

IDAHO DEPARTMENT OF FISH AND GAME

Steven M. Huffaker, Director

Project W-170-R-25

Job Progress Report



BIGHORN SHEEP

Study I, Job 4

Prepared By:

Jay Crenshaw Clearwater Region
Jon Rachael, Matt Lucia Southwest Region
Jeff Rohlman.....Southwest Region (McCall)
Randy Smith..... Magic Valley Region
Brad Compton, Justin Naderman..... Upper Snake Region
Tom Keegan.....Salmon Region

Compiled and Edited by: Dale Toweill

July 1, 2000 to June 30, 2001

September 2001

Boise, Idaho



Findings in this report are preliminary in nature and not for publication without permission of the Director of the Idaho Department of Fish and Game.

The Idaho Department of Fish and Game adheres to all applicable state and federal laws and regulations related to discrimination on the basis of race, color, national origin, age, gender, or handicap. If you feel you have been discriminated against in any program, activity, or facility of the Idaho Department of Fish and Game, or if you desire further information, please write to: Idaho Department of Fish and Game, PO Box 25, Boise, ID 83707; or the Office of Human Resources, U.S. Fish and Wildlife Service, Department of the Interior, Washington, DC 20240.

This publication will be made available in alternative formats upon request. Please contact the Idaho Department of Fish and Game for assistance.

TABLE OF CONTENTS

ABSTRACT.....	1
UNITS 11, 13, AND 18	4
ABSTRACT.....	4
MANAGEMENT DIRECTION	4
BACKGROUND	5
POPULATION SURVEYS	6
HARVEST CHARACTERISTICS.....	7
HABITAT AND CLIMATIC CONDITIONS.....	7
TRAPPING AND TRANSPLANTS	8
UNITS 14, 17, 19, AND 20	8
ABSTRACT.....	8
MANAGEMENT DIRECTION	9
BACKGROUND	9
POPULATION SURVEYS	9
HARVEST CHARACTERISTICS.....	10
HABITAT AND CLIMATIC CONDITIONS.....	11
TRAPPING AND TRANSPLANTS	11
UNITS 41 AND 42	21
ABSTRACT.....	21
MANAGEMENT DIRECTION	21
BACKGROUND	22
POPULATION SURVEYS	22
HARVEST CHARACTERISTICS.....	23
HABITAT CONDITIONS.....	23
WINTER FEEDING.....	24
TRAPPING AND TRANSPLANTS	24
MANAGEMENT IMPLICATIONS	24
UNITS 22, 23, AND 31	31
ABSTRACT.....	31
MANAGEMENT DIRECTION	31
BACKGROUND	31
POPULATION SURVEYS	32
HARVEST CHARACTERISTICS.....	32
MANAGEMENT IMPLICATIONS	32
UNITS 19A, 20A, AND 26	32
ABSTRACT.....	32
MANAGEMENT DIRECTION	32
BACKGROUND	33
POPULATION SURVEYS	33
HARVEST CHARACTERISTICS.....	33
MANAGEMENT IMPLICATIONS	33
UNITS 46, 47, 54, 55, AND 57	38
ABSTRACT.....	38

TABLE OF CONTENTS
(Continued)

MANAGEMENT DIRECTION	38
BACKGROUND	38
POPULATION SURVEYS	40
HARVEST CHARACTERISTICS.....	40
TRAPPING AND TRANSPLANTS	40
MANAGEMENT STUDIES	41
MANAGEMENT IMPLICATIONS	41
UNITS 51 (PART), 58, 59A, 61, 64, 65, AND 67	45
ABSTRACT.....	45
MANAGEMENT DIRECTION	45
GOALS	46
BACKGROUND	46
POPULATION CHARACTERISTICS	47
DISEASE EVALUATION	47
WEATHER CONDITIONS.....	47
MANAGEMENT IMPLICATIONS	47
UNITS 21, 21A, 27, 28, 29, 30, 30A, 36, 36A, 36B, 37, 37A, 50, 51.....	51
ABSTRACT.....	51
MANAGEMENT DIRECTION	51
BACKGROUND	52
POPULATION SURVEYS	53
HARVEST CHARACTERISTICS.....	54
CLIMATIC CONDITIONS.....	55
HABITAT CONDITIONS.....	55
CAPTURE AND TRANSLOCATION	55
DISEASE	55
MANAGEMENT IMPLICATIONS	56
APPENDIX A.....	69
TOTAL SHEEP	70

LIST OF TABLES

Table 1.	Summary of Bighorn Sheep Survey Data for Unit 11, 1992-2001 ^a	12
Table 2.	Summary of Bighorn Sheep Data Survey for Unit 13, 1997-2001.....	13
Table 3.	Summary of Bighorn Sheep Survey Data for Unit 18, 1983-2001 ^a	14
Table 4.	Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area, 1990-2000.	15
Table 5.	2000 Season Structure for Bighorn Sheep in Units 19 and 20 in the Clearwater Region.	15
Table 6.	Summary of Bighorn Sheep Survey Data for Unit 17, 1981-2001 ^a	16
Table 7.	Summary of Bighorn Sheep Survey Data for Unit 19, 1981-2001 ^a	17
Table 8.	Summary of Bighorn Sheep Data for Unit 20, 1981-2001 ^a	18
Table 9.	Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area, 1991-2000.	19
Table 10.	1999 and 2000 Season Structure for Bighorn Sheep in the Southwest Region (Nampa).	25
Table 11.	Summary of Bighorn Sheep Population Data for Little Jacks Creek, Hunt Area 41-1, 41-2, 41-3, 41-4, and 41-5, 1983-2001.	25
Table 12.	Summary of Bighorn Sheep Population Data for the Owyhee River, Hunt Areas 42-1, 42-2, 42-3, 42-4, and 42-5, 1983-2001.	26
Table 13.	Summary of Bighorn Sheep Population Data for Big Jacks Creek 1990-2001.....	26
Table 14.	Summary of Bighorn Sheep Population Data for Combined Big and Little Jacks Creek Herds 1998-2001.	27
Table 15.	Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area, 1989-2000.	27
Table 16.	Summary of the Southwest Region (Nampa) Bighorn Sheep Harvest and Drawing Odds, 1990-2000.....	29
Table 17.	Summary of Individual Bighorn Sheep Transplants in the Southwest Region (Nampa).	30
Table 18.	Season Structure for Rocky Mountain Bighorn Sheep in 2000 in the Southwest Region.	35
Table 19.	Summary of Bighorn Sheep Population Data for Hunt Area 20A, 1992-1999.	35
Table 20.	Summary of Bighorn Sheep Population Data for Hunt Area 26, 1992-1999.	35
Table 21.	Summary of Bighorn Sheep Population Data for Hunt Area 26-L, 1987-1999.	36
Table 22.	Summary of Southwest Region Rocky Mountain Bighorn Sheep Harvest and Drawing Odds, 1991-2000.....	37
Table 23.	Summary of Bighorn Sheep Transplants in Units 54 and 55, Magic Valley Region.	43

LIST OF TABLES
(Continued)

Table 24.	Summary of bighorn sheep population data, Jarbidge/Bruneau area (Hunt Area 46), 1990-2000.	43
Table 25.	Summary of Bighorn Sheep Harvest and Drawing Odds in Hunt Area 46, 1991-1999.	44
Table 26.	Summary of Rocky Mountain Bighorn Sheep Population Data for Unit 51, 1989-1999.	50
Table 27.	Summary of Rocky Mountain Bighorn Sheep Population Data for Unit 58 1989-1999.	50
Table 28.	Bighorn sheep population data, Hunt Area 21, Salmon Region, 1988-present.	57
Table 29.	Bighorn sheep population data, Hunt Area 21A, Salmon Region, 1997-present.	57
Table 30.	Bighorn sheep population data, Hunt Area 27-1, Salmon Region, 1988-present.	57
Table 31.	Bighorn sheep population data, Hunt Area 27-2, Salmon Region, 1988-present.	58
Table 32.	Bighorn sheep population data, Hunt Area 27-3, Salmon Region, 1988-present.	58
Table 33.	Bighorn sheep population data, Hunt Area 27-4, Salmon Region, 1988-present.	58
Table 34.	Bighorn sheep population data, west side of lower Panther Cr., Salmon Region, 1988-present.	59
Table 35.	Bighorn sheep population data, east side of lower Panther Cr., Salmon Region, 1988-present.	59
Table 36.	Bighorn sheep population data, Williams Cr. to Perreau Cr. portion of Unit 28, Salmon Region, 1990-present.	59
Table 37.	Bighorn sheep population data, Units 30 and 30A, Salmon Region, 1991-present.	60
Table 38.	Bighorn sheep population data, Unit 37A, Salmon Region, 1991-present.	60
Table 39.	Bighorn sheep population data, Unit 36A, Salmon Region, 1989-present.	61
Table 40.	Bighorn sheep population data, Morgan Creek area, Unit 36B, Salmon Region, 1988-present.	61
Table 41.	Bighorn sheep population data, Birch Creek area, Unit 36B, Salmon Region, 1988-present.	62
Table 42.	Bighorn sheep population data, Hunt Area 37, Salmon Region, 1982-present.	62
Table 43.	Season structure for controlled bighorn sheep hunts, Salmon Region, 2000.	62
Table 44.	Bighorn sheep harvest and draw odds by Hunt Area, Salmon Region, 1989-present.	63
Table 45.	Bighorn sheep harvest and draw odds, Salmon Region, 1988-present.	67
Table 46.	Bighorn sheep mortality, Salmon Region, 1989-present.	67
Table 47.	Bighorn sheep translocation history, Salmon Region, 1968-present.	68

LIST OF FIGURES

Figure 1. Rocky Mountain and California Bighorn Sheep Areas in Idaho. 3

**PROGRESS REPORT
SURVEYS AND INVENTORY**

STATE:	<u>Idaho</u>	JOB TITLE:	<u>Bighorn Sheep Surveys</u>
PROJECT:	<u>W-170-R-25</u>		<u>and Inventories</u>
SUBPROJECT:	<u>2-7</u>	STUDY NAME:	<u>Big Game Population Status,</u>
STUDY:	<u>I</u>		<u>Trends, Utilization, and</u>
JOB:	<u>4</u>		<u>Associated Habitat Studies</u>
PERIOD COVERED:	<u>July 1, 2000 to June 30, 2001</u>		

BIGHORN SHEEP –STATEWIDE

ABSTRACT

Idaho has huntable populations of both Rocky Mountain bighorn sheep and California bighorn sheep within its borders. Hunters may harvest only two bighorn sheep (one of each race) in their lifetime under current regulations.

The Idaho Department of Fish and Game authorized 15 controlled hunts and a total of 62 permits for Rocky Mountain bighorn sheep in 2000. Due to wildfires the opening of the hunting season was delayed in 2000, and 14 hunters opted to delay use of their Rocky Mountain bighorn sheep tag until 2001. The remaining 48 hunters harvested 28 Rocky Mountain bighorn sheep in 2000, for a harvest success rate of 58%. By comparison, 62 hunters harvested 27 Rocky Mountain bighorn sheep in 1999 for a harvest rate of harvest of 44%, and 64 hunters harvested 37 Rocky Mountain bighorn sheep in 1998 for a harvest rate of 58%.

A total of 9 hunts and a total of 43 permits for California bighorn sheep were offered in 2000. The 43 hunters harvested 24 California bighorn sheep, for a harvest rate of 56%. By comparison, 43 hunters harvested 23 California bighorn sheep in 1999 for a harvest rate of 53%, and 45 hunters harvested 30 California bighorn sheep in 1998 for a harvest rate of 67%.

Bighorn sheep permits are among the most desirable permits offered in Idaho. A single permit, valid for any open bighorn sheep controlled hunt in Idaho, brought \$84,000 at public auction at the annual convention of the Foundation for North American Wild Sheep in 2000. In 2000, 852 first-choice applications were received for 62 available permits for Rocky Mountain bighorn sheep (nearly 14 applications per permit). The majority of these, 499 (59%) were received from nonresidents. By comparison, 870 first choice applications were received for 62 permits in 1999 (14 applications per permit), and 782 first-choice applicants for 64 permits in 1998 (12 applications per permit).

Also in 2000, 559 first-choice applications were received for 43 available permits for California bighorn sheep (13 applications per permit). The majority of the applications for California bighorn sheep permits (352, or 63%) were received from residents of Idaho. By comparison,

there were 797 first-choice applicants for 43 permits in 1999 (18.5 applicants per permit), and 726 first-choice applicants for 45 permits in 1998 (16 applications per permit).

Aerial surveys flown in 2000 indicated that surveyed Rocky Mountain bighorn sheep populations fluctuated within the bounds of expectations. However, significantly fewer California bighorn sheep were seen than expected, and recommendations were made to reduce harvest of California bighorn sheep in the future.

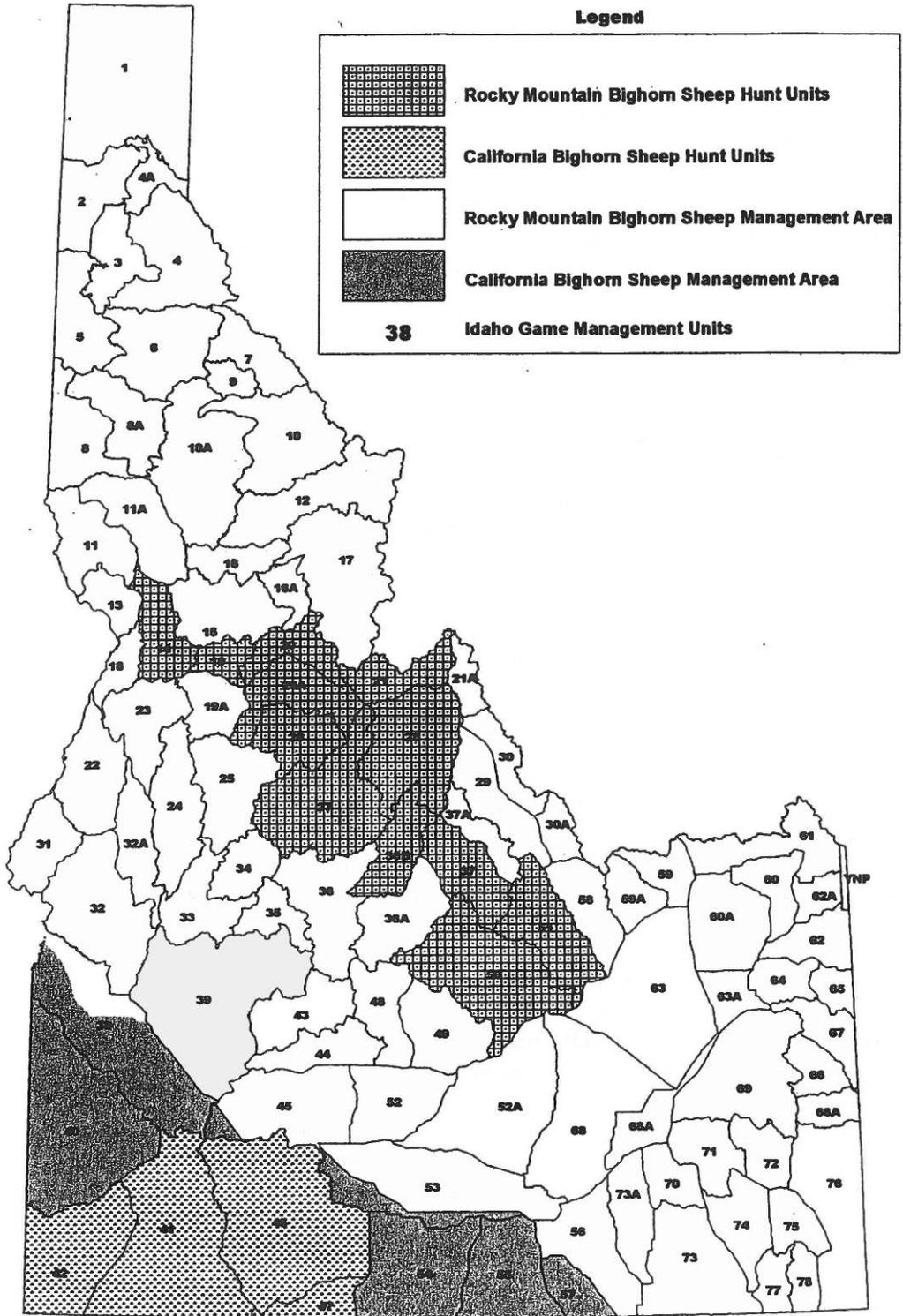


Figure 1. Rocky Mountain and California Bighorn Sheep Areas in Idaho.

**PROGRESS REPORT
SURVEYS AND INVENTORY**

STATE:	<u>Idaho</u>	JOB TITLE:	<u>Bighorn Sheep Surveys</u>
PROJECT:	<u>W-170-R-25</u>		<u>and Inventories</u>
SUBPROJECT:	<u>2</u>	STUDY NAME:	<u>Big Game Population Status,</u>
STUDY:	<u>1</u>		<u>Trends, Use, and</u>
JOB:	<u>4</u>		<u>Associated Habitat Studies</u>
PERIOD COVERED:	<u>July 1, 2000 to June 30, 2001</u>		

BIGHORN SHEEP - CLEARWATER REGION

**UNITS 11, 13, AND 18
CONTROLLED HUNT AREA 11**

ABSTRACT

Interest and support by The North American Foundation for Wild Sheep and other state and federal agencies has raised the level of involvement with bighorn sheep along the Snake River in Units 11, 13, and 18. These units will be top priority for future transplants in the Clearwater Region. The 1995-1999 survey results suggest a stable population in Unit 11 and recovery from the 1995-1996 epidemic; however, disease concerns still exist in the Snake River canyon. Hunt 11 was closed in 1997 after surveys indicated few legal rams remained in the population; however, the unit was opened to the 1999 lottery tag buyer. Sixteen bighorn sheep were released in Unit 13 in 1997 and were supplemented with 6 additional bighorn sheep in 1999. A small population persists in Unit 18. Monitoring efforts continue and include continuation of work on developing a sightability model for bighorn sheep in this area.

MANAGEMENT DIRECTION

The Department plans to conduct helicopter surveys for bighorn sheep at least every 5 years to monitor population trends. Interest and support by The North American Foundation for Wild Sheep and other state and federal agencies has raised the level of involvement with bighorn sheep along the Snake River in Units 11, 13, and 18. As a result Hells Canyon of the Snake River will be the top priority for future transplants in the Clearwater Region. In Units 11 and 13, an additional objective is to pursue cooperative land acquisitions with federal agencies to secure significant blocks of bighorn sheep habitat. The domestic sheep/bighorn sheep conflict in Unit 18 (Hells Canyon National Recreation Area) was reduced in 1996 with the removal of the last remaining Wallowa-Whitman National Forest grazing permit.

BACKGROUND

Bighorn sheep occurred naturally in the Hells Canyon area of Units 11, 13, and 18, but were extirpated in the early part of the century. Transplants have been conducted in all 3 units to reestablish populations.

The Unit 11 bighorn sheep population was reestablished from a transplant onto the Craig Mountain Wildlife Management Area. In 1984, 17 bighorn sheep (8 ewes and 9 rams) from Torrey Rim, Wyoming, were transplanted into the area. Additionally, marked transplant stock from both Washington and Oregon has been observed mixing with bighorn sheep from the Wyoming transplant and vice versa. A limited hunt with 2 permits was offered in Unit 11 from 1993 and 1994. One permit was offered in 1995 and 1996. In 1997 the hunt was closed after surveys indicated few legal rams remained in the population. In 1999, the lottery tag holder only was allowed to hunt in Unit 11.

Reports of dead and dying bighorn sheep on the Washington side of the Snake River opposite Unit 11 in December 1995 prompted the removal of 72 bighorn sheep from this area in an attempt to prevent the spread of pneumonia to other bighorn sheep in the population in the Snake River canyon. These bighorn sheep were transported to the IDFG Wildlife Health Laboratory in Caldwell after a joint capture effort by Idaho, Oregon, and Washington personnel. All but 8 of these bighorn sheep died by June 1996 despite intensive treatment in captivity. Periodic aerial surveys were conducted through spring 1996 by Idaho, Oregon, and Washington personnel to monitor bighorn sheep status. The disease spread along the Snake River from north of the Grande Ronde River, Washington to the Imnaha River, Oregon, and up the Grande Ronde River to the Wenaha River in Oregon. Some Idaho bighorn sheep appeared to exhibit symptoms, but no deaths were attributed to the Washington-Oregon outbreak. Unit 11 lamb survival was very low in 1996, high in 1997, dropped again in 1998 and 1999, and rebounded in 2000.

The last-known native bighorn sheep in Unit 18 was observed in 1932. Speculation at that time attributed the loss of bighorn sheep to overhunting by miners and disease outbreaks associated with domestic sheep contact. Bighorn sheep were reintroduced into Hells Canyon with transplants of Salmon River stock in 1975-1976 (11 ewes and 10 rams) and 1979 (7 ewes). The population was augmented in 1990 with 30 bighorn sheep (20 ewes and 10 rams) from Whiskey Mountain, Wyoming.

A disease outbreak that occurred in 1983 resulted in a substantial decline in the Unit 18 bighorn sheep population. The outbreak was initially detected through the observation of a number of dead and sick bighorn sheep along the Snake River. Domestic sheep, bighorn sheep, elk, mule deer, mountain goats, and white-tailed deer were tested for a variety of diseases at that time. The testing detected the presence of Pasteurella spp., Parainfluenza III (PI-3), epizootic hemorrhagic disease, and Chlamydia in the bighorn sheep and PI-3 and Chlamydia in the domestic sheep.

Another disease outbreak was detected in April 1991. Several sick bighorn sheep and 2 dead ewes were reported in the vicinity of Granite Creek in Hells Canyon. A subsequent helicopter survey did not detect any bighorn sheep, but a fixed-wing radiolocation flight (26 April 1991)

after the survey found 10 bighorn sheep and 1 active radio. Subsequent helicopter surveys in 1992, 1993, and 1996 indicated that few animals remained in the Unit 18 herd (Table 1). It is likely that domestic sheep have introduced 1 or more diseases to the bighorn sheep in Unit 18 and that the disease(s) have either caused or contributed to the decline of the population. The removal of the last remaining domestic sheep grazing permit offered by the Wallowa-Whitman National Forest should allow progress to be made on this issue.

POPULATION SURVEYS

Since the 1984 transplant, the Unit 11 herd has grown at a moderate rate (Table 1). Frequency of bighorn sheep surveys in Unit 11 increased in 1996 to monitor mortality and survival of lambs and to develop a sightability model as part of a research effort focusing on the Snake River Hells Canyon complex. Lamb survival in 1996 was extremely low (7 lambs:100 ewes). This was presumably a residual effect of the 1995-1996 Pasteurella outbreak in Oregon and Washington. Most recently lamb production has resulted in a slow increase in total bighorn sheep numbers. Three rams exhibiting exploratory movements were removed from the population in May 2000. One radio-collared two-year-old ram was hit by a car on Highway 12 near Hatwai Creek, and two yearling rams were darted near Clarkston, Washington but subsequently died. These may have come from Idaho or Washington. Necropsy revealed that the two-year-old ram hit by the car had recovered from a previous pneumonia infection.

In an attempt to increase lamb survival, a combination of a commercial cattle vaccine for Pasteurella and a bighorn sheep Pasteurella vaccine modified for the Colorado Division of Wildlife was tested on 6 of 12 bighorn ewes in Unit 11 captured and radio-collared in March 1997. One of these ewes was from the original 1984 transplant. All 12 Unit 11 bighorn ewes were pregnant at the time of capture and all lambs survived at least through September 1997. Similar tests were conducted on wild bighorn sheep herds at Black Butte, Washington and Wenaha, Oregon, and on 7 ewes captured in Washington during the 1995-1996 Pasteurella outbreak that now reside at the Idaho Wildlife Health Laboratory in Caldwell. Survival did not differ among lambs from vaccinated and unvaccinated ewes. Among the wild herds 1997 summer lamb survival was highest in the Unit 11 herd (100%) and lowest in the Wenaha, Oregon herd (30%).

Sightability model development has been ongoing since March 1998. Sightability has been assessed during 6 trials, 3 in March and 3 in December, in 7 herds in Idaho, Oregon, and Washington. Over the 6 trials, 359 of 397 radio-collared bighorn sheep (90%), 167 of 192 groups (87%), and 1,008 of 1,120 bighorn sheep (90%) have been observed during the helicopter surveys. Both the sightability model development and the vaccine test were conducted cooperatively under the "Hells Canyon Initiative."

As a consequence of recent efforts to rebuild the herds in Unit 13 through transplant operations, monitoring efforts of bighorn sheep in the unit have been renewed. In summer 2000 the population was estimated at 45 bighorn sheep (21 ewes, 16 lambs, 6 sublegal rams, and 2 legal rams) (Table 2). During fall 2000 nearly all lambs died. Nine yearlings and adults were also

found dead in 2000 and 2001, primarily due to scabies infection and pneumonia. In March 2001 the population was estimated at 25.

Aerial surveys indicated a sharp decline in the number of bighorn sheep in Unit 18 since the occurrence of disease outbreaks in 1983 and 1991 (Table 3). However, bighorn sheep continue to be regularly observed at Bernard Creek. On 25 May 1999, 4 adult ewes, 1 yearling ewe, 1 yearling ram, and 2 lambs were observed. A similar group (6 adult bighorn sheep and 2 lambs) was observed from the air on 16 June 1999. On 12 June 2000, 4 adult ewes, 1 yearling ewe, 1 yearling ram, and 3 lambs were observed at Bernard Creek. On 10 January 2001, 2 adult ewes, 1 yearling ewe, 1 yearling ram, and 2 lambs were observed. The yearling ewe was coughing. In March 2001, 4 ewes, 2 lambs, and 1 class II ram were observed, all at Bernard Creek.

HARVEST CHARACTERISTICS

Hunting was initiated in Unit 11 in 1993. Ten rams have been harvested to date. The likelihood of participation by the state auction or lottery tag holder in the Unit 11 hunt as occurred from 1993-1996 led to a reduction in the number of permits offered in the unit from 2 to 1 in 1995 (Table 4). Odds of drawing a tag declined significantly in 1995, probably in large part due to the harvest of a record book ram in 1994. In 1996, the Unit 11 permittee and the statewide auction tag holder were successful in harvesting rams in Hunt 11. In 1997, the hunt was closed after surveys indicated few legal rams remained in the population. The Idaho State record bighorn ram was picked up in Unit 11 in 1997 and probably died in 1996. In 1999, the statewide lottery tag holder was allowed to hunt in Unit 11 and harvested a record book ram.

Hunting was initiated in Unit 18 in 1984. Permit and harvest levels were reduced in subsequent years and the odds of drawing a controlled hunt permit have varied considerably (Table 4). Hunter success appeared to decline in the late 1980s and early 1990s concurrent with the population decline. Hunter success averaged 70% from 1984 through 1987, and 40% from 1988 through 1992. The hunt was closed in 1993.

HABITAT AND CLIMATIC CONDITIONS

Bighorn sheep habitat in Units 11, 13, and 18 consists of dry bunchgrass habitat types along the Salmon and Snake River breaks. Ownership in Unit 11 is primarily public along the Snake River including the Department's Craig Mountain Wildlife Management Area. Land along the Salmon River is primarily privately owned, although the Bureau of Land Management (BLM) manages much of the river corridor. The river breaks in Unit 13 are also primarily under private ownership with isolated tracts of BLM lands and state lands. The Snake River corridor in Unit 18 is entirely under U.S. Forest Service (USFS) ownership. Approximately 110 acres of the Snake River corridor in Unit 13 (Ragtown Bar) was acquired by a conservation group for transfer to the USFS in 1998. Additionally a conservation easement was acquired by the BLM on several thousand acres in Unit 13 in the Salmon River drainage.

The acquisition of habitat in Unit 11 by the Department, subsequent reduction of cattle grazing, and an intensive weed control program will lead to improved habitat conditions in that area.

Restoration of fire to the Hells Canyon ecosystem should also benefit bighorn sheep. In Unit 11, a wildfire burned approximately 400 acres along the Snake River between Captain John Creek and Billy Creek in 1996 and approximately 1,000 acres in the Tenmile Creek drainage in 1997. A prescribed fire burned additional acreage in Tenmile Creek in spring 1998 and the BLM and Idaho Department of State Lands cooperated with the Department on a mosaic burn between Captain John Creek and Dough Creek in March 1998. In 2000, the Maloney Creek wildfire burned approximately 70,000 acres along the Snake and Salmon Rivers between Maloney Creek on the Salmon River side and China Garden Creek on the Snake River. In Unit 18, wildfire burned approximately 16,100 acres of land managed by the USFS near Sheep Creek and 425 acres near Hells Canyon Dam in 1996.

The Clearwater Region experienced weather conditions in 2000-2001 that were far below normal. Snowpack was only 50% of average (October through March), the lowest since 1961 in the Clearwater Basin and the second lowest in the Salmon River Basin. Even though snow coverage at higher elevations was good and persisted into spring, water equivalent of snowpack was very low at 59% of average. Total precipitation in the mountains of the Clearwater Basin for this same period was low at 68% of average. Consequently, winter conditions throughout the region were relatively mild and therefore favorable for big game.

TRAPPING AND TRANSPLANTS

Six bighorn sheep (3 ewes and 3 rams) from the Cadomin coal mine in Hinton, Alberta, Canada were released into Big Canyon Creek in Unit 13 on 13 February 1999 to supplement the population (12 ewes and 4 rams) transplanted from Spences Bridge, British Columbia in 1997. All bighorn sheep were radio-collared. Several of the rams now summer in the Imnaha, Oregon bighorn sheep herd area and winter with the Big Canyon herd. This transplant project was conducted cooperatively by the states of Idaho, Oregon, and Washington; the USFS; BLM; and the Foundation for North American Wild Sheep under the "Hells Canyon Initiative." Bighorn sheep from this transplant were also released at Muir Creek, Oregon (14 bighorn sheep). One of the Muir Creek ewes has joined the Big Canyon herd.

UNITS 14, 17, 19, AND 20 CONTROLLED HUNT AREAS 19, 20-1, AND 20-2

ABSTRACT

Bighorn sheep were hunted on a general-hunt basis in these units until 1971. Hunting pressure in the Clearwater Region under a general season framework allowed more accessible populations to be overexploited. In 1971, all bighorn sheep hunts were placed on a controlled-hunt basis. Recent surveys in Units 17, 19, and 20 have suggested a decline in total bighorn sheep numbers and lamb recruitment that may be related to similar declines in adjacent units caused by diseases, primarily Pasteurella spp. The late hunts were dropped and permit levels were reduced substantially for the 1993-1994 hunts. Five rams were harvested by 10 permittees on hunts 19, 20-1, and 20-2 during the 1999 hunting season. Aerial survey results from Unit 17 have suggested a stable population.

MANAGEMENT DIRECTION

The Department plans to conduct bighorn sheep surveys at least every 5 years to monitor population trend and recruitment. Conservative permit levels will be continued until lamb recruitment and population trends suggest that increases are appropriate. In terms of hunting recreation, the emphasis will be to provide a high-quality backcountry hunting experience. Because of the difficulty that hunters experience in locating legal rams in some units, a somewhat lower success rate will be expected.

BACKGROUND

Rocky Mountain bighorn sheep populations are found in Units 14, 17, 19, and 20. The Unit 14 herd is limited to a few, scattered animals that likely disperse from adjacent herds to the east in Unit 19. At present, hunting is permitted only in the western portion of Unit 14 and in Units 17, 19, and 20. These units are further divided into 3 controlled hunt areas (Table 5).

Units 14, 19, and 20 bighorn sheep populations reside within the Salmon River breaks. Bighorn sheep in Unit 17 commonly move between Idaho and Montana. Bighorn sheep were transplanted into 2 sites in Unit 17 in the Selway-Bitterroot Wilderness in 1988. Fifteen bighorn sheep (10 ewes and 5 rams) were released near Tango Bar and 14 bighorn sheep (13 ewes and 1 ram) were released at Elevator Mountain. Recent surveys have suggested that neither transplant was successful. Bighorn sheep have not been observed in the Tango Bar area since the transplant. Similarly few animals have been observed in the Elevator Mountain area. The 1994 spring survey revealed the presence of 1 ewe on Elevator Mountain.

POPULATION SURVEYS

Bighorn sheep have usually been surveyed by helicopter coincidentally with elk sightability surveys in January and February (Tables 6, 7, and 8). From 5–14 February 2001, 15 hours were added to the elk survey flight time in Units 19 and 20 to allow total coverage of search units where bighorn sheep have been observed in the past. In Unit 17, 8 bighorn sheep were observed 8-9 February 2001 during a bighorn sheep capture effort in the upper Selway River east of Magruder Crossing. Spring surveys were most recently conducted in Units 19 and 20 during 1-3 May 1993 and in Unit 17 from 28-30 April 1994.

Total numbers of bighorn sheep observed during surveys have declined in Units 17, 19, and 20 since the early 1980s. From 99 to 121 bighorn sheep were observed in Unit 17, 1982 through 1984, whereas only 37 to 62 bighorn sheep were observed on the last 3 surveys (Table 6). Eight bighorn sheep (5 ewes and 3 class II rams) were observed during a helicopter search for bighorn sheep near Magruder Crossing in Sheep Creek on 8 February 2001. One hundred twenty-two to 136 bighorn sheep were observed during 1983 and 1984 in Unit 19, but only 52 to 60 were observed in 1992, 1993, and 1996 (Table 7). Although conducted with low sampling intensity, abundance of bighorn sheep observed in the 2001 survey in Unit 19 was within the expected range given recent levels. In Unit 20, 207 to 230 bighorn sheep were observed during 1986 and 1987; however, this number declined in surveys in 1993, 1994, and 1996 to a range of 66 to 87

(Table 8). Observed abundance in the Unit 20 survey in 2001 was alarmingly low. This may be related to the occurrence of large-scale fires that burned bighorn sheep habitat on both the north and south sides of the Salmon River during the summer of 2000. Of interest, is the fact that the Three Bears fire occurred throughout Hunt Area 20-2 and the Flossie fire was south of the Salmon River, adjacent to Hunt Area 20-2. However, bighorn sheep numbers were “normal” in 20-2, and deficient in 20-1. Lamb recruitment remained high in Unit 19 in 2001 (47 lambs per 100 ewes) after rebounding in 1996 from lows in 1992 and 1993 of 5.3 and 0.0, respectively. In Unit 20, observed recruitment in 2001 continued to be variable at 27 lambs, up from the 1992-2000 average of 17. Results from the 1994 and 1995 surveys in Unit 17 suggested favorable levels of lamb recruitment.

Low recruitment rates and overall decline in bighorn sheep numbers over the long term in these units may be caused by disease and habitat conditions. Diseases have apparently caused reduced lamb survival in adjacent herds along the Salmon River. The most significant pathogen appears to be Pasteurella spp., which causes pneumonia. Pasteurella spp. has a significant effect on population dynamics through increased adult and lamb mortality. Lambs generally develop clinical infections once they are weaned and passive immunity through colostrum is lost. Additionally, the effects of recent wildfires on bighorn sheep populations in these areas is as yet unknown, but may affect adult survival and recruitment of young, and alter habitat use patterns and distribution.

HARVEST CHARACTERISTICS

Beginning in 1952 and lasting until 1970, bighorn sheep hunting in the Clearwater Region was offered on a general-hunt basis. From 1971 to 1981 permit levels and hunt boundaries remained the same with variations only in season length. In 1982 the 4 controlled hunts were expanded. The September-October season was split, creating 2 hunts within the same hunt boundary and hunt numbers were changed. In 1985, 1 permit each was added to the September portion of the 4 hunts along the Salmon River (519-1, 520-1, 520-3, and 520-5).

The hunting season format was changed again beginning in 1991 to reduce the probability of hunters shooting bighorn sheep in the wrong hunt area, while continuing to provide the same amount of hunter opportunity on a statewide basis. As a result Hunt 519-2 and portions of Units 19A and 20A were combined into 519-L, and Hunts 520-3 and 520-5 were changed to Hunts 520-2 and 520-3. Hunts 520-2, 520-4, 520-6 and portions of Units 21 and 20A were incorporated into Hunt 520-L. Additionally Hunt 520-1 was expanded in area to include a portion of Units 17 and 21 beginning in 1991.

The hunting season structure was modified for the 1993-1994 hunting regulations to respond to the decline in total numbers and lamb recruitment. The late hunts, which have a higher success rate, were discontinued. The number of permits offered for early hunts was reduced from 25 to 15. In 1995, further changes were made to Units 19 and 20 hunts to address population status concerns. Hunt Area 520-3 was added to Hunt Area 519 to become Hunt Area 19. Permit numbers were reduced to 2 each in Hunt Areas 20-1 (-4 permits) and 20-2 (-1 permit).

Harvest was determined from telephone contacts of permittees prior to 1995 and from Big Game Mortality Reports beginning in 1996 (Table 9). In 2000, 10 permittees killed 5 rams for an average success rate of 50%. The current level of harvest is questionable given bighorn sheep plan guidelines which call for a minimum population of 100 bighorn sheep, and a maximum harvest of 20% of the legal rams observed on the previous survey. The 3 hunt areas contain 3 discreet bighorn sheep populations that are each below the 100 bighorn sheep minimum (Hunt Area 19: 62; Hunt Area 20-1: 17; Hunt Area 20-2: 25). Combined, there are only 104 bighorn sheep. In addition, with a total of 17 legal rams, maximum harvest would be 3 rams. The 5-year mean harvest in the 3 hunt areas was 4.8 rams. These data suggest that the current 10 permits should be reduced to 7 (4 in Hunt Area 19 and 3 in Hunt Area 20 (20-1 and 20-2 combined)).

HABITAT AND CLIMATIC CONDITIONS

Bighorn sheep habitat in Units 14, 17, 19, and 20 consists of dry bunchgrass habitat types along the Salmon River breaks and in the upper Selway River drainage. Ownership throughout the area is primarily USFS with small inholdings of private land.

Prior to 1995 drought conditions predominated leading to dry, hot summers and mild winters. These conditions may have led to increased winter survival but may also have limited lamb production and lamb survival during summer and fall. In the fall of 1992, numerous lightning-caused fires occurred along the Salmon River breaks in Units 14 and 19. Extensive burns resulted from wildfires during the summer and fall of 2000. In Unit 19, the Lone Sheep Fire burned about 300 acres in the Gospel Hump Wilderness. The Three Bears and Flossie fires burned a total of about 120,000 acres in the Frank Church River-of-No-Return Wilderness in Unit 20. Fire activity may have diminished short-term habitat potential but can be expected to improve habitat conditions in the long term.

TRAPPING AND TRANSPLANTS

As part of a statewide effort to monitor health in bighorn sheep populations, bighorn sheep were captured after immobilization with Carfentanil-filled darts to obtain throat and ear swabs and blood and fecal samples. During 2 trips up the Salmon River by jet boat into Unit 19 in November and December 2000, a total of 15 bighorn sheep (3 rams and 12 ewes) were sampled and eartagged. Additionally in Unit 17, 3 bighorn sheep (1 ram and 2 ewes) were processed during a trip by snowmachine into the upper Selway River area near Magruder Crossing at Sheep Creek 8-9 February 2001. Samples were taken from the ram, a 2½ year old, after it was observed from a helicopter being attacked and killed by a mountain lion.

Table 1. Summary of Bighorn Sheep Survey Data for Unit 11, 1992-2001^a. Counts are not additive.

Year	Ewes	Lambs	Rams		Uncl.	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			Sublegals	Legals				
<u>1992</u>	30	8	6	13	0	57	26.7	63.3
<u>1993</u>	25	4	6	10	0	45	16.0	64.0
<u>1994</u>	45	15	7	10	0	77	33.3	37.8
<u>1995</u>								
Dec. 1	40	13	7	12	0	72	32.5	47.5
Dec. 18	18	8	4	9	0	39	44.4	72.2
Dec. 23	16	4	5	9	0	36	25.0	87.5
<u>1996</u>								
Jan. 5	26	11	1	6	0	44	42.3	26.9
Jan. 30	24	10	5	1	0	40	41.7	25.0
Feb. 15	31	10	7	2	0	50	32.3	29.0
Feb. 28	29	8	8	2	0	47	27.6	34.5
Mar. 20	36	14	11	6	0	67	38.9	47.2
Jun. 20	19	11	10	5	0	45	57.9	78.9
Nov. 21	30	2	14	7	0	53	6.7	70.0
<u>1997</u>								
Jun. 27	28	23	4	8	0	63	82.1	42.9
Dec. 6	34	17	8	12	0	71	50.0	58.8
<u>1998</u>								
Mar. 18	35	15	12	11	0	73	42.8	65.7
Dec. 9	41	9	16	18	0	84	30.0	82.9
<u>1999</u>								
Mar. 22	44	8	11	17	0	80	18.1	63.6
Dec. 16	46	11	10	19	0	86	23.9	63.0
<u>2000</u>								
Dec. 11	56	28	8	16	24	130	50.0	42.0
<u>2001</u>								
Mar. 22	55	30	8	28	0	121	54.6	50.9

^a Surveys prior to 1995 were conducted during December and January incidental to elk and mule deer surveys.

Table 2. Summary of Bighorn Sheep Data Survey for Unit 13, 1997-2001.

Year	Ewes	Lambs	Rams				Uncl.	Total Legal Rams	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			I	II	III	IV					
<u>1997^a</u>											
Dec.	12	0	4	0	0	0	0	0	16	00.0	33.0
<u>1998</u>											
Oct 20	12	8	0	2	0	0	0	0	22	66.7	16.7
<u>1999^b</u>											
Mar. 22	14	7	3	2	0	0	0	0	26	50.0	35.7
Dec. 17	17	12	4	2	2	0	0	2	37	70.6	47.1
<u>2000</u>											
Jun 13	21	16	4	2	2	0	0	2	45	76.2	38.1
Dec. 4	18	2	3	2	2	1	0	3	28	11.1	44.4
<u>2001</u>											
Mar. 24	16	1	2	3	2	1	0	3	25	6.3	50.0

^a Transplant from British Columbia, Canada.

^b Transplant from Alberta, Canada, of 6 bighorn sheep.

Table 3. Summary of Bighorn Sheep Survey Data for Unit 18, 1983-2001^a.

Year	Ewes	Lambs	Rams				Uncl.	Total Legal Rams	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			I	II	III	IV					
1983	28	15	4	10	3	2	0	5	62	53.6	67.9
1984							ND				
1985							ND				
1986							ND				
1987	23	4	0	4	5	1	0	6	37	17.4	43.5
1988							ND				
1989							ND				
1990	16	0	3	2	1	0	0	1	22	0.0	37.5
1991							ND				
1992	1	0	0	0	1	0	0	1	2	0.0	100.0
1993	5	0	0	0	0	0	0	0	5	0.0	0.0
1994							ND				
1995							ND				
1996	0	0	0	0	0	0	0	0	0	-	-
1997							ND				
1998	3	3	1	0	1	0	0	1	8	100.0	67.0
1999	5	2	1	0	0	0	0	0	8	50.0	20.0
2000	5	3	1	0	0	0	0	0	9	60.0	20.0
2001	4	2	0	1	0	0	0	0	7	50.0	25.0

^a Surveys during 1983, 1990, and 1992 were conducted during winter (December through January) incidental to mule deer and elk surveys. The 1987, 1993, and 1996 surveys were conducted during spring (March through April). The 1998, 1999, and 2000 data were collected incidentally from the Snake River in May and June. The 2001 data were collected incidentally from the river in March.

Table 4. Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area, 1990-2000.

Hunt Area	Year	No. Permits	Harvest	Hunter Success	Days/Hunter	Total	Drawing Odds
						First Choice Applicants	
511	^a 1993	3	2	67%	3.5	76	1:38.0
	^a 1994	3	3	100%	1.0	61	1:30.5
511 was changed to 11 in 1995.							
11	1995	1	0	0%	8.0	68	1:68.0
	^a 1996	2	2	100%	2.0	105	1:52.5
Hunt 11 was closed in 1997.							
	^a 1999	1	1	100%	5.0	ND	ND
518	1990	2	0	0%	14.5	11	1:5.5
	1991	2	0	0%	12.0	14	1:7.0
	1992	2	2	100%	7.0	9	1:4.5
518 was closed in 1993.							

^a The state auction tag holder hunted for bighorn sheep in Unit 11, raising participation by one permit.

Table 5. 2000 Season Structure for Bighorn Sheep in Units 19 and 20 in the Clearwater Region.

Hunt Areas	Season		Permits
	Dates	Length	
19	Aug 30-Oct 13	45 Days	6
20-1	Aug 30-Oct 13	45 Days	2
20-2	Aug 30-Oct 13	45 Days	2

Table 6. Summary of Bighorn Sheep Survey Data for Unit 17, 1981-2001^a.

Year	Ewes	Lambs	Rams		Uncl.	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			Sublegals	Legals				
1981	16	7	1	0	31	55	43.8	6.3
1982	84	29	8	0	0	121	34.5	9.5
1983	38	8	10	1	42	99	21.1	28.9
1984	56	26	18	9	0	109	46.4	48.2
1985					ND			
1986					ND			
1987					ND			
1988	22	8	12	1	0	43	36.4	59.1
1989					ND			
1990					ND			
1991	37	7	6	2	0	52	21.2	24.2
1992					ND			
1993					ND			
1994	20	4	6	6	0	37	20.0	60.0
1995 ^b	22	11	5	5	0	43	50.0	45.5
Estimate:	32 ±18	16 ±10	7 ±4	6 ±4	0	62 ±4	50.5 ±43.0	42.4 ±31.8
1996					ND			
1997					ND			
1998					ND			
1999					ND			
2000					ND			
2001 ^c	2	0	1	0	0	3		

^a The 1994 survey was conducted during spring (28-30 April). Previous surveys and the 1995 survey were conducted during January and February coincident with elk surveys.

^b The 1995 data were analyzed using the current bighorn sheep sightability model.

^c The 2001 data were collected during a bighorn sheep capture effort in the upper Selway River east of Magruder Crossing.

Table 7. Summary of Bighorn Sheep Survey Data for Unit 19, 1981-2001^a.

Year	Ewes	Lambs	Rams				Uncl.	Total Legal Rams	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			I	II	III	IV					
1981	44	9	3	0	0	0	0	56	20.5	6.8	
1982	76	14	4	3	2	1	0	100	18.4	13.2	
1983	95	31	6	4	0	0	0	136	32.6	10.5	
1984	92	25	1	2	2	0	0	122	27.2	5.4	
1985							ND				
1986	69	9	3	4	3	1	0	89	13.0	15.9	
1987	68	20	2	0	0	0	0	90	29.4	2.9	
1988							ND				
1989	63	20	4	3	1	0	0	91	31.7	12.7	
1990							ND				
1991							ND				
1992	38	2	1	4	7	0	0	52	5.3	31.6	
1993	40	0	7	2	11	0	0	60	0.0	5.3	
1994							ND				
1995							ND				
1996	32	14	5	0	2	3	0	56	44.8	31.3	
1997							ND				
1998							ND				
1999							ND				
2000							ND				
2001	28	13		5		7	0	53	46.4	42.9	

^a The 1993 survey was conducted during spring (May). All other surveys were conducted during January and February coincident with elk surveys. The 2001 data include sightability estimates with 90% bounds.

Table 8. Summary of Bighorn Sheep Data for Unit 20, 1981-2001^a.

Year	Ewes	Lambs	Rams				Uncl.	Total	Total	Lambs:	Rams:
			I	II	III	IV		Legal			
1981	12	3	6	3	1	1	0	2	26	25.0	91.7
1982	78	19	3	8	15	6	0	21	129	24.4	41.0
1983	83	13	13	11	10	3	0	13	133	15.7	44.6
1984	107	29	6	15	14	6	0	20	177	27.1	38.3
1985								ND			
1986	132	31	14	15	19	19	0	38	230	23.5	50.8
1987	113	25	16	12	30	11	0	41	207	22.1	61.1
1988								ND			
1989	94	26	10	9	10	3	0	13	152	27.7	34.0
1990								ND			
1991								ND			
1992	68	13	3	8	10	4	0	14	106	19.1	36.8
1993	53	7	1	2	3	0	0	3	66	13.2	11.3
1994	49	11	10	3	12	2	0	14	87	22.4	55.1
1995								ND			
1996	51	7	4	5	7	3	1	10	78	13.8	39.2
1997								ND			
1998								ND			
1999								ND			
2000								ND			
2001	22	6	10		13		0	13	51	27.3	104.6

^a The 1993 survey was conducted during spring (May). All other surveys were conducted during January and February coincident with elk surveys. The 2001 data include sightability estimates with 90% bounds.

Table 9. Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area, 1991-2000.

Hunt Area	Year	No. Permits	Harvest	Hunter Success	Days/Hunter	Total First Choice Applicants	Drawing Odds
519	1991	5	1	20%	10.7	30	1:6.0
	1992	5	1	20%	6.8	11	1:2.2
	1993	3	0	0%	10.7	14	1:4.7
	1994	3	2	67%	8.0	16	1:5.3
519 was changed to 19 in 1995 and was expanded to include 520-3.							
19	1995	6	4	67%	12.2	51	1:8.5
	1996	6	2	33%	ND	47	1:7.8
	1997	6	4	67%	8.7	62	1:10.3
	1998	6	4	67%	2.5	71	1:11.8
	1999	6	4	67%	7.3	59	1:9.8
	2000	6	4	67%	8.0	76	1:12.7
519-L	1991	2	2	100%	5.5	47	1:23.5
	1992	2	2	100%	5.5	29	1:14.5
519-L was closed in 1993.							
520-1	1991	10	4	40%	11.6	37	1:3.7
	1992	10	5	50%	9.5	24	1:2.4
	1993	6	2	33%	10.3	40	1:6.7
	1994	6	2	33%	7.0	28	1:4.7
520-1 was changed to 20-1 in 1995.							
20-1	1995	2	1	50%	9.5	15	1:7.5
	1996	2	2	100%	3.0	30	1:15.0
	1997	2	1	50%	9.0	23	1:11.5
	1998	2	2	100%	8.0	22	1:11.0
	1999	2	0	0	0	45	1:22.5
	2000	2	2	100%	11.0	10	1:5.0
520-3	1991	5	1	20%	17.5	28	1:5.6
	1992	5	1	20%	11.4	23	1:4.6
	1993	3	0	0%	9.0	26	1:8.7
	1994	3	1	33%	5.5	8	1:2.7
520-2 was changed to 20-2 in 1995.							
20-2	1995	2	0	0%	ND	12	1:6.0
	1996	2	0	0%	ND	5	1:2.5
	1997	2	1	50%	8.0	12	1:6.0
	1998	2	2	100%	ND	16	1:8.0
	1999	2	1	50%	30.0	14	1:7.0
	2000	2	0	0%	ND	10	1:5.0

Table 9. Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area, 1991-2000
(Continued).

Hunt Area	Year	No. Permits	Harvest	Hunter Success	Days/Hunter	Total First Choice Applicants	Drawing Odds
520-3	1991		5	1	20%	9.2	131:2.6
	1992	5	1	20%	10.6	23	1:4.6
	1993	3	2	67%	5.5	17	1:5.7
	1994	3	2	67%	10.0	23	1:7.7
520-3 was added to 19 in 1995.							
520-L Hunts 520-2, 520-4, 520-6, and portions of Units 20A and 21 were incorporated into 520-L in 1991.							
	1991	2	2	100%	2.0	33	1:16.5
	1992	2	1	50%	8.5	32	1:16.0
520-L was closed in 1991.							

**PROGRESS REPORT
SURVEYS AND INVENTORY**

STATE:	<u>Idaho</u>	JOB TITLE:	<u>Bighorn Sheep Surveys</u>
PROJECT:	<u>W-170-R-25</u>		<u>and Inventories</u>
SUBPROJECT:	<u>3</u>	STUDY NAME:	<u>Big Game Population Status,</u>
STUDY:	<u>1</u>		<u>Trends, Use, and</u>
JOB:	<u>4</u>		<u>Associated Habitat Studies</u>
PERIOD COVERED: <u>July 1, 2000 to June 30, 2001</u>			

BIGHORN SHEEP - SOUTHWEST REGION, NAMPA

UNITS 41 AND 42

CONTROLLED HUNT AREAS 41-1, 41-2, 41-4, 41-5, 42-1, 42-2, 42-3, AND 42-4

ABSTRACT

Aerial surveys of California bighorn sheep herds were last conducted in June 2000. There was no major change in the observed bighorn sheep from the last survey in 1998 to 2000. Three hundred nine bighorn sheep were observed in the East Fork Owyhee River and 225 bighorn sheep were observed in the Big and Little Jacks Creek herd. The number of rams observed in Big and Little Jacks Creek herd dropped from 91 to 33.

Twenty-two California bighorn sheep were harvested by 37 hunters during the 2000 hunting season.

MANAGEMENT DIRECTION

Management direction follows the statewide management direction which is to: 1) reintroduce bighorn sheep into as many suitable habitats as possible while keeping the Rocky Mountain and California bighorn sheep subspecies geographically separated; 2) maintain controlled hunt strategy and offer more hunter opportunity where consistent with management goals; 3) encourage bighorn sheep habitat improvement projects by land management agencies; 4) harvest rams under the present $\frac{3}{4}$ curl 4+ years regulation, but consider a ewe hunt on a trial basis; 5) harvest and/or remove for transplant no more than 15-20% of the observed legal rams in a hunt unit; and 6) promote the nonconsumptive value of bighorn sheep and consider such values in our management decisions.

The Department will continue to cooperate and coordinate management with Nevada and Oregon to ensure that adjacent bighorn sheep habitat is stocked with only the California subspecies; conduct a research study of California bighorn sheep population status, habitat needs, and livestock interactions; and increase permit levels as population status allows.

The goals for California bighorn sheep are to increase populations, establish new populations, increase harvest, and provide more recreation (Table 10).

BACKGROUND

Units 41, 42, and 46 (Fig. 1) are reserved for the California bighorn sheep subspecies; all other units are designated as Rocky Mountain bighorn sheep habitat. Interstate Highway 84 was selected as the boundary because it is readily definable and there are few places where suitable bighorn sheep habitat abuts this boundary from either the north or the south. Likelihood of bighorn sheep movement across this boundary is essentially nonexistent.

Four releases of California bighorn sheep from British Columbia into Owyhee County in the 1960s provided the nucleus for the original herds along portions of the Owyhee River and in Little Jacks Creek. As those herds grew, hunting seasons were initiated. Beginning in 1980, 50 bighorn sheep were transplanted into other parts of the Owyhee, Bruneau, and Jarbidge River drainage. An additional 12 bighorn sheep from British Columbia were released into Idaho's Jarbidge River Canyon in 1984 when deep snows prevented Nevada Department of Wildlife personnel from reaching their proposed release site in Nevada. Much suitable habitat remains unoccupied; there are significant opportunities to enhance population growth and geographic expansion of these bighorn sheep through a continuing transplant program. During this planning period, California bighorn sheep may be released into several areas of unoccupied habitat.

POPULATION SURVEYS

Aerial surveys of all established California bighorn sheep herds in Owyhee County were flown in August 1987 and again in June 1990. The Little Jacks Creek and Owyhee River have been regularly surveyed since 1983 (Tables 11 and 12). No bighorn sheep were observed in the South Fork Owyhee or Little Owyhee River drainages in 1987; but, in 1990, 32 bighorn sheep were seen in these two drainages. The number of bighorn sheep observed in the Owyhee River drainage decreased from 669 in 1993 to 347 in 1994 (Table 11). Prior to 1987 all known bighorn sheep areas on the East Fork Owyhee River drainage downstream to Red Canyon were surveyed. In 1987 a stratified random sample of the drainage was surveyed, as well as additional areas from Red Canyon downstream to the Oregon border. Since 1990 the survey area has included the whole drainage from the Oregon border upstream to approximately 5 miles above the point where the pipeline crosses the East Fork Owyhee River.

The drainage of the Little Jacks Creek/Shoofly Creek complex has been surveyed since 1983 (Table 11). A research project to develop a sightability survey technique to correct for missed bighorn sheep was conducted in the Little Jacks Creek area 1987-1991. June appears to offer the best "time window" during which to conduct bighorn sheep census flights, but a stratified random survey methodology does not appear to work due to extensive movements of bighorn sheep between sampling units as a response to helicopter disturbance. The number of bighorn sheep counted in 1993 was an all-time high.

No population surveys were conducted in 2001, but aerial surveys were conducted in June 2000. The weather conditions and plant phenology were favorable for the survey. The survey area was well covered and there were no problems with the survey operation. The East Fork Owyhee River herd showed little change from the 1998 survey, 334 bighorn sheep observed in 1998 and 309 observed in 2000 (Table 12). Both Big and Little Jacks Creek were surveyed in both 1998 and 2000 (Tables 11 and 13). In the past these areas have been treated as separate herds. With the increase in population in the Big Jacks Creek area, there appears to be interchange between the Big and Little Jacks Creek herds. With this interchange between the two areas, the population data should be combined and examined as one larger herd (Table 14). The largest change in this herd was the decline in number of observed rams. The scattered pockets of bighorn sheep habitat in Unit 40 were not surveyed in 2000.

HARVEST CHARACTERISTICS

The permit levels in most California bighorn sheep hunts were reduced in 1995. A ram hunt was also initiated in Big Jacks Creek in 1995. The decrease in permit levels resulted in some changes to the season dates. The ram hunts were changed from three 12-day hunts to two 16-day hunts in the Little Jacks Creek and Owyhee River areas. There was a 6-day no hunting period between each hunt. The two hunts spread out the hunting pressure and reduced the potential for conflict from hunter crowding. However, even with the two hunts, some hunters interfered with other hunters by their presence or the inappropriate use of off-road vehicles.

There were two changes in the season structure for 1999 and 2000. The Big Jacks Creek hunt (41-4) was split into an early (41-4, Aug 30–Sep 14) and a late (41-5, Sep 22–Oct 8) hunt, similar to Little Jacks Creek area. Unit 40 contains several pockets of bighorn sheep habitat which have been occupied by bighorn sheep for several years. Unit 40 was added to Little Jacks Creek hunt areas 41-1 and 41-2. This will allow hunters to pursue the rams which reside in Unit 40. Hunters did not harvest any rams from Unit 40 in 1999 or 2000.

The decreased number of permits did reduce the chances of drawing a California bighorn sheep permit (Tables 15 and 16). Based upon the mandatory reports, 37 hunters harvested 22 California bighorn rams in the 2000 controlled hunts for a 59% success rate (Tables 15 and 16).

HABITAT CONDITIONS

These units are characterized by large expanses of flat terrain dominated by sagebrush/grass vegetative types. The major drainage systems (the Bruneau, Jarbidge, and Owyhee Rivers) have formed steep canyons which provide the habitats preferred by California bighorn sheep. Grass-covered benches along these canyons provide foraging sites. Steepness of these canyons and isolation of forage areas by rimrock reduces competition between bighorn sheep and cattle. Thus bighorn sheep seldom compete with cattle for forage on those sites. However the potential for bighorn sheep/livestock conflicts may intensify adjacent to the canyons as the numbers of either or both increase.

The Bureau of Land Management (BLM) administers most of the habitats suitable for bighorn sheep within these units. Some parcels of US Forest Service, state, and private lands also contain suitable habitat. Most currently-occupied habitat is under study by the BLM for possible wilderness designation.

WINTER FEEDING

No winter feeding of bighorn sheep occurred in 1999-2001.

TRAPPING AND TRANSPLANTS

There was no trapping and transplanting activity in Units 40, 41, and 42 during the period 1999-2001. A summary of transplant activity in Units 40, 41, and 42 is in Table 17.

MANAGEMENT IMPLICATIONS

California bighorn sheep were reintroduced into Little Jacks Creek in 1967. The first controlled hunt was held in 1975.

Prior to 1993 permit levels were held at a conservative level. This was in accordance with the plan that called for no more than 20% removal of legal rams. Additionally, the Owyhee River bighorn sheep population has been used to supply California bighorn sheep for reintroduction into other areas.

Hunting seasons since 1995-1996 have been modified in response to the 1994 population survey results. First, a new ram hunt was started in Big Jacks Creek. This herd is now sufficiently established to support a limited ram hunt. Second, the ewe hunt in Little Jacks Creek was temporarily closed. This ewe hunt may be reopened when the herd has recovered from the reduced population observed in 1994. Third, the number of ram permits in Little Jacks Creek and East Fork Owyhee River was reduced in response to the reduced number of bighorn sheep in these herds. The hunts in each area have been combined to two, with each hunt 16 days long.

These bighorn sheep populations should continue to be monitored very closely. Aerial surveys should be conducted every year to monitor population trends, ram:ewe ratios, and lamb survival while these populations are being harvested for transplant and sport hunting at levels exceeding the plan's criteria. If the herd continues to show a declining trend for several years, the rate of bighorn sheep removal should be closely evaluated and adjusted so that the herd will continue to be a viable source of transplant stock. Aerial surveys should be flown during the best time of the year to view bighorn sheep.

Table 10. 1999 and 2000 Season Structure for Bighorn Sheep in the Southwest Region (Nampa).

Hunt Areas	Season		Permits
	Dates	Length	
41-1	Aug 30-Sep 14	16	4
41-2	Sep 22-Oct 8	16	4
41-4	Aug 30-Oct 8	40	3
41-5	Sep 22-Oct 8	16	2
42-1	Aug 30-Sep 14	16	10
42-2	Sep 22-Oct 8	16	10
42-3	Aug 30-Sep 14	16	2
42-4	Sep 22-Oct 8	16	2

Table 11. Summary of Bighorn Sheep Population Data for Little Jacks Creek, Hunt Area 41-1, 41-2, 41-3, 41-4, and 41-5, 1983-2001.

Year	Ewes	Lambs	Rams		Uncl.	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			Sublegal	Legal				
1983	-	-	17	25	-	115	53	74
1984	No Data Collected							
1985 (August)	30	16	26	13	0	85	53	130
1985 (November)	40	18	22	16	0	96	95	45
1986	No Data Collected							
1987 (June)	84	49	26	25	0	184	58	61
1987 (August)	102	35	19	8	0	164	34	26
1988	73	29	56	26	0	184	40	112
1989	105	43	33	22	0	203	41	52
1990	78	32	54	33	5	202	41	113
1991	99	55	43	37	7	241	56	81
1992	81	42	35	36	0	194	52	88
1993	142	36	51	41	0	270	25	65
1994	107	40	41	16	0	204	37	53
1995	No Data Collected							
1996	95	33	39	14	0	181	38	40
1997	No Data Collected							
1998	57	18	35	11	3	124	32	81
1999	No Data Collected							
2000	63	20	8	5	0	96	32	21
2001	No Data Collected							

Table 12. Summary of Bighorn Sheep Population Data for the Owyhee River, Hunt Areas 42-1, 42-2, 42-3, 42-4, and 42-5, 1983-2001.

Year	Ewes	Lambs	Rams		Uncl.	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			Sublegal	Legal				
1983	135	76	76	46	1	334	56	90
1984	No Data Collected							
1985	124	71	57	21	0	273	57	63
1986	No Data Collected							
1987	140	70	-	-	0	329	50	85
1988	No Data Collected							
1989	No Data Collected							
1990	339	183	71	46	0	639	54	35
1991	400	175	60	114	4	753	44	44
1992	323	142	101	54	0	620	44	48
1993	406	81	125	57	0	669	20	45
1994 ^a	179	73	51	42	2	347	41	51
1994 ^b	177	63	61	35	0	336	36	54
1995	No Data Collected							
1996	202	96	52	51	0	401	48	51
1997	No Data Collected							
1998	204	76	24	26	4	334	37	25
1999	No Data Collected							
2000	198	60	29	22	0	309	30	26
2001	No Data Collected							

^a June Survey

^b July Survey

Table 13. Summary of Bighorn Sheep Population Data for Big Jacks Creek 1990-2001.

Year	Ewes	Lambs	Rams		Uncl.	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			Sublegal	Legal				
1990	14	10	-	-	-	38	-	-
1991	No Data Collected							
1992	No Data Collected							
1993	46	19	17	8	0	90	41	54
1994	No Data Collected							
1995	No Data Collected							
1996	No Data Collected							
1997	73	38	12	18	0	143	51	76
1998	59	30	25	20	0	134	51	76
1999	No Data Collected							
2000	78	31	9	11	0	129	40	26
2001	No Data Collected							

Table 14. Summary of Bighorn Sheep Population Data for Combined Big and Little Jacks Creek Herds 1998-2001.

Year	Ewes	Lambs	Rams		Uncl.	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			Sublegal	Legal				
1998	116	48	60	31	0	258	41	78
1999	No Data Collected							
2000	141	51	17	16	0	225	36	23
2001	No Data Collected							

Table 15. Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area, 1989-2000.

Hunt Area	Year	No. Permits	Harvest	% Hunter Success	Days/ Hunter	First Choice Applicants	Drawing Odds
741-1	1989	3	2	67	6.0	54	1:18.0
741-1	1990	3	3	100	3.0	67	1:22.3
741-1	1991	3	3	100	4.0	60	1:20.0
741-1	1992	3	2	67	3.3	74	1:24.7
741-1	1993	5	3	60	5.6	64	1:12.8
741-1	1994	5	4	75	7.0	110	1:22.0
741-1	1995	5	5	100	8.5	84	1:16.8
741-1	1996	5	3	60	--	103	1:20.6
741-1	1997	5	3	60	--	86	1:17.2
741-1	1998	5	4	80	--	95	1:19.0
741-1	1999	4	3	75	--	115	1:28.7
41-1	2000	4	2	50	--	83	1:20.8
741-2	1986	3	3	100	3.3	62	1:20.7
741-2	1987	3	1	33	4.5	56	1:18.7
741-2	1988	3	2	67	3.7	56	1:18.7
741-2	1989	3	3	100	1.0	35	1:11.7
741-2	1990	3	3	100	5.7	51	1:17.0
741-2	1991	3	3	100	3.3	62	1:60.7
741-2	1992	3	3	100	4.5	52	1:17.3
741-2	1993	5	4	80	4.0	48	1:9.6
741-2	1994	5	2	33	6.3	83	1:16.6
741-2	1995	5	5	100	3.8	86	1:17.2
741-2	1996	5	3	60	--	80	1:16.0
741-2	1997	5	3	60	--	57	1:11.4
741-2	1998	5	2	40	--	72	1:14.4
741-2	1999	4	3	75	--	82	1:20.5
41-2	2000	4	4	100	--	53	1:13.3
741-3	1993	5	3	60	2.5	51	1:10.2
741-3	1994	5	5	100	5.3	42	1:8.4
741-4	1993	5	2	40	1.5	9	1:1.8
741-4	1994	5	3	75	4.8	6	1:1.2
741-4	1995	3	3	100	7.5	94	1:31.3
741-4	1996	3	3	100	--	71	1:23.7
741-4	1997	5	3	60	--	108	1:21.6
741-4	1998	5	5	100	--	110	1:22.0
741-4	1999	3	1	33	--	43	1:14.3
41-4	2000	3	3	100	--	38	1:12.7

Table 15. Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area, 1989-2000
(continued).

Hunt Area	Year	No. Permits	Harvest	% Hunter Success	Days/Hunter	First Choice Applicants	Drawing Odds
741-5	1999	2	2	100	--	34	1:17.0
41-5	2000	2	2	100	--	44	1:22.0
742-1	1989	8	5	63	1.9	92	1:11.5
742-1	1990	8	7	88	3.4	115	1:14.4
742-1	1991	12	9	75	5.2	120	1:10.0
742-1	1992	12	10	83	4.5	167	1:13.9
742-1	1993	12	7	58	5.6	96	1:8.0
742-1	1994	12	5	44	7.4	135	1:11.3
742-1	1995	10	6	60	7.4	110	1:11.1
742-1	1996	10	4	40	--	139	1:13.9
742-1	1997	10	6	60	--	93	1:9.3
742-1	1999	10	3	30	--	149	1:14.9
42-1	2000	10	2	20	--	77	1:7.7
742-2	1988	10	7	70	--	144	1:14.4
742-2	1989	8	4	50	8.0	94	1:11.8
742-2	1990	8	6	75	4.1	67	1:8.4
742-2	1991	12	10	83	3.0	131	1:10.9
742-2	1992	12	11	91	4.2	164	1:13.7
742-2	1993	12	9	75	3.6	60	1:5.0
742-2	1994	12	8	67	5.4	127	1:10.6
742-2	1995	10	3	30	7.3	136	1:13.6
742-2	1996	10	5	50	--	90	1:9.0
742-2	1997	10	8	80	--	111	1:11.1
742-2	1998	10	7	70	--	124	1:12.4
742-2	1999	10	7	70	--	125	1:12.5
42-2	2000	10	5	50	--	100	1:10
742-3	1986	3	2	67	1.0	43	1:14.3
742-3	1987	3	2	67	4.7	34	1:11.3
742-3	1993	12	5	42	6.8	75	1:6.3
742-3	1994	12	11	90	6.0	91	1:7.6
742-3	1997	2	2	67	--	46	1:33.5
742-3	1998	2	2	100	--	58	1:29.0
742-3	1999	2	1	50	--	32	1:16.0
42-3	2000	2	1	50	--	45	1:22.5
742-4	1986	3	3	100	6.0	30	1:10.0
742-4	1987	3	2	67	5.0	38	1:12.7
742-4	1997	2	2	100	--	56	1:28.0
742-4	1998	2	1	50	--	33	1:16.5
742-4	1999	2	1	50	--	27	1:13.5
42-4	2000	2	2	100	--	43	1:21.5
742-5	1986	2	1	50	6.0	22	1:11.0
742-5	1987	2	1	50	3.0	22	1:11.0
746	1991	2	2	100	4.0	36	1:18.0
746	1992	2	2	100	7.0	34	1:17.0
746	1993	6	6	100	7.8	64	1:10.7
746	1994	6	2	40	6.4	91	1:15.2
746	1995	6	3	50	10.5	74	1:12.3
746	1996	6	4	67	--	75	1:12.5

Table 16. Summary of the Southwest Region (Nampa) Bighorn Sheep Harvest and Drawing Odds, 1990-2000.

Area	Year	No. Permits	Harvest	% Hunter Success	Days/ Hunter	Total First Choice Applicants	Drawing Odds
Calif.	1990	22	19	86	4.2	300	13.6:1
Calif.	1991	32	27	84	3.9	409	12.8:1
Calif.	1992	32	28	88	4.7	491	15.3:1
Calif.	1993	62	39	63	5.1	467	7.5:1
Calif.	1994	62	40	65	6.1	685	11.0:1
Calif.	1995	39	25	66	7.5	584	15.1:1
Calif.	1996	39	23	59	--	558	14.3:1
Calif.	1997	39	27	69	--	557	14.2:1
Calif.	1998	39	28	72	--	636	16.3:1
Calif.	1999	37	21	54	--	607	16.4:1
Calif.	2000	37	22	59	--	483	13.1:1
Calif.	10 Yr. Avg.	418	280	67	5.1	5,477	13.1:1

Table 17. Summary of Individual Bighorn Sheep Transplants in the Southwest Region (Nampa).

Date	Capture Site	Release Site	Adult ^a		Kid		Total
			Male	Female	Male	Female	
Oct 1963	Chilcotin, B.C.	E.F. Owyhee R.	5	14	-	-	19
Nov 1965	Chilcotin, B.C.	E.F. Owyhee R.	2	7	-	-	9
Nov 1966	Chilcotin, B.C.	E.F. Owyhee R.	2	8	-	-	10
Oct 1967	Chilcotin, B.C.	Little Jacks Cr	4	8	-	-	12
Mar 1980	Little Jacks	Granite Mt, NV	1	4	-	-	5
Feb 1981	Little Jacks	Jarbidge R, NV	3	9	-	-	12
Dec 1982	E.F. Owyhee	Bruneau/Jarbidge	2	10	-	-	12
Mar 1984	Chilcotin, B.C.	Bruneau/Jarbidge	2	10	-	-	12
Dec 1984	E.F. Owyhee	Bruneau/Jarbidge	2	9	-	-	11
Jan 1985	Little Jacks	Bruneau/Jarbidge	1	0	-	-	1
Jan 1985	Little Jacks	S.F. Owyhee	2	7	-	-	9
Dec 1986	E.F. Owyhee	Snowcloud Mt, NV	-	-	-	-	7
Dec 1986	E.F. Owyhee	Cottonwood Cr.	4	11	-	-	15
Dec 1987	Little Jacks	Cottonwood Cr.	3	11	-	-	14
Feb 1988	Chilcotin, B.C.	Big Jacks Cr.	3	11	-	-	14
Mar 1988	E.F. Owyhee	Big Jacks Cr.	2	0	-	-	2
Nov 1988	Shoofly Cr.	Cottonwood Cr.	5	9	-	-	14
Nov 1988	Shoofly Cr.	Nevada	2	11	-	-	13
Nov 1988	Battle Cr.	Duncan Cr.	9	15	-	-	24
Dec 1989	Little Jacks	W.F. Bruneau	3	9	-	-	12
Nov 1990	E.F. Owyhee	W.F. Bruneau	5	11	0	0	16
Nov 1990	E.F. Owyhee	North Dakota	6	17	0	0	23
Nov 1991	E.F. Owyhee	E.F. Dry Cr.	3	10	2	1	16
Nov 1991	E.F. Owyhee	North Dakota	5	28	3	2	38
Nov 1991	E.F. Owyhee	Nevada	4	31	1	2	38
Dec 1993	E.F. Owyhee	Battle Mt, Nevada	3	20	1	1	25
Dec 1993	E.F. Owyhee	Deschutes, Oregon	6	25	2	2	35
Dec 1993	E.F. Owyhee	Bruneau & Jarbidge Rivers & Big Cottonwood Cr	-	-	-	-	45

^a When the age of transplanted bighorn sheep is not available, all are listed as adult.

**PROGRESS REPORT
SURVEYS AND INVENTORY**

STATE:	<u>Idaho</u>	JOB TITLE:	<u>Bighorn Sheep Surveys</u>
PROJECT:	<u>W-170-R-25</u>		<u>and Inventories</u>
SUBPROJECT:	<u>3 (McCall)</u>	STUDY NAME:	<u>Big Game Population Status,</u>
STUDY:	<u>I</u>		<u>Trends, Utilization, and</u>
JOB:	<u>4</u>		<u>Associated Habitat Studies</u>
PERIOD COVERED:	<u>July 1, 2000 to June 30, 2001</u>		

BIGHORN SHEEP - SOUTHWEST REGION, MCCALL

UNITS 22, 23, AND 31

ABSTRACT

No hunting or population surveys for bighorn sheep occurred in this area during the 2000-2001 reporting period.

MANAGEMENT DIRECTION

1. Follow statewide management direction.
2. Continue to work with the US Forest Service and livestock producers in the Hells Canyon National Recreation Area to minimize the potential for any disease transfer between domestic sheep and bighorn sheep.
3. Coordinate with the Oregon and Washington departments to release Rocky Mountain bighorn sheep in Hells Canyon.
4. Open additional hunts as transplanted populations become established and meet minimum population estimate criterion of 100.
5. Complete inventories of potential release sites, assess status of recently established herds, and increase bighorn sheep numbers through transplants.

BACKGROUND

Units 22, 23, and 31 represent the southern and western distribution of Rocky Mountain bighorn sheep in Idaho. The Granite Creek drainage and the area from Granite Creek south to Hells Canyon Dam represent the current occupied bighorn sheep habitat in Unit 22. This population is nomadic and frequently moves north into Unit 18. Population data collected on this group of bighorn sheep are lumped with data collected in Unit 18. Movements west into Oregon have

been documented. Movements of radio-collared bighorn sheep from Oregon to Idaho and back have also been documented.

The opportunity for establishing huntable bighorn sheep populations in these units is limited by the abundance and distribution of domestic sheep. There has never been bighorn sheep hunting authorized in these units.

POPULATION SURVEYS

No population surveys were conducted in these units during the reporting period.

HARVEST CHARACTERISTICS

No bighorn sheep hunting was authorized during this reporting period.

MANAGEMENT IMPLICATIONS

Available habitat exists for bighorn sheep reintroduction in Unit 22. Reintroduction of bighorn sheep will depend on the priority within the Hells Canyon reintroduction project, availability of bighorn sheep from source populations, and the status of domestic sheep grazing allotments in the area.

UNITS 19A, 20A, AND 26 CONTROLLED HUNT AREAS 20A, 26, AND 26-L

ABSTRACT

The bighorn sheep hunt areas in Units 20A and 26 were restructured during implementation of the 1991-1995 Bighorn Sheep Management Plan and again in 1997. No population surveys were conducted during the reporting period. A total of 14 harvest permits was issued in 2000 among 3 separate hunt areas. The 2000 hunting season was extended to the end of November due to early forest fire closure areas. One controlled hunt permit holder opted for a raincheck tag in the 2001 hunting season. A total of 10 rams was harvested for a 77% hunter success rate.

MANAGEMENT DIRECTION

1. Allow and/or encourage population increases.
2. Increase recreational opportunity.
3. Develop and/or continue with reintroduction programs.
4. Monitor populations via helicopter surveys every other year.

BACKGROUND

Hunting seasons for bighorn sheep in Units 20A and 26 were restructured with the implementation of the 1991-1995 Bighorn Sheep Management Plan. Prior to this plan there were 5 hunt areas (20A-1, 20A-2, 20A-3, 26-1, and 26-2) in these units. Hunt Area 20A-1 remained unchanged. Hunt Area 20A-3 was incorporated into Hunt Area 20A-2. Hunt Areas 26-1 and 26-2 included all of Unit 26 and were stratified by season dates, but in 1992 a portion of Hunt Area 20A-2 was incorporated into Hunt Area 26-1 and a portion of 27-1 was incorporated into Hunt Area 26-2. The season dates for Hunt Areas 26-1 and 26-2 were made concurrent in 1991. Hunt Area 26-L was created in 1992 and incorporated portions of both Hunt Areas 26-1 and 26-2. This hunt was designed to provide a low permit level, high quality hunt close to the rut period. Hunt areas were restructured again in 1997 in response to declining bighorn sheep survey numbers. Hunt Area 20A-1 was eliminated and Hunt Area 20A-2 became Hunt Area 20A. Hunt Areas 26-1 and 26-2 were combined and permit levels were reduced from a combined total of 11 to a new total of 6. Current season structures are displayed in Table 18. Population and harvest data reflect the new hunt area boundaries.

POPULATION SURVEYS

Bighorn sheep population surveys were last conducted in April 1999. Aerial survey results indicated bighorn sheep numbers are low but stable in Hunt Areas 20A, 26, and 26-L (Tables 19-21). A total of 230 bighorn sheep was observed in 1999 (144 ewes, 38 lambs, and 48 rams) for a 26:100:33 lamb:ewe:ram ratio. Lamb recruitment appears to have slightly increased over numbers observed in 1996.

HARVEST CHARACTERISTICS

Harvest data are generated from a mandatory hunter report regulation for all permit holders for bighorn sheep hunts. Successful permit holders must present their bighorn sheep horns to a Department office and complete a harvest report within 10 days of the date of kill. Unsuccessful permit holders must present and/or mail their unused bighorn sheep tag/permit to a Department office within 10 days of the close of the hunt for which the tag was valid.

A combined total of 14 permits was authorized for bighorn sheep Hunt Areas 20A, 26, and 26-L in 2000 (Table 22). One permit holder opted to take a raincheck for the 2001 hunting season due to forest area closures during the active fire season. The 2000 hunting season was also extended to the end of November to allow ample hunting opportunity for controlled hunt permit holders. A total of 10 rams was harvested. This represents a 77% (10 out of 13) hunter success rate.

MANAGEMENT IMPLICATIONS

The permit level in Hunt Areas 26-1 and 26-2 was reduced by 2 and 9, respectively, in 1993. This reduction was in response to continued recruitment problems in the Big Creek and Middle Fork Salmon River drainages. The low number of legal rams observed in Hunt Area 26-2 and the fact that no hunters were able to harvest a legal ram during the 1995 and 1996 seasons

indicated that management restrictions were necessary. In 1997 the permits for Hunt Area 26-2 were dropped, and Hunt Area 26-2 was combined with Hunt Area 26-1 to form new Hunt Area 26. The bighorn sheep population in hunt area 20A showed a similar trend, but permit levels remained constant. The 1999 aerial bighorn sheep surveys indicated bighorn sheep recruitment may be improving, although the overall population still appears static. A research study conducted in April 2000 indicated that a highly virulent strain of Pasteurella spp is present in the Big Creek bighorn sheep population. This evidence does not suggest that this population is out of trouble and permit levels should remain at current levels. The bighorn sheep population in this area will be monitored every other year as funding permits.

Table 18. Season Structure for Rocky Mountain Bighorn Sheep in 2000 in the Southwest Region.

Hunt Area	Season ^a		Permit
	Dates	Length	
20A	Aug 30-Nov 30	93 days	6
26	Aug 30-Nov 30	93 days	6
26-L	Oct 13-Nov 30	49 days	2

^a The Commission extended the season closing date from October 13 to November 30 due to extensive forest fire area closures in the early part of the hunting season.

Table 19. Summary of Bighorn Sheep Population Data for Hunt Area 20A, 1992-1999.

Year	Ewes	Lambs	Rams				Uncl.	Total	Total	Lambs:	Rams:
			I	II	III	IV		Legal			
1992	80	7	4	7	11	7	0	18	116	9	36
1993	62	10	1	5	11	4	1	15	94	16	34
1994	63	11	4	1	7	7	0	14	93	17	30
1995	53	11	5	0	6	4	0	10	79	21	28
1996	38	6	1	4	1	8	0	9	58	16	37
1997	No Data Collected										
1998	No Data Collected										
1999	35	11	0	2	2	1	0	3	51	31	14

Table 20. Summary of Bighorn Sheep Population Data for Hunt Area 26, 1992-1999.

Year	Ewes	Lambs	Rams				Uncl.	Total	Total	Lambs:	Rams:
			I	II	III	IV		Legal			
1992 ^a	91	26	0	10	11	19	8	30	165	29	44
1993	152	25	4	6	13	21	0	34	221	16	29
1994 ^a	33	2	1	2	10	9	0	19	57	6	67
1995	129	18	6	7	10	9	0	19	179	14	25
1996	122	20	3	9	8	10	0	18	172	16	25
1997	No Data Collected										
1998	No Data Collected										
1999	109	27	9	14	12	8	0	20	179	25	39

^a Incomplete survey.

Table 21. Summary of Bighorn Sheep Population Data for Hunt Area 26-L, 1987-1999.

Year	Ewes	Lambs	Rams				Uncl.	Total	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			I	II	III	IV		Legal Rams			
1987	114	19	5	9	11	10	0	21	177	17	39
1988	116	18	3	7	8	12	0	20	172	16	33
1989	122	19	7	13	15	24	0	39	200	16	48
1990	No Data Collected										
1991	64	4	2	8	13	2	0	15	93	6	39
1992	62	20	0	5	6	14	0	20	107	32	40
1993	82	13	2	3	8	10	0	18	118	16	28
1994	22	1	1	2	7	5	0	12	38	5	68
1995	85	7	4	6	6	7	0	13	115	8	27
1996	73	9	1	7	4	7	0	11	101	12	26
1997	No Data Collected										
1998	No Data Collected										
1999	62	14	4	9	6	5	0	11	100	23	39

Table 22. Summary of Southwest Region Rocky Mountain Bighorn Sheep Harvest and Drawing Odds, 1991-2000.

Area	Year	No. Permits	Harvest	Hunter Success	Days/ Hunter	First Choice Applicants	Drawing Odds
20A	1991	6	4	67	10.6	29	1:4.8
	1992	6	2	40	15.4	46	1:7.7
	1993	6	3	50	19.2	27	1:4.5
	1994	6	^a 3	33	8.0	43	1:7.2
	1995	6	4	66	6.6	33	1:5.5
	1996	6	0	0	ND	72	1:12
	1997	6	5	83	3.6	41	1:6.8
	1998	6	^a 5	67	ND	75	1:12.5
	1999	6	3	50	ND	46	1:7.6
	2000	6	4	67	ND	77	1:12.8
26	1991	8	4	50	5.4	39	1:4.9
	1992	8	3	38	15.3	42	1:5.3
	1993	6	3	50	7.5	43	1:7.2
	1994	6	^b 2	17	7.0	58	1:9.7
	1995	6	2	33	5.2	55	1:9.2
	1996	6	3	50	ND	39	1:6.5
	1997 ^c	6	3	50	4.6	59	1:9.8
	1998	6	5	83	13.2	67	1:11.2
	1999	6	3	50	ND	84	1:14
	2000	^d 6	4	80	ND	100	1:16
26-L	1991	2	2	100	6.5	10	1:5
	1992	2	2	100	4.0	19	1:9.5
	1993	2	1	50	7.0	29	1:14.5
	1994	2	2	100	3.5	7	1:3.5
	1995	2	2	100	2.5	48	1:24
	1996	2	1	50	ND	24	1:12
	1997	2	2	100	6.0	28	1:14
	1998	2	2	100	5.0	53	1:26.5
	1999	2	1	50	10.0	82	1:41
	2000	2	2	100	11.5	80	1:40

^a The auction tag permit holder harvested a bighorn sheep in Hunt Area 20A.

^b Wildfires resulted in public access closures for this hunt area during the 1994 hunting season. The Commission allowed the two permit holders to relocate in other hunt areas. One of the permit holders harvested a bighorn sheep in Hunt Area 26-1. The other permit holder did not harvest a bighorn sheep.

^c Hunt area restructured in 1997 to include former Hunt Area 26-2.

^d One permit holder opted for a raincheck tag in 2001 due to forest fire area closures during part of the 2000 season.

**PROGRESS REPORT
SURVEYS AND INVENTORY**

STATE:	<u>Idaho</u>	JOB TITLE:	<u>Bighorn Sheep Surveys</u>
PROJECT:	<u>W-170-R-25</u>		<u>and Inventories</u>
SUBPROJECT:	<u>4</u>	STUDY NAME:	<u>Big Game Population Status,</u>
STUDY:	<u>I</u>		<u>Trends, Use, and</u>
JOB:	<u>4</u>		<u>Associated Habitat Studies</u>
PERIOD COVERED:	<u>July 1, 2000 to June 30, 2001</u>		

BIGHORN SHEEP - MAGIC VALLEY REGION

UNITS 46, 47, 54, 55, AND 57

ABSTRACT

During 1999 and 2000, 45 California bighorn sheep were reintroduced into suitable habitat on Jim Sage Mountain in Unit 55. Although 16 of the 45 released bighorn sheep have died, primarily from mountain lion predation immediately following the first release, reproduction has been good and the population is estimated at 49 head. If the mountain lion predation rate increases again, management options will be considered to relieve predation pressure to a level that will allow the bighorn sheep population to increase and become established.

The bighorn sheep population in Unit 54 has decreased during the past 10 years to fewer than 25 bighorn sheep. Disease is the suspected, but unverified, cause of the population decline. There are no future plans to augment the existing population because of the proximity of domestic sheep grazing allotments.

Aerial survey results indicate a substantial decline in the Jarbidge-Bruneau bighorn sheep population. Only 48 bighorn sheep were observed on the June 2000 survey; a 64% decline from the 1998 survey. Three of 7 hunters harvested rams in 2000. The hunting season was closed for the 2001 and 2002 seasons.

MANAGEMENT DIRECTION

Increase existing populations; reintroduce bighorn sheep into suitable historical habitats; conduct research on habitat use and population dynamics; promote nonconsumptive values.

BACKGROUND

Bighorn sheep were extirpated from southern Idaho in the early 1900s. During the 1960s the Department initiated a program to reestablish California bighorn sheep populations in the Owyhee River and Little Jacks Creek drainages in Owyhee County. These early releases were

successful and bighorn sheep populations increased and expanded their range in Owyhee County.

In Idaho the area south and west of Interstate 84 within the Magic Valley and Southwest Regions has been designated exclusively for the California bighorn sheep subspecies. Since 1980, 413 bighorn sheep have been trapped in Owyhee County and moved to other sites in Idaho, Nevada, Oregon, and North Dakota. In 1992 it was estimated there were more than 1,200 California bighorn sheep in Idaho. Population surveys in 1994 indicated a substantial decline in bighorn sheep populations in the East Fork Owyhee and Jacks Creek drainages and annual trapping/transplanting operations were discontinued. Surveys conducted from 1996-2001 indicate populations have not increased to 1992-1993 levels.

Units 46, 47, and 41 (east)

From 1982-1993 the Idaho Department and Nevada Division of Wildlife (NDOW) released 93 bighorn sheep into portions of the Jarbidge and Bruneau drainages (Table 17). The bighorn sheep released by NDOW in 1982 and 1984, with the objective of reestablishing a population in the Jarbidge Mountains, moved north and took up residence in the Jarbidge River Canyon in Idaho. Bighorn sheep have been released by the Department near the confluence of the Jarbidge and West Fork Bruneau Rivers, at Dorsey Creek, and near Black Rock Pocket on the West Fork Bruneau Canyon. Bighorn sheep are distributed throughout the Jarbidge and West Fork Bruneau canyons upstream from their confluence. Bighorn sheep have been observed as far north in the Bruneau Canyon as Cave Draw and are occasionally observed in the Sheep Creek and Mary's Creek drainages.

Unit 54

Because of the proximity of domestic sheep grazing allotments, potential habitat for bighorn sheep is restricted to the northeastern portion of the South Hills bordered by Trapper Creek on the south and Dry Creek on the west. From 1986-1993, 50 bighorn sheep were released into the Big Cottonwood drainage, and 24 bighorn sheep were released into the East Fork of Dry Creek (Table 23). The released bighorn sheep did well in Unit 54 until 1989 when high mortality of ewes and poor lamb survival were documented and the population began to decline. Disease from interaction with domestic sheep is believed to be the cause of the decline although it has not been verified. Currently fewer than 25 bighorn sheep persist in Unit 54.

Units 55 and 57

During 1999 domestic sheep grazing on federal allotments in Unit 55 ended, clearing the way for bighorn sheep releases. In February 2000, 30 California bighorn sheep were reintroduced into suitable habitat on the Jim Sage Mountains (Unit 55) with several more anticipated releases. Unit 57 is currently considered unsuitable habitat because of domestic sheep grazing.

POPULATION SURVEYS

Unit 54

There were no aerial surveys conducted during the 1999-2000 reporting period. Data collected were limited to incidental sightings and observations made during mule deer flights.

Observations of bighorn sheep in Unit 54 have become more infrequent in recent years, reflecting a decline in bighorn sheep numbers. During the 2000-2001 reporting period, a small group of bighorn sheep (<15) was observed a Big Cottonwood WMA on several occasions during late summer. In the Dry Creek drainage, no bighorn sheep were observed during October and December mule deer flights, although a nearby landowner reported observing several bighorn sheep in the drainage. There were also several sightings of bighorn sheep in Rock Creek Canyon near Harrington Fork during the reporting period. The total bighorn sheep population in Unit 54 is estimated to be less than 25 head.

Units 46, 47, and 41 (east)

An aerial survey conducted on June 24-25, 2000 suggests a substantial decline in bighorn sheep numbers. Only 48 bighorn sheep were observed on the survey, a 64% decline from the survey conducted in 1998 (Table 24).

HARVEST CHARACTERISTICS

Unit 54

There is no legal harvest of bighorn sheep in Unit 54.

Units 46, 47, and 41 (east)

From 1991-2000, 53 hunters harvested 34 rams from the Jarbidge/Bruneau population (Hunt Area 46). Annual hunter success rates have ranged from 33% to 100% and averaged 68%. Ages of harvested rams range from 4.5 years to 12.5 years with a mean of 7.2 years (SD=1.76, N=34) and a median of 6.5 years. In 2000, 3 of 7 hunters were successful, taking 5½-, 6½-, and 7½-year-old rams (Table 25).

TRAPPING AND TRANSPLANTS

On February 1, 2001, 15 California bighorn sheep, captured at Hart Mountain National Wildlife Refuge in Oregon, were released into the Jim Sage Mountains in Unit 55. This release augmented the existing population that was started with the release of 30 bighorns in 2000 (Table 23).

Between February 2000 and June 31, 2001, 16 of the 45 released bighorns (36%) died; 12 from mountain lion predation, 1 from coyote predation, and 3 from accidents and other natural causes.

Ten of the 16 bighorn sheep mortalities occurred during the first 3 months following the initial release. Survival since then has been good (>80%).

Observed lamb production in 2000 and 2001 was 9 lambs and 14 lambs, respectively. The estimated population size on June 30, 2001 was 49 bighorn sheep (28 ewes, 7 rams, and 14-lambs). A graduate research project (ISU) was started in May 2000 to monitor population dynamics, movements, and habitat use of the new bighorn sheep population and should be completed in the upcoming reporting period.

MANAGEMENT STUDIES

Unit 54

No activity.

Unit 55

Fieldwork on the graduate research project will continue through summer 2001. At that time monitoring of radio-collared bighorns will be continued by Department personnel on a weekly basis.

Unit 46 and 47

No activity.

MANAGEMENT IMPLICATIONS

The high rate of mountain lion predation on the reintroduced Jim Sage bighorn sheep population has tapered off and is not currently a significant concern. If mountain lion predation increases again to a level that might jeopardize the success of the project, management of the mountain lion population may be necessary to assist in the establishment of a viable, self-sustaining bighorn sheep population.

The future of the bighorn sheep population in Unit 54 is uncertain. In the Big Cottonwood area, poor summer lamb survival, a high mortality rate of radioed ewes, and less frequent bighorn sheep observations indicate a continued decline in bighorn sheep numbers. The close proximity of 2 domestic sheep allotments and the possibility of a disease outbreak is a major factor in the successful establishment of a viable bighorn sheep population in Unit 54. While we have no conclusive evidence that disease is a problem, the rapid decline of the Dry Creek herd and the timing of summer lamb mortality would strongly suggest that disease played a role. We estimate there are fewer than 25 bighorn sheep in Unit 54.

Results from the June 2000 aerial survey suggest a >50% decline in the Jarbidge/Bruneau California bighorn sheep population. Observed lamb production in June 1998 and June 2000 was very low (21 lambs and 22 lambs/100 ewes, respectively) indicating recruitment rates lower

than what might be expected to allow the herd to grow. The substantial and rapid decline of the bighorn sheep population is indicative of a disease die-off, although no conclusive evidence is available. It should be noted that a die-off in the bighorn sheep population near Contact, Nevada, about 50 miles from the Jarbidge Canyon, was documented in 1999. Also, wild sheep have been observed mixing with a domestic flock at a ranch in Mary's Creek south of Grasmere. Both the Mary's Creek and Contact areas are a possible source of disease for the Jarbidge/Bruneau herd. Because of the overall decline in bighorn sheep numbers and observation of only 2 legal rams on the June 2000 survey, the hunting season in this area was closed for the 2001 and 2002 seasons. Another population survey is scheduled for winter 2001.

Table 23. Summary of Bighorn Sheep Transplants in Units 54 and 55, Magic Valley Region.

Date	Capture Site	Release Site	Adult		Lambs		Total
			Male	Female	Male	Female	
12/17-20/86	East Fk. Owyhee River	Big Cottonwood (Unit 54)	2	10	1	2	15
12/16/87	Little Jacks Cr.	Big Cottonwood (Unit 54)	3	6	0	1	10
11/15/88	Poison/Shoofly Cr.	Big Cottonwood (Unit 54)	5	8	0	1	14
12/6/91	East Fk. Owyhee River	East Fk. Dry Cr. (Unit 54)	2	9	1	2	14
12/20/93	East Fk. Owyhee River	East Fk. Dry Cr. (Unit 54)	1	7	1	1	10
12/19/93	East Fk. Owyhee River	Big Cottonwood (Unit 54)	3	8	0	0	11
2/6-8/00	John Day River, Oregon	Jim Sage Mtn. (Unit 55)	7	15	2	6	30
2/1/01	Hart Mtn. NWR, Oregon	Jim Sage Mtn. (Unit 55)	0	14	0	1	15
Totals			23	77	5	14	119

Table 24. Summary of bighorn sheep population data, Jarbidge/Bruneau area (Hunt Area 46), 1990-2000 (Obs = observed, Est = estimated).

Year	Ewes		Lambs		Sublegal Rams		Legal Rams		Uncl.		Total Obs	Total Est ±90%CI	Lambs: 100 Ewes	Rams: 100 Ewes
	Obs	Est	Obs	Est	Obs	Est	Obs	Est	Obs	Est				
1990	51	ND	12	ND	8	ND	13	ND	0	ND	84	ND	23.5	41.2
1993	51	79	8	13	39	53	16	20	0	0	114	165 ± 37	16.5	92.4
1994	76	101	24	31	15	19	17	23	0	0	132	171 ± 31	30.7	41.6
1996	102	147	33	43	14	20	15	22	^a 5	7	169	239 ± 44	29.3	31.3
1997	62	83	25	34	21	33	10	14	3	4	121	168 ± 40	41.0	56.6
1998	85	138	18	29	26	41	6	11	0	0	135	220 ± 44	21.0	37.7
2000	33	45	7	10	6	8	2	3	0	0	48	66 ± 18	22.2	24.4

^a 4 were unclassified rams.

Table 25. Summary of Bighorn Sheep Harvest and Drawing Odds in Hunt Area 46, 1991-1999.

Year	No. Permits	Harvest	Hunter Success	Days/Hunter	First Choice Applicants	Total Drawing Odds
1991	2	2	100	4.0	36	18.0:1
1992	2	2	100	7.0	34	17.0:1
1993	^a 7	6	86	7.7	94	15.7:1
1994	6	2	33	6.4	91	15.2:1
1995	6	3	50	10.5	74	12.3:1
1996	6	4	67	ND	75	12.5:1
1997	6	5	83	ND	101	16.8:1
1998	6	4	67	ND	90	15.0:1
1999	^b 5	3	50	ND	190	31.7:1
2000	^b 7	3	43	ND	76	12.7:1

^a The winner of the lottery permit hunted here in addition to the 6 authorized permits.

^b A hunter successfully drawn for the 1999 season was given a rain-check to hunt in 2000.

**PROGRESS REPORT
SURVEYS AND INVENTORY**

STATE:	<u>Idaho</u>	JOB TITLE:	<u>Bighorn Sheep Surveys</u>
PROJECT:	<u>W-170-R-25</u>		<u>and Inventories</u>
SUBPROJECT:	<u>6</u>	STUDY NAME:	<u>Big Game Population Status,</u>
STUDY:	<u>I</u>		<u>Trends, Utilization, and</u>
JOB:	<u>4</u>		<u>Associated Habitat Studies</u>
PERIOD COVERED: <u>July 1, 2000 to June 30, 2001</u>			

BIGHORN SHEEP - UPPER SNAKE REGION

UNITS 51 (PART), 58, 59A, 61, 64, 65, AND 67

ABSTRACT

Bighorn sheep in the Lost River Range are managed and reported by the Salmon Region. Bighorn sheep in the Lemhi and Beaverhead Ranges are not hunted. The Lionhead bighorn sheep are hunted in Montana, but not Idaho. There is not an established bighorn sheep herd in the Bighole Mountains.

A population survey was conducted in conjunction with a mountain goat survey of the Lemhi Range (Units 51 and 58) in August 2000. A bighorn sheep distribution survey was also conducted on the Little Lost side of the Lemhi range from North Creek south to the end of the Range in November 2000 to appraise bighorn-domestic sheep conflicts on the Bernice allotment. No other surveys were conducted during the 2000-2001 reporting period.

Five adult ewe bighorn sheep from the Lemhi Range were sampled for disease agents in March 2001. Preliminary results indicate that 4 of the ewes tested positive for Pasteurella and all 5 had lungworm infection.

MANAGEMENT DIRECTION

The above units in the Upper Snake Region supported Rocky Mountain bighorn sheep populations historically. By the early 1900s bighorn sheep were eliminated from most of the area and severely reduced in the remaining habitats. Vegetative changes due to livestock use on winter ranges, loss to disease, and indiscriminate harvest by settlers and miners probably were the main causes of bighorn sheep declines.

Habitats are diverse, generally mountainous types, with bighorn sheep summering mostly at higher elevations on alpine and subalpine ranges. The winter ranges are mostly sagebrush-grass or curlleaf mountain mahogany types where precipitation is low. The U.S. Forest Service

(USFS) generally administers summer ranges, whereas the Bureau of Land Management (BLM) primarily manages the winter ranges.

Changes in land and livestock management practices have resulted in improved range conditions for bighorn sheep in much of these units. Improved grazing management, water developments, controlled burns on bighorn sheep ranges, and closing or changing domestic sheep allotments to eliminate domestic-bighorn sheep contact could further improve conditions for bighorn sheep in this area

Subsistence and indiscriminate harvest of bighorn sheep by early settlers and pioneering travelers was greatly reduced after establishment of the Idaho Department of Fish and Game in 1937. Some general bighorn sheep hunts were authorized through 1970, but since then all bighorn sheep hunts have been by permit only. These restrictions, along with improved habitat and reintroductions, have all contributed to increased bighorn sheep numbers in these units.

Bighorn sheep obtained from the Whiskey Mountain, Wyoming, herd were released in Badger and Uncle Ike Creeks in Unit 51 in 1983 and 1984.

Bighorn sheep trapped from Panther Creek, Idaho, were released into Long, Skull, and Bloom Canyons of Unit 58 in four transplants between 1976 and 1982.

GOALS

1. Increase population.
2. Increase recreational opportunity.
3. Maintain or increase harvest.
4. Revamp season framework.
5. Continue reintroduction program.
6. Attempt to manipulate one bighorn sheep population below carrying capacity to prevent periodic die-off.
7. Investigate if domestic sheep have a role in disease transmission.

BACKGROUND

Eighty-two Rocky Mountain bighorn sheep were released in Units 51 and 58 between 1976 and 1984. All of the bighorn sheep released in these units were transplants from either Panther Creek, Idaho or Whiskey Mountain, Wyoming.

A small population of bighorn sheep occurs on the Idaho-Montana border in the Lionhead area of Unit 61. During the summer and fall months, 12 to 15 bighorn sheep can frequently be seen in Idaho. Idaho has never authorized a hunt on this herd. The history of the Montana hunts on these bighorn sheep has been to issue a few permits a year until the herd declines, close the hunt and let the herd rebuild, and then open it again for a few years. This herd has high nonconsumptive value.

Bighorn sheep are occasionally observed during summer in the Bighole Mountain area of Units 64, 65, and 67. We believe these are pioneering bighorn sheep from Grand Teton National Park. Since we have no reports or observations of these bighorn sheep during the winter and few summer observations in consecutive years, we assume there is no established herd in Idaho.

POPULATION CHARACTERISTICS

Aerial counts of these populations have generally been made in conjunction with aerial surveys for other big game animals. Ground observations have been reported on several occasions. Only 14 bighorn sheep (2 lambs, 5 ewes and 7 rams) were observed in the Lemhi Range (Units 51 and 58) during a mountain goat survey August 1 through 5, 2000 (Table 26). Bighorn sheep were observed in Uncle Ike Creek, Horse Creek, on Diamond Peak, and in Keg Gulch and Rocky Canyon.

Seventeen bighorn sheep (13 rams and 4 ewes) were observed in the Peterson Canyon-Skull Canyon area of Unit 58 during a deer sightability survey April 2001 (Table 27). Also a ram was observed in the Rattlesnake Point area in December and in the Upper Reno Gulch area in April.

DISEASE EVALUATION

In March 2001, 5 ewes aged 1.5 (4) and 4 (1) years old were sampled for disease infection on the Little Lost side of the Lemhi Range. Preliminary results indicate 4 of the 5 bighorn sheep tested positive for Pasteurella infection and all 5 tested positive for lungworm (average 22, range 5-51, larvae/2.5 grams). All 5 bighorn sheep were radio marked and are being monitored periodically.

WEATHER CONDITIONS

The summer of 2000 had higher than normal temperatures and below normal precipitation. Winter conditions during 2000-2001 were very mild with lower than normal snow accumulation.

MANAGEMENT IMPLICATIONS

Bighorn sheep populations in the Upper Snake Region do not occupy all available habitats. Domestic sheep allotments have been closed on some USFS lands. However, active domestic sheep allotments still occur on USFS- and BLM-administered bighorn sheep range in Units 51, 58, and 59A.

The greatest concern for the future of bighorn sheep in the Region is interaction with domestic sheep. The Department is currently working with the USFS and BLM to identify all the domestic sheep allotments that overlap with bighorn sheep range in the Lost River, Lemhi, and Beaverhead Ranges. Once this is done, contingency action plans will be discussed with the respective agency and bighorn sheep permittee to minimize the potential of bighorn-domestic sheep interaction and to quickly remove bighorn sheep that have come into contact with domestic sheep.

At least two USFS domestic sheep allotments (Dry Creek and Long Lost) overlap with bighorn sheep in the Lost River Range. In the Lemhi Range the Bernice BLM allotment on the Lost River side of the Range and the Mahogany Butte BLM allotment on the Birch Creek side of the Range overlap with bighorn sheep range. The Mahogany Butte domestic sheep allotment also includes USFS land. Five domestic sheep allotments (Mahogany Butte [BLM], Reno Gulch [BLM], and Snaky Canyon, Rocky Canyon, and Nicholia Canyon [USFS]) in the Beaverhead Range overlap with bighorn sheep range.

Concern for domestic-bighorn sheep interaction and disease transmission has been discussed with both the BLM and the domestic sheep permittee of the Bernice allotment. The Department, BLM, and permittee are working together cooperatively to monitor for the presence of bighorn sheep before and during the time domestic sheep are on the allotment. If bighorn sheep are observed on or near the allotment, all entities will be informed and efforts made immediately to prevent bighorn sheep contact with domestic sheep.

The bighorn sheep population in the south Beaverhead Range uses private land on the Waggoner and Simmonds Ranches at the mouth of Goddard Canyon and Skull Canyon during rut and early winter. Although these ranches no longer run domestic sheep, the bighorn sheep daily come down and feed with corralled cattle during the winter. A solution to this concern does not exist at this time.

On 2 occasions bighorn sheep were observed on domestic sheep range above Rattlesnake Point and Reno Gulch during the winter of 2000-2001. As a result of these observations the Department met with the Forest Service and BLM to develop contingency plans similar to what was developed for the Bernice allotment. To date, draft plans from these 2 agencies have not been received.

A USFS volunteer mapped bighorn sheep summer distribution and water availability in the Beaverhead Range July 27 through August 7, 1992. Most of the bighorn sheep were observed on the ridges and open side slopes at 9,400 to 10,000 feet elevation from Copper Mountain north to the head of Timber Creek (Sections 23, 24, 25; T10N, R30E). Bighorn sheep were using several of the guzzlers that the USFS and the Foundation for North American Wild Sheep installed and a spring complex at the corners of Sections 13 and 24 for water. There was also evidence that domestic sheep had bedded on the ridges in Sections 12 and 13 in previous years.

Available free water is unevenly distributed along the Lemhi and Beaverhead Ranges. This may be the reason bighorn sheep are observed at lower elevations during the fall prior to the rut.

Currently, there are no plans to map the location of water sources or install additional water developments in the range.

The Dubois District, Targhee Forest, has implemented several habitat projects for bighorn sheep in the South Beaverhead Range. Seven water developments, three of these in cooperation with the Foundation for North American Wild Sheep, have been installed for bighorn sheep. Other water developments for upland game, deer, and elk on USFS and BLM lands are also available to bighorn sheep on transition range. The USFS has also conducted prescribed burns to reduce sagebrush density and improve forage quality for bighorn sheep in this area.

There may be opportunity to coordinate management and hunter opportunity of the bighorn sheep in the Lionhead Area of Unit 61 with Montana Fish, Wildlife, and Parks. This herd is small and currently provides limited hunter opportunity for Montana hunters. A cooperative agreement between the two state agencies allowing hunters to hunt in either state when a small herd of big game animals occurs on the state line has been approved by the Idaho Fish and Game Commission. If the Montana Commission approves a similar regulation and the two states develop an acceptable allocation mechanism, this bighorn sheep herd could provide limited hunting opportunity to Idaho hunters.

The bighorn sheep that are occasionally observed during the summer months in the Bighole Range (Units 64, 65, and 67) are probably transients from Grand Teton National Park. Although this range historically supported bighorn sheep, plant community succession makes it unsuitable to support bighorn sheep today. Domestic sheep also heavily graze the range. Therefore, management is directed to document bighorn sheep observations, protection of the bighorn sheep, and nonconsumptive use.

Table 26. Summary of Rocky Mountain Bighorn Sheep Population Data for Unit 51, 1989-1999.

Year	Ewes	Lambs	Rams				Uncl.	Total Legal Rams	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			I	II	III	IV					
1989			No data collected								
1990			No data collected								
1991			No data collected								
1992			No data collected								
1993 ^a	14	7	5 ^b				0	0	26	50	36
1994			No data collected								
1995 ^c	11	7	4 ^b			4 ^b	0	4	26	64	73
1996			No data collected								
1997			No data collected								
1998			No data collected								
1999			No data collected								
2000 ^d	4	1	2								
2000 ^e	5	2	1	5	3	0	0	3	14	40	140

^a Incidental to aerial elk sightability counts, winter 1992-1993.

^b Rams classified to sublegal and legal only.

^c Incidental to aerial mule deer sightability survey, winter 1994-1995. The entire bighorn sheep winter range was not surveyed.

^d Only the area from South Creek around to the first canyon east of East Creek was surveyed.

^e Incidental to helicopter mountain goat survey of the entire Lemhi Range August 1-5, 2000.

Table 27. Summary of Rocky Mountain Bighorn Sheep Population Data for Unit 58 1989-1999.

Year	Ewes	Lambs	Rams				Uncl.	Total Legal Rams	Total Sheep	Lambs: 100 Ewes	Rams: 100 Ewes
			I	II	III	IV					
1989			No data collected								
1990			No data collected								
1991			No data collected								
1992	11	6	5 ^b			1 ^b	0	1	23	55	55
1993 ^a	14	8						12 ^c	34	57	86
1994			No data collected								
1995 ^d	27	16	6 ^b			11 ^b	0	11	60	59	63
1996			No data collected								
1997			No data collected								
1998			No data collected								
1999			No data collected								
2000 ^d	8	0	6 ^c								
2001 ^d	4	0	7	0	6	0	0	6	17	0	325

^a Ground classification of bighorn sheep coming onto bait - Goddard Face, winter 1992-1993.

^b Rams classified to sublegal and legal only.

^c Rams not classified, but some were legal.

^d Incidental to aerial mule deer sightability surveys. The entire bighorn sheep winter range was not surveyed.

**PROGRESS REPORT
SURVEYS AND INVENTORY**

STATE:	<u>Idaho</u>	JOB TITLE:	<u>Bighorn Sheep Surveys</u>
PROJECT:	<u>W-170-R-25</u>		<u>and Inventories</u>
SUBPROJECT:	<u>7</u>	STUDY NAME:	<u>Big Game Population Status,</u>
STUDY:	<u>I</u>		<u>Trends, Utilization, and</u>
JOB:	<u>4</u>		<u>Associated Habitat Studies</u>
PERIOD COVERED:	<u>July 1, 2000 to June 30, 2001</u>		

BIGHORN SHEEP - SALMON REGION

**UNITS 21, 21A, 27, 28, 29, 30, 30A, 36, 36A, 36B, 37, 37A, 50, 51
CONTROLLED HUNT AREAS 21, 27-1, 27-2, 27-3, 27-4, 27-L, 28, 30, 36B, 37**

ABSTRACT

From 1989-1991 bighorn sheep populations in the Salmon Region experienced major, rapid declines (30-50%), followed by several years of very low lamb recruitment. Recent aerial surveys suggest lamb production, although still low (approximately 22 lambs per 100 ewes), is beginning to improve in several units. Lamb production was still notably low in Unit 36B and part of Unit 27. In general, bighorn sheep populations may be stabilizing after several years of decline.

During the 2000 hunting season, 38 controlled hunt permits for bighorn sheep rams ($\geq 3/4$ curl or >4 years old) were authorized in 9 hunt areas. However, 11 permit holders deferred their permits until 2001 because of wildfire activity in the region. The auction tag holder and 27 active permittees harvested 13 rams (46% success). Average age of harvested rams was 8.4 years. Chance of being drawn from among 499 applicants for bighorn sheep permits in 2000 (7.6%) was slightly higher than in 1999 but still below the previous 5-year average of 8.9%.

MANAGEMENT DIRECTION

Follow statewide direction to increase bighorn sheep populations, harvest, and recreational opportunity. Continue to establish new herds via translocation. Recognize nonconsumptive values of bighorn sheep. Conduct bighorn sheep disease research. Conduct bighorn sheep census flights on at least a 5-year rotation. Establish ≥ 1 hunt for female bighorn sheep. Attempt to manipulate 1 bighorn sheep population below carrying capacity to prevent periodic die-offs. Maintain hunts only where bighorn sheep population size is estimated to be ≥ 100 animals. Annually harvest #20% of legal rams observed during the most recent survey.

BACKGROUND

The Salmon Region contains approximately two-thirds of Idaho's Rocky Mountain bighorn sheep and offers two-thirds of the hunting opportunity. Habitats, bighorn sheep population characteristics, land management activities, and human access all vary considerably across the region, presenting a variety of bighorn sheep management situations.

Unit 27 contains bighorn sheep habitats of Middle Fork Salmon River drainages. Bighorn sheep populations in this area were protected from pressures of early settlement by the remote nature of the area and, thus, were better able to maintain viable population levels. Access into most occupied bighorn sheep habitats is limited. Herds are relatively stable, although annual fluctuations are commonly associated with varying winter losses and lamb survival rates.

Unit 27 is located in the Frank Church River-of-No-Return Wilderness Area, and managed by the U.S. Forest Service (USFS). Most bighorn sheep in the unit winter along the river breaks corridor and migrate to sub-alpine habitats during summer. However some bighorn sheep remain along Middle Fork Salmon River during summer, where they provide a valuable viewing resource for river float parties. Past grazing practices, especially on upper river winter ranges, changed some ranges from grassland to shrub-dominated habitats. However, recent range trends are back toward grass-dominated habitat types because of changes in livestock and fire management.

Hunt areas 527-1, 527-2, 527-7, and 527-8 were combined into 1 hunt (27-1) in 1987. In 1991 the north end of Hunt Area 27-1 (Brush Creek to Big Creek) was incorporated into Hunt Area 26-2. Hunt Area 27-4 (Camas Creek to Warm Springs Creek east of Middle Fork Salmon River) was previously part of Hunt 36B but was created as a separate hunt in 1989 to facilitate better distribution of hunters and harvest. Hunts 27-4, 27-5, and 27-6 were combined into 1 hunt in 1991 (27-3) to allow hunters a better likelihood of finding a ram. In 1997 Hunt 36B was formed by combining hunts 36B-1, 36B-2 and 36B-3, and hunts 28-1 and 28-2 were combined into 1 hunt and the area was enlarged in 1999.

Units 21 and 28 contain the bighorn sheep habitats of Panther Creek drainage and along the roaded portion of the main Salmon River below North Fork. Human access to major portions of bighorn sheep ranges and ongoing or planned development projects dictate special management considerations in this area. These units are well roaded, with potential for copper or cobalt mining, geothermal development, and timber harvest, which could lead to even more development and roads. Increased roading can lead to high levels of unregulated harvest. However, viewing and photographing bighorn sheep along the Salmon River and Panther Creek are popular recreational pastimes. We expect this type of nonconsumptive use to increase in importance.

Bighorn sheep populations in Units 21 and 28 were considered high-quality herds, exhibiting high lamb production and herd growth through the 1970s. However, the Panther Creek population experienced a decline in the early 1980s, probably due to weather-related mortality. The same herd suffered a major population decline (approximately 50%) during 1989-1990,

possibly caused by *Pasteurella haemolytica* pneumonia. Low lamb recruitment followed the decline and persisted for ≥ 3 years.

The Panther Creek bighorn sheep population was the primary source of Rocky Mountain bighorn sheep for translocation to other sites; 125 were captured and moved between 1974 and 1985. During the 1981-1985-planning period, new trapping sites were developed in Unit 21 along the Salmon River. However, capture and translocation have been curtailed since populations and productivity declined.

Much of the remainder of the Salmon Region (Units 21A, 30, 30A, 36, 36A, 37, 37A, 50, and 51) supported Rocky Mountain bighorn sheep in the past. By the early 1900s bighorn sheep were eliminated from most of the area and populations were severely reduced in remaining habitat. Vegetative changes due to livestock use on winter ranges, disease losses, and indiscriminate harvest by settlers and miners probably were primary causes of bighorn sheep declines.

Habitats are diverse, generally mountainous types, with bighorn sheep summering primarily at higher elevations in sub-alpine ranges. Winter ranges are dominated by sagebrush and grassland systems where precipitation is low. Summer ranges are generally administered by the USFS, whereas primarily the Bureau of Land Management (BLM) manages winter ranges. Recent changes in land management practices resulted in improved range conditions for bighorn sheep. Improved grazing management and controlled burns on bighorn sheep ranges could further improve conditions in other units. There are several opportunities to increase existing bighorn sheep herds, and some possibilities for reintroductions.

The Mt. Borah bighorn sheep population in Units 37, 50, and 51 resulted from releases of 7 bighorn sheep from Morgan Creek in 1969 and 24 bighorn sheep from Banff Park, Alberta, Canada in August 1970. The first hunt in area 37 was authorized in 1981 and the area has become very popular with bighorn sheep hunters. By 1992 the Mt. Borah population had suffered the same decline and persistent low recruitment as other bighorn sheep herds in the Salmon Region. Permit numbers were correspondingly reduced from a peak of 19 permits in 1992 to 3 in 1995.

In 1982, 8 Rocky Mountain bighorn sheep from Panther Creek were released near Birch Creek southwest of Challis in Unit 36B. This translocation was an attempt to stimulate growth of a small, stable population. In January 1985, 22 bighorn sheep obtained from Oregon were released in Unit 30A near Leadore. Since 1986, 54 bighorn sheep have been released in Unit 37A (2 sites) and an additional 17 have been released in Unit 30A.

POPULATION SURVEYS

Aerial surveys for bighorn sheep were conducted in February 2001 (Units 21 and 28) and April 2001 (Units 27, 36A, and 36B). Bighorn sheep were counted incidental to other big game in portions of Units 21, 28, 30, and 30A. Compared to previous surveys in these areas, total bighorn sheep numbers were stable to slightly higher. The region-wide lamb:100 ewes ratio in

2001 was 21.8, similar to previous surveys in comparable areas (23.3). The Salmon Region bighorn sheep populations experienced major young and adult mortality (apparently disease-related) beginning in 1989-1990 and very low lamb production for several years afterward (generally #10 lambs per 100 ewes). Although ewe to lamb ratios were still somewhat low, recent surveys suggest that the trend of very low lamb production in recent years may be reversing. Lamb production during this year's surveys ranged from 10 to 57 lambs per 100 ewes.

HARVEST CHARACTERISTICS

Low lamb survival through the 1990s was expected to reduce recruitment of legal rams available to hunters in 1993 and afterward for several years. Therefore, 1993 permit levels were reduced 50% from 1992 (Tables 43 and 45). Of 17 hunts in the Salmon Region, 4 hunts were eliminated, permit levels were reduced in 10 hunts, and permit numbers in 3 hunts were unchanged. One new hunt, 36B-3, was initiated in Unit 36B south of Challis Creek. Because hunter success was very high (80%) during late hunts (October 21-November 5), most of these hunts were eliminated to allow more regular season hunter opportunity. One remaining late hunt, 27-L, was shifted to an earlier time frame (October 13-October 31).

Harvest and hunter information was compiled from Big Game Mortality Reports (BGMRs). Successful hunters must present bighorn sheep horns to an IDFG representative within 10 days of harvest and complete a BGMR. At time of check-in, an identification pin is set in the right horn. Nine controlled hunts with 38 permits were authorized for 2000 in the Salmon Region; the Idaho bighorn sheep auction tag holder hunted in the Region as well. Hunters could harvest a male bighorn sheep with $\geq 3/4$ horn curl or >4 years old. Eleven holders of bighorn sheep permits for 2000 opted to defer their permits until the 2001 hunting season because of wildfires in the Region, including several areas normally occupied by bighorn sheep. Success among 28 active hunters was 46% in 2000. Bighorn sheep season structure (Table 43) has been essentially unchanged since 1991 and permit levels (Tables 44 and 45) were identical to those of 1999. Of 236 permits issued since 1995, 92 hunters harvested rams (39% success).

Chances of drawing a Salmon Region bighorn sheep permit dropped sharply in the early 1990s, primarily because of severe reductions in permits. Chances have continued to decline steadily since the mid-1990s, from 10.4% in 1995 to $<8\%$ in 1999 and 2000; the average chance of drawing a permit through the period was 8.7%.

Region-wide, nonhunting mortalities peaked during the suspected disease die-off period (1990-1992) and subsided afterward as mortality rates decreased and bighorn sheep numbers reached low ebb (Table 46). Under historic treaty rights, Sho-Ban Indians from the Fort Hall Indian Reservation are allowed to hunt bighorn sheep for subsistence uses. However, Sho-Ban bighorn sheep season dates, permit levels, and harvest data are generally not available to the Department. Two bighorn sheep harvested by Indians were checked and 23 other mortalities were recorded during the reporting period.

CLIMATIC CONDITIONS

Summer 2000 was dry with extensive wildfires in parts of the Salmon Region. Vegetation cured early in the growing season. However, above-average October rainfall prompted autumn green-up that partly replaced forage removed by fires. Winter temperatures were mild, seldom dropping below 0°F, and snow accumulation was minimal. Animals, therefore, entered winter in average body condition, then encountered a mild winter, which should have produced relatively high overwinter survival. Snowpack was well below average (30-55% of normal) and snowmelt occurred 2-4 weeks earlier than normal. Water-year precipitation has been well below average so drought conditions prevailed through the end of the reporting period.

HABITAT CONDITIONS

Land management practices over the past 25 years have generally improved bighorn sheep habitat. Water developments and controlled burns have been directed toward improving bighorn sheep range. Grazing systems have been modified and range improvements for livestock have been beneficial to bighorn sheep. Although domestic sheep numbers are down dramatically from historic levels, there are continued occurrences of bighorn sheep coming in contact with domestic sheep.

Several major wildfires have occurred in the Frank Church River-of-No-Return Wilderness since 1979. Large fires on bighorn sheep ranges from Ship Island to Goat Creek, Tappan, Pole Creek to Warm Springs, Grouse Creek, Camas Creek, and Marble Creek have been beneficial to bighorn sheep and elk. Several wildfires occurred during summer 2000, burning parts of Pistol, Indian, Brush, Soldier, Sheep, Warm Springs, and Yellowjacket Creeks in Middle Fork Salmon River drainage, as well as several tributaries in the lower half of Panther Creek. Several habitat rehabilitation projects were undertaken within burned areas. Habitat changes associated with wildfires and subsequent habitat work are expected to improve range conditions for bighorn sheep.

CAPTURE AND TRANSLOCATION

The Salmon Region had a very active capture and translocation program for a number of years (Table 47). Bighorn sheep were taken from Units 21, 28, 36A, and 36B for translocation to other parts of Idaho and to other states. Within the Salmon Region, Units 28, 30A, 37/50, and 37A have all received bighorn sheep in attempts to reestablish extirpated herds. However stagnant to declining bighorn sheep populations characterized by low productivity suggest that translocation from Salmon Region herds would be unwise in the near future. Some release sites are available in the Salmon Region if a source population can be identified. No bighorn sheep were captured or translocated within the Region during 2000-2001.

DISEASE

During an apparent disease outbreak in winter 1988-1989, bighorn sheep in several areas of the Salmon Region and adjacent regions were sampled for disease pathogens. Bighorn sheep tested

positive for *Pasteurella multocida* and *P. haemolytica* (biotypes/serotypes A₁, A₁₁, T₃, T₄, and T₁₀). Both haemolytic and nonhaemolytic types of *P. haemolytica* were found. Antibody titers to Respiratory Syncytial Virus (RSV), Parainfluenza (PI3), and Brucellosis (*Brucella ovis*) are common. However there does not appear to be a correlation between RSV/PI3 titers and sick bighorn sheep or *Pasteurella* positive bighorn sheep. Lungworm (*Protostrongylus* spp.) loads tend to be very high in Salmon Region bighorn sheep. Scabies (*Psoroptes* spp.) is occasionally evident but rarely severe on any individual bighorn sheep. Poor population performance of Salmon Region bighorn sheep in recent years may well be an indication of residual disease problems.

MANAGEMENT IMPLICATIONS

Harvest of $\geq 3/4$ -curl bighorn rams has no effect on total bighorn sheep populations when annual harvest is restricted to #20% of observed legal rams. Unregulated bighorn sheep populations appear to periodically build to high densities followed by herd die-offs, which are probably related to disease outbreaks. The 1991-1995 bighorn sheep plan calls for ewe removal via capture and translocation and/or hunting to maintain bighorn sheep populations at lower densities, which are less susceptible to die-offs.

Virtually all Salmon Region bighorn sheep populations have recently experienced poor population performance, particularly low lamb production. In some units (37, 50, 51) productivity has been low for several years while in others (36A) low productivity did not appear until 1990-1991. However, in most of the Region, the decline was first noted during winter 1989-1990. In all cases, low lamb:ewe ratios continued through at least 1991-1992. Aerial surveys suggest lamb recruitment is improving somewhat in most units. However, overall lamb:ewe ratios are still low compared to historical levels and productivity is notably low in a few units (36B and parts of 27). Salmon Region bighorn sheep herds probably will not produce surplus animals for translocation in the near future. Small lamb crops have resulted in fewer rams available to hunters. Four- to 8-year-old rams comprise the bulk of hunter harvest. Permit levels in many hunts were reduced and will remain low as several years of reduced ram recruitment continue to impact absolute ram numbers.

Table 28. Bighorn sheep population data, Hunt Area 21, Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-89	93	49	14	11	9	22	0	31	198	53	60
1989-90	41	4	6	4	7	10	0	17	72	10	66
1990-91	60	5	10	8	2	2	0	4	87	8	37
1991-92	72	8	1	13	14	5	0	19	113	11	46
1992-93	97	24	14	10	10	3	0	13	158	25	38
1993-95	No data collected										
1995-96	62	20	10	12	8	9	1	17	122	32	63
1996-99	No data collected										
1999-00 ^a	47	5	1	11	8	2	0	10	74	11	47
2000-01	40	16	5	11	9	4	0	13	85	40	73

^a Incidental to deer and elk surveys, Units 21 and Panther Cr. in Unit 28.

Table 29. Bighorn sheep population data, Hunt Area 21A, Salmon Region, 1997-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1997-98 ^a	9	3	1	0	1	0	0	1	14	33	22
1998-99	No data collected										
1999-00	5	4	0	1	0	0	0	0	14	80	
2000-01	No data collected										

^a Incidental to elk survey.

Table 30. Bighorn sheep population data, Hunt Area 27-1, Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-89	77	39	3	9	29	12	3	41	172	51	69
1989-90	No data collected										
1990-91	108	3	5	12	19	6	0	25	153	3	39
1991-92	No data collected										
1992-93	90	14	5	1	5	14	0	19	129	16	28
1993-94	No data collected										
1994-95 ^a	58	13	6	12	6	3	0	9	98	22	47
1995-98	No data collected										
1998-99	56	14	7	8	13	5	0	18	103	25	59
1999-00	No data collected										
2000-01	80	13	5	2	10	6	0	16	116	16	29

^a Incidental to elk survey, partial count.

Table 31. Bighorn sheep population data, Hunt Area 27-2, Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-89	57	19	3	10	4	2	38	6	133	33	33
1989-90	43	5	2	6	7	12	0	19	75	12	63
1990-91	60	2	3	2	4	2	0	6	73	3	18
1991-92	No data collected										
1992-93	36	2	1	7	4	4	0	8	54	6	44
1993-94	No data collected										
1994-95 ^a	16	4	0	3	1	0	0	1	24	25	25
1995-98	No data collected										
1998-99	54	16	7	8	5	1	0	6	91	30	39
1999-01	No data collected										

^a Incidental to elk survey, partial count.

Table 32. Bighorn sheep population data, Hunt Area 27-3, Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-89	80	35	7	9	11	11	1	22	154	44	48
1989-90	No data collected										
1990-91	88	7	2	10	13	3	0	16	123	8	32
1991-92	No data collected										
1992-93	62	17	7	4	8	11	0	19	109	27	48
1993-94	No data collected										
1994-95 ^a	30	3	1	1	3	2	0	5	40	10	23
1995-98	No data collected										
1998-99	67	12	3	8	9	3	0	12	102	18	34
1999-00	No data collected										
2000-01 ^b	34	7	0	3	1	0	0	1	45	21	12

^a Incidental to elk survey, partial count.

^b Partial count.

Table 33. Bighorn sheep population data, Hunt Area 27-4, Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-89	28	11	1	9	0	2	0	2	51	39	43
1989-90	No data collected										
1990-91	36	3	5	8	5	1	0	6	58	8	53
1991-92	No data collected										
1992-93	29	12	2	4	2	0	1	2	50	41	21
1993-94	No data collected										
1994-95 ^a	3	0	0	1	0	1	0	1	5		
1995-98	No data collected										
1998-99	2	0	1	1	6	8	0	14	18		
1999-00	No data collected										
2000-01 ^b	10	1	0	0	0	0	0	0	11	10	

^a Incidental to elk survey, partial count.

^b Partial count.

Table 34. Bighorn sheep population data, west side of lower Panther Cr., Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-89	62	24	7	6	5	7	2	12	113	39	40
1989-90	34	7	3	3	3	5	0	8	55	21	41
1990-91	31	7	2	9	7	5	0	12	61	23	74
1991-92	17	8	0	3	3	3	0	6	34	47	53
1992-95	No data collected										
1995-96	29	6	5	1	1	1	0	2	43	21	28
1996-98	No data collected										
1998-99 ^a	22	7	4	4	2	0	0	2	39	32	45
1999-00	No data collected										
2000-01 ^a	15	2	0	0	7	2	0	9	26	13	60

^a Incidental to elk survey.

Table 35. Bighorn sheep population data, east side of lower Panther Cr., Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-89	93	30	9	5	14	23	1	37	175	32	55
1989-90	36	4	1	8	7	12	0	19	68	11	41
1990-91	51	9	2	13	9	17	0	26	101	18	80
1991-92	66	2	2	3	12	3	0	15	88	3	30
1992-95	No data collected										
1995-96	57	7	5	5	2	3	0	5	79	12	26
1996-98	No data collected										
1998-99 ^a	71	23	10	3	8	5	0	13	120	32	37
1999-00	No data collected										
2000-01	49	11	4	6	3	2	0	5	67	22	31

^a Incidental to elk survey.

Table 36. Bighorn sheep population data, Williams Cr. to Perreau Cr. portion of Unit 28, Salmon Region, 1990-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1990-91	8	4	2	7	2	0	0	2	23	50	138
1991-95	No data collected										
1995-96	11	3	0	3	5	0	0	5	22	27	73
1996-98	No data collected										
1998-99 ^a	9	2	2	5	3	1	0	4	22	22	122
1999-00	No data collected										
2000-01 ^a	27	9	4	5	4	0	0	4	49	33	48

^a Incidental to deer survey.

Table 37. Bighorn sheep population data, Units 30 and 30A, Salmon Region, 1991-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1991-92	19	2	3	6	2	0	0	2	32	11	58
1992-96	No data collected										
1996-97	3	5	1	5	5	7	0	12	26		
1997-98	No data collected										
1998-99	29	9	3	5	1	3	0	4	50	31	41
1999-00 ^a	23	2	0	8	12	4	3	16	52	9	104
2000-01 ^a	18	9	5	2	9	1	0	10	44	50	94

^a Incidental to deer survey.

Table 38. Bighorn sheep population data, Unit 37A, Salmon Region, 1991-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1991-92	36	2	1	2	5	3	1	8	50	6	31
1992-97	No data collected										
1997-98 ^a	11	4	6	4	3	2	0	5	30	36	136
1998-01	No data collected										

^a Incidental to elk survey, partial count.

Table 39. Bighorn sheep population data, Unit 36A, Salmon Region, 1989-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1989-90	98	47	2	13	20	8	3	28	191	48	44
1990-91	84	7	5	11	12	9	0	21	128	8	44
1991-92	85	3	3	8	10	7	0	17	116	4	33
1992-93	63	5	4	6	10	7	0	17	95	8	43
1993-94	65	2	4	6	6	8	0	14	91	3	37
1994-95	No data collected										
1995-96	61	7	1	1	3	5	0	8	78	11	16
1996-97	53	2	0	1	2	3	0	5	60	4	11
1997-98	No data collected										
1999-00 ^a	34	5	7	5	1	1	0	2	53	15	41
2000-01	27	7	1	2	0	0	0	0	37	26	11

^a Incidental to deer and elk surveys.

Table 40. Bighorn sheep population data, Morgan Creek area, Unit 36B, Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-89	No data collected										
1989-90	66	10	11	18	12	13	0	25	130	15	82
1990-91	89	18	9	16	13	14	0	27	159	20	58
1991-92	75	10	10	11	16	6	1	22	129	13	57
1992-93 ^a	47	9	1	14	7	4	0	11	82	19	55
1993-94 ^a	54	3	1	6	14	4	0	18	82	6	46
1994-95	No data collected										
1995-96	66	13	12	6	7	1	0	8	105	20	39
1996-97	61	19	2	5	7	3	0	10	97	31	28
1997-99	No data collected										
1999-00 ^b	32	16	2	7	11	4	0	15	72	50	75
2000-01	77	10	6	8	21	5	3	26	130	13	52

^a Incidental to other surveys, partial count.

^b Incidental to deer and elk surveys.

Table 41. Bighorn sheep population data, Birch Creek area, Unit 36B, Salmon Region, 1988-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1988-90	No data collected										
1990-91	23	4	0	1	2	4	0	6	34	17	30
1991-92	No data collected										
1992-93 ^a	27	4	1	5	6	4	0	10	47	15	59
1993-94 ^a	7	3	0	0	2	0	0	2	12	43	29
1994-95	No data collected										
1995-96	30	0	0	0	6	1	0	7	37	0	23
1996-97	29	3	2	2	1	1	0	2	38	10	21
1997-99	No data collected										
1999-00 ^b	14	2	2	4	1	0	0	1	23	14	50
2000-01	21	2	2	3	4	0	0	4	32	10	43

^a Incidental to other surveys, partial count.

^b Incidental to deer and elk surveys.

Table 42. Bighorn sheep population data, Hunt Area 37, Salmon Region, 1982-present.

Year	Ewes	Lambs	Rams				Unclas- sified	Legal rams	Total sheep	Lambs: 100 ewes	Rams: 100 ewes
			I	II	III	IV					
1982-83	90	16	14	7	7	2	0	9	136	18	33
1983-86	No data collected										
1986-87	100	22	7	8	17	6	4	23	164	22	38
1987-91	No data collected										
1991-92	38	1	2	3	3	0	0	3	47	3	21
1992-93	No data collected										
1993-94	54	4	5	8	7	6	0	13	84	7	48
1994-99	No data collected										
1999-00	38	8	3	2	4	0	0	4	55	21	24
2000-01	No data collected										

Table 43. Season structure for controlled bighorn sheep hunts, Salmon Region, 2000.

Hunt Areas	Season		Length (Days)	Bag Limit	Permits/ Hunt Area
	Dates				
21, 27-4, 28, 37	Aug 30-Oct 13		45	1 ram, >3/4 curl or 4 yr	3
27-1	Aug 30-Oct 13		45	1 ram, >3/4 curl or 4 yr	12
27-2	Aug 30-Oct 13		45	1 ram, >3/4 curl or 4 yr	6
27-3	Aug 30-Oct 13		45	1 ram, >3/4 curl or 4 yr	2
36B	Aug 30-Oct 13		45	1 ram, >3/4 curl or 4 yr	4
27-L	Oct 13-Oct 31		19	1 ram, >3/4 curl or 4 yr	2

Table 44. Bighorn sheep harvest and draw odds by Hunt Area, Salmon Region, 1989-present.

Hunt Area	Year	Permits	Harvest	Hunter success (%)	Days/hunter ^a	First choice applicants	Draw odds
21	1989	7	2	29	14.6	42	1: 6.0
	1990	7	3	43	11.9	81	1: 11.6
	1991	7	2	29	14.8	69	1: 9.9
	1992	7	4	57	11.0	35	1: 5.0
	1993	3	3	100	11.5	20	1: 6.7
	1994	3	0	0	9.7	50	1: 16.7
	1995	3	1	33	22.3	36	1: 12.0
	1996	3	3	100	5.7	53	1: 17.7
	1997	3	3	100		34	1: 11.3
	1998	3	2	67	10.7	43	1: 14.3
	1999	3	3	100	8.7	51	1: 17.0
	2000	3 ^b	1	50	1.0	44	1: 14.7
21-L	1991	2	3 ^c	100	5.5	45	1: 22.5
	1992	2	2	100	10.5	42	1: 21.0
27-1	1989	36	9	26	6.7	75	1: 2.1
	1990	36	6	17	11.0	76	1: 2.1
	1991	30	5	17	10.8	93	1: 3.1
	1992	30	7	23	11.6	66	1: 2.2
	1993	30	3	10	12.1	61	1: 2.0
	1994	30	2	7	9.9	74	1: 2.5
	1995	12	2	17	9.1	39	1: 3.2
	1996	12	2	17		34	1: 2.8
	1997	12	4	33		63	1: 5.2
	1998	12	0	0		58	1: 4.8
	1999	12	2	17	11.0	60	1: 5.0
	2000	12 ^d	1	13		51	1: 4.3
27-2	1989	10	7	70	5.6	53	1: 5.3
	1990	10	4	40	14.7	57	1: 5.7
	1991	10	3	30	7.6	39	1: 3.9
	1992	10	6	60	13.9	32	1: 3.2
	1993	6	2	33	6.7	35	1: 5.8
	1994	6	1	17	10.0	41	1: 6.8
	1995	6	4	67	3.8	45	1: 7.5
	1996	6	3	50		44	1: 7.3
	1997	6	1	17		83	1: 13.8
	1998	6	3	50	5.0	42	1: 7.0
	1999	6	1	17	10.0	99	1: 17.0
	2000	6 ^e	3	60	4.5	64	1: 10.7
27-3	1989	19	5	26	8.0	44	1: 2.3
	1990	19	6	32	8.8	61	1: 3.2
	1991	19	2	11	13.2	50	1: 2.6

Table 44. Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area (Continued).

Hunt Area	Year	Permits	Harvest	Hunter success (%)	Days/hunter ^a	First choice applicants	Draw odds
	1992	19	1	5	11.4	25	1: 1.3
	1993	2	0	0	7.0	18	1: 9.0
	1994	2	2	100	7.0	14	1: 7.0
	1995	2	1	50	5.5	30	1: 15.0
	1996	2	0	0	12.5	16	1: 8.0
	1997	2	1	50		30	1: 15.0
	1998	2	2 ^f	67		27	1: 13.5
	1999	2	1	50	9.5	36	1: 18.0
	2000	2 ^g	1 ^c	50	1.0	51	1: 25.5
27-4	1990	8	5	62	9.4	40	1: 5.0
	1991	8	6	75	9.8	42	1: 5.2
	1992	8	2	25	10.7	45	1: 5.6
	1993	3	2	67	10.0	18	1: 6.0
	1994	3	1	33	7.0	11	1: 3.7
	1995	3	1	33	8.3	28	1: 9.3
	1996	3	1	33		27	1: 9.0
	1997	3	1	33		22	1: 7.3
	1998	3	2	67		36	1: 12.0
	1999	3	2	67	2.0	36	1: 12.0
	2000	3	1	33	1.0	22	1: 7.3
27-L	1991	2	1	50	9.0	23	1: 11.5
	1992	2	2	100	9.0	38	1: 19.0
	1993	2	2	100	5.0	18	1: 9.0
	1994	2	1	50	6.0	30	1: 15.0
	1995	2	2	100	8.0	22	1: 11.0
	1996	2	1	50		69	1: 34.5
	1997	2	1	50		63	1: 31.5
	1998	2	1	50		106	1: 53.0
	1999	2	1	50		98	1: 49.0
	2000	2	2	100	5.0	88	1: 44.0
28	1989	12	4	33	7.9	45	1: 3.8
	1990	12	2	17	15.4	34	1: 2.8
	1991	12	2	17	13.4	41	1: 3.4
	1992	12	4	33	13.1	39	1: 3.2
	1993	2	1	50	19.5	10	1: 5.0
	1994	2	0	0	14.0	15	1: 7.5
	1995	2	0	0	8.5	10	1: 5.0
	1996	2	1	50		10	1: 5.0
	1997	2	0	0		13	1: 6.5
	1998	2	1	50		11	1: 5.5
	1999	3	0	0		41	1: 14.0
	2000	3 ^h	0	0		37	1: 12.0

Table 44. Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area (Continued).

Hunt Area	Year	Permits	Harvest	Hunter success (%)	Days/hunter ^a	First choice applicants	Draw odds
28 Combined	1989	7	6	83	8.8	60	1: 8.6
	1990	7	3	43	14.6	80	1: 11.4
	1991	7	2	29	14.1	77	1: 11.0
	1992	7	3	43	17.0	58	1: 8.3
	1993	3	2	67	12.0	43	1: 14.3
	1994	3	1	33	10.3	29	1: 9.7
	1995	3	0	0	10.5	32	1: 10.7
	1996	3	0	0		33	1: 11.0
	1997	3	2	67		33	1: 11.0
	1998	3	2	67		37	1: 12.3
36A	1989	5	2	40	25.6	44	1: 8.8
	1990	5	3	60	8.7	37	1: 7.4
	1991	5	3	60	10.6	29	1: 5.8
	1992	5	3	60	14.3	45	1: 9.0
	1993	5	3	60	12.3	40	1: 8.0
	1994	6	2	33	9.5	50	1: 10.0
	1995	3	1	33	16.3	33	1: 11.0
	1996	3	2	67		39	1: 13.0
36A-L	1991	2	1	50	7.0	15	1: 7.5
	1992	2	1	50	9.5	17	1: 8.5
36B-1	1989	6	4	67	5.5	54	1: 9.0
	1990	6	5	83	9.5	44	1: 7.3
	1991	6	3	50	20.3	68	1: 11.3
	1992	6	1	17	19.4	17	1: 2.8
	1993	2	1	50	7.5	16	1: 8.0
	1994	2	1	50	5.0	18	1: 9.0
	1995	2	1	50	13.0	19	1: 9.5
	1996	2	1	50		27	1: 13.5
36B-2	1989	4	4	100	2.7	26	1: 6.5
	1990	4	4	100	8.0	49	1: 12.2
	1991	4	2	50	14.7	33	1: 8.2
	1992	4	4	100	2.3	33	1: 8.2
	1993	2	2	100	14.0	45	1: 22.5
	1994	2	2	100	9.5	23	1: 11.5
	1995	2	2	100	21.5	29	1: 14.5
	1996	2	0	50		26	1: 13.0
36B-3	1993	2	2	100	6.5	25	1: 12.5
	1994	2	1	50	8.5	25	1: 12.5
	1995	2	1	50	9.5	24	1: 12.0
	1996	2	1	50		9	1: 4.5

Table 44. Summary of Bighorn Sheep Harvest and Drawing Odds by Hunt Area (Continued).

Hunt Area	Year	Permits	Harvest	Hunter success (%)	Days/hunter ^a	First choice applicants	Draw odds
36B-L	1991	2	2	100	4.0	18	1: 9.0
	1992	2	4 ^{c,f}	100	22.0	40	1: 20.0
36B	1997	4	2	50		65	1: 16.2
	1998	4	2	50		57	1: 14.2
	1999	4	4	100	14.0	50	1: 12.5
	2000	4 ⁱ	1	50	7.0	57	1: 14.3
37	1989	16	14	88	8.6	186	1: 11.6
	1990	16	7 ^c	41	12.4	192	1: 12.0
	1991	17	9	53	7.6	152	1: 8.9
	1992	17	9	53	10.4	129	1: 7.6
	1993	6	3	50	12.2	84	1: 14.0
	1994	6	6	100	7.5	95	1: 15.8
	1995	3	1	33	15.0	83	1: 27.7
	1996	3	1	33	9.0	74	1: 24.7
	1997	3	1	33	-	55	1: 18.3
	1998	3	2	67	-	61	1: 20.3
	1999	3	1	33	4.0	69	1: 23.0
	2000	3	3	100	6.0	85	1: 28.3
	50 Combined	1991	2	1	50	13.5	36
1992		2	2	100	9.0	20	1: 10.0

^a Days/hunter based only on partial sample of successful hunters beginning 1996.

^b One permit in Hunt Area 21 deferred until 2001 season.

^c Auction permit harvest included.

^d Four permits in Hunt Area 27-1 deferred until 2001 season.

^e One permit in Hunt Area 27-2 deferred until 2001 season.

^f Lottery permit harvest included.

^g One permit in Hunt Area 27-3 deferred until 2001 season.

^h Two permits in Hunt Area 28 deferred until 2001 season.

ⁱ Two permits in Hunt Area 36B deferred until 2001 season.

Table 45. Bighorn sheep harvest and draw odds, Salmon Region, 1988-present.

Year	Permits	Harvest	Hunter Success (%)	Days/ Hunter ^a	First Choice Applicants	Draw Odds
1988 ^b	118	35	30	10.9	751	1:6.4
1989	130	61	47	8.4	658	1:5.1
1990 ^b	131	48	37	11.4	751	1:5.7
1991 ^b	136	47	35	11.3	830	1:6.1
1992 ^{b,c}	137	55	40	12.0	681	1:5.0
1993	68	26	38	10.8	433	1:6.4
1994	69	20	29	7.6	475	1:7.0
1995	45	17	38	11.6	430	1:9.6
1996	45	16	36		461	1:10.2
1997	40	16	40		461	1:11.5
1998 ^c	41	17	41		478	1:11.7
1999	38	15	39	8.5	421	1:14.2
2000 ^b	^d 38	13	46	3.9	499	1:13.1

^a Days/hunter based only on partial sample of successful hunters beginning 1996.

^b Auction permit harvest included.

^c Lottery permit harvest included.

^d Eleven of these permits were deferred until 2001 season because of wildfires.

Table 46. Bighorn sheep mortality, Salmon Region, 1989-present.

Year	Controlled Harvest	Indian Harvest*	Illegal Kill	Other	Total
1989-90	57	2	0	48	107
1990-91	44	0	1	72	117
1991-92	44	1	0	55	100
1992-93	55	10	1	32	98
1993-94	26	0	0	30	56
1994-95	20	5	0	23	48
1995-96	17	3	0	38	58
1996-97	16	1	0	17	34
1997-98	16	2	0	28	46
1998-99	17	1	2	26	46
1999-00	15	1	1	24	41
2000-01	13	2	0	23	38

* Indian harvest information has not been consistently available and is incomplete.

Table 47. Bighorn sheep translocation history, Salmon Region, 1968-present.

Year	Capture Site		Release Site		Adult		Lamb		Total
	Unit/State	Location	Unit/State	Location	M	F	M	F	
1968-69	36B	Morgan Cr.	37	Mahogany Cr.	1	4	1	1	7
1969-70	Can.	Banff Park	37	Mahogany Cr.	5	19	0	0	24
1974-75	28	Burnt Gulch	18	Granite Cr.	1	10	2	0	13
1975-76	28	Pretty Gulch	18	Granite Cr.	5	10	4	2	21
	28	Bacon Ranch	58	Blue Dome	1	3	1	1	6
1977-78	28	Burnt Gulch	58	Long Canyon	2	8	0	2	12
1978-79	28	Burnt Gulch	OR	Imnaha R.	5	9	1	0	15
	28	Burnt Gulch	18	Bernard Cr.	0	7	0	0	7
	WY	Whiskey Mt.	50	Elbow Canyon	3	10	2	2	17
1979-80	WY	Whiskey Mt.	50	Jaggles Canyon	2	5	2	2	11
1981-82	28	Clear Cr.	36B	Birch Cr.	2	3	0	3	8
	28	Clear Cr.	58	Goddard Canyon	1	3	2	0	6
	28	Pretty Gulch	58	Goddard Canyon	0	3	0	0	3
	28	Burnt Gulch	58	Bloom Canyon	2	8	0	4	14
1983-84	28	Pretty Gulch	OR	Imnaha R.	3	8	0	0	11
	OR	Lostine R.	21	Shoup Bridge	3	7	3	3	16
1984-85	28	Burnt Gulch	OR	Grande Ronde R.	5	5	0	1	11
	21	Cove Cr.	OR	Grande Ronde R.	1	10	3	2	16
	OR	Lostine R.	30A	Rocky Canyon	3	14	3	2	22
1985-86	21	Ebenezer Bar	OR	Minam R.	2	9	1	0	12
	OR	Lostine R.	37A	Falls Cr.	4	11	1	2	18
1987-88	36A	E. Fk. Salmon R.	37A	Morse Cr.	3	9	1	0	13
	36B	Morgan Cr.	30A	Cedar Gulch	4	11	2	0	17
	36B	Morgan Cr.	28	Williams Cr.	2	4	0	0	6
1988-89	36B	Morgan Cr.	37A	Falls Cr.	2	18	2	1	23
	36B	Morgan Cr.	17	Tango Bar	5	9	1	0	15
	36B	Morgan Cr.	17	Elevator Mt.	2	11	0	1	14
1991-92	36B	Morgan Cr.	WY	Bighorn Mts.	2	16	2	2	22

APPENDIX A

2000-2001 Progress Report

June 1, 2001

Distribution and Prevalence of Disease Agents in Central Idaho Bighorn Sheep and their Relationship to Lamb Recruitment

Michael D. Scott, Idaho Department of Fish and Game, Salmon, ID 83467

Al Ward, Ph.D., Caine Veterinary Teaching Center, University of Idaho, Caldwell, ID

Mark L. Drew, D.V.M., Idaho Department of Fish and Game, Wildlife Health Laboratory,
Caldwell, ID 83605.

Study Objectives

The objectives of this proposed project are to:

1. Identify the distribution and prevalence of potential disease agents, including bacteria, viruses, and parasites that may affect lamb recruitment. The research null hypothesis is that there are no significant differences in disease agent prevalence among sheep herds experiencing low, moderate, or high lamb recruitment rates.
2. Determine the prevalence and allele distribution of the natural disease resistance gene (Nramp) in bighorn sheep in central Idaho.
3. Place radio collars on bighorn sheep and investigate seasonal sheep distribution in relation to domestic sheep herds in the South Lemhi Range.

Results

Eighty-four sheep were sampled between fall 2000 and spring 2001 (Table 1). Of the 84 samples, 16 sheep were from hunter-harvested rams, 4 were from other mortalities, 26 were darted from the ground, and 34 were captured using a net gun from a helicopter. There were three capture mortalities, one darted sheep and two net-gunned sheep. Ear swabs, pharyngeal swabs, lung, and fecal samples have been processed and results are complete. DNA isolation for Nramp assay, serology, and trace mineral samples were banked for analysis in 2001-2002. Aerial surveys were completed for four of the sampled sheep herds (Figure 2). Five sheep in the south Lemhi Range were fitted with radio collars and their movements are being monitored.

Eighty-two lung samples and/or pharyngeal swab samples were cultured for bacteria. Of these, 51 samples cultured positive for *Pasteurella* spp. Negative samples probably indicate sample collection or handling problems rather than the absence of *Pasteurella*. Significant numbers of

sheep, 39% of the *Pasteurella* positives, had isolates of beta-hemolytic *P. trehalosi* biovariants 2 or 4. Although it cannot be confirmed without DNA analysis, these isolates appear identical to the virulent “Idaho-1” strain associated with past bighorn sheep die-offs in the same geographical area of Idaho. These isolates were not found from sheep along the lower main Salmon River, nor in the Lost River Range, but they were found at high frequencies in the Selway drainage, in the South Lemhi Range, and in 90% of the sheep sampled along the East Fork of the Salmon River. Prior to this year, the East Fork sheep herd has had exceptionally poor lamb production, and the herd is still declining in animal numbers.

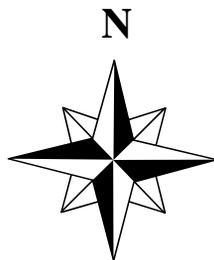
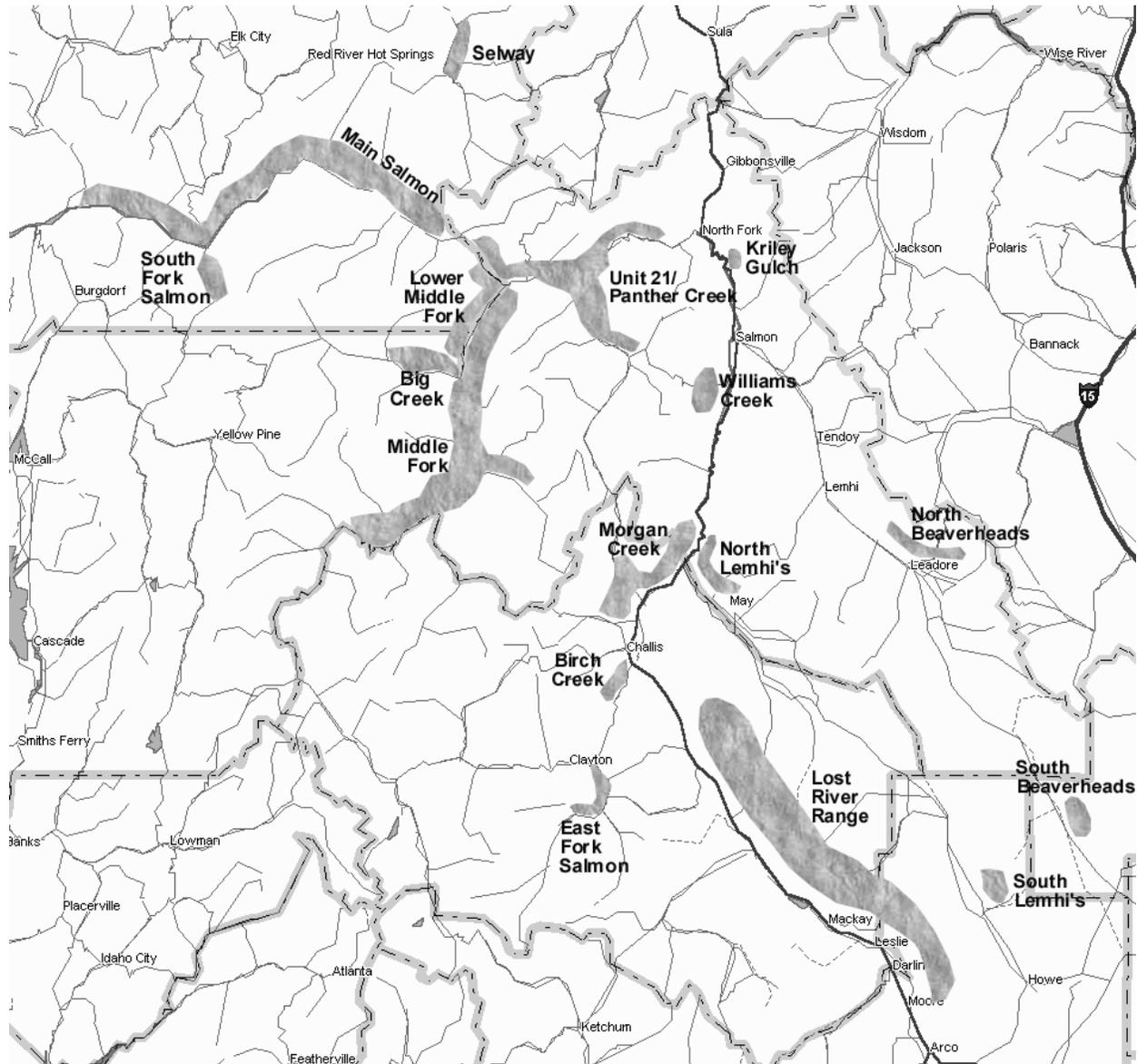
Over all 80 samples analyzed, an average of 18 lungworm larvae (*Protostrongylus* spp.) were found per 2.5 grams of feces (Table 3). Most areas had relatively light lungworm loads, averaging 5 to 18 larvae. However, sheep from the Lost River Range had considerably higher lungworm numbers, averaging 119 with a range of 35-176 larvae. Ear mites (*Psoroptes* spp.) were detected in only four of 63 ear swabs, one swab from GMU 19 and three swabs from GMU 21. Crusted ears were noted in sheep from GMU 21, an area known to have ear mites in the past.

Future Analysis

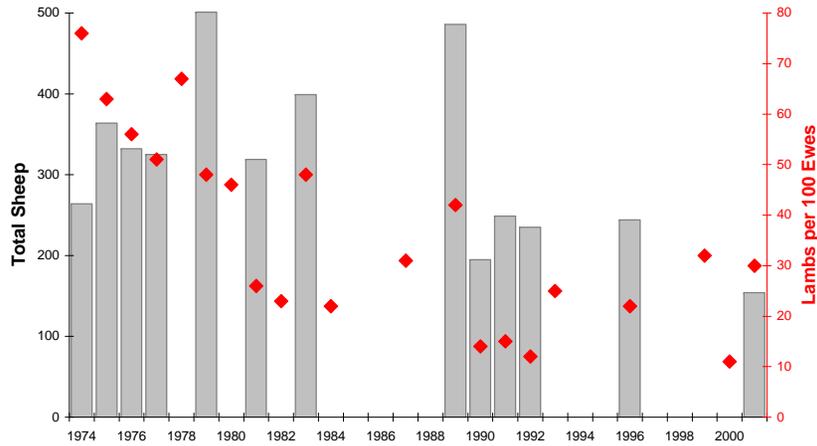
During the second phase of the project, scheduled for 2001-2002, 74 banked samples will be analyzed for serology, clinical biochemistry, DNA, and trace minerals. Results will be compared to data from the 1988-1990 die-off. Results will be presented to management staff at Idaho Fish and Game for consideration in managing these sheep populations.

These results will be presented at professional meetings in 2001-2002 and submitted for publication upon completion.

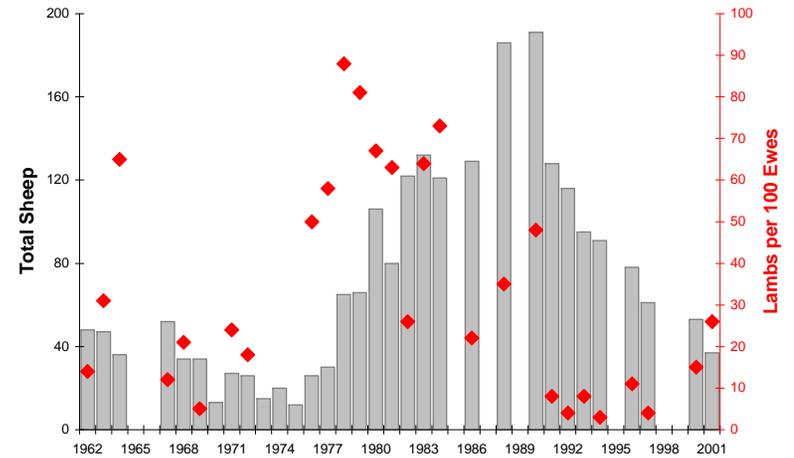
Figure 1. Central Idaho Winter Bighorn Sheep Herds



Unit 21 and Panther Creek Sheep Surveys

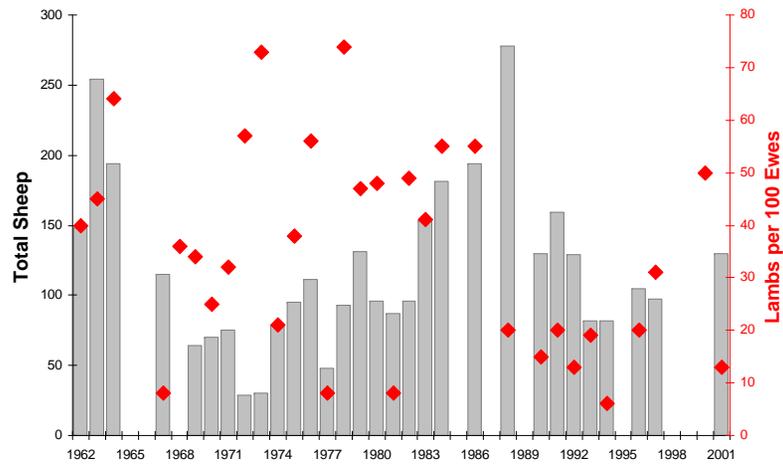


East Fork Sheep Surveys



TOTAL
 Lambs per 100 Ewes

Morgan Creek Sheep Surveys



Lost River Range Sheep Surveys

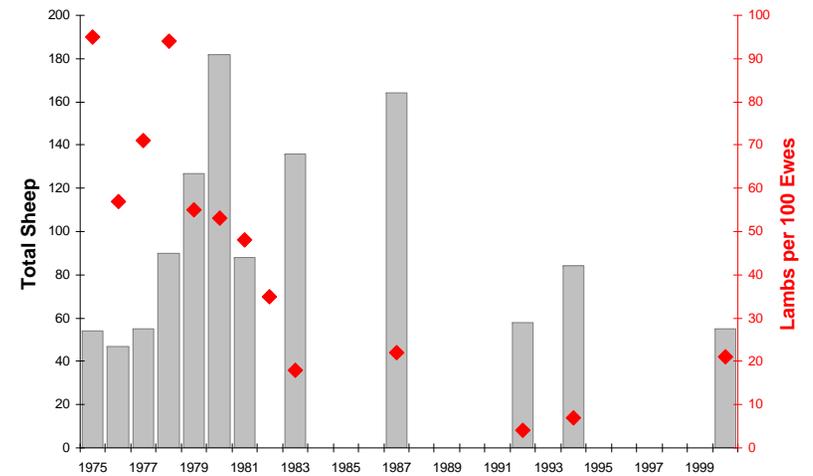


Table 1. Central Idaho Bighorn Sheep Samples - Winter 2000-2001

<u>Area</u>	<u>Sample Method</u>	<u>Sex</u>	<u>No. Sheep</u>	<u>Samples Collected</u>					
				<u>Throat & Lung</u>	<u>Serology</u>	<u>Trace Mineral</u>	<u>DNA</u>	<u>Fecal</u>	<u>Ear Swab</u>
Selway, GMU 17	Dart	F	2	2	2	2	2	2	2
	Natural Mortality	M	1	1	1	1	1	1	1
Main Salmon, GMUs 19 & 20	Dart	M	3	3	2	2	2	3	3
	Dart	F	12	12	10	8	7	10	12
	Hunter Harvest	M	4	4	4	4	4	4	0
Main Salmon & Panther Creek, GMUs 21 & 28	Dart	F	12	12	12	12	12	12	12
	Natural Mortality	M	1	1	1	1	1	1	0
Middle Fork Salmon River	Hunter Harvest	M	10	9	7	10	10	8	0
Lost River Range, GMUs 37 & 50	Net Gun	F	5	5	4	4	4	5	5
South Lemhi Range, GMU 51	Net Gun	F	5	5	4	4	4	5	5
East Fork Salmon River, GMU 36A	Net Gun	F	10	10	8	8	8	10	10
Birch Creek, GMU 36B	Dart	M	1	1	1	1	1	1	0
	Road Kill	F	2	2	2	2	2	2	0
Morgan Creek, GMU 36B	Net Gun	F	14	13	14	14	14	14	13
	Hunter Harvest	M	1	1	1	1	1	1	0
Unknown Location	Hunter Harvest	M	1	1	1	0	1	1	0
Total			84	82	74	74	74	80	63

Table 2. Central Idaho Bighorn Sheep Lung and Throat Cultures - Winter 2000-2001

<u>Area</u>	<u>Sample Method</u>	<u>Sex</u>	<u>No. Sheep</u>	<u>Samples</u>	<u>Pasteurella spp.</u>		<u>beta-hemolytic P. trehalosi biovariants 2, 4</u>	
					<u>Negative</u>	<u>Positive</u>		
Selway, GMU 17	Dart	F	2	2	0	2	2	
	Natural Mortality	M	1	1	0	1	0	
Main Salmon, GMUs 19 & 20	Dart	M	3	3	2	1	0	
	Dart	F	12	12	8	4	0	
	Hunter Harvest	M	4	4	3	1	0	
Main Salmon & Panther Creek, GMUs 21 & 28	Dart	F	12	12	6	6	1	
	Natural Mortality	M	1	1	0	1	1	
Middle Fork Salmon River	Hunter Harvest	M	10	9	7	2	1	
Lost River Range, GMUs 37 & 50	Net Gun	F	5	5	1	4	0	
South Lemhi Range, GMU 51	Net Gun	F	5	5	1	4	3	
East Fork Salmon River, GMU 36A	Net Gun	F	10	10	0	10	9	
Birch Creek, GMU 36B	Dart	M	1	1	0	1	0	
	Road Kill	F	2	2	2	0	0	
Morgan Creek, GMU 36B	Net Gun	F	14	13	0	13	3	
	Hunter Harvest	M	1	1	0	1	0	
Unknown Location	Hunter Harvest	M	1	1	1	0	0	
			Total	84	82	31	51	20

Table 3. Central Idaho Bighorn Sheep Fecal Sample Results - Winter 2000-2001

<u>Area</u>		<u>No. Sheep</u>	<u>Samples</u>	<u>Lungworm Larvae per 2.5 grams</u>	
				<u>Average</u>	<u>Range</u>
Selway	GMU 17	3	3	9	0-26
Main Salmon	GMUs 19 & 20	19	17	8	0-50
Main Salmon & Panther Creek	GMUs 21 & 28	13	13	2	0-10
Middle Fork Salmon River	GMUs 20A, 26, & 27	10	8	14	0-42
Lost River Range	GMUs 37, 50	5	5	119	35-176
South Lemhi Range	GMU 51	5	5	22	5-51
East Fork Salmon River	GMU 36A	10	10	7	0-26
Birch Creek	GMU 36B	3	3	12	1-28
Morgan Creek	GMU 36B	15	15	18*	0-60*
Unknown Location		1	1	5	--
	Total	84	80	18	0-176

Submitted by:

Jay Crenshaw
Regional Wildlife Manager

Jon Rachael
Regional Wildlife Manager

Jeff Rohlman
Regional Wildlife Manager

Randy Smith
Regional Wildlife Manager

Carl Anderson
Regional Wildlife Manager

Brad Compton
Regional Wildlife Manager

Tom Keegan
Regional Wildlife Manager

Justin Naderman
Regional Wildlife Biologist

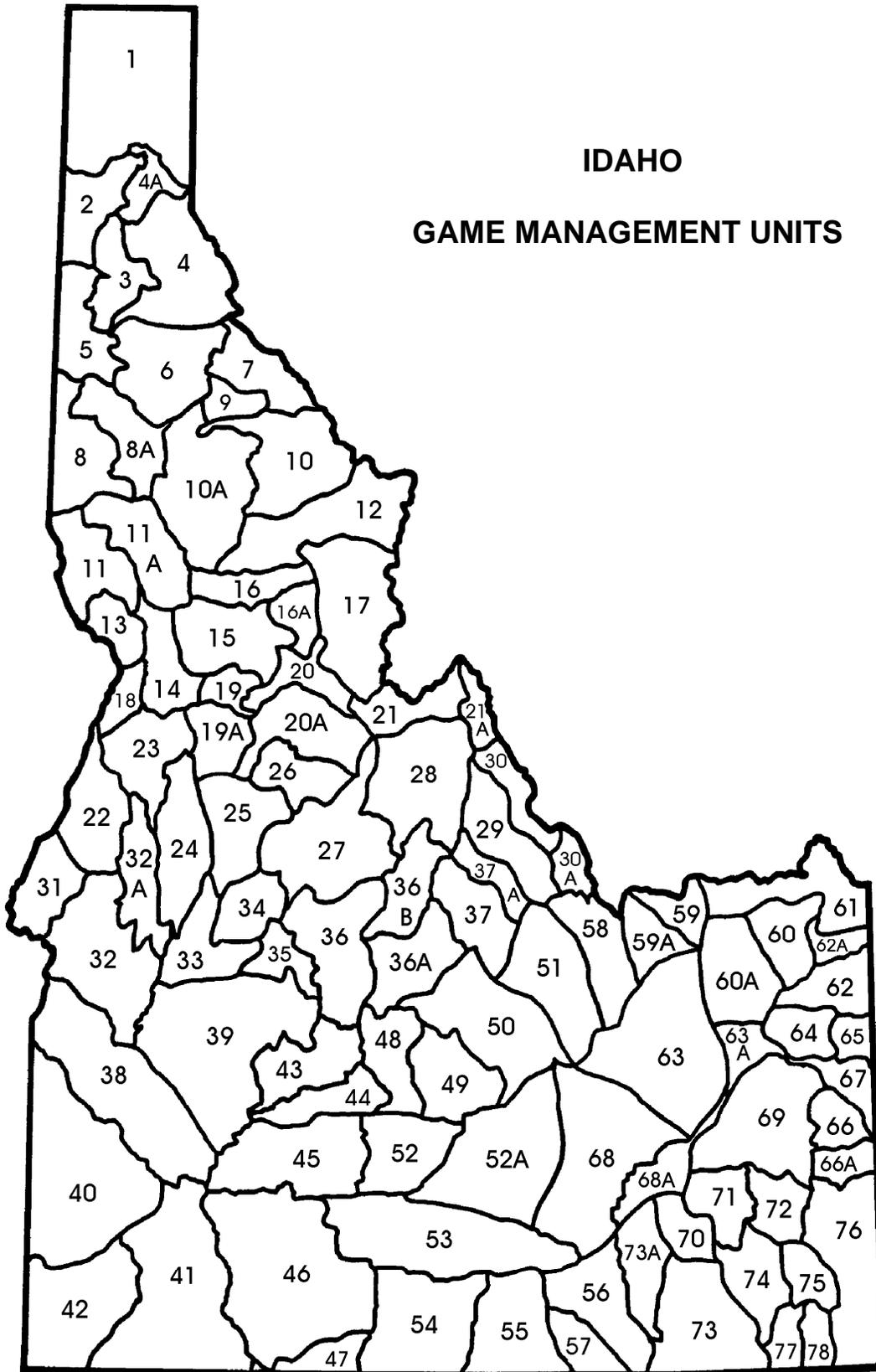
Approved by: IDAHO DEPARTMENT OF FISH AND GAME

Wayne Melquist
Wayne Melquist
State Nongame Wildlife Manager
Federal Aid Coordinator

Steven M. Huffaker
Steven M. Huffaker, Chief
Bureau of Wildlife

IDAHO

GAME MANAGEMENT UNITS



FEDERAL AID IN WILDLIFE RESTORATION

The Federal Aid in Wildlife Restoration Program consists of funds from a 10% to 11% manufacturer's excise tax collected from the sale of handguns, sporting rifles, shotguns, ammunition, and archery equipment. The Federal Aid program then allots the funds back to states through a formula based on each state's geographic area and the number of paid hunting license holders in the state. The Idaho Department of Fish and Game uses the funds to help restore, conserve, manage, and enhance wild birds and mammals for the public benefit. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes necessary to be responsible, ethical hunters. Seventy-five percent of the funds for this project are from Federal Aid. The other 25% comes from license-generated funds.

