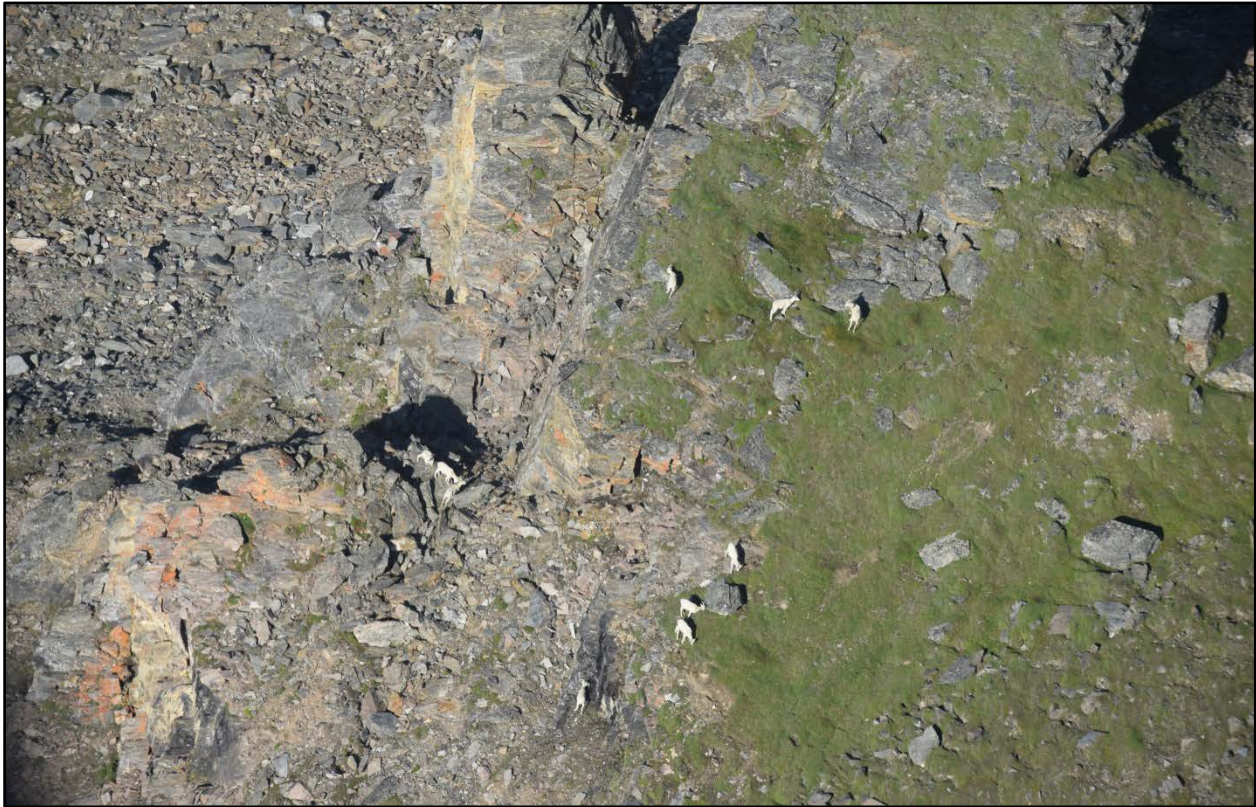


Dall Sheep Management Report and Plan, Game Management Units 20B, 20D, and 20E, Tanana Hills:

Report Period 1 July 2011–30 June 2016, and
Plan Period 1 July 2016–30 June 2021

Robert Schmidt



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Species management reports and plans provide information about species that are hunted or trapped, management actions, goals, recommendations for those species, and plans for data collection. Detailed information is prepared for each species every 5 years by the area management biologist for game management units in their area; the area biologist also develops a plan for data collection and species management for the next 5 years. This type of report is not produced for species that are not managed for hunting or trapping or for areas where there is no current or anticipated activity. Unit reports are reviewed and approved for publication by regional management coordinators and are available to the public via the Alaska Department of Fish and Game's public website.

This species management report and plan was reviewed and approved for publication by Doreen Parker McNeill, Management Coordinator for Region III for the Division of Wildlife Conservation.

Species management reports and plans are available via the Alaska Department of Fish and Game's public website (www.adfg.alaska.gov) or by contacting Alaska Department of Fish and Game's Division of Wildlife Conservation, PO Box 115526, Juneau, AK 99811-5526; phone: (907) 465-4190; email: dfg.dwc.publications@alaska.gov. The report may also be accessed through most libraries, via interlibrary loan from the Alaska State Library or the Alaska Resources Library and Information Services (www.arlis.org).

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Contents

Purpose of this Report.....	1
I. RY11–RY15 Management Report	1
Management Area.....	1
Summary of Status, Trend, Management Activities, and History of Dall Sheep in the Tanana Hills.....	1
Management Direction.....	2
Existing Wildlife Management Plans	2
Goals	2
Codified Objectives	2
Amounts Reasonably Necessary for Subsistence Uses	2
Intensive Management	2
Management Objectives.....	3
Management Activities	3
1. Population Status and Trend	3
2. Mortality-Harvest Monitoring and Regulations.....	8
3. Habitat Assessment-Enhancement.....	15
Nonregulatory Management Problems or Needs	16
Data Recording and Archiving	16
Agreements	16
Permitting.....	16
Conclusions and Management Recommendations	16
II. Project Review and RY16–RY20 Plan	17
Review of Management Direction	17
Management Direction.....	17
Goals	17
Codified Objectives	17
Amounts Reasonably Necessary for Subsistence Uses	17
Intensive Management	17
Management Objectives.....	17
Review of Management Activities.....	18
1. Population Status and Trend	18
2. Mortality-Harvest Monitoring	18
3. Habitat Assessment-Enhancement.....	19
Nonregulatory Management Problems or Needs	19
Data Recording and Archiving	19
Agreements	20
Permitting.....	20
References Cited	20

List of Figures

Figure 1. DS206 hunt area, Alaska.	4
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List of Tables

Table 1. Mount Harper–upper Goodpaster River and Tanana Hills Dall sheep composition counts from aerial surveys, 2005–2015.....	6
Table 2. Glacier Mountain Controlled Use Area sheep composition counts from aerial surveys, 2000–2005 and 2012–2015. ^a	7
Table 3. Mount Harper (DS206) drawing permit sheep harvest, regulatory years ^a 2005–2016...	10
Table 4. Tanana Hills ^a area general season sheep harvest, regulatory years ^b 2005–2016.	10
Table 5. Mount Harper (DS206) sheep hunter residency and success, regulatory years ^a 2005–2016.	11
Table 6. Tanana Hills ^a area general season, sheep hunter residency and success, regulatory years ^b 2005–2016.	12
Table 7. Mt. Harper (DS206) and Tanana Hills ^a sheep harvest chronology percent by month/day, regulatory years ^b 2005–2016.	13
Table 8. Mt. Harper (DS206) and Tanana Hills ^a area sheep percent harvest by transport method, regulatory years ^b 2005–2016.	14

Purpose of this Report

This report provides a record of survey and inventory management activities for Dall sheep in Units 20B, 20D, and 20E, Tanana Hills and Mount Harper, for the 5 regulatory years 2011–2016 and plans for survey and inventory management activities in the following 5 regulatory years, 2016–2021. A regulatory year (RY) begins 1 July and ends 30 June (e.g., RY10 = 1 July 2010–30 June 2011). This report is produced primarily to provide agency staff with data and analysis to help guide and record its own efforts but is also provided to the public to inform it of wildlife management activities. In 2016 the Alaska Department of Fish and Game’s (ADF&G) Division of Wildlife Conservation (DWC) launched this 5-year report to more efficiently report on trends and describe potential changes in data collection activities over the next 5 years. It replaces the Dall sheep management report of survey and inventory activities that was previously produced every 3 years. The next 5-year sheep management report and plan is scheduled for 2021.

I. RY11–RY15 Management Report

Management Area

The Tanana Hills area is located in eastern interior Alaska and encompasses the hills and drainages of the upper Goodpaster River, including Mt. Harper and Glacier Mountain (Glacier Mountain Controlled Use Area). Land ownership is primarily state-owned with the exception of small Native withholdings and the Glacier Mountain area, which is owned by the federal Bureau of Land Management (BLM). The Tanana Hills draw hunt area is bordered by BLM land and the Yukon Charley Rivers National Preserve. These areas are open to general season harvest. The Dall sheep population in the Tanana Hills comprises several small, discrete groups or subpopulations separated by areas of unsuitable habitat. These subpopulations persist at low density because the physical geography of the area provides relatively low-quality Dall sheep habitat (Kelleyhouse and Heimer 1989). The Tanana Hills were not glaciated during the most recent glacial advance and have little uplift. They are at fairly low elevation and have a rolling rather than rugged physiography that limits escape terrain. Most of the sheep habitat in this area is remote and difficult to access, and historically there was little consumptive and nonconsumptive use of the sheep populations. The community of Delta Junction lies about 50 miles south of the Tanana Hills and Mt. Harper areas. Maps for the Delta Junction Area boundaries and special management areas are found on the ADF&G website at <http://www.adfg.alaska.gov/index.cfm?adfg=maps.main>.

Summary of Status, Trend, Management Activities, and History of Dall Sheep in the Tanana Hills

Alaska Department of Fish and Game management plans for Dall sheep (ADF&G 1976) define the management goals for this species in Alaska. These goals include protection and maintenance of populations, scientific and educational study, diversified recreational use, and commercial and subsistence uses. Federal and state subsistence laws mandate subsistence use as the highest priority of fish and wildlife when harvest is allowable. However, the Alaska Board of Game, acting in compliance with these subsistence laws, has found that historic human use of Dall

sheep rarely meets the present definitions of subsistence use. Consequently, diversified human recreation is the predominant use of Dall sheep in Alaska.

The department revised management plans to recognize that diversified human recreational uses of Dall sheep include both consumptive and nonconsumptive uses. Nonconsumptive uses include viewing and photography. Possible goals for consumptive use of this species include maximum opportunity to hunt, opportunity to hunt under aesthetically pleasing conditions, and the opportunity to harvest unusually large rams as trophies. Maintaining a harvestable population of Dall sheep fluctuating within historical levels of abundance and the carrying capacity of the species' habitat is the present consumptive use goal for this species in the Tanana Hills area.

Since the full-curl regulation was adopted the Tanana Hills sheep population and harvest have both been very stable with natural fluctuations occurring. Hunters have been very pleased with the trophy rams this area continually produces and with the overall quality of the hunt in the Tanana Hills and Mt. Harper area. The area has been meeting its management objectives.

Management Direction

ADF&G will manage sheep populations to provide for human uses, both consumptive and non-consumptive. This area will continue to be managed as a low-density sheep population with limited hunting for large mature rams. We recognize the value of this small unique sheep population for both human uses and the unique ecosystem in which the sheep live.

EXISTING WILDLIFE MANAGEMENT PLANS

A wildlife management plan for the Tanana Hills and Mount Harper exists in the 2014 Dall sheep management survey and inventory report for these portions of 20B, 20D, and 20E (Bruning 2014).

GOALS

- Maintain a harvestable population of Dall sheep fluctuating within historic levels of abundance and the carrying capacity of available sheep habitat.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

C1. None.

Intensive Management

The Tanana Hills and Mt. Harper sheep population is not in an intensive management program.

MANAGEMENT OBJECTIVES

M.1. Provide opportunity for up to 50 hunters annually to harvest mature rams in the Mt. Harper drawing area, Glacier Mountain Controlled Use Area, and the Tanana Hills general hunting season area.

MANAGEMENT ACTIVITIES

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial minimum count sheep abundance and composition surveys to estimate population status and trend (Objective 1).

Data Needs

Minimum annual abundance estimates in the Mt. Harper permit area and the Glacier Mountain area are needed to evaluate population status.

Methods

ADF&G staff conducted surveys in the DS206 sheep draw hunt area (Fig. 1), including areas around Mount Harper, the upper Goodpaster River, and portions of the Tanana Hills. There were 2 main survey areas in the hills along the boundaries of Units 20B, 20D, and 20E. Along the Units 20D and 20E boundary, the survey area included Mount Harper and sheep habitat in the upper drainages of the Healy River, Boulder Creek, and the Eisenmenger Fork of the Goodpaster River. Along the Units 20B and 20D boundaries the survey area in Unit 20D included sheep habitat in the upper drainages of the Goodpaster River, Slate Creek, and Glacier Creek. In Unit 20B the survey area included sheep habitat in the upper Charley River, Stone Boy Creek, Porcupine Creek, and Upper and Lower Boulder Creek. The Glacier Mountain controlled use area (CUA) was surveyed separately by Tok ADF&G staff. The Glacier Mountain CUA is a 66 mi² area around Glacier Mountain and Mount Eldridge and is located in Unit 20E.

Surveys were timed to avoid turbulence by conducting flights in the early morning, generally starting about 0530 hours, or evening, starting about 1900 hours. Survey altitude was 300–700 feet above ground level. Data and search times were recorded in reference to major drainages and recorded on 1:250,000 scale USGS topographic maps. Sheep were classified as lambs, rams $\geq \frac{1}{2}$ -curl, and others (includes ewes and rams $\leq \frac{1}{2}$ -curl). Full-curl rams were noted when possible. Photographs were taken of aggregations that were difficult to observe from the air (i.e., in a steep canyon, too windy, etc.) and classified from the photographs. Photographs were taken with a digital single lens reflex camera and a 70–300 mm image stabilized lens, using ISO 400–800 depending on light conditions. Photographs were also taken of many ram aggregations to compare ram horn size from visual observations to the photographs.

The Mt. Harper–Tanana Hills area and the Glacier Mountain Controlled Use Area are surveyed annually or biennially depending on weather and funding.

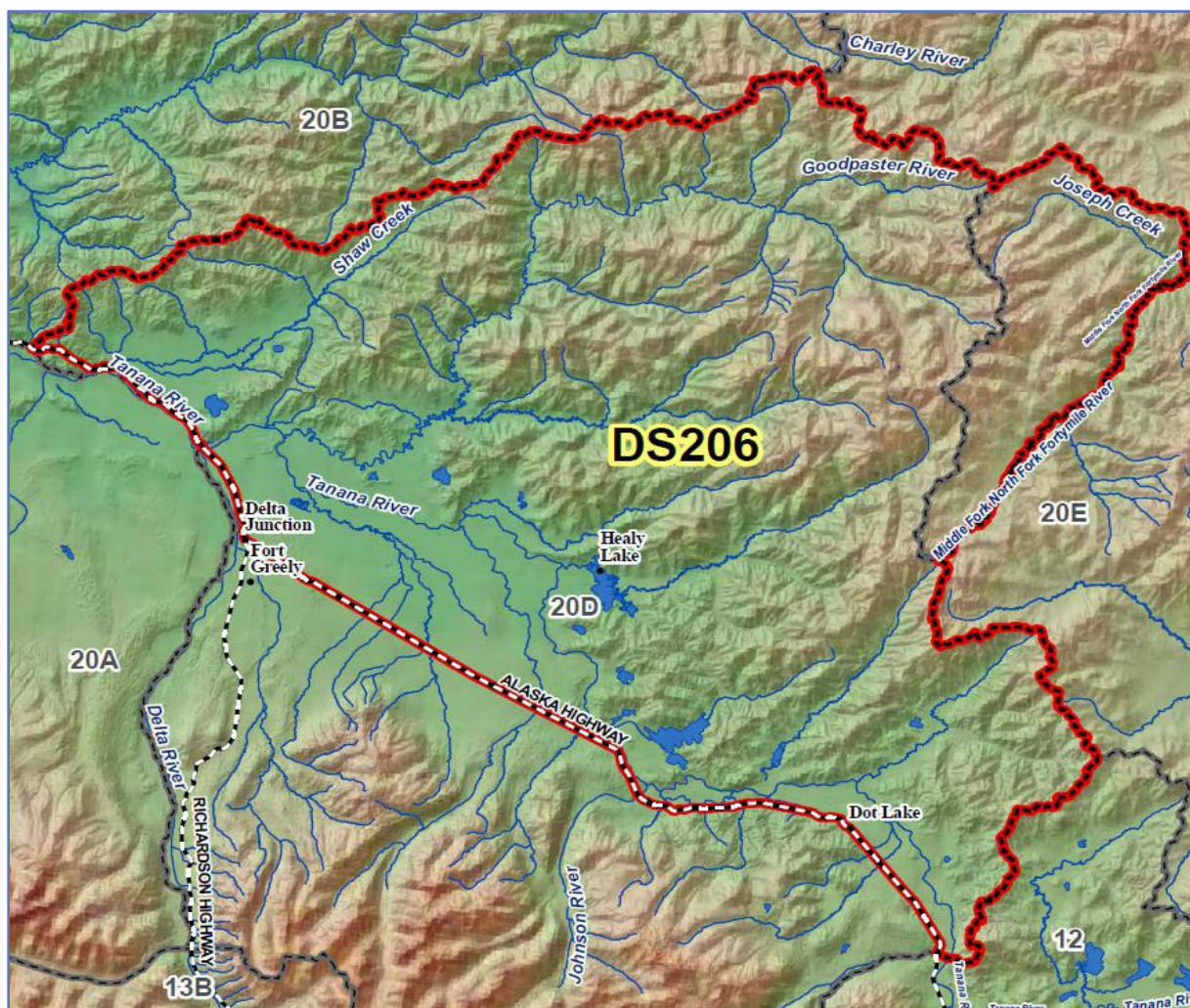


Figure 1. DS206 hunt area, Alaska.

Results and Discussion

Mount Harper–upper Goodpaster River and Tanana Hills

RY11. During an aerial survey on 25 July 2011, 107 sheep were observed. The composition was 29 rams (including 7 with full-curl horns), 19 lambs, and 59 ewe-like sheep. Resulting composition ratios were 49 rams:100 ewe-like sheep, 32 lambs:100 ewe-like sheep, and 18% lambs in the population (Table 1). Survey time totaled 6.8 hours.

RY12. A partial aerial survey of the Mount Harper-upper Goodpaster River area was conducted on 31 July 2012 that resulted in an incomplete count of 59 sheep: 15 rams (including 3 with full-curl horns), 10 lambs, and 34 ewe-like sheep (Table 1). Composition ratios were not calculated due to the incomplete survey. The survey was not completed due to poor survey conditions. Survey time totaled 3 hours.

RY13. No survey was conducted.

RY14. A complete aerial survey of the Mount Harper-upper Goodpaster River and Tanana Hills was conducted on 8 July 2014 that resulted in 81 sheep being observed. The composition was 24 rams (6 with full-curl horns), 11 lambs, and 46 ewe-like sheep. Resulting composition ratios were 52 rams:100 ewe-like sheep, 24 lambs:100 ewe-like sheep, and 14% lambs in the population (Table 1). Survey time totaled 5.5 hours. The survey area was not covered as intensely this regulatory year as previous years due to incoming weather and fuel constraints.

RY15. A partial aerial survey of the Mount Harper-upper Goodpaster River and Tanana Hills area was conducted on 1 August 2015 that resulted in an incomplete count of 53 sheep: 18 rams (including 7 with full-curl horns), 11 lambs, and 24 ewe-like sheep (Table 1). Composition ratios were not calculated due to incomplete survey. The survey was not completed due to poor survey conditions. Survey time totaled 3 hours 51 minutes.

Glacier Mountain

RY11. No survey was conducted.

RY12. The Glacier Mountain CUA survey was flown on 30 July 2012. Survey time totaled 1.95 hours. During the survey 159 sheep were observed: 57 rams (including 9 with full-curl horns), 8 lambs, and 94 ewe-like sheep. Resulting composition ratios were 61 rams:100 ewe-like sheep, 8 lambs:100 ewe-like sheep, and 5% lambs in the population (Table 2).

RY13. In 2013 the Glacier Mountain CUA was surveyed on 13 July. Survey time totaled 1.7 hours. Sixty-three sheep were seen: 17 rams (including 2 with full-curl horns), 3 lambs, and 43 ewe-like sheep. Resulting composition ratios were 40 rams:100 ewe-like sheep, 7 lambs:100 ewe-like sheep, and 5% lambs in the population (Table 2). In spring 2013, freezing rain and ice followed by prolonged winter conditions with deep snow during May likely affected adult survival as well as lamb production and survival. The 2013 lamb:ewe-like ratio was the lowest observed in the Glacier Mountain CUA since at least 2000. Similar reductions in sheep populations and productivity were observed throughout the Interior in 2013.

RY14. The Glacier Mountain CUA survey was conducted on 23 July 2014. Survey conditions were excellent with high overcast skies, light winds, and very little snow remaining within the survey area. Total flight time (including ferry time) was 4.4 hours and total survey time was 2.1 hours. Ninety-seven sheep were observed: 25 rams (including 2 with full-curl horns), 15 lambs, and 57 ewe-like sheep. Resulting composition ratios were 44 rams:100 ewe-like sheep, 26 lambs:100 ewe-like sheep, and 15% lambs in the population (Table 2).

RY15. The Glacier Mountain CUA survey was conducted on 26 June 2015. Survey conditions were excellent with high overcast skies, light winds, and very little snow remaining within the survey area. Total flight time (including ferry time) was 4.3 hours and total survey time was 1.9 hours. During the survey 103 sheep were observed: 18 rams (including 1 with full-curl horns), 21 lambs, and 64 ewe-like sheep. Resulting composition ratios were 28 rams:100 ewe-like sheep, 33 lambs:100 ewe-like sheep, and 20% lambs in the population (Table 2).

Table 1. Mount Harper–upper Goodpaster River and Tanana Hills Dall sheep composition counts from aerial surveys, 2005–2015.

Sex/age class	2005	2009	2010	2011	2012 ^a	2013 ^b	2014	2015 ^a
Legal rams ^c	5	6	2	7	3	ND	6	7
Sublegal rams ^d	8	31	15	22	12	ND	18	11
Unclassified rams	0	0	0	0	0	ND	0	0
Total rams	13	37	17	29	15	ND	24	18
Ewes ^e	27	50	52	59	34	ND	46	24
Lambs	9	17	11	19	10	ND	11	11
Yearlings	0	0	0	0	0	ND	0	0
Unidentified	0	4	0	0	0	ND	0	0
Total other sheep	36	71	63	78	44	ND	57	35
Total sheep	49	108	80	107	59	ND	81	53
Legal rams:100 ewes	19	12	4	12	–	ND	13	–
Sublegal rams:100 ewes	30	62	29	37	–	ND	39	–
Total rams:100 ewes	48	74	33	49	–	ND	52	–
Lambs:100 ewes	33	34	21	32	–	ND	24	–
% Lamb	18	16	14	18	–	ND	14	–

^a Incomplete survey; therefore, composition ratios were not calculated.

^b No survey conducted.

^c Full curl or larger.

^d Greater than 1/2 curl but less than full curl.

^e Ewe classification also includes yearlings of both sexes and rams of 1/2 curl or less.

Table 2. Glacier Mountain Controlled Use Area sheep composition counts from aerial surveys, 2000–2005 and 2012–2015.^a

Sex/age class	2000	2001	2002	2003	2004	2005	2012	2013	2014	2015
Legal rams ^b	6	7	2	5	5	5	9	2	2	1
Sublegal rams ^c	27	18	14	10	19	11	48	15	23	17
Unclassified rams	0	0	0	0	0	0	0	0	0	0
Total rams	33	25	16	15	24	16	57	17	25	18
Ewes ^d	61	50	46	37	48	72	94	43	57	64
Lambs	6	11	15	12	26	20	8	3	15	21
Unidentified	0	0	0	0	0	0	0	0	0	0
Total other sheep	67	61	61	49	74	92	102	46	72	85
Total sheep	100	86	77	64	98	108	159	63	97	103
Legal rams:100 ewes	10	14	4	14	10	7	10	5	4	2
Sublegal rams:100 ewes	44	36	30	27	40	15	51	35	40	27
Total rams:100 ewes	54	50	34	41	50	22	61	40	44	28
Lambs:100 ewes	10	22	33	32	54	28	9	7	26	33
% Lamb	6	13	19	19	27	19	5	5	15	20

^a No surveys were conducted during 2006–2011.

^b Full curl or larger.

^c Greater than ½-curl but less than full curl.

^d Ewe classification also includes yearlings of both sexes and rams of ½-curl or less.

Recommendations for Activity 1.1 (continue, modify, discontinue)

It is recommended that aerial surveys be continued to determine the minimum count Dall sheep population of the Tanana Hills and Mount Harper areas. Minimum counts should be completed at least biennially in the Mount Harper DS206 hunt area and the Glacier Mountain CUA. Utilize minimum count data to generate a minimum abundance estimate to ensure the Mount Harper and Tanana Hills sheep population can sustain current harvest levels; and to gather trend data to ensure the Mount Harper and Tanana Hills sheep population has had no major declines and that no health concerns are detected.

2. Mortality-Harvest Monitoring and Regulations

ACTIVITY 2.1. Monitor harvest through hunter contacts and sealing records or permit reports and analyze harvest data (Objective M.1.).

Data Needs

Access ADF&G's Wildlife Information Network (WinfoNet) database annually and query sheep sealing data for the Mount Harper and Tanana Hills area. Harvest data are necessary to determine whether the management objective has been achieved.

Methods

Hunters selected in the permit drawing were required to report on their activities. Sheep harvest was monitored through a mandatory sealing program. All sheep harvested in Alaska must be presented to ADF&G or to a department designee to be sealed with a permanent horn pin. Data contained on the harvest reports were analyzed to determine hunter success, hunter residence, hunter effort, ram horn size, ram age, hunt location, transportation type, sex, number of days hunted, age of the sheep, curl class, broken horns, horn lengths and base circumference, and the seal number. Data were summarized by regulatory year (RY), which begins 1 July and ends 30 June (RY = 1 July through 30 June, e.g., RY15 = 1 July 2015–30 June 2016). These data were accounted for when estimating the population size in the Tanana Hills. Most importantly, harvest data were used as a key indicator of population trends. Harvest data were archived in ADF&G's Wildlife Information Network (WinfoNet) database (<http://winfonet.alaska.gov/index.cfm>).

Season and Bag Limit

The open season for resident and nonresident hunters in the Tanana Hills in Units 20B, 20D, and 20E was 10 August–20 September; the bag limit was 1 ram with full-curl or longer horns, with both horns broken, or at least 8-years old. A drawing permit was required to hunt the Mount Harper DS206 hunt area, defined as that portion of Units 20D and 20E north of the Alaska Highway and north and west of the north bank of the Middle Fork Fortymile River upstream from and including the Joseph Creek drainage. A harvest ticket was required for the remainder of Unit 20E and Unit 20B. Hunters who used the Glacier Mountain CUA could not use motorized vehicles from 5 August through 20 September.

Results and Discussion

Harvest by Hunters-Trappers

Mount Harper (DS206 hunt) — During RY11–RY15, 4 permits were issued each year, for a total of 20 permits issued for the period; 15 (75%) of those who received permits hunted, harvesting a total of 6 sheep. Hunters averaged a 50% annual success rate. Average horn size and age for the sheep killed in RY11–RY15 were 37.7 inches and 9.5 years old (Table 3), respectively, which met the harvest objective of harvesting mature 8-year-old or older rams.

Harvest was slightly higher than the previous reporting period, but the average horn size and age of harvested sheep decreased slightly (Bruning 2014).

Tanana Hills — During RY11–RY15, Tanana Hills sheep harvest averaged 8.6 sheep/year (range 4–11). Annual average horn length was 34.8 inches. Annual average age of sheep harvested was 8.5 years (Table 4), which met the harvest objective.

Harvest increased substantially during RY11–RY15 compared to the previous 5 years. This is likely linked to better fall hunting conditions and sheep being closer to access points.

Hunter Residency and Success

Mount Harper— Most hunters in the Mount Harper DS206 drawing permit hunt continue to be nonlocal residents. No nonresidents reported hunting in this area during RY11–RY15 (Table 5).

Tanana Hills — Most hunters in the Tanana Hills continued to be Alaska residents. Five nonresidents reported hunting in this area during RY11–RY15. The total number of hunters each year averaged 23 during RY11–RY15 (Table 6).

Harvest Chronology

Mount Harper — All the sheep killed in the Mount Harper DS206 drawing permit hunt during RY11–RY15 were killed during the first 2 weeks of the hunting season (Table 7).

Tanana Hills — The highest percentage of harvest during RY11–RY15 occurred in the first 7 days of the hunting season (Table 7).

Transport Methods

Mount Harper — All rams taken in DS206 during RY11–RY15 were taken by hunters using aircraft to access the hunt area (Table 8).

Tanana Hills — Aircraft, ATV, highway vehicle, airboat, and horse were the most common transport methods for successful hunters in the Tanana Hills outside of the DS206 hunt area (Table 8).

Table 3. Mount Harper (DS206) drawing permit sheep harvest, regulatory years^a 2005–2016.

Regulatory year	Permits issued	Did not hunt	Unsuccessful hunters	Successful hunters	\bar{x} Horn length	\bar{x} Age	Total harvest
2005	4	1	1	2	35.25	6.5	2
2006	4	2	0	2	35.75	8.5	2
2007	4	2	2	0	–	–	0
2008	4	3	1	0	–	–	0
2009	4	2	1	1	42.0	13	1
2010	4	1	3	0	–	–	0
2011	4	0	2	2	40.1	11	2
2012	4	0	4	0	–	–	0
2013	4	1	2	1	39.5	9	1
2014	4	2	1	1	35.0	9	1
2015	4	2	0	2	36.0	9	2

^a Regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2005 = 1 July 2005–30 June 2006).

Table 4. Tanana Hills^a area general season sheep harvest, regulatory years^b 2005–2016.

Regulatory year	Rams	\bar{x} Horn length	\bar{x} Age	Ewes	Total sheep
2005	8	35.7	9.8	0	8
2006	2	37.3	9.5	0	2
2007	7	37.1	10.0	0	7
2008	3	39.0	10.3	0	3
2009	5	33.1	8.8	0	5
2010	6	36.6	9.7	0	6
2011	10	35.8	9.7	0	10
2012	11	35.3	8.0	0	11
2013	10	33.8	8.4	0	10
2014	8	34.9	7.7	0	8
2015	4	34.3	8.8	0	4

^a Includes Unit 20B UCUs 400, 405, 600, 604, and 605, and Unit 20E UCUs 100, 101, 102, 103, 104, 303, 304, 305, and Glacier Mountain controlled use area UCUs 0206, 0301, 0302, and 802.

^b A regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2005 = 1 July 2005–30 June 2006).

Table 5. Mount Harper (DS206) sheep hunter residency and success, regulatory years^a 2005–2016.

Regulatory year	Successful				Unsuccessful				Total hunters
	Local resident ^b	Nonlocal resident	Nonresident	Total (%)	Local resident ^b	Nonlocal resident	Nonresident	Total (%)	
2005	0	2	0	2 (50)	0	2	0	2 (50)	4
2006	0	2	0	2 (50)	0	2	0	2 (50)	4
2007	0	0	0	0 (0)	0	2	0	2 (100)	2
2008	0	0	0	0 (0)	0	1	0	1 (100)	1
2009	0	1	0	1 (50)	0	1	0	1 (50)	2
2010	0	0	0	0 (0)	0	3	0	3 (100)	3
2011	0	2	0	2 (50)	0	2	0	2 (50)	4
2012	0	0	0	0 (0)	0	4	0	4 (100)	4
2013	0	1	0	1 (33)	0	2	0	2 (67)	3
2014	0	1	0	1 (50)	0	1	0	1 (50)	2
2015	0	2	0	2 (100)	0	0	0	0 (0)	2

^a A regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2005 = 1 July 2005–30 June 2006).

^b Residents of Unit 20D.

Table 6. Tanana Hills^a area general season, sheep hunter residency and success, regulatory years^b 2005–2016.

Regulatory year	Successful				Unsuccessful				Total hunters
	Local resident ^c	Nonlocal resident	Nonresident	Total (%)	Local resident ^c	Nonlocal resident	Nonresident	Total (%)	
2005	0	8	0	8 (73)	0	3	0	3 (27)	11
2006	0	3	0	3 (21)	0	13	0	13 (81)	16
2007	0	7	0	7 (47)	0	8	0	8 (53)	15
2008	0	3	0	3 (23)	0	10	0	10 (77)	13
2009	0	5	0	5 (20)	2	16	2	20 (80)	25
2010	0	6	0	6 (24)	0	19	0	19 (76)	25
2011	0	10	0	10 (33)	1	19	0	20 (67)	30
2012	0	10	1	11 (41)	2	14	0	16 (59)	27
2013	0	9	1	10 (67)	1	4	0	5 (33)	15
2014	0	7	1	8 (35)	1	13	1	15 (65)	23
2015	1	3	0	4 (20)	1	14	1	16 (80)	20

^a Includes Unit 20B UCUs 400, 405, 600, 604, and 605, and Unit 20E UCUs 100, 101, 102, 103, 104, 303, 304, 305, and Glacier Mountain controlled use area UCUs 0206, 0301, 0302, and 802.

^b A regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2005 = 1 July 2005–30 June 2006).

^c Residents of Unit 20E and Salcha.

Table 7. Mt. Harper (DS206) and Tanana Hills^a sheep harvest chronology percent by month/day, regulatory years^b 2005–2016.

Hunt	Regulatory year	Harvest chronology percent by month/day							Unknown	n
		8/10–8/16	8/17–8/23	8/24–8/30	8/31–9/6	9/7–9/13	9/14–9/20			
DS206	2005	100	0	0	0	0	0	0	0	2
	2006	100	0	0	0	0	0	0	0	2
	2007	0	0	0	0	0	0	0	0	0
	2008	0	0	0	0	0	0	0	0	0
	2009	100	0	0	0	0	0	0	0	1
	2010	0	0	0	0	100	0	0	0	0
	2011	0	0	0	50	50	0	0	0	2
	2012	0	0	0	0	0	0	0	0	0
	2013	0	100	0	0	0	0	0	0	1
	2014	100	0	0	0	0	0	0	0	1
	2015	50	50	0	0	0	0	0	0	2
Tanana Hills	2005	25	0	0	25	50	0	0	0	8
	2006	33	67	0	0	0	0	0	0	3
	2007	29	0	14	43	14	0	0	0	7
	2008	67	0	33	0	0	0	0	0	3
	2009	80	0	20	0	0	0	0	0	5
	2010	50	17	0	0	33	0	0	0	6
	2011	40	20	20	0	20	0	0	0	10
	2012	27	27	18	9	0	18	0	0	11
	2013	40	0	20	30	10	0	0	0	10
	2014	63	12	12	12	0	0	0	0	8
2015	50	50	0	0	0	0	0	0	4	

^a Includes Unit 20B UCUs 400, 405, 600, 604, and 605, and Unit 20E UCUs 100, 101, 102, 103, 104, 303, 304, 305, and Glacier Mountain controlled use area UCUs 0206, 0301, 0302, and 802.

^b A regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2005 = 1 July 2005–30 June 2006).

Table 8. Mt. Harper (DS206) and Tanana Hills^a area sheep percent harvest by transport method, regulatory years^b 2005–2016.

Permit hunt	Regulatory year	Harvest percent by transport method									n
		Airplane	Horse	Boat	3- or 4-wheeler	Snowmachine	ORV	Highway vehicle	Other	Unknown	
DS206	2005	100	0	0	0	0	0	0	0	0	2
	2006	100	0	0	0	0	0	0	0	0	2
	2007	0	0	0	0	0	0	0	0	0	0
	2008	0	0	0	0	0	0	0	0	0	0
	2009	100	0	0	0	0	0	0	0	0	1
	2010	0	0	0	0	0	0	0	0	0	0
	2011	100	0	0	0	0	0	0	0	0	2
	2012	0	0	0	0	0	0	0	0	0	0
	2013	100	0	0	0	0	0	0	0	0	1
	2014	100	0	0	0	0	0	0	0	0	1
	2015	100	0	0	0	0	0	0	0	0	2
Tanana Hills	2005	88	0	0	0	0	0	0	0	13	8
	2006	67	0	0	0	0	0	33	0	0	3
	2007	14	29	14	0	0	0	29	0	14	7
	2008	100	0	0	0	0	0	0	0	0	3
	2009	60	0	0	40	0	0	0	0	0	5
	2010	67	0	0	0	0	0	0	33 ^c	0	6
	2011	50	0	0	20	0	0	20	10 ^c	0	10
	2012	36	18	9	9	0	0	27	0	0	11
	2013	50	20	0	20	0	0	10	0	0	10
	2014	63	0	13	0	0	0	25	0	0	8
2015	50	0	25	25	0	0	0	0	0	4	

^a Includes Unit 20B UCUs 400, 405, 600, 604, and 605, and Unit 20E UCUs 100, 101, 102, 103, 104, 303, 304, 305, and Glacier Mountain controlled use area UCUs 0206, 0301, 0302, and 802.

^b A regulatory year begins 1 July and ends 30 June (e.g., regulatory year 2005 = 1 July 2005–30 June 2006).

^c Airboat is the transport method.

Other Mortality

Most Dall sheep mortality in the Tanana Hills is likely due to natural factors. However, we do not know the primary limiting factors to population growth. Wolf, grizzly bear, and golden eagle predation has been observed (Gardner 2002). Escape terrain is limited, increasing predator effectiveness. We have no data on the limiting effects of weather, accidents, disease, or winter habitat.

Alaska Board of Game Actions and Emergency Orders

No action was taken by the Alaska Board of Game and no emergency orders were issued during RY11–RY15.

Recommendations for Activity 2.1

Harvest data should be utilized in conjunction with survey data to generate a minimum abundance estimate to ensure the Mount Harper and Tanana Hills sheep population is within the population objective. Also use harvest data through the mandatory sealing of sheep to ensure the Mount Harper and Tanana Hills harvest levels are sustainable, and to help further detect any major declines or health concerns in this sheep population.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Monitor habitat quality and monitor habitat use by sheep (Objective M1).

Data Needs

Habitat utilization and quality was periodically documented through documentation of vegetation succession and mineral development.

Methods

The Alaska Department of Fish and Game (ADF&G) records any new sheep location observations, any evident habitat changes, and any new mining activity during aerial surveys.

Results and Discussion

Kelleyhouse and Heimer (1989) detailed an explanatory hypothesis of habitat limitation based on physical geography of the Tanana Hills. Although it is unlikely that summer range is limiting in extent or quality, it seems probable that winter range availability may limit population growth. Inconsistent winter winds and snow depth combine to produce variable winter foraging conditions. Vegetation succession and fire suppression have also reduced habitat suitability in lower elevation winter ranges and travel routes.

Recommendations for Activity 3.1.

Periodic surveys should be conducted to assess habitat use and to identify winter range. The implementation of the *Alaska Interagency Fire Management Plan* (Alaska Wildland Fire Coordinating Group 2010) should result in a near-natural fire regime throughout this area. Restoring a natural fire region will slow vegetation succession, allowing for increased habitat suitability, and therefore possibly benefiting the sheep population.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

Mount Harper is known to have mineral potential and has been subjected to mining operations in the past. More mineral exploration is expected. Any mining development of the area should include sufficient measures to minimize disturbance of sheep or destruction of sheep escape cover and winter range. The ADF&G Division of Wildlife Conservation biologists will coordinate with ADF&G, Division of Habitat staff and landowners to ensure impacts to sheep habitat are considered during future mining development.

Data Recording and Archiving

- Harvest data are stored on an internal database housed on a server (<http://winfonet.alaska.gov/index.cfm>).
- All other electronic data and files such as survey memos, excel spreadsheets, and reports are located on the Delta Area Biologists computer; bwschmidt Home Drive (H:) Sheep. They are also archived in WinfoNet Data Archive, Project Title 'Unit 20D Sheep'.
- Field data sheets, paper files, hard copies, etc. are located in the file cabinet located in Delta Junction Area Biologist office.

Agreements

Alaska Interagency Fire Management Plan (Alaska Wildland Fire Coordinating Group 2010). This agreement states that fires are left to burn in certain areas if there is a benefit to habitat and private property or other valued natural resources are not at risk.

Permitting

None

Conclusions and Management Recommendations

We met our management objective to provide opportunity for up to 50 hunters to hunt mature rams. A total of 130 hunters pursued sheep in the Tanana Hills, including the Mount Harper (DS206) hunt area during RY11–RY15. Reported harvest in the RY11–RY15 Tanana Hills general season started higher during the first part of the reporting period but tapered off during RY14–RY15. Harvest reports suggest the increased harvest was due primarily to increased hunter effort. The reported harvest levels for the past 2 reporting periods are sustainable for the next reporting period. No change in management direction is recommended at this time.

The Tanana Hills sheep population tends to be widely dispersed, often below tree line. The area has few trails or suitable aircraft landing sites. However, currently there is renewed mining interest in the area. Any mining development of the area should include sufficient measures to minimize disturbance of sheep or destruction of sheep escape cover and winter range.

It has been difficult to monitor population trends of the Tanana Hills population due to budget limitations and variable summer weather. Sheep distribution and movements during the summer and fall months have been documented by aerial surveys and hunter reports. However, little is known about rutting and lambing areas and winter distribution. Periodic surveys should be conducted to assess habitat use and to identify winter range.

II. Project Review and RY16–RY20 Plan

Review of Management Direction

MANAGEMENT DIRECTION

There are no changes in management direction for this area. Management will focus on work to monitor whether goals and objectives are met. ADF&G will manage sheep populations to provide for human uses, both consumptive and non-consumptive. This area will continue to be managed at a low density sheep population with limited hunting for large mature rams. We recognize the value of this small unique sheep population for both human uses and the unique ecosystem in which they live.

GOALS

G1. Maintain a harvestable population of Dall sheep fluctuating within historic levels of abundance and the carrying capacity of their habitat.

CODIFIED OBJECTIVES

Amounts Reasonably Necessary for Subsistence Uses

C.1. None. No change.

Intensive Management

The Tanana Hills and Mt. Harper sheep population is not in an intensive management program and that is not expected to change during RY16–RY20.

MANAGEMENT OBJECTIVES

M.1. Provide opportunity for up to 50 hunters annually to harvest mature rams in the Mt. Harper drawing area, Glacier Mountain Controlled Use Area, and the Tanana Hills general hunting season area.

M.2. Maintain a fall population of 100 or more sheep in the Mt. Harper and Glacier Mountain areas. This excludes the general season hunting area in the Tanana Hills, which is not surveyed.

REVIEW OF MANAGEMENT ACTIVITIES

There are no new activities being reported on, but some activities are being adjusted as noted below. A stronger emphasis will be placed on mortality monitoring and habitat assessment (Activities 2.2 and 3.1).

1. Population Status and Trend

ACTIVITY 1.1. Conduct aerial minimum count sheep abundance and composition surveys to estimate population status and trend (Objective M1 and M2).

Data Needs

No change from prior reporting period. Minimum count population composition and trend count data will be used to evaluate population status.

Methods

No change from prior reporting period.

2. Mortality-Harvest Monitoring

ACTIVITY 2.1. Monitor harvest through hunter contacts and sealing records or permit reports and analyze harvest data (Objective M1).

Data Needs

Total annual sheep hunters and harvest data are necessary to assess whether the management objective has been achieved. Harvest data will be analyzed from the database accessible through ADF&G's Wildlife Information Network (WinfoNet) database annually.

Methods

RY16–RY20 Hunters selected in the permit drawing will be required to report on their activities. Hunters hunting in the general season portion of the hunt area will also be required to report on their activities. Sheep harvest is monitored through a mandatory sealing program. All sheep harvested in Alaska must be presented to ADF&G or to a department designee to be sealed with a permanent horn pin. Data contained on the harvest reports will be analyzed to determine hunter success, hunter residence, hunter effort, ram horn size, ram age, hunt location, transportation type, sex, number of days hunted, age of the sheep, curl class, broken horns, horn lengths and base circumference, and the seal number. Data will be summarized by regulatory year (RY), which begins 1 July and ends 30 June (RY = 1 July through 30 June, e.g., RY15 = 1 July 2015–30 June 2016). This data will be accounted for when estimating the population size in the Tanana Hills. Most importantly harvest data is a key indicator of population abundance trends. Harvest data will be archived in ADF&G's Wildlife Information Network (WinfoNet) database (<http://winfonet.alaska.gov/index.cfm>).

ACTIVITY 2.2. Monitor for evidence of respiratory pathogens in the Mt. Harper and Tanana Hills sheep population in order to monitor whether harvestable rams are available to meet objective M1.

Data Needs

Disease monitoring for respiratory pathogens is a high priority for ADF&G, especially due to high profile concerns about *Mycoplasma ovipneumoniae* in North America.

Methods

We will monitor the health of this population through as many anecdotal observations as possible and physical tests, such as swabbing the nasal cavity whenever possible when an animal is harvested. Plans for monitoring disease in this sheep population will be refined during RY16–RY20.

3. Habitat Assessment-Enhancement

ACTIVITY 3.1. Monitor habitat quality and monitor habitat use by sheep (Objective M1).

Data Needs

Habitat utilization and quality should be periodically documented through documentation of vegetation succession and mineral development to assess how these may influence the sheep population.

Methods

It has been difficult to monitor population trends of the Tanana Hills subpopulation due to budget limitations and variable summer weather. Sheep distribution and movements during the summer and fall months have been documented by aerial surveys and hunter reports. However, little is known about rutting and lambing areas and winter distribution. Periodic surveys should be conducted to assess habitat use and to identify winter range.

NONREGULATORY MANAGEMENT PROBLEMS OR NEEDS

There is renewed mining interest in the area. Any mining development of the area should include sufficient measures to minimize disturbance of sheep or destruction of sheep escape cover and winter range.

Data Recording and Archiving

- Harvest data are stored on an internal database housed on a server (<http://winfonet.alaska.gov/index.cfm>).
- All other electronic data and files such as survey memos, excel spreadsheets, and reports are located on the Delta Area Biologists computer; bwschmidt Home Drive (H:) Sheep. They are also archived in WinfoNet Data Archive, Project Title ‘Unit 20D Sheep’.

- Field data sheets, paper files, hard copies, etc. are located in the file cabinet located in Delta Junction Area Biologist office

Agreements

- *Alaska Interagency Fire Management Plan* (Alaska Wildland Fire Coordinating Group 2010).

Permitting

- None.

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