Effects of snowshoe hare population cycles on demography of Dall sheep and their predators

Stephen M. Arthur

Research Annual Performance Report
1 July 2006–30 June 2007
Federal Aid in Wildlife Restoration
Grant W-33-5
Project 6.14

This is a progress report on continuing research. Information may be refined at a later date.

PROJECT TITLE: Effects of snowshoe hare population cycles on demography of Dall sheep and their predators

PRINCIPAL INVESTIGATOR: Stephen M. Arthur

COOPERATORS: Alaska Chapter, Foundation for North American Wild Sheep; University of British Columbia

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR.: W-33-5

PROJECT NR.: 6.14

WORK LOCATION: Central Alaska Range, Unit 20A

STATE: Alaska

PERIOD: 1 July 2006 – 30 June 2007

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

OBJECTIVE 1: Estimate home range size and reproductive success of resident coyote pairs.

From March 1998–June 2003, 19 coyotes were captured and radiocollared as part of project 6.13. These coyotes were located approximately twice per month through September 2005 to determine home ranges, habitat use, movement patterns, and reproductive success. These included 15 resident adults (5 M:F pairs, plus 5 mortalities), 3 pups (2M, 1F; aged 10–13 months), and 1 dispersing 2-year-old male.

OBJECTIVE 2: Estimate annual survival and cause-specific mortality of Dall sheep lambs.


OBJECTIVE 3: Estimate annual survival and natality of Dall sheep ewes.

Ewes radiocollared during 1999–2002 as part of Project 6.13 were located daily during May to estimate birth rates and approximately twice per month during other months through September 2005 to estimate survival and causes of mortality.
OBJECTIVE 4: Estimate size and age/sex composition of the Dall sheep population each year.
The sheep population in the study area was surveyed annually during June 1995–2006. Surveys consisted of intensive searches conducted with R-22 and R-44 helicopters. Sheep were counted and classified as lambs, yearlings, adult ewes, or rams (4 horn size classes).

OBJECTIVE 5: Data analysis and report writing.
Analysis of survival rates and home ranges has begun.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB/ACTIVITY 1: Radiocollaring and tracking resident coyote pairs to estimate home range size and reproductive success.
No coyotes were captured during this period.

JOB/ACTIVITY 2: Estimate annual survival and cause-specific mortality of Dall sheep lambs.
No lambs were captured or monitored during this period.

JOB/ACTIVITY 3: Estimate annual survival and natality of Dall sheep ewes.
No ewes were captured or monitored during this period.

JOB/ACTIVITY 4: Estimate size and age/sex composition of the Dall sheep population each year.
The sheep population was surveyed on 14 and 15 June 2007 using an R-44 helicopter. We saw a total of 886 sheep (Table 1), with overall ratios of 44 lambs and 42 rams per 100 ewes (counts of ewes excluded yearlings but probably included some young rams). In areas surveyed annually since 1994 we found a total of 752 sheep, with ratios of 44 lambs and 48 rams per 100 ewes (Table 2). The population estimate for these sections was the highest since standardized surveys began in 1994, although the count of rams was less than in recent years. The most likely explanation for these results is that some groups of ewes moved into the area while some rams moved out of the area. Costs of the survey were provided by Survey and Inventory funds.

JOB 5: Data analysis and report writing.
Data analysis has begun. This will continue during FY08.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

As part of SWG Project T-1-8, a helicopter survey of eagle nesting success was conducted on 15 June 2007 in part of the sheep study area. Five active nests produced at least 7 young birds that survived until late June. This was similar to results from 2003 through 2006 and a substantial increase from 2002 when only one occupied nest was
found, and no young birds survived. Of the 29 nests first surveyed during July 2000, 2 were occupied and produced 2 young birds.

IV. PUBLICATIONS

The following publications describe work conducted as part of this project. Publication costs were provided by other (non-Federal Aid) sources.


V. RECOMMENDATIONS FOR THIS PROJECT

None.

VI. APPENDIX

Table 1. Results of helicopter sheep survey in the central Alaska Range, 14–15 June 2007

<table>
<thead>
<tr>
<th>Unit</th>
<th>Section</th>
<th>Ewes</th>
<th>Lambs</th>
<th>Yearlings</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Rams</th>
<th>Total Ewes</th>
<th>Lambs:100</th>
<th>Rams:100</th>
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</thead>
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<tr>
<td>27</td>
<td>4</td>
<td>28</td>
<td>13</td>
<td>7</td>
<td>2</td>
<td>3</td>
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<td>80</td>
<td>80</td>
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<tr>
<td>29</td>
<td>3</td>
<td>54</td>
<td>23</td>
<td>12</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>14</td>
<td>103</td>
<td>43</td>
<td>26</td>
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<tr>
<td>30</td>
<td>2</td>
<td>55</td>
<td>22</td>
<td>11</td>
<td>6</td>
<td>13</td>
<td>21</td>
<td>13</td>
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<td>96</td>
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<tr>
<td>31</td>
<td>2</td>
<td>101</td>
<td>38</td>
<td>26</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>167</td>
<td>38</td>
<td>2</td>
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<td>32</td>
<td>1</td>
<td>60</td>
<td>24</td>
<td>22</td>
<td>15</td>
<td>13</td>
<td>9</td>
<td>7</td>
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<tr>
<td>33</td>
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<td>60</td>
<td>32</td>
<td>18</td>
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<tr>
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<td>0</td>
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<tr>
<td>Total</td>
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<td>418</td>
<td>182</td>
<td>109</td>
<td>53</td>
<td>40</td>
<td>50</td>
<td>34</td>
<td>177</td>
<td>886</td>
<td>44</td>
<td>42</td>
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</table>

a Ram classes: 1 = <1/2 curl; 2 = 1/2–3/4; 3 = 3/4–7/8; 4 = full curl.
b Sample units designate areas that were surveyed continuously or with only brief interruptions (to refuel helicopter).
c Sections 1–3 were surveyed during 1994–2007; section 4 was surveyed during 1998–2007 and some years prior to 1994.
d Counts of ewes likely included some young rams.
TABLE 2. Comparison of annual sheep surveys for the central Alaska Range sections 1–3, 1984–2007

<table>
<thead>
<tr>
<th>Year</th>
<th>Date</th>
<th>Ewes</th>
<th>Lambs</th>
<th>Yearlings</th>
<th>Rams</th>
<th>Total</th>
<th>Lambs:100</th>
<th>Rams:100</th>
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</thead>
<tbody>
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<td>1984</td>
<td>11–12 Jul</td>
<td>605</td>
<td>231</td>
<td></td>
<td>266</td>
<td>1102</td>
<td>38</td>
<td>44</td>
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<tr>
<td>1991</td>
<td>22–25 Jul</td>
<td>374</td>
<td>68</td>
<td></td>
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<td>637</td>
<td>18</td>
<td>52</td>
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<tr>
<td>1994</td>
<td>4 Jun</td>
<td>211</td>
<td>72</td>
<td></td>
<td>125</td>
<td>408</td>
<td>34</td>
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<td>1995</td>
<td>7 Jun</td>
<td>249</td>
<td>109</td>
<td>61</td>
<td>167</td>
<td>586</td>
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<td>67</td>
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<tr>
<td>1996</td>
<td>9 Jun</td>
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<td>137</td>
<td>95</td>
<td>158</td>
<td>657</td>
<td>51</td>
<td>59</td>
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<tr>
<td>1997</td>
<td>17 Jun</td>
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<td>85</td>
<td>93</td>
<td>177</td>
<td>567</td>
<td>40</td>
<td>83</td>
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<td>1998</td>
<td>17 Jun</td>
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<td>69</td>
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<td>67</td>
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<td>48</td>
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<td>552</td>
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<td>2002</td>
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<td>752</td>
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</tbody>
</table>

*In 1984, 1991, and 1994, surveys were conducted using a Piper Super Cub; all yearlings were classified as ewes. All other surveys were conducted using helicopters; yearlings were separated from ewes. During all years, counts of ewes likely included some young rams.*

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