UTAH DIVISION OF WILDLIFE RESOURCES
STATEWIDE MANAGEMENT PLAN FOR BIGHORN SHEEP

I. PURPOSE OF THE PLAN

A. General

This document is the statewide management plan for bighorn sheep in Utah. The plan will provide overall guidance and direction to Utah's bighorn sheep management program. The plan assesses current information on bighorn sheep, identifies issues and concerns relating to bighorn sheep management in Utah, and then establishes goals and objectives for future bighorn management programs. Strategies are also outlined to achieve goals and objectives. The plan will be used to help determine priorities for bighorn management and provide the overall direction for management plans on individual bighorn units throughout the state.

B. Dates Covered

The plan was approved September 15, 1999 and will be in effect until January 1, 2005.

II. SPECIES ASSESSMENT

A. Natural History

Bighorn sheep are one of the most impressive large mammals in North America. They are named for the massive horns grown by the males of the species. Horns grow throughout life and reach maximum size at 8 to 10 years of age. Females also have horns about the size of yearling males. Males, females, and young of the year are called rams, ewes, and lambs respectively. Rams normally separate themselves from groups of ewes and lambs, except during the breeding season. The bighorn breeding season is mid October to early December. During this time of year rams engage in impressive head butting clashes to establish dominance. Gestation is about 180 days. Lambs which are nearly always singles are born in mid April to early June. Bighorn sheep are found in the western U.S. from central British Columbia to Mexico and from California to the Dakotas

Bighorn sheep are native to Utah. Archeological evidence indicates they were well known to the prehistoric inhabitants of Utah, since bighorns are depicted in pictographs and petroglyphs more than any other form of wildlife. Historical records of the first white men in the state confirm the presence of bighorns. Father Escalante noted in his journal as he crossed the Colorado River in Utah - "through here wild sheep live in such abundance that their tracks are like those of great herds of domestic sheep" (Rawley 1985). Explorers, trappers, pioneers and settlers also recorded numerous observations of bighorn sheep throughout the state. Rocky Mountain bighorns *(Ovis canadensis canadensis)* are generally recognized to have inhabited northern and central Utah and desert bighorn *(Ovis canadensis nelsoni)* were found in southern Utah.

California bighorns *(Ovis canadensis californiana)* historically inhabited portions of the Great Basin in Nevada and Idaho. It is not known if they inhabited Utah. However, recent studies indicate there is no genetic or taxonomic distinction between Rocky Mountain and California bighorns and they should both be considered the same subspecies (Ramey 1993). Some mixing and interbreeding of Rocky Mountain and desert bighorns likely occurred where their ranges converged in Utah, making a clear distinction of historic ranges difficult.

Native populations of Rocky Mountain bighorn sheep were nearly extirpated following pioneer settlement. A few scattered sighting of bighorns persisted in northern Utah as late as the 1960's. Factors contributing to their demise include (1) competition with domestic livestock for forage and space; (2) vulnerability to domestic livestock-borne diseases; (3) habitat conversions away from native grasslands towards shrub lands due to excessive grazing and fire suppression; and (4) unregulated hunting (Shields 1999).

Utah's desert bighorn sheep populations also struggled to survive civilization. While some herds suffered early extirpation, others remained relatively unexploited until the 1940's and 1950's when uranium was discovered on the Colorado Plateau. By the 1960's, only a small population of desert bighorns remained in Utah along the remote portions of the Colorado River. Desert bighorn populations were thought to have declined for the same reasons as Rocky Mountain bighorns.

B. Management

1. DWR Regulatory Authority

The Utah Division of Wildlife Resources presently operates under authority granted by the Utah Legislature in Title 23 of the Utah Code. The division was created and established as the wildlife authority for the state under Section 23-14-1 of the Code. This Code also vests the Division with its functions, powers, duties, rights, and responsibilities. The Division's duties are to protect, propagate, manage, conserve, and distribute protected wildlife throughout the state.

The Utah Division of Wildlife Resources is charged to manage the state's wildlife resources and to assure the future of protected wildlife for its intrinsic, scientific, educational and recreational values. Protected wildlife species are defined in code by the Utah Legislature.

2. Past and Current Management

Utah has been involved in an aggressive program to restore bighorn sheep to their native habitat for over 30 years. Extensive efforts have been made to reintroduce and supplement populations of both Rocky Mountain bighorn and desert bighorn sheep. Rocky Mountain bighorns were first reintroduced into the state near Brigham City in 1966. Desert bighorns were first relocated to areas of historic habitat in Utah beginning in 1973 in Zion National Park. Since restoration

efforts

began, over 400 Rocky Mountain bighorn sheep and over 500 desert bighorns have been released in areas of historic habitat. Most desert bighorn transplants have been successful while there have been some failures of Rocky Mountain bighorn transplants. California bighorns have also been released in Utah. Twenty three bighorns were released on Antelope Island in 1997 and appear to be doing well. The history of bighorn transplants is summarized in Table 1.

Current management practices include extensive transplant projects, population surveys, research, and habitat management. Bighorn populations are regularly monitored by helicopter and ground surveys to determine herd size, productivity and composition. Utah has conducted and participated in many bighorn sheep research projects. Findings from these research projects have greatly improved the current knowledge of bighorn sheep and have improved management practices.

Habitat management practices include buy-outs or conversions of domestic sheep grazing permits, vegetative treatments, and water developments. The Foundation for North American Wild Sheep and other conservation groups have been extremely helpful in negotiating, funding, and participating in habitat projects.

C. Habitat

Bighorn sheep are uniquely adapted to inhabit some of the most remote and rugged areas in Utah. They exist in some of the most hostile of climatic conditions from the hot, dry canyonlands of southern Utah to the cold, snowy alpine regions of Utah's northern mountains. Bighorns are sometimes referred to as a wilderness species because of the naturally remote and inaccessible areas they inhabit.

Bighorns prefer open habitat types with adjacent steep rocky areas for escape and safety. Habitat is characterized by rugged terrain including canyons, gulches, talus cliffs, steep slopes, mountain tops, and river benches (Shackleton et al. 1999). Most Rocky Mountain bighorns have seasonal migrations with established winter and summer ranges while desert bighorns generally do not migrate.

Sheep habitat in North America is highly varied but is characterized by an open landscape and stable plant communities in which grasses predominate (Geist 1971). The diet of mountain sheep is primarily grasses and forbs, although they also utilize shrubs depending on season and availability.

Extensive historic bighorn habitat occurs throughout the state. However, not all habitat is currently suitable for reestablishment of bighorn populations. Vegetative changes, human encroachment, and continued domestic sheep grazing make some areas unsuitable for bighorn restoration. Opportunities for future bighorn expansion are limited and based on habitat

availability and suitability. Habitat evaluations should be conducted to determine suitability of new release sites prior to release of bighorns.

D. Population Status

1. Rocky Mountain and California Bighorns

Rocky Mountain bighorns currently exist in six areas in the northern half of the state. All of these populations are the result of transplant efforts. The current population estimate for Rocky Mountain bighorns in Utah is approximately 800 sheep. The locations of these herds and population estimates are listed in Table 2 and shown in Figure 1. California bighorns currently exist only on Antelope Island State Park. These animals were obtained from British Columbia and released in March, 1997. The current population is estimated at 60 sheep.

2. Desert Bighorn

Desert bighorns inhabit southern Utah and are more abundant than Rocky Mountain bighorns. Significant populations occur across the Colorado Plateau including the San Rafael Swell and throughout the Colorado River and its many tributaries. The current population estimate for desert bighorns in Utah is 2600 sheep. Herd locations and populations estimates are listed in Table 2 and shown in Figure 1.

III. ISSUES AND CONCERNS

A. Disease

Catastrophic die-offs from disease pose serious threats to bighorn populations in Utah. Significant evidence indicates that several diseases of domestic sheep and goats can be transmitted to bighorn populations with devastating results (Jessup 1985, Foreyt 1990). Many cases are cited in the literature of native wild sheep interacting with domestic sheep resulting in wide spread die-offs in the wild sheep (Martin et al. 1996). Cases also exist of bighorn die-offs in the apparent absence of contact with domestic sheep.

Questions yet remain to be answered concerning diseases of bighorn sheep. However, most wildlife biologists and veterinarians would agree with the following statement: “Until more is known about interspecies transmission of *Pasteurella*, it is absolutely critical that land managers and biologists avoid circumstances that allow domestic sheep and exotic wild sheep to commingle on ranges that harbor viable populations of North American wild sheep” (Bunch et al. 1999).

In 1998, the BLM, with assistance from representatives of state and federal agencies and the domestic sheep industry, revised the *Guidelines for Domestic Sheep and Goat Management in Native Wild Sheep Habitats* (See Appendix 1). The guidelines clearly outline steps which

should be taken to physically separate wild and domestic sheep and should be implemented on BLM lands throughout the state. The Forest Service is currently developing similar guidelines which should be implemented on National Forests when approved.

It is not the intent of this plan or the Division of Wildlife Resources to force domestic sheep operators off their ranges or out of business. Rather, the intent is to look for opportunities which will protect bighorn sheep populations without negatively impacting domestic sheep operators.

The Foundation for North American Wild Sheep has been very instrumental in resolving bighorn/domestic sheep issues in recent years. FNAWS has been very active in negotiating and funding willing seller buy outs of domestic sheep grazing permits or conversions of domestic sheep to cattle. Their efforts have resulted in protection of many bighorn sheep populations by reducing the potential for the transmission of disease.

Disease problems are also thought to be triggered by various forms of stress including overcrowding, poor nutrition, human disturbance, loss of habitat, and competition with domestic and feral animals (DeForge 1981 and Bunch et al. 1999). Many managers believe disease problems can be reduced by periodically thinning bighorn populations in areas of concentration to reduce stress caused by overcrowding. Continued transplant programs should be an integral part of proper bighorn sheep management.

All bighorn sheep brought into Utah from other states are tested under the direction of the Utah state veterinarian to prevent the introduction of disease into wild or domestic sheep populations.

B. Predation

Predators have played an important role in the evolution and development of adaptive strategies in bighorn sheep (Geist 1999). However, predation can be a serious limiting factor to bighorn herd establishment or expansion. In some states excessive predation has resulted in substantial herd reductions (Wehausen 1996, Creeden and Graham 1997). Mountain lions are the most significant predators of bighorns in Utah. Coyotes and golden eagles may occasionally take bighorn sheep but are not considered to be a serious threat to bighorn sheep herds.

Mountain lion populations should be managed at levels which will allow for the establishment of viable bighorn populations and to meet bighorn population objectives. This may require removal of mountain lions which are negatively impacting bighorn populations until herds are well established. Bighorn sheep unit management plans and predator management should specify the need for predator management in bighorn areas.

C. Habitat Degradation or Loss

Bighorn habitat can be degraded, fragmented, or lost to a variety of causes including human disturbance, mineral development and natural succession. Reductions in the quality or quantity

of habitat can result in corresponding losses to bighorn populations (Deforge 1972 and Hamilton et al. 1982).

Human disturbance in bighorn sheep habitat is an increasing concern in many areas of Utah. These disturbances include outdoor recreation activities such as off-road vehicle use, mountain biking, river running, and others. Bighorn sheep may change use areas and abandon certain habitats because of these disturbances. Human disturbance is also thought to be a possible stress inducer which may lead to disease problems in some populations.

Mineral development in bighorn habitat can result direct loss of habitat if not properly regulated and mitigated. Mineral exploration for oil, gas, uranium and other minerals has been extensive in bighorn areas. Habitat managers need to carefully monitor and regulate these activities to avoid impacts on bighorn sheep.

Plant succession can also dramatically affect habitat quality. Encroachment by pinyon-juniper and other shrubs has resulted in the fragmentation and loss of large expanses of bighorn habitat. Vegetative treatments and fire management can restore and improve bighorn habitat to its condition prior to settlement times.

D. Wilderness and Park Management

Administration of wilderness areas and national parks has presented problems for bighorn sheep managers in some states (Arizona Game and Fish 1989 and Bleich 1999). Utah currently has a good working relationship with federal land management agencies which has allowed and promoted good bighorn management programs.. Future wilderness designation and park expansions should specifically allow for continued proper management of bighorn populations including the use of aircraft for surveys, transplants, and research projects. It is critical to the future of bighorn sheep in these areas to maintain the use of these valuable management tools.

E. Poaching

While not a problem for overall bighorn populations, poaching can have a detrimental effect on hunter harvest opportunities. Bighorn sheep are highly prized by hunters and legal hunting permits are difficult to obtain. Bighorns also inhabit very remote areas which are difficult to monitor and patrol. The incentives and opportunities for poaching exist.

F. Competition

Competition for forage and space by domestic livestock, feral animals and other wild ungulates can impact bighorn populations (Bailey 1980). Competition is most likely to occur in critical habitats such as winter ranges and lambing areas and during periods of extreme weather such as droughts or heavy snow. Competition with livestock for forage is minimal for most bighorn populations in Utah since bighorns utilize steep, rugged terrain generally not utilized by

livestock. However, some feral animals such as burros and goats and some wild ungulates may utilize the same ranges as bighorn sheep where competition is possible. Bighorn habitat should be monitored to assure proper range management and minimize competition.

G. Transplants

Transplantation of bighorn sheep is a primary management tool for restoration and management of bighorn populations. Several issues should be considered before releasing bighorns in new areas or in existing herds (Douglas and Leslie 1999). Bighorns should be released only in areas where there is a good probability of success as determined by habitat evaluations. Sufficient numbers should be released to assure genetic diversity and to help new herds reach the viable level (125 head) as soon as possible. Source stocks should come from the nearest available source with habitat similar to the release site. Disease issues should be considered prior to mixing bighorns from different sources.

IV. USE AND DEMAND

Bighorn sheep are considered the most sought after and highly prized big game animal in North America. Demand for bighorn sheep hunting opportunities far exceeds the current availability of hunting permits. Applications by residents currently exceed available permits by 50 to 1. Hunters have paid over $60,000 for bighorn sheep conservation hunting permits in Utah. A summary of bighorn sheep hunting in Utah is presented in Table 3.

Great demand also exists for information concerning bighorn sheep and bighorn viewing opportunities. Many people who have no interest in hunting bighorns are very interested in opportunities to learn more about bighorns and to observe them in the wild. Informational programs and viewing opportunities are currently very limited for bighorn sheep.

Finally, public interest and legal mandates require management of bighorn sheep for their intrinsic value. Bighorn sheep are an important part of fragile ecosystems throughout Utah and should be properly managed regardless of recreational uses.

V. CONCLUSION

A fitting conclusion to this section of the plan is found in the book *Mountain Sheep of North American* by Raul Valdez and Paul Krausman (1999). It states:

> ***"****Mountain sheep, like all other native fauna and flora, are part of the structure and heritage of North America. Despite all of the efforts exerted toward their conservation, wild sheep face a precarious future. They are an ecologically fragile species, adapted to limited habitats that are increasingly fragmented. Future conservation efforts will only be successful if land managers are able to minimize fragmentation. According mountain sheep their rightful share of North America and allowing them to inhabit the wilderness regions they require is a responsibility all Americans must shoulder. It is our moral and ethical obligation*

never to relent in the struggle to ensure their survival."

VI. STATEWIDE MANAGEMENT GOALS AND OBJECTIVES

A. Population Management Goal: Establish optimum populations of bighorn sheep in all suitable habitat within the state.

Objective 1: By 2005, increase total numbers of Rocky Mountain and California bighorns from 800 sheep to 1500 sheep and increase all herds to at least the minimum viable level of 125 bighorns.

Strategies:

a. Develop management plans for individual units with population goals and objectives (see Table 4 and Figure 1).
b. Survey all herd units by helicopter every two to three years to monitor population size and composition.
c. Utilize population or sightability models to determine the relationship between population surveys and population size.
d. Augment existing populations where needed to improve herd distribution, link small populations, and improve genetic diversity (see Table 5).
e. Transplant bighorns to areas of suitable habitat to establish new populations (see Table 5).
f. Reduce bighorn numbers in specific areas of concentration through trapping and transplanting programs to help reduce potential for disease problems.
g. Develop an annual transplant plan based on available bighorns and consistent with table 5.
h. Monitor herds periodically for disease and provide treatment if possible.
I. Participate in research efforts to find solutions to disease problems and low lamb survival.
j. Initiate predator management as specified in predator and bighorn sheep unit management plans.
k. Support law enforcement efforts to reduce illegal taking of bighorn sheep.

Objective 2: By 2005, increase the number of desert bighorn sheep in Utah from 2600 sheep to 3800 sheep and increase all herds to at least the minimum viable population level of 125 bighorns.

Strategies:

a. Develop management plans for individual units with population goals and objectives (see Table 4 and Figure 1).
b. Survey all herd units by helicopter every two to three years to monitor population size and composition.
c. Utilize population or sightability models to determine the relationship between

population surveys and population size.

d. Augment existing populations where needed to improve herd distribution, link small populations, and improve genetic diversity (see Table 5).
e. Reduce bighorn numbers in specific areas of concentration through trapping and transplanting programs to help reduce potential for disease problems.
f. Develop an annual transplant plan based on available bighorns and consistent with table 5.
g. Monitor herds periodically for disease and provide treatment if possible.
h. Participate in research efforts to find solutions to disease problems and low lamb survival.
I. Initiate predator management as specified in predator and bighorn sheep unit management plans.
j. Support law enforcement efforts to reduce illegal taking of bighorn sheep.

Objective 3: Manage for a diversity of age classes in the ram segment of each population with at least 30% of the rams 6 ½ years of age or older.

Strategies:

a. Survey all herd units by helicopter to monitor age class of rams.
b. Recommend conservative ram harvest to assure a diversity of age classes in each hunted population.
c. Monitor size and age class of all harvested rams.

B. Habitat Management Goal: Provide good quality habitat for healthy populations of bighorn sheep.

Objective: Maintain or improve sufficient bighorn sheep habitat to allow herds to reach population objectives.

Strategies:

a. Identify critical bighorn sheep habitats and work with land managers and private landowners to protect these areas.
b. Assist land management agencies in monitoring bighorn sheep habitat.
c. Work with land managers to minimize and mitigate loss of bighorn habitat due to human disturbance and development.
d. Inform and educate the public concerning the needs of desert bighorn sheep including the effects of human disturbance and the need for habitat improvements.
e. Initiate vegetative treatment projects to improve bighorn habitat lost to natural succession or human impacts.
f. Improve and develop water sources to improve distribution and abundance of bighorns.
g. Work with land management agencies and private landowners to implement agency guidelines for management of domestic sheep and goats in bighorn

areas.

h. Pursue buy outs or conversions of domestic sheep grazing from willing sellers in bighorn areas to minimize the risk of disease transmission.

C. Recreation Goal: Provide high quality opportunities for hunting and viewing of bighorn sheep.

Objective 1: By 2005, increase hunting opportunities by at least 50% while maintaining high quality hunting experiences.

Strategies:

a. Recommend permit numbers based on a consistent percentage of the estimated ram population (yearling and older).
b. Utilize sub units to maximize hunting opportunities and distribute hunters.
c. Recommend long hunting seasons to provide recreational opportunity while avoiding the peak of the rutting season.
d. Maintain high hunter success rates on all units.

Objective 2: By 2005, increase public awareness and expand viewing opportunities of bighorn sheep by 100%.

Strategies:

a. Install interpretive signs in bighorn sheep areas for public information.
b. Produce written guides or brochures to help educate the public and provide viewing opportunities which will not impact bighorn sheep.
c. Initiate special bighorn sheep viewing events for interested publics.

Table 1. History of bighorn sheep transplants in Utah.

ROCKY MOUNTAIN BIGHORN SHEEP

Unit #	Name and Area	# Released	Year	Source
1	Box Elder, Pilot Mountain	24	1987	Basalt, CO
		2	1993	Bare Top Mtn, UT
		32	1998	Nevada
3	Ogden, Box Elder	60	1966-70	Whiskey Basin, WY
				Waterton/Banff, AT
8	North Slope, Bare Top Mountain	36	1983-84	Whiskey Basin, WY
8	North Slope, Sheep Creek	21	1989	Whiskey Basin, WY
8	North Slope, Hoop Lake	23	1989	Whiskey Basin, WY
10	Book Cliffs, Hill Creek	9	1970	Whiskey Basin, WY
		12	1973	Alberta, Canada
		44	1998	Kaleden, BC
		20	1998	Fowler, CO
11	Ninemile, Bighorn Mountain	54	1993-95	Estes Park, CO
				Georgetown, CO
16	Mount Nebo	48	1981-82	Whiskey Basin, WY
19	West Desert	32	1984/89	Whiskey Basin, WY

CALIFORNIA BIGHORN SHEEP

1	Box Elder, Antelope Island	23	1997	Kamloops, B.C.

DESERT BIGHORN SHEEP

12	San Rafael, North	12	1979	San Juan Unit
		11	1982	Island in the Sky
		6	1986	Canyonlands N.P.
12	San Rafael, South	12	1983	Island in the Sky
		16	1984	Potash
		12	1986	Island in the Sky
		4	1997	Escalante
		6	1998	Escalante
12	San Rafael, Dirty Devil	22	1991	North San Rafael
		15	1994	Potash
12	San Rafael, North Wash	21	1996	South San Rafael
		13	1997	Escalante

Table 1. (cont.) History of bighorn sheep transplants in Utah

DESERT BIGHORN SHEEP

Unit #	Name and Area	# Released	Year	Source
12	San Rafael, Maze	23	1982	Island in the Sky
		2	1985	Canyonlands N.P.
13	La Sal, Dolores Triangle	7	1979	San Juan Unit
		20	1990	River Mtns, NV
13	La Sal, Arches National Park	6	1985	Canyonlands N.P.
		19	1986	Canyonlands N.P.
	La Sal, Professor Valley	10	1991	Potash
14	San Juan, North	6	1998	Kaiparowitz
15	Henry Mountains, Little Rockies	18	1985	Canyonlands N.P.
25,26	Capitol Reef National Park	21	1984	Island in the sky
		10	1985	Canyonlands N.P.
		20	1996	Island in the Sky
		20	1997	Island in the Sky
26	Kaiparowits, Escalante	4	1975	Gypsum Canyon
		12	1976	Gypsum Canyon
		7	1978	Cataract Canyon
		4	1986	Canyonlands N.P.
		6	1998	Escalante
26	Kaiparowits, Rock Creek	20	1980	Cataract/White Canyons
		12	1982	Canyonlands N.P.
26	Kaiparowits, Rogers Canyon	13	1993	Escalante
		17	1995	Escalante
26	Kaiparowits, Coyote Canyon	21	1995	Black Mtns, AZ
		2	1995	Escalante
26	Kaiparowits, Bowns Caynon	18	1995	Escalante
27	Paunsagunt, Paria River	21	1995	Arizona
		2	1995	Escalante
		20	1996	Nevada
29	Zion, National Park	12	1973	Lake Mead, NV
30	Pine Valley, Beaver Dam	25	1994	Lake Mead, AZ

Table 2. Status of existing bighorn sheep populations in Utah, 1999

ROCKY MOUNTAIN BIGHORN SHEEP

Unit #	Unit Name	Herd Status	Population Est.	Trend
1	Box Elder, Pilot Mtn	Transplanted	100	Up
8	North Slope, Hoop Lake	Transplanted	50	Stable
8	North Slope, Sheep Creek	Transplanted	50	Stable
8	North Slope, Bare Top Mountain	Transplanted	100	Up
9	South Slope, Dinosaur	Transplanted	100	Up
10	Book Cliffs, Rattlesnake	Transplanted	200	Up
10	Book Cliffs, Ute Tribe	Transplanted	100	Up
11	Nine Mile, Bighorn Mountain	Transplanted	140	Up
19	West Desert, Deep Creek Mountains	Transplanted	?	Down

CALIFORNIA BIGHORN SHEEP

1	Box Elder, Antelope Island	Transplanted	60	Up

DESERT BIGHORN SHEEP

12	San Rafael, North	Transplanted	350	Up
12	San Rafael, South	Transplanted	350	Up
12	San Rafael, Dirty Devil	Transplanted	75	Up
12	San Rafael, Maze (CNP)	Transplanted	80	Up
13	La Sal, Potash	Native	200	Up
13	La Sal, Island in the Sky (CNP)	Native	200	Stable
13	La Sal, Professor Valley	Transplanted	30	Up
13	La Sal, Arches National Park	Transplanted	90	Up
13	La Sal, Dolores Triangle	Transplanted	20	Stable
14	San Juan, South	Native	160	Stable
14	San Juan, North	Native	20	Stable
14	San Juan, Lockhart	Native	100	Up
14	San Juan, Needles (CNP)	Native	30	Stable
14	San Juan, Navajo Tribe	Native	70	Stable
15	Henry Mountains, Little Rockies	Transplanted	75	Up
25/26	Capitol Reef National Park	Transplanted	100	Up
26	Kaiparowits, Escalante	Transplanted	300	Up
26	Kaiparowits, Fiftymile Mountain	Transplanted	150	Up
27	Paunsaugunt, Paria	Transplanted	60	Up
29	Zion, National Park	Transplanted	80	Stable
30	Pine Valley, Beaver Dam	Transplanted	60	Up

Table 3. Summary of bighorn sheep hunting opportunities in Utah.

	Rocky Mountain Bighorns		Desert Bighorns	
Year	**Hunters Afield**	**Rams Harvested**	**Hunters Afield**	**Rams Harvested**
1967	No Hunt		9	9
1968	No Hunt		10	3
1969	No Hunt		10	6
1970	No Hunt		10	4
1971	No Hunt		10	1
1972	No Hunt		8	1
1973	No Hunt		No Hunt	
1974	No Hunt		No Hunt	
1975	No Hunt		5	2
1976	No Hunt		10	4
1977	No Hunt		25	10
1978	No Hunt		33	7
1979	No Hunt		18	3
1980	No Hunt		19	10
1981	No Hunt		18	5
1982	No Hunt		11	6
1983	No Hunt		10	9
1984	No Hunt		14	5
1985	No Hunt		15	12
1986	No Hunt		14	10
1987	No Hunt		12	7
1988	No Hunt		15	12
1989	No Hunt		12	10
1990	No Hunt		15	12
1991	2	2	13	11
1992	3	3	11	10
1993	6	6	17	15
1994	6	6	19	18
1995	5	5	32	30
1996	5	4	27	27
1997	3	3	26	26
1998	5	5	31	31

Table 4. Bighorn sheep management units and region responsible for plan.

Unit #	Unit Name	Sub Unit	Region
1	Box Elder	Pilot Mountain Newfoundland Mountains Antelope Island	NRO NRO NRO
8	North Slope	Hoop Lake Sheep Creek Bare Top Mountain	NRO NERO NERO
10	Book Cliffs	Rattlesnake	SERO
11	Nine Mile	Bighorn Mountain	SERO
12	San Rafael	North South Dirty Devil	SERO SERO SERO
13	La Sal	Potash Professor Valley Dolores Triangle	SERO SERO SERO
14	San Juan	North South Lockhart	SERO SERO SERO
17	Wasatch Mountains	Timpanogas	CRO
19	West Desert	Deep Creek Mountains	CRO
26	Kaiparowits	Escalante Fiftymile Mountain	SRO SRO
27	Paunsaugunt	Paria	SRO
30	Pine Valley	Beaver Dam	SRO

Table 5. Potential bighorn sheep relocation sites. [1] (Amended April 2002)

Rocky Mountain Bighorn

Augment existing populations to meet population management objectives, including:

~~Box Elder - Pilot Mountain~~
North Slope - Hoop Lake, Sheep Creek, Carter Creek, Bare Top, Red Creek
Book Cliffs - Willow Creek, Meadow Creek, Floy Canyon
~~West Desert - Deep Creek Mountains~~

Reintroduction areas to establish new populations:

Wasatch Mountains - Timpanogos, Provo Peak
Central Mountains - Nebo

California Bighorn

Augment existing populations to meet population management objectives:

Box Elder - Antelope Island
West Desert - Deep Creek Mountains

Reintroduction areas to establish new populations:

Box Elder - Newfoundland Mountains

Desert Bighorn

Augment existing populations to meet population management objectives, including:

San Rafael - Green River near Horshoe Canyon, West side of Colorado River above Hite, Poison springs Wash, Dirty Devil, Orange Cliffs
La Sal - Westwater, Dolores River
San Juan - Gypsum Canyon, San Juan River
Kaiparowits - Smokey Mountain, Cow Canyon, Lower Lake Powell
Paunsaugunt - Paria River
Pine Valley - Beaver Dam Mountains

[1] In accordance with Utah Code 23-14-21

Figure 1. Management units and bighorn sheep distribution, 1999.

Insert Map

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