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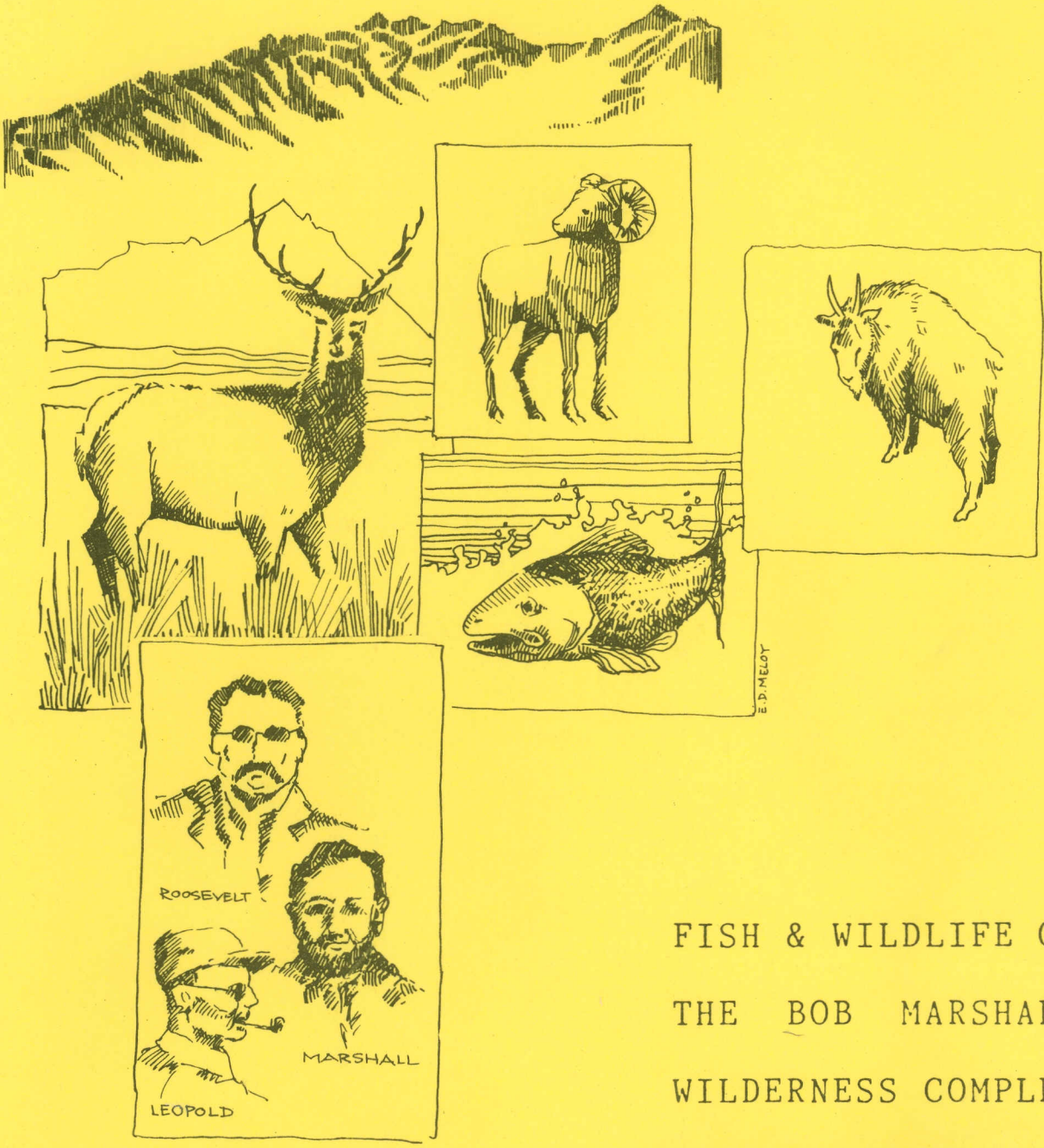

FISH & WILDLIFE OF THE BOB MARSHALL WILDERNESS COMPLEX AND SURROUNDING AREA

PLANNING, GOALS AND STRATEGIES

LIMITS OF ACCEPTABLE CHANGE IN WILDERNESS

1989

Montana Department of Fish, Wildlife & Parks

in cooperation with
REGION ONE
U.S. FOREST SERVICE

DRAFT

FISH AND WILDLIFE OF THE BOB MARSHALL WILDERNESS COMPLEX AND SURROUNDING AREA PLANNING GOALS AND STRATEGY

Limits of Acceptable Change in Wilderness

March 1989

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INTRODUCTION

This document continues the process of developing a fish and wildlife plan for the Bob Marshall Wilderness Complex (BMWC) ecosystem. The complex includes the Bob Marshall, Scapegoat and Great Bear Wilderness Areas along with ecologically associated fish and wildlife habitat. This ecological association is generally defined as those lands used by elk through the year and is generally identified in Figure 1. Most of the species discussed in this report live within the outer perimeter defined by elk distribution and use.

The first step was publication and review of the inventory document, "Fish and Wildlife of the Bob Marshall Wilderness Complex and Surrounding Area" (1987, 161 pp). That document had three basic parts. First, it developed a historical and philosophical perspective on this wild land complex. Second, it identified important wildlife values, delineated some ecological boundaries for the complex and noted potential threats to components of wildlife habitat. The wildlife section placed an emphasis on elk. Third, the inventory document reviewed the fishery resource and its condition with a focus on cutthroat and bull trout.

This segment of the planning process will establish a planning foundation by reviewing important aspects of the philosophical, historical, wildlife and fishery discussions found in the inventory report. Based upon this review, some basic principles that will guide the plan are developed and addressed as "foundation issues." Among these foundation issues will be a discussion of our perception of how we relate to the Wilderness as managers, sportsmen and other users of this resource.

After the foundation for planning is established, fish and wildlife goals are identified along with strategies for achieving those goals, both within the Wilderness and on critical habitat within the ecosystem.

It is anticipated that a third document that recommends specific management actions will be developed by the Limits of Acceptable Change (LAC) committee to implement this plan.

SUMMARY OF THE BACKGROUND AND INVENTORY

Historical and Philosophical Perspectives

To develop a background for a wildlife management philosophy consistent with Wilderness, the writings of three individuals were reviewed: Theodore Roosevelt, Bob Marshall and Aldo Leopold. Each of them brought a distinct perspective to the issue of Wilderness which reflected their sensitivities and vision. Collectively, their philosophies endow our Wilderness heritage and enhance our understanding of why Wilderness is part of our culture.

Theodore Roosevelt was a hunter and an advocate for preserving Wilderness, wildlife and the hunt. One of his many conservation

legacies was the Forest Reserve System from which many of our Wilderness areas are being derived. To Roosevelt, big game hunting, particularly elk hunting, and wild country were synonymous. Among the concepts that emerge from Roosevelt's writings is the idea that conservation of wildlife and preservation of wild country are the same issue. Another concept he articulated is that these resources are for all the people - equally.

Bob Marshall's life and career drove the evolution of the Wilderness concept and saw Wilderness become a reality by United States Forest Service regulation. Marshall focused on the aesthetic aspects and physical challenge of Wilderness. Wildlife and its pursuit were rarely the center of his attention. This focus on the physical and aesthetic aspects of Wilderness added balance to the evolving Wilderness thought. It kept a broad range of values well represented among the founders of the Wilderness preservation system.

Aldo Leopold was an articulate Wilderness advocate whose arguments for conservation of country, wildlife and a sensitive human relationship with both became a gospel that persists to this day. More than any other thinker, he honed the Wilderness and wildlife relationship to an edge keen enough to carve through even the complexities of today. In Leopold's writings, we often see the close association between Wilderness preservation and hunting and fishing. We also see in his work an emphasis on the aesthetic experience and a cautioning to managers that the objective is not necessarily the maximum production of game.

Just as it was important to review the thoughts and ideas that gave rise to the Wilderness System, it is also important to note how the specific areas within the BMWC came to be preserved under the Act. The Bob Marshall Wilderness was established by combining three primitive areas that were classified and protected under United States Forest Service (USFS) regulation. These areas, Upper Sun River, Pentagon and Upper South Fork, were combined and named in honor of Bob Marshall in 1940, one year after his death. The action was initiated and accomplished by the USFS. When the Wilderness system was created by the U.S. Congress, this area was a part of it.

The Scapegoat Wilderness was added after an intense debate over the land's future. It was the first area added to the Wilderness System on the initiative of the citizens and contrary to the land-use plans proposed by land managers. The area was added to the Wilderness System in 1972. The hunting, fishing and recreation assets of the area were the overwhelming public concerns.

Following the pattern established in the Scapegoat land-use debate, the Great Bear Wilderness was added to the Wilderness System in 1978. One of the main features of this area is the Middle Fork of the Flathead River which is part of the Wild and Scenic River System. Protecting the watershed of this river was

one of the main arguments offered in support of preserving the Great Bear area under the Wilderness Act. Another major argument offered was the protection of a wild land linkage between Glacier National Park and the Bob Marshall Wilderness for wildlife conservation purposes.

Long before formal protection of the land was achieved under the Wilderness Act, wildlife conservation and restoration was underway, propelled by various local initiatives. The result of these efforts was establishment of some of the most significant big game populations in North America. The original abundance of wildlife along the eastern edge of the area had been reduced to remnant populations near the turn of the century. Gradually, populations of elk, deer and bighorn sheep were restored and expanded into a wildlife resource of major proportions.

This wildlife recovery and expansion was the result of protection, management and land-use changes. The degree of human intervention applied throughout this system was substantial and it continues to be responsible for the wildlife that now use the Wilderness and associated habitats. The recovering wildlife populations were responding to specific management programs implemented by both wildlife and land managers such as fire suppression, domestic grazing reduction, intensive predator control and restrictive hunting regulations. It is probable that these populations are ecologically unlike anything that existed under the pristine circumstance.

Wildlife

The BMWC ecosystem is important to a wide variety of wildlife, both game and non-game species. Through the years, following the recovery of wildlife populations, the BMWC has maintained a backcountry hunting tradition that has remained relatively unchanged. The recreational values offered are considered exceptional in Montana and rare in the entire country. While many important big game populations inhabit the ecosystem, elk have historically provided the majority of recreational opportunity. In order to maintain traditional wildlife values, attention must focus not only on activities and management within statutory Wilderness, but upon other areas essential to the welfare of Wilderness wildlife populations.

All species of wildlife, game and nongame, are considered of equal importance in an intrinsic sense. Elk were selected as the focal wildlife species in the LAC analysis because there is considerable information on elk and because they attract the majority of wilderness users for the three-month hunting season. Other big game and special interest species that occur in the BMWC ecosystem include: mule deer, white-tailed deer, moose, bighorn sheep, mountain goat, mountain lion, black bear, grizzly bear and wolves. These species inhabit the BMWC seasonally and depend upon non-wilderness lands for a portion of their needs. Management of these lands will have far reaching consequences for most wildlife

species inhabiting the ecosystem.

Nine to eleven thousand elk inhabit the nearly 4-million- acre BMWC elk ecosystem. The population of elk has historically averaged at least 8,000 and is now considered to be relatively stable. Over the years, the number of elk harvested varied depending upon weather conditions during the hunting season and other factors.

Over the last 30 years, the BMWC elk ecosystem has experienced fewer changes in the elk population, hunting regulations, or composition of the harvest, than any other area of Montana. The BMWC provides some of the least restrictive elk hunting seasons available in the United States, largely because motorized access is negligible or lacking over much of the ecosystem. In addition to the traditional hunter harvest of elk, the wolf recovery plan anticipates their availability as prey to sustain a portion of the proposed wolf population as repopulation by that species occurs.

The State of Montana has purchased four Wildlife Management Areas (WMA) along the eastern and southern edge of the Wilderness. The interest and concern for wildlife has spread to private conservation organizations which have purchased land to accommodate the needs of wildlife. These state and private acquisitions account for 5 percent of elk winter range within the ecosystem.

Seven entities own or manage lands in the BMWC elk ecosystem. The USFS manages 74 percent of the area, the private sector owns 17 percent and 9 percent is controlled by the State of Montana, large corporations, the Bureau of Land Management (BLM), the Blackfeet Indian Reservation and Glacier National Park (GNP).

The entire area is elk summer range, and almost all of the elk utilize statutory Wilderness at some time during the year. Elk winter range generally occurs around the perimeter of the Wilderness. Over 80 percent of the elk population winter on non-wilderness lands. Forty-one elk winter ranges were identified (Fig. 1). About 4,000 elk winter east of the Continental Divide on the Sun River, Teton and Two Medicine areas, another 3,000 elk winter on the Flathead areas west of the Divide and between 2,000 and 3,000 elk winter on the Blackfoot and Dearborn areas at the southern end of the ecosystem.

Current and proposed land-management programs could result in development of 2/3 of the elk winter range within the ecosystem. This would affect 26 different winter ranges. Forty-two percent of the current elk winter range occurs on private and corporate lands, while 53 percent occurs on USFS lands. Over 1/2 of the latter (about 134,000 acres) is outside of Wilderness. Although there is only limited opportunity to influence land management on private and corporate lands, management of the public lands can be influenced through this LAC process and implementation of other state and federal laws.

While the analysis of the wildlife resource of the BMWC focused on elk for a number of reasons, it is recognized that other species, both game and nongame, occupying the area are of equal importance. This continuing discussion on wildlife focuses on game species because there is information to support such a discussion. This focus does not imply that game species are more important than other wildlife occupying the area. It is recognized that information on the many other species living in the area needs to be gathered.

The entire BMWC is summer range for mule deer. Wintering areas are located in the South Fork and Middle Fork of the Flathead within the Wilderness and along the periphery on USFS, BLM, State and private lands (Fig. 2). Generally, buck/doe ratios are higher than in eastern Montana due to the inaccessible nature of wilderness terrain and the limited number of deer hunters. Montana sportsmen regard the BMWC as a "trophy buck" reservoir due to rugged topography and seasonal migration habits of the various herds. Mule deer are an important component of how the BMWC is appreciated by the public. Management of fire, logging, recreation, grazing, access around the perimeter and wolf recovery will play a key role in mule-deer management in the BMWC ecosystem.

White-tailed deer comprise about 30 percent of the deer harvest within the BMWC but little is known of their movements, population dynamics or relationship to adjacent non-wilderness areas. Whitetails in northwestern Montana appear to be adapted to older aged, mixed species forest and to well-developed riparian areas. They currently seem to be increasing in the South Fork of the Flathead and along the North Fork of the Sun River. Whitetails that winter in the interior of the BMWC occur only in parts of the South and Middle Forks of the Flathead River where closed canopy timber provides adequate snow intercept and late seral stage vegetation. Whitetails may assume an increasingly important ecological role in the BMWC and adjacent areas like the Swan Valley as wolves recover in the ecosystem.

Moose habitat in the BMWC is limited, occurring primarily in the northern portion of the area. Their numbers and distribution appear to have increased over the last 8 to 10 years in the lower South Fork of the Flathead. The majority of moose in this area are found from the Wilderness boundary north to Hungry Horse Dam. A small but productive moose population is found in the Middle Fork Flathead River associated with a large meadow complex around Shaffer Meadows (Fig. 3). Scattered moose populations occur in the Summit-North Fork Birch Creek area, Swan and Clearwater drainage to the west and the Landers Fork, Monture Creek and North Fork Blackfoot drainages to the south.

Bighorn sheep range from the Major Steele Backbone north of Swift Dam south to Crown and Scapegoat Mountains which lie on the northern border of the Scapegoat Wilderness. Summer ranges within the BMWC are found at high elevations along the Chinese Wall, the Prairie Reef-White River area, the divide from Arsenic Mountain to Rocky Mountain, the divide from Hodley Creek to Crown Mountain and

around Mount Patrick Gass and Crooked Mountain. Outside the Wilderness, summer ranges extend to the eastern edge of the Rocky Mountain Front along Castle Reef and Sawtooth Ridge, and in the drainages of Willow Creek and Renshaw Creek. Two areas that receive use by bighorns throughout the year are south of Swift Dam to Walling Reef and from Mount Werner to Choteau Mountain. Animals in these areas use lands under private, state and federal jurisdiction. Bighorns occupy nine winter ranges within this ecosystem located almost entirely outside classified Wilderness (Figure 4). These winter ranges are by far the most important aspect to the continued perpetuation of these populations.

The future of bighorn sheep is dependent upon the management options selected for the areas they use. Of critical importance are fire, grazing, oil and gas exploration, logging and human disturbance.

Mountain goats are found throughout the BMWC. While goats are generally thought to be relegated to ice and rock, they travel through and, in fact, use most of the habitat types in this system. About 70 percent of suitable mountain goat habitat occurs within Wilderness. Non-wilderness areas where goats occur include the Swan, Badger-Two Medicine, several segments of the Rocky Mountain Front, Monture, Stonewall and many slopes extending outward from the Wilderness boundary on the south and east.

Areas where goat numbers have declined most noticeably occur outside or on the accessible edges of the Wilderness. Goat behavior tends to remain true in that they often retain the same habits even when their habitat is altered and their security compromised. Factors contributing to the decline include road access and activities that adversely impact goat welfare such as logging, oil and gas exploration, over hunting, and recreational development.

Wilderness provides the most stable mountain goat habitat for a species which has one of the highest natural mortality rates among North American big game animals.

The mountain lion is a highly adaptable animal, living under a broad spectrum of environmental conditions from northern British Columbia to the Straits of Magellan. Little information about lion populations and distribution in the BMWC exists. Seasonally, they are probably distributed throughout the entire Wilderness complex and associated wild lands. In the winter, their distribution is dictated by the distribution of the big game populations upon which they prey.

The BMWC sustains a healthy black bear population. Habitat in the BMWC appears adequate, however, vegetative succession following the fires of the early 1900s may have lowered habitat quality in recent years through diminished production of seasonally important foods. The recent fires of 1988 have again initiated the successional process over a significant portion of the BMWC.

The grizzly bear occurs throughout the BMWC and adjacent areas. In this ecosystem, they use a wide variety of habitat types, the current population estimate is a minimum of 356, and the population is believed to be stable or increasing in most areas. As with black bear, grizzly habitat within the Wilderness changes gradually due to plant succession, and dramatically due to major fires such as occurred in 1988. Acquisitions of key habitat areas outside of the Wilderness such as Pine Butte Swamp, bought by The Nature Conservancy, and Antelope Butte Swamp, acquired by Montana Department of Fish, Wildlife and Parks (MDFWP), are important positive steps in improving grizzly bear habitat. These areas at low elevations are heavily used by bears, particularly in the spring.

At the present, time conflicts have occurred on the periphery of the BMWC outside the designated Wilderness. These adjacent areas are vitally important in that they seasonally provide important forage or carrion required by the bears for survival. The preservation of the grizzly population must be addressed in the context of retaining critical habitat and a reasonably compatible relationship with landowners/managers throughout the system on public and private lands.

Reports of wolves in the BMWC have occurred sporadically since at least 1944 and continue with some reliability today. The BMWC is part of a designated wolf-recovery area that has as its goal the establishment of 10 breeding pairs of wolves. The Wolf Recovery Plan identifies this recovery area as Glacier National Park, designated Wilderness areas (Bob Marshall, Great Bear, Lincoln-Scapegoat, Mission Mountains), and on suitable adjacent public lands where the majority of recent wolf reports have occurred. Because recovered big game populations are now substantial in the BMWC ecosystem, it is a certainty that wolves will be, or already are, attempting to repopulate the area.

The National Wildlife Federation in Wolves in the Northern Rockies discusses the prey demand of a recovered wolf population. The Federation states, "It is estimated that each wolf consumes the **equivalent** of 6 to 8 adult elk per year or 5 to 12 pounds of meat per day. Ten wolf packs with a total population of 50 to 150 would consume the **equivalent** of 300 to 1,200 adult elk." The Federation also points out that wolves will also consume carrion when it is available and a variety of other small mammals. It is emphasized that no one knows where the wolves will elect to establish their territories and that the area identified for recovery is larger than just the BMWC ecosystem. It is prudent, however, to assume that the wolves will establish themselves where prey is most available to them.

If a stable, recovered population of wolves is to be realized and accepted in the BMWC, elk and deer populations should be increased in proportion to the prey utilized by the wolves. Since hunters are presently harvesting the annual surplus of the elk

population, wolf recovery will be more compatible if it doesn't directly reduce what has been available to the hunters. At the present time, deer populations seem to rise and fall independent of hunting pressure. While wolves would be an ecologically sound addition to the ecosystem, planning must anticipate and prepare for their presence. Wolf populations will also require management and be strongly affected by ecological conditions inside and outside the Wilderness.

The above discussion focused primarily on elk and other species of wildlife of considerable public concern. For some of those species, there was sufficient information to support a reasonable level of analysis. This assessment was constrained by the amount of information on hand since neither time nor funds were available to initiate new wildlife studies. Many other species of wildlife inhabit the BMWC, but the lack of area- specific information about them precluded their inclusion in this report. It is recognized that these species are as important ecologically and intrinsically as those considered in this report. It is not assumed that if some species are benefited, all species will share in those benefits. Analysis and evaluation of other species of wildlife inhabiting the BMWC is definitely a need that should be addressed in future planning programs.

Fisheries

The fisheries resource within the BMWC is extensive and unique. More than 500 miles of stream and 35 lakes support populations of native and introduced species of salmonids. Hundreds of lakes and potholes within the complex are barren of fish either because of their basic limnological features or because of management decisions to keep them barren. Waters within the BMWC provide an isolated habitat that is a genetic stronghold for two native fish species of special concern - bull trout and westslope cutthroat trout. These waters also provide thousands of angler days of recreation. For fishery discussion purposes, the BMWC can be divided into the following drainage areas: Middle Fork Flathead, South Fork Flathead, Blackfoot and East Front streams.

The Middle Fork Flathead River drainage supports a complex of migratory and resident native species including the bull trout, westslope cutthroat trout and mountain whitefish. Westslope cutthroat trout in the drainage below Bear Creek appear to be primarily migrants that travel from Flathead Lake (adfluvial fish). Those in the Middle Fork above the mouth of Bear Creek travel primarily between the river and its tributary streams (fluvial fish). This division between adfluvial and fluvial fish at the mouth of Bear Creek is a generalization with some adfluvial fish probably going further up the Middle Fork. Catch rates of cutthroat trout by anglers in the Middle Fork ranged from 1.21 to 1.68 fish/hour as measured in 1979 through 1981.

The bull trout in the Middle Fork are adfluvial fish, growing to maturity in Flathead Lake and migrating into the river and its

tributaries to spawn. Mountain whitefish are quite abundant and have been estimated to exceed 1,000 fish per mile of stream in places.

Tributaries in the Middle Fork drainage support from 0.2 to 27.2 westslope cutthroat per 100 square meters of water surface. Juvenile bull trout densities ranged from 0.1 - 7.2 fish per 100 square meters of water surface. These tributary streams are important nursery areas for migratory fish populations from both the Middle Fork Flathead River and from Flathead Lake. Angler catch rates of westslope cutthroat trout in these tributaries averaged 4.4 fish per hour.

Bull trout spawning sites or redds in the Middle Fork tributaries numbered from 237 to 523 in years when nearly complete surveys were conducted. Major tributaries used by spawning bull trout in this drainage within the BMWC include: Strawberry, Trail, Bowl, Clack, Schaffer, Dolly Varden, Morrison, Lodgepole and Granite Creeks. Tributaries used to a lesser degree include Lake, Long, and Charlie Creeks and probably a few others.

Twelve mountain lakes in the Middle Fork drainage within the BMWC are populated with cutthroat trout. The genetic purity of these fish has not been tested. In these twelve lakes, the fish populations are sustained by natural reproduction in six, and are maintained with fish stocking in six. The fish used in the stocking program are genetically pure.

The South Fork Flathead River drainage supports a fish assemblage similar to that of the Middle Fork. However, this river is isolated from the Flathead system by Hungry Horse Dam. Bull trout and some westslope cutthroat migrate between Hungry Horse Reservoir and South Fork drainage within the BMWC. Information from tag returns indicates that most cutthroat in the upper South Fork are fluvial residents of the river. Westslope cutthroat in the upper portion of the river were genetically tested and found to be essentially genetically pure.

Ten productive lakes in the South Fork drainage support rainbow and Yellowstone cutthroat trout. Fish from these lakes are currently being tested to evaluate their genetic characteristics. Westslope cutthroat are also being planted into some of these lakes.

Population estimates for cutthroat on several sections of the South Fork ranged from 293 to 1,090 fish per mile. The highest densities of cutthroat were found in the Black Bear and Mid Creek sections. The average length of cutthroat trout sampled in 1960 and 1981 was about 9 inches. This average length changed to 9.4 inches in 1984, 10.2 in 1985, and 10.7 in 1986. This apparent increase in average length may be due to the angling limits of three fish, none over 12 inches. The limits were established in 1984.

Populations of cutthroat trout in the South Fork tributaries averaged 3.43 fish per 100 square meters of water surface area, or 40 fish per 100 meters of stream length. Upper Gordon Creek supported the highest densities of westslope cutthroat trout.

The Blackfoot River drainage within the BMWC ecosystem provides some of the best spawning habitat available for large, fluvial bull trout living in the Blackfoot and North Fork Blackfoot Rivers. Other species in the drainage include westslope cutthroat, rainbow, hybrids of rainbow and westslope cutthroat, Yellowstone cutthroat, brown trout and mountain whitefish.

Little information is available for major tributaries in the drainage within the BMWC. Major drainages include the North Fork Blackfoot River, Landers Fork of the Blackfoot, the East Fork of the North Fork Blackfoot River and Monture Creek. While little fishery data has been collected on these streams, some of them, like Monture Creek, have supported substantial fishing pressure as evidenced by the number of camps located there specifically for fishermen. Seven mountain lakes support Yellowstone cutthroat populations of undetermined genetic origin. There are a few barren lakes in this portion of the BMWC, with at least one (Heart Lake) kept barren to encourage restoration of adjacent overused camp sites.

Streams draining the East Front within the BMWC ecosystem support an important fishery for rainbow, cutthroat and eastern brook trout. Major East Front drainages include the North and South Forks of the Sun River, the Dearborn River, and tributary streams of the Teton and Marias Rivers. Average lengths of rainbow trout in the North and South Forks of the Sun River have ranged from 10.0 to 12.7 inches in samples taken from 1975 through 1985.

Four mountain lakes in the Sun River drainage support populations of Yellowstone cutthroat trout inside the Wilderness. In addition, two lakes adjacent to the classified Wilderness also support Yellowstone cutthroat trout. One lake outside the Wilderness supports westslope cutthroat trout.

Westslope cutthroat trout from several streams in the North Fork Badger Creek and Upper South Fork Two Medicine River drainages were tested and found to be genetically pure

FOUNDATION ISSUES

Before addressing the goals of this planning process, it is important to identify the basic principles upon which the plan will be built. These items have been designated "Foundation Issues." These topics have been discussed throughout the planning process and they are generally accepted as valid. Six foundation issues form the basis for developing the fish and wildlife goals for the Bob Marshall Complex. It is again acknowledged that the focus of these issues, and eventually the goals and strategies of the

planning process, remains on elk and the other species previously discussed. This does not reflect either a lack of interest or concern for other species occupying the BMWC ecosystem. What it does reflect is the fact that elk and other game species have been the focus of conservation efforts in this region since the turn of the century and that this effort has been as successful as any in the nation.

The six foundation issues are:

I. Fish and wildlife populations are now functioning in a managed situation that while not pristine in a strict sense, is consistent with the wilderness resource goals.

This foundation issue recognizes two important points. First, the fish and wildlife resources may be considerably different from what they were under the pristine circumstance. The limited historical information that was available indicates a wildlife abundance on the northern plains that was systematically consumed by pioneer markets for hides, meat and bones. There was also indication of a scarcity of game in the mountainous country to the west of the great plains. By the turn of the century, wildlife populations in the mountains and on the plains were little more than remnants. Hungry Horse and Gibson Dams have altered aquatic systems and exotic species have been introduced into the area. Second, conservation programs have restored substantial populations of wildlife and introduced new species of fish to the area. These populations, however, are not a restoration of the original condition. The current fish and wildlife populations are the result of protection and management programs practiced both in and around the classified Wilderness land. These programs were instituted well before passage of the Wilderness Act.

II. Fish and wildlife planning must be approached in an ecological context, boundaries being dictated by the animals' needs. Those boundaries go beyond classified Wilderness and, at times, national forest boundaries.

The BMWC ecosystem has been defined on the basis of elk distribution (Fig. 1). Although most of the elk summer ranges are within the classified Wilderness, the species cannot prosper without protection for the land that sustains them in all seasons. The data base for elk distribution is substantial and supports a broad definition of the BMWC ecosystem. This definition is generally adequate for most other species considered in this analysis. With exception of the exclusion of Flathead Lake, the ecosystem definition is also reasonable from a fisheries perspective.

Elk distribution defines a BMWC ecosystem of about 4 million acres (Fig. 1). The USFS manages 74% of the ecosystem. The next largest landowner is the private sector with 17%, followed by the State of Montana with 4%. Only 1% of this 4% is under the Montana Department of Fish, Wildlife and Parks' (MDFWP) management. The remaining 5% includes: corporate lands, the Bureau of Land

Management (BLM), the Blackfeet Indian Reservation, and Glacier National Park (GNP). Slightly more than half of the USFS lands (53%) are presently designated Wilderness. This arrangement of land ownership and resource-management responsibility emphasizes the need to approach wildlife planning in an ecological context and with a cooperative attitude.

III. Hunting and fishing will be Wilderness oriented and emphasize primitive recreation within the BMWC ecosystem. A diversity of recreational experiences will continue to be offered within this primitive setting.

The type of recreational areas most limited in Montana and elsewhere are places offering the primitive recreation experience. Places to hunt and fish in developed settings are already abundant and will increase as other public lands are further developed. Preservation of sites for more primitive forms of recreation must occur both within and beyond wilderness boundaries if those forms of recreation are to be sustained. Within this context, there will continue to be a high degree of diversity of opportunity. Archery seasons, early-rifle seasons and general seasons in addition to permit hunting, branch-antlered bull hunting and either-sex seasons will likely be part of the evolving management formula. While the recreational emphasis will be on backcountry activities, season dates and types will be set to assure the perpetuation of game populations and their habitat throughout the ecosystem.

IV. Wildlife and fisheries management will strive to maintain population age structures approaching those occurring in pristine populations.

Fish and wildlife management will emphasize the intrinsic values of fish and wildlife and the esthetics of the recreational experience rather than striving to achieve the maximum number of recreation days or the maximum rate of game harvest in the BMWC ecosystem. This emphasis is consistent with the Wilderness Act, the philosophy of those who were active in the movement that produced the Act, and contemporary users of the area. The present planning direction of the MDFWP for the elk population of this area is to maintain a diverse age structure in the bull segment of the herd. This planning direction is consistent with this foundation issue.

V. Fish and wildlife recreational opportunities include hunting, fishing and appreciating their intrinsic values.

The consideration of both consumptive and nonconsumptive uses and values of fish and wildlife are compatible and consistent with the traditional use of the area. These varied uses of fish and wildlife are also consistent with the Wilderness Act, the philosophy of the founders of the wilderness concept, and contemporary fish and wildlife management programs.

VI. Individual perceptions of what the Wilderness is, and what

the recreational experiences in the Wilderness are or should be, ought to be a consideration in developing fish and wildlife programs for the BMWC ecosystem.

Wilderness users and Wilderness resource managers all have perceptions of what these areas are and what the human experiences related to them mean. These perceptions are probably as varied as the individuals who hold them and more diverse than the land that nurtures them. It was noted early in this planning process that Aldo Leopold counseled, "To promote perception is the only truly creative part of recreational engineering." The entire Limits of Acceptable Change (LAC) process is in a sense "recreational engineering" and the perceptions of those using the BMWC ecosystem and those managing its resources need to become a visible part of this process. People's perceptions of what is Wilderness and what type of recreational experiences can be expected in Wilderness, will be discussed throughout the LAC process.

FISH AND WILDLIFE PLANNING GOALS

The planning goals for the fish and wildlife resource of the BMWC ecosystem are presented for the species discussed in this process. The many other species living in this complex may benefit as more consideration is given to the featured species. It is important, however, that this not be assumed and forgotten and that programs be initiated that inventory and assess other species inhabiting this wild land complex.

Elk

It is the goal of this plan to maintain or improve elk populations, to sustain the current level of hunter opportunity, and to provide for the general public enjoyment. Emphasis will be on providing mature bull elk in a backcountry setting. This goal includes increasing the elk population to compensate for expected wolf predation.

One of the purposes of this goal is to sustain or slightly increase the present hunter harvest of elk in the BMWC ecosystem while accepting some expected increase in predation with the recovery of wolves. To accomplish this, the base herd will have to be increased to produce enough additional elk to compensate for expected predation. This goal will be pursued with the following strategies:

1. Allow natural burns to occur according to prescription. In addition, develop and implement an expanded prescribed fire policy within the Wilderness boundary. These fires would be used to bring the ecosystem back into a natural vegetative mosaic which would have existed had fire suppression not been imposed the last 80 years. The positive or negative consequences to wildlife would be accepted.

2. On winter ranges outside the Wilderness boundary but within the BMWC ecosystem, elk habitat will be given priority in resource allocation.

3. Winter range acquisition and improvements should be pursued along the east and south perimeter of the BMWC. Emphasis should be directed south of the Dearborn River where publicly owned winter range is currently limited. This emphasis should include evaluating the effect of the 1988 fires on elk distribution and range use.

4. Cooperative efforts must be initiated with the Blackfeet Tribe to institute a progressive game-management program designed to increase the elk herd in the Badger-Two Medicine area.

5. The current program of creating and managing a vegetation disturbance regime that mimics natural disturbance and sustains early plant successional stages within the BMWC ecosystem

outside the Wilderness should be continued. This work on the South Fork Flathead River is sponsored under the Northwest Power Planning Act.

Mule Deer

It is the goal of this plan to provide for an unquantified increase in the mule deer population of the BMWC ecosystem through habitat manipulation outside the classified Wilderness area.

Unlike the relatively stable elk populations, mule deer populations fluctuate considerably due to factors other than hunter harvest. Presently, elk are given management priority and this is generally expected to continue. When addressing mule deer, it is important to recognize differences in the management needs between the resident and migratory segments of the population. To sustain the current hunter harvest opportunity and accommodate increased predation, the habitat base suitable for mule deer needs to be improved or expanded. This goal will be pursued with the following strategies:

1. (The first strategy for mule deer is the adoption of the fire policy as described for elk.)

2. On winter ranges outside the Wilderness but within the BMWC ecosystem mule deer, habitat needs will be given priority in resource allocation.

3. Vegetation manipulation outside the Wilderness boundary will be conducted to favor plant species utilized by wintering mule deer where their key areas do not overlap important elk ranges.

White-tailed Deer

The goal of this plan for white-tailed deer is to have the population within the BMWC ecosystem fluctuate with the plant successional stages that affect their numbers.

The white-tailed deer populations have expanded within the Wilderness with the maturing of old-age timber stands. At the same time, this habitat type has disappeared from managed timber lands around the Wilderness but within the ecosystem. There is little evidence to suggest that whitetails migrate between the BMWC and adjacent timber lands within the BMWC ecosystem. Since there is little exchange between these areas, this plan will not address the needs of white-tailed deer beyond the Wilderness boundary. The goal for white-tailed deer within the Wilderness suggests no specific strategy.

1. Within the Wilderness boundary, maturing forests are expected to sustain some white-tailed deer expansion. Natural burns will periodically recycle the vegetation community to the detriment of this species. This will be accepted.

Moose

It is the goal of this plan to encourage the expansion of moose throughout the BMWC.

Moose populations have demonstrated some expansion throughout the BMWC. This trend, perhaps now encouraged by plant successional changes initiated by the 1988 fires, can be maintained. This goal will be pursued with the following strategies:

1. Moose populations will be managed conservatively to maintain the gradual increase in populations that is apparently occurring.

2. The impact of wolf recovery on moose populations will be observed.

3. A fire policy within the Wilderness, as described for elk, and a prescribed burn program outside the Wilderness boundary will be pursued to assure proper vegetational stages for moose populations.

4. The impact of domestic grazing on riparian areas will be evaluated and practices detrimental to balanced utilization of riparian vegetation will be modified if necessary to assure the production of forage normally utilized by moose.

Bighorn Sheep

It is the goal of this plan to manage bighorn populations and habitat to continue the recovery of this species and to expand their distribution, if possible, within the BMWC ecosystem.

The bighorn sheep population lives primarily along the eastern portions of the BMWC on Wilderness and adjacent non-wilderness lands. Prior to 1983, the population peaked at about 1,200 animals but was reduced by disease to present levels. At the present time, there are about 800 bighorns in the Sun River segment of the population and about 200 living north along the Rocky Mountain Front. The goal for the Sun River segment of the bighorn population is to sustain a minimum of 800 bighorns having a

recruitment rate of at least 30 lambs per 100 ewes and capable of providing a minimum of 40 3/4 curl rams for harvest annually. This goal will be pursued with the following strategies:

1. Continuation of the rams-only hunting season for the immediate future.

2. A fire policy within the Wilderness as described for elk, and a prescribed burn program outside the Wilderness boundary will be pursued to assure proper vegetational stages for bighorn sheep populations.

3. Evaluate habitat changes resulting from the 1988 burns and consider the transplant of bighorns into suitable historic range both within and outside of designated Wilderness areas if natural dispersal fails to stock suitable habitat.

Mountain Goat

It is the goal of this plan to manage mountain goats to increase populations and distribution so that all available historic mountain goat habitat is filled, ultimately increase hunter opportunity, and to provide for the general enjoyment by the public.

Mountain goat habitat occurs "where you find it." Little can be done in the way of improving, manipulating or otherwise "creating" it. Because mountain goat terrain is fragile and goat behavior is inflexible, it is important that buffers exist to protect both the habitat and the animal from human disturbances. This goal will be pursued with the following strategies:

1. Within the Wilderness boundaries, goat habitat is secure and the populations will be managed with conservative hunting seasons.

2. Emphasis will be on protecting habitats and herd units which do not occur within the existing Wilderness boundary. In these areas, mountain goat habitat will be given top priority in resource allocation decisions.

3. Exterior to the Wilderness, where island populations of goats are in jeopardy of being isolated, land-use decisions will favor maintaining linkages between island and main populations by avoiding human disturbance in or near travel corridors.

4. Distribution of mountain goats on historic and potentially suitable ranges, both within the

Wilderness and on associated non-wilderness lands, will be restored through management programs such as reintroduction (utilizing native stock), full protection and variable hunting seasons.

Mountain Lion

It is the goal of this plan to maintain mountain lion populations by maintaining the prey base that sustains them, primarily mule deer.

Little is known of mountain lion populations within the BMWC ecosystem other than that they exist and appear to be healthy. The objective will be to maintain productive and abundant ungulate populations that typically support lion populations. The mountain lion goal will be pursued with the following strategies:

1. The strategies for maintaining the various ungulate populations that form the lion's prey base can be found under their individual goal and strategy discussions for each species.

2. A composite data base on mountain lions harvested from the ecosystem should be established to follow age and sex ratios of lions harvested. This data base would be used to avoid the over harvesting of females and to otherwise adjust harvest rates if necessary.

Black Bear

It is the goal of this plan to manage habitats that provide the opportunity for stable black bear populations.

Black bears are the most common and widely distributed of the three bear species in North America. They are found primarily in less settled, forested regions of at least 23 states and all Canadian provinces. Black bear populations are thriving in and around the BMWC ecosystem. The most productive populations are associated with the moist, west-side coniferous forests and berry fields. In some localized areas, with high grizzly bear densities, black bear populations appear depressed. This situation is natural and will be tolerated. In most circumstances, measures taken to improve grizzly range will also benefit black bears. The black bear goal will be pursued with the following strategies:

1. Natural burns and prescribed fire should be promoted to create more edge and forage that favor bears.

2. Efforts should continue to elevate the public

perception of the black bear. This species needs to be viewed as an animal that is an integral part of a healthy forested environment.

Grizzly Bear

It is the goal of this plan to manage the grizzly bear population and its habitat to continue and sustain the recovery of this species in the BMWC ecosystem.

The grizzly bear represents a truely wild vestige of primitive America that is being maintained in the Wilderness setting of the BMWC ecosystem. The bear population has met or exceeded the recovery goals identified in the 1982 recovery plan. The responsible agencies are now considering taking the grizzly bear off the list of threatened and endangered species. Taking the bear off the list, however, needs to be accompanied by creation of a process that assures the preservation or improvement of grizzly bear habitat within the BMWC ecosystem. It is also essential that bear management programs strive to maintain optimum population levels and current distribution throughout the ecosystem. This goal will be pursued with the following strategies:

1. The grizzly bear, like other species, is dependent on vegetative patterns established by precipitation, fire and plant succession. The fire policy described for elk and other species in this plan is appropriate for grizzlies within the Wilderness. This impact of changing vegetative patterns is acceptable.

2. Education of recreation and other land users of the BMWC ecosystem in methods to minimize human/grizzly conflict should be emphasized.

3. Outside of the Wilderness boundaries, grizzly bear habitat and security needs must be given priority consideration in resource allocation decisions.

Wolves

The goal of this plan is to accommodate the recovery of wolves in the BMWC ecosystem consistent with the objectives of the prey species that must sustain them.

Wolves have existed in and continue to extend their range into the BMWC ecosystem. Accomplishing and sustaining permanent recovery of this species in the ecosystem depends upon sustaining a prey base for them to utilize and gaining broad public acceptance for their presence. Sustaining the prey base can be achieved by meeting the goals established in this plan for elk, mule deer, moose, mountain goats and bighorn sheep. Protecting and improving habitat for white-tailed deer outside the Wilderness in places like the Swan Valley could also be important to wolf recovery. Gaining public consensus for their permanent presence in the BMWC ecosystem will require developing a recovery program that allows for the management of wolves. Wolf management must include an emphasis on the condition of prey base, the shared utilization of that prey base, and the ability to kill wolves if necessary to keep their recovery in balance with other resource objectives. This goal will be pursued with the following strategy:

1. Request the drafting of a new wolf recovery plan that includes maintaining and expanding the prey base, does not establish recovery goals based on numbers of wolves, and defines how competing demands for the various prey species will be resolved. It is suggested that rather than setting a numerical goal, wolf distribution be used to determine recovery.

FISH

Westslope Cutthroat Trout

The goal of this plan is to maintain, at current or increased levels (as indicated by population estimates and angler success rates), the naturally reproducing populations of genetically pure westslope cutthroat trout in streams and lakes within the BMWC ecosystem. This goal includes the opportunity to catch and keep a small number of these trout for a wilderness subsistence experience.

Management of westslope cutthroat within the BMWC ecosystem should emphasize preservation of the population for its own values and emphasize a quality fishery over a production fishery. The ecosystem represents one of the major remaining strongholds of this species, so protection of the gene pool is critical. The

goal for westslope cutthroat trout will be pursued through the following strategies:

1. Maintain the current angling limits of three fish, none over 12 inches in streams, and three fish with no size restrictions in lakes.

2. Protect the genetic integrity of westslope cutthroat by planting those fish over existing non-native fish species or by removing the exotic species from lakes within or draining into the BMWC.

3. Continue introductions of westslope cutthroat trout in selected lakes to establish genetically pure populations and to increase angling opportunity while protecting other resource values.

4. Protect fisheries habitat within, and in areas draining into, the BMWC. It is important to ensure no further degradation in vulnerable areas such as the Middle Fork Flathead drainage.

5. Manage trail systems in a manner consistent with the goals for westslope cutthroat trout with an emphasis on protecting water quality.

6. Isolating some areas by locating trails and stream crossings away from critical areas and isolating some areas by sustaining difficult or primitive access.

7. Increase enforcement of angling regulations through a cooperative effort between the USFS and MDFWP.

Bull Trout

The goal of this plan is to maintain, at current or increased levels (as indicated by redd counts), the naturally reproducing populations of migratory bull trout in streams and lakes within the BMWC ecosystem. This goal includes providing an opportunity for anglers to catch a trophy fish in a wilderness setting, but de-emphasizes harvest of this unique species.

This population of bull trout, living in a natural lake and migrating into an extensive and still largely accessible and unaltered headwater tributary system, is probably the only one of its kind left in the United States. Streams within the BMWC provide some of the most important spawning and nursery habitats

for migratory bull trout in Flathead Lake and Hungry Horse Reservoir. Because of the ecological relationships within these expansive aquatic systems, management must be sensitive to conditions both within and beyond the BMWC. The goal for bull trout will be pursued with the following strategies:

1. Maintain the current angling limit of one fish per day and in possession. Consider an education program to encourage voluntary catch and release of only one mature fish per day. The stress of migration and spawning render this species very sensitive to angling. If necessary, further restrictions will be considered.

2. Protect fisheries habitat within and in areas draining into the BMWC. It is important to ensure no further degradation in vulnerable areas such as the Middle Fork Flathead River.

3. Locate trail crossings away from important spawning areas and maintain primitive or difficult access to critical habitat areas.

4. Increase enforcement of angling regulations through a cooperative effort between the USFS and MDFWP.

5. Encourage management of bull trout in a manner consistent with this goal outside the BMWC. Sound management of this species in Flathead Lake, Hungry Horse Reservoir and the river corridors is required to protect the species within the BMWC.

Other Species of Game Fish

The goal of this plan is to emphasize recreational opportunity, primarily east of the continental divide, on populations of rainbow trout, brook trout, yellowstone cutthroat trout and mountain whitefish.

The primary emphasis of the fishery program is to favor native species in the BMWC. In this instance, it is done by focusing angling pressure on non-native fish. The whitefish is an underutilized native fish that could absorb more angling pressure. The objective is to reduce the taking of native cutthroat and bull trout. Rainbow trout, brook trout, Yellowstone cutthroat trout and whitefish should be able to support increased angling pressure, provide more recreational opportunity and perhaps reduce pressure on westslope cutthroat and bull trout. The goal for these species will be pursued through the following strategies:

1. Consider increasing the angling limit on

rainbow trout in the Sun River drainage.

2. Develop and implement an education program to emphasize harvest of mountain whitefish for a subsistence experience within the BMWC.

3. Ensure that the management and education programs for these fish species are developed complimentary to the dominant fishery goal of preserving the westslope cutthroat and bull trout fish populations.

WILDERNESS USER PERCEPTIONS

The goal of this plan is to devise a methodology to address and deal with human perceptions of Wilderness and the Wilderness experience.

Most of the effort committed to this process has been directed toward the physical (land condition) and biological (fish and wildlife) resources of the BMWC ecosystem. Just as beauty and its identification belong to each person individually, the perception of what Wilderness is and the experiences we seek there vary across a wide spectrum. If we are to follow Leopold's suggestion that, "To promote perception is the only truly creative part of recreation engineering", then we must devise ways to deal with perceptions as well as realities. The ultimate goal will be to bring perceptions and reality as close together as possible so that Wilderness, and the experiences we have there, are as genuine and fulfilling as possible.

Dealing with something as elusive and private as how people intuitively and instinctively relate to Wilderness might be approached in two ways. First, an effort needs to be made to sample the spectrum of perceptions or expectations held by users of the BMWC ecosystem. This sampling should include both what the individual thinks the Wilderness is and what each person would like it to be. Second, a program should be developed that enriches the physical and intellectual environment in which ideas about wilderness and our relationship to it are formed. The first suggestion initiates a process of learning about contemporary feelings held by Wilderness users which could be both enlightening and valuable to resource managers. The second suggestion approaches Leopold's idea of dealing with perceptions as a means of initiating "recreation engineering" as the only creative aspect of recreation management. The goal for these species will be pursued through the following strategies:

1. Design and implement a study of the perceptions of Wilderness experiences, expectations and management held by people interested in the preservation and use of the BMWC ecosystem.

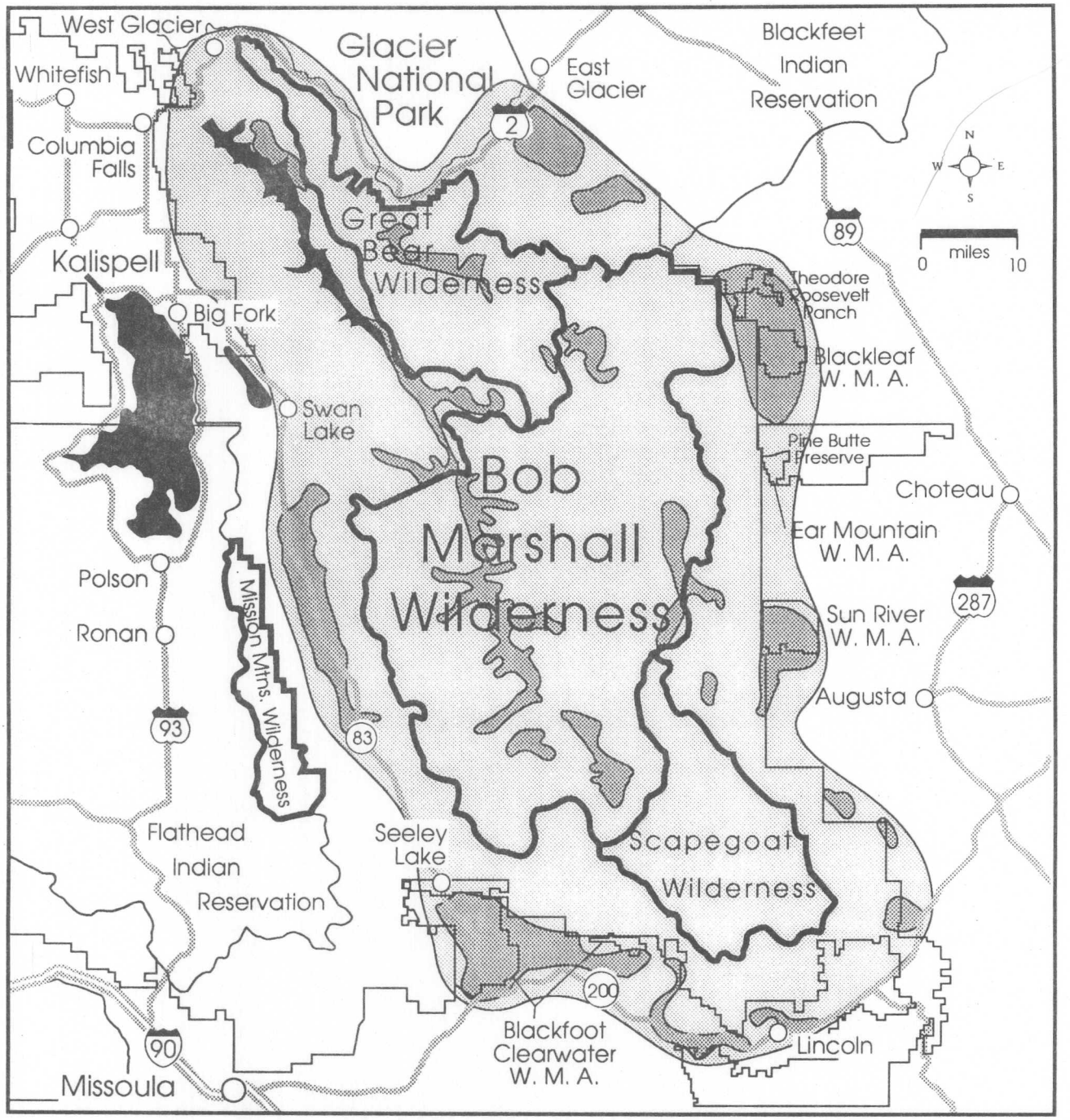
2. Continue the LAC planning and implementation process as a means of preserving the physical environment in which Wilderness perceptions will be formed.

3. Design and implement an educational program that develops and disseminates information about the philosophy and history of the Wilderness movement and the BMWC ecosystem. This program will enrich the intellectual environment in which Wilderness perceptions will be formed.

4. Integrate user perceptions and expectations into management plans for the BMWC ecosystem.

CONCLUSION

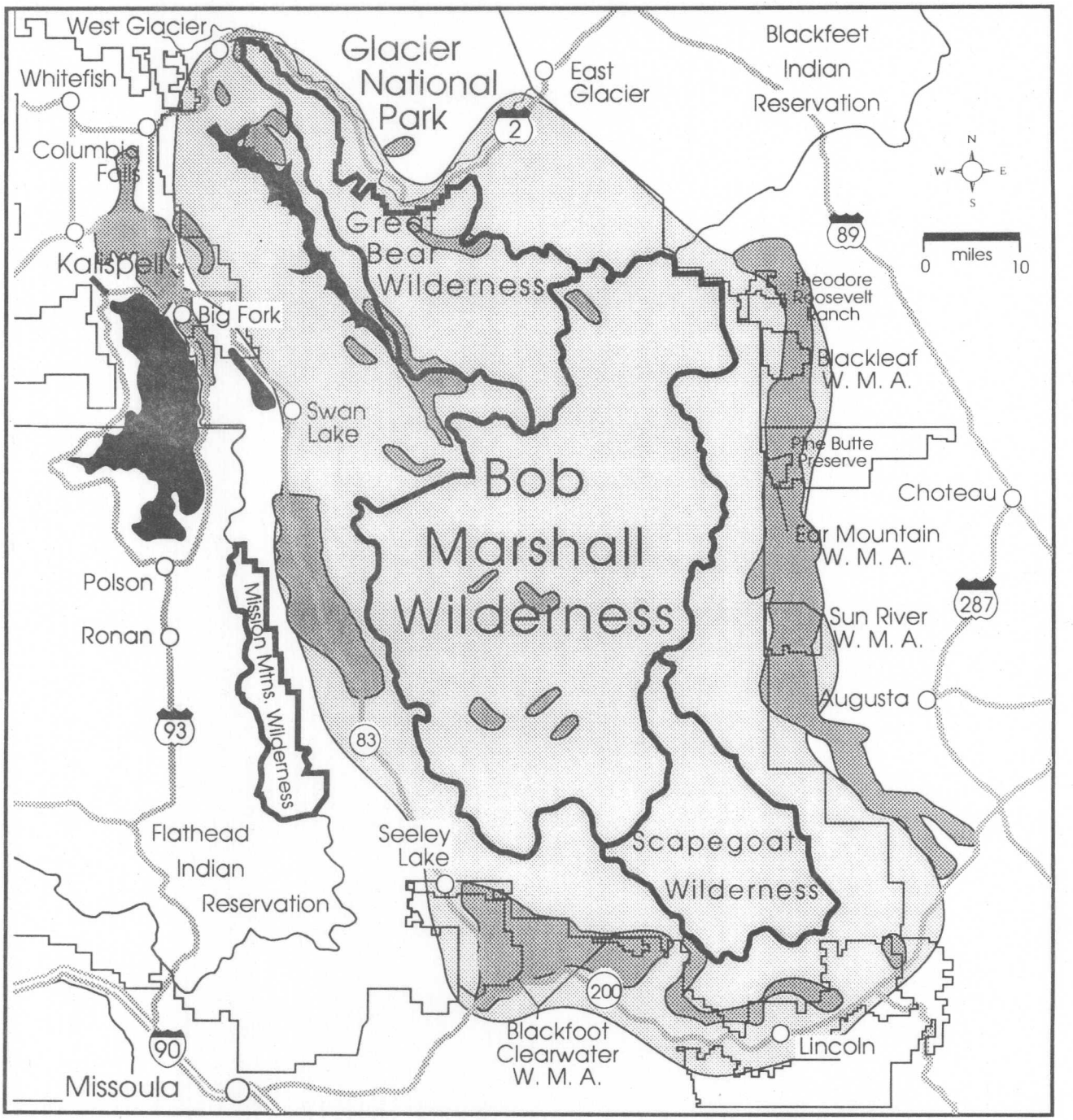
This report is the second in a three-part series that addresses the fish and wildlife resource of the BMWC ecosystem. The first report, "Fish and Wildlife of the Bob Marshall Wilderness Complex and Surrounding Area" (1987 161 pp.), addressed the history, philosophy and baseline fish and wildlife information relative to the area. This document establishes the planning goals and suggests strategies for attaining those goals. A final document must follow this report that addresses specific actions required to meet the planning goals and execute the suggested strategies.



Elk Winter Range

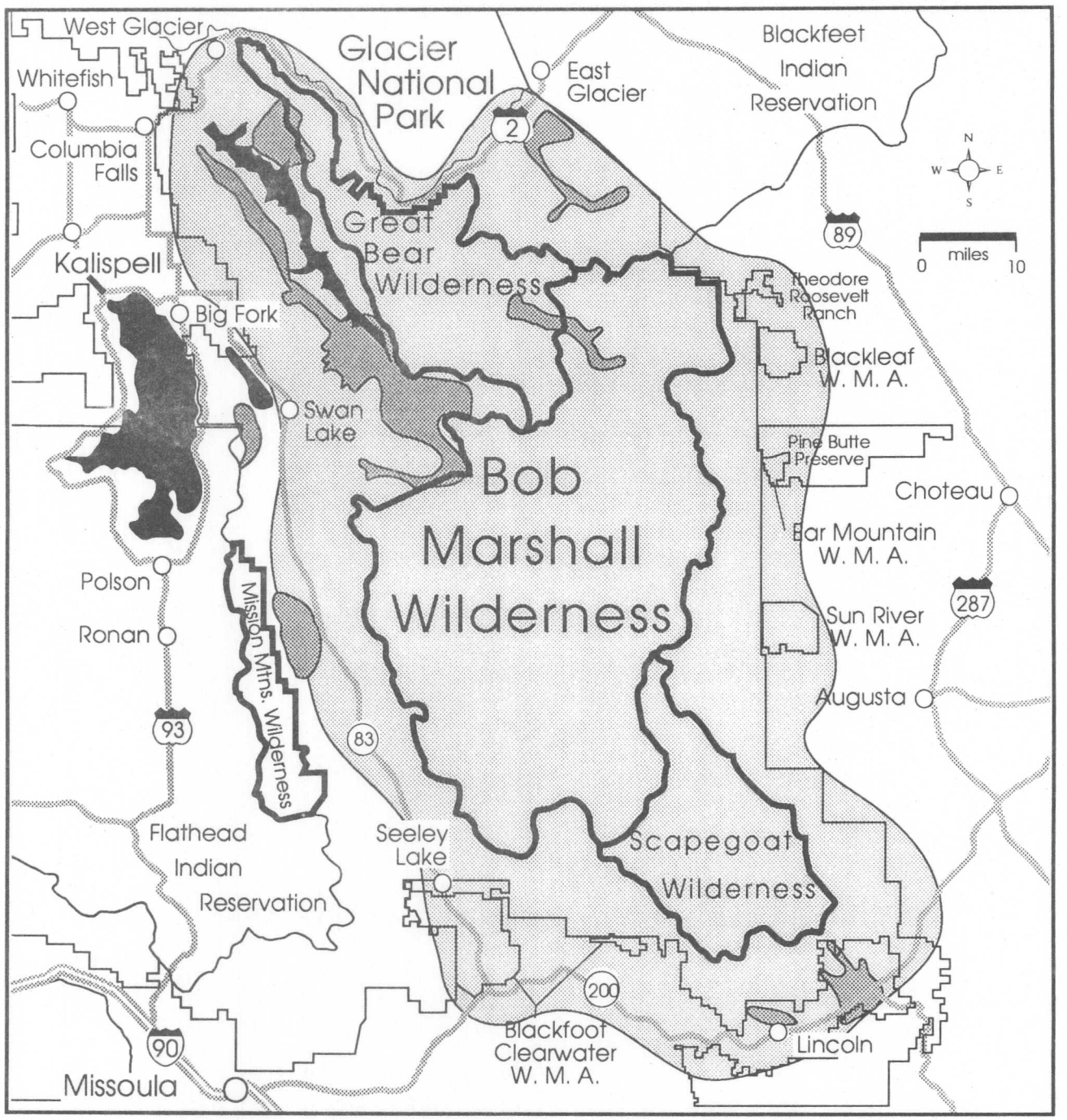
Limit of Elk Ecosystem

Figure 1. Bob Marshall Wilderness Complex (BMWC) ecosystem and elk winter ranges.



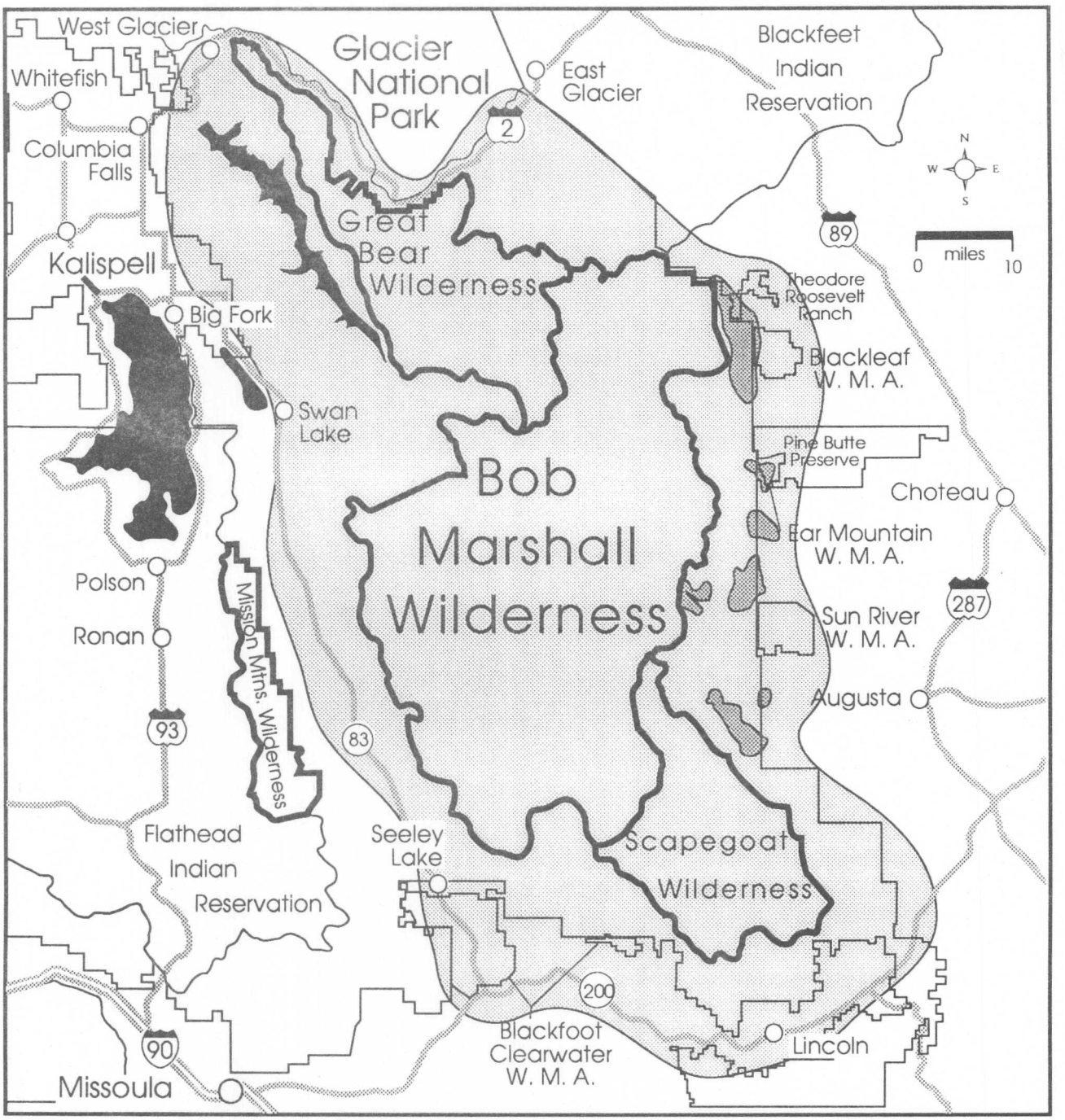
Deer Winter Range **Limit of Elk Ecosystem**

Figure 2. Mule deer winter ranges associated with the BMWC ecosystem.



Moose Winter Range **Limit of Elk Ecosystem**

Figure 3. Moose winter range associated with the BMWC ecosystem.



Bighorn Sheep Winter Range **Limit of Elk Ecosystem**

Figure 4. Bighorn sheep winter ranges associated with the BMWC ecosystem.