

IDAHO IDFG OF FISH AND GAME

Virgil Moore, Director

Surveys and Inventories

FY2017 Statewide Report



BIGHORN SHEEP

July 1, 2016 to June 30, 2017

Prepared by:

Clay Hickey	Clearwater Region
Rick Ward, Rachel Curtis, Jake Powell	Southwest (Nampa) Region
Regan Berkley.....	Southwest (McCall) Region
Daryl Meints	Magic Valley Region
Curtis Hendricks	Upper Snake Region
Greg Painter, Bret Stansberry	Salmon Region
Summer Crea	Data Coordinator
David Smith	Grants/Contracts Specialist

Compiled and edited by: Hollie Miyasaki, Program Manager

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STATEWIDE REPORT SURVEYS AND INVENTORY

JOB TITLE: Bighorn Sheep Surveys and Inventories

STUDY NAME: Big Game Population Status, Trends, Use, and Associated Habitat Studies

PERIOD COVERED: July 1, 2016 to June 30, 2017

STATEWIDE

Bighorn sheep are one of Idaho's most prized game animals. Idaho is home to 2 distinct populations of bighorn sheep. California bighorns occupy southern Idaho's canyon and rangelands south of Interstate 84. Rocky Mountain bighorns live north of Interstate 84 in mountainous terrain from Hells Canyon on the west side of the state to the Montana border on the east.

From historical records, bighorn sheep ranged widely in Idaho in the early 1800s and are believed to have been the most abundant game animal in the state. Beginning in the late 1800s, Idaho's bighorn sheep populations declined drastically. Idaho estimated 1,000 bighorns in the state in the early 1920s, mostly in the Salmon River drainage. By 1940 bighorn sheep were extirpated from the Owyhee River area. The 3 primary factors believed responsible for the large decline of bighorn sheep in Idaho were unregulated hunting, competition with domestic livestock for forage, and disease.

Idaho began efforts to reestablish bighorn sheep populations in the 1960s. Bighorn sheep from British Columbia were translocated to the East Fork Owyhee River drainage in 1963. Numerous bighorn sheep have been moved into and out of Idaho since then. In the early 1990s, Idaho Department of Fish and Game (IDFG) estimated there were about 5,000 bighorn sheep in the state.

Bighorn sheep distribution for this plan is defined as the geographic range regularly or periodically occupied by bighorn sheep. Not all areas within this range have sufficient suitable habitat to support persistent populations and bighorn sheep can and do occasionally move outside this area. Distribution can change through time as a consequence of changes in population density, habitat, or other factors. Bighorn sheep populations were separated into population management units (PMUs) based on current knowledge of distribution and connectivity between subpopulations and populations (Table 1). We divided the California bighorn sheep distribution into 6 PMUs (Figure 1). We divided the Rocky Mountain bighorn sheep distribution into 16 PMUs (Figure 13). Data is lacking for some of Idaho's bighorn sheep populations, additional information from radio telemetry, aerial surveys, ground surveys, etc. would be beneficial for population management.

Idaho plans to continue to manage bighorn sheep north and south of Interstate 84 separately and will continue to refer to them as California and Rocky Mountain bighorn sheep "trophy types." The California and Rocky Mountain bighorn sheep display differences in physical appearance and occupy different habitats. California bighorn sheep generally occupy canyon and desert

habitat while the Rocky Mountain bighorn sheep occupy rugged mountainous terrain. Currently, there are approximately 600 California and 2,000 Rocky Mountain bighorn sheep in Idaho.

California Bighorn Sheep

During April 2016, 695 hunters applied for 21 tags for California bighorn sheep. Of these, 53% (366) of the applicants were non-residents. Eighteen residents and 3 non-residents were successful in obtaining a tag for the fall 2016 hunting season.

Twenty-one (21) tags were issued for California bighorn sheep in 2016. Fifteen successfully harvested a ram for a hunter success rate of 71%, up from 55% in 2015. Successful hunters hunted an average of 4.4 days before harvesting a ram, as compared with 7.9 days in 2015. Harvested rams averaged 7.8 years of age (Figure 2). Horn measurements averaged 14.2 inches basal circumference and 30.0 inches in length.

Rocky Mountain Bighorn Sheep

During April 2016 a total of 1,861 hunters applied for 68 Rocky Mountain bighorn sheep tags. Nonresidents comprised 58% (1,072) of the applications. Sixty-three resident hunters and 5 non-resident hunters drew Rocky Mountain bighorn sheep tags for the fall 2016 hunting season.

Sixty-eight (68) tags were issued for Rocky Mountain bighorn sheep in 2016. Two additional tags, 1 by auction through the Wild Sheep Foundation and 1 by lottery through the Idaho Chapter of the Wild Sheep Foundation, were also issued to hunt Rocky Mountain bighorns. Forty-seven (47) hunters were successful (including the auction and lottery tag holders), for a hunter success rate of 67%. Successful hunters hunted an average of 6.7 days before they harvested a ram, up from 5.3 days in 2015. Age of harvested rams averaged 7.7 years of age, compared to 8.9 years of age in 2015. Horn measurements averaged 14.3 inches basal circumference and 32.8 inches (Figure 14).

Regional personnel checked all harvested bighorn sheep, and completed data collection forms for all reported bighorn sheep known to have died during the year, whether hunter-harvested or found dead due to other causes. Horns of all rams were individually pinned for future identification.

Statewide Bighorn Sheep population surveys between 2014 to present.

Season	Females captured, radio-marked, and/or Monitored	Males captured, radio-marked, and/or Monitored	Lambs captured, radio-marked, and/or Monitored	GMUs Surveyed
2014	43	26	0	14
2015	67	35	33	3
2016	72	42	75	5

Table 1. Predicted bighorn sheep supportable by habitat within bighorn sheep distribution, by PMU. Based on a density of 1.9 sheep/km² (Van Dyke 1983).

PMU	Total km ² of predicted habitat within bighorn sheep distribution (A)	Bighorn sheep population supportable by (A)	Total km ² of private land within (A)	Total km ² of domestic sheep grazing or trailing allotments within (A)	Bighorn sheep population supportable by (A) without private land and allotments
Hells Canyon	1,474	2,802	580	77	1,555
Lower Salmon River	792	1,504	57	239	942
Selway	290	552	0	0	552
Middle Fork Salmon River	1,867	3,546	10	0	3,527
Lower Panther-Main Salmon	576	1,094	6	0	1,083
Tower-Kriley	24	46	6	0	35
North Beaverhead	137	261	0	0	261
South Beaverhead	212	402	2	58	287
North Lemhi	324	615	12	0	592
South Lemhi	322	612	2	24	565
Lost River Range	773	1,468	2	93	1,289
East Fork Salmon River	591	1,122	14	18	1,060
Middle Main Salmon River	595	1,130	28	0	1,077
Lionhead	27	51	0	0	51
Owyhee Front	526	999	48	14	880
Owyhee River	388	738	4	0	731
Jacks Creek	261	496	10	0	476
Bruneau-Jarbidge	410	779	10	0	759
South Hills	35	66	0	5	56
Jim Sage	56	107	3	0	102
Totals	9,679	18,390	794	528	15,880

POPULATION MANAGEMENT UNITS CALIFORNIA BIGHORN SHEEP

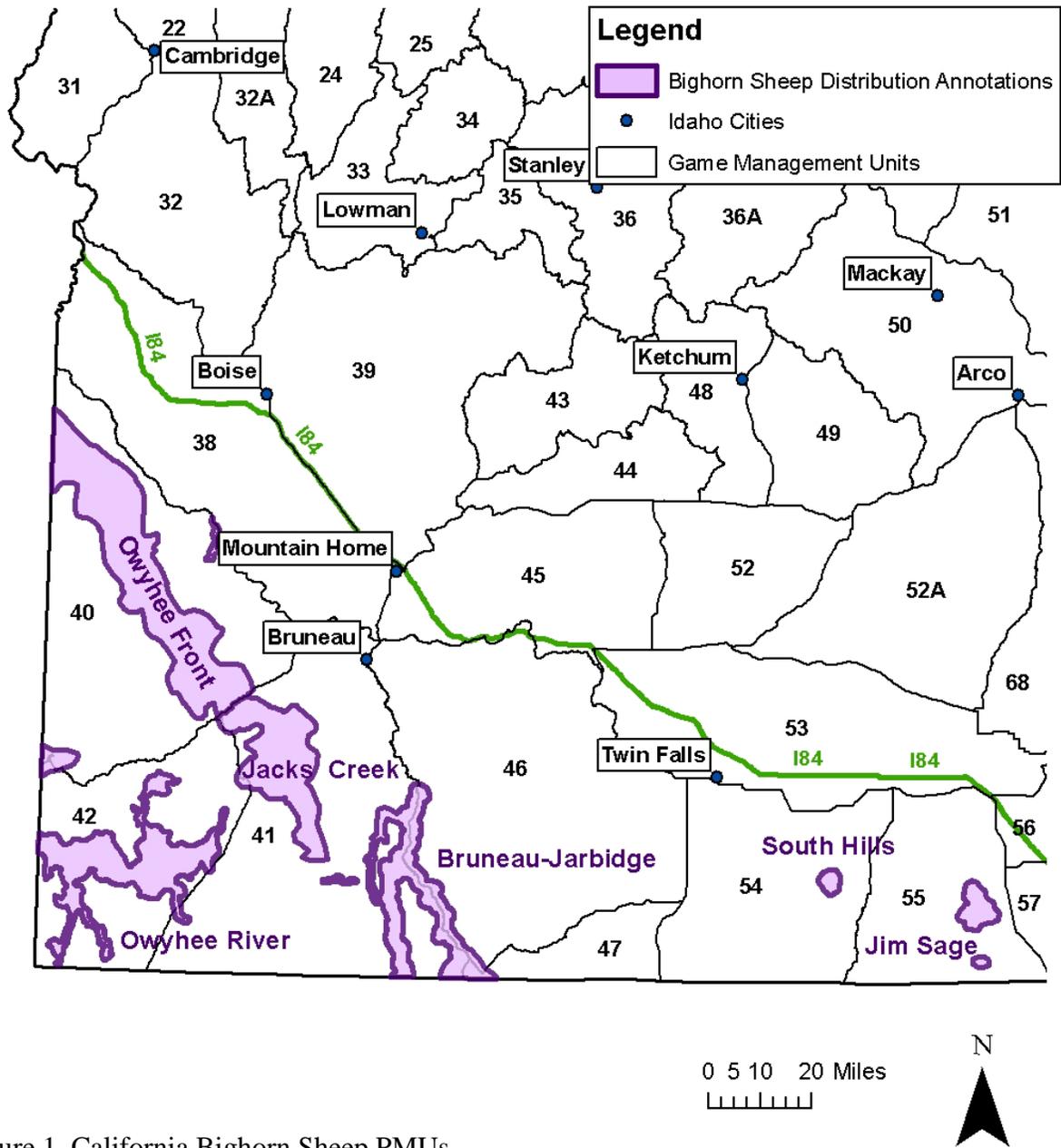


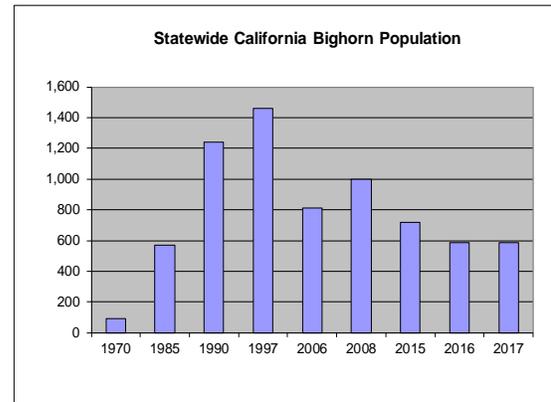
Figure 1. California Bighorn Sheep PMUs

California Bighorn Sheep

Population status

PMU	Observed						Modeled					Most Recent Survey
	Ewes	Lambs	Rams		Unclass	Total	Ewes	Lambs	Rams		Total	
			I, II	III, IV					I, II	III, IV		
Owyhee Front	12	4	4	11	0	31	n/a	n/a	n/a	n/a	n/a	2016
Owyhee River	79	28	23	28	0	158	172	91	44	42	349	2016
Jacks Creek	94	39	11	28	0	172	113	72	29	43	257	2016
Bruneau-Jarbidge	59	33	6	18	0	116	92	55	40	25	212	2015
South Hills	4	1	4	3	0	12	n/a	n/a	n/a	n/a	n/a	2008
Jim Sage	51	25	8	13	0	97	n/a	n/a	n/a	n/a	n/a	2015
Total	299	130	56	101	0	586	377	218	113	110	818	

Estimates of statewide population								
1970	1985	1990	1997	2006	2008	2015	2016	2017
90	570	1,240	1,460	810	1,000	716	586	586



Hunting tags, applications, and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	22	22	21	21	21	21	21	21
Resident applicants	357	371	382	358	367	366	345	329
Nonresident applicants	281	427	417	414	338	338	442	366
Harvest	21	15	17	18	20	18	11	15
Hunter success (%)	95	68	81	86	95	86	52	71
Average ram age (yrs)	6.0	7.5	7.1	6.9	7.4	6.8	8.0	7.8

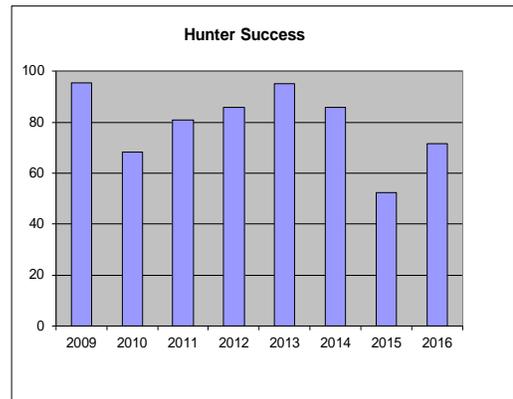
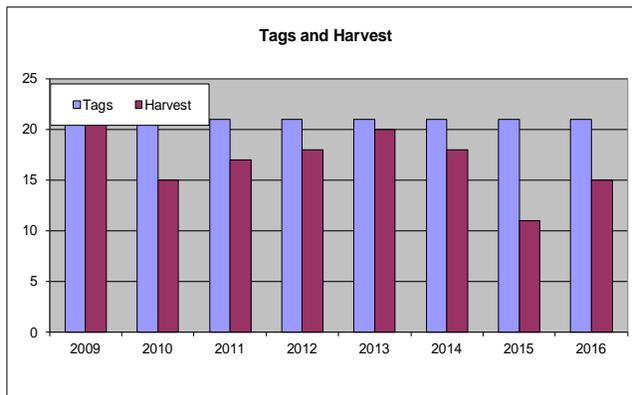
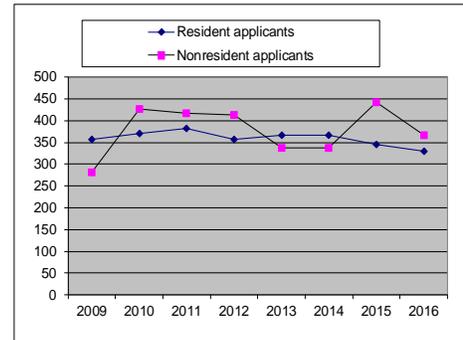


Figure 2. California Bighorn Sheep Statewide Population and Harvest

OWYHEE FRONT PMU GMU 40; Hunt Area 40

Description

The Owyhee Front in GMU 40 is characterized by scattered pockets of suitable escape terrain in sagebrush (*Artemisia* spp.)-steppe dominated foothills above the Snake River plain. The main drainages sheep occupy are Reynolds Creek and Castle Creek. Ewes and lambs occupy the most rugged and broken country, whereas rams seek out areas that provide abundant forage and isolation from human disturbance, often using low rock outcroppings or steep slopes in the absence of “typical” escape terrain. This PMU differs from other California bighorn sheep habitat in Idaho in that it lacks the deep canyon topography which typifies much of the bighorn habitat in Owyhee County. While much of the Owyhee Front is managed by the Bureau of Land Management (BLM), approximately 1/3 is privately owned rangeland. In 2016, 35 sheep were observed occupying the Owyhee Front, including 4 collared ewes that were not observed during the spring aerial survey.

Historical Perspective

The first bighorn sheep to colonize the Owyhee Front after extirpation in the early 1900s are thought to have immigrated from Oregon’s Leslie Gulch following a wildfire in the 1980s. The sheep occupying the Castle Creek drainage likely colonized from Shoofly Creek in GMU 41. Until 2009, GMU 40 was included in the Little Jacks hunt area, but only 1 ram had ever been taken in GMU 40. To better distribute hunting pressure, a hunt in GMU 40 was created in 2009.

Issues

The Owyhee Front is close to the largest human population center in Idaho, and the area is used year-round for recreational off-road vehicle use, hiking, hunting, trapping, horseback riding, wildlife viewing, sightseeing, and recreational shooting.

Habitat degradation, due to increased and unregulated off-road motorized vehicle use, the spread of invasive annual grasses, and risk of disease threaten this bighorn sheep population. A proposed transmission line on the Owyhee Front may affect bighorn sheep and habitat. Livestock grazing is also prevalent, both on private and public lands, and a large herd of feral horses occupy habitat near suitable bighorn sheep habitat. Competition with domestic livestock and feral horses is a concern, particularly due to the limited nature of bighorn sheep habitat.

In general, disease has been an important factor contributing to the extirpation of bighorn sheep in Idaho, and pneumonia continues to be a risk to bighorn populations. The effects of respiratory disease on bighorn sheep populations can include high rates of mortality in all age classes, high rates of mortality restricted to lambs (especially during summer), and chronic, low level, sporadic adult mortality. Pneumonia can be spread from domestic sheep, goats, and other bighorn sheep.

Bighorn sheep, especially rams, are known to make long distance movements between the areas of suitable habitat. Generally, the bands of rams move 5-10 miles away from summer pastures to

reach the ewe groups during the rut. Bighorn sheep have been documented crossing GMU boundaries and the Oregon state line. These movements increase risk of disease transmission, poaching, and likely predation. A domestic sheep trailing route crosses a portion of this PMU, and efforts have been made to reduce contact between bighorns and domestic sheep. Additionally, due to the prevalence of roads, trails, and off-road vehicle use in the area, bighorn sheep migration corridors are threatened by human recreation, and the ability of bighorn sheep to move undisturbed between patches of habitat is reduced.

Nine bighorn sheep were captured in February 2011 as part of a previous study. Those radio-collared sheep were tracked until the collar batteries died in the spring of 2016. These sheep made long distance movements between available habitats, and biologists tracked movement patterns and travel corridors, identified critical habitats, documented population size and status, located additional bighorn sheep herds, and determined cause-specific mortality. Staff documented movements of one ram into Shoofly Creek in GMU 41 and determined that rams have moved between Reynolds Creek and Castle Creek in GMU 40, a distance of over 30 miles. Additionally, what was believed to be small, individual bands of sheep in the Reynolds Creek area is likely one herd moving between drainages. The small bands of sheep were moving between isolated pockets of habitat, and were not distinct herds like previously thought. Therefore, the estimated number of sheep in GMU 40 is likely lower than previously estimated.

Management Direction

This sheep population will continue to be managed conservatively, offering hunters a reasonable chance to harvest a mature ram.

Little population data is available for the sheep occupying the Owyhee Front in GMU 40. Within current distribution, modeled habitat comprises 464 km², which could support approximately 880 animals (assuming all habitat is suitable year-round and relatively high densities of 1.9/sheep/km²). It is likely that the lack of lambing habitat and escape terrain would limit this bighorn sheep population, and bighorn sheep numbers would remain lower than the currently predicted population estimate (Table 1). Additionally, much of the area within bighorn sheep distribution in this PMU is used primarily for travel corridors between isolated patches of critical habitat. Further refinement of habitat models is necessary to better estimate potential population size, and will likely lead to an estimate <880 bighorn sheep. The management objective is to maintain or increase this bighorn sheep population, provided the increase occurs in portions of the PMU where separation from domestic sheep can be maintained.

In 2015, eastern Oregon experienced a pneumonia outbreak that reduced their population by over 60% (personnel communication, Oregon Department of Fish and Wildlife, ODFW). In response, IDFG conducted a population survey, and capture event to determine if pneumonia had spread into nearby GMU 40. IDFG typically conducts sheep surveys in July, but because of the emerging disease issue the 2016 survey was flown in March before a planned capture operation (Figure 3). Population survey numbers were lower than previous survey years because of the timing of the March survey. A July survey includes all recently recruited young into the adult

population and all lambs born that year. A March survey did not include new lambs and recent recruitment, instead the lamb count was a result of the lambs born the previous year that survived to ~10-months. Therefore, use caution when comparing 2016 survey results to previous years.

In March of 2016, IDFG captured and radio-collared five bighorn sheep in GMU 40. IDFG staff fitted all sheep with a GPS collar, and collected biological samples to test for current and previous exposure to pneumonia (specifically *Mycoplasma ovipneumoniae*). One ram was captured and radio-collared in Reynold's Creek, and two rams and two ewes in Castle Creek. One additional yearling ram was captured and sampled in Castle Creek but was released un-collared. All samples tested negative for pneumonia. Due to collar failures, only one ewe and one ram collar were still functional at the end of June 2016. The remaining collared ewe was observed in April and June to determine lamb survival, and will be conducted again in August. IDFG will continue to monitor collared sheep survival status, movements, spatial and habitat use, and ultimately causes of mortality for the life of the collars.

Therefore, the estimated number of sheep in GMU 40 is likely lower than previously estimated.

Management Actions

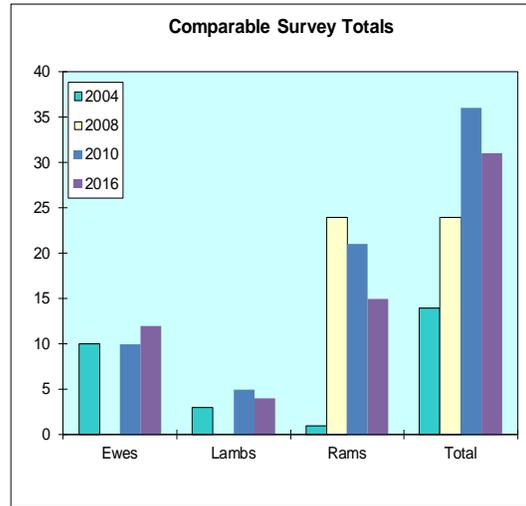
1. Provide technical assistance to the BLM on travel management in Owyhee County.
2. Work with willing domestic sheep permittees, and BLM to use BMPs to maintain separation between bighorn sheep and domestic sheep and goats.
3. Increase knowledge of movement patterns, habitat use, survival, etc. using radio-collared bighorn sheep.
4. Continue disease monitoring efforts by collecting biological samples on bighorn sheep mortalities.
5. Refine habitat modeling to more accurately characterize sustainable population levels.

California Bighorn Sheep
Owyhee Front
 GMU 40; Hunt Area 40

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
40	2004	10	3	1	0	1	0	14
	2008	0	0	7	17	24	0	24
	2010	10	5	4	17	21	0	36
	2016	12	4	4	11	15	0	31
Modeled estimate								
Per 100 ewes observed		33	33	92	125			

*2016 Surveys were conducted in March rather than July due to a disease outbreak in nearby Oregon populations.
 Sheep counted as lambs in the March survey would have been counted as adults in a July survey, and there are no new 2016 lambs included in the survey.



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	2	2	2	2	2	2	1	1
Harvest	2	1	2	1	2	2	1	1
Hunter success	100	50	100	50	100	100	100	100
Ave ram age	5.0	9.5	7.5	7.5	7.0	8.5	10.5	6.5

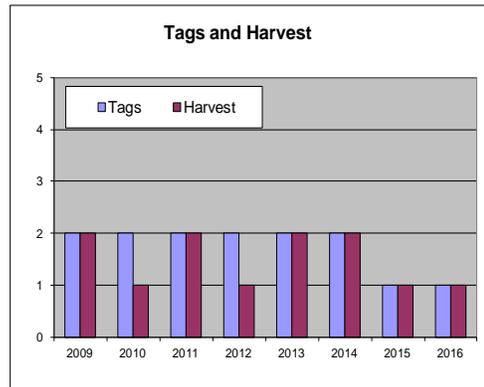


Figure 3. Owyhee Front Population Survey and Harvest

OWYHEE RIVER PMU

GMU 42; Hunt Areas 42-1, 42-2

Description

This PMU encompasses GMU 42 in southwestern Idaho. Most of the habitats suitable for bighorn sheep are managed by the BLM, although a few private- and state-owned parcels exist in the area. The majority of currently occupied sheep habitat occurs within the Owyhee Canyonlands Wilderness, which was designated in May 2008 as part of the Owyhee Initiative. This GMU is characterized by large expanses of sagebrush-steppe habitat intersected by steep drainages that are 300-400 m deep. Grass-covered benches and terraces within these rugged canyons provide foraging areas preferred by California bighorn sheep, although it is common to see sheep foraging up to 1 mile away from canyon rims. Sheep are found within the East Fork Owyhee River and its major tributaries (Deep Creek, Battle Creek, and others), and within the South Fork Owyhee River and the Little Owyhee River.

Historical Perspective

Bighorn sheep were extirpated from this area by 1940. Subsistence hunting by mining camps, heavy grazing by domestic livestock, and diseases introduced by domestic livestock led to the end of this native sheep population. Three releases of bighorn sheep in the 1960s, translocated from British Columbia, provided the nucleus for this reintroduced herd. By 1982, this sheep population was well enough established to be used as a source population for translocations to other parts of Idaho, in addition to 3 other states. Translocations from the PMU continued through 2003. This sheep population increased to a high of near 750 animals in 1992, but declined after the severe winter of 1992-1993 (>200 sheep were also translocated from this area in 1990-1993). The population has remained relatively stable at approximately 250-300 animals since 2004 (Figure 4). Recently the bighorn population has declined in Idaho along the Oregon border; although numbers have remained stable in the upper portions of the river.

Issues

The steep and rugged canyon terrain and isolation of some forage areas by rimrock reduces competition between bighorn sheep and domestic livestock. However, the potential for conflict may exist adjacent to the canyons, and in portions of canyons accessible to cattle. Competition for forage may increase as bighorn or cattle numbers increase, or as forage availability decreases due to drought, grazing pressure, wildfire, or invasion of unpalatable exotic weeds or grasses. Anecdotal observations of elk wintering along the East Fork Owyhee River (300-500 animals) appear to be increasing, and elk may be competing with bighorn sheep for forage in winter as well. In addition, feral horses occupy habitat adjacent to canyons in sections of the PMU.

The potential exists for disease outbreaks due to the proximity of private inholdings in or adjacent to bighorn sheep habitat. There are no domestic sheep grazing allotments in Idaho near the Owyhee River sheep population, but there is no way to regulate or monitor small farm flocks on private land. In addition, disease transmission is possible from neighboring bighorn sheep populations. A lone domestic sheep was found south of the East Fork Owyhee River in March

2017 intermixed with a herd of cattle. Law enforcement lethally removed the animal, and took the carcass to the wildlife health lab for disease testing. The sheep tested negative for pneumonia.

Predation by mountain lions is a concern for many bighorn sheep enthusiasts, but the impact of predation on this population is largely unknown.

Evidence of illegal off-road vehicle use in bighorn sheep habitat and along canyon rims has increased over the last 20-25 years. Enforcement is challenging due to the remoteness of the area, but the wilderness designation may have helped assuage some of the illegal use by off-road vehicles. The wilderness designation eliminated >30 miles of roads within the entire Owyhee Initiative area. However, 17 miles of these closed roads occurred in the Dickshooter Ridge area, within the Owyhee River PMU. Hunter congestion at the remaining access points may need to be addressed in the future if contention arises.

This area is used by the Air Force for training missions. Impacts of military overflights to bighorn sheep are not fully understood. Agreements have been made to mitigate the potential impacts to bighorn sheep (e.g., flights will take place perpendicular to the canyons and not parallel to them), but monitoring and compliance is unknown. Expanded use of the area for military training could have negative impacts to bighorn sheep, especially during critical times of year (e.g., lambing, winter, etc.).

Management Direction

This sheep herd will continue to be managed conservatively, offering a hunter with a reasonable chance at harvesting a mature ram. Recent hunter success rates have been approximately 66%.

The predicted bighorn population of 731 sheep that is supportable by habitat within current distribution (Table 1) is similar to the population high observed in early 1990s. However, seasonal habitats (winter range) and specific habitat needs (lambing areas) are not accounted for in the habitat model. Further refinement of the habitat model will likely result in a lower estimate of potential population size. Available information suggests the Owyhee River PMU is capable of supporting ≥ 400 bighorn sheep and the overall management goal is to maintain or increase the current population.

In 2015, eastern Oregon experienced a pneumonia outbreak that reduced their population by over 60% (personnel communication, ODFW). In response, IDFG conducted a population survey and capture event to determine if pneumonia had spread into neighboring GMU 42. IDFG typically conducts sheep surveys in July, but because of the emerging disease issue conducted the 2016 survey in March (Figure 5). Population survey numbers were likely lower than previous survey years because of the timing of the March survey. A July survey includes all recently recruited young into the adult population and all lambs born that year. A March survey does not include new lambs and recent recruitment, instead the lamb count is a result of the lambs born the previous year that survived to ~10-months. Therefore, use caution when comparing 2016 survey results to previous years.

In March of 2016, IDFG captured and radio-collared twenty-three bighorn sheep in GMU 42 and in February 2017 captured an additional 20 sheep to supplement the previous year's collars. IDFG staff fitted all sheep with a GPS collar, and collected biological samples to test for current and previous exposure to pneumonia (specifically *Mycoplasma ovipneumoniae*). One ewe tested positive for pneumonia west of Lambert Table. In 2016, one ewe two miles west also tested positive for historical exposure. This strain of *Mycoplasma ovipneumoniae* was different than the strain responsible for the Oregon outbreak, and likely was already established in this area. It is possible that pneumonia accounted for the observed population decline in recent years near the Oregon border.

IDFG and University of Idaho recently expanded this project to study lamb survival and nutritional quality in the Owyhee River and East Fork Salmon populations in Idaho. As part of the study, MS Candidate Nicole Bilodeau conducted vegetation sampling and coordinated monthly lamb surveys to determine early survival of collared ewes' lambs. IDFG will continue to monitor collared sheep survival status, movements, spatial and habitat use, and ultimately causes of mortality. One collared yearling ewe was killed by a mountain lion in May 2017.

Management Actions

1. Provide technical assistance to the BLM on travel management in Owyhee County.
2. Work with BLM to enforce motorized travel restrictions in the Owyhee Initiative area.
3. Increase knowledge of movement patterns, habitat use, survival, etc. using radio-collared bighorn sheep.
4. Continue disease monitoring efforts by collecting biological samples on bighorn sheep mortalities.
5. Refine habitat modeling to more accurately characterize sustainable population levels.

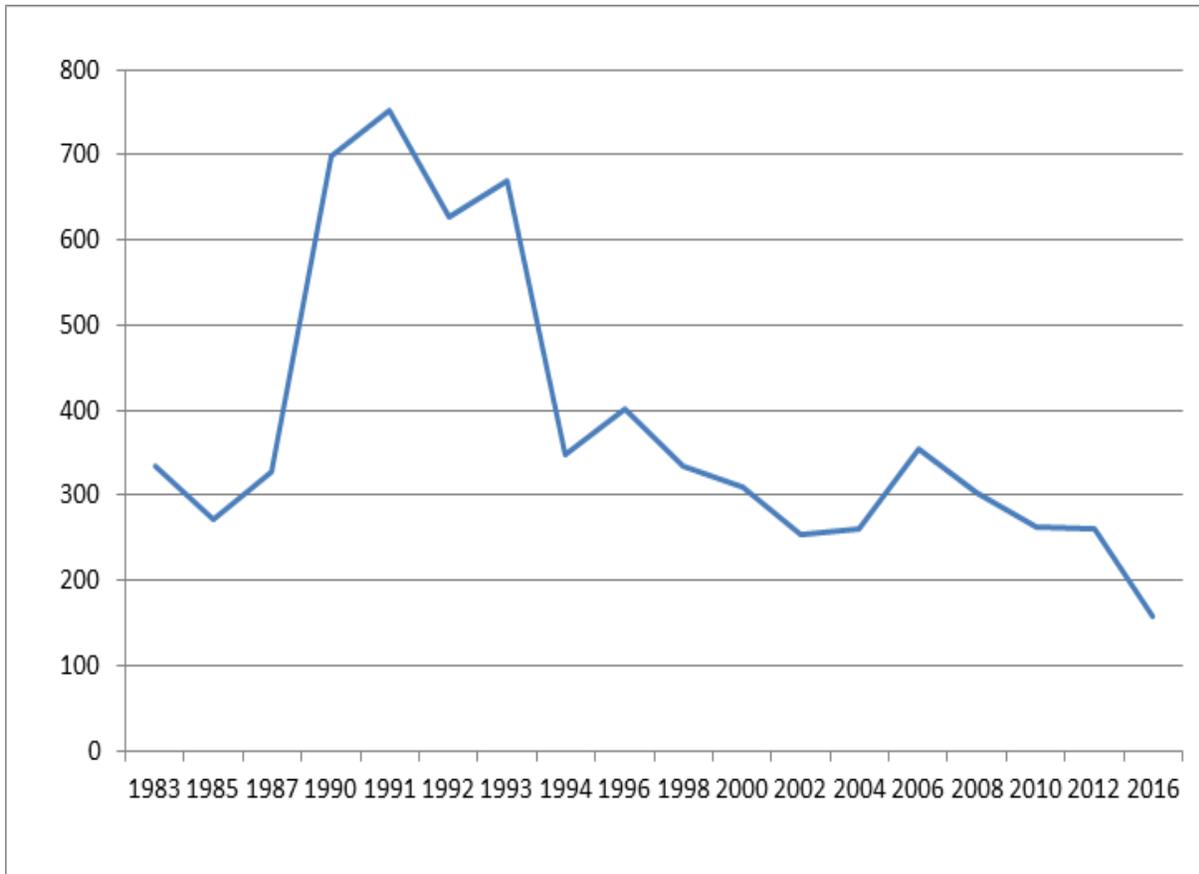


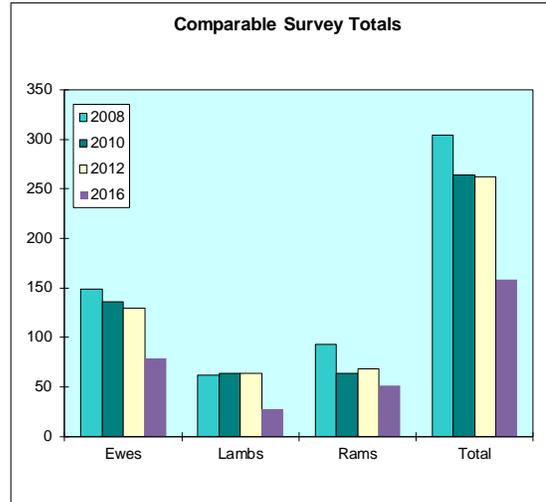
Figure 4. Total bighorn sheep observed (or estimated in years without surveys) during aerial surveys, GMU 42, Owyhee River PMU, 1983-present. These numbers represent actual counts and are considered minimum population estimates. The 2016 surveys were conducted in March rather than July due to a disease outbreak in nearby Oregon populations. Sheep counted as lambs in the March survey would have been counted as adults in a July survey, and there are no new 2016 lambs included in the survey. Therefore, the lower number of sheep counted in 2016 may not indicate an actual decline in population.

California Bighorn Sheep
Owyhee River
 GMU 42; Hunt Areas 42-1,42-2

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
42	2008	149	62	37	56	93	0	304
	2010	136	64	40	24	64	0	264
	2012	130	64	36	32	68	0	262
	2016	79	28	23	28	51	0	158
Modeled estimate		172	91	44	42	86	0	349
Per 100 ewes observed			35	29	35	65		

*2016 Surveys were conducted in March rather than July due to a disease outbreak in nearby Oregon populations. Sheep counted as lambs in the March survey would have been counted as adults in a July survey, and there are no new 2016 lambs included in the survey.



Hunting tags and harvest information

		2009	2010	2011	2012	2013	2014	2015	2016
Tags	42-1	6	6	4	4	4	4	4	4
	42-2	6	6	4	4	4	4	4	4
	Total	12	12	8	8	8	8	8	8
Harvest	42-1	6	3	3	3	4	3	0	4
	42-2	5	4	2	2	3	2	2	2
	Total	11	7	5	5	7	5	2	6
Hunter success		92	58	63	63	88	63	25	75
Ave ram age		6.9	6.8	5.5	5.5	8.0	7.3	4.5	6.7

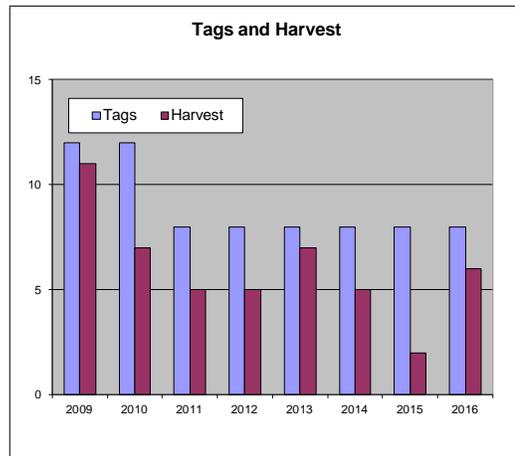


Figure 5. Owyhee River Population Survey and Harvest

JACKS CREEK PMU

GMU 41; Hunt Areas 41-1, 41-2

Description

This area ranges 1,100-1,900 m in elevation, and surrounds Big Jacks, Little Jacks, and Shoofly creeks. These perennial streams cut through terraced canyons that average 300 m deep, and are generally characterized by cliff bands interspersed with vegetated benches. The vegetative community is dominated by sagebrush, rabbitbrush (*Chrysothamnus* spp.), cheatgrass (*Bromus tectorum*), and bluebunch wheatgrass (*Pseudoroegneria spicata*).

Historical Perspective

Bighorn sheep were abundant in southwestern Idaho prior to European settlement, but numbers began to decline following the mining boom of the late 1800s. Several causes have been implicated in this decline, including competition from cattle, disease introduced by domestic sheep, and indiscriminate hunting to provide meat for mining camps. The last reported sighting of a native bighorn sheep in Owyhee County occurred in 1927.

The first release of California bighorns into Jacks Creek occurred in 1967, when 12 sheep from British Columbia were released into Rattlesnake Creek, a tributary of Little Jacks Creek. Sheep were reintroduced into Big Jacks Creek in 1988. The Jacks Creek population of California bighorn sheep grew from those 12 animals to 392 animals observed on a 1999 helicopter survey. Following 1999, however, the number began to decline (Figure 6). Since 2004, the observed population has hovered around 170-230.

Issues

The steep and rugged canyon terrain and isolation of some forage areas by rimrock reduces competition between bighorn sheep and domestic livestock. However, the potential for conflict may exist adjacent to the canyons and in portions of the canyons accessible by cattle. Competition for forage may increase as bighorn or cattle numbers increase, or as forage availability decreases due to drought, grazing pressure, wildfire, or invasion of unpalatable exotic weeds or grasses.

While this sheep population has been unaffected by recent disease and die-offs, the potential exists due to the proximity of private inholdings in or adjacent to bighorn sheep habitat. There are no domestic sheep grazing allotments near Jacks Creek; however, there is no way to regulate or monitor small farm flocks on private land. In addition, disease transmission is possible from neighboring bighorn sheep populations.

Predation by mountain lions is a concern for many sheep enthusiasts, but the impact of predation on this population is not well understood.

Evidence of illegal off-road vehicle use in sheep habitat and along the canyon rims has increased during the last 20-25 years. Enforcement is challenging due to the remoteness of the area, but the wilderness designation may have helped assuage some of the illegal use by off-road vehicles.

The wilderness designation eliminated >30 miles of roads within the entire Owyhee Initiative Area, and several key access roads were closed within the Jacks Creek PMU. Hunter congestion at the remaining access points may need to be addressed in the future if contention arises.

This area is used by the Air Force for training. Impacts to bighorn sheep are not fully understood. Agreements have been made to mitigate the potential impacts to bighorn sheep, particularly during lambing season (e.g., flights will take place perpendicular to the canyons and not parallel to them). Expanded use of the area for military training could have negative impacts to bighorn sheep, especially during critical times of the year (e.g., lambing, winter). Compliance with overflight agreements are unknown and difficult to enforce.

A wildfire burned approximately 50,000 acres between Big Jacks and Little Jacks Creek in the summer of 2012. This fire burned a considerable amount of bighorn sheep habitat in both drainages, and it is uncertain how it will affect bighorns long-term. If native grasses and forbs can reestablish, the burn could prove favorable. However, if invasive annual grasses colonize the burn, the effectiveness of the habitat to support bighorn sheep will be diminished. Additionally, rush skeleton weed was documented in Big Jacks Creek in 2014. This weed has the potential to establish across thousands of acres, and could severely impact bighorn sheep habitat in the area.

Management Direction

This sheep herd will continue to be managed conservatively, offering hunters reasonable chances at harvesting a mature ram. Hunter success rates since 2010 have been 75-100%. These herds have been stable since 2003 at approximately 200-250 sheep (Figure 6). The Little Jacks herd experienced a population decline following the severe winter of 1992-1993 after peaking in the early 1990s. It is estimated approximately 475 sheep could occupy the Jacks Creek PMU based on suitable habitat within current sheep distribution (Table 1). This estimate is similar to the population high observed in early 1990s. However, seasonal habitats (winter range) and specific habitat needs (lambing areas), are not accounted for in the habitat model. Further refinement of the habitat model will likely decrease the estimated potential population size. Current available information indicates the Jacks Creek PMU is capable of supporting ≥ 300 sheep and the overall management goal is to maintain or increase the current population.

In February 2011, 31 sheep were captured in Shoofly, Little Jacks, and Big Jacks. Thirty adult ewes were fitted with VHF radio collars, and one ram was fitted with a GPS radio collar. Movements of sheep between Big Jacks and Little Jacks have been documented, in addition to the ram moving into GMU 40 and summering with rams from Castle Creek. Mountain lions were the highest source of mortality, killing 7 ewes. Three ewes died of unknown causes/non-predation, and 3 died of unknown causes. IDFG continued tracking radio-collared sheep until the collar batteries died in late 2016.

In 2015, eastern Oregon experienced a pneumonia outbreak that reduced the bighorn sheep population by over 60% (personnel communication, ODFW). In response, IDFG conducted a population survey, and capture event to determine if pneumonia had spread into Idaho. IDFG typically conducts sheep surveys in July, but because of the emerging disease issue the 2016 survey was conducted in March (Figure 7). Population survey numbers were lower than previous survey years because of the timing of the March survey. A July survey includes all recently recruited young into the adult population, and all lambs born that year. A March survey does not include new lambs and recent recruitment, instead the lamb count is a count of the lambs born the previous year that survived to ~10-months. Therefore, use caution when comparing 2016 survey results to previous years.

Management Actions

1. Provide technical assistance to the BLM on travel management in Owyhee County.
2. Work with BLM to enforce motorized travel restrictions in the Owyhee Initiative area.
3. Refine habitat modeling to more accurately characterize sustainable population levels.

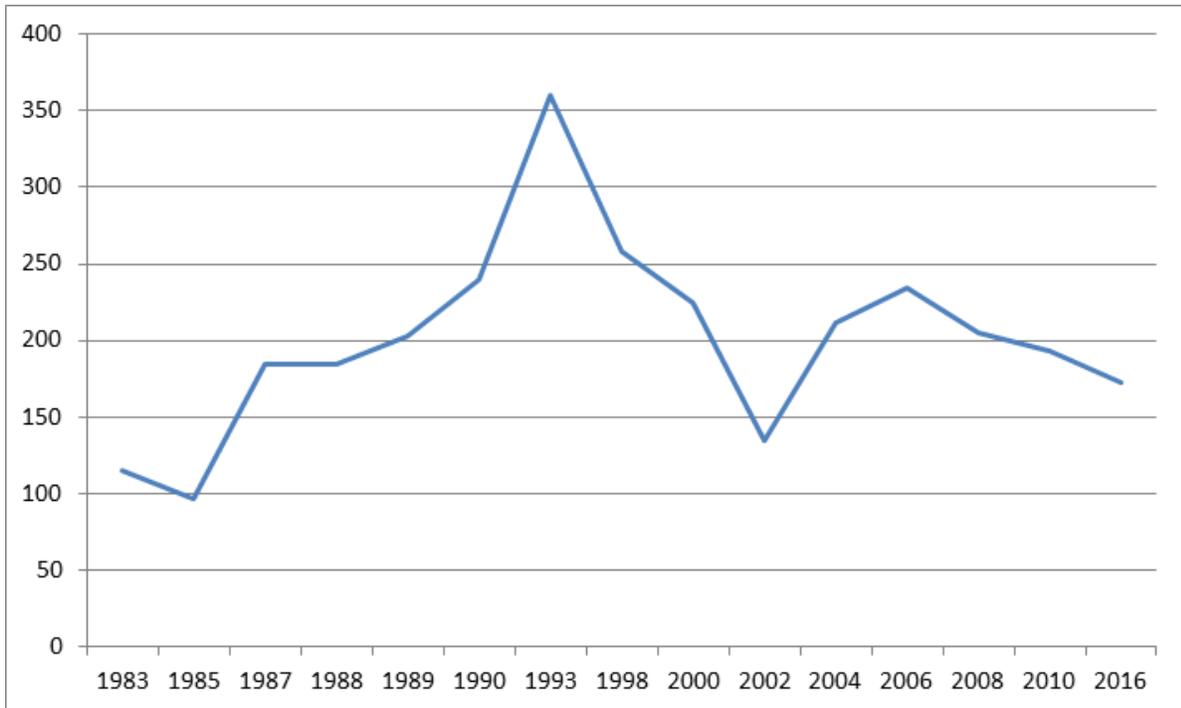


Figure 6. Total bighorn sheep observed during aerial surveys, GMU 41, Jacks Creek PMU, 1983-present.

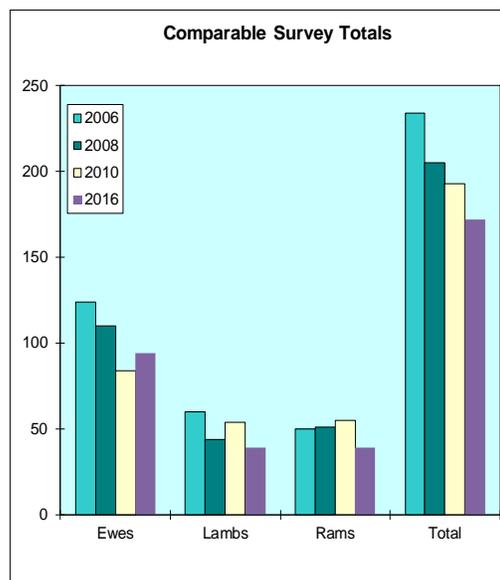
These numbers represent actual counts and are considered minimum population estimates. The 2016 surveys were conducted in March rather than July due to a disease outbreak in nearby Oregon populations. Sheep counted as lambs in the March survey would have been counted as adults in a July survey, and there are no new 2016 lambs included in the survey. Therefore, the lower number of sheep counted in 2016 may not indicate an actual decline in population.

California Bighorn Sheep
Jacks Creek
 GMU 41; Hunt Areas 41-1, 41-2

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
41	2006	124	60	36	14	50	0	234
	2008	110	44	33	18	51	0	205
	2010	84	54	21	34	55	0	193
	2016	94	39	11	28	39	0	172
Modeled estimate		113	72	29	43	72	0	257
Per 100 ewes observed		41	12	30	41			

*2016 Surveys were conducted in March rather than July due to a disease outbreak in nearby Oregon populations.
 Sheep counted as lambs in the March survey would have been counted as adults in a July survey, and there are no new 2016 lambs included in the survey.



Hunting tags and harvest information

		2009	2010	2011	2012	2013	2014	2015	2016
Tags	41-1	2	2	2	2	2	2	2	2
	41-2	2	2	3	3	3	3	4	4
	Total	4	4	5	5	5	5	6	6
Harvest	41-1	2	2	2	2	2	2	2	2
	41-2	2	1	2	4	3	3	2	2
	Total	4	3	4	6	5	5	4	4
Hunter success		100	75	80	120	100	100	67	67
Ave ram age		6.0	7.8	6.3	6.3	8.4	7.9	8.3	8.0

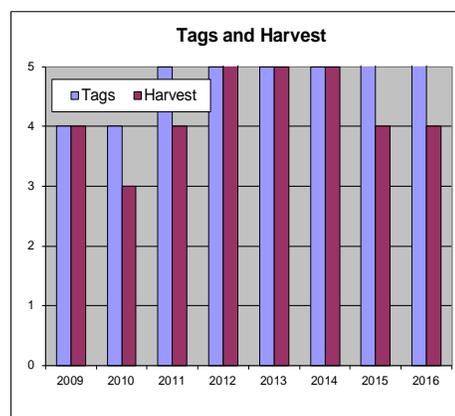


Figure 7. Jacks Creek Population Survey and Harvest

BRUNEAU-JARBIDGE PMU

GMU 41 (east), 46, 47; Hunt Area 46

Description

This population includes bighorn sheep in GMUs 46, 47, and that portion of 41 east of Highway 51. Bighorn sheep in this area primarily use lands managed by the BLM, but occasionally use private lands. Elevations in the area used by bighorn sheep range from 1,100 m in canyon bottoms to approximately 1,500 m on desert plateaus. The landscape is characterized by steep, rugged canyons that are 300-400 m deep. Vegetation is almost exclusively shrub-steppe, with some riparian shrub communities along river corridors. Road densities in the area are relatively low, and the distance and difficulty of travel serve as natural limitations on human use of the area. Bighorn sheep in this area do not exhibit seasonal migratory movements.

Historical Perspective

Bighorn sheep were extirpated from southern Idaho in the early 1900s. In the 1960s, IDFG 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 southwest Idaho.

From 1982-1993, IDFG and Nevada Department of Wildlife (NDOW) released nearly 100 California bighorn sheep into portions of the Jarbidge and Bruneau. The bighorn sheep released by NDOW in 1982 and 1984 moved north into the Jarbidge River Canyon in Idaho. Bighorn sheep have also been released by IDFG 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. Currently, bighorn sheep are distributed throughout the Jarbidge and West Fork Bruneau canyons upstream from their confluence. Bighorns have been observed as far north in the Bruneau Canyon at Cave Draw and are occasionally observed in the Sheep Creek and Marys Creek drainages.

Issues

Population surveys in 1998 and 2000 indicated poor recruitment and a downturn in the Bruneau-Jarbidge bighorn population. The substantial and rapid decline of this sheep population suggested a disease die-off, although no conclusive evidence was available. Possible sources of disease for the Bruneau-Jarbidge herd were identified in the Marys Creek and Contact, Nevada, areas. The decline in bighorn sheep numbers prompted the closure of the hunting season in 2001 and 2002.

Results from aerial surveys in 2006 and 2008 indicated that the population was increasing (Figure 8). During a June 2015 survey, 116 individual sheep were observed – 38 fewer sheep than the previous (2010) survey. Lush green habitat conditions and using a different helicopter may have influenced survey results. A standard Bell 47 that has been used in previous surveys was unavailable. IDFG used a Hughes 600. The more powerful ship proved to be less maneuverable and may have influenced survey results. We have no reason to believe that the

population has declined. From 2005 to 2013 tags were offered annually in Hunt Area 46. Beginning in 2011, 5 tags were offered annually in two temporally separate hunts.

Because of suspected previous disease issues, continued monitoring of population trends and productivity are warranted. IDFG staff met with domestic sheep producers during the spring of 2016 to revise separation agreements and update contact information.

Management Direction

Within current distribution, modeled habitat comprises 400 km², which could support approximately 759 animals (assuming all habitat is suitable year-round and relatively high densities of 1.9/sheep/km²). However, these models were not developed for desert-dwelling bighorn sheep, and do not account for small-scale variation in habitat quality or for specific habitat needs such as lambing and winter habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size (Table 1).

Given previous survey data, the Bruneau-Jarbridge area seems capable of supporting ≥ 200 bighorn sheep. The overall management goal will be to maintain or increase the current population. No portion of the Bruneau-Jarbridge PMU overlaps any domestic sheep or goat grazing or trailing allotments. However, in those portions of bighorn sheep distribution that overlap private lands, management will focus on minimizing potential contact between bighorn sheep and domestic sheep and goats. Management will also focus on providing hunters the opportunity to take 5-6 year-old rams with an annual hunter success $\geq 50\%$.

Management Actions

1. Work with private land owners to minimize potential contact between bighorn sheep and domestic sheep and goats.
2. Refine habitat modeling to more accurately characterize sustainable population levels.

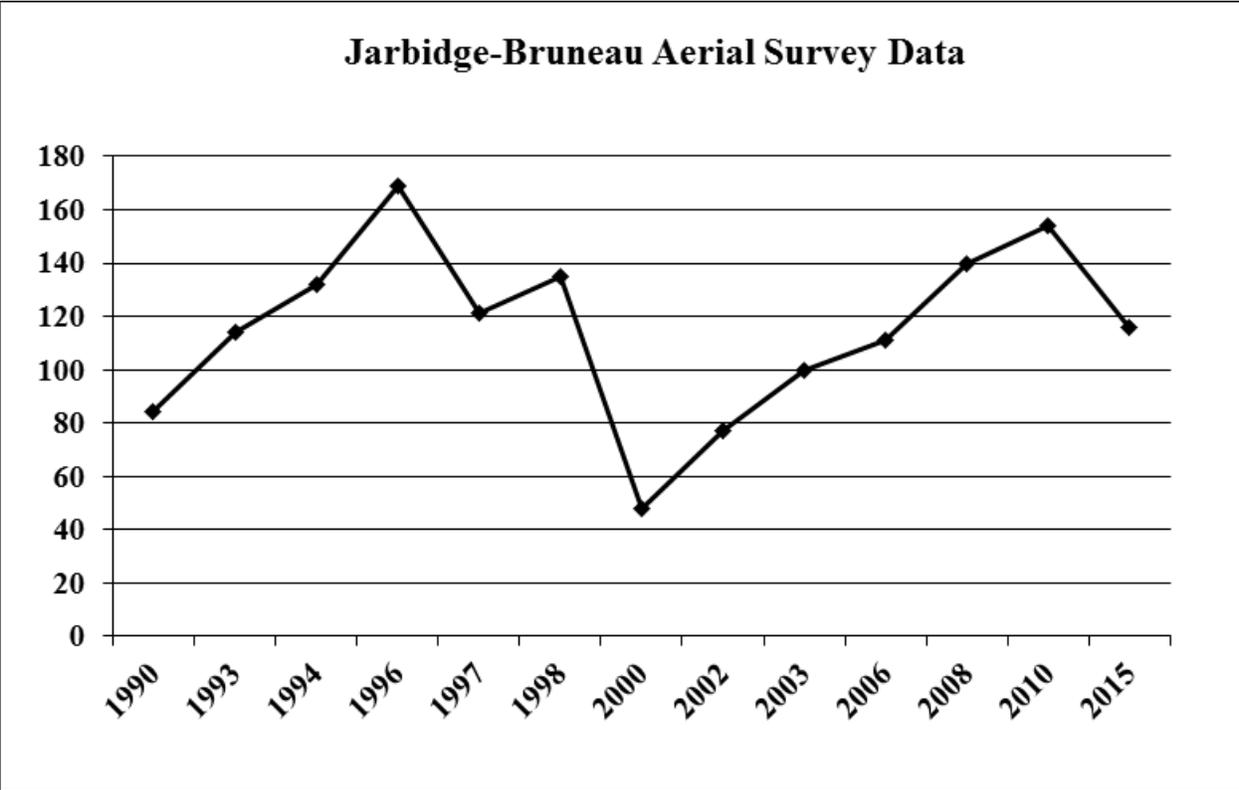
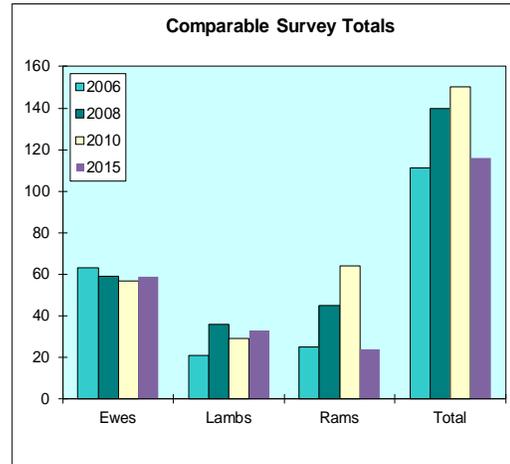


Figure 8. Total bighorn sheep estimated (modeled) during aerial surveys, Bruneau-Jarbidge PMU, 1990-present.

California Bighorn Sheep
Bruneau-Jarbidge
 GMUs 41 (east), 46, 47; Hunt Area 46

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
Total	2006	63	21	15	10	25	2	111
	2008	59	36	26	19	45	0	140
	2010	57	29	32	32	64	0	150
	2015	59	33	6	18	24	0	116
Modeled estimate		92	55	40	25	65	0	212
Per 100 ewes observed			56	10	31	41		



Hunting tags and harvest information

		2009	2010	2011	2012	2013	2014	2015	2016
Tags	46	3	3						
	46-1			3	3	3	3	3	3
	46-2			2	2	2	2	2	2
	Total	3	3	5	5	5	5	5	5
Harvest	46	3	3						
	46-1			3	3	3	3	3	2
	46-2			2	2	2	2	0	1
	Total	3	3	5	5	5	5	3	3
Hunter success		100	100	100	100	100	100	60	60
Ave ram age		7.8	6.8	6.7	6.5	7.0	7.7	7.2	9.5

Note: Hunt Area 46 season was split into two hunts in 2011.
 An early hunt Aug 30 - Sep 14 and a late hunt Sep 22 - Oct 8

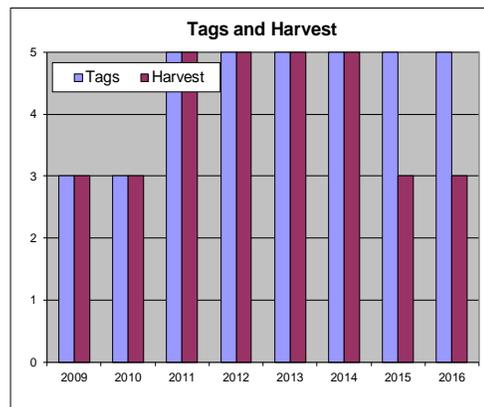


Figure 9. Bruneau-Jarbidge Population Survey and Harvest

SOUTH HILLS PMU

GMU 54

Description

The South Hills PMU (GMU 54) is an isolated mountain range of approximately 1,600 km². The landscape is characterized by low mountains bisected by moderately rugged canyons. Lower elevations and south and west facing slopes feature predominately shrub-steppe vegetation and juniper woodlands. Lodgepole pine (*Pinus contorta*) and quaking aspen (*Populus tremuloides*) communities occur at higher elevations (Figure 10).

Suitable habitat for bighorn sheep occurs in the Rock Creek, Dry Creek, and Big Cottonwood Creek drainages. In recent years most bighorn sheep use has been confined to a relatively small area in the lower portions of Big Cottonwood and Big Cedar canyons. Six bighorn sheep (4 rams and 2 ewes) were observed during a deer survey in the Cottonwood Creek drainage in February 2017. While most bighorn sheep use is on the Sawtooth National Forest, bighorns also use lands managed by the BLM, IDL, and IDFG. Bighorn sheep range in elevations from 1,400 m to 2,100 m. Motorized road and trail densities in bighorn sheep habitat are moderate to high. Bighorn sheep in this area do not exhibit seasonal migratory movements.

Historical Perspective

Bighorn sheep were extirpated from southern Idaho, including the South Hills, in the early 1900s. In 1963, IDFG initiated a successful program to reestablish California bighorn sheep populations in Owyhee County. By the mid-1980s, the healthy bighorn populations in Owyhee County provided a source for many translocations, including efforts to reestablish bighorns in the South Hills.

From 1986-1993, 50 California bighorn sheep were released into the Big Cottonwood drainage and 24 bighorns were released into the East Fork of Dry Creek. In 1989, the bighorns in Big Cottonwood experienced a die-off and despite additional releases numbers continued to decline. Currently, <15 bighorn sheep persist in GMU 54 and reintroduction efforts are considered impractical due to several issues, including the proximity of domestic sheep and goats, motorized recreation, and habitat issues such as juniper (*Juniperus* spp.) encroachment.

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

Issues

The future of the bighorn sheep population in GMU 54 is uncertain. Bighorn sheep have persisted in the Big Cottonwood area without additional releases since 1988, however, it is believed <15 sheep remain. Wild bighorns were reported to have contacted domestic sheep on 2 occasions: once near Big Cottonwood Canyon, and once near Dry Creek. Characteristics of the subsequent population declines in both areas suggest that disease may have played a role. However, in March 1991 5 bighorn sheep were captured and tested for disease; all results were negative. In November, 2012, there were several observations of bighorn sheep outside their

traditional range. Many of these observations were within 2 miles of a domestic sheep band that was trailing through the area, and there was one confirmed observation of contact between a bighorn ewe and domestic sheep. Significant efforts were made to locate the bighorns following this incident, with the intent to remove the ewe from the population, but those efforts were unsuccessful.

Several other issues affecting the suitability of the South Hills for bighorn sheep include 1) increasing human recreational activities in sheep habitat and 2) the expansion of juniper in the lower reaches of the canyons.

During spring 2008, IDFG staff worked with representatives of the USFS, BLM, ISDA, and 2 domestic sheep permittees to craft the *Strategy for managing separation between bighorn sheep and domestic sheep and goats in the South Hills* (Strategy). The Strategy is designed to improve monitoring of and decrease likelihood of contact between bighorn and domestic sheep in GMU 54. All of the above parties endorsed the final plan, and aspects of the plan have been incorporated into the permittees' annual operating instructions. Bighorn-domestic interaction response protocols in the Strategy figured prominently in IDFG's response to the November, 2012 observations of bighorn sheep in proximity to domestic sheep.

IDFG staff met with domestic sheep producers during the spring of 2016 to revise separation agreements and update contact information.

Management Direction

Given the long unsuccessful history and all the issues bighorn sheep face within this GMU, the decision was made to allow sportsman the opportunity to take whatever rams they desire and then develop a plan to remove any and all remaining sheep from this GMU. IDFG maintains healthy sheep populations to both the east (Jim Sage) and west (Bruneau and Jarbidge Canyons) of this population and hopes to eliminate any possibility of these sheep from GMU 54 from mixing with these other populations.

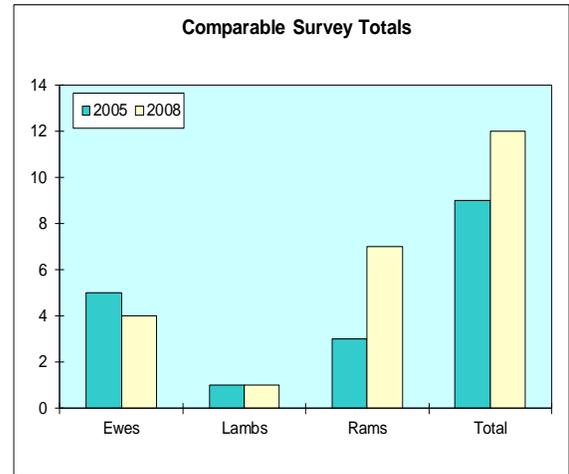
Management Actions

The Commission has approved 3 bighorn sheep ram tags for GMU 54 starting in the fall of 2017. Depending on hunter success and their observations, IDFG may continue the hunt into 2018 or start to remove whatever sheep remain.

California Bighorn Sheep
South Hills
 GMU 54

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
54	2005	5	1	2	1	3	0	9
	2008	4	1	4	3	7	0	12
Modeled estimate								<15
Per 100 ewes observed			25	100	75	175		



Hunting permits and harvest information

No hunting season in this area.

Figure 10. South Hills PMU

JIM SAGE PMU

GMU55; Hunt Area 55

Description

This population includes bighorn sheep in GMU 55. Jim Sage Mountain is one of many small, isolated mountain ranges that occur throughout southern Idaho. Bighorn sheep primarily use lands managed by the BLM, but also occasionally use private land. Bighorn sheep range in elevations from 1,500 to 2,400 m. The landscape is characterized by moderately rugged canyons and low mountains. Lower elevations and south slopes feature predominately shrub-steppe vegetation. Many slopes on the southern and western portions of Jim Sage Mountain exhibit thick juniper cover. Road densities in the area used by bighorn sheep are moderate. Bighorn sheep in this area do not exhibit seasonal migratory movements.

Historical Perspective

Bighorn sheep were extirpated from southern Idaho in the early 1900s. In the 1960s, IDFG initiated a program to reestablish California bighorn sheep populations in the Owyhee River and Little Jacks Creek drainages in Owyhee County. By the 1980s the healthy bighorn sheep population in Owyhee County was providing sheep for translocation programs in several western states including Idaho. From 1988 through 2004, IDFG embarked on a program to reestablish California bighorns into historic range in several locations in Cassia County including the Jim Sage and Albion mountains.

During 1999, domestic sheep grazing on federal grazing allotments in GMU 55 was eliminated, clearing the way for bighorn sheep releases. From 2000 to 2004, 93 bighorns were released into historic habitat on the Jim Sage and Albion mountains. The Jim Sage population has increased steadily to an estimated 100-120 bighorns. The Albion Mountain releases were unsuccessful. Released sheep began dispersing immediately from the habitat selected for them and no sheep are known to currently exist in the area.

Issues

The 2006, 2009, 2012, and 2015 helicopter surveys suggested that the population had increased to 100-120 individuals (Figure 11); probably near or exceeding the carrying capacity of the existing habitat. Until approximately 2007, a small farm flock of domestic sheep occurred near the south end of Jim Sage Mountain. A few of the bighorn sheep from Jim Sage had migrated to this area, and still spend much of their time on 2 low hills just south of the Narrows Road. Although no contact between domestic and bighorn sheep was confirmed, there is a chance contact may have occurred. Currently, the landowner no longer has domestic sheep on his private land; however, the close proximity of private land and the potential of previous contact warrant some monitoring.

During the summer of 2015, IDFG received a call from a concerned individual about 5 domestic goats that he observed on Jim Sage Mountain near bighorn sheep. IDFG put together a team and

the following day lethally removed all 5 goats. Biological samples were taken and sent to the lab for testing.

In early October 2016 we received a report that a bighorn sheep was observed with a band of domestic sheep on Black Pine Mountain in GMU 57. A team was sent out to locate and remove this animal from the population. Samples were sent to the lab for testing.

Key to maintaining a wild sheep population on Jim Sage Mountain will be minimizing the potential adverse effects of an increasing human population in the surrounding mountain valleys. Increasing human activities on and surrounding the mountain would be expected to lessen the suitability of existing habitat and could jeopardize the long-term viability of the herd.

Thick juniper cover occurs on portions of Jim Sage Mountain, reducing the amount of available suitable habitat. While bighorn sheep on Jim Sage Mountain tend to avoid thick juniper habitats, the junipers likely serve as a buffer to discourage bighorn movements to areas with increased human activities. A long-term juniper management program designed to improve bighorn sheep habitat, while considering the needs of mule deer and other wildlife, should be considered. BLM over the last several years has conducted juniper removal projects at higher elevations within bighorn sheep range on Jim Sage Mountain.

The 2003 and 2004 releases of bighorn sheep on the Albion Mountains appear unsuccessful in establishing a new wild sheep population. Presently there are no known wild sheep remaining in the release area.

In light of the high rate of dispersal away from the Albion Mountains release sites, it is apparent that the bighorn sheep habitat model developed in the Jim Sage Mountains failed to accurately predict bighorn habitat in the Albion area. In addition, habitat differences between source locations and release locations may have exacerbated the disorientation experienced by sheep in the new terrain. Specifically, the release site exhibited taller, shrubby vegetation than the source sites; this difference may have contributed to the rejection of the area by the translocated sheep.

Management Direction

Within current distribution, modeled habitat comprises 53 km², which could support approximately 102 animals (assuming all habitat is suitable year-round and relatively high densities of 1.9/sheep/km²). However, specific habitat needs such as lambing and seasonal habitats are not accounted for in these figures. Thus, further refinement of habitat models and available habitat could reduce the estimate of potential population size (Table 1).

Given the isolated nature and limited amount of suitable habitat on Jim Sage Mountain, it is likely that this herd is approaching or exceeding carrying capacity. The habitat-based population modeling approach detailed in the habitat section of this plan supports this theory as it yields a population goal of 102 bighorn sheep. Furthermore, because releases in the Albion Mountains have proven unsuccessful, future releases are not currently under consideration. Due to these factors, management will likely focus on maintaining, or slightly decreasing the bighorn sheep

population on Jim Sage Mountain. In those portions of bighorn sheep distribution that overlap or abut domestic sheep and goat grazing or trailing allotments, and within those portions that overlap private lands, management will focus on minimizing potential contact between bighorn sheep and domestic sheep and goats.

Management Actions

1. Work with domestic sheep and goat owners to minimize potential contact with bighorn sheep.
2. Work with BLM staff to discuss bighorn sheep habitat on Jim Sage Mountain, with particular emphasis on juniper density within bighorn sheep habitat.
3. Refine habitat modeling to more accurately characterize sustainable population levels.

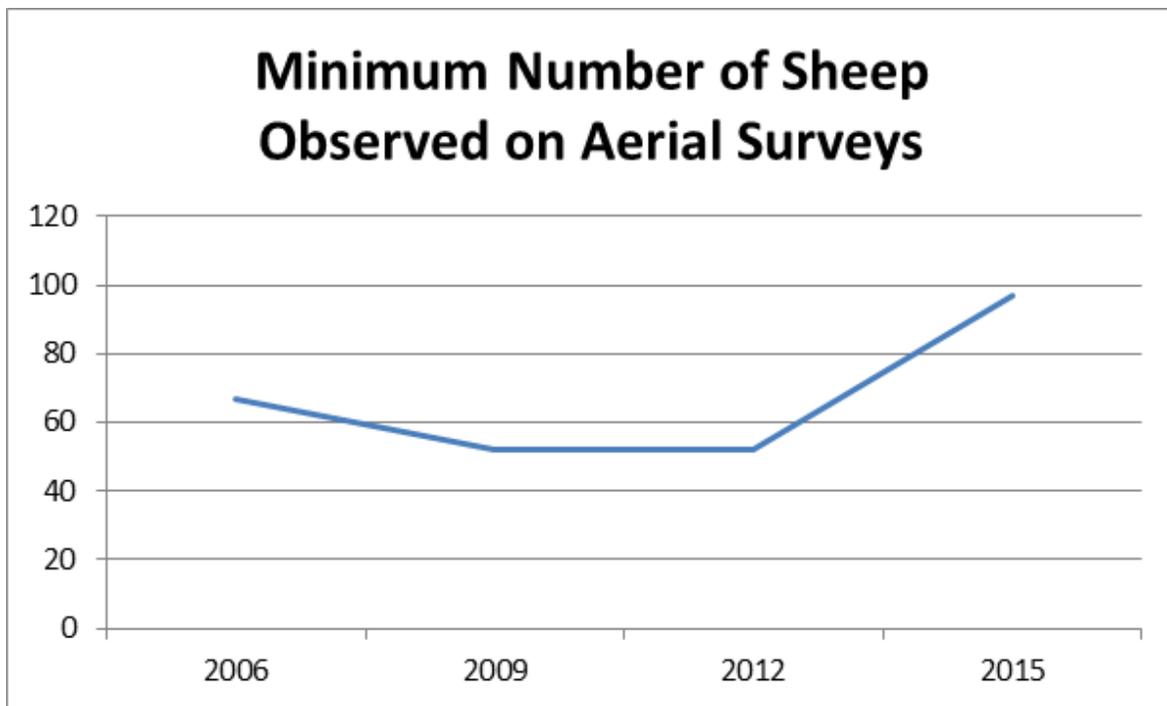
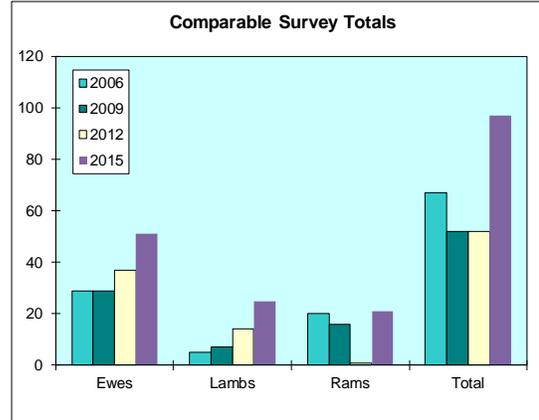


Figure 11. Total bighorn sheep estimated during aerial surveys, Jim Sage PMU, 2004-present.

California Bighorn Sheep
Jim Sage
 GMU 55; Hunt Area 55

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
55	2006	29	5	11	9	20	13	67
	2009	29	7	13	3	16	0	52
	2012	37	14	1	0	1	0	52
	2015	51	25	8	13	21	0	97
Modeled estimate								
Per 100 ewes observed		49	16	25	41			



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	1	1	1	1	1	1	1	1
Harvest	1	1	1	1	1	1	1	1
Hunter success	100	100	100	100	100	100	100	100
Ave ram age	4.5	6.5	9.5	8.5	6.5	2.5	9.5	8.5

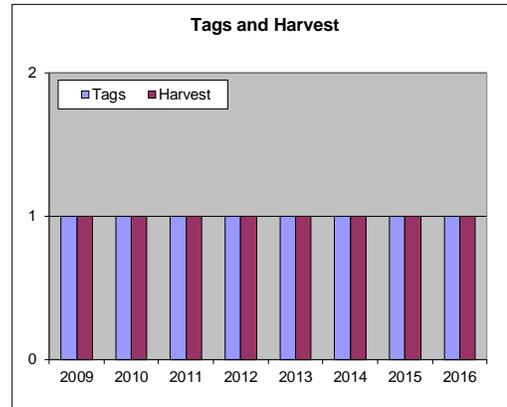


Figure 12. Jim Sage Population Survey and Harvest

POPULATION MANAGEMENT UNITS ROCKY MOUNTAIN BIGHORN SHEEP

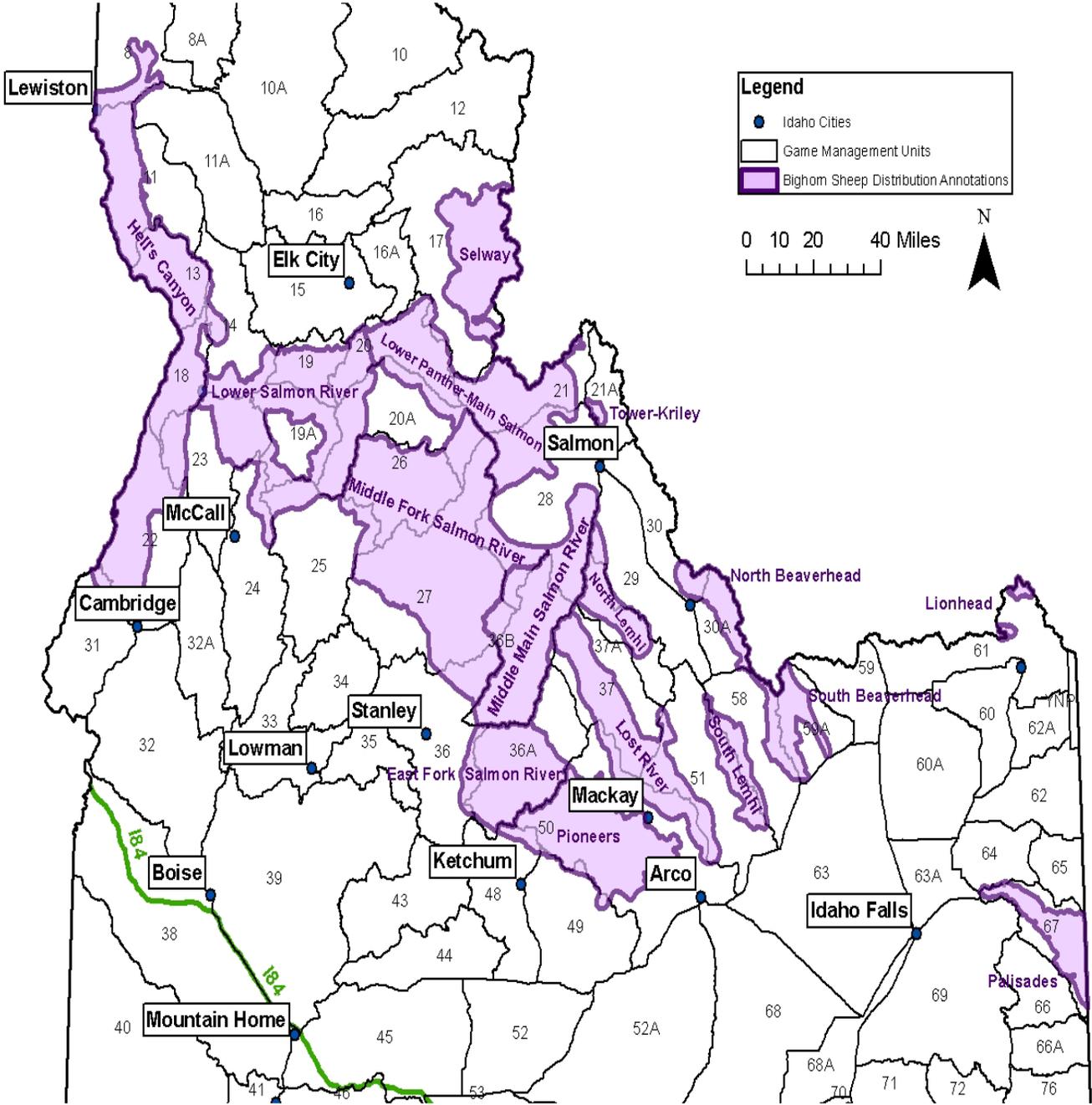


Figure 13. Rocky Mountain Sheep PMUs

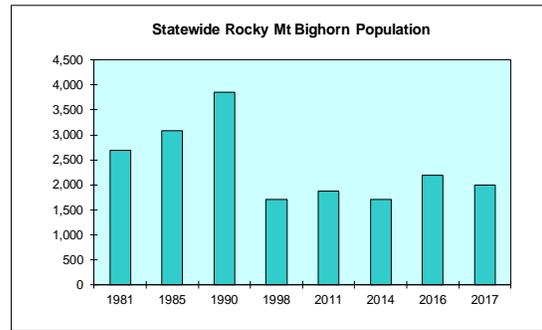
Rocky Mountain Bighorn Sheep

Population status

PMU	Observed							Modeled				Most recent survey
	Ewes	Lambs	Rams			Unclass	Total	Ewes	Lambs	Rams		
			I, II	III, IV	Total					I, II	III, IV	
Hells Canyon	66	8	11	30	41	0	115					2014
Lower Salmon	208	63	26	53	79	0	350					2013
Selway	21	1	3	1	4	0	26					2007
Middle Fork Salmon	273	68	70	65	135	1	477					2017
Panther-Main Salmon	182	61	42	30	72	2	317					2011
Tower-Kriley	6	3	6	0	6	0	15					2008
North Beaverhead	35	19	25	5	30	0	84					2014
South Beaverhead	10	3	2	1	3	20	36					2016*
North Lemhi	21	10	12	28	40	45	116					2016
South Lemhi	20	8	6	7	13	0	41					2016*
Lost River	114	49	32	61	93	0	256					2016
East Fork Salmon	25	3	1	10	11	0	39					2017
Middle Main Salmon	75	18	19	10	29	0	122					2016
Pioneers												
Palisades												
Lionhead												
Total	1,056	314	255	301	556	68	1,994					

*incidental to aerial elk or deer survey

Estimates of statewide population							
1981	1985	1990	1998	2011	2014	2016	2017
2,690	3,080	3,850	1,710	1,883	1,708	2,199	1,994



Hunting tags, applications, and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags*	65	64	67	64	65	65	69	70
Resident applicants	665	607	663	682	663	687	716	789
Nonresident applicants	923	804	829	898	939	1,091	1,027	1,072
Harvest	31	33	35	38	35	39	39	46
Hunter success (%)	48	52	52	59	54	60	57	66
Average ram age (yrs)	3.1	5.7	6.2	7.8	7.2	7.1	6.5	7.4

*Includes auction and/or lottery tags.

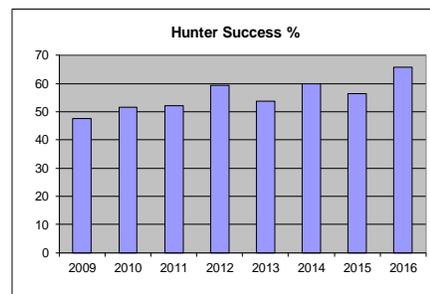
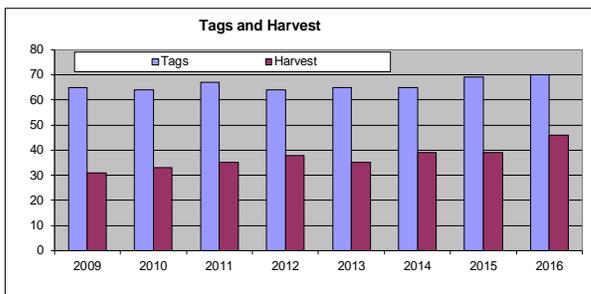
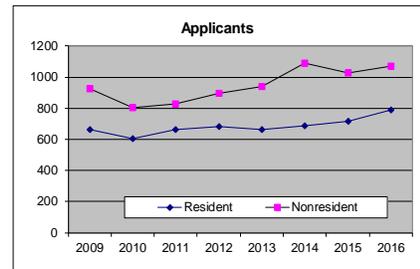


Figure 14. Rocky Mountain Bighorn Sheep Statewide Population Survey and Harvest.

HELLS CANYON PMU

GMUs 11, 13, 18, 22; Hunt Area 11

Description

The Hells Canyon PMU includes sheep in at least 4 populations in GMUs 11, 13, 18, and 22 (Figure 13). Extensive bighorn sheep habitat in these GMUs consists of dry, bunchgrass vegetation and rocky cliffs along the Snake and Salmon River breaks and their tributaries. Land ownership in GMU 11 is primarily public along the Snake River and includes IDFG's Craig Mountain Wildlife Management Area (CMWMA). There are also several significant blocks of private land, including one of the primary lambing areas for the population. The Salmon River breaks in GMU 11 and both the Snake and Salmon River breaks in GMU 13 are predominantly in private ownership, although the BLM manages much of the river corridor along the Salmon River and most of the Snake River corridor is protected by conservation easements with the USFS. The USFS is the major land manager in the Snake River corridor portion of GMUs 18 and 22 which includes portions of the Hells Canyon National Recreation Area and wilderness. Idaho Power manages the reservoirs and adjacent access sites in GMU 22 above Hells Canyon Dam. Road access into occupied sheep habitat is extremely limited in all 4 GMUs. Bighorn sheep provide a valuable viewing resource for river recreationists in the Hells Canyon area.

Historical Perspective

Bighorn sheep were native to Hells Canyon, but were extirpated in the early part of the 20th century. The last-known native bighorn sheep in GMU 18 was observed in 1932. Speculation at that time attributed the loss of bighorn sheep to over-hunting by miners for subsistence and disease outbreaks associated with domestic sheep contact.

Bighorn sheep were reintroduced into Hells Canyon beginning with a translocation of bighorn sheep from the upper Salmon River into GMU 18 in 1975 and continued with releases in GMUs 11, 13, and 18 through 2002. Since reintroduction, populations in GMU's 13 and 18 and 22 have experienced significant mortality from all-age disease outbreaks. All populations have experienced intermittent adult mortality and poor lamb recruitment due to pneumonia-caused mortalities.

In 1984, 17 sheep from Wyoming were released on the Craig Mountain Wildlife Management area in GMU 11. There were no surveys until 1992 when 57 animals were observed. The herd remained stable until the late 1990's when the population started increasing and reached 148 total sheep in 2002 (Figure 15). Intermittent poor lamb survival from 1998 through 2008 and low adult survival in 2005 resulted in a decline. There were 85 bighorn sheep counted in 2012 in GMU 11 and 91 in 2013. The primary cause of mortality in recovered dead lambs and in adults that died in 2005 was pneumonia.

After translocations in 1997 and 1999, the GMU 13 population was estimated at a high of 45 sheep in summer 2000. Disease outbreaks in adults between 2000 and 2003 due to scabies infection (2000) and pneumonia (2000 – 2003), and low recruitment of lambs 2000 – 2012 have

resulted in a decline in this population. In 2012 and 2013, only 19 and 21 sheep were observed, respectively.

Five translocations occurred in GMUs 18 and 22 from 1975 – 2002. Access is difficult and survey data are limited, however a high count of 87 sheep was tallied in 1982. Disease outbreaks were observed in 1983 and 1991. Since 1992, there have been 20 – 35 sheep observed in GMU 18. During the most recent survey (2013), 8 bighorn sheep were observed in GMU 18 and GMU 22 below Hells Canyon Dam.

Bighorn sheep translocated by the ODFW to the west side of the Snake River below Brownlee Reservoir 1990 – 1995, and above and below Hells Canyon Dam 1971 – 1999 periodically cross the river into GMU 22. The sheep released across from the extreme southern end of the GMU in 1990 and 1995 spend a significant portion of time in Dukes Creek. This population peaked at 76 sheep in 1998. In 1999, an all-age disease outbreak occurred and the population has not recovered due to lack of lamb recruitment and sporadic chronic pneumonia mortality in adults. Ten sheep were counted in 2011, while in 2012 and 2013 10 and 9 total sheep were counted respectively.

Hunting was initiated in GMU 11 in 1993. A controlled hunt with 2 tags was offered in 1993 and 1994. The likelihood of participation by the state auction or lottery tag holder in the GMU 11 hunt, as occurred from 1993-1996, led to a reduction in the number of tags offered in the hunt from 2 to 1 in 1995. Beginning in the late 1990s, the GMU 11 hunt has consistently produced some of the largest rams taken statewide. The Idaho state record bighorn ram was picked up in 1997 after probably having died in 1996. Many record book rams have been harvested in this hunt, including the largest ever taken in Idaho. Consequently, tags are highly sought after. Drawing odds reached an all-time high of 1 in 345 in 2006, with many out-of-state applicants. No bighorn sheep hunts have been offered in GMU 13 or 22.

Hunts were offered in GMU 18 beginning in 1984. Tag levels were reduced in subsequent years concurrent with the population decline. The hunt was closed in 1993.

Issues

Disease is the largest issue facing bighorn sheep in the Hells Canyon PMU. The very low or absence of recruitment because of sporadic lamb die offs and pneumonia in adults is the reason populations in this PMU have not grown. Currently, all populations in this PMU are disease limited. Increases in elk herds in this PMU could theoretically cause increased competition but currently little spatial overlap is observed. High rates of reproduction and large body and horn size in bighorn sheep suggest forage is not limiting.

Management Direction

GMU 11 is the only GMU in the Hells Canyon PMU that currently has a sheep population large enough to support a hunt. The hunt in GMU 11 is the most sought-after sheep hunt in the state. The recipient of the auction and raffle tag (alternate years) have consistently hunted in GMU 11

and drawing odds are the most difficult in Idaho (0.43% in 2016). Despite relatively difficult access, hunter success is usually 100% (Figure 16).

Hunting opportunity in GMU 11 will be managed to provide the opportunity to harvest large mature rams. Poor lamb recruitment due to disease issues represents the largest threat to continued bighorn sheep hunting opportunity in this GMU. As a result, tag levels will remain conservative as a response to limited ram availability. Access for hunting bighorns in GMU 11 is considered fair to moderately difficult. In 2017 the commission included GMUs 13 and 18 in hunt area 11. This will need to be watched closely to avoid over exploitation on rams in these GMUs.

Within current distribution, modeled habitat comprises approximately 817 km², which could support approximately 1,550 bighorn sheep (assuming that all habitat is suitable year-round at bighorn sheep densities of 1.9 km²). There is extensive lambing and year round habitat in this PMU but further refinement of habitat models could reduce estimates of available habitat and potential population size (Table 1).

Noxious weeds, especially yellow-starthistle, have become established in a significant portion of this PMU. Currently IDFG is working with cooperative weed management groups and aggressively spraying weeds and using biological controls on IDFG managed ground to improve wildlife habitat.

Cooperation with wildlife agencies in Oregon and Washington, public land management agencies including USFS and BLM, and private individuals is necessary to manage habitat and bighorn sheep in the Hells Canyon PMU.

The current objective in this PMU is to maintain or increase bighorn sheep populations.

Management Actions

1. Continue work with the Hells Canyon Initiative research.
2. Improve bighorn sheep habitat by working to reduce noxious weeds.
3. Improve bighorn sheep habitat by working to limit timber encroachment.
4. Refine habitat modeling to more accurately characterize sustainable population levels.
5. Use radio-marked sheep to provide data points for sightability modeling.

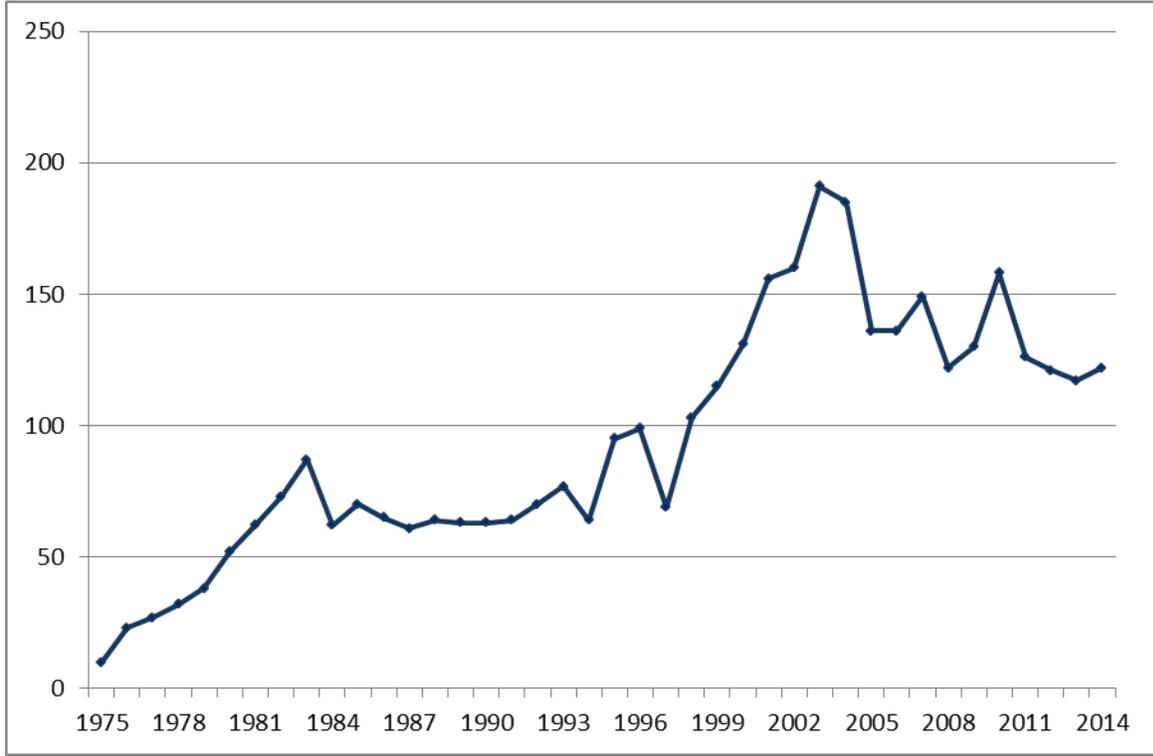


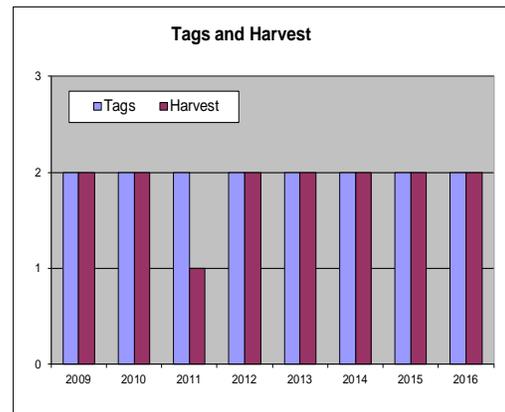
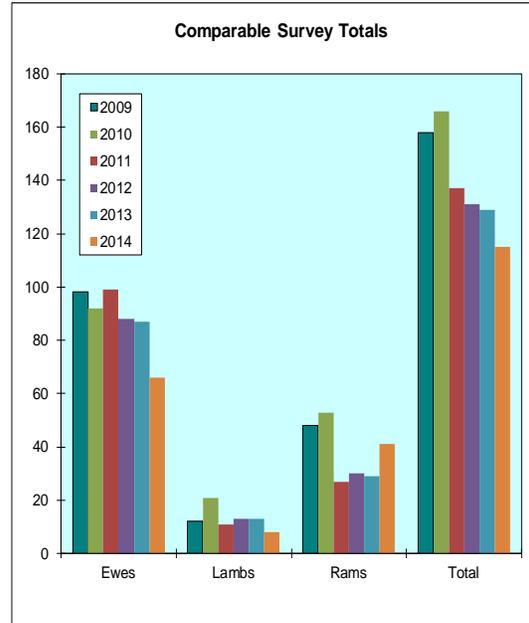
Figure 15. Total bighorn sheep observed or estimated between surveys, Hells Canyon PMU, 1975-present.

Rocky Mountain Bighorn Sheep
Hells Canyon
 GMUs 11, 13, 18, 22; Hunt Area 11

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
11	2009	63	9	5	25	30	0	102
	2010	59	17	21	18	39	0	115
	2011	69	9	7	10	17	0	95
	2012	58	8	6	13	19	0	85
	2013	63	8	9	11	20	0	91
	2014	53	8	8	23	31	0	92
13	2009	9	1	3	3	6	0	16
	2010	12	3	1	6	7	0	22
	2011	12	1	1	5	6	0	19
	2012	11	3	1	4	5	0	19
	2013	11	4	2	4	6	0	21
	2014	9	0	3	7	10	0	19
18	2009	12	2	2	4	6	0	20
	2010	14	0	3	4	7	0	21
	2011	8	1	1	3	4	0	13
	2012	9	2	1	5	6	0	17
	2013	4	1	0	3	3	0	8
	2014	NA	NA	NA	NA	NA	NA	NA
22	2009	10	0	0	1	1	0	11
	2010	7	1	0	0	0	0	8
	2011	10	0	0	0	0	0	10
	2012	10	0	0	0	0	0	10
	2013	9	0	0	0	0	0	9
	2014	4	0	0	0	0	0	4
Total	2009	98	12	10	38	48	0	158
	2010	92	21	25	28	53	0	166
	2011	99	11	9	18	27	0	137
	2012	88	13	8	22	30	0	131
	2013	87	13	11	18	29	0	129
^a	2014	66	8	11	30	41	0	115
Modeled estimate								
Per 100 ewes observed			12	17	45	62		

^aSurvey not conducted in GMU 18 during 2014



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags*	2	2	2	2	2	2	2	2
Harvest*	2	2	1	2	2	2	2	2
Hunter success	100	100	50	100	100	100	100	100
Ave ram age	10.5	10.0	9.5	9.0	10.5	11.5	9.5	11.5

*Includes auction and/or lottery tags.

Figure 16. Hells Canyon Population Survey and Harvest

SELWAY PMU

GMU 17; Hunt Area 17L

Description

The Selway PMU includes the upper portion of the Selway River drainage in GMU 17. Bighorn sheep occurred naturally in this area. Sheep in GMU 17 move between Idaho and Montana. Summer range lies along the border of the 2 states, with most animals moving down into Idaho to winter (between Indian Creek and White Cap Creek and on the east side of the Selway River). In some years, some of these sheep may winter in Montana. Sheep marked by Klaver (1978) were observed in both states over several years.

Sheep habitat in GMU 17 consists of dry, bunchgrass habitat types. Land ownership is almost entirely USFS, with just a few small in-holdings of private land. The area is encompassed by the Selway-Bitterroot and Frank Church River of No Return wilderness areas. The only road access in this area is provided by USFS roads 468 and 6223 which runs from Nez Perce Pass on the Idaho-Montana border, down Deep Creek to the Selway River, and downstream along the Selway to White Cap Creek.

Historical Perspective

In February 1989, a total of 29 bighorns from Morgan Creek in GMU 36B were translocated into 2 sites along the Selway River in GMU 17. Both of these releases were made outside of currently occupied bighorn range within the GMU. Recent surveys and observations have suggested that neither translocation was successful.

Most bighorn sheep surveys have been conducted by helicopter coincidental to elk sightability surveys in January or February. Bighorns have been counted in GMU 17 since 1981 (Figure 17). The highest counts were obtained in 1982, 1983 and 1984, and were 121, 99 and 109 total sheep, respectively. Since that time, counts have ranged between 26 and 52 total sheep. During the most recent survey, conducted in 2007, 26 sheep were observed. There is concern that the currently employed survey methodology may not accurately reflect current population status.

Bighorn sheep were hunted under a general season framework in the Clearwater Region between 1952 and 1970. This season framework allowed more accessible populations to be overexploited. The general season bighorn sheep hunt was discontinued in this PMU in 1971, and no hunting occurred in the Selway PMU until 2007 when a new hunt with 1 tag was initiated as Hunt Area 17L. Hunter success has been low; no sheep have been harvested since 2013 (Figure 18). The late timeframe of this hunt (14-31 October) was established to ensure enough time for bighorns to move from their summer range on the Idaho-Montana border back into Idaho where they would be available to Idaho hunters

Issues

Low lamb survival and recruitment rates have been an issue in some years since the early 1980s. The timing and causes of this low survival are poorly understood.

Currently the largest issue affecting management of sheep in this PMU is the lack of information. Little is known about the current disease status in the Selway. Ground counts conducted in the last 10 years would indicate that lambs are surviving and this population should be growing.

Management Direction

Bighorn sheep have been hunted in a portion of GMU 17 (Hunt Area 17L) since 2007. Since inception of the hunt, only 1 tag has been offered annually. Hunt Area 17L will be managed primarily to provide limited bighorn sheep hunting opportunity. Given the short duration of this relatively new hunt and a general lack of reliable population data, future emphasis will be placed on improving knowledge of population status. IDFG has in the past and will continue in the future to work with and encourage the USFS to improve bighorn sheep habitat in this PMU through prescribed burning, let burn policies, and management of weeds.

Within current distribution, modeled habitat occupies approximately 290 km², which could support approximately 550 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9 km²). However, there are limitations based on specific habitat needs such as lambing and wintering habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size. The current objective in this PMU is to increase bighorn sheep populations (Table 1).

Management Actions

1. Conduct an aerial survey specifically for bighorn sheep.
2. Improve bighorn sheep habitat by working to reduce noxious weeds.
3. Improve bighorn sheep habitat by working to limit timber encroachment.
4. Increase knowledge of movement patterns, habitat use, survival, etc. using radiomarked bighorn sheep.
5. Refine habitat modeling to more accurately characterize sustainable population levels.
6. Use radiomarked sheep to provide data points for sightability modeling.

Literature Cited

Klaver, R. W. 1978. A management-oriented study of the ecology of bighorn sheep in the Bitterroot Mountains, Montana and Idaho. Thesis, University of Montana, Missoula, USA.

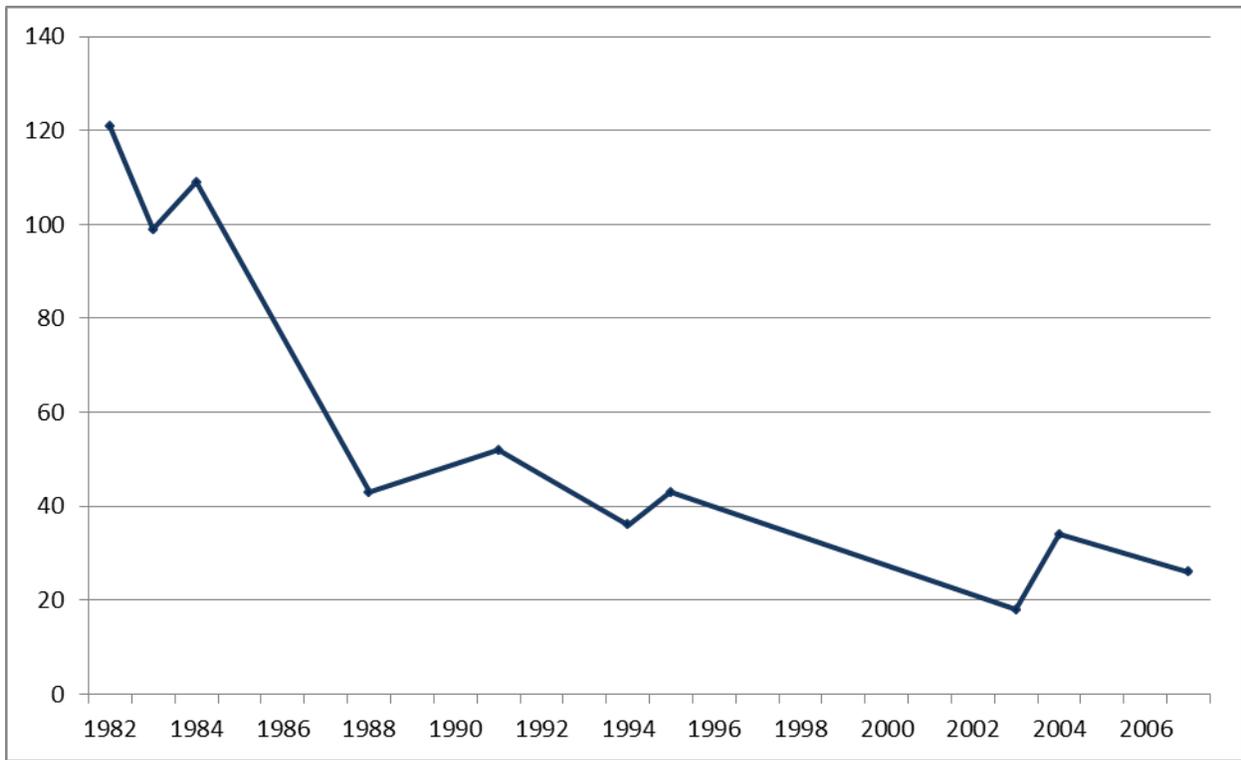


Figure 17. Approximate total bighorn sheep observed, Selway PMU, 1982-present.

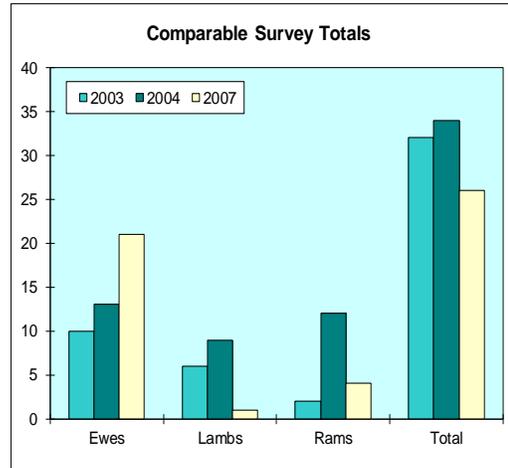
Rocky Mountain Bighorn Sheep

Selway

GMU 17; Hunt Area 17L

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
17	2003	10	6	2	0	2	14	32
	2004	13	9	4	8	12	0	34
	2007	21	1	3	1	4	0	26
Modeled estimate								
Per 100 ewes observed		5	14	5	19			



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	1	1	1	1	1	1	1	1
Harvest	0	0	0	1	0	0	0	1
Hunter success	0	0	0	100	0	0	0	100
Ave ram age	0.0	0.0	0.0	4.5	0.0	0.0	0.0	5.5

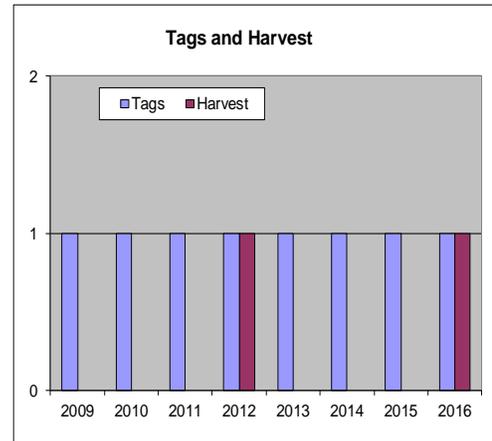


Figure 18. Selway PMU Population Survey and Harvest

LOWER SALMON RIVER PMU

GMUs 14, 19, 19A, 20 (west), 20A (west); Hunt Area 19

Description

The Salmon River PMU includes GMUs 14, 19, 19A, 20 (western portion), 20A (western portion), 23, 24, and 25 (Figure 13). Bighorn sheep habitat in these GMUs consists of dry, bunchgrass habitat types along the Salmon River breaks and some high elevation, alpine summer habitat. Habitat along this river corridor is primarily under USFS ownership with the eastern portions of this PMU occurring within the Gospel Hump and Frank Church River of No Return wilderness areas. Habitat also occurs on some BLM land and small in-holdings of private land. Road access is extremely limited with the exception of the Salmon River Road downstream of Vinegar Creek (primarily in GMU 14).

Historical Perspective

Bighorn sheep are native to these GMUs and were not extirpated in the early 1900s. No reintroductions or augmentations have occurred in the PMU.

Beginning in 1952 and lasting until 1970, bighorn sheep hunting in the Lower Main Salmon PMU was offered on a general hunt basis. From 1971 to present, all sheep hunting in these GMUs has been by controlled hunts. Season structure and tag levels were modified starting in 1993 to reflect the decline in total numbers of sheep and lamb recruitment. Currently, there are 2 hunts offered in this area Hunt Area 19 consists of portions of GMUs 14, 19 and 20 and has 4 tags with success averaging 80% over the last 5 years (see figure 20). Hunt area 19A consists of portions of GMUs 19A and 20A. This hunt was established in 2015 with 2 tags. During 2016, both hunters harvested rams for a success rate of 100%.

Issues

Bighorn sheep have usually been surveyed by helicopter coincidentally with elk sightability surveys (up until 2009 when bighorn sheep only surveys were started) which likely systematically underestimated bighorn sheep. Total numbers of bighorn sheep observed during surveys have declined in GMUs 19 and 20 since the early to mid-1980s. These surveys have yielded very conservative bighorn sheep population estimates for this PMU. IDFG is developing a sightability model for bighorn sheep surveys in this area to increase precision of population estimates (see Research Bighorn Sheep PR Report for details).

In GMU 19, between 122 and 136 bighorn sheep were observed during 1983 and 1984 elk surveys. However, only 40-60 were observed in 1992, 1993, 1996, 2001 and 2007. Surveys conducted since 2009 were flown strictly as a bighorn sheep surveys. In the 2012 survey 112 animals were observed, while during 2013 there were 133 bighorn sheep observed. This estimate reflects an attempt to collect more precise data rather than an actual change in the population. In GMU 14, 29 sheep were observed in 2011, 38 sheep in 2012, and 36 sheep in 2013. In GMU 20 (west), 12 sheep were observed in 2011, 38 sheep in 2012, and 36 sheep in 2013.

Low recruitment rates and overall declines in sheep numbers over the years in these GMUs may have been caused by disease and habitat conditions. Population numbers have dwindled in the western portion of this PMU (GMU 14) that is closest to active domestic sheep allotments. Disease has resulted in low lamb survival in adjacent herds along the Salmon River. Respiratory disease is the most significant disease, resulting in negative effects on population dynamics through increased adult and lamb mortality.

In the South Fork of the Salmon River (east part of GMU 19A and west part of GMU 20A), complete surveys were conducted between 2011 and 2013. These surveys indicate the population in this portion of the GMU was fairly stable, with 122-144 total sheep observed. A survey conducted in February, 2017 in the South Fork of the Salmon River recorded 185 total sheep, indicating the population may be growing despite the addition of a hunt.

Management Direction

Sheep in the Lower Salmon River PMU are hunted in 2 hunt areas within only a portion of the total PMU area. Hunt Area 19 consists of portions of GMUs 14, 19, and 20. This hunt will continue to be managed primarily to maximize bighorn sheep hunting opportunity. Hunter success averages 80% in Hunt Area 19 over the last 5 years despite difficult access (Figure 20). New hunt area 19A was established in 2015. Hunter success during the first two years was 100%. Bighorn sheep in this PMU will continue to be monitored for impacts from disease and conflicts with domestic sheep operations.

In this PMU the current management strategy for bighorn sheep is to manage for separation from domestic sheep and goats using BMPs as outlined in the health section of the Bighorn Sheep Management Plan. The BMP agreements will be evaluated annually and adjusted as necessary to try to achieve this goal.

Within current distribution, modeled habitat comprises approximately 496 km², which could support approximately 950 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9 km²). However, there are limitations based on specific habitat needs such as lambing and wintering habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size. The current objective in this PMU is to maintain or increase bighorn sheep populations (Table 1).

Management Actions

1. Work with willing domestic sheep permittees, USFS, and BLM to use BMPs to maintain separation between bighorn sheep and domestic sheep and goats.
2. Increase knowledge of movement patterns, habitat use, survival, etc. using radiomarked bighorn sheep.
3. Refine habitat modeling to more accurately characterize sustainable population levels.
4. Use radiomarked sheep to provide data points for sightability modeling.

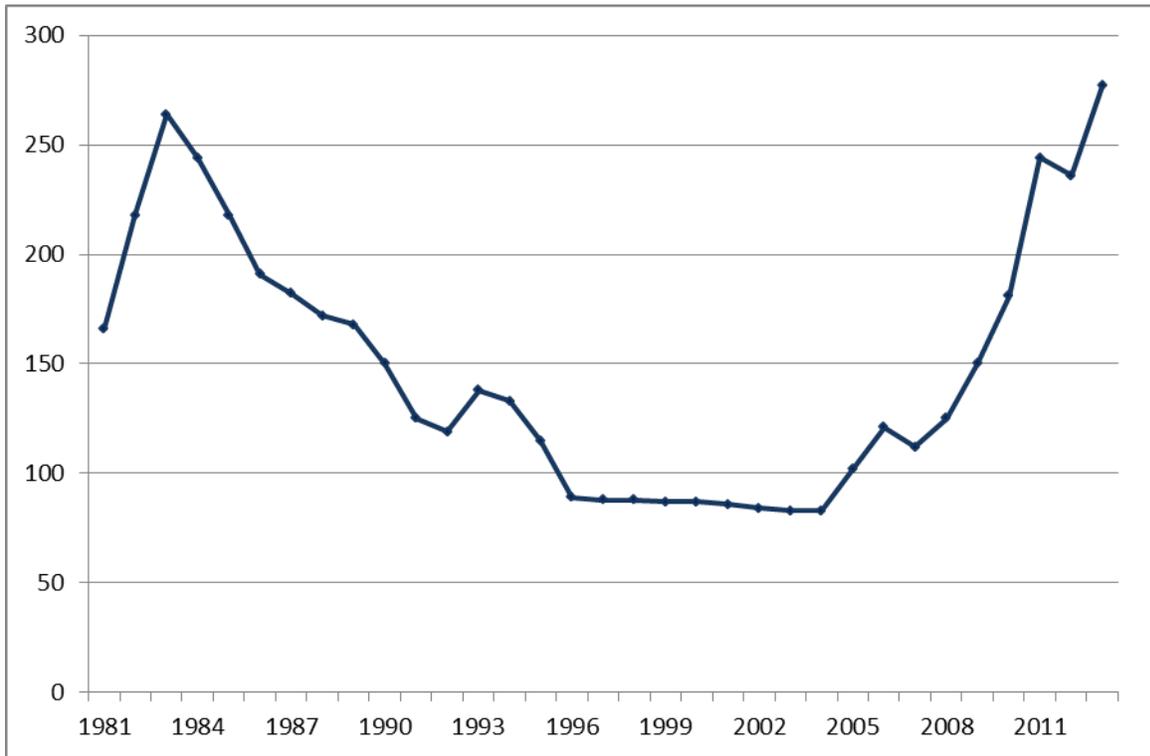


Figure 19. Approximate total bighorn sheep observed or estimated, Lower Salmon River PMU (GMUs 19, 19A, and 20A west), 1981-present.

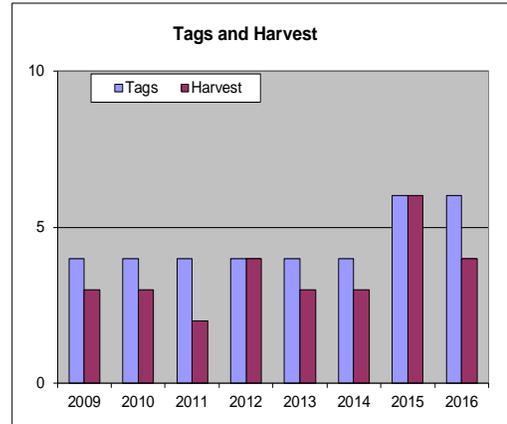
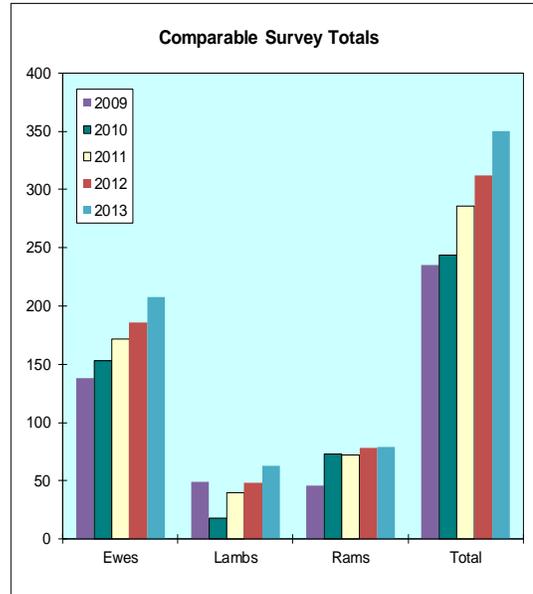
Rocky Mountain Bighorn Sheep

Lower Salmon River

GMUs 14,19, 19A, 20 (west), 20A (west); Hunt Area 19 and 19A

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
14	2009	10	1	5	7	12	0	23
	2010	18	0	2	8	10	0	28
	2011	20	1	2	6	8	0	29
	2012	25	6	2	5	7	0	38
	2013	25	6	2	3	5	0	36
19	2009 ^a	55	17	6	0	6	0	78
	2010	81	6	15	13	28	0	115
	2011	79	8	12	24	36	0	123
	2012	65	18	7	22	29	0	112
	2013	82	22	10	19	29	0	133
19A	2006	13	7	1	0	1	0	21
	2010	27	9	2	6	8	0	44
	2011	26	8	7	6	13	0	59
	2012	34	11	4	9	13	0	58
	2013	44	19	6	8	14	0	77
20 West	2007	11	1	1	6	7	0	19
	2010	3	2	9	10	19	0	24
	2011	6	0	1	5	6	0	12
	2012	25	0	2	11	13	0	38
	2013	14	3	3	16	19	0	36
20A West	2006	34	13	4	6	10	0	57
	2010 ^a	24	1	3	5	8	0	33
	2011	41	23	3	6	9	2	75
	2012	37	13	8	8	16	0	66
	2013	43	13	4	7	11	0	67
Total	2009	138	49	22	24	46	2	235
	2010	153	18	31	42	73	0	244
	2011	172	40	25	47	72	2	286
	2012	186	48	23	55	78	0	312
	2013	208	63	26	53	79	0	350
Modeled estimate								
Per 100 ewes observed		30	13	25	38			



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	4	4	4	4	4	4	6	6
Harvest	3	3	2	4	3	3	6	4
Hunter success	75	75	50	100	75	75	100	67
Ave ram age	6.2	5.7	5.8	8.0	5.5	5.5	9.0	9.0

* New hunt 19A with 2 tags added in 2015.

Figure 20. Lower Salmon River Population Survey and Harvest

MIDDLE FORK SALMON RIVER PMU

GMUs 20A (east), 26, 27, 36 (northeast)

Hunt Areas 20A, 26, 26L, 27-1, 27-2, 27-3, 27-4, 27L

Description

This population includes sheep in GMUs 20A (east), 26, and 27, as well as smaller portions of northeast 25, southwest 28, and northeast 36 (Figure 13). The majority of the area is managed by the U.S. Forest Service (USFS) and falls within the Frank Church River-of-No-Return Wilderness. The area is typified by rugged canyons and dry, coniferous forest-grassland habitats with very low road densities. Access into most occupied bighorn sheep habitats is limited. Most bighorn sheep in the area winter along the river breaks corridor and migrate to sub-alpine habitats during summer. However, some bighorn sheep remain along the Middle Fork Salmon River during summer, where they provide a valuable viewing resource for river float recreationists.

Historical Perspective

Bighorn sheep populations in this area were somewhat protected from pressures of early settlement by the remote nature of the area and thus were better able to maintain viable population levels when most front-country populations were extirpated. However, subsistence hunting for mining camps and intensive livestock grazing in the late 1800s produced some negative impacts. Grass ranges important to bighorn sheep were converted to shrub habitats in the early part of the 20th century and bighorn populations declined to a low of perhaps 200-500 animals in the late 1920s (Smith 1954).

No translocations have taken place in the Middle Fork PMU and most consider the area one of the few native bighorn sheep populations in North America that was not extirpated. Hunting occurred under various combinations of controlled and general season frameworks from the early 1950s through 1970 and under a controlled hunt system since 1971.

Land and resource use changed after the mining boom; subsistence hunting and livestock use decreased and many shrub-dominated ranges began reverting to grasslands. The bighorn sheep population increased to approximately 1,000 animals by 1990, but declined by roughly 50% after a disease-driven, all-age die-off in the early 1990s and remains between 450-600 bighorn sheep (Figure 21). Some early estimates were derived from historical observations by USFS and IDFG personnel. More recent values are primarily observed numbers from IDFG aerial surveys. All of these values should be interpreted as a minimum population estimate.

Issues

Although modern land management activities in the wilderness are minimal, the landscape and productivity of habitats are continually changing. Wildfire has been prevalent during the last decade. Nearly 800,000 acres within the area have burned since 2000. In some cases, fires have likely benefited wild sheep by reducing conifer encroachment and promoting grass and forb production. However, because of the semi-arid nature of parts of the landscape, habitat response

to fire may be slow or negative, particularly on winter ranges where invasive cheat grass and noxious weeds such as knapweed, rush skeletonweed, and leafy spurge could ultimately have significant impacts on winter range productivity. Elk populations have declined somewhat since peaks during the late 1990s, but competition with a large elk herd may impact habitat capacity for bighorns.

Currently, the Middle Fork population appears to still be disease-limited, as evidenced by chronically low lamb:ewe ratios since the die-off in the early 1990s (Figure 22). Ratios declined from an average of almost 37:100 (range 11-74) between 1973 and 1989 to 22:100 (range 5-38) since 1990.

Management Direction

Because of the size of the area and population and access limitations, a variety of hunting experiences are available. During the standard season framework, hunter success is typically lower than in more accessible areas. Recent average hunter success ranged from 13% to 75% depending on area and year. As a result of the 2017-2018 season-setting process, the boundary for hunt area 27-4 was expanded and 1 tag was added.

Because hunter success tends to be quite low and access is difficult, Hunt Area 27-1 will be managed primarily to maximize bighorn sheep hunting opportunity. Remaining hunt areas will be managed to maintain moderate success rates in a remote, wilderness setting.

Within current distribution, modeled habitat occupies approximately 1,856 km², which could support approximately 3,525 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). However, there are limitations based on specific habitat needs such as lambing and wintering habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size. Regardless, historic and recent data indicates the PMU can sustain significantly more bighorn sheep and management direction will be to increase population levels (Table 1).

Management Actions

1. Work with USFS to maintain or improve habitat for bighorn sheep.
2. Work with USFS and other partners to control or reduce noxious weed occurrence.
3. Increase knowledge of movement patterns among hunt areas and adjacent PMUs to better understand metapopulation characteristics (connectivity and genetic exchange).
4. Refine habitat modeling to more accurately characterize sustainable population levels.

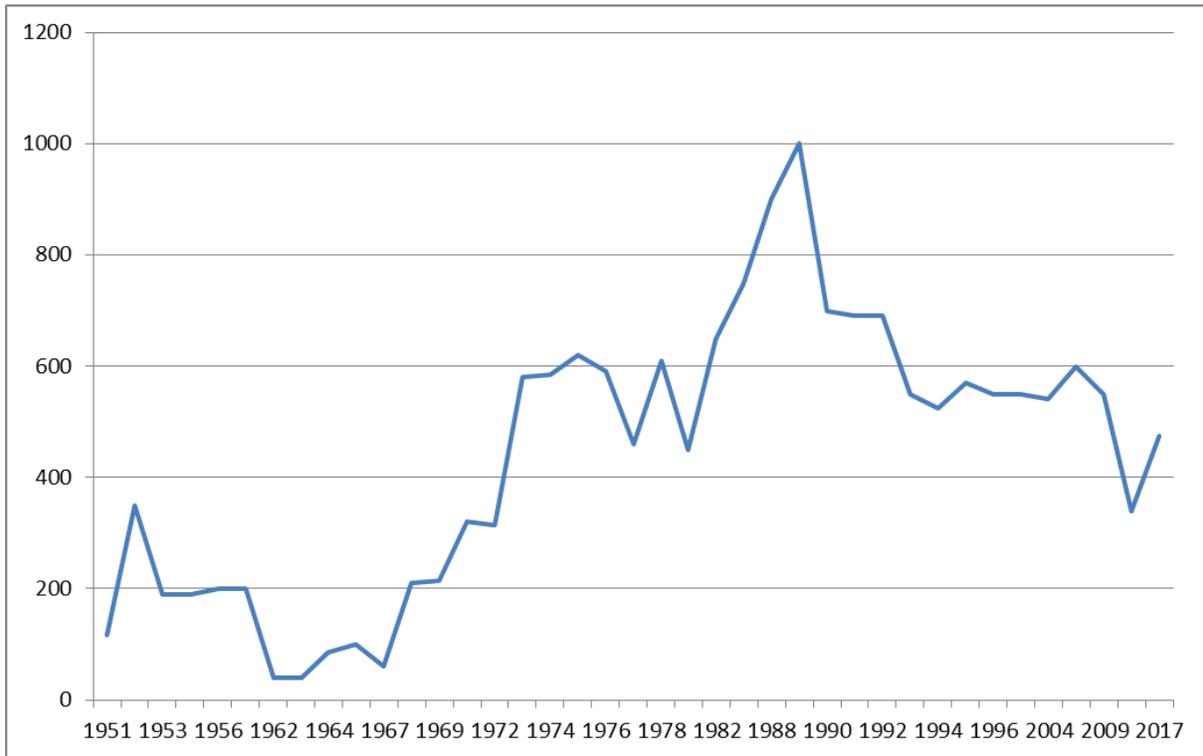


Figure 21. Approximate total bighorn sheep observed or estimated, Middle Fork Salmon River PMU (1951-72 includes only GMU 27 estimates), 1951-present.

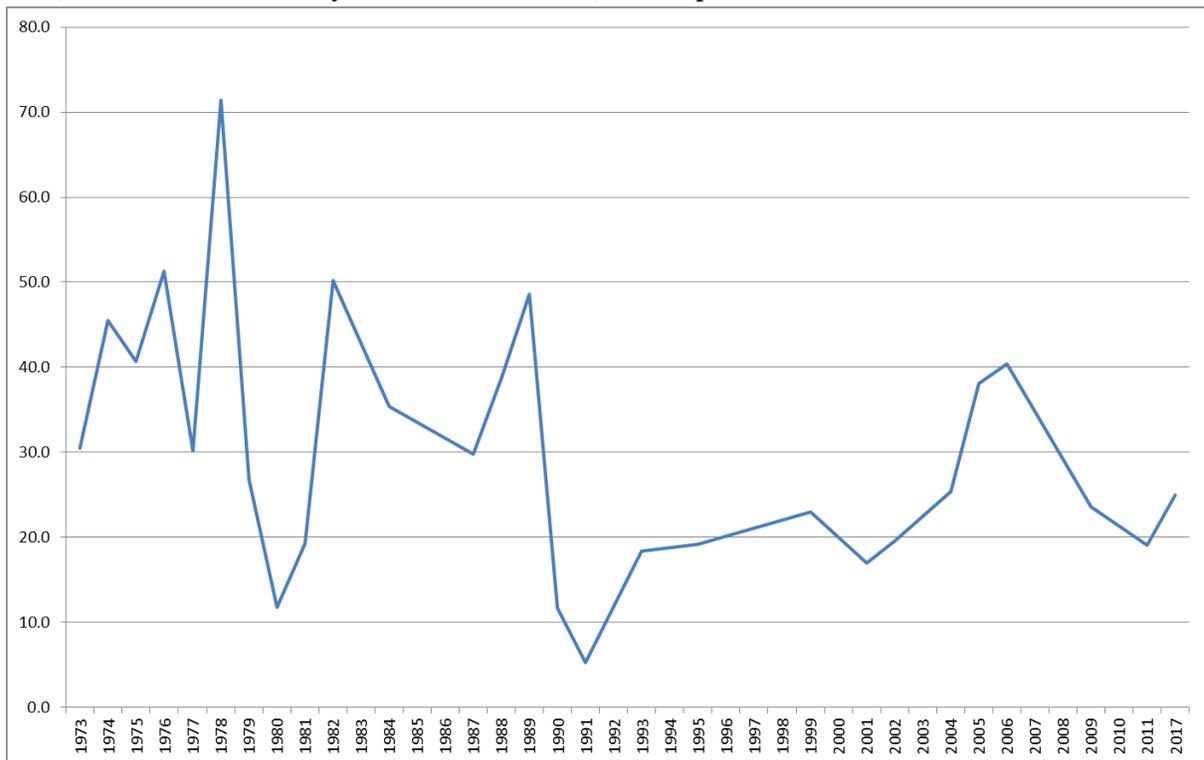


Figure 22. Observed bighorn sheep lamb:100 ewe ratios, Middle Fork Salmon River PMU, 1973-present.

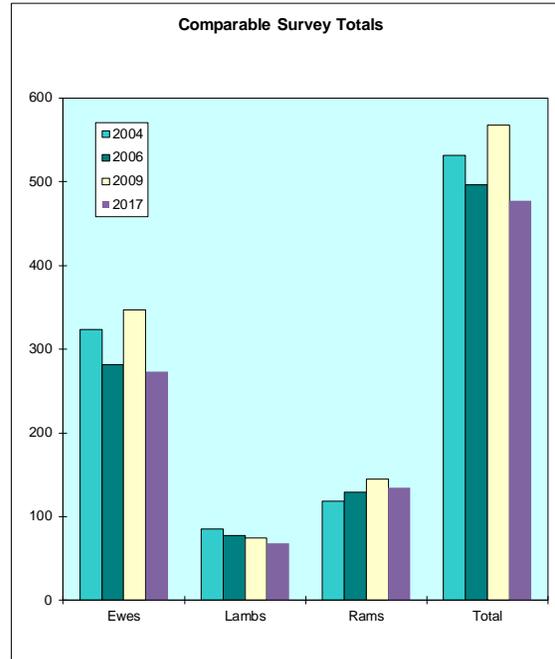
Rocky Mountain Bighorn Sheep

Middle Fork Salmon River

GMUs 20A (east), 26, 27, 36 (northeast); Hunt Areas 20A, 26, 26L, 27-1, 27-2, 27-3, 27-4, 27L, 36

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
20A	2004	21	8	5	2	7	0	36
	2006	48	9	6	5	11	0	68
	2009	47	15	8	7	15	0	77
26	2017	65	16	19	7	26	0	107
	2004	90	23	19	12	31	0	144
	2006	120	23	10	33	43	0	186
27-1	2009	63	4	5	14	19	0	86
	2017	40	12	13	17	30	0	82
	2004	100	24	15	24	39	0	163
27-2	2006	50	16	16	18	34	0	100
	2009	102	21	35	14	49	0	172
	2017	58	9	15	15	30	0	97
27-3	2004	44	9	5	9	14	0	67
	2006	23	14	6	5	11	0	48
	2009	61	20	10	7	17	1	99
27-4	2017	42	15	14	11	25	0	82
	2004	57	13	10	14	24	4	98
	2006	31	11	10	9	19	7	68
Total	2009	41	5	12	11	23	0	69
	2017	33	11	15	22	37	1	82
	2004	12	8	2	2	4	0	24
Total	2006	10	5	2	9	11	0	26
	2009	33	10	11	11	22	0	65
	2017	55	13	7	9	16	0	84
Total	2004	324	85	56	63	119	4	532
	2006	282	78	50	79	129	7	496
	2009	347	75	81	64	145	1	568
	2017	273	68	70	65	135	1	477
Modeled estimate								
Per 100 ewes observed			25	26	24	49		



Hunting tags and harvest information

		2009	2010	2011	2012	2013	2014	2015	2016
Tags*	20A	2	2	2	2	3	3	2	2
	26	4	4	4	4	4	4	4	5
	26L	2	2	2	2	2	2	2	2
	27-1	12	12	12	12	12	12	12	12
	27-2	7	6	6	6	6	6	6	6
	27-3	4	4	4	4	4	4	4	4
	27-4	3	3	3	0	0	0	2	2
	27L	2	2	2	2	2	2	2	2
	Total	36	35	35	32	33	33	34	35
Harvest*	20A	1	2	0	0	3	3	2	2
	26	2	1	1	1	1	1	3	2
	26L	1	1	1	2	1	1	1	2
	27-1	6	2	2	5	1	1	3	5
	27-2	3	2	3	2	3	3	0	1
	27-3	0	1	4	2	3	3	2	2
	27-4	2	2	1	1	0	0	1	2
	27L	0	1	2	2	1	1	2	2
	Total	15	12	14	15	13	13	14	18
Hunter success	42	34	40	47	39	39	41	51	
Ave ram age	7.2	7.2	7.1	6.9	8.0	7.9	8.5	8.4	

*Includes auction and/or raffle tags and rainchecks

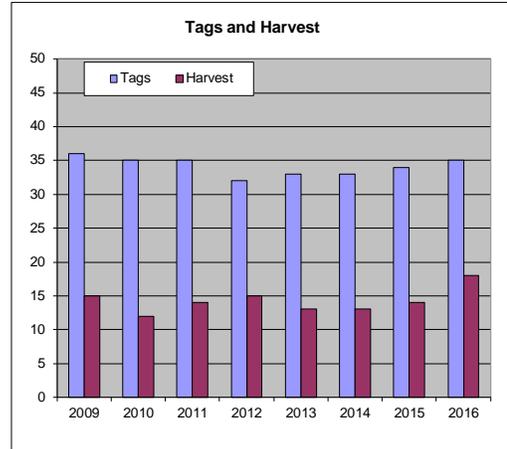


Figure 23. Middle Fork Salmon River Population Survey and Harvest

LOWER PANTHER–MAIN SALMON RIVER PMU

GMUs 20 (east), 21, 28 (north); Hunt Areas 20, 21, 28-1, 28-3

Description

This population includes sheep in GMUs 20 (east), 20A (north-central), 21, and 28 (northwest). The majority of the area is managed by the USFS and a significant portion falls within the Frank Church River-of-No-Return Wilderness. The area is typified by rugged canyons and dry, coniferous forest-grassland habitats with very low to moderate road densities. Access into occupied bighorn sheep habitat within wilderness is limited, whereas sheep can be observed along roads in some portions of the PMU. Most bighorn sheep in the area winter along the river breaks corridor. Some animals migrate to sub-alpine habitats during summer, but many remain along the main Salmon River during summer, where they provide a valuable viewing resource for both river float parties and others traveling along Forest Road 030 (“River Road”) downstream from North Fork.

Historical Perspective

Bighorn sheep populations in this area were somewhat protected from pressures of early settlement by the remote nature of the area and, thus, were better able to maintain viable population levels when most front-country populations were extirpated. However, subsistence hunting for mining camps and intensive livestock grazing in the late 1800s produced some negative impacts. Grass ranges important to bighorn sheep were converted to shrub habitats in the early part of the 20th century. Land and resource use changed after the mining boom: subsistence hunting and livestock use decreased and many shrub-dominated ranges began reverting to grasslands. Smith (1954) estimated approximately 290 animals occupied the area in the early 1950s.

Bighorn sheep populations in GMUs 21 and 28 were considered high-quality herds, exhibiting high lamb production and herd growth through the 1970s. However, populations along Panther Creek 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, likely caused by pneumonia (Figure 24). Some early estimates were derived from historical observations by USFS and IDFG personnel. More recent values are primarily observed numbers from IDFG aerial surveys. Low lamb recruitment followed the decline and persisted for several years. The population has displayed a gradual, long-term decline, however, nearly 260 sheep were observed during deer surveys in 2011. About 180 sheep were observed during an elk survey in winter, 2016, with a comparable lamb:ewe ratio and higher ram:ewe ratio to the 2011 observations.

The Panther Creek bighorn sheep population was the primary source of Rocky Mountain bighorn sheep for translocation to other sites; nearly 125 were captured and moved between 1975 and 1985. However, capture and translocation have been curtailed since populations and productivity declined. Only 1 translocation into the PMU has occurred (16 sheep from northeast Oregon were released near Shoup in 1984). Hunting occurred under various combinations of controlled and

general season frameworks from the early 1950s through 1970 and under a controlled hunt system since 1971.

Issues

Human access to some portions of bighorn sheep ranges and ongoing or planned development projects dictate special management considerations in this area. GMUs 21 and 28 have high road densities, with potential for copper and cobalt mining, geothermal development, and timber harvest, which could lead to even more development and roads. Increased road densities can lead to high levels of unregulated harvest. However, viewing and photographing bighorn sheep along Salmon River and Panther Creek are popular recreational pastimes. We expect this type of non-consumptive use to increase in importance. Native American harvest occurs in portions of the PMU, but harvest levels are essentially unknown.

Wildfire has been prevalent during the last decade. Tens of thousands acres within the area have burned since 2000. In some cases, fires have likely benefited wild sheep by reducing conifer encroachment and promoting grass and forb production. However, because of the semi-arid nature of parts of the landscape, habitat response to fire may be slow or negative, particularly on winter ranges where noxious weeds such as knapweed, rush skeletonweed, and leafy spurge could ultimately have significant impacts on winter range productivity. In several areas where fire occurred at mid to low elevations invasive cheat grass has replaced the more nutritious perennial grasses. Elk populations have declined somewhat since peaks during the mid-2000s, but competition with a large elk herd may impact habitat capacity for bighorns.

Currently, the population appears to still be disease-limited, as evidenced by generally low lamb:ewe ratios since the die-off in the early 1990s (Figure 25). Ratios declined from an average of 46:100 (range 22-76) between 1974 and 1989 to 23:100 (range 11-33) since 1990 (for years in which >50 sheep were classified). The population appeared to be at a recent low in 2008, but numbers increased substantially by 2016 and may be reversing a downward trend of the previous 15-20 years.

Management Direction

Because the PMU encompasses diverse access and land management objectives, hunting opportunity and experiences vary considerably. Hunter success rates can be quite low in predominantly wilderness hunt areas and range near 100% in areas with road access. Hunt area boundaries have been adjusted several times to better match sub-population groupings and access, as well as improve hunter and harvest distribution. As a result of the 2017-2018 season-setting process the boundary for hunt area 28-1 was expanded and 1 tag was added. In addition, hunt area 28-3 was added with 2 tags. Average age of harvested rams in 2016 dropped considerably from the previous year. Harvest data from 2017 should be closely analyzed to see if this trend continues.

Within current distribution, modeled habitat occupies approximately 570 km², which could support approximately 1,075 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). However, there are limitations based on specific habitat

needs such as lambing and wintering habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size. .

Management Actions

1. Work with USFS to maintain or improve habitat for bighorn sheep.
2. Work with USFS and other partners to control or reduce noxious weed occurrence.
3. Increase knowledge of movement patterns among hunt areas and adjacent PMUs to better understand metapopulation characteristics (connectivity and genetic exchange).
4. Refine habitat modeling to more accurately characterize sustainable population levels.
5. Use radiomarked sheep to provide data points for sightability modeling.

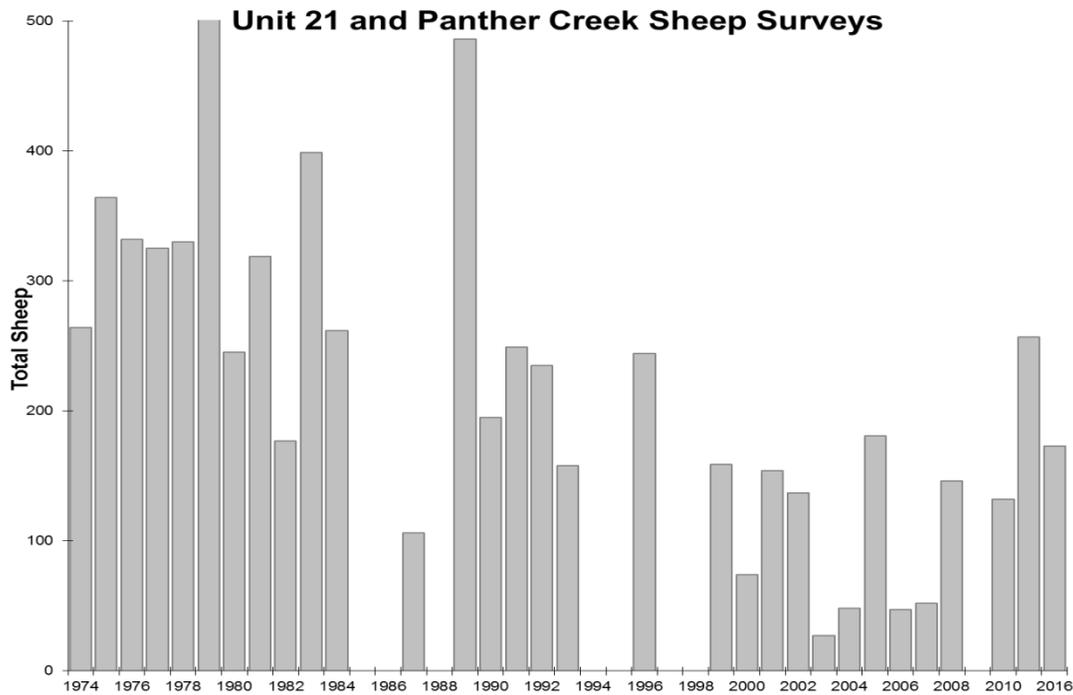


Figure 24. Approximate total bighorn sheep observed or estimated, Lower Panther-Main Salmon River PMU (GMU 20 included only from 1982 forward), 1974-present.

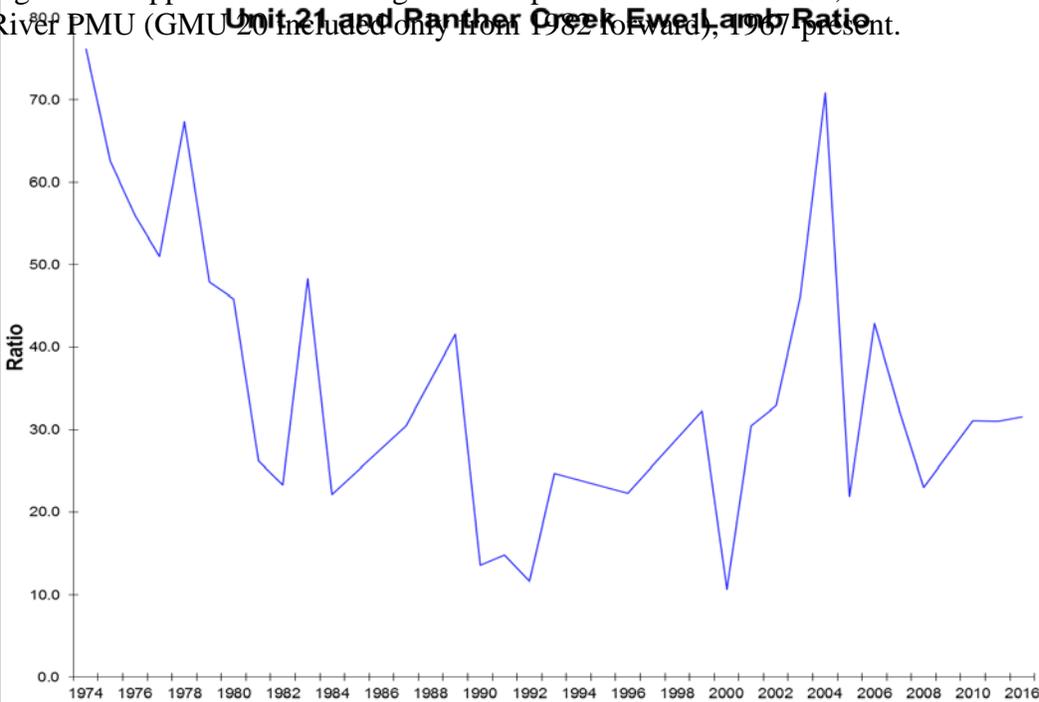


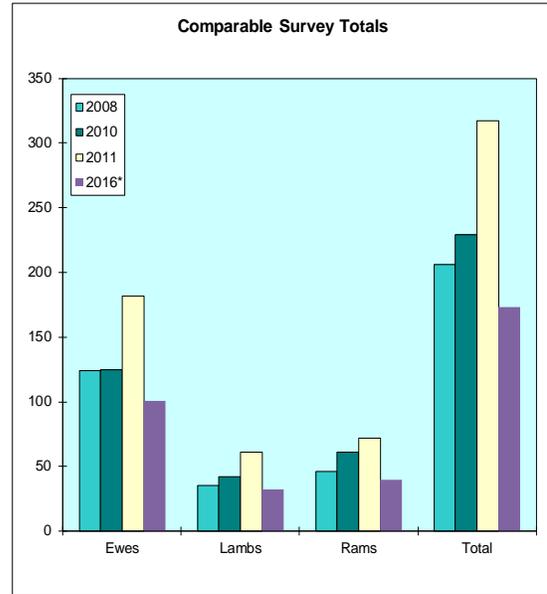
Figure 25. Observed bighorn sheep lamb:100 ewe ratios, GMUs 21 and 28, Lower Panther-Main Salmon River PMU, 1974-present.

Rocky Mountain Bighorn Sheep
Lower Panther-Main Salmon River
 GMUs 20 (east), 21, 28 (north); Hunt Areas 20, 21, 28-1, 28-3

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
20	2001	22	6	10	13	23	0	51
	2007 ^b	11	1	1	6	7	0	19
	2011	24	12	12	11	23	1	60
	2016	0	0	0	0	0	0	0
21	2008	78	19	13	4	17	0	114
	2010	75	24	11	13	24	0	123
	2011	98	31	16	8	24	1	154
	2016	61	22	11	10	21	0	104
E Panther	2008	14	1	3	1	4	0	19
	2010	15	2	8	2	10	0	27
	2011	55	16	9	4	13	0	84
	2016	31	7	6	5	11	0	49
W Panther	2008	8	3	2	0	2	0	13
	2010	11	4	4	0	4	0	19
	2011	5	2	5	7	12	0	19
	2016	9	3	5	3	8	0	20
Total	2008	124	35	30	16	46	1	206
	2010	125	42	35	26	61	1	229
	2011	182	61	42	30	72	2	317
	2016*	101	32	22	18	40	0	173
Modeled estimate								
Per 100 ewes observed			32	22	18	40		

2016* is an incomplete survey



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	20	2	2	2	2	2	2	2
	20-1*							
	20-2*							
	21	3	3	3	3	3	3	3
	28-1	2	2	2	2	2	2	2
	28-3**	1	1	1	1	1	1	
	Total	8	8	8	8	8	8	7
Harvest	20	0	1	1	0	2	0	1
	20-1*							
	20-2*							
	21	2	3	3	0	3	3	1
	28-1	0	2	0	1	1	2	2
	28-3**	0	0	0	1	1	1	0
	Total	2	6	4	2	7	6	4
Hunter success	25	75	50	25	88	75	57	71
Ave ram age	7.0	4.0	6.0	7.0	7.7	6.0	7.3	4.3

*Hunt areas 20-1 and 20-2 were combined into Hunt Area 20 in 2009

**Hunt area 28-3 not offered in 2015/2016

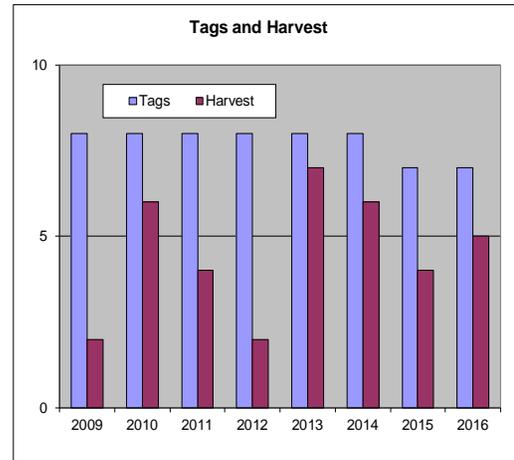


Figure 26. Lower Panther-Main Salmon River Populations ‘Survey and Harvest

TOWER-KRILEY PMU

GMU 21A

Description

This small, relatively isolated population occupies a small portion of GMU 21A, primarily along the east side of the Salmon River between Tower Creek and Fourth of July Creek. The majority of the area is managed by the BLM, with some interspersed private land. The area is typified by sagebrush hills and cliffs; U.S. Highway 93 parallels the river. Because of their habit of using sites immediately adjacent to the highway, these sheep provide some viewing opportunity, but are subject to vehicle collisions.

Historical Perspective

This general area along the Salmon River was occupied bighorn sheep range through approximately the 1930s (Smith 1954). Bighorns re-colonized the area in the 1990s; the source is unknown, but was most likely the Lower Panther-Main Salmon population. No translocations have taken place in the Tower-Kriley PMU and the number of bighorns in the area has varied between 10 and 35 (Figure 27). The number of sheep observed in 2016 was the highest recorded since 1998.

Because of sporadic bouts of vehicle collisions, managers made 1 unsuccessful attempt to capture and move this small herd. Motorist warning signs were deployed (twice), but were quickly stolen. A collaborative effort among Idaho Outfitters and Guides Association, Idaho Chapter Wild Sheep Foundation, IDFG, and several other entities resulted in development of a bighorn sheep viewing station at Red Rock Access Site in 2009. Unfortunately, a change in land ownership and land use practices on adjacent property appears to have deterred wild sheep use of the viewing area.

Issues

The greatest threat to persistence is likely the small population size which makes it unstable in the face of random environmental impacts. Vehicle collisions contribute to mortality and may prevent further population increases, as well as Native American harvest. Continued development and encroachment on areas used by these sheep also contribute to reduced likelihood of long-term persistence. Lastly, potential for exposure to domestic sheep or goats in local farm flocks is high.

Management Direction

Because of the small size of the area and population, few management options exist. Within current distribution, modeled habitat comprises approximately 18 km², which could support approximately 35 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). As a result of the 2017-18 season setting process, this population was added to a new hunt area that encompasses portions of GMU's 21 and 28. The multiple risk factors mentioned above could lead to the extirpation of this population. For that reason, IDFG

biologists decided to offer additional hunting opportunity even though this is a very small population. In addition, another value of this population is to enhance public knowledge and appreciation of bighorn sheep and their habitat through active information and education projects. Therefore, management direction will be to maintain or increase population levels (Table 1).

Management Actions

1. Continue to promote viewing and educational opportunities associated with this small, but visible, population.
2. Work with USFS to maintain or improve habitat for bighorn sheep.
3. Work with USFS and other partners to control or reduce noxious weed occurrence.
4. Increase knowledge of movement patterns among hunt areas and adjacent PMUs to better understand metapopulation characteristics (connectivity and genetic exchange).

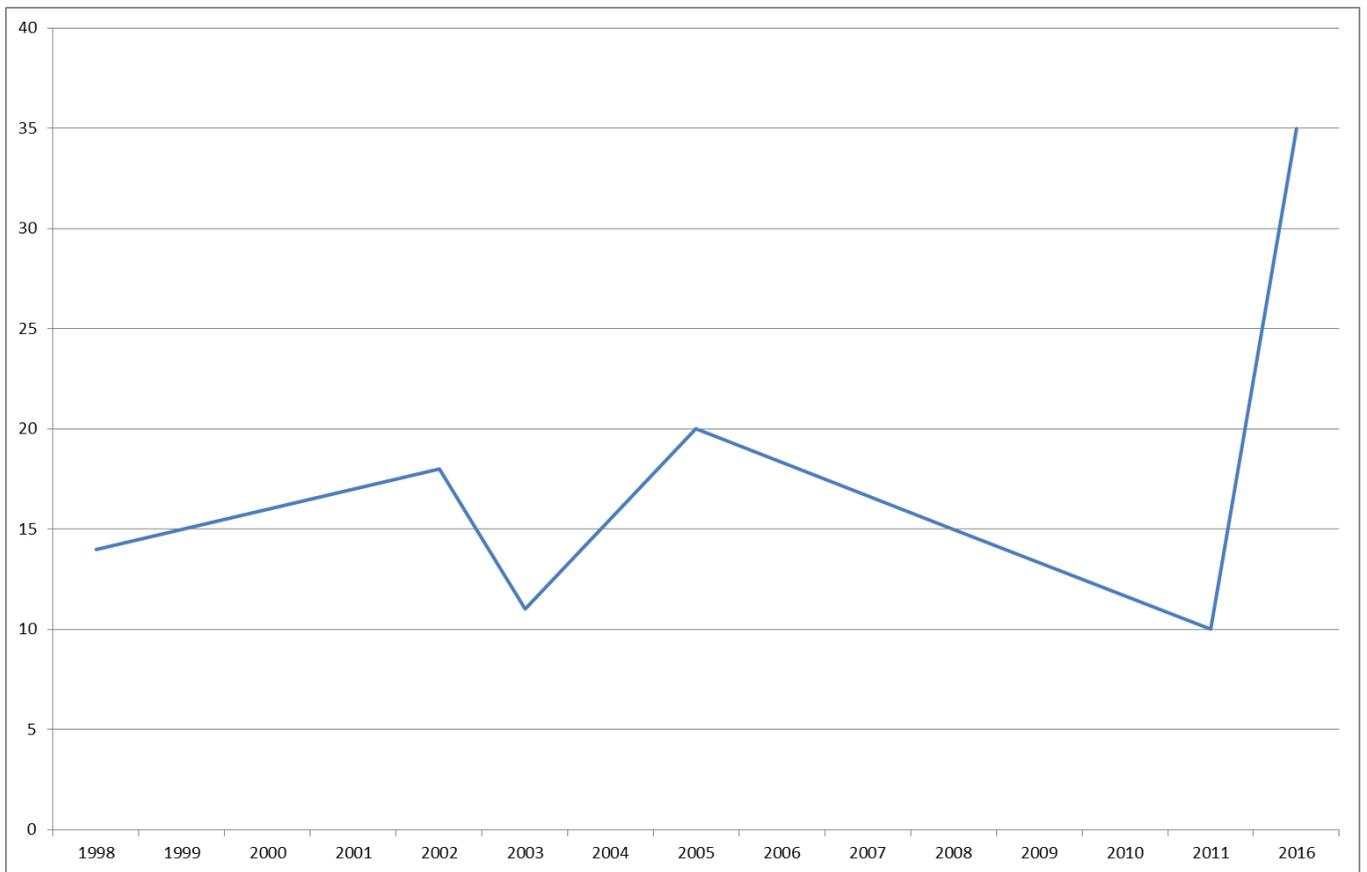
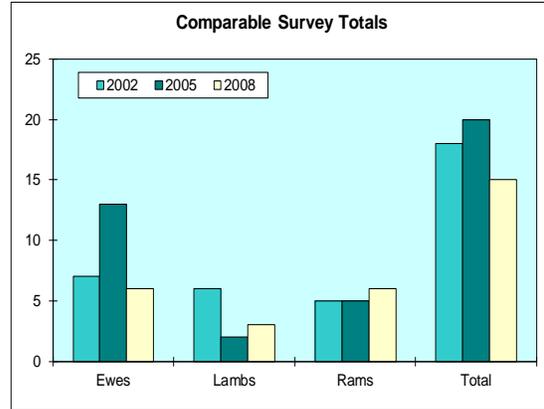


Figure 27. Bighorn sheep observed during IDFG aerial surveys, Tower-Kriley PMU, 1998-present.

Rocky Mountain Bighorn Sheep
Tower-Kriley
 GMU 21A

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
21A	2002	7	6	3	2	5	0	18
	2005	13	2	4	1	5	0	20
	2008	6	3	6	0	6	0	15
Modeled estimate								
Per 100 ewes observed			50	100	0	100		



Hunting tags and harvest information

No hunting season in this area.

Figure 28. Tower-Kriley PMU Population Survey

NORTH BEAVERHEAD PMU

GMUs 30, 30A; Hunt Area 30

Description

This population includes sheep in GMUs 30 and 30A. The majority of the area is managed by the USFS with some bighorn sheep range on BLM lands. The area is typified by rugged canyons and dry, coniferous forest-grassland habitats with moderate road densities. There is generally motorized access to or near much of the occupied bighorn sheep habitat. Bighorn sheep in the area winter in and around the mouths of small canyons between Stroud Gulch and Hawley Creek. The animals migrate to sub-alpine and alpine habitats to the south and east during summer, moving as far south as upper Eighteen-mile Creek. Some sheep cross into Montana during summer and autumn.

Historical Perspective

As with most front-country populations, bighorn sheep in this area were extirpated in the late 1800s to early 1900s (Smith 1954). Restoration began with 2 translocation events in the mid-1980s. Little population growth occurred after the translocations until the late 1990's. Biologists observed 84 bighorns during a sightability survey in 2014 and observed a minimum of 116 sheep in 2016 during an elk survey indicating an upward trend in the population (Figure 29). Both rams and ewes were fitted with GPS collars to refine habitat use, determine movements between adjacent populations, and determine health status in 2013 and 2014.

Issues

Currently, the area occupied by the North Beaverhead population can likely support more bighorn sheep. However, the existence of a domestic sheep allotment in Montana adjacent to or overlapping summer range is a risk factor. For a number of wildlife species, including bighorn sheep, the Beaverhead Range forms a potential travel corridor between the Yellowstone ecosystem and ecosystems farther north and west. If populations increase, bighorns may move along the length of the Beaverhead Range and form a more stable metapopulation. Conversely, the movement corridor could also provide an avenue for spread of diseases or parasites among sub-populations.

Management Direction

Modern hunting seasons were established in 2001. Because the risk of an all-age die-off is relatively high, IDFG will continue to offer ram harvest even though the population does not exceed 100 individuals. Hunter success has been 100% in most years since the Hunt Area was opened.

The relatively small amount of occupied habitat and number of sheep somewhat limit management options. Within current distribution, modeled habitat occupies approximately 137 km², which could support approximately 250 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). However, there are limitations based on specific habitat needs such as lambing and wintering habitat. Thus, further refinement of habitat

models and available habitat will likely reduce the estimate of potential population size. Regardless, recent data indicate the PMU can sustain more bighorn sheep and management direction will be to increase population levels (Table 1).

Management Actions

1. Work with USFS to maintain or improve habitat for bighorn sheep.
2. Increase knowledge of movement patterns among hunt areas and adjacent PMUs to better understand metapopulation characteristics (connectivity and genetic exchange).
3. Refine habitat modeling to more accurately characterize sustainable population levels.
4. Use radiomarked sheep to provide data points for sightability modeling.

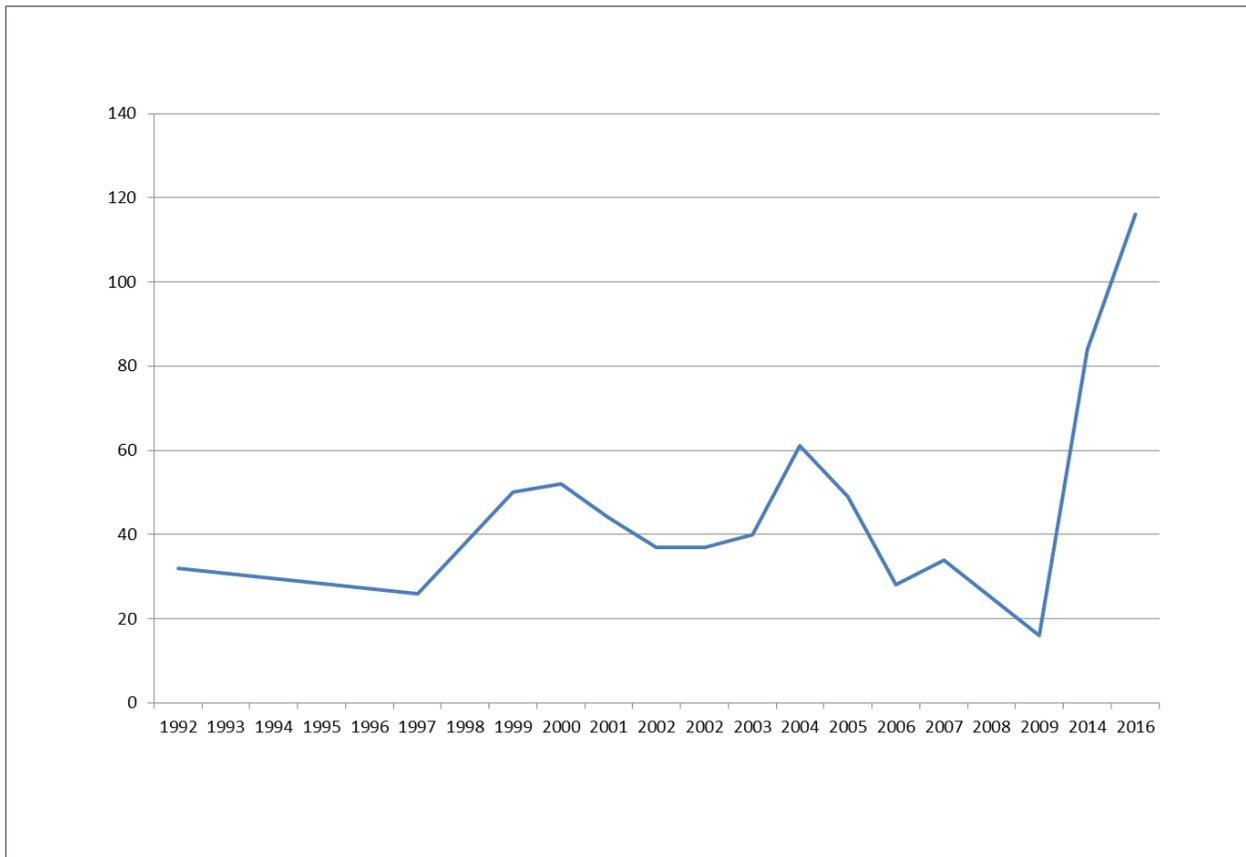


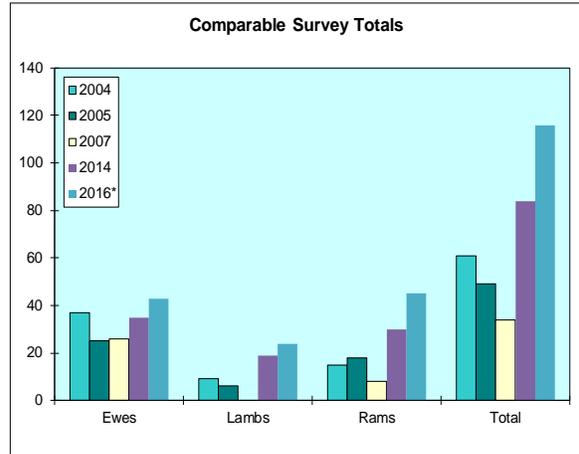
Figure 29. Total bighorn sheep observed during IDFG aerial surveys, North Beaverhead PMU, 1992-present.

Rocky Mountain Bighorn Sheep
North Beaverhead
 GMUs 30, 30A; Hunt Area 30

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
30, 30A	2004	37	9	4	11	15	0	61
	2005	25	6	5	13	18	0	49
	2007	26	0	7	1	8	0	34
	2014	35	19	25	5	30	0	84
	2016*	43	24	22	11	45	4	116
Modeled estimate								
Per 100 ewes observed			56	51	26	105		

2016* estimate includes 12 unclassified rams



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	2	2	2	2	2	2	2	2
Harvest	0	0	1	2	2	1	2	1
Hunter success	0	0	50	100	100	50	100	50
Ave ram age	0.0	0.0	4.5	8.5	5.0	7.5	5.5	6.5

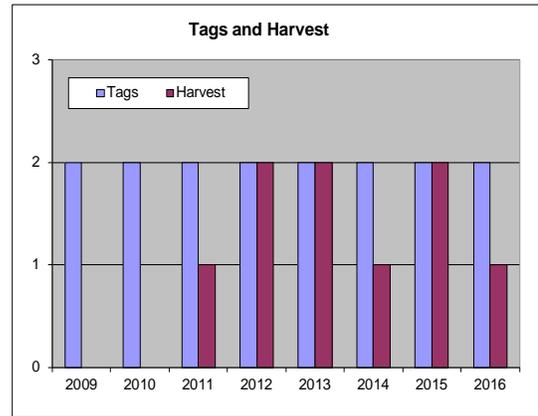


Figure 30. North Beaverhead Population Survey and Harvest

SOUTH BEAVERHEAD PMU

GMUs 58 (east), 59, 59A

Description

Bighorn sheep in the South Beaverhead PMU primarily occur in GMUs 58 (east), 59A, and 59. Habitats in the South Beaverhead PMU are diverse, generally mountainous types with bighorn sheep summering mostly at higher elevations on alpine and sub-alpine ranges. The winter ranges are mostly sagebrush-grass or curl-leaf mountain mahogany (*Cercocarpus ledifolius*) types where snow depth is low. The USFS generally administers summer ranges, whereas both USFS and BLM manage winter ranges. Bighorn sheep are observed consistently in the southern Beaverhead Range.

The bighorn sheep population in the south Beaverhead Range commonly uses private land on the Waggoner, Simmons, and Taylor ranches from Goddard canyon north to Bruce canyon during the rut and early winter. These ranches no longer have domestic sheep operations, but the bighorns still come to the area and often feed with corralled cattle. Some of the bighorns often move south into Bloom, Deadman, and Peterson canyons as winter progresses, but the majority seem to stay on the slopes from Goddard canyon north to Bruce canyon (near the Simmons Ranch). Rams have been documented moving through Reno Point in November 2015.

Historical Perspective

There is little historic data available for Rocky Mountain bighorn sheep in the South Beaverhead PMU. The journals of early trappers, settlers, miners, and other sources indicate that sheep were more plentiful and widely distributed than what is currently observed (Seton 1929, Smith 1954, and Russell 1955). 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.

Subsistence and indiscriminate harvest of bighorn sheep by early settlers and pioneering travelers was greatly reduced after establishment of IDFG in 1937. Changes in federally controlled domestic sheep grazing allotments, habitat improvement projects, water developments, and bighorn sheep translocations have all been implemented in hopes of increasing wild sheep populations in the southern Beaverhead Range.

Forty-one bighorn sheep from GMU 28 were released into Long, Skull, and Bloom canyons of GMU 58 in 4 translocations between 1976 and 1982.

Counts in this PMU have generally been made incidental to aerial surveys for other big game species and, therefore, do not represent thorough population surveys or composition trends (Figure 31). Bighorns have been observed across the southern Beaverheads. The largest concentration of observations are centered around the Skull canyon area, but there are observations from Crooked Creek, Horsethief Ridge, Snakey Canyon, the TNC ranch, Sullivan Ridge, Irving Creek, and numerous other locations throughout the area.

Issues

Risk of contact with domestic sheep exists near allotments on USFS and BLM lands in GMUs 58 and 59A (Bernice, Mahogany Butte, Nicholia/Chandler, Snakey, Kelly, and Crooked Creek). Domestic sheep on private land near bighorn sheep habitat within the PMU are also a potential source of contact.

Management Direction

IDFG is working with federal agencies and willing domestic sheep producers in the South Beaverhead PMU to reduce risk of contact (using BMPs outlined in this plan) between domestic and bighorn sheep, particularly for active domestic sheep allotments that overlap bighorn sheep distribution in this area. Management priority in this PMU is to maintain separation between bighorn sheep and domestic sheep and goats.

Within current distribution, modeled habitat is limited to approximately 151 km², which could support approximately 275 bighorn sheep (assuming all habitat is suitable and relatively high densities of 1.9/km²). There is no current population estimate for this PMU, but incidental observations appear to show a decline in bighorn sheep numbers since the mid-1990s. Management direction is to maintain populations and increase them in areas of the PMU where separation can be maintained (Table 1).

There have been no bighorn hunts in the South Beaverhead PMU and none are planned until the population increases enough to allow hunting.

More information is needed to manage this population; including use areas, seasonal movements, a population estimate, survival rates, and production. IDFG is actively pursuing funding to initiate a study to gather this type of data in the South Beaverhead PMU.

Management Actions

1. Work with willing domestic sheep permittees, USFS, and BLM to use BMPs to maintain separation between bighorn sheep and domestic sheep and goats.
2. Increase knowledge of movement patterns, habitat use, survival, etc. using radiomarked bighorn sheep.
3. Conduct an aerial survey specifically for bighorn sheep.
4. Refine habitat modeling to more accurately characterize sustainable population levels.
5. Use radiomarked sheep to provide data points for sightability and habitat modeling.

Progress

IDFG radio-collared 10 bighorn sheep (7 rams (1 recaptured and collared twice) and 3 ewes) in the south Beaverhead PMU during 5 capture efforts in December 2011, February 2012, January 2014, November 2015 and November 2016. The information gathered from the satellite GPS collars has been used to evaluate spatial and temporal use of the area, summer lamb survival, and to eventually gain some sightability points for the sightability model. IDFG will also use these

points to evaluate the Payette Summer Habitat Model that we used to predict habitat in the Statewide Bighorn Sheep Management Plan. The radio collared bighorn sheep were sampled for disease and those samples were sent to the Wildlife Health Laboratory for analysis. This project is funded with BLM Challenge Cost Share money and IDFG matching funds.

Regional personnel surveyed this area for bighorn sheep in March 2014. A total of 13 bighorn sheep were observed; 7 ewes, 3 lambs, and 3 rams. Staff also surveyed for bighorn sheep in conjunction with Beaverhead elk zone survey during the winter of 2015-2016 and counted a total of 33 individuals. Ground observations of up to 14 sheep have been documented on Andy Wagner's ranch in March and April.

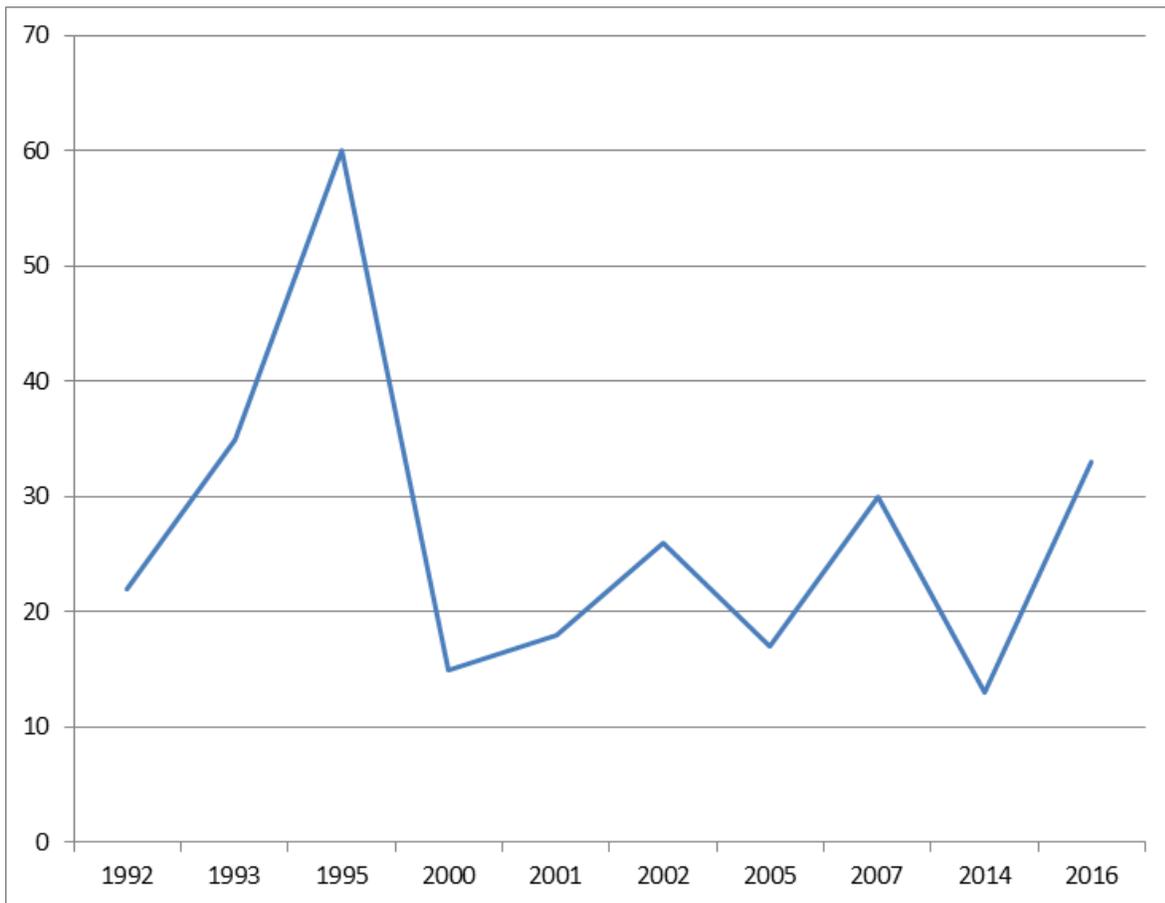


Figure 31. Total bighorn sheep observed (primarily during mule deer and elk surveys), South Beaverhead PMU, 1992-present.

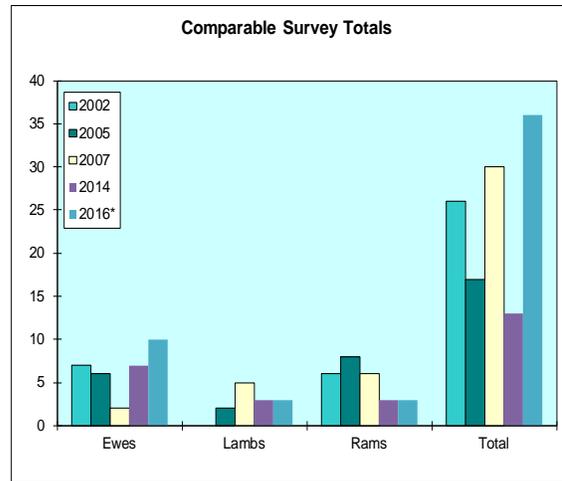
Rocky Mountain Bighorn Sheep
South Beaverhead
 GMUs 58 (east), 59, 59A

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
58/59A	2002	7	0	5	1	6	13	26
	2005	6	2	4	4	8	1	17
	2007	2	5	1	5	6	17	30
	2014	7	3	2	1	3	0	13
	2016*	10	3	2	1	3	20	36
Modeled estimate								
Per 100 ewes observed			30	20	10	30		

NOTE: All aerial counts are incidental to other surveys (not representative of populations).

**incidental to aerial elk survey*



Hunting tags and harvest information

No hunting season in this area.

Figure 32. South Beaverhead PMU Population Survey

NORTH LEMHI PMU

GMUs 29, 37A; Hunt Area 37A

Description

Habitat used by this population occurs primarily in GMU 37A, but includes some areas in GMU 29. Although the USFS manages most of the bighorn range, important portions of the winter and year-round range occur on BLM-managed lands. The area is a combination of the rugged Salmon River canyon to the west and the equally rugged southwest flank of the Lemhi Range to the east. Habitat varies from sagebrush-steppe at lower elevations through dry coniferous forest-grassland to alpine at the highest elevations. U.S. Highway 93 parallels the Salmon River along the western edge of the PMU, but few other roads provide access to occupied bighorn sheep range. Bighorn sheep in the area winter along the river breaks corridor and lower elevation south-southwest facing slopes in the Pahsimeroi Valley. Some bighorns remain in these areas during summer, whereas others apparently migrate to higher elevation sub-alpine and alpine habitats.

Historical Perspective

Bighorn sheep populations in this area were essentially extirpated during the early 20th century. Occasional sightings of small numbers of sheep in the 1960s-early 1980s likely resulted from temporary movements of animals from the adjacent Middle Main Salmon River or Lost River Range PMUs. The current population resulted from 3 translocation events between 1986 and 1989. Sheep numbers appeared rather stagnant for 10-15 years following translocation, but increased to ≥ 112 animals in 2007 (Figure 33). Bighorn numbers have ranged between 80 and 120 animals since 2007. The survey data from 2016 indicate an extremely high ram:ewe ratio and a high lamb:ewe ratio. One should note that there were 45 unclassified animals counted during the survey which may skew the ratios. A hunting season was established in 2005. Both rams and ewes were fitted with GPS collars to refine habitat use, determine movements between adjacent populations, and determine health status in 2013 and 2014.

Issues

Elk populations in this area expanded rapidly in the 1970s-1980s and remain at relatively high numbers. Competition with this large elk herd may impact habitat capacity for bighorns. Risk of contact with domestic sheep or goats is relatively high in this PMU, primarily related to “farm flocks” on adjacent private land. One domestic sheep allotment occurs near potential bighorn habitat.

Management Direction

Because of the relatively high risk of contact with domestic sheep and goats, a hunting season was established before the total population reached 100 individuals. Limited access and rugged terrain provide opportunity for a semi-wilderness hunting experience. Since the area was opened for hunting, 7 of 8 hunters have been successful.

Within current distribution, modeled habitat occupies approximately 312 km², which could support approximately 600 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). However, there are limitations based on specific habitat needs such as lambing and wintering habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size. Given recent growth rates, the population is expected to continue growing in the near future and management direction will be to increase population levels (Table 1).

Management Actions

1. Work with USFS to maintain or improve habitat for bighorn sheep.
2. Work with USFS, BLM, and other partners to control or reduce noxious weed occurrence.
3. Increase knowledge of movement patterns among hunt areas and adjacent PMUs to better understand metapopulation characteristics (connectivity and genetic exchange).
4. Refine habitat modeling to more accurately characterize sustainable population levels.
5. Use radiomarked sheep to provide data points for sightability modeling.
6. Work with domestic sheep owners/permittees to employ BMPs designed to maintain separation of wild and domestic sheep.

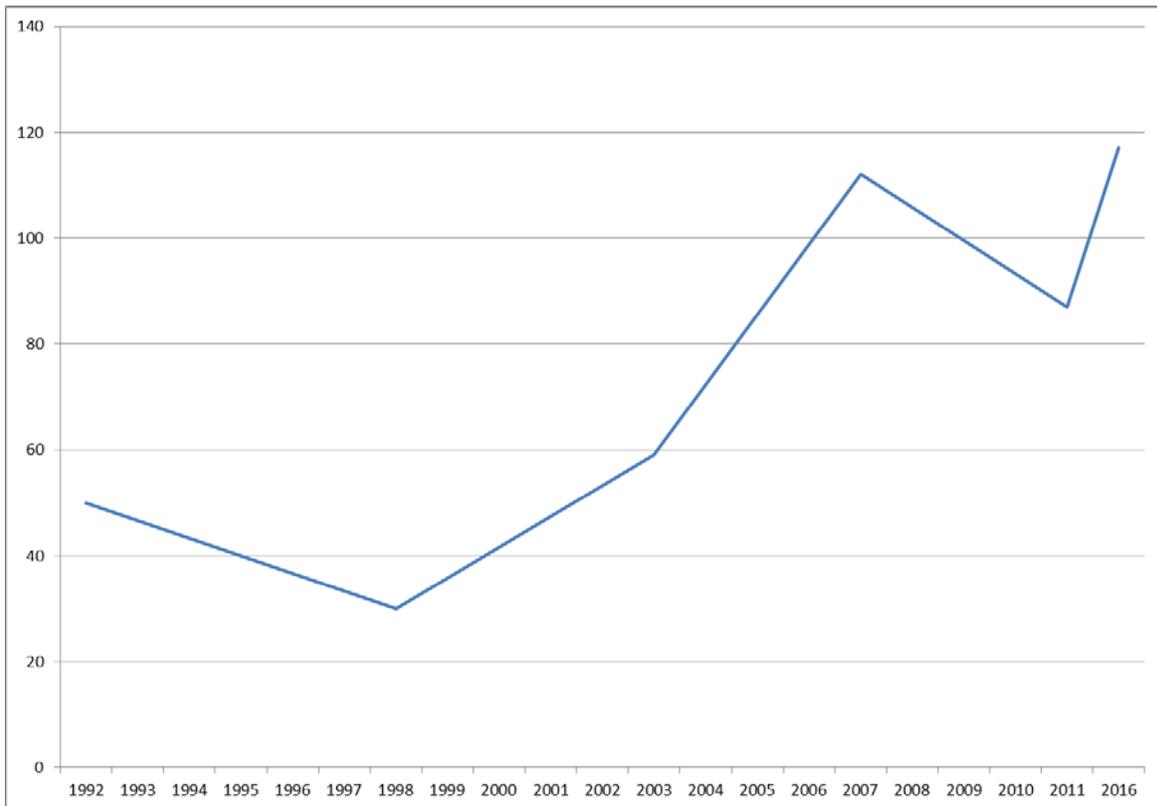


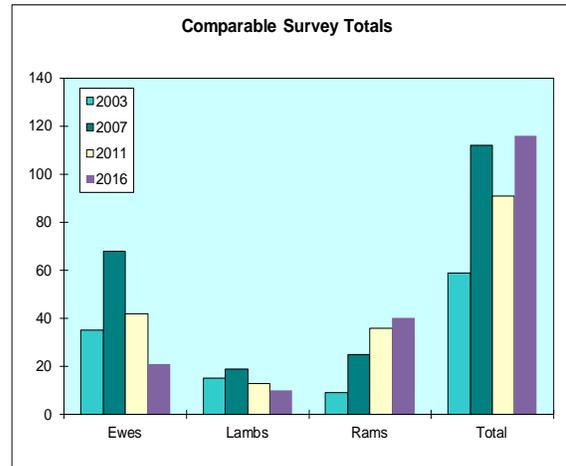
Figure 33. Total bighorn sheep observed during IDFG aerial surveys, North Lemhi PMU, 1992-present.

Rocky Mountain Bighorn Sheep North Lemhi

GMUs 29, 37A; Hunt Area 37A

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
Total	2003	35	15	6	3	9	0	59
	2007	68	19	11	14	25	0	112
	2011	42	13	15	21	36	0	91
	2016	21	10	12	28	40	45	116
Modeled estimate								
Per 100 ewes observed			48	57	133	190		



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags*	2	2	2	2	2	2	2	3
Harvest	2	1	2	2	2	2	0	3
Hunter success	100	50	100	100	100	100	0	100
Ave ram age	8.0	6.5	5.5	9.5	10.5	7.5	0.0	7.7

* Includes raincheck 2016.

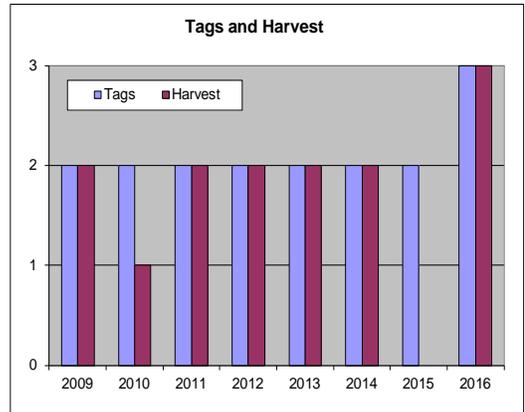


Figure 34. North Lemhi Population Survey and Harvest

SOUTH LEMHI PMU

GMUs 51 (east), 58 (west)

Description

Bighorn sheep in the South Lemhi PMU primarily occur in GMUs 51 (east) and 58 (west). Habitats are diverse, generally mountainous types with bighorn sheep summering mostly at higher elevations on alpine and sub-alpine ranges. Winter ranges are mostly sagebrush-grass or curl-leaf mountain mahogany types where snow accumulation is light. The USFS generally administers summer ranges, whereas both USFS and BLM manage winter ranges. Bighorn sheep have been observed throughout the southern Lemhi Range.

Historical Perspective

Similar to some other areas in central Idaho, historic data for Rocky Mountain bighorn sheep in the southern Lemhi Range is lacking. The journals of early trappers, settlers, miners, and other sources indicate that sheep were more plentiful and widely spread than what is currently observed. 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.

Subsistence and indiscriminate harvest of bighorn sheep by early settlers and pioneering travelers was greatly reduced after establishment of IDFG in 1937. Changes in federally controlled domestic sheep grazing allotments, habitat improvement projects, water developments, and wild bighorn translocations have all been implemented in hopes of increasing wild sheep populations in the Lemhi Range.

There have been 2 bighorn sheep translocations in the South Lemhi PMU. All of the sheep (41 total) were captured from the Whiskey Basin population in Wyoming and were released in Badger Creek and Uncle Ike Creek on the west side of the Lemhi range in 1983 and 1984. Counts of these sheep have generally been made incidental to aerial surveys for other big game species and therefore do not represent complete population surveys or composition trends (Figure 35).

Issues

There is risk of contact between domestic and wild sheep in parts of the Lemhi Range. There are both “farm flocks” on private land and active domestic sheep allotments (Bernice, Mahogany Butte, Eightmile) that overlap bighorn sheep distribution in this area. One known farm flock of approximately 100 domestic sheep is located in the Deep Creek area. Domestic sheep allotments that occur on Idaho National Laboratory land may also be a source of potential contact.

Although information about the number of bighorn sheep is poor, the small numbers observed in recent years suggest the population may currently be at risk of extirpation.

Management Direction

IDFG will continue to work with federal agencies and willing domestic sheep producers in the South Lemhi PMU to reduce risk of contact between domestic and bighorn sheep, particularly for active domestic sheep allotments that overlap or abut bighorn sheep distribution in this area. Management direction will focus efforts on maintaining separation between bighorn sheep and domestic sheep and goats.

Within current distribution, modeled habitat occupies approximately 297 km², which could support approximately 550 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). However, there are limitations based on specific habitat needs such as lambing and wintering habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size. There is no current population estimate for this PMU, but incidental observations appear to show a decline since 1992. Management direction is to maintain populations and increase them in areas of the PMU where separation can be maintained (Table 1).

There have been no bighorn hunts in the South Lemhi PMU and none are planned until the population increases enough to allow hunting.

More information is needed to manage this population; including use areas, seasonal movements, a population estimate, survival rates, and production. IDFG will pursue funding to initiate a study to gather this type of data in the South Lemhi PMU.

Management Actions

1. Work with willing domestic sheep permittees, USFS, and BLM to use BMPs to maintain separation between bighorn sheep and domestic sheep and goats.
2. Increase knowledge of movement patterns, habitat use, survival, etc. using radiomarked bighorn sheep.
3. Conduct an aerial survey specifically for bighorn sheep.
4. Refine habitat modeling to more accurately characterize sustainable population levels.
5. Use radiomarked sheep to provide data points for sightability modeling.

Progress

Radio-collaring efforts for bighorn sheep in the south Lemhi PMU began in January and February of 2012 and continued in January of 2013. In total, 15 GPS radio-collars have been deployed on bighorn sheep in the South Lemhis over the last two years (2012 – 3 ewes and 3 rams; 2013 – 4 ewes and 5 rams). The information gathered from the satellite GPS collars has been used to evaluate spatial and temporal use of the area, summer lamb survival, and to eventually gain some sightability points for the sightability model. This information has and will continue to be used evaluate the Payette Summer Habitat Model that we used to predict habitat in the Statewide Bighorn Sheep Management Plan. Health samples were taken from radio-collared bighorn sheep and those samples were sent to the Wildlife Health Laboratory for analysis. This project has been funded with BLM Challenge Cost Share money and IDFG matching funds.

Regional personnel surveyed this area for bighorn sheep in March 2014. A total of 45 bighorn sheep were counted; 20 ewes, 5 lambs, and 20 rams. Staff also surveyed for bighorn sheep in conjunction with Mountain Valley mule deer PMU survey during the winter of 2015-2016 and counted 40 individuals.

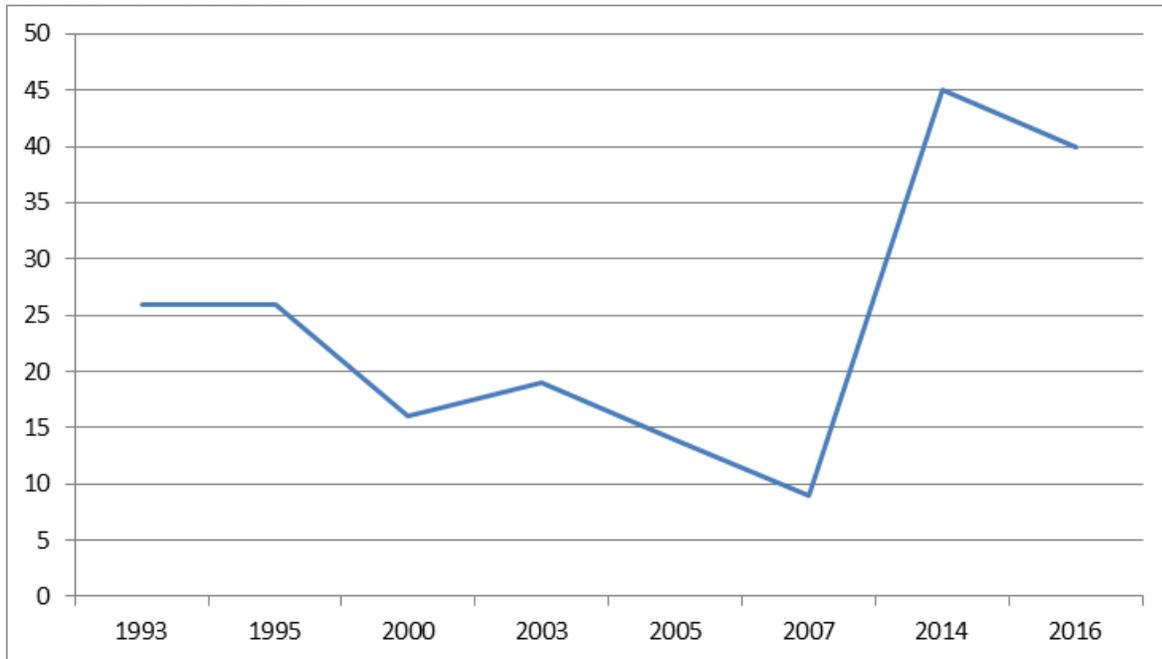


Figure 35. Total bighorn sheep observed, South Lemhi PMU, 1993-present.

Rocky Mountain Bighorn Sheep

South Lemhi

GMUs 51(east), 58 (west)

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
51	2003	10	5	3	1	4	0	19
	2005	6	3	2	3	5	0	14
	2007	1	1	0	0	0	7	9
	2014	20	5	5	15	20	0	45
	2016*	20	8	6	7	13	0	40
Modeled estimate								
Per 100 ewes observed		40	30	35	65			

NOTE: All aerial counts are incidental to other surveys (not representative of populations).

*incidental to aerial deer survey

Hunting tags and harvest information

No hunting season in this PMU.

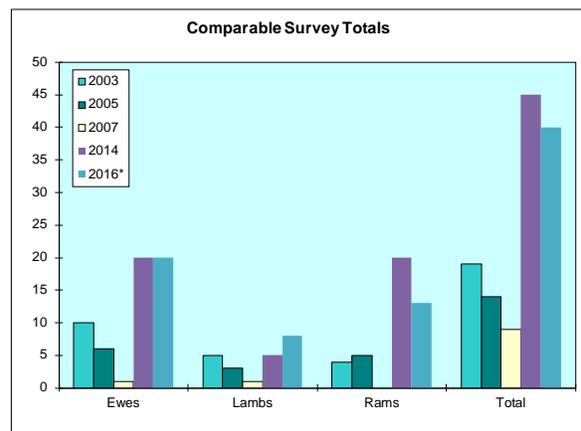


Figure 36. South Lemhi Population Surveys

LOST RIVER RANGE PMU

GMUs 37, 50 (east), 51 (west); Hunt Area 37

Description

This population occurs on the Lost River Range in GMUs 37, 50, and 51. Although USFS manages most of the bighorn range, there is some use of BLM-managed lands. The area is typified by dry coniferous forest-grassland and alpine habitats with low motorized road or trail densities. Access into most occupied bighorn sheep habitats is limited. Bighorn sheep primarily summer at higher elevations in alpine ranges. Winter ranges extend from the lower elevation foothills to mountain ridges >11,000 feet and include multiple habitat types. Bighorn sheep are observed consistently throughout this PMU.

Historical Perspective

There are no quantitative historical data for the number of bighorn that occurred on the Lost River Range. However, by the 1950s bighorn throughout the central Idaho area had declined substantially. In the Lost River area where Seton (1929) reported thousands of bighorn sheep in the late 1800s, Smith (1954) reported there were only a few dozen bighorn left.

Initial releases of Rocky Mountain bighorn sheep into the Lost River Range began in 1969 and continued through 1980; a large augmentation occurred in 2005. All releases were considered successful. Prior to the 2005 augmentation, IDFG entered into a Memorandum of Understanding (MOU) with the BLM and USFS to foster enhanced management of bighorn sheep in the Lost River Range. The MOU was spurred by removal of domestic sheep from grazing allotments within and adjacent to occupied bighorn sheep range.

Bighorn numbers on the Lost River Range appear to increase steadily until the early 1980s, reaching a high of 182 observed during a 1980 survey. The population remained near that level through the late 1980s. However, by 1992 the population appeared to have suffered the same decline and persistent low recruitment as other bighorn sheep populations in the region (Figure 54). Recovery from a period of low recruitment and augmentation with 62 wild sheep from Montana apparently spurred significant population growth; a record high 240 (since reintroduction) bighorn sheep were observed during the most recent survey in 2010. In response to the increases in this sheep population, IDFG increased the bighorn sheep tags available for harvest from 3 to 6 in 2011 and then to 8 tags in 2017. Bighorn sheep surveys conducted in March of 2016 showed continued growth to this population with 260 total sheep observed.

Issues

Although reduced by several changes in land management practices in recent years, risk of contact with domestic sheep remains an issue. At the time of the augmentation release, IDFG and USFS staff developed a response plan to address and reduce wild sheep-domestic contact in the event bighorns left the defined project area.

The Lost River Range is relatively dry and availability of surface water is sporadic. The USFS has developed some water sources (guzzlers) to address potentially limited natural water

distribution. With current available information and considering the potential of increased disease risk, IDFG currently discourages the development of water sources.

Management Direction

Within current distribution, modeled habitat occupies approximately 678 km², which could support approximately 1,290 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). Point agreement with the habitat model is low (~60%), indicating sheep have spent significant time outside of predicted habitat areas. Conversely, there could be greater limitation based on specific habitat needs such as lambing and wintering habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size. Regardless, the PMU can sustain more bighorn sheep and IDFG will continue to manage for an increase in population in the PMU (Table 1).

Management Actions

1. Work with USFS to maintain or improve habitat for bighorn sheep.
2. Work with USFS, BLM, and other partners to control or reduce noxious weed occurrence.
3. Increase knowledge of movement patterns among hunt areas and adjacent PMUs to better understand metapopulation characteristics (connectivity and genetic exchange).
4. Refine habitat modeling to more accurately characterize sustainable population levels.
5. Work with domestic sheep owners or permittees to employ BMPs designed to maintain separation of wild and domestic sheep.

Progress

IDFG radio-collared 20 bighorn sheep (6 rams and 14 ewes) on the north end of the Lost River Range PMU in March 2017. The information gathered from the satellite GPS collars will be used to evaluate spatial and temporal use of the area, summer lamb survival, and to eventually gain some sightability points for the sightability model. IDFG will also use these points to evaluate the Payette Summer Habitat Model that we used to predict habitat in the Statewide Bighorn Sheep Management Plan. Health samples were taken from radio collared bighorn sheep and those samples were sent to the Wildlife Health Laboratory for analysis.

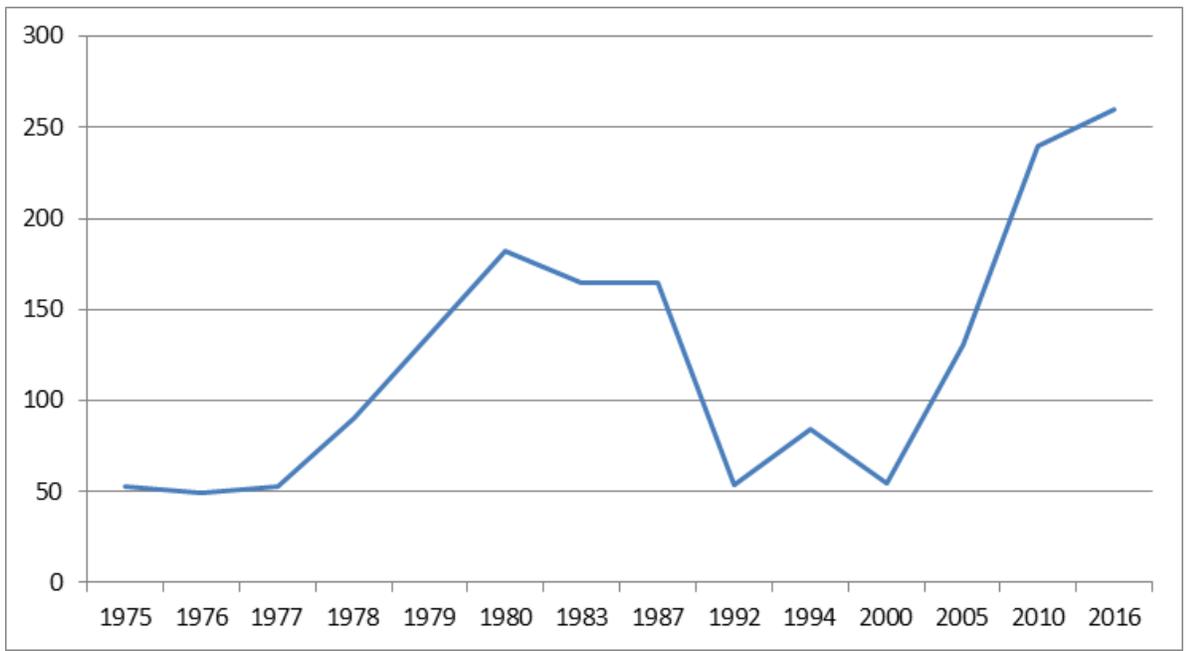
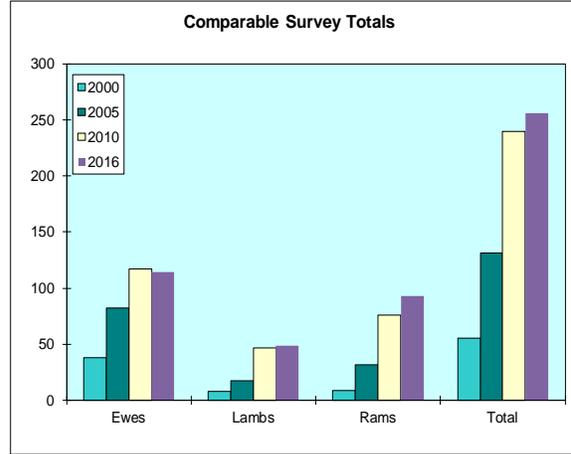


Figure 37. Total bighorn sheep observed during IDFG aerial surveys, Lost River Range PMU, 1975-present.

Rocky Mountain Bighorn Sheep
Lost River Range
 GMUs 37, 50 (east), 51 (west); Hunt Area 37

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
37, 50, 51	2000	38	8	5	4	9	0	55
	2005	82	17	19	13	32	0	131
	2010	117	47	38	38	76	0	240
	2016	114	49	32	61	93	0	256
Modeled estimate								
Per 100 ewes observed		43	28	54	82			



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	3	3	6	6	6	6	7	6
Harvest	3	3	5	5	2	6	3	6
Hunter success	100	100	83	83	33	100	43	100
Ave ram age	6.2	7.2	6.9	7.3	8.0	8.8	9.5	8.3

2015 Includes auction or lottery tags.

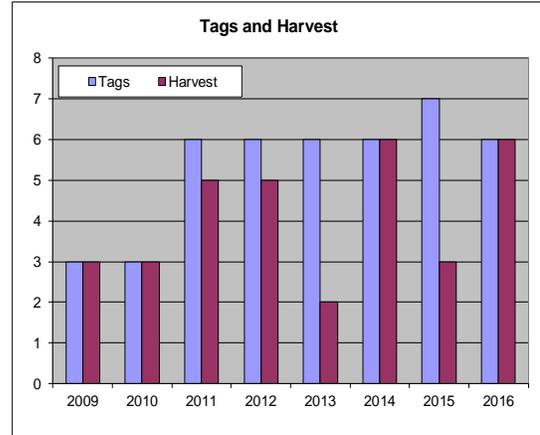


Figure 38. Lost River Range Population Survey and Harvest

EAST FORK SALMON RIVER PMU

GMUs 36 (southeast), 36A; Hunt Area 36A

Description

This population includes sheep in GMUs 36A and 36 (southeastern portion). Ownership of bighorn range is split between USFS (summer range) and BLM (winter range). The area is typified by dry, coniferous forest-grassland habitats with low motorized road-trail densities. Access into most occupied bighorn sheep habitats is limited. Bighorn sheep in the area winter in a relatively small area of shrub-steppe habitat west of the East Fork Salmon River between Joe Jump Basin and Big Boulder Creek. Sheep migrate west into the White Cloud Mountains to summer in sub-alpine to alpine habitats.

Historical Perspective

Bighorn sheep populations in this area persisted despite pressures of early settlement. However, subsistence hunting for mining camps and intensive livestock grazing in the late 1800s reduced numbers to low levels. Estimated sheep numbers from various sources in the early 20th century ranged from 50 to 150. Sheep in this PMU became the subject of much social and political interest in the 1960s and 1970s, resulting in several research and habitat enhancement projects, as well as a cooperative management agreement between BLM and IDFG.

No animals have been translocated into this native population and only 1 translocation out of the PMU has occurred. Population estimates for the PMU varied considerably over time (50-150 in the early-mid 20th century) depending on the source (USFS, private landowners, IDFG). Annual variations included some that do not appear biologically feasible. Regardless, the population apparently reached a modern peak in 1990 (191 observed), a level higher than estimates from earlier in the century (Figure 40). Some early estimates were derived from historical observations by USFS and IDFG personnel. More recent values (1978 forward) are primarily observed numbers from IDFG aerial surveys. The population suffered an all-age die-off along with surrounding PMUs and declined by 50% by 1993. Hunting was permitted through 1996, but closed until 2007 because of low sheep numbers. Recent surveys in 2013 and 2017 indicate a low number of sheep with poor recruitment. However, it should be noted that the 2013 survey was incomplete and the 2017 survey occurred soon after a capture effort took place. For those reasons, these recent surveys may not paint a complete picture of population dynamics in this PMU.

A research project was implemented in winter of 2016. Thirty-four sheep were fitted with GPS collars to determine movements, habitat use, health status, and lamb survival.

Issues

Quantity and quality of winter range may be important limiting factors for this PMU. Grazing management has changed over time and should have improved range for bighorns. However, the winter range is quite dry and vegetative production appears low. Elk numbers in the East Fork

drainage increased dramatically beginning in the 1970s and competition with a large elk herd may impact habitat capacity for bighorns.

Contact with domestic sheep is a risk factor at the edges of occupied summer range near USFS allotments. Risk could increase in the event individuals of either species wander. BMP agreements have been developed to minimize risk of contact.

Lastly, the East Fork population appears to still be disease-limited, as evidenced by very low lamb:ewe ratios since the die-off in the early 1990s (Figure 40). Ratios declined from an average of 57:100 (range 22-88) between 1977 and 1990 to <9:100 (range 3-15) since 1991 (for years in which >50 sheep were classified). In 2013, a lamb:ewe ratio of 40 was observed by a partial survey. A targeted survey was conducted in 2017 which indicated the lamb:ewe ratio went back down to 12.

Management Direction

Hunting seasons were closed for 10 years and reopened in 2007 because adequate numbers of rams were available to support limited harvest. Only one of the 2 tags was filled in 2016 and the age of that harvested ram was much lower than the average age in the previous 7 years. This may call for careful scrutiny of 2017 harvest data.

Within current distribution, modeled habitat occupies approximately 558 km², which could support approximately 1,060 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). However, with the current restricted winter range, total sheep numbers that can be supported in this PMU are likely much lower. Regardless, historic and recent data indicates the PMU can sustain significantly more bighorn sheep and management direction will be to increase population levels (Table 1).

Management Actions

1. Work with USFS and BLM to maintain or improve habitat for bighorn sheep.
2. Work with USFS, BLM, and other partners to control or reduce noxious weed occurrence.
3. Increase knowledge of movement patterns among hunt areas and adjacent PMUs to better understand metapopulation characteristics (connectivity and genetic exchange).
4. Refine habitat modeling to more accurately characterize sustainable population levels.
5. Use radiomarked sheep to provide data points for sightability modeling and determining limiting factors to population growth.
6. Work with domestic sheep owners or permittees to employ BMPs designed to maintain separation of wild and domestic sheep.

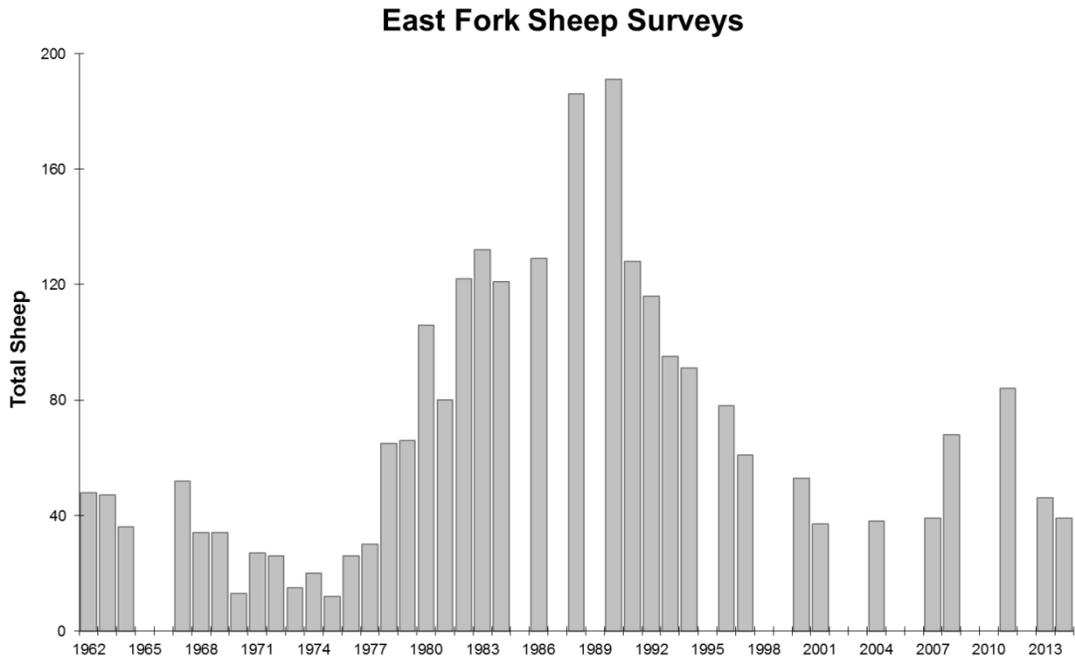


Figure 39. Approximate total bighorn sheep estimated or observed, East Fork Salmon River PMU, 1920-present

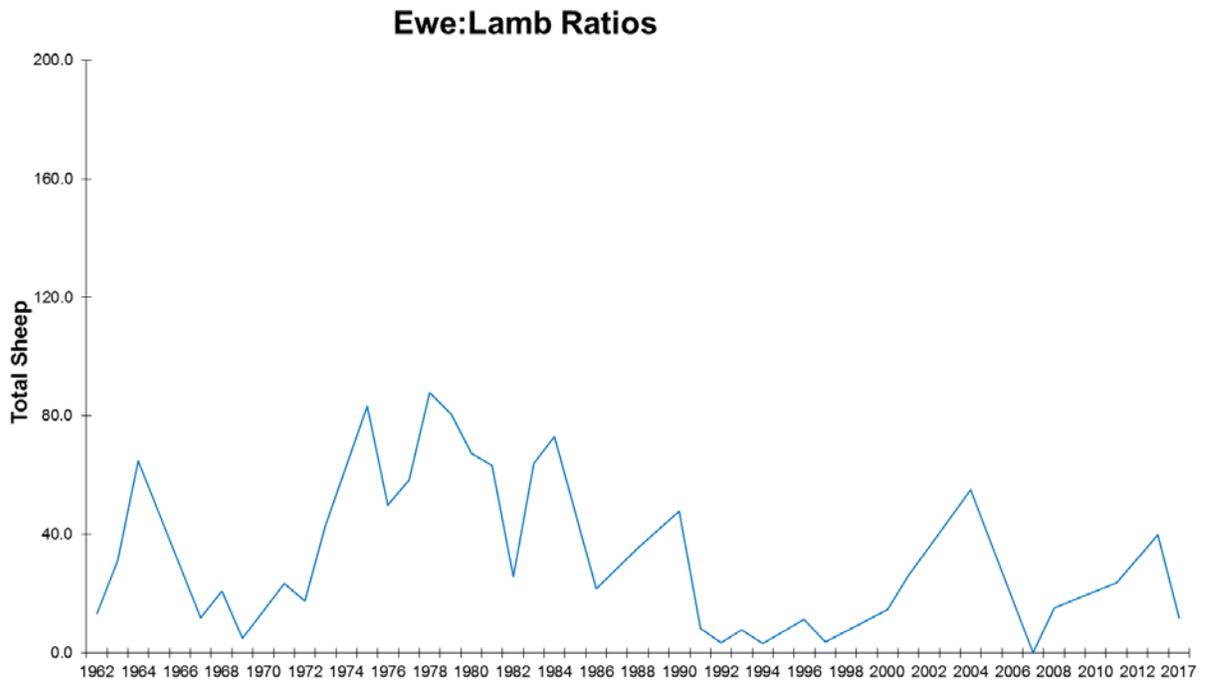
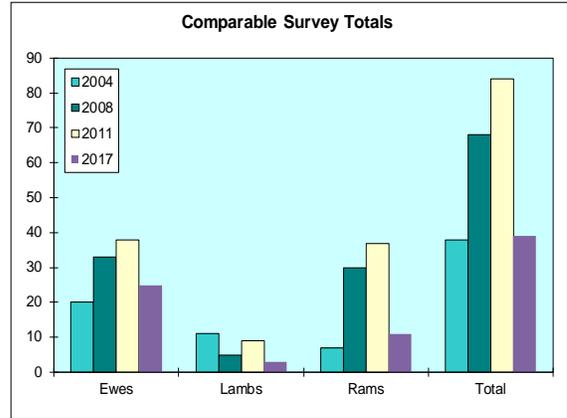


Figure 40. Observed bighorn sheep lamb:100 ewe ratios, East Fork Salmon River PMU, 1962-present.

Rocky Mountain Bighorn Sheep
East Fork Salmon River
 GMUs 36 (southeast), 36A; Hunt Area 36A

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
36A	2004	20	11	4	3	7	0	38
	2008	33	5	16	14	30	0	68
	2011	38	9	12	25	37	0	84
	2017	25	3	1	10	11	0	39
Modeled estimate								
Per 100 ewes observed			12	4	40	44		



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags*	2	2	2	2	2	2	2	2
Harvest*	2	1	1	1	1	2	2	1
Hunter success	100	50	50	50	50	100	100	50
Ave ram age	8.5	8.5	8.5	10.5	9.0	8.8	9.5	5.5

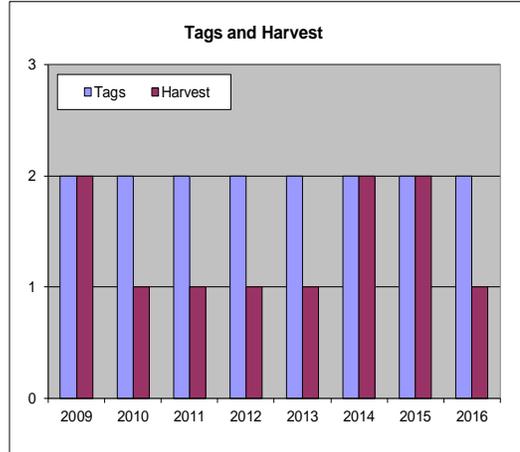


Figure 41. East Fork Salmon River Population Survey and Harvest

MIDDLE MAIN SALMON RIVER PMU

GMUs 28 (southeast), 36B, 27 (southeast); Hunt Areas 28-2, 36B

Description

The Middle Main population includes sheep in GMU 36B and small portions of GMUs 27 (upper Warm Springs and Camas creek drainages) and 28 (Hat Creek and upstream). Three subpopulations exist: the smaller Birch Creek subpopulation occupies the area from Challis upstream to approximately Sink Creek; the Morgan Creek herd ranges downstream from Challis to Hat Creek in GMU 28; and the Williams Lake herd ranges downstream from Hat Creek to Perreau Creek. Ownership is split between the BLM and USFS, including some area within the Frank Church River-of-No-Return Wilderness. Habitat grades from sagebrush-steppe at lower elevations though dry, coniferous forest-grassland to alpine at the highest elevations. This PMU contains some of the least rugged terrain occupied by bighorns in eastern Idaho. Highways 93 and 75 parallel the Salmon River along the eastern edge of the PMU; some gravel roads provide access to occupied bighorn sheep range. Bighorn sheep in the area winter along the main Salmon River corridor. Some bighorns remain in these areas during summer, whereas others migrate to higher elevation sub-alpine and alpine habitats.

Historical Perspective

Even though they were near human population centers, bighorn sheep in this area persisted when most front-country populations were extirpated. Like most areas, subsistence hunting for mining camps and intensive livestock grazing in the late 1800s produced some negative impacts. Little information about historic population trends exists.

The native population of the Middle Main PMU provided a source of animals for translocation within and outside Idaho for >20 years. A small number of sheep were moved from the adjacent Lower Panther-Main Salmon PMU to augment the Birch Creek sub-population.

Land and resource use changed after the mining boom: subsistence hunting and livestock use decreased and many shrub-dominated ranges began reverting to grasslands. The bighorn population increased to approximately 300 animals by 1988, but declined by roughly 50% after a disease-driven, all-age, die-off in the early 1990s and remains between 130-160 sheep (Figure 42). Values are primarily observed numbers from IDFG aerial surveys.

In March 2016, 10 bighorn sheep were fitted with GPS collars in Morgan Creek primarily to determine movements and connectivity between this PMU and Middle Fork PMUs.

Issues

Wildfire has impacted some portions of the PMU, particularly since 2007. In some cases, fires have likely benefited wild sheep by reducing conifer encroachment and promoting grass and forb production. However, because of the semi-arid nature of parts of the landscape, habitat response to fire may be slow or negative, particularly on winter ranges where cheatgrass and noxious weeds such as knapweed, rush skeletonweed, and leafy spurge could ultimately have significant

impacts on winter range productivity. Elk populations have declined somewhat since peaks during the mid-2000s, but competition with a large elk herd may impact habitat capacity for bighorns.

Because bighorns in this PMU occupy less rugged winter ranges than typical of wild sheep, predation risk from wolves may be somewhat higher than in other PMUs. Some farm flocks of domestic sheep occur in and near the PMU, creating a risk of contact. Several animals from the Birch Creek sub-population spend most of the year in close proximity to Highway 75 just south of Challis and are subject to mortality due to vehicle collisions. Past attempts to reduce vehicle collisions by drawing sheep farther west of the highway with habitat improvements have met with limited success, as have highway signage. In April 2010, a sheep viewing station was opened to enhance public knowledge and appreciation of bighorn sheep and their habitat (a collaborative effort among Idaho Outfitters and Guides Association, Idaho Chapter Wild Sheep Foundation, IDFG, and several other entities).

Management Direction

Because of relatively easy access to much of the hunt area, hunter success tends to be high most years. Backcountry hunting experiences are available within wilderness portions of the hunt area. As a result of the 2017-2018 season-setting process the boundary for hunt area 28-2 was adjusted, but number of tags available stayed constant.

Within current distribution, modeled habitat occupies approximately 567 km², which could support approximately 1,075 bighorn sheep (assuming all habitat is suitable year-round and relatively high densities of 1.9/km²). However, there are limitations based on specific habitat needs such as lambing and wintering habitat. Thus, further refinement of habitat models and available habitat will likely reduce the estimate of potential population size.

Management Actions

1. Work with USFS and BLM to maintain or improve habitat for bighorn sheep.
2. Work with USFS, BLM, and other partners to control or reduce noxious weed occurrence.
3. Work with USFS to reduce fire occurrence on winter range in areas where a seed source exists for cheat grass.
4. Increase knowledge of movement patterns among hunt areas and adjacent PMUs to better understand metapopulation characteristics (connectivity and genetic exchange).
5. Refine habitat modeling to more accurately characterize sustainable population levels.
6. Use radiomarked sheep to provide data points for sightability modeling.
7. Work with domestic sheep owners to employ BMPs designed to maintain separation of wild and domestic sheep.

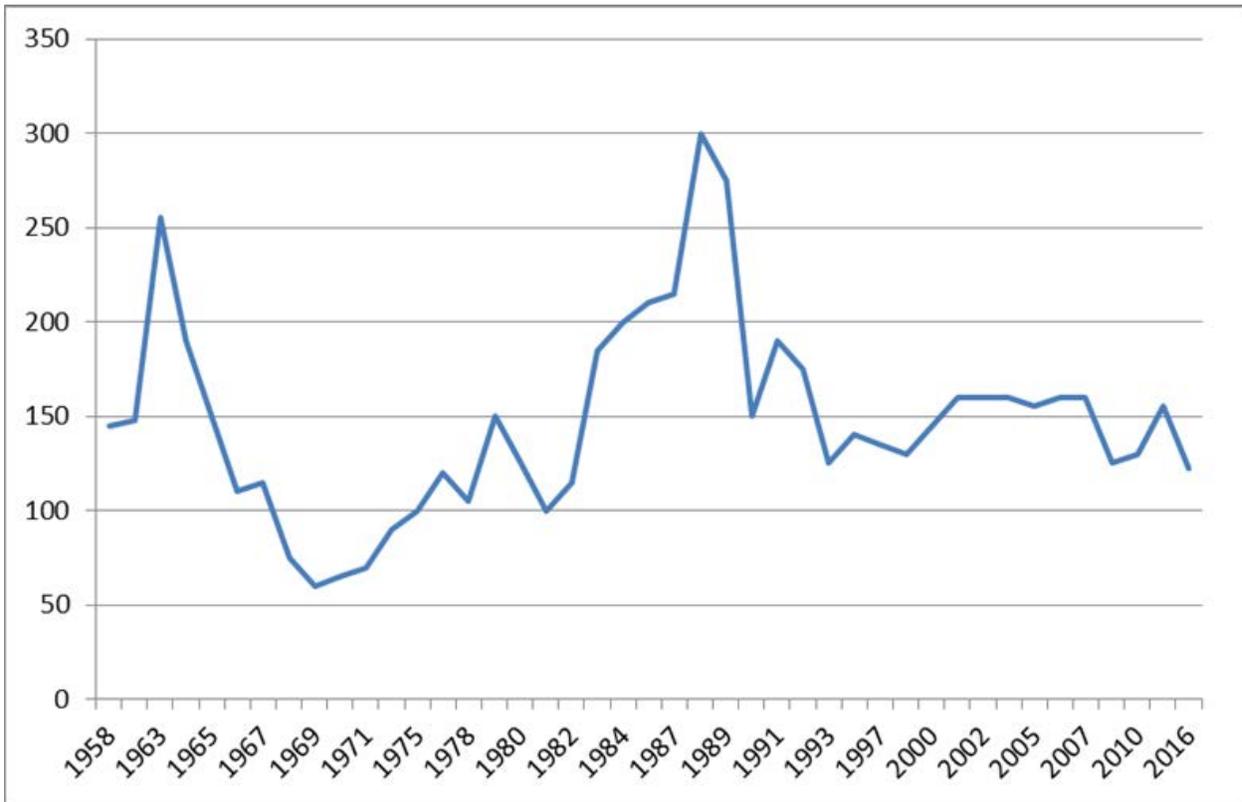


Figure 42. Approximate total bighorn sheep observed or estimated, Middle Main Salmon River PMU, 1958-present.

Rocky Mountain Bighorn Sheep

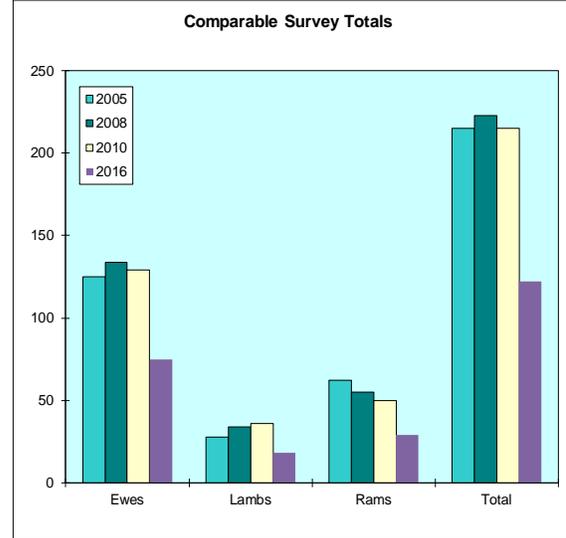
Middle Main Salmon River

GMUs 28 (southeast), 36B, 27 (southeast); Hunt Areas 28-2, 36B

Population surveys

Area	Year	Ewes	Lambs	Rams			Unclass	Total
				I, II	III, IV	Total		
Morgan Cr.	2005	76	18	26	13	39	0	133
	2008	61	18	10	19	29	0	108
	2010	63	22	21	11	32	0	117
	2016	50	14	11	8	19	0	83
Birch Cr.	2005	21	2	5	4	9	0	32
	2008	22	6	2	4	6	0	34
	2010	6	2	4	2	6	0	14
	2016	5	0	3	1	4	0	9
SE 28	2005	28	8	9	5	14	0	50
	2008	51	10	10	10	20	0	81
	2010	60	12	4	8	12	0	84
	2016	20	4	5	1	6	0	30
Total	2005	125	28	40	22	62	0	215
	2008	134	34	22	33	55	0	223
	2010	129	36	29	21	50	0	215
	2016	75	18	19	10	29	0	122
Modeled estimate								
Per 100 ewes observed			24	25	13	39		

Note: Numbers corrected per past data summaries; of note, this population status graph is comprised of partial and "total" surveys, the 2005, 2008, and 2010 are total surveys. Total = most of the PMU surveyed.



Hunting tags and harvest information

	2009	2010	2011	2012	2013	2014	2015	2016
Tags	28-2	1	1	1	1	1	1	2
	36B	4	4	4	4	4	4	4
	Total	5	5	5	5	5	5	6
Harvest	28-2	1	1	1	1	1	1	2
	36B	1	4	4	3	2	3	4
	Total	2	5	5	4	3	4	6
Hunter success	40	100	100	80	60	80	100	83
Ave ram age	6.0	7.7	7.8	6.6	8.0	7.0	6.2	7.1

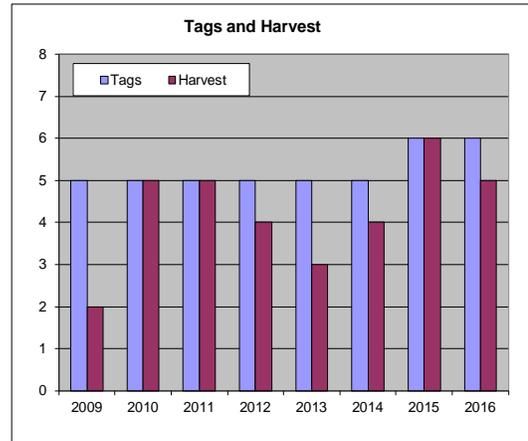


Figure 43. Middle Main Salmon River Population Survey and Harvest

LIONHEAD PMU

Description

This area includes portions of GMU 61 near Henry's Lake (Figure 13). There is a small population of bighorn sheep that occurs on the Idaho-Montana border. Montana's state plan refers to this as the Hilgards population. These sheep spend varying amounts of time in Idaho. Montana has periodically issued hunting tags for this herd. Idaho authorized a 5-tag controlled hunt on this population in 1962, 1964, 1965, and 1966. Currently this population of bighorn sheep is not hunted in Idaho and has a high nonconsumptive value, particularly to those recreating in the Targhee Creek area.

Management Direction

Management direction is to document observations and provide for nonconsumptive use. IDFG does not currently manage this sheep population for hunting but there has been interest in the past to try to provide limited opportunity that is shared cooperatively between Montana and Idaho.

Management Action

1. Document bighorn sheep locations to better understand their use of this area.
2. Provide information to those interested in bighorn sheep viewing opportunities.

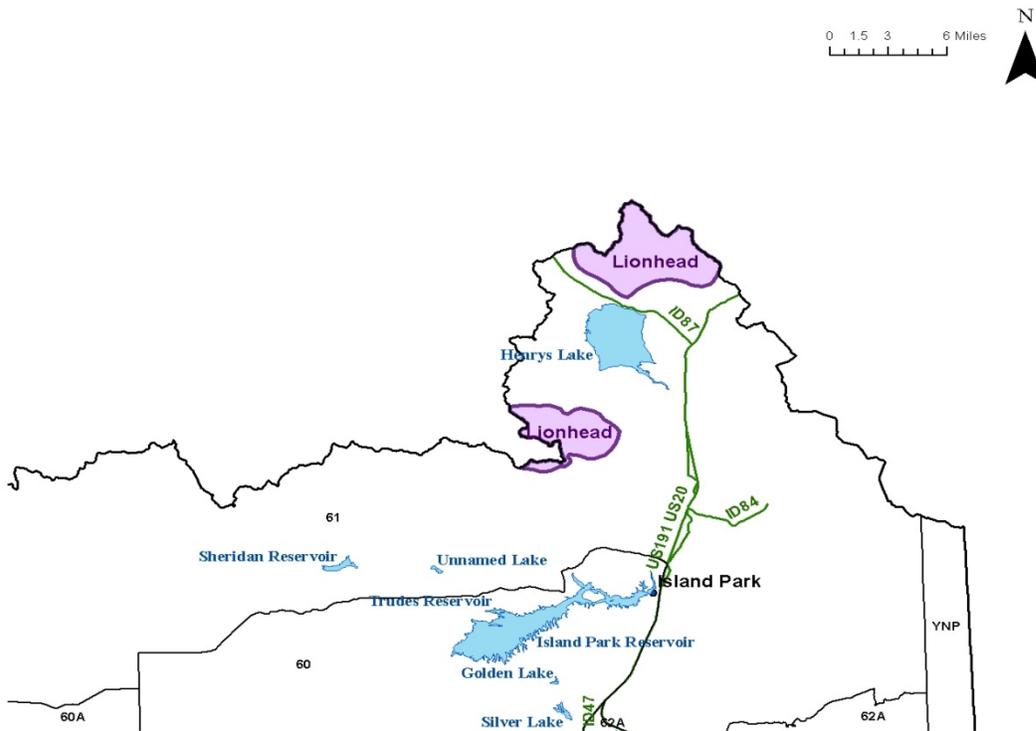


Figure 44. Lionhead PMU (GMU 61)

PALISADES PMU

Description

This area includes portions of GMUs 64 and 67 (Figure 13). Periodically bighorn sheep are observed in this area. There are reports of bighorn sheep that have been in the area for a short duration during the last decade. The individual sheep are usually seen a few times and then apparently leave the area. These sheep most likely come from Wyoming but this has not been confirmed with telemetry data. There is not a persistent bighorn sheep population in the Palisades PMU.

Management Direction

IDFG does not manage to maintain a population of bighorn sheep in the Palisades PMU. Management will focus on minimizing potential contact between bighorn sheep and domestic sheep and goats, and preventing bighorn sheep that contact domestic sheep in this area from returning to an established population of bighorn sheep. If possible, the bighorn sheep that wander into this area will be captured, radiocollared, and monitored to learn more about their travel routes and source population(s). Management may also include lethal removal of bighorn sheep that have contact with domestic sheep.

Management Action

1. IDFG will work to establish direction for communication between the USFS, Wyoming Game and Fish, permittees, the public, and IDFG so that bighorn sheep sightings are reported promptly to appropriate personnel.
2. When possible, radiocollar bighorn sheep to learn more about their movements and source population(s).
3. Remove bighorn sheep that have contact with domestic sheep.

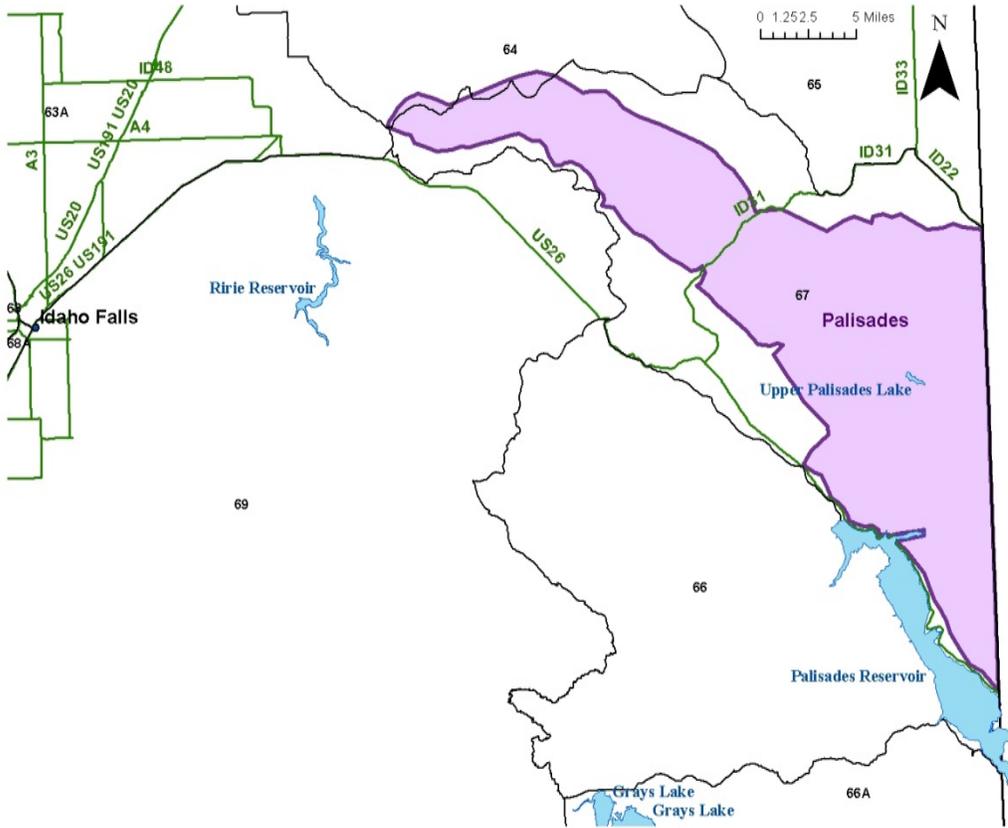


Figure 45. Palisades PMU (GMUs 64 and 67)

PIONEERS PMU

Description

This area includes portions of GMUs 48, 49, and 50 (Figure 13). On average, there are confirmed sightings of bighorn sheep in this area every 2-3 years. Often, these sheep are young rams which are observed once or a few times, but then apparently leave the area. IDFG staff is uncertain of the source populations for these sheep; they may migrate from either the East Fork Salmon River population or the Lost River population. There does not appear to be a persistent bighorn sheep population in the Pioneers PMU.

Management Direction

IDFG does not manage to maintain a population of bighorn sheep in the Pioneers PMU. Management will focus on minimizing potential contact between bighorn sheep and domestic sheep and goats, and preventing bighorn sheep that contact domestic sheep in this area from returning to an established population of bighorn sheep. To this end, IDFG has BMP agreements with all of the known domestic sheep producers who operate within this PMU. These BMPs focus on prompt communication of bighorn sightings and minimizing the likelihood of contact between domestic and bighorn sheep. Furthermore, the BMPs outline tools IDFG may use when a bighorn sheep is sighted. These tools include monitoring, deploying a radio collar on, or euthanizing the bighorn sheep.

Management Action

1. Continue to collect observation data on bighorn sheep that move into the Pioneers PMU. If the opportunity arises, this may include deploying radio collars on bighorn sheep to learn about movements, source herds, and other bighorn sheep that may use the Pioneers PMU.

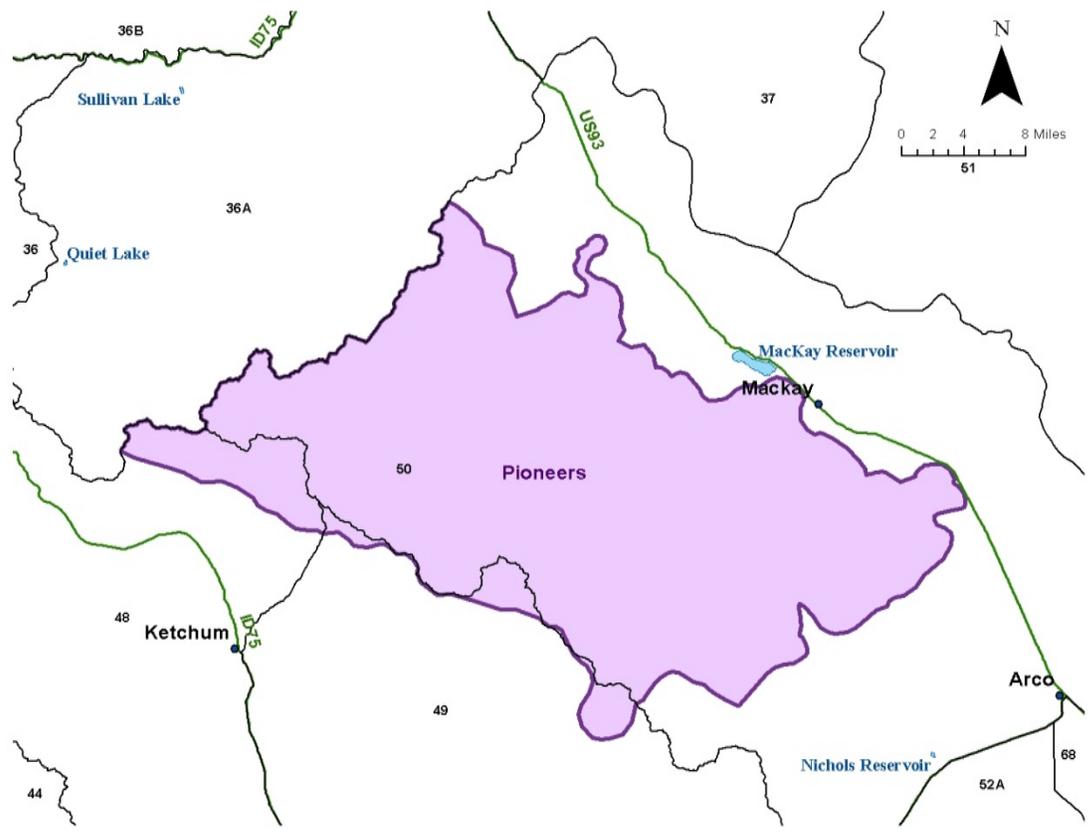


Figure 46. Pioneers PMU (GMUs 48, 49, and 50)

Appendix A
IDAHO
2016 SEASON
BIGHORN SHEEP RULES

Moose, Bighorn Sheep and Mountain Goat

2015 and 2016 Seasons and Rules



2015 - 2016 BIGHORN SHEEP HUNTING SEASONS

Mandatory Check and Report Requirements

Any hunter killing a bighorn sheep ram must present the horns and have a big game mortality report completed at an Idaho Fish and Game regional office within 10 days of the date of the kill. Fish and Game's headquarters office is not equipped to check in bighorn sheep. In the Boise area, these animals can be checked at the Fish and Game regional office in Nampa (3101 S. Powerline Rd, 208-465-8465) weekdays between the hours of 8 a.m. and 5 p.m. or by appointment at the Garden City facility, 109 W. 44th St., 208-327-7095.

A hunter may authorize another person to comply with the above report requirements if that person possesses the necessary information to accurately complete the necessary form, see page 30.

Unsuccessful hunters must present or mail their unused tags to a Fish and Game office within 10 days after the close of the season for which the tag was valid. Tags can be mailed

to: Idaho Fish and Game, Attn: Wildlife Bureau, PO Box 25, Boise, ID 83707. Cancelled tags will be returned to the hunter upon request. Failure to report may result in future ineligibility in bighorn sheep drawings.

No person may harvest more than one Rocky Mountain and one California bighorn sheep in Idaho during their lifetime. Lottery and Auction tag winners are exempt from the once in a lifetime provision.

Drawing Odds: Drawings odds are an approximation of the probability of drawing a tag for each hunt in 2014 and were calculated by dividing the number of tags offered by the number of first choice applicants for that hunt in the 2014 drawing then converting to a percentage. New Hunts and controlled hunt areas with significant boundary changes for 2015 - 2016 have been designated as "New Hunts."

To review more detailed information about number of applicants or drawing odds for other years, please visit our website at <http://fishandgame.idaho.gov/CHodds>.

SHEEP

2015 & 2016 Bighorn Sheep Controlled Hunts - Rams Only 91 Total Tags Including Special Lottery and Auction Tag

Rocky Mountain Bighorn Rams: North of Interstate Highway 84 63 Tags				
Hunt No.	Controlled Hunt Area	Tags	Season Dates	Drawing Odds in 2014
5001	11	1	Aug 30 - Oct 13	0.4%
5002	19*	4	Aug 30 - Oct 13	3%
5003	19A*	2	Aug 30 - Oct 13	New Hunt
5004	20*	2	Aug 30 - Oct 13	18%
5005	20A	2	Aug 30 - Oct 13	6%
5006	21	3	Aug 30 - Oct 13	5%
5007	26*	4	Aug 30 - Oct 13	14%
5008	27-1	12	Aug 30 - Oct 13	24%
5009	27-2	6	Aug 30 - Oct 13	20%
5010	27-3*	4	Aug 30 - Oct 13	10%
5011	27-4	2	Aug 30 - Oct 13	4%
5012	28-1	2	Aug 30 - Oct 13	11%
5013	28-2	2	Aug 30 - Oct 13	New Hunt
5014	30*	2	Aug 30 - Oct 13	4%
5015	36*	1	Aug 30 - Oct 13	4%
5016	36A*	2	Aug 30 - Oct 13	3%
5017	36B*	4	Aug 30 - Oct 13	4%
5018	37*	6	Aug 30 - Oct 13	1%
5019	37A	2	Aug 30 - Oct 13	1%

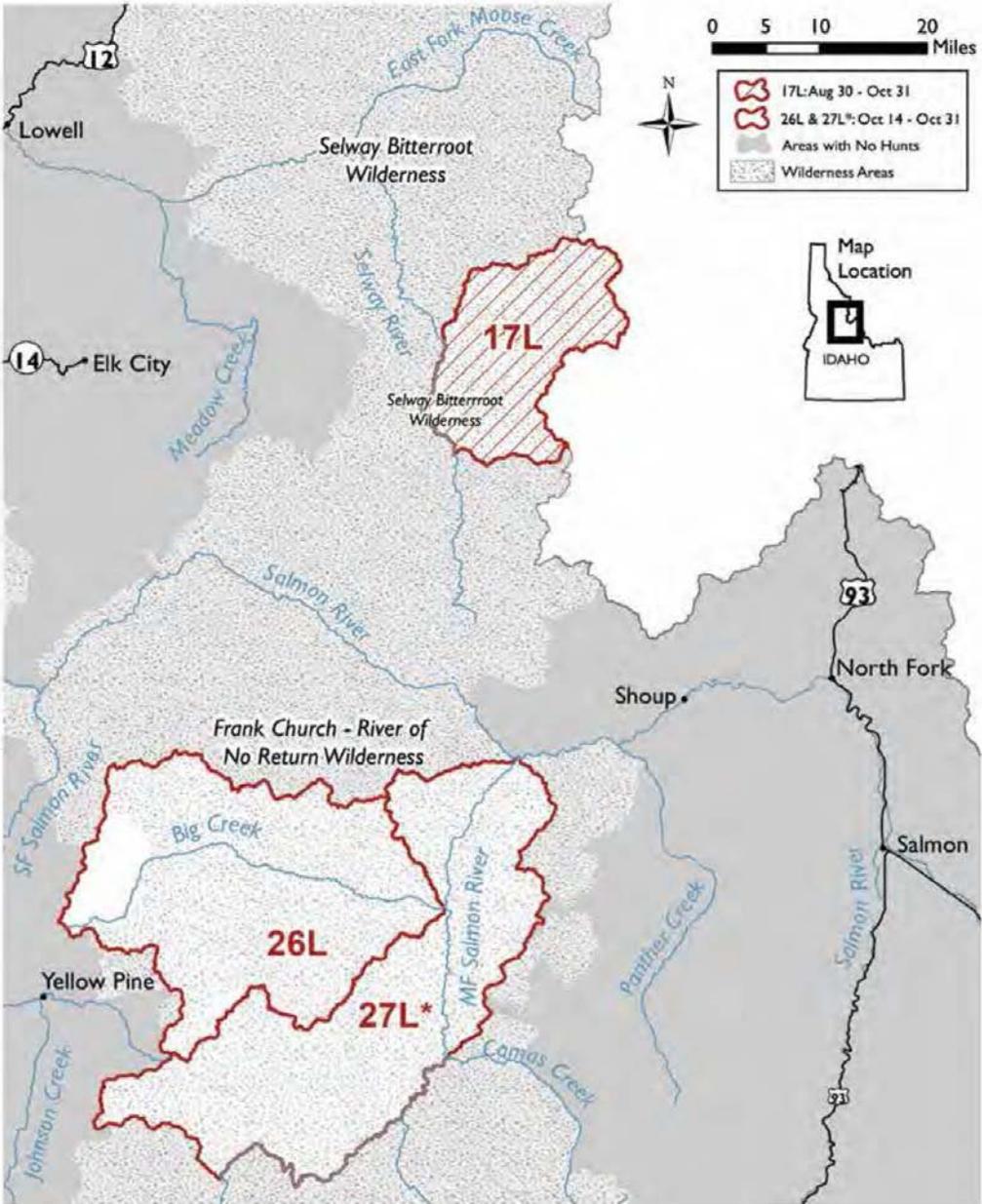
Rocky Mountain Bighorn Rams: Late Controlled Hunts North of Interstate Highway 84 5 Tags				
Hunt No.	Controlled Hunt Area	Tags	Season Dates	Drawing Odds in 2014
5020	17L	1	Aug 30 - Oct 31	9%
5021	26L	2	Oct 14 - Oct 31	4%
5022	27L*	2	Oct 14 - Oct 31	5%

California Bighorn Rams: South of Interstate Highway 84 21 Tags				
Hunt No.	Controlled Hunt Area	Tags	Season Dates	Drawing Odds in 2014
7001	40	1	Aug 30 - Oct 8	4%
7002	41-1	2	Aug 30 - Oct 8	3%
7003	41-2	4	Aug 30 - Oct 8	3%
7004	42-1	4	Aug 30 - Sep 14	4%
7005	42-2	4	Sep 22 - Oct 8	4%
7006	46-1*	3	Aug 30 - Sep 14	3%
7007	46-2*	2	Sep 22 - Oct 8	2%
7008	55	1	Aug 30 - Oct 8	3%

* See controlled hunt area descriptions. This hunt includes other units or parts of other units.

2015 - 2016 ROCKY MOUNTAIN BIGHORN SHEEP HUNTS

Rocky Mountain Bighorn Sheep Hunts

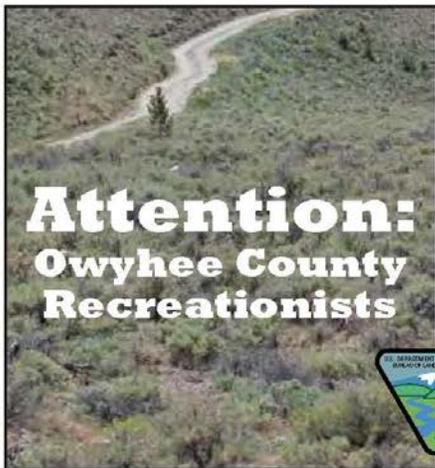
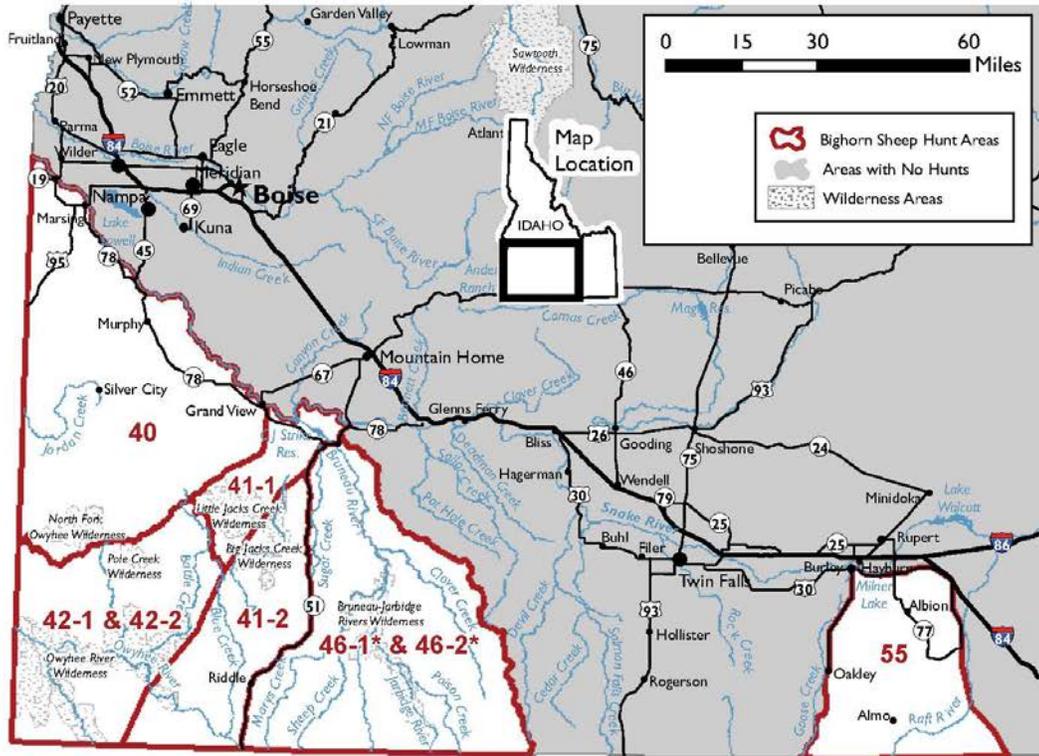


SHEEP

2015 - 2016 CALIFORNIA BIGHORN SHEEP HUNTS

California Bighorn Sheep Hunts

SHEEP



**Attention:
Owyhee County
Recreationists**



Legislation approved in 2009 designated major portions of California Bighorn Sheep hunt areas as wilderness, where access by motorized vehicles is forbidden by law. A number of access routes were preserved for hunter access. Please check your maps and abide by wilderness regulations. Maps showing wilderness boundaries can be found at Bruneau, Owyhee and Jarbidge offices of the Bureau of Land Management.

For More Information, Please Contact
**BLM Boise District @ 208-384-3300 or the
 BLM Twin Falls District @ 208-736-2350;
 or visit the website @ www.id.blm.gov**

Rocky Mountain and California Bighorn Sheep Hunt Area Descriptions

Please note that hunt areas are different for each species. For full text of legal description and boundaries for Game Management Units please refer to the current Big Game Seasons and Rules Books or visit, <http://adminrules.idaho.gov/rules/current/13/0108.pdf>

Hunt Area 11 — That portion of Unit 11 that drains into the Snake River downstream from the mouth of the Salmon River to, but excluding, the Tenmile Creek Canyon drainage.

Hunt Area 17L — That portion of Unit 17 east of the Selway River upstream from and including the Whitecap Creek drainage and north of the Deep Creek Road (Forest Service Road 468).

Hunt Area 19 — Those portions of Units 14, 19 and 20 from the Red River Ranger Station-White Water Ranch Road (Forest Service Road 421) downstream to and including the Wind River drainage.

Hunt Area 19A — That portion of 19A within the South Fork of the Salmon River Drainage downstream of and including the Bear Creek Drainage, and that portion of 20A within the South Fork of the Salmon River Drainage.

Hunt Area 20 — That portion of Unit 20 upstream from the Red River Ranger Station-Whitewater Ranch Road (Forest Service Road 421), that portion of Unit 21 downstream from the Horse Creek Trail (Forest Service Trail 159) and Reynolds Creek Trail (Forest Service Trail 067), and that portion of Unit 17 upstream from the Witter Ridge Trail (Forest Service Trail 75) and the Thompson Flat-Wood Hump-Surprise Creek Trail (Forest Service Trail 031).

Hunt Area 20A — Those portions of Unit 20A up-stream from and including the Butts Creek drainage to the Middle Fork of the Salmon River, and within the Middle Fork of the Salmon River drainage upstream to Papoose Creek-Papoose Lake-Coyote Springs.

Hunt Area 21 — That portion of Unit 21 downstream from the Spring Creek Road (Forest Service Road 038) to the Horse Creek Trail (Forest Service Trail 159) and Reynolds Creek Trail (Forest Service Trail 067).

Hunt Area 26 — All of Unit 26 and that portion of Unit 20A within the Middle Fork of the Salmon River drainage upstream from Papoose Creek-Papoose Lake-Coyote Springs and that portion of Unit 27 on the west side of the Middle Fork of the Salmon River from Big Creek upstream to and including the Brush Creek drainage.

Hunt Area 26L — All of Unit 26.

Hunt Area 27-1 — That portion of Unit 27 west of the Middle Fork of the Salmon River upstream from, but excluding, the Brush Creek drainage to and including the Indian Creek drainage.

Hunt Area 27-2 — That portion of Unit 27 east of the Middle Fork of the Salmon River upstream from its mouth to the Waterfall Creek Trail (Forest Service Trail 045).

Hunt Area 27-3 — That portion of Unit 27 east of the Middle Fork of the Salmon River upstream from the Waterfall Creek Trail (Forest Service Trail 045) to and including the Camas Creek drainage on the north side of Camas Creek, and that portion of Unit 28 within the Camas Creek drainage north of Camas Creek and west of the Silver Creek-Meyers Cove Road (Forest Service Road 108).

Hunt Area 27-4 — That portion of Unit 27 within the Loon Creek drainage north of Forest Service Road 172; that portion of Unit 27 east of the Middle Fork of the Salmon River, south of Camas Creek, and northwest of Fly Creek Trail (Forest Service Trail 124).

Hunt Area 27L — That portion of Unit 20A within the Middle Fork of the Salmon River drainage, and that portion of Unit 27 on the west side of the Middle Fork of the Salmon River downstream from but excluding the Pistol Creek drainage and the east side of the Middle Fork of the Salmon River downstream from but excluding the Camas Creek drainage.

Hunt Area 28-1 — That portion of Unit 28 west of Panther Creek downstream from and including Big Deer Creek drainage.

Hunt Area 28-2 — That portion of Unit 28 within the Salmon River drainage, upstream from and including the Perreau Creek drainage; and that portion of Unit 28 east of Panther Creek upstream from its confluence with the Salmon River to and including the Napius Creek drainage; and that portion of Unit 28 upstream from the mouth of Panther Creek along the Salmon River to and including the Pine Creek drainage.

Hunt Area 30 — All of Units 30 and 30A.

Hunt Area 36 — That portion of Unit 36 within the Yankee Fork drainage and that portion of Unit 27 south of Forest Service road 172.

Hunt Area 36A — All of Unit 36A and that part of Unit 36 south and east of State Highway 75.

Hunt Area 36B — All of Unit 36B; that portion of Unit 28 west of the Panther Creek Road and south of the Silver Creek- Meyers Cove Road; and that portion of Unit 27 southeast of Fly Creek Trail (Forest Service Trail 124) and northeast of the Sleeping Deer Road (Forest Service Road 086).

Hunt Area 37 — All of Unit 37 and that portion of Unit 50 east of U.S. Highway 93 and that portion of Unit 51 west of the Little Lost Highway-Pahsimeroi Road.

Hunt Area 37A — All of Unit 37A.

Hunt Area 40 — All of Unit 40.

Hunt Area 41-1 — That portion of Unit 41 north and west of the El Paso Natural Gas Pipeline.

Hunt Area 41-2 — That portion of Unit 41 west of Highway 51 and south and east of the El Paso Natural Gas Pipeline.

Hunt Area 42-1 and 42-2 — All of Unit 42.

Hunt Area 46-1 and 46-2 — Those portions of Units 46 and 47 within the Bruneau and Jarbidge River drainages and Unit 41 east of State Highway 51.

Hunt Area 55 — All of Unit 55.

SHEEP

Submitted by:

Clay Hickey
Regional Wildlife Manager

Rick Ward
Regional Wildlife Manager

Regan Berkley
Regional Wildlife Manager

Daryl Meints
Regional Wildlife Manager

Curtis Hendricks
Regional Wildlife Manager

Greg Painter
Regional Wildlife Manager

David Smith
Grants/Contracts Specialist

Approved by: IDAHO IDFG OF FISH AND GAME


Toby Boudreau, Asst. Chief
Bureau of Wildlife


Scott Reinecker, Chief
Bureau of Wildlife

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 IDFG 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.

