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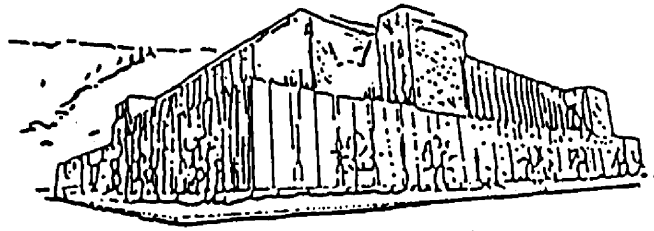
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ZOOGEOGRAPHY OF THE GRAY WOLF IN IDAHO: A HISTORICAL
REVIEW

By

Timmothy J. Kaminski

B.S., University of Wyoming, 1978

presented in partial fulfillment of the requirements

for the degree of

Master of Science

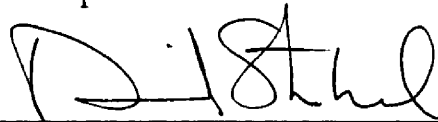
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Zoogeography of Gray Wolves (Canis lupus) in Idaho: A Historical Review.

Director: Dr. Christopher Servheen



Gray wolf (Canis lupus) distribution in Idaho is reviewed from the period of early exploration through post European settlement, 1940 to 1973. Evidence for wolves includes skeletal remains, accounts of early frontiersmen, predator control records and observations made by backcountry residents, outfitters, agency personnel, and visitors. Gray wolf remains were found in 5 locations in the southeast portion of the state dating approximately 1,000 to 5,000 years, evidence that corroborates accounts by explorers in eastcentral Idaho, where wolves appear to have been most numerous in the state. Wolf packs, adults and pups were observed and dispatched from north Idaho near the Clearwater River in 1812, and throughout central Idaho from the late 1800s to 1922. Use of poison in association with livestock ranges in Idaho and the surrounding region increasingly reduced and isolated remaining Idaho wolves by 1930. Ingress by wolves to Idaho backcountry and reproduction also were increasingly reduced. The last 12 wolves were removed during control from ungulate winter range near the Middle Fork Salmon River by 1936. Evidence suggests packs did not persist in remote areas of north and central Idaho from the late 1940s to early 1960s. Lone and occasional wolf pairs likely resulted from dispersing male wolves from southeast British Columbia and southwest Alberta following cessation of 1950s rabies control and wolf range expansion.

Historical information on wolf distribution may be useful to future wolf management in Idaho. Current wolf densities following wolf reintroduction likely exceed historic wolf numbers in mountainous terrain of Idaho backcountry, due in part to sex bias harvest of ungulates since the 1970's. Offspring of wolves reintroduced to Idaho in 1995 and 1996 can be expected to reoccur in areas occupied historically as young wolves disperse to areas where private and public land interface, and available ungulate prey and domestic livestock are interspersed.

ACKNOWLEDGEMENTS

This research would not have been possible without the help and support of many people. This professional paper addresses one of 3 aspects of a 2 year investigation of the status of the gray wolf in central Idaho. For invaluable support I thank Dr. Bart O’Gara, Dr. Chris Servheen, Tom Roy, Dr. John Weaver, Jay Gore, and Dr. Charles Jonkel. To each of you, my sincere appreciation.

Jerome Hansen, Steve Nadeau, Don Young, Chris Schultz and Anne Van Sweringen diligently assisted with the field aspects of this study. Without them, it could not have been completed. Dr. Dan Pletscher, Dr. Eric Forsman, Dr. Andrew Carey, Nancy Hoffman, Dr. Wayne Melquist, Dr. Steve Knick, John Malloy, Marcy Mahr, Shelley Alexander and Dr. Paul Pacquet offered encouragement that helped me persevere in finishing my degree requirements, for which I am thankful.

My endeavor as a graduate student was one of learning to be a practitioner of science. I benefitted from having as peers, fellow graduate students of the Montana Cooperative Wildlife Research Unit, Wildlife Biology, and Environmental Studies Programs while at the University of Montana. During my tenure, Dr. Les Pengelly, Dr. Les Marcum, Dr. Phil Wright, Dr. Charles Jonkel, Dr. Bart O’Gara, Dr. Dan Pletscher, Dr. Riley McClelland, Dr. Lee Metzgar, Dr. Kerry Forsman, Tom Roy and Donald Snow taught me about science and life. I learned a great deal.

The U.S. Fish and Wildlife Service, Boise Field Office, Idaho Department of Fish and Game, and U.S. Forest Service, Northern Region, were principal funders of my research. The U.S. Forest Service, Intermountain Region assisted with printing of my final contract report from which this manuscript is based.

Finally, I thank my parents, family, and my aunt, Ms. Lt. Col. S.W. Sealander, for their unfailing love, encouragement and support.

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INTRODUCTION

Gray wolf (Canis lupus) expansion in the Rocky Mountain states of Montana, Idaho and Wyoming is reoccurring in areas they historically occupied following their near extirpation in the western United States (Goldman 1944, Curnow 1969, Mech 1970, Nowak 1973, Day 1981, Lopez 1978), even in national parks (Weaver 1978, Harbo and Dean 1983)). Wolf dispersal from southern Canada into the Rocky Mountain U.S. has reoccurred since at least the the 1940's (Nowak 1983). Reports of lone wolves throughout Idaho and western Montana (Kaminski and Hansen 1984, Ream and Mattson 1982) from the late 1970's through the early 1990's likely resulted from expanding wolf populations following cessation of 1950's rabies control efforts in southern and western Canada (Gunson 1983, 1992, Hayes and Gunson 1995, Boyd et al. 1995). Wolves are recolonizing western Montana (Ream et al. 1989, Fritts et al. 1994, Boyd et al. 1995) and gray wolves from Canada recently have been translocated to Yellowstone National Park and central Idaho (Bangs and Fritts 1996).

Historical information on wolf distribution over western landscapes prior to and during early settlement may offer important

insights to wolf management as they reclaim portions of the Rocky Mountain region (Gunson 1992, Fuller et al. 1992). Evidence suggests wolves historically were more abundant in association with large ungulates amidst grasslands, prairies, coulees and foothills of Alberta, British Columbia, Montana, and Wyoming (Bailey 1907, Young and Goldman 1944, Curnow 1969, Ream and Mattson 1980, Gunson 1983, Schullery and Whittlesey 1992) than in mountainous terrain. Human settlement and commodity production now render lowland areas where wolves apparently achieved high densities largely untenable for wolf restoration.

Mountainous and high elevation areas in designated U.S. wilderness and national parks comprise wolf recovery areas of the Rocky Mountain U.S. (U.S. Fish and Wildlife Service (USFWS), 1987.) Historical information and reports of wolves in or proximal to these areas with available prey and minimal conflicts with humans, principally livestock, were germane to their selection for wolf recovery in Montana, Idaho and Wyoming (USFWS 1987). Yet, sufficiency of identified recovery areas for meeting population goals remains uncertain. In western Montana, naturally recolonizing wolves appear to prefer large lowland river valleys (Fritts et al. 1994) occupied by people, livestock and white-tailed deer (*Odocoileus virginianus*) to the

recovery area (Bangs et al. 1995). Wolves colonizing human-inhabited areas have resulted in control efforts due to livestock depredations and slowed recovery progress toward delisting (USFWS 1996, 1997).

Wolves are reproducing and demonstrating affinity to mountainous recovery areas in central Idaho and Yellowstone National Park where reintroduced (Kaminski et al. 1997, D. Smith, pers. commun., USFWS 1996, 1997) in 1995 and 1996, but results are preliminary.

Except for Idaho, gray wolf history, distribution and abundance extending from the Canadian provinces of British Columbia and Alberta and southward into the northern Rocky Mountain U.S. is well documented (Carbyn 1987, Curnow 1969, Day 1981, Gunson 1983, 1992, Mattson and Ream 1980, Tompa 1983, Weaver 1978, Schullery and Whittlesey 1992). Assessments of presettlement wolf distribution and abundance have traditionally relied on anecdotal information on occurrence, or analysis from skeletal remains (Goldman 1937, Hall and Kelson 1959, Skeel and Carbyn 1977, Hall 1981, Pedersen 1982, Nowak 1983, Friis 1985, Cannon 1992, Nowak 1995). More recently, sophisticated genetic and mitochondrial DNA analyses (Wayne et al. 1989, Lehman et al. 1991, Wayne and Jenks 1991, Kennedy et al. 1991, Dowling et al. 1992, Wayne et al. 1992, Wayne et al. 1995) have contributed to a more complete understanding of wolf systematics and status. Goldman (1937, 1944) defined the range of the gray wolf in Idaho based largely on the location of trapped or dead wolves. Such

information alone conveys limited information about the original distribution and occurrence of wolves while alive.

I researched information on historical gray wolf distribution in Idaho prior to, during, and after European settlement. Historical accounts regarding wolf distribution are reviewed, and Idaho wolves' increasing isolation during the period of settlement and control is discussed. I suggest likely reasons for apparent wolf persistence through the 1970s, and conclude with implications for wolf management in Idaho.

STUDY AREA

I reviewed available information on wolf distribution within the entire state of Idaho for the periods 1800 through 1899 (Early Settlement) and 1900 through 1939 (Settlement and Control). During 1940 through 1973, I confined my review to remaining areas of wolf persistence on public lands in northcentral and central Idaho (Figure 1).

The largest of 3 wolf recovery areas (USFWS, 1987) in the northern Rocky Mountain U.S., this 19,000 km² area includes the Selway-Bitterroot and Frank Church River of No Return Wilderness areas and adjacent National Forest service land. Included is nearly 7 million hectares of rugged mountainous terrain designated Wilderness sought less for timber and livestock production than surrounding

public lands. Thirty-five gray wolves from Canada were released in this area under Section 10(j) of the Endangered Species Act of 1973, as amended, during 1995 and 1996 (Bangs and Fritts 1996).

The Salmon River Mountains, bordered by the Clearwater Mountains to the north, and Bitterroot Mountains to the east characterize the topography of the area. Elevations range from 1200 to more than 3,000 meters and slopes commonly exceed 40 percent. Over 75 percent of the area is dominated by steep volcanic and fluvial lands, with 20 percent strongly glaciated. Less than 25 percent is gentle terrain in the form of isolated rolling basins. Precipitation varies with elevation but ranges from 25 to 80 cm annually, most in the form of moderate to deep snowpack.

Vegetation consists of timbered slopes on north and east aspects. South and west exposures are sparsely timbered and covered by grasses and scattered brush. Timber types are predominantly Ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga mensziesii*), Lodgepole pine (*Pinus contorta*), Engelman spruce (*Picea engelmannii*), and Subalpine fir (*Abies lasiocarpa*). Specifics about a particular area may be found in land management plans of administering national forests.

Ungulate populations resident within the area include mule deer (*Odocoileus hemionus*), white-tailed deer, elk (*Cervus elaphus*),

bighorn sheep (Ovis canadensis), moose (Alces alces) and mountain goats (Oreamnos americanus).

METHODS

Idaho was partitioned into three areas for describing gray wolf distribution: southeast, central and north (See Figure 1). For ease of reporting I separated central and north Idaho along the mainstem of the Salmon River.

I describe Idaho gray wolf distribution beginning with a prehistoric time period, followed by a review of historic and recent wolf occurrence. Three periods associated with the westward movement of Euro-americans and their relevance to wolf distribution in Idaho are reviewed:

Early Settlement (1800 to 1899). This period is marked by the first of euro-american trappers and frontiersman, government sanctioned expeditions and increasing and expanding number of euro-american settlers, chiefly livestock producers and miners that subsequently influenced the distribution and abundance of wolves and prey;

Settlement and Control (1900-1939) . Settlement in the western states and Idaho was accompanied by increase and expansion of private, state, and federal campaigns to rid the region of large predators; and

Post-Settlement (1940-1973) . After 1940, Euro-american settlements were well established, active predator control efforts by government agents were less extensive in Idaho backcountry and the west, large predator populations reduced. This period is prior to listing of the gray wolf as an endangered species.

Historical references from the state library and archives in Boise, and related materials including periodicals and newsprint were examined for information on large predators including gray wolves. I visited county and local libraries in Challis, Salmon, McCall, Idaho Falls, Riggins and Grangeville in search of information on gray wolf occurrence during 1860 through 1899 and 1900 through 1939. Various historians were interviewed, as well as long-time backcountry residents, trappers, outfitters, and ranchers. I collected information from former state and federal employees and researchers familiar with wildlife in the state, and reviewed historic and recent state and federal agency predator control records (e.g. Idaho Department of Fish and Game (IDFG) Biennial Reports, U.S. Biological Survey).

Licensed elk hunters were queried for information concerning wolves across the state in cooperation with the IDFG during 1982 - 1984 (Kaminski and Hansen 1984). Questionnaires also were sent to all registered trappers, and outfitters for game management units representative of remote backcountry and wilderness areas in Idaho.

Thus, in addition to reviewing historical information from experienced backcountry users during all seasons of the year, I collected information from respondents active in the Idaho backcountry during periods when wolves or their sign would be most detectable. Most observers of gray wolves or their sign during these periods hunted, trapped or outfitted in the state for many years. I assumed, because of long-time experience and familiarity with wildlife in their respective areas, an ability to discriminate between coyotes and gray wolves.

Findings of 3 research efforts, independent of my own, were incorporated because they contribute temporal and substantial information to the historical, often anecdotal information available concerning wolves in Idaho. Cannon(1992) interpreted prehistoric faunal remains in an extensive review of the paleontologic and archeologic evidence for gray wolves in the Yellowstone region. His review included information on prehistoric occurrence of Idaho fauna and findings by Swanson (1972). White et al. (1980) also researched the prehistoric occurrence of Idaho fauna. They reported on carnivore remains found in lava blisters in southeastern Idaho that included gray wolves dating more than a thousand years. Relevant information from Hansen (1986) was included because the methodology closely followed my own, and his findings contribute to a more complete assessment of wolf distribution and occurrence in north Idaho.

Assumptions and Limitations for Historical Evidence

At least three limitations exist regarding information on historical gray wolf distribution in Idaho. Inferences made about wolves in historical documents and files are most often passing comments about wolves presence and do not commonly provide detailed accounts of their numbers or abundance; second, there is often little or no corroborative evidence to substantiate historical claims; and third, information of the distribution of wolves during the 1800's and early part of the 20th century likely conforms to the general travel patterns or routes used by trappers or frontiersmen exploring the country, followed by settlers. Long, cold winters, short growing seasons and difficult access make it likely that travel "throughout" Idaho often skirted the interior and most mountainous portions of the state at least until the 1860's.

Periodic reference to "large, mountain coyotes" were made by early residents of Idaho backcountry areas I contacted. IDFG Biennial Reports refer to coyotes taken from the Selway River vicinity during predator control as "among the largest seen and more the size and character of wolves" (IDFG Biennial Report, 1907). Hence, I acknowledge that some confusion or lack of clarity in distinguishing wolves and coyotes in historical accounts may exist and bias findings herein.

My review of the historical occurrence and distribution of the gray wolf in Idaho is dependent upon the accuracy of documents reviewed and the reliability of historical evidence gathered from other sources. Numerous authors have addressed this problem (Weaver 1978, Mattson and Ream 1980, Schullery and Whittlesey 1992, and others). I limited my use of overly broad information. Evidence was not sufficient to estimate historical wolf abundance in Idaho for any period. Patterns of occurrence that appeared to corroborate areas or specific time periods were relied upon where reports of wolves were persistent, or absent. Relative changes in wolf occurrence and distribution were inferred during and between periods.

RESULTS

Taxonomy of Idaho Wolves

Twentieth century taxonomy of the gray wolf, including the northern Rocky Mountains of Canada and the U.S. including Idaho, was provided by Goldman (1937). Wolves were recognized as similar and likely intergraded over most of their range (Goldman 1944:404). Subspecific groupings of wolves persisted (Goldman 1944, Hall and Kelson 1959) but have received increasing scrutiny (Nowak 1983, 1995). Re-examination of morphologic characteristics (Jolicoeur 1975, Skeel and Carbyn 1977, Pedersen 1982, Nowak 1983, Friis 1985, Nowak 1995) coupled with the advent of molecular taxonomy (Kennedy et al. 1991,

Lehman et al. 1992, Wayne et al. 1989, 1992) cast doubt on the legitimacy of 24 gray wolf subspecies across North America (Hall and Kelson 1959, Hall, 1981). Multivariate analyses of wolf skull characteristics, genetic analyses, a lack of post-glacier geographic barriers and wolves well-known ability for long distance movements (Fritts 1983, Ream et al. 1991, Boyd et al. 1995) lead scientists to agree generally that fewer subspecific groupings are warranted.

Five subspecies of Canis lupus recognized throughout North America might better represent taxonomic subgroupings for the gray wolf, one of which likely ranged over the plains and mountains of the western U.S. (Nowak 1983, 1995). Wolves in northwestern Canada were genetically more similar than other carnivores suggesting an interbreeding wolf population capable of long distance movements and intergradation over large geographic areas (Kennedy et al. 1991; also see Boyd et al. 1995, Forbes and Boyd 1997). That a race or genetic cline of wolves were restricted to the Rocky Mountains including Idaho and portions of Alberta, Montana, Wyoming, the Dakotas, Oregon and Washington seems unlikely (Brewster and Fritts 1995).

Prehistoric Evidence of Wolves in Idaho

Distribution of prehistoric wolf remains located in caves are represented in Figure 2 (Appendix).

The gray wolf was resident in Idaho from the late Pleistocene or early Holocene, dating to approximately 10,000 years ago. Wolf remains were found in each of 5 caves spanning eastcentral and southeast Idaho, including those of a Dire wolf (Canis dirus), thought to be among the earliest of present day gray wolf progenitors. Of 3 caves occupied by early aboriginal residents, Bison Rockshelter and Veratic Rockshelter are located along the western slope of the Beaverhead Mountains in the Lemhi Valley. Jaguar Cave is located in the Birch Creek Valley of east central Idaho, and Weston Canyon Rockshelter is located in Weston Canyon in the Bannock Range of southeastern Idaho (Cannon 1992).

White et al. (unpublished manuscript) also found gray wolf remains in caves in southeastern Idaho. They inferred that wolves and other carnivores became entrapped after entering lava blisters, pit-like caves from which they could not escape. Remains of 11 and 4 wolves estimated to have dated as far back as 5,000 years were found respectively in 2 separate blisters located west of Idaho Falls, Idaho.

Methods employed by Swanson (1972), and faunal remains from the respective caves do not allow estimates of abundance. Grayson (1981) and Lyman (1991) discuss limitations of archeological evidence recovered from prehistoric deposits for reconstructing original faunal assemblages. Cannon (1992) emphasizes the serious shortcomings of

archeological findings where evidence of wolves in caves might result from being transported by humans (Swanson 1972). Lyman (1991:23) investigated the distribution of red fox in eastern Washington and believed it reasonable to assume that taxa represented in faunal assemblages lived in the general area of the site of recovery. Lyman (1991:24) assumed, despite the possibility of human transport, that red fox remains were unlikely to have been carried such long distances (>25 km) on foot that the area of their origin was in doubt. Nowak (1983, 1995) also examined wolf remains from Pleistocene caves and believed their remains were evidence of their early occupancy. I have assumed for the gray wolf in Idaho, as did Lyman (1991:24) for red fox in Washington, that gray wolf remains found in caves in southeastern Idaho occurred by natural means and not in association with human presence.

Wolves in Idaho During Early Settlement (1800 to 1899)

Distribution of reported wolf occurrences in Idaho during Early Settlement (1800-1899) are represented in Figure 2 (Appendix).

The earliest written record of gray wolves in Idaho involved a pack of unspecified number in the Clearwater River vicinity in 1812 (Spaulding 1953). During the same year, Robert Stuart observed wolves in the vicinity of Pierre's Hole (present day Teton Valley) and along the Snake River near present day Rupert (Rollins, 1935).

Wolves apparently were common in east to southeast Idaho where they are referenced most often in journals of frontiersmen and trappers exploring this part of Idaho between 1812 and 1840. Ogden noted, while exploring near the Lost River Range in 1827, "wolves are ...numerous, large, and scattered over the plains in search of food" (Davies 1961). Ogden's journals remark on a number of occasions regarding wolves benefitting from frontiersmen harvesting prey animals including bison and beaver (Rich 1950, Davies 1961). Joe Meek found wolves during the 1820's along the upper Bear, Malad, Blackfoot and Portneuf Rivers (Vestal 1952). Other references suggest wolves were distributed along the Continental Divide, and Salmon River from near Challis to the upper reaches of the North Fork Salmon River (Bailey 1907, Hawley 1920, Young and Goldman 1944). Captain Bonneville observed wolves in the Lost River Range, the upper Pahsimeroi, and "gathered with bears along the upper Salmon River to feed on salmon (Onchorhynchus spp.) (Irving 1915).

I found only a single reference to wolves in central Idaho during the 1800-1899 period. A pack of 10 wolves frequented the New Meadows and upper Little Salmon River area during the early 1880's. Stockmen and valley residents reportedly fearing depredations on livestock dispatched all but one wolf during a two year period. Conspicuous in the valley, these wolves were believed to have emigrated from the central Idaho mountains to the west during

winter (L. Highley, 1940; microfiche newsprint from Adams Co. Chronicle, reprinted Idaho Statesman).

Information from north Idaho on wolf occurrence during the period also was limited. Spaulding (1953) reported the first evidence of wolves in the Clearwater region during 1812. Reference to wolves was not made again in Idaho until near the end of the period, but wolves appear to have been common in the region surrounding Idaho to the north and west. Thompson found wolves in the Athabasca Valley (near Jasper Park) in 1810 (Tyrell 1916). Wolves were reported east of the Columbia River during 1812-1815 and "numerous" along the Fraser River of central British Columbia (Cox 1832). Forty wolves were taken from near the Pend O'Reille River in northern Idaho during 1899 (Davis 1939) in an apparent control action. Similarly, poison was used to control wolves during the period in nearby Alberta (Gunson 1983), British Columbia (Tompa 1983) and Montana (Curnow 1969), including the vicinity of Glacier National Park (Singer 1979). By the late 1890's, wolves were estimated to be "practically non-existent" in the prairies and Parklands of central Alberta (Stelfox 1969; cited in Gunson 1983). Thousands of wolves were bountied in Montana between 1894 and 1899 causing them to range from "fast disappearing" to "scarce" in areas grazed by livestock (Curnow 1969).

Livestock began arriving in Idaho beginning with cattle in 1834 and included sheep by 1860 (Yensen 1980). Mining brought thousands of settlers to central Idaho with the discovery of rich ore deposits from 1860 - 1890, including Deadwood, Warren, Thunder Mountain and Elk City. The combined effect of settlement during the period on wolves and native ungulates in Idaho likely was significant for the first time. Trapping for beaver pelts along major river systems in southeast Idaho had become popular but gradually declined with beaver numbers during the 1840's. Emphasis shifted to buffalo and other hides (ungulates, wolf) in Idaho (Anderson 1940, Young 1944) and the west (Chittenden 1902, Spaulding 1953, Phillips 1961, Curnow 1969, Ream and Mattson 1982). Other than a few stragglers, mainly in the southeast, buffalo were gone from Idaho by 1890 (Roe 1971). Increasing settlements, a subsequent demand for meat, and exploitation by hide and tooth hunters reportedly reduced Idaho elk populations by 1900 (Parsell 1938, Kowalsky 1964, Biennial Reports, Idaho Department of Fish and Game, Boise). Winter trapping by miners further reduced what appeared to be limited beaver numbers in the central Idaho mountains (Lewis and Phillips 1923).

With settlement and demand for meat steadily growing, a substantial market for livestock producers developed by 1880 (French 1914). Bounties supported by stockmen on wolves were common in the northern Rockies including Canada by the 1880's (Curnow 1969,

Stelfox 1969, Day 1981, Ream and Mattson 1982, Gunson 1983).

Depredations by wolves on livestock in Idaho were reported by 1885 (Bailey 1907).

Wolves in Idaho During Settlement and Control (1900-1939)

Location of wolves removed from Idaho during wolf control actions (reported by Young and Goldman, 1944) are represented in Figure 3. (Appendix). Distribution of reported wolf occurrences in Idaho during Settlement and Control (1900-1939), including wolves killed during wolf control actions that were not reported by Young and Goldman (1944) are represented in Figure 4 (Appendix).

A bounty on predators was established in Idaho beginning in 1907, the goal of which was extermination of “wolves, coyotes, wildcats [bobcats, lynx] and cougars” (IDFG Biennial Reports, 1907). Under this direction the IDFG purchased and distributed strychnine and traps throughout the state in addition to paid bounties. A legislative change in 1910 giving cattle and sheepmen authority for predator control across the state resulted in the unreported deaths of many predators (IDFG Biennial Reports, 1907). In 1915 the U.S. Biological Survey became principally involved in organizing and leading all operations to systematically remove predators from private and federal lands (U.S. Agriculture Yearbook 1927: 774-776). Between 1919 and 1928, 258 wolves were poisoned, bountied, trapped or shot in Idaho. One

hundred eighty-four of these were killed from 1919 through 1920, a 2 year period during which IDFG trappers were placed statewide near major ungulate winter ranges including the Salmon, Selway, Boise, Payette and Clearwater River drainages to trap and poison predators (IDFG Biennial Reports, 1924).

Southeast

Wolves ranged throughout the southeast and continued to produce pups in remote areas with available prey. Packs numbering from 5 to 11 wolves in southeast Idaho persisted during 1900-1939. Wolves were reported increasing near Iron Creek, preying on colts and calves near the Cow Creek Range in 1907 (Idaho Recorder 1907) and causing damage to livestock in the Lemhi Range in 1910 (Lemhi Herald 1910). R. Jensen (pers. comm.) observed a pack of 5 wolves in a raid on sheep near Henry's Lake in 1911. Yellowstone National Park was thought to be a source of wolves in that part of southeast Idaho. Wolves were reportedly increasing and believed trailing migrating ungulates along the continental divide (IDFG Biennial Reports, 1907). Wolves did increase in Yellowstone during 1912-1914 (Weaver 1978:7) and some may indeed have ranged outside the Park to the west.

Distribution of poisoned carcasses on open range during the period was widespread and common in control efforts but declined in it's efficacy (Bailey 1907, Young 1944, Curnow 1969, Jensen, pers.

comm.). Wolf dens, from which pups were taken and destroyed, were sought during spring (Bailey 1907, Young 1944, Weaver 1978). Six pups and an adult female were found and dispatched in an abandoned beaver lodge on the Malad River in 1916 by U.S. Biological Survey trapper L. Twitchell (Young 1944), who trapped and killed adult wolves near the upper Blackfoot River and near Soda Springs in 1919 (Young 1944, USFWS records). A U.S. Biological Survey trapper for Lemhi County killed 2 adult wolves near a den in 1921 and captured 7 pups that were subsequently shipped to a Boise City Zoo (Salmon Herald 1921). Six pups were found at a den site in 1922 near Hat Creek and destroyed (Salmon Herald 1922).

Thirty-five wolves were killed in southern Idaho from 1921 through 1922 (IDFG Biennial Reports, 1921-22). By the latter part of the decade, most wolves appear to have been removed from southeast Idaho. Wolves by this time also had been reduced in Yellowstone National Park (Weaver 1978) and Montana along the continental divide (Curnow 1969). A few remaining wolves were reported depredating on livestock near the Lemhi Range during the 1930s by area ranchers. A U.S. Biological Survey trapper, F. Yowell, was hired to remove any remaining wolves though none were found (F.Yowell, pers. comm.).

An estimated 10 to 25 wolves were thought to have remained in east and southeastern Idaho national forests in 1939 (Young 1944:55).

Central

Wolf presence in central Idaho is substantiated by predator control records for the period but wolves do not appear to have been numerous. Central Idaho trappers reported wolves during winters but their descriptions suggest wolves were fewer in number than elsewhere in the state. John Reeves trapped the Deadwood River area near the turn of the century to 1930. He reported observing black wolves in this vicinity between 1905 to 1915, similar to those he had observed in Canada. U.S. Biological Survey and Forest Service employees reported wolves near the South Fork Payette River winter range during 1919-1920 during a large winter die-off of deer. To the west, a pair of wolves was observed by an IDFG officer near Peace Valley and the Middle Fork Payette River during summer 1931 (J. Chenoweth, pers. comm.) Nonetheless, reference to lone wolves and occasional pairs coupled with periodic references to howling or tracks distinguishable from coyotes (Kaminski and Boss 1981) comprise the few reports concerning wolves in westcentral Idaho from 1923 to early 1930.

Farther to the south and east, a pack of 3 or 4 wolves ranged west of the White Cloud Mountains from 1918 to the late 1920's. T.

Williams, who trapped that area during the period, indicated the pack traveled a circuitous route from Warm Springs Creek, Bear Lake Creek, Pigtail Creek, and Williams Creek before looping back to Warm Springs (Kaminski and Hansen, 1984).

Farther north, residents of Idaho's Salmon River Mountains seldom observed evidence of wolf occurrence. L. Cox (pers. comm.) reported wolves were rare along the South Fork Salmon River as did E. Budell (pers. comm.) who lived and trapped in the Middle Fork Salmon River vicinity from the 1920's to 1930's, frequenting Chamberlain Basin in summers and Pungo Creek confluence with the Middle Fork during winters (Kaminski and Hansen, 1984). D. Tappan lived with her family on the Middle Fork Salmon River from 1912 through 1940 and described wolves as scattered and rare occurring mostly alone but occasionally in pairs. She observed tracks of a lone wolf near the confluence of the Middle Fork Salmon River and Pistol Creek in 1915 (Kaminski and Hansen, 1984).

Control efforts removed 12 wolves from the Middle Fork Salmon River between 1928 and 1936, the last wolves so removed from this area by the U.S. Biological Survey. Two wolves were killed during 1929-1930, and single wolves were killed in 1931-32 and 1935-1936. Eight wolves, perhaps representing a pack and the last in this area, were killed during 1933-1934 (IDFG Biennial Reports, 1928-1936).

Despite control and seemingly low densities, wolves apparently persisted in central Idaho. Lone wolves were reported near Thunder Mountain and near Monumental Creek during the late 1930's (Kaminski and Hansen, 1984). Young (1944: 55) reported an estimate of 10 to 25 wolves remaining on central Idaho national forests in 1939, but was skeptical that any wolves remained in Idaho five years later (Young 1944:56). The more conservative estimate of 10 wolves seems more plausible estimate of wolves that survived predator control in remote portions of central Idaho.

North

From the late teens to early 1920's, U.S. Biological Survey trapper L. Black found packs of 7 to 11 wolves ranging south from near the Idaho-Canada border over the Pack River divide and along the Priest River side of Mount Baldy (Kaminski and Hansen 1984, Hansen 1986). Wolves extended their range south from near the border area to northwest of Coeur d' Alene between Spirit Lake and Priest River. Pack size varied but Black rarely observed more than 11 animals. Presence of wolves along the Idaho-Canada border area may best be explained by wolves reclaiming former range (Tompa 1983:21) prior to poisoning campaigns undertaken in Alberta (Gunson 1983) and British Columbia (Tompa 1983) during the 1950's (Ream and Mattson 1982).

Wolves traveled the Lochsa, Selway and Clearwater drainages. Periodic observations and evidence of wolves identified by trappers, guides, and agency personnel of the period suggest few wolves ranged over large areas in that part of Idaho, most of them alone. J. Turner was raised in the Lochsa River area, guiding hunters and trapping between 1908 and 1940 (pers. comm.). Turner did not observe evidence of more than a single wolf during summers or winters that he worked the Lochsa River corridor and the adjacent area south that is now the Selway-Bitterroot Wilderness (Kaminski and Hansen, 1984). Turner referred to wolves of the period as "stragglers" ranging back and forth between Montana and Idaho. He found evidence of lone wolves from the Montana border to Powell, from Elk Meadows along Beaver Ridge to Fish Lake, and north of the Lochsa River in the Wietas and Cayuse Creek drainages. B. Moore also guided and trapped along the Lochsa River and surrounding area during 1920 to 1940. Moore trapped from the Montana border to the headwaters of the Lochsa, Clearwater and Selway drainages. He also believed wolves were few in number, traveling alone while following migrating elk between Idaho and Montana (pers. comm.). L. Rupe (1911) and later J. Parsall (1921), both Forest Service rangers at Moose Creek (Selway) reported wolves were rare in the Selway drainage finding evidence of them near Elk Summit and near Big Sand Lake (D.Parsall, W. Agee pers. comm.). Idaho Department of Fish and Game personnel frequented the area from 1910

through 1930. They also reported finding only rare evidence of wolves (D. McPherson, pers. comm.)(Kaminski and Hansen, 1984).

South of the Lochsa River, Idaho backcountry residents of Elk City, Dixie and from Red River to the Salmon River breaks reported wolves a rarity from 1914 to 1930 (W. York, pers. comm.). Young (1944:55) estimated 10 wolves remaining on the Nez Perce National Forest by the late 1930's.

Wolves in Idaho During Post-Settlement (1940-1973)

Distribution of reported wolf occurrences in Idaho during Post-Settlement (1940-1943) including wolves killed during the period by predator control agents are represented in Figure 5 (Appendix).

Southeast

Predator control efforts continued into the 1950's but no wolves were killed as a result. Wolves seldom were observed or reported over most of southeast Idaho (L. Jacklin, J. Nancolis; IDFG, pers. comm.). F.Yowell continued trapping predators for area ranchers along the Pahsimeroi and Lemhi Ranges. Two to 4 wolves may have persisted in Timber and Eightmile Creeks near the Salmon National Forest in 1945 (F.Yowell, pers. comm.).

Persistent reports of wolves in southeast Idaho from the 1940's into the early 1970's came from along the continental divide between

Idaho and Montana, extending from west of Yellowstone National Park to the Lemhi Mountains. Trapper Yowell indicated that wolves were reported in this area through the 1940's but observations were sporadic. Farther south and east, 10 wolves were estimated to remain on the Targhee National Forest in 1939 (Young 1944).

Of 8 reliable reports of wolves from 1963 to 1970, 3 involved 4 or more wolves (n=4, 8, 11) together and 3 additional reports were of pairs (M. Rath, pers. comm.). Two to 9 wolves traveling together continued to be reported from along the Centennial Range to the Lemhi Mountains separating the Beaverhead National Forest (Montana) and Targhee National Forest (Idaho) and Salmon National Forest (Idaho). A den was subsequently discovered in the Gravelly Range of southwestern Montana in the early 1970's and wolves including adults and pups were destroyed. Speculation of a surreptitious release of wolves in Yellowstone National Park has been discussed (Weaver 1978). Flath (1979) documented a continuance of reports from this area throughout the 1970's that declined significantly by the end of the decade (Ream and Mattson 1982, D. Flath, pers. comm.).

Whatever the fate of remaining wolves in remote areas, increasing settlement accompanied by livestock, shrinking of remote areas and few reports suggest the absence of wolves from southeast Idaho by the end of the period.

Central

Lone wolves rarely were observed over most of central Idaho from the 1940's well into the 1950's. During a 16 year period from 1941 to 1957 wolves were observed 9 times scattered over west central Idaho (Kaminski and Boss 1981, Kaminski and Hansen 1984). Fifteen wolves were observed involving pairs (N=6) and loners (N=4) and 4 wolves were killed by Fish and Wildlife Service trappers. A pair of wolves was killed by P. Reed (FWS) near the headwaters of the North Fork Boise River in 1941 and an individual from a pair near Pilot Peak in 1947 (P. Reed, pers. comm.). A single wolf was shot from a pair during hunting season in 1951. Wolves were reported again in west central Idaho near the Boise National Forest in 1955 and 1957. However, no pack formation nor reproduction were reported during the period. A possibility exists that 2 wolves traveling together did not represent a reproductive pair.

Outfitters and guides, trappers and IDFG personnel frequenting the backcountry rarely observed wolves but suggested those that persisted demonstrated fidelity to geographic areas. J. Gilliland (pers. comm.) outfitted and guided hunters near the south end of Chamberlain Basin from near Big Creek during 1956 to 1972. He never observed more than 2 wolves together but believed he and his guides saw the same pair of animals in the Chamberlain area for 3 successive

years and periodically thereafter. Trapper T. Williams also believed the same lone wolves were frequenting an area from Cape Horn to Stanley Basin during the late 1940's to mid 1950's. Identity was based on size, coloration, and repeat occurrences in time and locale (P. Williams, pers. comm.).

With exception of a wolf observed near Loon Creek in 1958 (J. Peppcorn, pers. comm.), outfitters, trappers and residents did not observe wolves or their sign along the South nor Middle Fork Salmon Rivers from the 1940's to the early 1960's. L. Rebillet (pers. comm.) did not observe wolves or sign while frequenting areas along the South Fork Salmon River and from the Secesh River to Mackay Bar and Elk Creek during winters. He did not recall ever observing them from Warren to the Wilson Ranch during summers from 1946 to 1962. Rebillet's experience parallels that of others that frequented these areas outfitting or (B. Sullivan, N. Guth, B. Cole; pers. comm.) trapping predators for IDFG (L. Jacklin, J. Smith, IDFG; pers. comm.).

Between 1960 and 1973 wolves were reported 38 times in central Idaho. All but two reports were of lone wolves or pairs distributed across east to west central Idaho on the Challis, Boise and Payette National forests.

Close to Stanley Basin, lone wolves were reported near Cape Horn, Valley Creek, Decker Flat and Hellroaring Creek between 1960

and 1966 (H.Wadley, pers. comm.). Two wolves regularly traveled Greyhound Ridge near Seafoam during the mid-to-late 1960's and another wolf ranged alone near Josefas Lake in 1970 (Kaminski and Boss 1981). Two wolves were reported traveling together near Loon Creek in the Middle Fork Salmon River drainage during 1966 by an outfitter (B. Sullivan, pers. comm.) and again from 1969 to 1970 near Soldier Mountain-Jackass Flat vicinity (Kaminski and Hansen 1984).

Abutting Stanley Basin to the north and west, 8 of 13 observations involving lone wolves occurred in a complex of low-lying ridges and the expansive meadows of Bear Valley (Kaminski and Boss 1981). A Forest Service ranger resident in the Valley reported observing lone wolves in 1961, 1963, and 1967 (W. Pavlett, pers. comm.). From 1970 to 1973 livestock permittees in the area believed they observed the same dark colored wolf on 4 different occasions. Two wolves were observed together in 1973 (E.T. Evans, D. Smithee, pers. comm.). Wolves were reported 7 additional times distributed widely on the Boise National Forest from 1965 to 1970. All but one report involved lone wolves.

Remaining reports from central Idaho come from Chamberlain Basin (Kaminski and Hansen 1984), a similarly high elevation complex of low-lying ridges and expansive meadows nearly encircled by mainstems of the Salmon River. Wolves were reported 13 times in

Chamberlain Basin from 1965 to 1972 by IDFG personnel and outfitters guiding hunters (B. Dorris, T. Beeler, J. Gilliland, pers. comm.). All but 2 observations of wolves in the Basin were of lone animals. Two outfitters reported seeing wolves or evidence of adults and pups on 2 occasions. In November 1966, tracks of 6 to 8 wolves were followed to an elk carcass. One pup was shot by a hunter (S. Potts, pers. comm.). In 1972, one black and "light colored" pup were observed standing together in a meadow in the W. Fork Monumental Creek (J. Gilliland, pers. comm.).

A researcher conducting an elk calf study during 1965-66 could not recall having seen evidence of wolves (L. Hayden-Wing, pers. comm.). Other outfitters in Chamberlain Basin during the period from 1966 to the early 1970's did not observe wolves or were reluctant to report them. Following the last reports of wolves in 1972, outfitters and guides operating in Chamberlain Basin were in agreement that wolves or their sign were rarely observed in the area.

North

Predator control agents of the U.S. Biological Survey and IDFG reported wolf packs and scattered individuals along the British Columbia-Idaho border and south. Wolves apparently frequented or traveled the Idaho panhandle area northwest of Coeur d'Alene. Wolves were trapped near Blue Lake, Bonners Ferry and along the

Priest River during the 1950's (V. Black, pers. comm.). Tracks of 12 wolves were observed in deep snow near Spirit Lake in 1952, and a pack numbering 7 wolves was observed in the area during 1953 (J. Smith, pers. comm.). Tompa (1983: 21) indication that wolves reclaimed portions of southeast British Columbia prior to poisoning campaigns of the early 1950's might account for wolf persistence in the Panhandle region.

Wolves were scarce from the North Fork Clearwater River south during 1940 through the 1950's. Outfitters, trappers, agency personnel and residents of this area report that wolves ranged widely showing little affinity for any one area (B. Moore, J. Turner, C. Morrison, J. Lykins, D. McPherson, pers. comm.). Wolves were observed in the Lochsa River drainage along Beaver Ridge, north of the Lochsa to Cook Mountain and south of the Lochsa past Moose Creek to Cub Creek in the Selway River drainage. Two wolves were observed in upper Bear Creek of the Selway River drainage in the mid 1940's (J. Turner, pers. comm.). Thus, only 1 of 9 wolf observations during the period involved more than a single animal and there were no reports of pack activity or pups, suggesting that outfitters and trappers supposition of lone wolves transiency during the 1940's and 1950's is valid.

From 1960 to 1973, wolves were reported primarily in the Lochsa River drainage and north to the North Fork Clearwater River. Of 18 observations reported, all but 4 were from this area. Lone wolves observed by outfitters guiding hunters during the fall account for all but 3 reports. A black wolf was observed repeatedly over 3 successive years in the Lochsa River drainage along Highway 12 between Boulder and Split Creeks (J. Rose, pers. comm.). Just north of the Lochsa drainage lone wolves were reported on 5 occasions near Wietas Creek, and a pack of 6 (one black, five gray) were observed in the Wietas Creek drainage and reported to IDFG in 1969. Wolves of similar description continued to be observed but alone between Wietas Creek and Cook Mountain into the early 1970's (J. Renshaw, G. Stimmel, pers. comm.).

Near the Salmon River, an outfitter reported a wolf pack near Bargamin Creek in 1967, just across the Salmon River and north of Chamberlain Basin where a pack had been observed a year previous. Tracks of 3 wolves were observed by an outfitter at a freshly killed elk carcass in this area in 1968 (T. Ramsey, pers. comm.). Elsewhere along drainage headwaters bending south to the Salmon River wolves were observed on 3 occasions from 1970 to 1973, each time alone (Kaminski and Hansen 1984).

Thus, 3 of 18 wolf observations involved 3 or more wolves together. Wolves may have produced young during the mid-1960's.

Regardless, most reports remain observations of single wolves, once again suggesting that wolves were few in number, ranged widely and predominantly alone.

DISCUSSION

Presettlement (1800-1899)

Prehistoric gray wolf remains distributed from southeast to eastcentral Idaho as far back as far as 5,000 years. Observations of wolves made by early explorers and frontiersman during 1812 to 1840 suggest wolves were indigenous and widespread across Idaho. Flanked by the Beaverhead Mountains to the east and Lemhi Mountains to the west and south, this valley represented a major causeway for early explorers who commonly encountered wolves in southeast and eastcentral Idaho. Prehistoric wolf remains from Idaho caves in southeast to east central Idaho were accompanied by skeletal material from a diversity of prey including bison, elk, bighorn sheep, antelope and deer (Swanson 1972, Cannon 1992). Major drainages inhabited by wolves in this region included the Blackfoot, Portneuf, Lost, Malad, Pahsimeroi and Salmon Rivers. An expansive terrain of rolling foothills and coulees amidst drainages such as these would provide a coarsing predator (Mech 1970) of diverse ungulates (Pimlott 1967, Keith 1983) both opportunity and advantage in pursuit of its prey. Immense areas of grassland, river bottom and upland habitats found in southeast

and eastcentral region of Idaho and an apparent diversity of ungulates coupled with wolves presence make tenable early frontiersmen and explorer accounts of both ungulate and wolf abundance in this area.

In contrast, frontiersmen accounts of wolves across north and central portions of Idaho are rare, though travel by explorers throughout that region appears to have been more difficult and restricted (Figure 6). Evidence suggests wolf densities throughout the mountains and heavily dissected terrain of northern to central Idaho were probably low compared to areas of relatively gentle slopes and broad valleys of the Snake River Plains to eastcentral and southeastern Idaho, consistent with that reported for the mountainous areas of Alberta (Gunson 1983) and British Columbia (Tompa 1983).

Goldman speculated that prior to their exploitation (ca. 1850) wolves were more abundant in the southeast to eastcentral Idaho than elsewhere in Idaho (1944:48), though it is difficult to conceive of their confinement solely to this region of the state. With few obstacles other than a lack of food to affect their occurrence and travel over large areas, wolves would likely have ranged over most of the region adjoining Idaho (Goldman 1944, Cowan 1947, Curnow 1969, Stelfox 1969, Weaver 1978, Ream and Mattson 1980, Tompa 1983) during the period. Wolves appear to have been common in regions surrounding Idaho to the

north (Tyrell 1916), west (Cox 1832) and east (Bailey 1907, Curnow 1969, Young and Goldman 1944) during the presettlement period.

Evidence for gray wolf occurrence across much of north and central Idaho during presettlement prior to the period of wolf control suggests that wolf numbers simply were low. Though wolf packs existence was documented in north and central Idaho, observations of loners and occasional wolf pairs were more common.

Livestock including sheep were grazed throughout much of north and central Idaho from the mid 1800s through the late 1940's, accompanied by widespread use of strychnine poison (B.Moore, J.Turner, J.Nancolis, pers. comm.). The combined effect of mining, demand for meat and exploitation by settlers near the turn of the century resulted in a decline of native ungulates in central Idaho. The effect on wolves and other predators is unknown, but may have been significant.

Settlement and Control (1900-1939)

The persistence of wolf packs in the eastcentral and southeastern portions of Idaho suggests their resilience despite intensive wolf control. Wolves persisted in the north and central parts of the state during the period of control, but accounts by backcountry residents coupled with control records suggest wolves were widely distributed

and fewer in number. Wolf packs in central Idaho appear to have been small and isolated. Where they occurred they were consistently reported suggesting their fidelity to a particular area. Regardless, most reports of wolves during the period were of loners and occasional pairs.

Wolf population reductions over a large geographic area in the Rocky Mountain west (See Nowak 1983, 1995) increasingly fragmented wolf packs, perhaps leaving lone wolves to wander during the Settlement and Control period. Wolves declined throughout the Rocky Mountain region, and a breeding wolf population as a source of immigrating wolves to Idaho did not become well-established in southern Canada for nearly 40 years (Ream and Mattson 1982, Gunson 1983, 1992, Tompa 1983, Hayes and Gunson 1995). Predator control efforts in the north and central portions of the state may have had a disproportionate affect on Idaho wolves, underscoring the importance of dispersing wolves from neighboring states and Canada. Remaining wolves in Idaho became isolated and remained in remote areas, or wandered nomadically over long distances in search of other wolves.

Post Settlement (1940-1973)

Young and Goldman (1944) estimated 40 to 50 wolves remained in Idaho by 1940, an assertion I found no support for among those who lived in or were familiar with Idaho backcountry during the period. I could find only limited evidence for wolves remaining in eastcentral

and southeastern Idaho, suggesting control efforts there were entirely effective.

Following control, nearly as many people did not observe wolves as those who did. Aulerich (1964) speculated that wolves surviving the control period probably did so on remote national forest lands. Based on accounts of wolves I reviewed and my knowledge of the areas referred to, Young and Goldman's (1944) estimate of wolves remaining in Idaho following control seems high. Wolves continued to be killed in central Idaho during the 1940's and into the early 1950's. Hence, some wolves succeeded in surviving the control period in remote Idaho backcountry areas for undetermined amounts of time. Ingress by both male and female wolves to Idaho from adjacent areas of established populations, however, remained unlikely. Wolves were removed over most of the western states, and their resurgence in southeastern British Columbia and western Alberta during the 1940's was met with large scale poisoning during the 1950's for rabies control (Gunson 1983, Tompa 1983, Also See Nowak 1983: Figure 7) effectively reducing their numbers. Nearly all Idaho wolf observations that followed referred to lone wolves or occasional pairs.

Persistence of Wolf Reports

Lacking consistent wolf reproduction across north and central Idaho, what might explain the persistence of wolf reports including

those periodically killed in north and central Idaho and northwestern Montana during the post settlement period ?

Periodic Reproduction

Reports of wolves across north and central Idaho during 1960 through the early 1970's nearly doubled, suggesting possible reproduction. Yet, reliable observations during the period indicated most wolves were alone. Only 6 of 56 reports were of 3 or more wolves together. Thus, the pattern of lone wolf occurrence is repeated from the previous period.

Whether wolves reproduced in north and central Idaho during the period is unknown. Four observations from 1966 to 1970 by big game outfitters in central Idaho (2 from the same area) involved adult wolves and pups. Near the Salmon River, adult wolves and pups were reported on several occasions near Chamberlain Basin by long-term outfitters and guides during 1966 through 1972. Still others using Chamberlain Basin saw no evidence of wolves, including researchers studying elk calves in Chamberlain Basin during 1965 to 1967 (L. Hayden-Wing, pers. comm.) and mountain lions in the Big Creek drainage (M.Hornocker, pers. comm.).

Periodic wolf reproduction followed by human-caused wolf mortality might explain a lack of pack activity, and result in persistent

reports of lone wolves or two or more together. Two instances of wolves being shot were reported to me following independent observations of adult wolves and pups. If true, it suggests that tolerance lessened among Idaho backcountry users as wolf packs became conspicuous. Yet, outfitters and backcountry visitors in the Chamberlain Basin area and elsewhere in central Idaho most often reported lone wolves. Observers of wolves during the mid to late 1960's indicate they became rare following the early 1970's in Chamberlain Basin. Hence, whatever pack activity or reproduction may have occurred was irregular, and did not last.

Human-caused mortality would likely pose substantial and relatively long term effects on an isolated wolf pack in Idaho. Vucetich et al. (1997) discuss adverse demographic effects on social animals in isolated populations. For an isolated population of 50 wolves, they indicate a 95% likelihood of survival for 9 years or less. None of the information I accumulated on wolves suggests even half of that number of wolves existed in north and central Idaho during the period.

Occasional wolf reproduction in central Idaho during the post settlement period cannot be discounted. Regardless, such irregular events could not explain the persistence of reports in Idaho during a more than 30 year period. These findings are in agreement with other

investigators studying wolves and reports of their persistence during wolf recolonization in Europe (Pullianen 1975, 1982) and North America (Thiel and Welch 1981, Ream and Mattson 1982, Peterson and Woolington 1982, Peterson et al. 1984, Hammill 1992, Wydeven et al. 1995). A more plausible explanation for persistent reports of lone wolves in Idaho is wolf dispersal from Canada.

Role of Wolf Dispersal

Wolf dispersal, coupled with tolerance by central Idaho backcountry users for lone and occasional wolf pairs have likely been key to their persistence in Idaho. The combination of these factors, in my judgement, best explain wolves reported occurrence during the period of Post Settlement and Control, 1940-1973, and after.

Goldman (1944) was the first to speculate that wolves likely intergraded across much of their range, suggesting that wolves long distance travel including transboundary movements have long operated throughout the Rocky Mountain region of Canada and the U.S. Boyd (et al. 1995) and Forbes and Boyd (1997) substantiate this hypothesis in their examination of wolf dispersal mechanisms and relatedness among wolves of the Rocky Mountain U.S. and Canada. Wolf dispersal characteristics documented by Boyd (et al. 1995) during 1984-1991 suggest that mechanisms exist for similar wolf movements during past recolonization attempts.

During the 1948-1963 wolf recolonization of Finland, Pullainen reported that nearly 90 % of wolves killed were males (Pullainen 1979, 1982). Similar to Pullainen's findings following a period of wolf control, Nowak (1983) examined 9 wolf skulls from animals killed in the Rocky Mountain and conterminous western U.S. during 1941 through 1978 (Figure 7). All 9 individuals were male wolves demonstrating skull characteristics most closely resembling wolves of northwestern Alberta. The last from west central Idaho, a 162 kg young (ca. 3 yrs.) male killed 80 km north of Boise, Idaho in 1978, this wolf had the largest skull of any examined previously and was most similar to wolves of northern Alberta (R. Nowak, pers.comm.) known to be of extreme size (Gunson and Nowak 1979).

Though distant, the wolf locations examined by Nowak (1983) fall within the range of longest known wolf dispersals for North America for both males (Fritts 1983) and females (Ream et al. 1991). Such movements are similar to those reported by Pullianen (1982) in Finland but contrast with average distances dispersed by male (N=5) and female wolves (N=6) traveling a cordilla between Banff National Park, Alberta and Glacier National Park, Montana (Boyd et al. 1995). No sex bias in dispersal frequency or distance was found in the Montana study (but See Weaver et al. 1996), similar to findings of Gese and Mech (1991) in northeastern Minnesota. Differences may reflect changes in pack dynamics, the time during which dispersal occurred or was

monitored (Peterson et al. 1984), proximity and density of neighboring packs, or a lack of conspecifics over a region such as the Rocky Mountains of the western U.S. and Canada during and immediately following large-scale poisoning. The preceding scenarios underscore the wide range of behavioral and olfactory mechanisms (Asa and Mech 1995) employed by wolves as effective dispersers under varying conditions (Forbes and Boyd 1997).

I suggest that Idaho wolves, some survivors of state control efforts, and others long-distance dispersers (e.g. Nowak 1983), were reported and periodically killed in central Idaho beginning in the early 1940s. Reported wolf occurrence and distribution since that time result in a pattern of almost uncanny consistency in Idaho through the early 1990s. Aside from the prevalence of lone wolf reports, perhaps the most revealing information from outfitters and stockgrowers in central Idaho is the number of times, after returning to the same area, they observed what they believed was the same wolf or wolves. If accurate, their observations are consistent with the suggestion that individual wolves may have survived for varying time periods in remote backcountry areas (Goldman 1937, See also Boitani 1982). Two recent incidents in Idaho involving lone wolves elucidate how repeat observations of wolves in the same area could result in numerous reported wolf occurrences that become clumped over time.

During a 1978 study of elk calf mortality in northcentral Idaho, a lone wolf was observed in the Kelly Creek vicinity of Idaho feeding on an elk calf (M. Schlegel, pers comm.). The animal was observed from a helicopter and photographed. During a wolf study in the area during winter 1982- 1983 a lone wolf bearing strong resemblance to the animal photographed in 1978 was again observed and photographed from a helicopter in the same general area. Observations of a lone wolf during the 5 to 6 year period were consistently reported by Kelly Creek area outfitters and backcountry visitors.

During 1992, male wolf M 13 (Boyd et al. 1995) from Glacier Park dispersed to the Kelly Creek area of Idaho. He traveled in the area and was monitored until his radio apparently failed. Outfitters and fishermen consistently reported observing a lone wolf in the area during the period. Following the 1995 experimental release of wolves from Canada into Idaho, radio-collared female wolf B-15 moved into the Kelly Creek area, and was routinely monitored. During a monitoring flight in 1996 she was observed paired with an unknown wolf. Though at least 3 years had elapsed since his radio failed, we speculated that the wolf traveling with female wolf B-15 was the dispersing male from Glacier Park. During Spring, 1998 efforts to trap and radio collar 1997 wolf pups in the Kelly Creek area, a large adult male believed to be the breeding male in the pack was captured. His

expired radio collar revealed his identity as M 13, the dispersing Glacier Park male.

Though limited, these examples suggest how the occurrence of a lone wolf dispersing into an area of exceedingly low wolf density and remaining alone during a several year period could result in repeated observations of a single wolf in the same area. The pattern of lone wolf observations under this scenario would mirror the prevailing pattern of lone wolf reports in Idaho since the early 1940s. Moreover, the examples are consistent with strategy used by dispersing wolves attempting to secure an area that may eventually attract a wolf of opposite sex (D. Mech, pers. comm.). Relatively long-lived wolves, even alone, might survive in such an area for a period of 4 to 9 years (Mech 1970). Regular backcountry users such as an outfitter or livestock producer might observe the same wolf under these circumstances for a period of years. Wolf reports would be expected to vary with the number of recreational visits to the area.

Gray wolf reports in central Idaho approximately doubled from the early 1960s to 1970s, consistent with notoriety of the Idaho Primitive area and increasing recreational visits. Idaho wolf observations during the periods of Settlement and Control (1900-1939) and Post Settlement (1940-1973) through 1993 consistently indicate the occurrence of lone wolves. Independent of the number of reports, it is

significant that 79% of wolves reported during a period of more than 50 years have consistently been of lone wolves, originating from similar areas (Kaminski and Boss 1981, Kaminski and Hansen 1984, Hansen 1986, Rachel 1993).

CONCLUSION

An important finding of this study is that wolves inhabited the rugged backcountry of north and central Idaho. Despite ample evidence of their occurrence at low densities and unknown influence associated with fluctuating prey populations, livestock, and poison, wolves persisted over an extensive area of mountainous terrain. I found evidence for lone wolves, pairs and occasional packs, but was unable to estimate wolf numbers or density for any area of the state.

Information I reviewed suggests wolves were far less common in the dissected north and central Idaho backcountry than the rolling terrain of eastcentral and southeastern Idaho. Thus, my review of Idaho wolf distribution prior to and following settlement corroborate findings by Goldman (1937, 1944), and underscores the plausible role of long slopes, coulees and rolling terrain amidst a high diversity and abundance of ungulates in contributing to the effectiveness of a cursorial predator.

Regarding wolf persistence in Idaho, I conclude that the occurrence and distribution of the gray wolf in Idaho, after 1960, is primarily a function of periodic dispersal by wolves from Canada. Because reproduction was either lacking or so periodic as to generate no conclusive evidence of pack activity during a 30 year period from 1940 through 1973, most of the observed wolves would be expected alone. Dispersing wolves immigrating to Idaho from the north likely settled in areas of available prey and remoteness, and survived for undetermined time periods. Increasing visitors in these areas reported the consistent occurrence of lone and occasional wolf pairs.

While the use of poison and its influence on carnivores throughout the early 1950's and perhaps through the early 1970's until the ban on 1080 cannot be denied, I believe the effect was to limit the ingress and survivorship of dispersing wolves, rather than resident wolf packs. Persistent reports of lone wolves throughout north and central Idaho were a likely result of male and occasionally female wolves traveling into Idaho in search of conspecifics following the period of intense control, just as shown by Nowak (1983) during 1941 through 1978. These findings are in general agreement with the conclusions of Brewster and Fritts (1995) elsewhere in the region.

CONSERVATION IMPLICATIONS

Nowak (1983:18) referred to wolf persistence in the mountain and conterminous states of the western U.S., stating “there has long been a question as to whether these animals represent survival of populations that inhabited U.S. territory or are invaders from Canada”. Molecular analysis from wolf skulls collected during control efforts, including the sample of 9 in the Rocky Mountain region, and the skull of a female wolf poisoned in west central Idaho in 1991 less than 5 km from where a large male was shot in 1978, represent a means of addressing this question and adding to the findings of Boyd (et al. 1995) and Forbes and Boyd (1996).

Wolves affinity for areas historically occupied are well documented and pose implications for future conservation of wolves across the Rocky Mountain west under conditions vastly different than presettlement. Historical findings concerning wolf distribution in central Idaho contrast sharply with the current status of Canadian wolves reintroduced to Idaho in 1995 and 1996. Following reintroduction and establishment of pair bonds, 3 packs whelped 11 pups in 1996 (USFWS 1997), 6 packs produced an estimated 32 pups in 1997 (USFWS 1998), and 10 packs an estimated 56 pups in 1998 (USFWS, pers comm). The resulting finite rate of increase is among

the highest documented for an expanding wolf population (Keith 1983, Pietscher et al. 1991). Wolf survivorship also has been extremely high (Kaminski, unpubl. data) owing, in part, to wolves settling in areas of restricted access (partly designated wilderness) within contiguous forests of central Idaho (Figure 1).

Current Idaho wolf population expansion and growth is unlikely to continue at its current rate. Historic wolf numbers in north and central Idaho can be reconciled with the current growth of central Idaho wolf numbers, in part, by vulnerability of aged adult female elk that have not been subjected to harvest in mountainous backcountry areas of central Idaho for more than 2 decades (IDFG harvest regulations). Based upon historic information, I predict as aged elk and deer are reduced largely via wolf predation, litter sizes, pup survivorship, and the number of wolf packs across central Idaho also will decline. Wolves are likely to expand their home ranges and territories across north and central Idaho in search of available and vulnerable prey, especially during winter, resulting in increasing interpack aggression and dispersal. Over time, a reduction of aged ungulates may result in a reduction of vulnerable prey, and effective use of escape terrain by elk and deer increasingly aware of wolf presence. As wolves find it more difficult to secure vulnerable prey over portions of north and central Idaho, wolf densities will likely adjust downward toward historic levels.

The most immediate concern to managers, however, is dispersal by wolves into areas they historically occupied throughout the east central and southeastern portions of the state, especially where native ungulates are interspersed with domestic livestock. The timing during which wolves achieve recovery goals (FWS 1987), prey increasingly on livestock and big game populations, and expand into areas inhabited by long-time residents and newcomers to rural areas who are unfamiliar with wolves presence will be cause for increasing acrimony and unnecessary political rhetoric surrounding predator management. We can do better by our wildlife resources, and we should.

Wildlife managers in Idaho and the surrounding region have ample opportunity to learn from the experience of others. Numerous authors have made suggestions for involving their publics on the issue of large predator management including wolves in recent years (Pletscher et al. 1991, Gasaway et al. 1992, Boitani 1982, 1995, Anderson et al. 1995, Clarkson 1995, Haggstrom et al. 1995, Thiel and Valen 1995, Pacquet 1996). Engaging stakeholders on explicit criteria for determining unacceptable effects on ungulate populations, and trade-offs in public benefits for where and how habitat resources, wolves, other predators, and ungulates will be managed into Idaho's future is timely now.

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APPENDIX

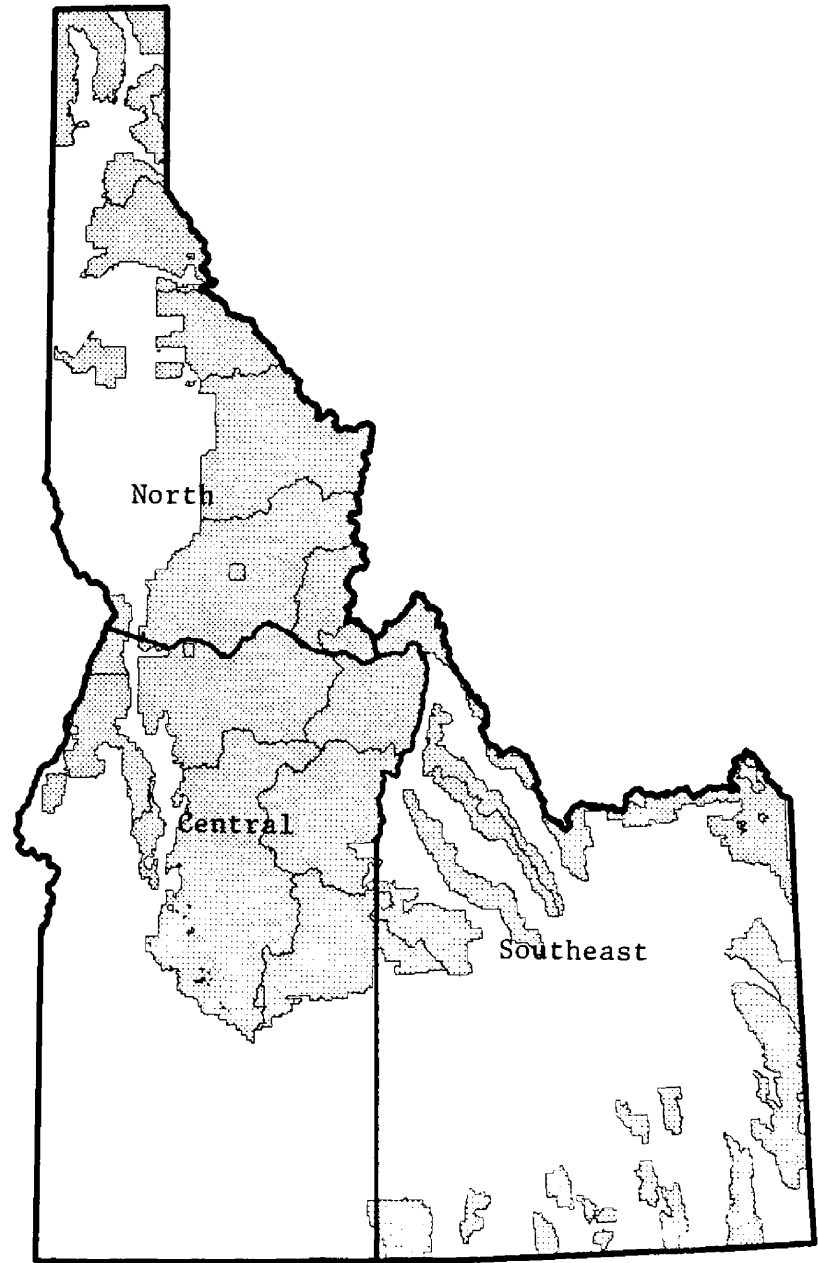
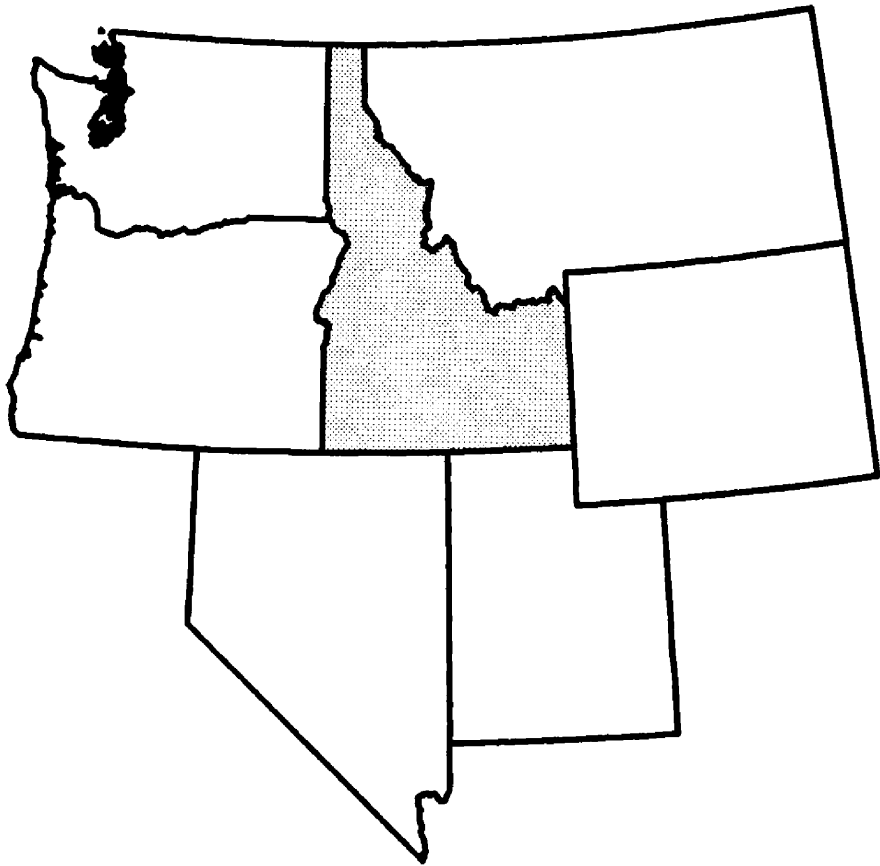
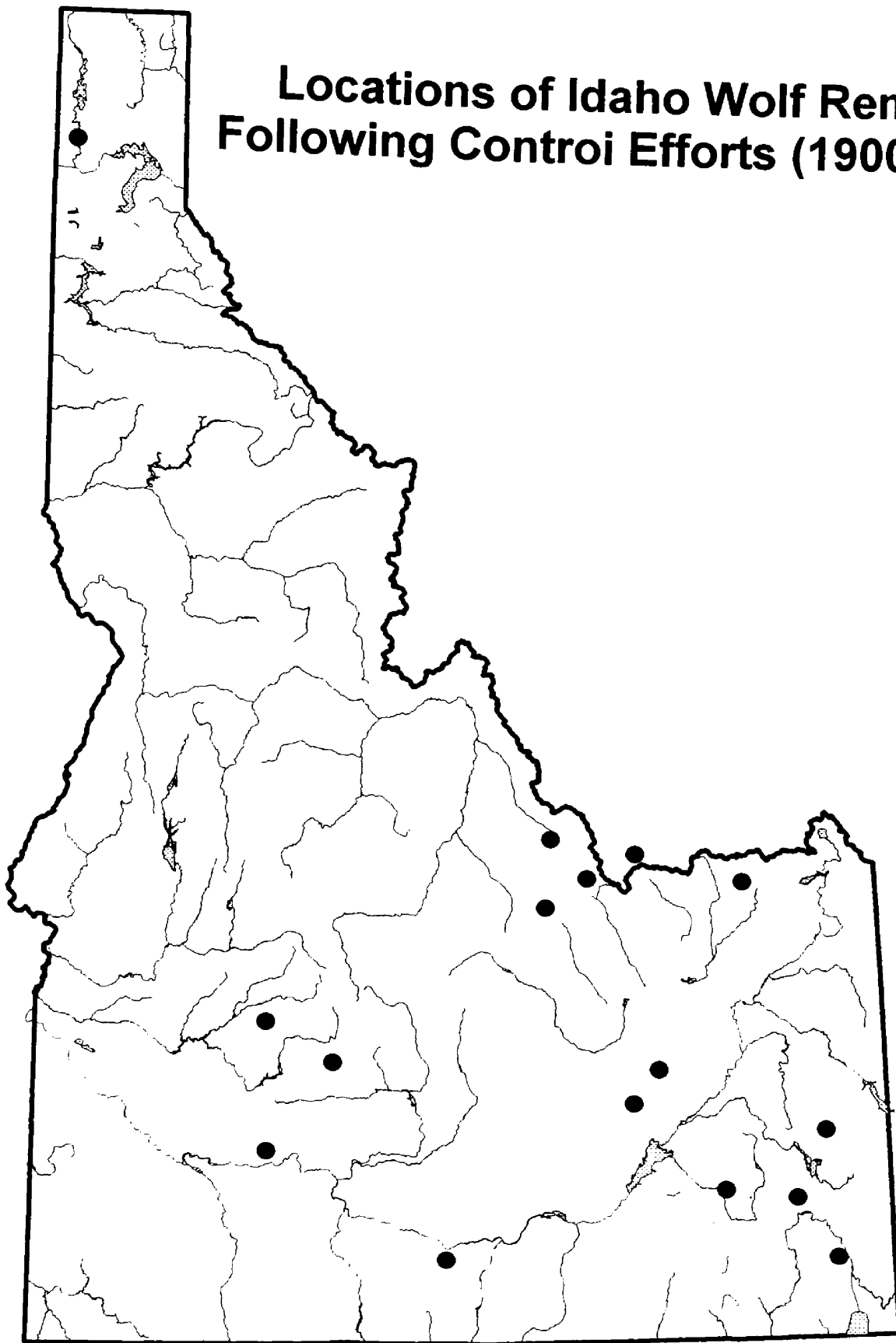


FIGURE 1.

Locations of Idaho Wolf Remains Following Control Efforts (1900 - 1939)



1/ Skulls or hides, E.A. Goldman, 1944.

FIGURE 3.

Locations of Idaho Wolf Reports 1940 - 1970

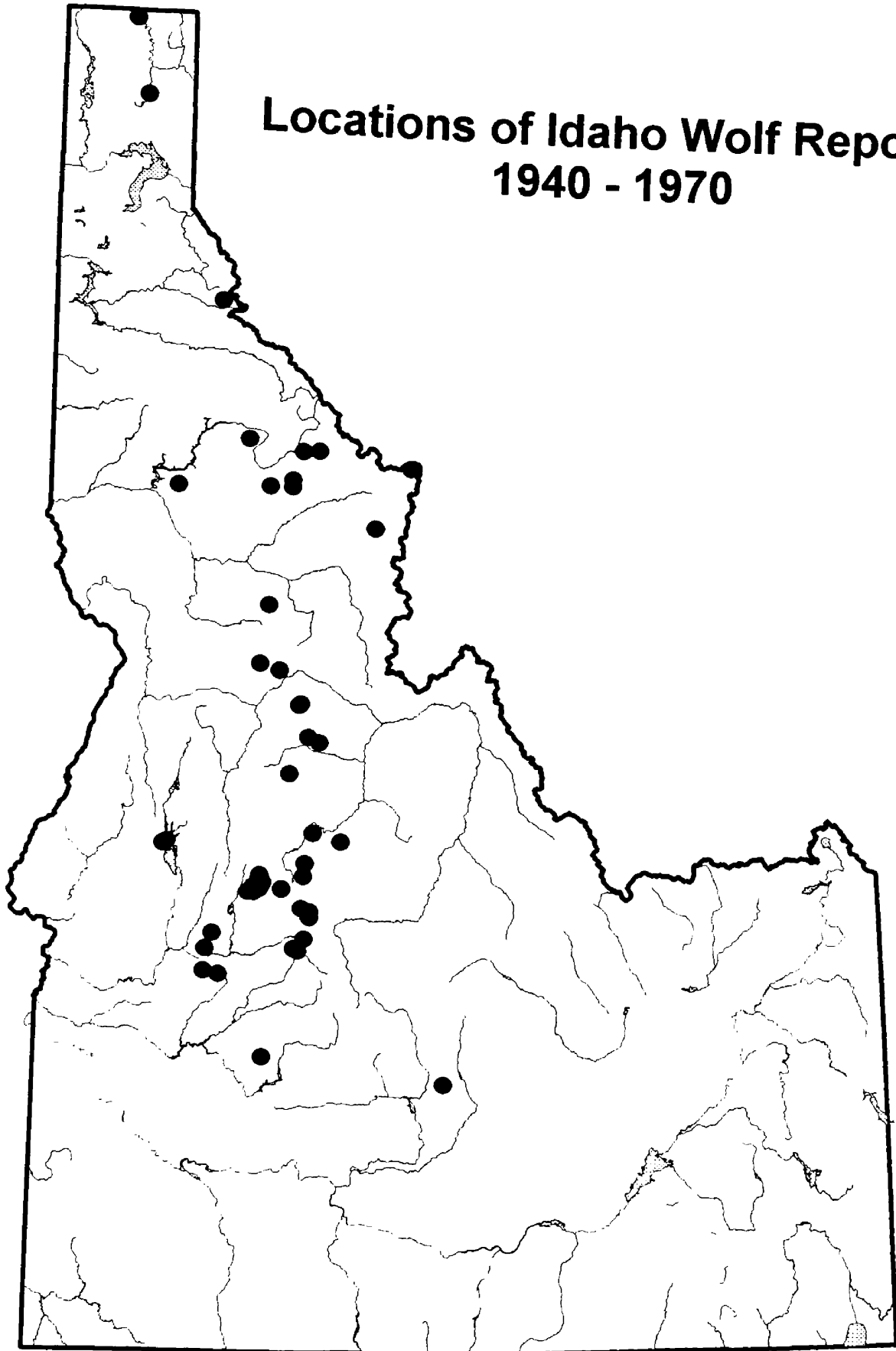
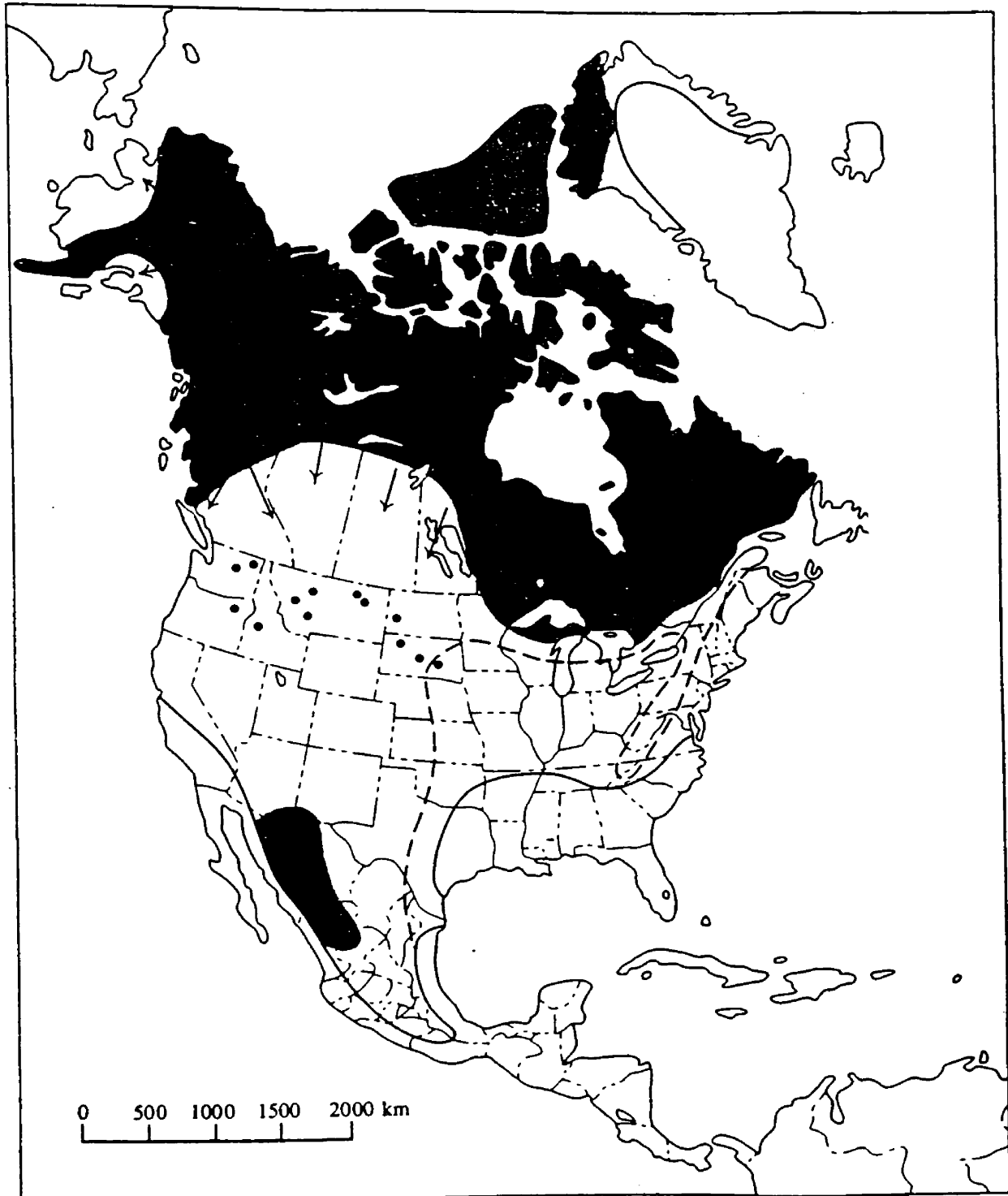


FIGURE 5.

Figure 7



— Original range of *Canis lupus*
- - - Range in 1900
■ Range in 1930

Dots indicate localities at which specimens of *Canis lupus*, examined by the author, were collected between 1941 and 1978 in the northwestern conterminous U.S. Arrows show modern range extensions