwise be relieved except through a sport trapping season. In Montana, legal action was stayed pending preparation of an environmental impact statement that fully presented the rationale for Montana's grizzly bear management program. Because the agency adequately demonstrated the rationale for a limited hunt and its provisions to adjust the hunting quota to new biological information, the threatened suit was dropped.

To comply with the Minnesota court order, the Fish and Wildlife Service required that these specific conditions be met before control of wolves would be initiated: (1) presence of a wounded animal or some remains of a livestock carcass, (2) evidence that wolves were responsible for the damage, and (3) reason to believe that additional losses would occur if the wolves were not removed. The decision in the Minnesota wolf case does not prevent the control of problem animals listed as endangered or threatened by authorized Federal of State agents.

Other Issues/Justification for No Change

- Issue: Some respondents suggested that an Environmental Impact Statement be prepared on the recovery program as a whole before the draft plan is approved.

  Rationale: The Fish and Wildlife Service is mandated by the Endangered Species Act to develop recovery plans for listed species. With regard to preparation of an Environmental Assessment or Environmental Impact Statement on development or approval of recovery plans, it is the Service's position that recovery plans generally are categorically excluded from analysis under the National Environmental Policy Act. Intended as broad planning documents, recovery plans list all possible tasks the Service believes may contribute to recovery of a species. As such, these plans do not propose specific actions, but outline general guidelines for the protection and management of species. They impose no mandates or obligations on any agency or group. Thus, specific tasks may or may not be implemented by the various agencies involved, depending upon funding and manpower constraints or changes in the species' needs. For these reasons, meaningful analysis of the environmental impacts of any recovery plan would be almost impossible. It is important to note, however, that any recovery actions outlined in a recovery plan will be subject to review under the National Environmental Policy Act at the time they are actually proposed for implementation.

- Issue: A few respondents felt that management zones should be revised only by going through a complete public review under the National Environmental Policy Act process.

  Rationale: Management zones will be designated through an interagency effort with opportunity provided for public comment. Periodic revision of the zone designations may be necessary, and opportunity for public comment will be provided.

Issue: Some commenters stated that the plan should provide more detail on the effects of wolves on other species (i.e., grizzly bear, black bear, elk, moose, bighorn sheep, and trumpeter swan populations).

Rationale: The recovery plan calls for evaluating/monitoring the effects of wolves on other species. Additional language was added to the plan regarding possible impacts to and management of big game populations. However, the issue of impacts to other species will be addressed and evaluated in greater detail during promulgation of the proposed rulemaking and preparation of appropriate National Environmental Policy Act documents regarding establishment of any wolf population in Yellowstone. It is expected that wolf recovery and predation will have little adverse impact on grizzly bear populations and may actually prove beneficial. Wolf presence in winter may cause a wider distribution of ungulates, making a greater number of winterkill carcasses available to bears over a wider area. Wolves also kill large ungulates in the late summer and fall when bears normally do not have the opportunity to utilize such a food source. Since there is evidence from studies in Alaska that bears can usually displace wolves from a carcass, such wolf kills may provide grizzly bears with an additional protein food source that is currently not available.