Alaska Department of Fish and Game Division of Wildlife Conservation

> Federal Aid in Wildlife Restoration Management Report of Survey-Inventory Activities I July 1994-30 June 1996

DEER

Mary U Hicks, Editor



(irchhoff

Grants W-24-3 and W-24-4 Study 2.0 December 1997

STATE OF ALASKA Tony Knowles, Governor

DEPARTMENT OF FISH AND GAME Frank Rue, Commissioner

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LOCATION

GAME MANAGEMENT UNITS: 1A $(5,300 \text{ mi}^2)$ and 2 $(3,600 \text{ mi}^2)$

GEOGRAPHIC DESCRIPTION:

Unit 1Å - Unit 1 south of Lemesurier Point, including all drainages into Behm Canal and excluding all drainages into Ernest Sound

Unit 2 - Prince of Wales Island and adjacent islands south of Sumner Strait and west of Kashevarof Passage

BACKGROUND

Sitka black-tailed deer live throughout Subunit 1A and Unit 2, although mainland densities are consistently lower than densities on the maritime-influenced offshore islands. Deer populations fluctuate seasonally, primarily in response to severe winter weather and wolf and bear predation. Deer numbers are at moderate levels throughout most of southern Southeast Alaska.

Weather conditions and population levels influence deer harvests. In Subunit 1A, harvests ranged from 350 to 915 deer during the past 12 seasons, while in Unit 2 harvests ranged from 1880 to 3900 deer during the same period. Hunting seasons have generally extended from August through November or December, and limited hunting of antlerless deer was allowed prior to 1978. A 3-week antlerless season was initiated in Unit 2 during 1987-88 but was discontinued a year later because of public opposition. In 1995-96, despite state opposition, the federal government implemented a 2 1/2-month antlerless season in Unit 2 for rural-qualified residents.

As clearcut logging continues to reduce old-growth habitat in portions of Subunit 1A and Unit 2, we expect deer populations to decline. Population models suggest declines in overall carrying capacity of 50 to 60% by the end of the logging rotation in 2054. Long-term implications of habitat loss include the inability to provide for subsistence needs and the loss of deer hunting opportunities.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

The management objective for deer in Subunit 1A and Unit 2 is to maintain populations in excess of 45 deer per mi² of winter range. Mean pellet group densities of 1.4 pellet groups per plot have been determined to be equivalent to 45 deer per mi² (Kirchhoff 1990).

METHODS

We collected population information from anecdotal hunters' reports, aerial surveys, and spring pellet-group surveys. We gathered harvest data from an annual hunter questionnaire which we mailed to a random sample of hunters who were issued deer harvest tickets during the hunting season.

We carried out 2 aerial alpine surveys using a float-equipped PA-12 airplane. Surveys were flown with a pilot and 1 observer at a height of 200-500 ft. Effort was made to distinguish bucks, does, and fawns, but in most cases this was not possible and observed deer were simply recorded as unknown sex or age.

We surveyed 7 sets of deer pellet-group transects during April 1995 and another 7 during 1996. Methods for conducting the surveys are described by Kirchhoff and Pitcher (1988). We did not undertake any beach mortality transects during this reporting period.

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The Divison of Wildlife Conservation Southeast Regional Office mailed harvest questionnaires to all harvest ticket holders residing in communities where less than 150 harvest tickets were issued; we sampled 30% of all ticket holders residing in communities where more than 150 harvest tickets were issued. Results were extrapolated to estimate the entire deer harvest.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Deer densities vary within and between Value Comparison Units (VCUs) in Subunit 1A and Unit 2. The highest noted 1995 deer pellet densities in Subunit 1A were in Helm Bay and Port Stewart (Table 1). Helm Bay data indicate that the population in that area remained stable between 1993 and 1995, while Port Stewart data showed that the population in that area increased about 24% during the same period (Table 1). Although only about half as high as the Helm Bay and Port Stewart transects, the Margaret transects showed an increase of 56% from 1993 levels.

Similar to 1994 counts, our highest Subunit 1A deer pellet density in 1996 was observed on Gravina Island (Table 1). Our lowest density during 1996 was at Duke Island where transects were established and surveyed for the first time. George Inlet data indicate the population in that area remained stable between 1994 and 1996, while data from Dall Head and Alava Bay showed increases of 51% and 15%, respectively (Table 1).

1995 pellet-group densities in Unit 2 were highest at Trocadero, where transects were established and surveyed for the first time, and Thorne Lake where we observed a 40% increase from 1994 levels (Table 2). We observed a 55% decline from 1989 pellet-group densities in Kitkun Bay.

Our highest Unit 2 pellet density in 1996 was observed at Warm Chuck where we noted a 32% decline from 1991 levels (Table 2). Densities at Red Bay increased 21% from their 1994 levels, but at Sarheen densities decreased 42% from 1989.

Unlike the high densities of up to 3.9 pellet-groups per plot observed in Unit 4 (Kirchhoff 1996), Unit 2 densities represent low to moderate population levels. The disparity between these unit densities is probably due to the presence of wolves in Unit 2 and their absence from Unit 4.

Population Composition

During 1994 we completed aerial alpine surveys in a small portion of Subunit 1A and Unit 2 (Table 3). Due to the small sample size and the difficulty determining the sex of observed deer, we are unable to make any inferences about sex composition from these data. We noted, however, that fawns composed only 5% of the small sample of deer observed in Subunit 1A and Unit 2.

MORTALITY	
Harvest	
Season and Bag Limit.	Resident and nonresident hunters
Subunit 1A	Aug 1 - Dec 31; 4 antlered deer
Unit 2	Aug 1 - Dec 31; 4 antlered deer

Board of Game Actions and Emergency Orders. No regulatory changes were made to state seasons or bag limits during this period.

<u>Hunter Harvest</u>. Numbers of hunters increased slightly in Subunit 1A during the past 2 seasons and remained stable in Unit 2 (Table 4). Deer harvests in Subunit 1A increased 30% during the past 2 seasons from the previous 10-season average, while in Unit 2 the past 2 seasons' harvest was nearly the same as the previous 10-season average (Table 4). Hunter success increased markedly in Subunit 1A to 44–48% during the past 2 seasons and remained stable at 70% in Unit 2. The average number of days required to bag deer declined slightly in both Subunit 1A and Unit 2 during the past 2 seasons. Average numbers of deer taken per hunter remained constant in both areas, with the Unit 2 average nearly twice as high as that reported for Subunit 1A (Table 4).

Southern Revilla Island continued to receive the greatest hunting pressure in Subunit 1A during both 1994 and 1995 (Table 5). Hunter effort increased or remained stable throughout most of the Subunit during the past 2 seasons. South Revilla and the Cleveland Peninsula accounted for the highest deer harvests in the subunit during 1994; the highest harvests during 1995 came from Gravina Island and South Revilla.

Central Prince of Wales Island continued to attract the most hunters and highest harvests in Unit 2 in 1994 and 1995 (Table 6). Harvests reached 6-year highs on Heceta and the Outer Island Harvest Areas during 1994, and the North POW Harvest Area reached a 5-year high in 1995. Success rates varied throughout the unit, with the highest success coming from Heceta and the Outer Island harvest areas.

Because of the extensive and increasing road system, many settlements, and insufficient law enforcement personnel, Unit 2 probably has a higher illegal or unreported harvest than Subunit 1A. Although the degree of illegal harvests in Subunit 1A and Unit 2 is unknown, Wood (1990) thought it was considerable (Table 7). Several does are reported killed each season, eventhough Subunit 1A has had an antlered-only season for several years and Unit 2 has only had antlerless seasons in 1987 and 1995. Additionally, Flynn and Suring (1989) reported actual hunter kill may be 38% greater than estimated harvests from hunter reports because of crippling loss.

<u>Hunter Residency and Success</u>. Subunit 1A residents harvested 96% of the deer from the subunit during 1994 and 1995 (Table 8). Only 8 nonresidents and 28 nonlocal state residents bagged deer in Subunit 1A during this report period. By contrast, nonlocal residents accounted for 41% of the Unit 2 deer harvest during 1994 and 1995. Nonresident hunters took only 2% of the reported Unit 2 deer harvest during the past 2 seasons (Table 8).

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<u>Harvest Chronology</u>. Most of the Subunit 1A and Unit 2 deer harvests occur during August, October, and November (Table 9). However, unlike Subunit 1A, where harvest is more evenly distributed among these 3 months, 35% and 30% of the past 2 seasons' Unit 2 harvests occurred during August and November, respectively. Only 18% of the Unit 2 harvest occurred during October (Table 9).

<u>Transport Methods</u>. Most Subunit 1A hunters continue to use boats to access hunting areas, while in Unit 2 most hunters use the extensive road system (Table 9). Airplanes account for very little of the reported hunter access.

Other Mortality

Based on staff observations and responses to 1994-95 and 1995-96 trapper questionnaires, wolf populations are abundant in Subunit 1A (Table 10). In Unit 2 wolves are probably at lower densities than observed in Subunit 1A. Wolves and black bears kill several thousand deer each year. Person et al. (1996) reported that, on average, in Unit 2 1 wolf kills 26 deer per year.

Deer are extremely vulnerable to harsh winter weather. The extent of winter mortality depends on the severity of weather. Based on weather data collected and analyzed from the Annette Island Weather Station, we calculated weather indices of 4.7 and 2.7 for the past 2 seasons (Table 10). We believe these indices represent mild to moderate winter severity.

HABITAT

Assessment

Logging continues to cause major changes in old-growth habitat. The most serious effects are in the higher volume stands at low elevations. These stands are critical to deer during years of heavy snowfall. U. S. Forest Service and ADF&G habitat models predict by the year 2054 the forest's capacity to support deer in an average winter will decline by nearly half. This loss will be greater in deep snow years. By 2054 we expect few areas will meet projected hunter demand within roaded and logged portions of Subunit 1A and Unit 2 (U. S. Forest Service 1989).

CONCLUSIONS AND RECOMMENDATIONS

Based on pellet-group data, we achieved our objective of maintaining 45 deer/mi² in winter habitat in only 27% of the VCUs sampled in Subunit 1A and Unit 2 during 1995 and 1996. This percentage is up slightly from 22% in 1993 and 1994. With reported hunter harvests remaining relatively high throughout much of the area, mild weather during the past several years enabled deer numbers in most parts of Subunit 1A and Unit 2 to remain stable.

Wolf abundance remained relatively high in recent years, and predation continues to influence deer populations. We believe the on-going federal antlerless season in Unit 2 is contrary to appropriate wildlife management principles and may negatively influence future deer levels in the unit. As noted in the past (Wood 1990, Larsen 1993, Larsen 1995), we are aware of illegal hunting in southern Southeast, particularly in Unit 2.

We anticipate winter habitat loss through logging will reduce carrying capacity of deer for many decades. Long-term implications of habitat loss are (1) the inability to provide for subsistence needs and (2) loss of hunting opportunities for deer hunters in Subunit 1A and Unit 2 (Wood 1990, Larsen 1993).

LITERATURE CITED

- BRAND, C. J., AND L. B. KEITH. 1979. Lynx demography during a snowshoe hare decline in Alberta. J. Wildl. Manage. 43:827-849.
- FLYNN, R. W., AND L. SURING. 1989. Harvest rates of Sitka black-tailed deer populations in Southeast Alaska for land-use planning. Unpubl. rep. 9pp.
- KIRCHHOFF, M. D., AND K. W. PITCHER. 1988. Deer pellet-group surveys in Southeast Alaska, 1981-87. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Final Rep. Proj. W-22-6, W-23-1. Job 2.9. Douglas, Alaska USA. 113pp.
 - ———. 1990. Evaluation of methods for assessing deer population trends in Southeast Alaska. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Res. Final Rep. Proj. W-22-6, W-23-1, W-23-2, W-23-3. Study IIB-2.9. Juneau, Alaska USA. 35pp.
- KIRCHHOFF, M. J. 1996. Deep pellet-group surveys in Southeast Alaska. Alaska Dep. Fish and Game. Douglas, Alaska USA.
- LARSEN, D. N. 1993. Deer management report of survey-inventory activities. Pages 1-20 in S. M. Abbott, ed. Alaska Dep. Fish and Game. Fed. Aid Wildl. Rest. Proj. W-23-4 and W-23-5, Study 2.0. Juneau, Alaska USA. 89pp.
 - ———. 1995. Deer management report of survey-inventory activities. Pages 1-22 in M. V. Hicks, ed. Alaska Dep. Fish and Game. Fed. Aid Wildl. Rest. Grants W-24-1 and W-24-2, Study 2.0. Juneau, Alaska USA. 85pp.
- PERSON, D. K., M. KIRCHHOFF, V. VAN BALLENBERGHE, G. C. IVERSON, AND E. GROSSMAN. 1996. The Alexander Archipelago wolf: a conservation assessment. USDA For. Ser. Gen. Tech. Rep. PNW-GTR-384. Portland, Oregon USA. 42pp.
- U. S. FOREST SERVICE. 1989. 1989-94 operating period for the Ketchikan Pulp Company. Longterm Sale Area, final Environ. Impact. State. USDA Forest Service. R-10-MB-66h. Approx. 2,000pp.

WOOD, R. E. 1990. Deer survey-inventory progress report. Pages 1-13 in S. O. Morgan, ed. Annual report of Survey-inventory activities. Part VI. Deer. Vol. XX. Alaska Dep. Fish and Game. Fed. Aid Wildl. Rest. Prog. Rep. Proj. W-23-2, Study 2.0. Juneau, Alaska USA. 60pp.

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		Mean pellet	Nr	
Year	VCU	Groups/plot ^a	Plots	95% CI
		<u></u>		
1981	715-Smugglers Cove	0.48	147	0.30-0.66
1981	716-Helm Bay	0.16	704	0.12-0.19
1984	716	0.54	302	0.44-0.65
1985	716	0.85	181	0.65-1.05
1988	716	1.67	247	1.38-1.95
1991	716	1.63	240	1.35-1.92
1992	716	1.25	169	0.96-1.53
1993	716	1.37	286	1.16-1.59
1995	716	1.31	284	1.09-1.52
1000			• • • •	
1993	739-Port Stewart	1.22	289	1.03-1.42
1995	719	1.61	278	1.35-1.87
1003	722-Spacious Bay	0.54	300	0 43-0 64
1005	722-5pacious Bay	0.34	283	0.35 0.54
1995	122	0.43	205.	0.53-0.54
1985	738-Margaret	0.57	515	0.47-0.66
1986	738	0.84	251	0.69-1.00
1988	738	1.32	110	0.97-1.67
1989	738	0.62	129	0.44-0.84
1990	738	0.56	274	0.44-0.68
1991	738	0.76	272	0.58-0.94
1993	738	0.31	281	0.23-0.39
1995	738	0.70	304	0.56-0.84
1981	748-George Inlet	0.21	110	0.09-0.33
1984	748	0.27	344	0.19-0.35
1985	748	0.52	313	0.39-0.65
1989	748	1.41	169	1.08-1.75
1990	748	1.03	240	0.82-1.25
1991	748	1.49	168	1.15-1.84
1992	748	0.65	195	0.49-0.81
1994	748	0.95	309	0.79-1.11
1996	748	0.98	305	0.76-1.19
1981	752-Whitman Lake	0.18	45	0.02-0.33
1987	752	0.16	187	0.09-0.23
1990	752	0.45	193	0.32-0.59
1992	752	0.20	189	0.12-0.28

Table 1 Deer pellet-group survey results, Unit 1A; Cleveland Peninsula, Revillagigedo and Gravina Islands, 1981–1996

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Table 1 Continued

		Mean nellet	Nr	
Year	VCU	Groups/plot ^a	Plots	95% CI
<u> </u>			11010	
1985	758-Carroll Point	0.66	118	0.46-0.86
1986	758	0.75	118	0.56-0.95
1988	758	1.15	85	0.82-1.49
1992	758	0.28	87	0.14-0.41
1994	758	0.70	125	0.49-0.90
1985	759-Moth Bay	0.59	140	0.42-0.74
1986	759	0.98	156	0.79-1.17
1988	759	0.72	78	0.46-0.97
1992	759	0.48	136	0.30-0.66
1994	759	0.95	136	0.71-1.17
1985	760-Lucky Cove	1.16	335	1.00-1.33
1986	760	1.16	258	0.95-1.32
1988	760	1.02	65	0.69-1.34
1991	760	1.39	271	1.07-1.70
1981	764-Blank Inlet	1.24	108	0.89-1.59
1981	765-Dall Head	0.52	69	0.31-0.74
1996	765	1.07	295	0.90-1.24
1996	767-Duke Island	0.05	294	0.02-0.09
1985	769-Alava Bay	0.52	311	0.39-0.65
1986	769	0.85	326	0.68-1.01
1991	769	1.64	143	1.22-2.05
1994	769	0.79	326	0.64-0.94
1996	769	0.93	324	0.77-1.09
1985	772-Wasp Cove	0.41	271	0.31-0.51
1986	772	0.50	300	0.38-0.62
1989	772	0.58	145	0.39-0.77
1991	772	0.13	207	0.07-0.18
1991	821-Winstanley Island	0.27	49	0.11-0.42
	-			
1981	999-East Gravina	1.06	226	0.89-1.22
1984	999 (all transects)	0.86	1,087	0.78-0.94
1985	999	1.23	1,172	1.13-1.32
1986	999	1.40	1,267	1.30-1.50

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Table 1 Continued

		Mean pellet	Nr	
Year	VCU	Groups/plot [*]	Plots	95% CI
1984	999-East Gravina	0.88	376	0.73-1.03
1985	999 (trans. 1-3)	1.44	224	1.20-1.67
1986	999	1.62	346	1.43-1.81
1987	999	1.63	334	1.41-1.84
1988	999	2.07	278	1.79-2.35
1989	999	1.13	182	0.86-1.41
1990	999	1.40	279	1.12-1.68
1991	999	1.12	154	0.80-1.43
1992	999	1.22	302	1.05-1.38
1994	999	1.52	331	1.37-1.79
1996	999	1.47	338	1.28-1.67

^aDensity classes based on mean pellet groups/plot.

Less than 0.5 = extremely low

1.51-1.0 = low

1.01-2.0 = moderate

2.01-3.0 = high

<u></u>	······	Mean pellet	Nr	
Year	VCU ^a	Groups/plot ^b	Plots	95% CI
1988	528-Calder	2.14	252	1.78-2.49
1987	532-Red Bay	0.32	177	0.18-0.47
1994	532	0.94	256	0.74-1.14
1996	532	1.19	281	0.97-1.41
1988	539-Exchange Cove	1.40	266	1.15-1.64
1992	539	1.10	125	0.83-1.38
1989	549-Sarheen	1.73	310	1.44-2.01
1996	549	1.00	334	0.83-1.16
1988	554-Sarkar	1.28	298	1.06-1.50
1992	554	0.53	245	0.41-0.66
1994	554	0.92	292	0.77-1.07
1984	561-Warm Chuck	1.02	326	1.02-1.38
1985	561	1.60	295	1.36-1.84
1989	561	2.21	302	1.91-2.50
1991	561	2.05	291	1.73-2.37
1996	561	1.39	276	1.17-1.61
1991	569-Baker	0.08	256	0.04-0.12
1992	575-Thorne Lake	1.20	334	1.03-1.37
1994	575	0.76	293	0.62-0.91
1995	575	1.27	299	1.09-1.45
1986	578-Snakey Lakes	0.62	279	0.51-0.73
1988	578	1.05	300	0.85-1.26
1989	578	1.56	200	1.26-1.86
1993	578	0.77	356	0.61-1.32
1986	581-Luck Lake	1.74	178	1.41-2.07
1988	581	2.11	300	1.80-2.42
1993	581	1.10	175	0.87-1.32
1992	584-Little Ratz	0.94	272	0.76-1.13
1988	587-Tuxekan	1.07	300	0.84-1.28

Table 2 Unit 2 deer pellet-group survey results, Prince of Wales and adjacent islands, 1984–1996

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		Mean pellet	Nr	
Year	VCUª	Groups/plot ^b	Plots	95% CI
1985	621-Twelvemile	0.31	196	019-0.43
1986	621	0.64	300	0.48-0.81
1987	621	0.65	370	0.49-0.81
1988	621	0.62	302	0.46-0.77
1989	621	0.78	235	0.59-0.98
1990	621	1.18	176	0.84-1.52
1991	621	1384	231	1.48-2.21
1992	621	0.43	250	0.32-0.55
1993	621	0.84	258	0.63-1.05
1994	621	0.93	324	0.76-1.09
1995	625-Trocadero	1.74	235	1.41-2.06
1985	635-Port Refugio	2.69	317	2.27-3.12
1986	635	2.52	324	2.09-2.96
1987	635	1.76	369	1.46-2.07
1988	635	1.15	270	0.90-1.40
1989	635	0.80	507	0.68-0.93
1990	635	1.25	232	1.03-1.48
1991	635	1.13	367	0.95-1.32
1992	635	0.76	255	0.57-0.95
1993	635	1.35	213	0.98-1.71
1994	635	1.85	280	1.51-2.19
1988	679-Kitkun	0.32	240	0.20-1.07
1989	679	0.89	273	0.71-1.07
1995	679	0.40	264	0.28-0.52
1988	685-Nutkwa	0.09	234	0.02-0.16

Table 2 Continued

^aValue comparison unit ^bDensity classes based on mean pellet groups/plot: Less than 0.5 = extremely low

0.51-1.0 = low

1.01-2.0 = moderate

2.01-3.0 = high

Location	Date	Bucks	Does	Fawns	Unknown	Total	Flight Time ^a (hr)
Subunit 1A							
Gravina Island ^b	07/12/94	5	3	3	39	50	1.0
Gravina Island ^c	07/12/94	1	0	0	6	7	0.3
Unit 2							
P.O.W. Island ^d	07/12/94	1	1	1	3	6	0.8
P.O.W. Island ^e	07/12/94	6	1	0	7	14	0.6
^a Surround using DA	12 Superaruiser						

Table 3 Aerial alpine deer surveys, Subunit 1A and Unit 2, 1994

^a Surveyed using PA-12 Supercruiser. ^b Dall Head to Grant Cove.

^c House Mtn. to High Mtn. ^d Eudora Mtn. to S. Arm Cholmondeley Sound. ^e West side of S. Arm Cholmondeley Sound.

					Average		Average	Average
	Nr	Successful	Percent	Hunter	hunter		deer per	hunter days
Year	hunters	hunters	Successful	days	days	Nr deer ^a	hunter	per deer
Unit 1A								
1984	1,060	440	42	5,280	5.5	620	0.6	9.3
1985	1,108	412	37	5,683	5.1	779	0.7	7.3
1986	1,107	529	48	7,100	6.4	859	0.8	8.3
1987	946	376	40	6,379	6.7	611	0.6	10.4
1988	958	413	43	4,930	5.1	686	0.7	7.2
1989	982	335	34	4,348	5.1	592	0.6	7.3
1990	1,009	443	44	5,127	5.1	723	0.7	7.1
1991	734	259	35	3,094	4.2	347	0.5	8.9
1992	751	294	39	4,519	6.0	686	0.9	6.6
1993	996	344	34	4,465	4.5	515	0.5	8.7
1994	1,067	516	48	5,514	5.2	912	0.8	6.0
1995	1,118	493	44	5,080	4.5	914	0.8	5.5
<u>Unit 2</u>								
1984	1,910	1,210	63	13,070	6.8	1,880	1.0	6.9
1985	2,025	1,373	68	14,182	7.0	3,151	1.6	4.5
1986	2,233	1,538	69	17,505	7.8	2,805	1.3	6.2
1987	2,481	1,845	74	17,709	7.1	3,886	1.6	4.5
1988	2,124	1,415	67	10,668	5.0	2,849	1.3	3.7
1989	2,132	1,397	65	12,315	5.7	2,806	1.3	4.4
1990	2,149	1,445	67	13,566	6.3	3,093	1.4	4.4
1991	1,664	1,142	69	11,985	7.2	2,466	1.5	4.9
1992	2,046	1,416	69	12,337	6.0	3,097	1.5	4.0
1993	1,986	1,394	70	11,860	6.0	2,807	1.4	4.2
1994	2,019	1,412	70	12,140	6.0	2,825	1.4	4.3
1995	2,143	1,496	70	12,887	6.0	3,277	1.5	3.9

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Table 4 Deer harvest data, Subunit 1A and Unit 2, 1984–1995

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^aIncludes does which were reported killed.

		Nr hunters,	Nr Successful			Average days	Average deer	
		Expanded	Hunters,	Percent	Hunter days,	per	per	Deer
Major Harvest Area	Year		Expanded	Successful	expanded	hunter	hunter	Killed
1-Gravina Island	1990	221	72	33	614	2.8	0.5	101
	1991	198	46	23	624	3.2	0.2	46
	1992	179	64	35	801	4.5	0.9	160
	1993	266	52	19	553	2.1	0.3	87
	1994	246	80	32	578	2.4	0.5	115
	1995	404	164	40	1,413	3.5	0.8	328
2-Annette Island	1990	16	13	78	39	2.4	1.1	18
	1991	6	0	0	11	2.0	0.0	0
	1192	16	16	100	179	10.9	5.5	91
	1993	22	11	52	112	5.1	0.6	14
	1994	15	0	0	49	3.1	0.0	0
	1995	16	13	80	84	5.2	1.2	19
3-Duke Island	1990	9	2	20	18	2.0	0.2	2
	1991	33	8	26	70	2.2	0.6	20
	1992	22	3	12	58	2.6	0.1	3
	1993	15	0	0	15	1.0	0.0	0
	1994	3	0	0	7	2.0	0.0	0
	1995	19	0	0 ·	49	2.5	0.0	0
4-South Revilla	1990	594	180	30	2,610	4.4	0.4	259
	1991	416	124	30	1,134	2.7	0.4	147
	1992	341	61	18	1,376	4.0	0.3	102
	1993	463	135	29	1,883	4.1	0.4	188
	1994	600	212	35	2,696	4.5	0.6	389
	1995	572	168	29	1,925	3.4	0.4	218
5-North Revilla	1990	242	82	34	801	3.3	0.4	103
	1991	204	55	27	748	3.7	0.4	76
	1992	275	55	20	846	3.1	0.3	80

Table 5 Deer harvests from major harvest areas within Subunit 1A, 1990–1995

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Table 5 Continued

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			Nr			Average	Average	
		Nr hunters,	Successful			days	deer	
		Expanded	Hunters,	Percent	Hunter days,	per	per	Deer
Major Harvest Area	Year		Expanded	Successful	expanded	hunter	hunter	Killed
	1993	345	80	23	1,033	3.0	0.3	97
	1994	347	136	39	1,049	3.0	0.6	192
	1995	334	137	41	918	2.7	0.6	192
6-Cleveland Pen.	1990	245	122	50	981	4.0	1.0	236
	1991	158	42	26	458	2.9	0.4	59
	1992	280	126	45	1,159	4.1	0.9	241
	1993	262	74	28	705	2.7	0.4	109
	1994	307	155	51	1,044	3.4	0.7	208
	1995	200	70	35	549	2.7	0.6	114
7-North Mainland	1990	10	2	20	58	5.8	0.4	4
			_	0				
	1991	11	0	33	33	3.0	0.0	0
	1992	25	8	10	75	3.0	0.3	8
	1993	38	19	5	164	4.3	0.5	19
	1994	19	1		84	4.5	0.1	1
	1995	28	7	20	56	2.0	0.3	7
8-South Mainland	1990	3	0	0	7	2.5	0.0	0
	1001	9	0	0	15	1.0	0.0	
	1991	8	0	0	15	1.8	0.0	0
	1992	_	0	_	25	3.0	0.0	0
	1993	2	-	· 100				
	1994		3		7	2.0	2.0	7
	1995	38	21	00	86	2.3	0.9	35

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	T	T	T	T	1	r	T	
		Nr hunters	Nr Successful			Average	Average	
		evnanded	hunters	Dercent	Uunter deue	uays	ueel	Deer
Major Harvest Area	Vear	expanded	expanded	Successful	expanded	bunter	bunter	beer
0 Outer Island	1000	62	Al	65		1.6		Killeu
9-Outer Island	1990	02	41		100	1.0	0.8	4/
	1991	42		72	89	2.1	1.2	50
	1992	107			246	2.3	1.0	107
	1993	55	22	41	203	3.7	0.7	36
	1994	146	124	84	260	1.8	1.4	198
,	1995	56	41	73	245	4.4	1.8	102
10-Heceta Island	1990	52	52	100	117	1.6	0.8	47
	1991	122	86	71	350	2.1	1.2	50
	1992	164	117	71	501	2.3	1.0	107
	1993	140	113	80	354	3.7	0.7	36
	1994	86	72	83	194	2.2	1.5	125
	1995	64	50	78	340	5.3	1.5	95
11-SW POW Island	1990	119	72	60	875	7.3	1.4	166
,	1991	59	33	56	529	8.9	1.1	67
	1992	174	98	56	743	4.3	1.1	189
	1993	127	82	65	441	3.5	1.3	170
	1994	141	80	57	504	3.6	0.8	117
	1995	192	92	48	1,061	5.5	0.9	166
12-SE POW Island	1990	264	128	48	847	3.2	0.9	234
	1991	244	121	49	904	3.7	0.7	174
	1992	270	150	56	952	3.5	0.9	247
	1993	336	102	30	1,072	3.2	0.5	153
	1994	260	106	41	824	3.2	0.5	140
	1995	279	121	43	919	3.3	0.7	206

Table 6 Deer harvests from major harvest areas within Unit 2, 1990–1995

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Table 6 Continued

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•				Nr			Average	Average	
			Nr hunters,	Successful			days	deer	
			Expanded	hunters,	Percent	Hunter days,	per	per	Deer
	Major Harvest Area	Year		expanded	Successful	expanded	hunter	hunter	killed
	13-Central POW Island	1990	1,100	626	57	6,201	5.6	1.2	1,271
		1991	849	580	68	5,093	6.0	1.3	1,129
		1992	1,032	645	62	4,901	4.7	1.1	1,183
		1993	1,005	657	65	5,248	5.2	1.2	1,187
		1994	973	622	64	5,560	5.7	1.2	1,143
		1995	1,092	763	70	5,341	4.9	1.3	1,423
	14-North Central	1990	664	343	52	2,924	4.5	0.9	568
	POW Island	1991	553	275	50	3,003	5.4	0.8	448
		1992	639	375	59	2,647	4.1	1.0	662
		1993	710	418	59	3,076	4.3	10.	690
<u> </u>		1994	570	349	61	3,001	5.3	1.1	654
L		1995	659	342	52	2,501	3.8	1.0	646
	15-North POW Island	1990	538	382	71	2,463	4.6	1.3	725
		1991	411	233	57	2,16	4.9	1.1	468
		1992	477	297	62	2,347	4.9	1.0	470
		1993	382	245	64	1,466	3.8	1.0	364
		1994	420	298	71	1,797	4.3	1.1	448
		1995	560	351	63	2,480	4.4	1.1	640

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Reported harvest			est	Unreported & illegal	Estimated	Estimated nr
Year	Male	Female	Total	harvest ^a	Total harvest	of road kills
<u>Unit 1A</u>						
1984	620	0	620	310	930	1 - 5
1985	779	0	779	390	1,169	1 - 5
1986	859	0	859	430	1,289	1 - 5
1987	611	0	611	306	917	1 - 5
1988	686	0	686	343	1,029	1 - 5
1989	587	5	592	296	888	1 - 5
1990	642	81	723	361	1,084	1 - 5
1991	331	61	347	173	520	1 - 5
1992	661	25	686	343	1,029	1 - 5
1993	515	0	515	257	772	1 - 5
1994	877	35	912	456	1,368	1 - 5
1995	853	61	914	457	1,371	1 - 5
Unit 2						
1984	1,880	0	1,880	1,880	3,760	unknown
1985	3,151	0	3,151	3,151	6,302	unknown
1986	2,805	0	2,805	2,805	5,610	unknown
1987	3,616	270 ^b	3,886	3,886	7,772	20
1988	2,846	3	2,849	2,849	5,698	30
1989	2,806	0	2,806	2,806	5,612	25
1990	2,952	141	3,093	3,093	6,186	25
1991	2,343	123	2,466	2,466	4,932	25
1992	3,036	61	3,097	3,097	6,194	25
1993	2,746	61	2,807	2,807	5,614	25
1994	2,762	62	2,825	2,825	5,650	25 - 30

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Table 7 Reported and estimated deer harvest/mortality, Subunit 1A and Unit 2, 1984-1995

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Table 7 Continued

	<u>R</u>	eported harve	est	Unreported & illegal	Estimated	Estimated nr
Year	r Male Female Total			harvest ^a	Total harvest	of road kills
1995	2,957	320 ^b	3,277	3,277	6,554	25 - 30

^aUnreported and illegal harvest is estimated at 50% of reported harvest in Subunit 1A and 100% of reported harvest in Unit 2. ^bAntlerless seasons: State season in 1987, Federal season in 1995.

,		Succ	essful			Unsucc	cessful	
	Local	Nonlocal			Local	Nonlocal	·	
Year	res. ^a	res.	Nonres.	Total	resident*	Resident	Nonres.	Total
<u>Unit 1A</u>								
1988	392	21	0	413	508	37	0	545
1989	310	25	0	335	607	40	0	647
1990	429	14	0	443	527	38	2	567
1991	259	0	0	259	418	53	4	475
1992	292	2	0	294	440	10	8	458
1993	336	3	6	345	619	21	11	651
1994	509	5	2	516	513	27	11	551
1995	464	23	6	493	601	12	12	625
<u>Unit 2</u>								
1988	748	638	29	1,415	242	430	38	710
1989	713	675	9	1,397	272	425	38	735
1990	825	583	36	1,444	323	351	30	704
1991	632	487	23	1,142	224	276	22	522
1992	829	572	17	1,418	299	291	38	628
1993	800	582	13	1,395	260	294	37	591
1994	773	608	31	1,412	231	321	54	606
1995	893	573	30	1,496	226	385	37	648

Table 8Hunter residency and success, Subunit 1A and Unit 2, 1988–1995

^aLocal residents refer to those Alaskans living within the boundaries of Subunit 1A for Subunit 1A data, and Unit 2 for Unit 2 data.

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			1			Method of Transportation [*]							
											Highway		<u> </u>
Year	Aug.	Sep	Oct	Nov	Dec	Jan	Unk	Airplane	Boat	Foot	Vehicle	Other	Unk
Unit 1A													
1988	165	80	172	197	52	0	20	63	1,456	458	518	7	107
1989	97	68	165	221	35	5	4	93	1,394	411	465	25	0
1990	92	85	171	325	50	0	0	105	1,366	514	515	0	14
1991	121	0	65	140	21	0	0	40	972	329	367	0	15
1992	118	33	213	283	30	0	9	35	1,042	377	304	8	0
1993	126	32	88	239	30	0	0	171	1,139	553	602	32	18
1994	171	33	273	315	97	21	2	117	1,436	405	638	50	18
199 5	206	145	179	268	116	0	0	56	1,570	501	581	64	7
<u>Unit 2</u>													
1988	895	447	506	888	72	7	34	173	99 0	547	2,875	18	55
1989	729	377	469	1,061	152	12	6	203	815	1042	3,276	52	16
1990	1,013	470	559	903	135	11	2	207	776	1023	3,522	28	0
1991	816	272	470	793	109	5	1	36	771	617	2,924	34	9
1992	1,256	422	635	696	52	8	28	106	865	1,113	3,467	54	0
1993	1,124	421	368	774	74	24	22	. 292	753	1,082	2,723	280	0
1994	911	344	578	916	68	0	8	170	1,049	800	2,507	68	19
1995	1,253	433	553	904	124	0	10	143	666	877	3,792	145	11

Table 9 Deer harvest chronology and method of transportation used by all hunters, Subunit1A and Unit 2, 1988–1995

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^aNumbers of successful and unsuccessful hunter trips. ^bIncludes cars, trucks, and off-road vehicles (3- and 4-wheelers).

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				Harvest data							
	Pellet group data ^b		T	Total		r Kill/	Hu	nter	Wolf		Weather
Season			Harvest		hunter day		success (%)		abun	dance	index ^c
	1A	2	1A	2	1A	2	1A	2	1A	2	
1981-82											6.3
1982-83											1.3
1983-84	0.6										1.3
1984-85	0.8	1.2	620	1,880	0.10	0.14	42	63			4.7
1985-86	1.0	1.6	779	3,151	0.14	0.22	37	68			2.0
1986-87	1.1	1.2	859	2,805	0.12	0.16	48	69			2.7
1987-88	1.7	1.0	611	3,886	0.09	0.22	40	74			1.7
1988-89	1.1	1.3	686	2,849	0.14	0.27	43	66			4.7
1989-90	1.0	1.2	587	2,806	0.13	0.23	34	65			1.3
1990-91	1.2	1.6	723	3,093	0.14	0.23	44	67			2.3
1991-92 ^d	0.8	0.7	347	2,466	0.11	0.20	35	69	86	59	0.3
1992-93	0.8	1.0	686	3,097	0.15	0.25	39	69	65	60	3.0
1993-94	1.0	1.1	515	2,807	0.11	0.24	34	70	57	25°	1.7
1994-95	1.0	1.1	912	2,825	0.16	0.23	48	70	93	37	4.7
1995-96	0.9	1.2	914	3,277	0.18	0.25	44	70	80	37	2.7

Table 10 Deer pellet group and harvest data, predator abundance(I_A)^a, and weather severity indices for Subunit 1A and Unit 2, 1981-1996

^a Indices taken from Brand and Keith (1979). $I_A = [(\Sigma R_i - n)/2n] \times 100$ where: R_I = the numerical value assigned to the *ith* response (R_I = 1 when population level reported to be scarce, 2 when population level reported to be common, or 3 when population level reported to be abundant).

n = number of trappers that responded. Data derived from 1991–96 Subunit 1A and Unit 2 trapper questionnaires.

^b Average number of pellet groups per plot.

^c Based on weather data collected at Annette Island, Alaska during November-March. Higher indices represent more severe weather conditions.

^d Extremely wet but snow-free season; pellets may not have persisted as long as in past years.

^e Sample consisted of only 2 trappers.

LOCATION

GAME MANAGEMENT UNITS: 1B and 3 $(6,000 \text{ mi}^2)$

GEOGRAPHIC DESCRIPTION: Southeast Alaska mainland from Cape Fanshaw to Lemesurier Point and adjacent islands

BACKGROUND

Sitka black-tailed deer inhabit most of the islands in Unit 3 and on the Subunit 1B mainland. Historically, deer populations in these areas have fluctuated with high and low population extremes. Severe winter weather causes most declines. Illegal hunting and predation by wolves and bears have extended the length of the declines, and concurrently clear-cut logging has reduced winter carrying capacity.

The most recent significant population decline was in the late 1960s and early 1970s, which led to restrictive regulations and bag limits in 1973. Subunit 1B remained open, with a 1 antlered deer limit from 1973 to 1980 and a 2 antlered deer limit from 1981 to the present.

Unit 3 was closed to deer hunting from 1975 through 1979. The area south of Sumner Strait had a 1 antlered deer limit from 1980 to 1987. The Alaska Board of Game increased this limit to 2 antlered deer in 1988, with an August 1–November 30 season. In 1991 a registration permit hunt with an October 15–31 season and a 1 antlered deer bag limit was opened on parts of Mitkof, Kupreanof, Woewodski, and Butterworth islands. The registration permit was replaced with a harvest ticket requirement in 1995. Beginning in the 1993 hunt, the only part of Unit 3 closed to deer hunting was the area within the Petersburg and Kupreanof city limits.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

For the period 1991-1995, the division adopted a regional strategic deer management plan for Southeast Alaska. Until the plan is revised, we will continue to use population objectives listed in that document:

Planning Area	Population Objective
Sumner/Ernest Islands-	14,373
Mitkof/Woewodski Islands	3482
Kupreanof Island	13,971
Kuiu/Coronation Islands	23,169

METHODS

We derived harvest data for the Lindenberg Peninsula on Kupreanof Island and Mitkof Island from registration permit reports for the 1994 season. Harvest data for 1994 for the remainder of Unit 3 and Subunit 1B and for all of Unit 3 and Subunit 1B in 1995 was estimated from a regional questionnaire mailed to a random sample of deer harvest ticket holders. Relative winter deer densities were measured with spring pellet group transects in selected areas of Unit 3.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Deer populations in Unit 3 vary from stable to increasing (Table 1). Pellet-group counts at Security Bay and Portage Bay in spring of 1995 were .22 and .32 pellet-groups/plot, respectively, which is similar to recent years. Conclusion and Woewodski (S. Mitkof) counts showed a substantial increase in 1996 to 1.45 and 2.25 pellet-groups/plot, respectively. The US Forest Service established 3 transects in the Muddy River area of Subunit 1B in the spring of 1996. Both deer and moose use the area. A moderate deer pellet-group density of 1.53 groups/plot was recorded. No pellet-group counts were conducted on Zarembo Island, but field observations by state and Forest Service biologists indicate a substantial increase in deer seen along the road systems. Most does observed had twins that survived to fall.

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MORTALITY

Season and Bag Limit.	Resident and nonresident hunters					
Unit 1B	Aug 1–Dec 31	2 antlered deer				
Unit 3, that portion of Mitkof Island south of the Petersburg city limits, that portion of Kupreanof Island on the Lindenberg Peninsula east of Portage Bay–Duncan Canal portage outside the Kupreanof city limits, and Woewodski and Butterworth islands	Oct 15–Oct 31	1 antlered deer				
Unit 3, the Petersburg city limits and that portion of Kupreanof Island within the Kupreanof City limits	No open season					
Remainder of Unit 3	Aug 1–Nov 30	2 antlered deer				

<u>Board of Game Actions and Emergency Orders</u>. The registration permit requirement for Mitkof Woewodski, and Butterworth islands and the Lindenberg Peninsula of Kupreanof Island was eliminated in 1995 and replaced with the harvest ticket requirement.

<u>Hunter Harvest</u>. Hunter effort and harvest changed little prior to 1991 (Tables 2–9). Unit 3 hunter survey data for 1991–1995 include Mitkof Island, the area primarily causing the large increase in both hunter numbers and kill. The 1995 harvest of 866 deer was the highest harvest for Unit 3 in recent times.

All deer hunters using Mitkof, Woewodski. and Butterworth Islands and the Lindenberg Peninsula were required to return a registration report card on hunting activity through1994. Hunters were also randomly surveyed by mail questionnaire (Table 10). Between registration reports and mail questionnaires, numbers of hunters and deer harvested were inconsistent, especially in 1991 and 1992. In 1994 mail questionnaire data were consistent with registration report data.

The mail survey contained reports of does taken in Units 1B and 3. This is reported as illegal kill in this report because there is no doe season in these units.

<u>Hunter Residency and Success</u>. Few nonresidents hunt deer in Units 1B and 3 (Tables 3 and 7); therefore, most hunters are local. Deer populations are greater and seasons and bag limits more liberal in other nearby units, attracting nonlocal hunters to areas other than Units 1B and 3.

<u>Harvest Chronology</u>. Tables 5 and 9 show the harvest percentage by month. Most deer harvest takes place during August, October, and November. Some Unit 3 hunters reported taking deer in December and January during the closed season. The increase of Unit 3 kills during October in 1991–1995 in Unit 3 coincides with the Mitkof Island registration permit hunt.

<u>Transport Methods</u>. Most hunters traveled by boat to their hunting areas. The increase in the use of highway vehicles and decrease in boat use in 1991–1995 in Unit 3 reflect the opening of Mitkof Island (Tables 4 and 8).

CONCLUSIONS AND RECOMMENDATIONS

Deer populations in Units 1B and 3 are stable or increasing with localized variations. Winter weather, predation, and clear-cut logging have the greatest effects on deer population dynamics. There are no indications that hunting seasons or bag limits should be restricted. Except for the closures in the communities of Petersburg and Kupreanof, Unit 3 can remain open for deer hunting.

PREPARED BY:

Edward Crain Wildlife Biologist II

SUBMITTED BY:

<u>W. Bruce Dinneford</u> Regional Management Coordinator

		Pellet_			
VCU	Name	Vear	Plots	Mean	95% CI
	Traine	<u> </u>	11003	With	<u> </u>
400	Security Bay	1984	360	0.02	0.01-0.04
100	Security Day	1989	304	0.25	0.16-0.34
		1995	268	0.22	0.15-0.29
		1775	200	0.22	0.10 0.27
403	Pillar Bay	1988	337	0.16	0.10-0.22
	,				
408	Malmesbury	1990	206	0.11	0.05-0.18
417	Conclusion	1987	207	2.66	2.32-3.01
		1989	200	0.95	0.72-1.18
		1991	200	0.71	0.53-0.88
		1996	191	1.45	1.19-1.70
407	D' I I D	1004	•••	0.00	0 0 0 40
427	Big John Bay	1994	300	0.38	0.29-0.48
431	Point Barrie	1088	357	0.23	0 17-0 29
451	I out Danc	1002	275	0.23	0.17-0.20
		1995	575	0.77	0.04-0.90
434a	Big Level	1981	399	1.54	1.45-1.63
	6	1983	336	1.56	
		1986	382	1.66	1.41-1.90
		1989	227	1.07	
		1991	456	2.16	1.90-2.41
		1771	150	2.10	1.90 2.11
434b	Little Level	1981	114	2.48	2.02-2.94
		1983	136	2.34	
		1986	122	1.39	1.07-1.70
		1989	137	1.52	
		1991	132	3.59	3.07-4.11
					••••
435	Castle River	1984	312	0.19	0.12-0.26
		1987	305	0.51	0.37-0.65
		1989	312	0.40	0 25-0 56
		1994	310	0.32	0 20-0 40
		1774	510	0.52	0.20 0.40
437	East Duncan Canal	1990	227	1.12	0.92-1.32
	····· = ····· • • • • • • • • • • • • •	1992	213	0.78	0.63-0.94
		-//-	-10	0.70	
442	Portage Bay	1993	282	0.43	0.31-0.56
		1995	277	0.43	0.63-0.94

Table 1 Deer population trends as indicated by pellet group surveys in Units 1B and 3, 1981-96

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		Pellet-	Groups		
VCU	Name	Year	Plots	Mean	<u>95% CI</u>
448	Woewodski	1984	295	.088	0.69-1.08
	(S. Mitkof)	1985	209	1.00	0.82-1.19
		1987	195	1.65	1.85-2.61
		1988	433	1.33	1.16-1.51
		1989	417	1.35	1.24-1.73
		1990	355	1.46	1.28-1.64
		1991	316	1.80	1.52-2.07
		1992	248	0.79	0.62-0.97
		1993	230	1.06	0.85-1.27
		1994	152	1.13	0.82-1.46
		1995	157	1.38	1.08-1.67
		1996	243	2.25	1.95-2.55
448a	Woewodski Island	1991	461	1.86	1.66-2.05
	·····	1994	510	1.30	1.15-1.46
			• • •		
449	Frederick	1981	945	0.08	0.06-0.11
	(N. Mitkof)	1990	180	0.55	0.36-0.74
		1992	227	0.54	0.42-0.65
452	Blind Slough	1992	114	1.04	0.77-1.30
	(Central Mitkof)	1993	265	1.28	1.04-1.51
454	Drv	1981	91	0.92	0.56-1.28
	219	1993	210	1.44	1.17-1.72
455	Vank Island Group	1981			
	a) Sokolof		900	1.73	1.61-1.85
	b) Rynda		281	0.25	0.18-0.32
	c) Greys		284	0.25	0.18-0.32
458	Snow	1994	345	0.57	0.45-0.70
4.5.4				1.60	1 45 4 04
461	(All Transects)	1985	646	1.63	1.45-1.81
	(1 m Hunstets)				
461	Woronkofski	1985	218	2.01	1.62-2.39
	(Trans. 10, 11, 12)	1987	201	2.23	1.85-2.61
		1989	223	2.52	2.18-2.85
		1991	203	1.59	1.32-1.85
		1993	225	0.22	0.13-0.31

Table 1 Continued

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	Pellet-Groups										
VCU	Name	Year	Plots	Mean	95% CI						
		1994	224	0.26	0.18-0.34						
467	Mosman	1993	304	0.07	0.03-0.11						
473	Onslow	1984	321	0.37	0.28-0.46						
		1985	334	0.59	0.48-0.70						
		1986	347	0.72	0.59-0.84						
		1987	336	0.42	0.31-0.55						
		1988	329	0.44	0.32-0.55						
		1991	322	0.66	0.51-0.80						
		1993	341	0.68	0.55-0.82						
		1994	340	0.88	0.74-1.02						
480	Fools	1994	193	0.54	0.38-0.70						
489	Muddy River	1996	348	1.53	1.26-1.80						
564	Coronation	1983	696	1.20	1.04-1.36						
		1985	228	2.34							
		1988	408	1.41	1.17-1.66						
		1989	293	1.63	1.28-1.98						

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Table 1 Continued

Regulatory		Estin	nated	legal h				
Year N		(%)	F	(%)	Unk	Total	Estimated illegal harvest	Total ^a
1988	234	(100)			0	234	6	240
1989	236	(100)			0	236	0	236
1990	228	(100)			0	228	22	250
1991	381	(100)			0	381	30	411
1992	581	(100)			0	581	57	638
1993	619	(100)			0	619	51	670
1994	690	(100)			0	690	0	690
1995	844	(100)			0	844	22	866

Table 2 Unit 3 deer harvest, 1988–96

^aData from mail questionnaire survey

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Table 3 Unit 3 deer hunter residency and success, 1988–96

	Success	Unsuccessful									
Regulatory	Local ^a	Nonlocal				Local ^a	Nonlocal				Total ^b
Year	resident	resident	Nonresident	Total	(%)	resident	resident	Nonresident	Total	(%)	hunters
1988	175	12	0	187	(55)	148	7	0	155	(45)	342
1989	154	9	0	163	(46)	162	25	5	192	(54)	355
1990	131	43	0	174	(51)	145	18	2	165	(49)	339
1991	278	22	0	300	(49)	282	19	5	306	(51)	606
1992	428	45	0	473	(48)	468	46	0	514	(52)	987
1993	422	51	2	475	(45)	492 ·	72	5	569	(55)	1,044
1994	457	33	4	494	(44)	488	101	3	592	(55)	1,086
1995	569	28	6	603	(58)	386	47	0	433	(42)	1,036

^aResidents of Units 1B, 3, Meyers Chuck, Point Baker and Port Protection ^bData from registration permit report and hunter survey included

	Percent of	effort						
Regulatory			3 - or			Highway		Number
Year	Airplane	Boat	4 - wheeler	Foot	ORV	Vehicle	Other	of trips
1988	4	69		3	4	20		677
1989	3	73		8	1	14	1	666
1990	4	60		14		21	1	708
1991	1	41	1	12	3	43		1,227
1992	1	32	4	11	1	50	1	1,861
1993	2	44	2	10	4	36	2	1,835
1994	1	33	4	13	2	46	1	2,204
1995	1	42	5	13	4	34	1	2,140

Table 4 Unit 3 deer hunter effort percent by transport method, 1988–96^a

^a The hunter mail survey reports transport as total number of hunting trips by method

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Regulatory	tory Harvest periods								
Year	August	September	October	November	December	January	deer		
1988	17	13	40	28	1	1	238		
1989	14	19	16	51	0	0	216		
1990	36	10	24	25	4	0	250		
1991	15	11	53	21	0	0	410		
1992	9	11	63	16	· 0	0	639		
1993	21	6	45	24	1	2	671		
1994	16	4	47	31	1	1	691		
1995	29	7	41	23	0	0	866		

 Table 5 Unit 3 deer harvest chronology percent by month, 1988–96

^a May not equal harvest table due to rounding or incomplete reporting

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Regulatory		Estir	nated	legal ha	arvest			Estimat	ed illeg	gal harvest	t	Total ^a
Year	Μ	(%)	F	(%)	Unk	Total	Μ	(%)	F	(%)	Unk	
1988	101	(100)				101						101
1989	73	(100)				73						73
1990	148	(100)				148						148
1991	50	(100)				50						50
1992	142	(100)				142			6	(100)		148
1993	164	(100)				164			21	(100)		185
1994	184	(100)				184						184
1995	75	(100)				75						75

Table 6 Unit 1B deer harvest, 1988–96

^a Data from mail questionnaire survey.

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Table 7 Unit 1B deer hunter residency and success, 1988–96

	Successful							Unsuccessful					
Regulatory	Local ^a	Nonlocal				Local ^a	Nonlocal				Total		
Year	resident	resident	Nonresident	Total	(%)	resident	resident	Nonresident	Total	(%)	hunters		
1988	65	13	0	78	(44)	86	13	0	99	(56)	177		
1989	40	15	0	55	(29)	97	35	5	137	(71)	192		
1990	89	14	0	103	(52)	80	14	3	97	(48)	200		
1991	37	8	0	45	(43)	40	17	2	59	(57)	104		
1992	123	10	0	133	(54)	94	18	0	112	(46)	245		
1993	80	27	0	107	(56)	53	26	6	85	(44)	192		
1994	107	18	0	125	(48)	100	35	2	137	(52)	262		
1995	40	16	0	56	(33)	81	32	0	113	(67)	169		

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^aResidents of Units 1B, 3, Meyers Chuck, Point Baker and Port Protection

Percent of effort							-	
Regulatory			3- or			Highway		Number
Year	Airplane	Boat	4-wheeler	Foot	ORV	Vehicle	Other	of trips
1988		95		3				209
1989	6	90		1		1		324
1990		85	15	1				307
1991		86	14					148
1992		87	3	6	2	3		422
1993	10	74		8		8		244
1994	5	91	2			2		345
1995	3	89	2	3	2			226

Table 8 Unit 1B deer hunter effort percent by transport method, 1988–96^a

^a The hunter mail survey reports transport as total number of hunting trips by method

Table 9 Unit 1B deer harvest chronology percent by month, 1988–96

Regulatory	Harvest periods								
Year	August	September	October	November	December	January	deer		
1988	32	11	35	16	6	0	100		
1989	7	0	32	49	12	0	73		
1990	18	10	15	53	3	0	148		
1991	10	0	47	22	22	0	51		
1992	39	0	5	27	30	0	148		
1993	14	17	22	47	0	0	185		
1994	14	0	14	59	13	0	183		
1995	6	0	66	28	0	0	75		

^a May not equal harvest table due to rounding or incomplete reporting

	1991					
	S	Source				
	Hunter Mail Survey	Registration Permit Report				
Total hunters	312	603				
Deer killed	167	214				
Average deer/hunter	.53	.35				
Total hunter days	1116	1636				
Average days/hunter	3.6	2.7				

Table 10 A comparison of hunter effort and success estimates from registration reports and hunter surveys on Mitkof, Woewodski, and Butterworth islands and the Lindenberg Peninsula, 1991–1994

	1 S	1992 Source				
	Hunter Mail Survey	Registration Permit Report				
Total hunters	488	664				
Deer killed	326	187				
Average deer/hunter	.7	.3				
Total hunter days	1894	2062				
Average days/hunter	3.9	3.1				

	1993 Source				
	Hunter Mail Survey	Registration Permit Report			
Total hunters	451	562			
Deer killed	186	155			
Average deer/hunter	.4	.3			
Total hunter days	1756	1916			
Average days/hunter	3.9	3.4			

<u> </u>	1994 Source				
	Hunter Mail Survey	Registration Permit Report			
Total hunters	523	570			
Deer killed	179	160			
Average deer/hunter	.3	.3			
Total hunter days	1736	1950			
Average days/hunter	3.3	3.4			
LOCATION

GAME MANAGEMENT UNIT: $1C (6,500 \text{ mi}^2)$

GEOGRAPHIC DESCRIPTION: The southeast Alaska mainland and the islands of Lynn Canal and Stephens Passage lying between Cape Fanshaw and the latitude of Eldred Rock, including Sullivan Island and the drainages of Berners Bay

BACKGROUND

Deer have inhabited northern Southeast Alaska since their emigration from southern refugia following the Pleistocene epoch (Klein, 1965). Deep winter snow on the mainland portion of Subunit 1C has kept the number of deer lower than that on adjacent islands. Severe winters in 1969 and 1971 increased winter mortality and reduced deer numbers (Olson, 1979). A 1963 population estimate indicated 200,000 deer were in Southeast Alaska at that time (Merriam, 1965). The harvest in the 1962 season was 10,500 deer. Hunter surveys were begun in 1970 and have continued through the present. Pellet group counts (Kirchhoff and Pitcher, 1988) were begun in Subunit 1C in 1984 and have been conducted on Douglas, Harbor, Lincoln, and Shelter islands.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

Population objectives were established in the Strategic Plan for Management of Deer in Southeast Alaska 1991–1995 (ADF&G, 1991). Population objectives are listed by area within Subunit 1C:

Chilkat Range	586
Juneau Mainland	1090
Shelter-Lincoln Islands	354
Douglas Island	1326
Mainland-Taku Inlet to Cape Fanshaw	1256
Total	4612

The following has been identified as a measurable management objective for Subunit 1C: maintain population densities on Douglas, Lincoln, and Shelter islands at high levels as reflected by a mean pellet density of 2.0 pellet groups per plot.

METHODS

The department issued 12,556 deer harvest tickets for the 1994 regulatory year in Southeast Alaska and 12,564 for 1995. We mailed 40% of the 1994 harvest ticket holders hunter surveys and 41% of those responded to the survey. In 1995 39% of the people with harvest tickets were mailed surveys and the response rate was almost 47%. Survey results for hunter effort, success, and kill location were extrapolated to estimate results for all harvest ticket holders. We conducted

pellet group surveys on Shelter Island and Douglas Island in 1995. In the spring of 1996 we surveyed both sets of transects on Douglas Island (North Douglas and Inner Point).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

No population estimates are available for deer in Subunit 1C, and pellet group information is scanty. In spring 1994 (just prior to the reporting period) and 1995 (midway through the period), pellet densities on the North Douglas Island transects averaged about 0.90 pellet groups/plot, remaining in the range seen since these transects were established in 1991. In 1996 we found an average of 0.97 groups/plot, the highest recorded for these transects.

At Inner Point on the southwest side of Douglas Island, pellet group densities averaged 1.41 groups/plot in spring of 1995 and 1.68 groups/plot the following year. These levels are similar to results recorded since 1985, when this site was first sampled. The fieldwork in spring of 1995 was the first time that we were able to gather data at both Douglas Island sites. The northerly aspect and quick rise to higher elevation at North Douglas may explain a lower level of winter deer use. Based on the North Douglas transects, deer populations there were stable over the reporting period.

Compared to Shelter Island densities in 1993, the 1995 Shelter Island transects showed a decrease in deer densities. Deer pellet densities on Shelter Island are now less than half the levels documented in the mid-1980s, perhaps indicating that levels of around 3.0 pellet groups/plot are not sustainable on the island.

MORTALITY

Harvest

Season and Bag Limits.

Unit 1C That portion including Douglas, Lincoln, Shelter, Sullivan Islands

Resident and nonresident hunters

Aug 1–Dec 31 4 deer; antlerless deer may be taken only from Sep 15–Dec 31.

Remainder of Unit 1C

Aug 1–Dec 31 2 antlered deer

Board of Game Actions and Emergency Orders. State regulations remained unchanged during the reporting period.

<u>Hunter Harvest</u>. Based on data gathered from the annual deer hunter survey, 659 deer were killed in Subunit 1C in 1994 and 311 deer in 1995 (Table 2). Does composed 35% of the 1994 harvest and 32% of the 1995 harvest.

Hunter Residency and Success. In both 1994 and 1995 most successful (98% and 100%) and unsuccessful (88% and 86%) hunters were residents of Subunit 1C (Table 3). Nonlocal residents

composed most of the remainder of hunters, at 1% and 0% of successful hunters and 10% and 12% of unsuccessful hunters during 1994 and 1995, respectively. In 1994, 13 nonresidents (2 successful) made up 0.5% of successful and 2% of unsuccessful hunters. In 1995, 18 nonresidents hunted, all without success.

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On average in 1994, each hunter took 1.8 deer, 0.5 deer per hunter-day, 2.0 hunter-days, and 3.5 days in the field (Table 4). The 1994 hunter success was similar to that of 1989 and several times greater than levels seen through the early 1990s. The success rate, as measured by the number of deer/hunter, matched the rate of the late 1980s. Effort (nr hunter days/deer) during the 1994 season remained low and was similar to figures for 1987–1989. The number of deer per hunter day rebounded from the low levels seen in the 2 years prior to this period. The number of days afield per hunter remained similar to the level seen since 1986.

In 1995 the patterns were quite different. While the number of deer/hunter remained about the same, the time expended by hunters to bag a deer doubled.

<u>Transport Methods</u>. Boats have usually been the predominant form of transportation for deer hunters in Unit 1C, but since 1992 this mode has been superseded by a combination of highway vehicles and foot access. In 1994 26.6% of Unit 1C deer hunters reported using boats, 35.8% highway vehicles, and 33.2% gained access on foot. In 1995 29.5% used boats, while 48.3% reported using vehicles, and 19.5% accessed their hunt on foot. Since little of the unit is roaded, these figures indicate heavy pressure on Douglas Island, an area with relatively good deer habitat.

CONCLUSIONS AND RECOMMENDATIONS

Pellet counts within Subunit 1C seem to indicate stable deer densities, with slightly higher results at the end of the reporting period. In 1995 we were able to sample both sets of transects on Douglas Island, and while the North Douglas transect group showed lower densities than those at Inner Point, the trend in pellet group numbers is similar. None of the areas sampled within the subunit meet the management objective of 2.0 groups/plot.

Hunter survey data indicate deer were easy to find in 1994, when hunters were more successful than they have been recently. This was undoubtedly due to heavy fall snow accumulations which pushed deer to low elevation during November and December in 1994, when the state deer hunting season was still in progress. The percent of females in the harvest in 1994 returned from the high level in 1993 to a level similar to the long-term average.

During the 1995 season, fewer deer were taken than in any other year within the previous decade. This can be explained by several factors. First, the population may still have been showing the effects of the heavy harvest in 1994, as well as possible die-offs caused by heavy snow accumulations that year. Secondly, the distribution and amount of hunter effort in 1995 was affected by long periods of poor weather with high winds and seas, which prevented small boats from accessing much of the unit. This focused harvest even more heavily than usual on Douglas Island, where hunter success and total harvest were halved during the second year of the reporting period. Last, an absence of snowpack in 1995 allowed deer to use habitat at all elevations throughout the state hunting season, making it more difficult for hunters to locate deer.

Despite the trends noted above, little or no anecdotal information or hunter complaints have been received regarding deer hunting in Unit 1C. Possibly this is because many hunters using this area still regard it as a secondary deer hunting area to be used when weather or time do not allow them to access Unit 4.

We should consider further reductions in season and bag limit in areas if success per unit effort for hunters remains low and pellet group densities trend downward.

LITERATURE CITED

- ADF&G. 1991. Strategic plan for management of deer in Southeast Alaska 1991–1995. Alaska Department of Fish and Game, Juneau.
- KIRCHHOFF, MATTHEW D. AND K. W. PITCHER. 1988. Deer pellet-group surveys in Southeast Alaska, 1981–1987. Alaska Department of Fish and Game, Division of Game, Federal Aid in Wildlife Restoration, Research Final Report. Project W-22-6, Job 2.9, Objective 1. July 1988.
- KLEIN, D. R. 1965. Postglacial distribution patterns of mammals in the southern coastal regions of Alaska. Journal of Arctic Institute of North America, 18:7–20.
- MERRIAM, H. R. 1970. Deer fluctuations in Southeast Alaska. Paper presented to annual. meeting of Northwest Sec., The Wildl. Soc., Spokane, WA, March 13, 1970. 13 pp.
- OLSON, SIGURD. 1979. Life and times of Sitka black-tailed deer. Pages 160–168 in O. C. Wallmo and J. W. Schoen, editors, Sitka black-tailed deer: proceedings of a conference in Juneau, AK. US Forest Service, Juneau, AK. R-10-48. 231 pp.

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Management Coordinator

		Mean pellet	Nr		
Site	Year	groups/plot	plots	95% CI	
Kensington (VCU 20)	1994	0.00	180		
Portland Island (VCU 27)	1987	0.99	381	0.87-1.12	
North Douglas	1991	0.8	300	0.65-0.96	
(VCU 35)	1993	0.74	324	0.62-0.87	
	1994	0.91	315		
	1995	0.86	306	0.70-1.02	
	1996	0.97	323	0.81-1.12	
Inner Point	1986	1.97	235	1.68-2.25	
(VCU 36)	1987	1.76	262	1.53-2.00	
. ,	1988	1.21	200	1.02-1.39	
	1989	1.30	258	1.08-1.53	
	1992	2.05	204	1.75-2.36	
	1995	1.41	254	1.21-1.60	
	1996	1.68	240	1.45-1.91	
Harbor Island (VCU 65)	1987	1.28	200	1.00-1.56	
Couverden (VCU 117)	1993	0.35	350	0.27-0.44	
Shelter Island	1987	2.91	288	2.57-3.24	
(VCU 124)	1988	3.16	130	2.62-3.70	
`	1989	1.42	300	1.23-1.62	
	1990	1.60	300	1.37-1.82	
	1993	2.00	250	1.73-2.26	
	1995	1.38	297	1.20-1.56	
Sullivan Island (VCU 94)	1990	1.40	250	1.17-1.62	

Table 1 Unit 1C. Deer population trends as indicated by pellet group surveys, 1986-95

			Estimated
Year	<u>M</u>	F	Total
1986	296	138	434
1987	347	149	496
1988	325	118	443
1989	271	218	489
1990	330	169	499
1991	245	172	417
1992	358	153	511
1993	302	277	579
1994	427	232	659
1995	210	101	311

Table 2 Unit 1C. Annual deer harvest, 1986-95

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Data from extrapolated results of hunter surveys.

Table 3 Unit 1C. Hunter residency and success, 1986–1995

		Success	ful			Unsucces	ssful	
	Local	Nonlocal			Local	Nonlocal		
Year	Res.	Res.	Nonres.	Total	Res.	Res.	Nonres.	Total
1986	256	8	0	264	655	67	4	726
1987	316	14	0	330	611	42	2	655
1988	232	20	0	252	639	45	6	690
1989	247	26	0	273	624	43	0	667
1990	291	32	2	324	564	56	3	623
1991	209	21	0	230	551	42	4	597
1992	321	15	6	343	550	63	5	618
1993	295	8	0	302	549	50	2	601
1994	359	4	2	365	574	67	11	652
1995	210	0	0	210	670	92	18	780

Year	Nr deer/ hunter	Nr deer/ hunter day	Nr hunter days/deer	Nr days/ hunter
1986	2.4	0.5	6.7	3.3
1987	1.5	0.5	3.4	3.6
1988	1.8	0.6	2.6	2.5
1989	1.8	0.5	3.2	3.4
1990	0.5	0.2	6.5	3.4
1991	0.5	0.1	7.2	3.6
1992	0.5	0.2	2.8	3.3
1993	0.6	0.2	3.1	3.3
1994	1.8	0.5	2.0	3.5
1995	1.5	0.2	4.3	6.3

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Table 4 Unit 1C. Average statistics for successful hunters, 1986–1995

LOCATION

GAME MANAGEMENT UNIT: Unit 4 $(5,820 \text{ mi}^2)$

GEOGRAPHIC DESCRIPTION: Admiralty, Baranof, Chichagof, and adjacent islands

BACKGROUND

Game Management Unit 4 provides most of the deer hunting opportunity in Southeast Alaska. In 1994–95 it accounted for 41% of the region's hunter effort and 57% of the deer harvest. For 1995–96 the unit provided 43% of the effort and 66% of the deer killed in the region.

Significant changes in deer density are normal in Unit 4. Periodic declines are attributed to severe winter weather and associated deep snow conditions (Olson 1979). Populations were low in the late 1940s, following years of heavy winter losses. By 1956 deer increased to exceed carrying capacity (Klein and Olson 1960). Winter severity is on a 10-year cycle, with intervening mild winters. Most winters in Unit 4 were mild from the mid-1970s through 1988, with excellent survival of fawns and adult deer. During the winters of 1988–89, 1989–90, and 1990-91, however, persistent snow caused significant deer mortality. In the winter of 1994–95 many fawns died, but since then winters have been mild and survival of all age classes good.

Deer densities are expected to decline in the future in response to habitat alteration caused by commercial logging. Kirchhoff (1994) identified that postlogging clearcuts had lower browse availability to deer after reforestation produced a closed canopy that shaded important forage plants. Additionally, Kirchhoff noted that in severe winters deer could not use clear-cut areas well because of deep snow accumulation; higher mortality occurred in these areas than for deer wintering in old-growth forest.

Since 1990, both state and federal subsistence hunting regulations have been in effect. State regulations were adopted by the Alaska Board of Game and applied on all land in Unit 4. The Federal Subsistence Board promoted regulations that applied only on federal lands and gave federally qualified subsistence hunters more liberal season dates and bag limits. While the 2 sets of regulations were initially quite similar, they have continued to diverge. During this report period, federal regulations were further liberalized to allow hunters to shoot deer from a boat.

MANAGEMENT DIRECTION

MANAGEMENT GOALS

No management goals have been established for this area.

MANAGEMENT OBJECTIVES

- Maintain a population density capable of sustaining an average hunter kill of at least 1.5 deer
- Maintain a population capable of providing a minimum success rate of 1 deer killed per 4 days hunting
- Maintain the male component of the deer harvest at a minimum of 60%

METHODS

We gathered population data through spring surveys of fecal pellet groups on Admiralty, Baranof, Chichagof, and Kruzof islands. The technique has been used to collect trend data for many years. Methodology is described in detail in Kirchhoff and Pitcher (1988).

Winter mortality surveys on some of the previously established trend areas were conducted during both winters.

To survey deer hunter effort and success for both seasons (Alaska Department of Fish and Game 1995, 1996), we mailed harvest questionnaires to a sample of persons obtaining deer harvest tickets. Hunters were asked to indicate hunting effort, kills, months hunted, and kill locations.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Deer populations during this report period have been stable or slightly increasing in most areas. Pellet group surveys indicated higher populations in many areas sampled (Table 1). The population has recovered from the winter losses in 1988–89, 1989–90, and 1990–91. By the end of this report period, deer numbers were near carrying capacity in many areas of the unit. Areas sustaining heavy hunting pressure were below carrying capacity.

Habitat quality and winter severity vary significantly throughout the unit because of local topography and changes brought by logging. The eastern portions of the unit undergo greater snow depths and greater winter mortality. Some areas logged before 1970 are entering a stage of reforestation with low long-term ability to support deer. Because of the extensive acreage that has been logged, future carrying capacities for deer in the unit will be lower than prelogging levels. Many popular hunting areas will not sustain current harvest levels.

Pellet group surveys (Table 1) generally reflect an increasing population trend with data from most of the unit indicating high numbers of deer. Except in areas sustaining heavy hunting pressure, department staff and public observations support this trend. Evaluation of population status for management purposes should continue to be based on a variety of indicators, including pellet transects, hunter contacts, field observations, harvest questionnaires, and mortality transects.

Population Size

Deer pellet group surveys conducted on Admiralty, Baranof, Chichagof, and Kruzof islands in spring 1995 and 1996 indicated an increase in numbers (Table 1). By itself, the technique used may not accurately reflect deer populations in late winter because deer that deposited pellets on the range in December and January could have died in February and March. Snowfall that concentrates deer in restricted habitats may result in high pellet counts for sample units in such areas. In years with little snow accumulation, even though deer numbers may be high, deer use may be scattered over a wide area with fewer pellet groups encountered along the sample transects. Population trends cannot be directly extrapolated only from trend in the pellet group data. Evaluation of population status for management purposes includes a variety of indicators, including pellet and mortality transects, hunter contacts, field observations, and harvest questionnaires.

Population Composition

The sex composition of the legal kill (Table 2) was estimated from deer harvest questionnaires (Alaska Department of Fish and Game 1995, 1996). Hunter reports indicated a 1994–95 take of 7400 male deer (68%) (Table 2). Hunters took 5300 (72%) male deer in 1993–94. Aging of deer teeth taken by hunters during the 1994 seasons showed that yearlings and 2-year-old deer of both sexes made up the largest segment of the harvest. There remains a tendency among hunters to select males, although the either-sex season has been in effect for many years. Hunters took few fawns.

Distribution and Movements

I have no information collected on distribution and movement of deer populations.

MORTALITY		
Harvest		
Season and Bag Limit	Resident and Nonresid	ent Hunters
Unit 4		
That portion of Chichagof Island east of Port Frederick and north of Tenakee Inlet including all drainages into Tenakee Inlet and Port Frederick.	Aug 1–Dec 31	3 deer; antlerless deer may be taken only from Sep 15–Dec 31
Remainder of Unit 4	Aug 1–Dec 31	4 deer; antlerless deer may be taken only Sep 15–Dec 31

Board of Game Actions and Emergency Orders. No actions were taken this reporting period.

<u>Hunter/Trapper Harvest</u>. A questionnaire was mailed to a sample of deer harvest ticket holders to obtain harvest information during both seasons (Alaska Department of Fish and Game 1995, 1996). Extrapolation of responses from the hunter harvest survey indicated 4379 hunters were afield during the 1994–95 season and 3894 hunters afield in 1995–96 (Table 3).

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In 1994–95 hunters reported killing 10,800 deer. In 1995–96 the reported kill decreased to 7400 deer. The crippling loss, unreported kills, and illegal kills are estimated to be near 20% of the reported harvest (Table 2). Based on these estimates, the total hunter-related mortality was approximately 12,900 deer in 1994–95. The estimated 1995–96 mortality was 8600 deer.

<u>Hunter Residency and Success</u>. In 1994–95, 2164 hunters reported they resided in Unit 4, while 2160 resident hunters lived outside the unit (Table 3). In 1995–96, 1832 hunters reported they resided in Unit 4, while 2026 resident hunters lived outside the unit. There were 55 nonresidents in 1994–95 and 36 in 1995–96 who hunted in Unit 4. In 1994–95, 84% of unit residents were successful and 74% were successful in 1995–96. Nonlocal residents had an 83% success rate in 1994–95 and 61% success in 1995–96. Nonresidents had a 63% success rate in 1994–95 and an 83% rate in 1995–96. The success rate for all hunters was 84% in 1994–95 and 68% in 1995–96.

<u>Harvest Chronology</u>. As in past years, the greatest hunting effort was expended in November (Table 4). November 1994 provided 44% of the total days hunted and 46% of the harvest. In 1995 hunting in November accounted for 42% of the total days hunted and 42% of the harvest. In 1995 and 1996, the month of January (when only the federal subsistence season was open) accounted for 1% (138) and 6% (449), respectively, of the estimated harvest for those hunting seasons.

<u>Transport Methods</u>. Transport use has changed little since the 1988–89 season, when data was first collected. In 1994–95 boats were used in 68% of the hunting trips by hunters, 11% walked from a community, 11% used highway vehicles, 8% used airplanes, and 1% used off-road vehicles (including 3- or 4-wheelers and snow machines). In 1995–96, boats were used in 70% of the hunting trips, 12% walked from a community, 12% used highway vehicles, 7% used airplanes, and 1% hunted from off-road vehicles. Transport use by deer hunters remains almost identical with past years (Table 5).

Other Mortality

In the late winter of 1994–95, we examined 8 beach mortality transects. Data from bone marrow examination revealed the causes of death for 34 deer were winter mortality (23 deer) and crippling loss (11) from the hunting season. Winter-killed deer were almost entirely fawns, but adult deer comprised all of the crippling loss. The rate of finding dead deer was 2.9 winter mortalities and 1.4 crippling losses per mile of beach examined. The winter of 1995–96 was more open and snow did not concentrate deer near the beaches. For the 13 beach transects examined, winter mortality was 1.2 deer per mile of beach and crippling loss was 0.5 deer per mile.

HABITAT

Assessment

No information was available on habitat assessment during this reporting period.

Enhancement

No enhancement projects were underway during this reporting period.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

None.

CONCLUSIONS AND RECOMMENDATIONS

All management objectives were met during both seasons. The average kill in 1994–95 was 2.5 deer per hunter with a hunting effort of 2.2 days per deer. Male deer composed 68% of the harvest. The average kill in 1995–96 was 1.9 deer per hunter with a hunting effort of 2.7 days per deer. Male deer composed 72% of the harvest.

Harvest questionnaire data indicated an estimated harvest of 10,836 deer during the 1994– 95 season (Alaska Department of Fish and Game 1995) and 7428 deer during the 1995–96 season (Alaska Department of Fish and Game 1996).

In 1994–95 84% of hunters were successful; in 1995–96 hunter success was 68%. Higher harvest and hunter success rates were the result of early snows bringing deer to the beach in November 1994. Shooting from boats under the federal subsistence hunting regulations caused a high crippling loss of deer. Therefore, the estimated illegal take was raised from the 10% estimate of past years to nearly 20%. Deer densities in the unit are high, although hunting effort has reduced numbers in some areas immediately adjacent to the beaches.

A major management concern is the divergent hunting regulations announced by the Federal Subsistence Board and the State Board of Game. Having different regulations for separate groups of hunters using the same resource makes law enforcement difficult, confuses hunters, and lessens the credibility of management agencies. In addition to creating confusion with the public, the conflicting hunting regulations may make management of the deer resource more difficult in the future. Wherever possible, the division should assist the two regulatory boards in standardizing deer hunting regulations.

LITERATURE CITED

ALASKA DEPARTMENT OF FISH AND GAME. 1995. 1994 deer hunter survey summary statistics. Alaska Department of Fish and Game. Division of Wildlife Conservation. Juneau. 81pp.

———. 1996. 1995 deer hunter survey summary statistics. Alaska Department of Fish and Game. Division of Wildlife Conservation. Juneau. 79pp.

KLEIN, D. R. AND S. T. OLSON. 1960. Natural mortality patterns of deer in Southeast Alaska. J. Wildl. Manage. 24:80-88.

- KIRCHHOFF, M. D. AND K. W. PITCHER. 1988. Deer pellet-group surveys in Southeast Alaska 1981-1987. Research Final Report. Proj. W-22-6. Job 2.9. Alaska Dep. Fish and Game. July 1988. Juneau. 113pp.
- KIRCHHOFF, M. D. 1994 Effects of forest fragmentation on deer in Southeast Alaska. Research Final Report. Grant W-23-3,4,5. and W-24-1. Study 2.10. Alaska Department of Fish and Game. December 1994. Juneau. 60pp.

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- MERRIAM, H. R. 1966. Relationships between deer and wolves on Coronation Island, Southeast Alaska. Presentation at Northwest Section of The Wildlife Society. La Grande, OR.
- OLSON, S. T. 1979. The life and times of the black-tailed deer in Southeast Alaska. Pages 160-168 in O. C. Wallmo and J. W. Schoen, eds. Sitka black-tailed deer. US For. Serv., Alaska Region. Ser. No. R10-48. Juneau.
- SMITH, C. A., E. L. YOUNG, C. R. LAND, AND K. P. BOVEE. 1986. Effects of predation on blacktailed deer population growth. Alaska Department of Fish and Game. Fed. Aid in Wildl. Rest. Prog. W-22-4. Job 14.13. Juneau.

PREPARED BY:

SUBMITTED BY:

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	Regulatory	Mean pellet	Number
Area	year	groups/plot	of plots
128 - Hawk Inlet	1985/86	1.92	286
	1986/87	2.54	278
	1988/89	1.82	334
	1989/90	2.19	250
	1991/92	1.61	319
	1995/96	1.26	325
171 - Hood Bay	1986/87	2.31	358
	1988/89	1.77	366
	1989/90	1.85	375
	1991/92	1.91	360
	1993/94	1.64	371
182 - Pybus Bay	1985/86	2.00	235
	1986/87	2.03	242
	1988/89	2.00	156
	1989/90	1.72	221
	1991/92	1.13	236
	1994/95	1.48	205
185 - Pleasant Island	1990/91	1.38	311
	1991/92	1.34	210
	1992/93	1.77	305
	1993/94	1.26	345
189 - Port Althorp	1987/88	1.80	195
	1990/91	1.92	223
	1991/92	1.36	261
	1992/93	1.39	248
	1993/94	1.31	253
	1994/95	2.12	98
190 - Idaho Inlet	1987/88	1.34	258
	1991/92	0.94	219
	1992/93	0.56	305
	1993/94	0.71	294
202 - Port Frederick	1987/88	1.87	242
	1995/96	1.02	226

Table 1 Unit 4 deer population trends as indicated by pellet group surveys

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	Regulatory	Mean pellet	Number
Area	year	groups/plot	of plots
209 - Suntaheen Creek	1987/88	1.22	272
	1991/92	1.13	271
	1992/93	0.73	265
	1993/94	1.05	272
	1995/96	0.98	276
218 - Pavlov River	1987/88	1.78	325
	1991/92	1.56	341
	1995/96	1.50	249
223 - Upper Tenakee	1987/88	1.47	253
	1991/92	0.59	265
	1992/93	0.47	249
	1993/94	0.61	319
	1995/96	0.56	263
231 - Saltery Bay	1987/88	2.02	256
	1991/92	0.97	256
	1992/93	0.76	227
	1993/94	0.97	193
	1995/96	1.90	152
235 - Kadashan	1987/88	2.67	221
	1991/92	1.63	282
	1992/93	1.12	385
	1993/94	1.39	294
	1995/96	2.36	204
236 - Corner Bay	1980/81	0.35	60
	1991/92	2.27	206
	1992/93	1.72	50
	1993/94	1.69	198
247 - Finger Mountain	1986/87	3.11	236
- · · · · · · · · · · · · · · · · · · ·	1988/89	2.99	305
	1989/90	3.36	225
	1990/91	3.93	150
	1991/92	2.85	207
	1992/93	3.03	179
	1993/94	2.29	275

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Table 1 Continued

Table 1 Continued			
	1995/96	2.62	221
254 – Soapstone	1987/88	1.92	274
	1990/91	2.05	270
	1992/93	1.88	243
	1993/94	1.34	310
	1994/95	1.48	283
300 – Nakwasina	1986/87	2.31	195
	1988/89	2.32	244
	1989/90	2.99	255
	1990/91	3.98	175
	1991/92	1.64	223
	1992/93	3.15	188
	1993/94	1.46	230
	1994/95	1.75	216
	1995/96	2.82	210
305 - Sea Lion Cove	1986/87	3.31	226
	1988/89	1.75	303
	1989/90	2.03	227
	1990/91	1.63	219
	1991/92	1.30	239
	1992/93	1.70	198
	1993/94	1.29	221
	1994/95	1.30	210
	1995/96	1.63	225
308 - South Kruzof	1992/93	1.62	345
	1993/94	1.71	370

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Regulatory year	M (%)	F (%)	Unk	Total	Illegal harvest ^b	Total ^c
1991/92	3,500 (62)	2,100 (38)	-	5,600	560	6,200
1992/93	5,200 (71)	2,100 (29)	-	7,300	730	8,000
1993/94	6,000 (70)	2,500 (30)	-	8,500	850	9,400
1994/95	7,400 (68)	3,500 (32)	-	10,900	2,000	12,,900
1995/96	5,300 (72)	2,100 (28)	-	7,400	1,200	8,600

Table 2 Unit 4 deer harvest, 1991–96

^a From mail questionnaire survey. ^b Includes crippling loss estimate. ^c Rounded to nearest 100.

		Succ	essful			Unsue	ccessful		
Regulatory	Local [*]	Nonlocal			Local [*]	Nonlocal			Total
year	Resident	resident	Nonresident	Total	resident	resident	Nonresident	Total	hunters
1991/92	831	1,253	14	2,098	462	672	9	1,144	3,242
1992/93	1,416	1,310	13	2,738	468	796	14	1,278	4,018
1993/94	1,590	1,476	17	3,083	349	564	33	946	4,029
1994/95	1,839	1,800	35	3,674	325	360	20	705	4,379
1995/96	1,361	1,249	30	2,640	471	777	6	1,254	3,894

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 Table 3 Unit 4 deer hunter residency and success, 1991–96

^a Residents of Unit 4.

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Table 4 Unit 4 deer harvest chronology by months, 1991–19

Regulatory			<u>H</u>	arvest periods			
Year	August (%)	September (%)	October (%)	November (%)	December (%)	January (%)	n
1991/92	236 (4)	299 (5)	827 (15)	2,301 (41)	1,643 (29)	332 (6)	5,635
1992/93	557 (8)	663 (9)	1,204 (17)	2,544 (35)	1,819 (25)	443 (6)	7,230
1993/94	684 (8)	672 (.8)	1,561 (18)	3,110 (36)	1,744 (20)	623 (7)	8,394
1994/95	621 (6)	565 (5)	1,266 (12)	4,969 (46)	3,238 (30)	138 (1)	10,797
1995/96	451 (6)	575 (8)	940 (13)	3,108 (42)	1,874 (25)	449 (6)	7,397

	Percent of harvest						
Regulatoy					Highway		
Year	Airplane	Foot	Boat	ORV ^a	vehicle	Unknown	n^{b}
1991/92	8	9	70	1	12	_	8266
1992/93	8	12	67	1	11	1	9781
1993/94	7	11	66	1	12	3	10,134
1994/95	8	11	68	1	11	1	9934
1995/96	7	12	70	1	12	1	9632

Table 5 Unit 4 deer hunting trips percent by transport method, 1991–1996

^a Includes all off-road vehicles (including snowmachine and 3- and 4-wheelers). ^b Includes successful and unsuccessful hunters.

LOCATION

GAME MANAGEMENT UNIT: $5 (5,800 \text{ mi}^2)$

GEOGRAPHIC DESCRIPTION: Cape Fairweather to Icy Bay, Eastern Gulf Coast

BACKGROUND

Deer were introduced to Yakutat Bay in 1934, when 7 does and 5 bucks were released (Burris and McKnight, 1973). These animals established a small herd that is found on islands and the mainland along the east side of Yakutat Bay. Habitat and predators limit deer densities, and the population has supported only small hunts. Many of the deer are taken during the course of hunts for other species. The growth potential for this deer herd is very limited.

Due to deer declines in the 1970s and a virtual cessation of harvest, the deer season within Unit 5 was closed in July 1980. By the end of the 1980s, deer had recovered to some degree, and the public requested an open season. In an effort to provide an opportunity for legal deer hunting, the Board of Game established a limited deer hunt within Unit 5A for 1991. Since the reopening of the season, estimated legal harvest has remained low. Reports of heavy predation pressure by wolves using deer-inhabited islands in Yakutat Bay have concerned local hunters. Spring pellet group counts have shown decreases in the already low deer densities in some of these areas. Another factor affecting the herd is illegal harvest, which some local residents estimate is higher than the reported harvest.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

No formal management objectives have been established for this deer population. Preliminary objectives for this deer herd are to sustain an effort level of 125 hunter days annually.

METHODS

A total of 12,556 deer harvest tickets were issued for the 1994 regulatory year in Southeast Alaska and 12,564 for 1995. We mailed 40% of the 1994 harvest ticket holders hunter surveys and 41% of those responded to the survey. In 1995, 39% of harvest ticket holders were mailed surveys and the response rate was almost 47%. We extrapolated survey results for hunter effort, success, and kill location to estimate results for all harvest ticket holders. Since 1986 the U.S. Forest Service crews have conducted pellet-group surveys on several islands and on the mainland near Yakutat to assess deer population trends. No transects were read in the spring of 1995 due to unavailability of personnel. In 1996 transects were walked on Knight Island and on the Yakutat Islands.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Deer populations remain low in the Yakutat area. Habitat condition and heavy snow accumulations on the mainland probably prevent numbers from climbing significantly, although some islands in Yakutat Bay will continue to support deer. Reports from local hunters, fishers, and recreationists indicate that wolves have had significant effects upon deer. The 1996 deer pellet transect results indicate that deer have virtually disappeared from Knight Island.

MORTALITY

Harvest

Season and Bag Limit.

Unit 5A	Nov 1–Nov 30	1 antlered deer
Unit 5B	No Open Season	

<u>Board of Game Actions and Emergency Orders</u>. The Board of Game made no changes to the state deer hunting regulations during the reporting period. The Federal Subsistence Board granted 1 potlatch harvest permit during the first year of the period and established provisions for potlatch permits to be issued to local residents beginning in 1995.

<u>Hunter Harvest</u>. Extrapolated deer harvest survey results indicate 5 hunters were successful in taking 1 deer each in 1994, with a total effort of 89 hunter-days by 24 hunters. The following year, the survey estimated that 7 of 22 hunters were successful, using 61 hunter-days. It should be noted these figures are a statistical extension of harvest reported through our survey, and in such a small hunt, significant error is possible. Additionally, illegal harvests create undocumented harvests of unknown size.

<u>Hunter Residency and Success</u>. Since this deer hunt was resumed in 1991, virtually all hunters within Subunit 5A have been local residents. The only exception was in 1994, when an estimated 4 nonlocal state residents participated, all unsuccessfully. Since the limited habitat in the Yakutat area supports low densities of deer, it is unlikely nonlocal hunters would choose to pursue deer within this subunit.

<u>Transport Methods</u>. In 1994 78% of deer hunting trips were by boat, with 16% by foot and 6% by highway vehicles. In the following year all reported deer hunting trips involved boats as the primary mode of transportation.

CONCLUSIONS AND RECOMMENDATIONS

The deer hunt within Unit 5A remains an opportunity for Yakutat residents to legally harvest small numbers of deer. Habitat conditions, predation, and snow depths will prevent the deer population from growing significantly and are apparently causing declines in some parts of this limited range. We should continue to collect deer pellet transect data to monitor deer densities. Local trapping pressure on wolves has increased and has reduced predation in some areas, although the capability of deer to recolonize areas like Knight Island is unknown. The either-sex

federal potlatch permit system may place additional pressure on this introduced deer population. Closure of the state hunt should be considered as a management option if pellet transects and harvest data continue to show declines.

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Site	Year	Mean pellet groups/plot	Number of plots	95 % CI
Knight Island (VCU 361)	1991	0.81	100	0.61–1.01
Humpback (VCU 363)	1991	0.01	118	0.00-0.03
Yakutat Islands (VCU 368)	1991	0.32	415	0.24-0.39
Ankau (VCU 369)	1991	0.03	116	0.00-0.05

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Table 1 Unit 5A deer population trends as indicated by pellet group surveys, 1986–95

Table 2 Unit 5A annual deer harvest, 1991–1995

Year	М	F	Estimated Total	
1991	2	0	2	
1992	0	0	0	
1993	3	0	3	
1994	5	0	5	
1995	7	0	7	

Data from expanded results of hunter surveys.

	Successful				Unsuccessful					
Year	Local Res	Nonlocal Res	Nonres	Total	Local Res	Nonlocal Res	Nonres.	Total		
1991	2	0	0	2	34	0	0	34		
1992	0	0	0	0	15	0	0	15		
1993	3	0	0	3	19	0	0	19		
1994	5	0	0	5	15	4	0	19		
1995	7	0	0	7	15	0	0	15		

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Table 3 Unit 5A hunter residency and success, 1991–1995

Table 4 Unit 5A average statistics for successful hunters, 1994–1995

Year	Nr deer/ hunter	Nr deer/ hunter day	Nr hunter days/deer	Nr days/ hunter
1991	1.0	0.4	4.8	4.8
1992				
1993				
1994	1.0	0.3	3.0	3.0
1995	1.0	0.4	2.3	2.3

LOCATION

GAME MANAGEMENT UNIT: $6 (10, 140 \text{ mi}^2)$

GEOGRAPHIC DESCRIPTION: Prince William Sound and North Gulf Coast

BACKGROUND

Between 1916 and 1923 the Cordova Chamber of Commerce introduced Sitka black-tailed deer to Unit 6 by releasing 24 deer on Hawkins and Hinchinbrook Islands in Prince William Sound (PWS) (Burris and McKnight 1973). This was the first big game transplant in the state and was one of the most successful. Deer quickly occupied vacant habitat on most islands in PWS and on some areas of adjacent mainland. The population reached a peak in 1945. Resulting habitat damage may have reduced carrying capacity (Robards 1952). Major winter die-offs occurred in the late 1940s, mid 1950s, late 1960s and early 1970s (Reynolds 1979). Today, deer exist in all subunits of Unit 6. The highest densities are on Hawkins, Hinchinbrook, and Montague Islands in PWS. Lower densities occur on mainland areas surrounding PWS, and densities decrease rapidly as distance from PWS increases.

Deer in Unit 6 are at the extreme northern limit of their range (Cowan 1969). The population thrives because of favorable environmental conditions on islands in PWS. Weather data from Hinchinbrook Island indicate the climate (Shishido 1986) is milder than on the surrounding mainland because of a strong maritime influence. Stands of old-growth forest provide food and shelter during winter (Shishido 1986, Reynolds 1979), and predation is minimal because there are no wolf or coyote populations. A change in these conditions could significantly influence the deer population.

The most important factors limiting the deer population are snow depth and duration (Reynolds 1979). Deer numbers increase during mild winters and decline during severe winters because some deer starve. Mild or near average winters during 1980/81–89/90 allowed the overwintering population to increase. More severe winters during 1990/91–1992/93 reduced the population. Hunting is also an important limiting factor when deep snow concentrates deer on beaches during open season. Harvest may become a more significant factor in the future if numbers of hunters increase.

Deer hunting began in 1935. It was monitored from 1960 through 1979 by harvest reports and hunter contacts. Beginning in 1980, the Alaska Department of Fish and Game (ADF&G) collected most information through questionnaires mailed to deer harvest ticket holders. Annual harvests before 1978 probably ranged between 500 and 1500 (Reynolds 1979). Harvests began to increase after 1978 and peaked at around 3000 in 1987. Harvests increased at an average annual rate of 14% between 1980 and 1984 (Griese and Miller 1986).

Clear-cut logging of old-growth forest on private land in PWS is clearly the most important deer management concern in Unit 6. Extensive logging is underway or planned on the mainland in eastern PWS and in Patton Bay on Montague Island. Research demonstrates the importance of these timber stands for overwinter survival of deer in coastal ecosystems in PWS (Shishido 1986) and in southeastern Alaska (Kirchhoff 1992, Schoen et al. 1985, Schoen 1978, Yoe and Peek

1992, Kirchhoff and Schoen 1987 and 1983). As old-growth is removed, the deer population in Unit 6 will decline.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVES

- To maintain a deer population capable of sustaining an annual harvest of 1500 deer
- To maintain a minimum harvest of 60% males
- To maintain a minimum hunter success rate of 50%

METHODS

The United States Forest Service (USFS) and ADF&G cooperated to monitor population trend in PWS. We conducted annual pellet-group surveys (Kirchhoff and Pitcher 1988) at 6 locations (Figure 1) during late May and early June. Three transects consisting of continuous 3.3- x 65.6-foot plots were run uphill from the beach fringe at each sampling location. Most transects (15 of 18) were ended when they reached alpine cover types. Those not reaching the alpine were ended after 100 plots were examined. Number of plots varied, depending upon the distance from the beach to the alpine and upon persistence of snow at the time of the survey. The minimum number of plots within a location was 200. Mean numbers of pellet groups per plot (MPGP) were calculated for each location. Within each location, means were tested for significant differences (p < 0.10) between years using the Mann-Whitney U test (Marascuilo and McSweeney 1977).

A fundamental assumption of pellet-group surveys was persistence of pellets for no more than 1 year. To test this assumption, we studied persistence of early and late winter pellets using methods similar to those employed by Harestad and Bunnell (1987). We collected early winter pellets during November 1995 on Hawkins Island and collected late winter pellets during late May–early June 1996 from Hawkins, Hinchinbrook and Montague Islands. Fifty pellets were taken from each pellet-group that was found. These fifty pellets comprised a pellet-group for our study.

Four experimental plots were established within 100 feet of sea level in Shipyard Bay on Hawkins Island. One plot was in each of 4 different forest cover types: open wet (muskeg), open dry, closed wet, and closed dry. Plots consisted of 20 pellet-groups arranged in 2 parallel lines of 10 each. Groups were spaced 32 ft apart. Two stakes were placed on each side of every pellet group. Groups were dropped in a 4 in diameter circle from 6 inches above the ground. Early winter pellet-groups were placed in plots on 26 November 1995, and late winter groups were placed on 15 June 1996.

Persistence was checked monthly whenever pellets were not covered with snow. Pellet-group visibility was checked by casual observation between marking stakes for 5 seconds. If any pellets were seen, the group was counted as visible. If no pellets were seen, the group was counted as disappeared. We then made a count of pellets remaining in each group.

Visibility was summarized as the number of pellet-groups seen in each forest cover type during each observation. Number of pellets remaining was summarized as a mean for each forest cover type during each observation.

*

I calculated an annual index to snow depth and duration (SI) at Port San Juan in southwestern PWS. First, I determined the mean number of days during 1980/81-95/96 when snow depth was within intervals of: 5–15 inches, 16–25 inches, 26–35 inches, 36–45 inches, and >45 inches. Next, I calculated deviations (+ or -) from the long-term mean for each interval for each year, multiplied the deviations by a weighting factor, and summed them. The weighting factor for each interval was 0 for 5–15 and 16–25 inches, 1.1 for 26–35 inches, 1.2 for 36–45 inches and 1.3 for >45 inches. Finally, I assigned the total of deviations for each year to a numeric value of 0–10. Zero represented deviations of <90 days and was the mildest snow condition. Values 1–9 each represented an interval of 20 days deviation from the long-term mean. Five was the midpoint (deviations of >90 days and was the most severe snow condition. Depths were measured in openings at recording stations within 50 feet of sea level (NOAA, Climatological Data, Annual Summary, Alaska).

Mean SI was calculated for time periods 1980/81-83/84, 1984/85-89/90, 1990/91-92/93 and 1993/94-95/96 when the index remained relatively constant at different levels. Means were tested for significant differences (p < 0.05) between periods using a one-way ANOVA followed by a Duncan's multiple range test (Steele and Torie 1960).

We estimated deer harvest from responses to questionnaires mailed to deer hunters issued harvest tickets in southcentral Alaska. Each year, staff mailed 3000 questionnaires (30% of harvest ticket holders) and received a questionnaire response rate of 66%. I summarized total harvest, hunter residency and success, harvest chronology, and transportation methods for Unit 6. I grouped total harvest data into geographic areas that included Hinchinbrook Island, Montague Island, western PWS, and northern and eastern PWS (Figure 1).

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

Deer density was low or moderate based upon standards set by Kirchhoff and Pitcher (1988). They suggested that MPGPs of 0.50-0.99 and 1.00-1.99 were low and moderate densities, respectively. Three of my MPGPs during this reporting period were in the low-density range and 9 were in the moderate range (Table 1). Among geographic harvest areas, the highest MPGPs were on Hinchinbrook Island (1.21-1.94), followed by Montague Island (0.98-1.23), and Hawkins Island (0.76-1.80).

Population Trend

Deer numbers during this reporting period were increasing (Table 1). Twelve comparisons (p < 0.10) of MPGPs between this reporting period and 1992–93 or 1993–94 revealed 8 increases, 4

unchanged, and 0 decreases. No comparisons were made with MPGPs from prior to 1992–93 because changes in survey design made those comparisons invalid.

Our understanding of long-term trends in the population is limited. Pellet-group data and incidental observations indicated the population declined after the severe winter of 1990–91 and changed very little over the next 2 years when the winters were more severe than average. Recovery probably began with the mild winter of 1993–94 and has continued because of relatively average winters during this reporting period.

MORTALITY

Harvest

<u>Season and Bag Limit</u>. The open season for resident and nonresident hunters was 1 August to 31 December. The bag limit was 4 deer; however, antlerless deer could be taken only from 1 November to 31 December.

Board of Game Actions and Emergency Orders. The Board of Game took no actions, and no emergency orders were issued during this reporting period.

<u>Hunter Harvest</u>. Total estimated deer harvest in Unit 6 during 1994–95 and 1995–96 was 2837 and 1859, respectively (Table 2). The 1994–95 take was the highest in 5 years. The high harvest was due to abnormally deep snow during late November and December that concentrated deer near beaches where deer were especially vulnerable to hunter kill. The number of hunters was normal, but their success rate (68%) was the highest in 5 years. As during past years, most harvest came from Montague and Hinchinbrook Islands. Northern and eastern PWS had the lowest harvests, and other areas were intermediate. The legal harvest consisted of 64% males during 1994–95 and 71% males during 1995–96. These proportions were similar to past years.

<u>Hunter Residency and Success</u>. Approximately 1385 and 1234 individuals hunted deer in Unit 6 during 1994–95 and 1995–96, respectively (Table 3). Their success during each year was 68% and 56%. Total numbers of hunters were similar to previous years. Success rate during 1994–95 was the highest in 5 years because of the vulnerability of deer concentrated near beaches by deep snow.

Most successful hunters during this reporting period were local residents of Unit 6 (52% in 1994–95 and 40% in 1995–96) or nonlocal residents (47% in 1994–95 and 58% in 1995–96). These proportions were similar to previous years.

<u>Harvest Chronology</u>. Hunters took the most deer during November in 1994–95 (49%) and in 1995–96 (56%) (Table 4). Deer were easiest to hunt during November because the bag limit was any deer and the rut was in progress. This was the same pattern of chronology as in previous years.

<u>Transport Methods</u>. Boats were the most important transportation method used (68% in 1994–95 and 72% in 1995–96) (Table 5). Airplanes were second; 3- and 4-wheelers, highway vehicles, and walking were of minor importance as in previous years.

HABITAT

Pellet-group Persistence

Results of the pellet-group persistence study are preliminary because of the short monitoring time covered by this report period. Most (16–20) of the 20 pellet-groups placed in each cover type during November 1995 were still visible in mid June 1996 (Table 6). Mean number of pellets remaining from the 50 deposited within each group varied from 15 in the closed wet type to 30 in the open wet type.

Snow Depth and Duration

Snow Index (SI) showed slightly above average snow depth and duration for 1994–95 (SI = 6) and slightly below average for 1995–96 (SI = 4) (Figure 2). Deer mortality was probably average for this reporting period, which allowed the population to continue to increase. This population increase began in the very mild winter of 1993–94 (SI = 2).

Historical data suggested SI was an indicator of winter mortality and population status. In the 1980s, mean SI showed very mild (SI = 2) or near average (SI = 6) snows (Figure 2). Incidental observations and hunter reports indicated mortality was low and the population was increasing. During 1990/91–92/93, the mean showed significantly (p < 0.05) more severe snows (SI = 8). Observations, reports, and pellet-group surveys mostly indicated higher mortality and declining deer numbers. Most of the mortality probably occurred during the very severe winter of 1990–91 (SI = 10) and continued at a lower level during the following 2 winters. During 1993/94–95/96, mean SI showed significantly milder snows (SI = 4). Reports and surveys indicated lower mortality and increasing numbers.

When I calculated the SI, I weighted deviations from mean number of days for snow depth intervals greater than 25 inches because those intervals were biologically significant to deer. When depth in the open exceeded 25 inches, accumulation in old-growth forest wintering areas probably exceeded 9 inches (35% of depth in open areas). This depth limited food availability and increased the energetic cost of movement. The relationship between depth in open areas and in old-growth was modified from results of snow interception studies in Southeast Alaska that showed depth in high volume stands averaged 29% of that in adjacent openings (Kirchhoff and Schoen 1987). The percentage was increased for PWS to 35% because stand volume and potential for snow interception was lower than in Southeast Alaska. Parker et al. (1984) found that snow depth >10 inches caused a significant increase in the energetic cost of travel for mule deer.

Logging

Logging by private landowners began in Patton Bay on Montague Island during 1993. Clearcutting was completed on approximately 2700 acres. A haul road was constructed around the south end of the island to move logs from Patton Bay to a log transfer site in MacLeod Harbor. Habitat alteration resulting from these activities will negatively affect deer. Logging is removing high volume, old-growth stands that provide critical winter forage and snow shelter on one of the highest density wintering areas in PWS. The haul road was constructed almost entirely along the beach fringe where deer concentrate during deep snow years. However, the road was constructed under a U.S. Forest Service permit that contains provisions for restricting hauling under deep snow conditions. Those provisions could mitigate some adverse effects of winter operations.

CONCLUSIONS AND RECOMMENDATIONS

We achieved our objective to maintain a deer population capable of sustaining an annual harvest of 1500 deer, with a minimum harvest of 60% males and a minimum hunter success rate of 50%. The management strategy applied during this reporting period was successful.

The deer population increased as a result of 1 very mild and 2 near average winters over the past 3 years. The Unit 6 deer population could sustain additional harvest. I recommend opening the antlerless season on 1 October to extend it by 1 month. Hunters support this change, and it would align the state season with the current federal subsistence season.

We should continue pellet-group surveys and refine the SI. MPGP is probably a good index to population trend. However, our assumption that pellets do not persist for more than 1 year should be tested by completing the pellet persistence study. The SI may be a good indicator of winter mortality and population status. Attempts to improve it and verify relationships with other data should continue.

LITERATURE CITED

- BURRIS, O.E. AND D.E. MCKNIGHT. 1973. Game transplants in Alaska. Alaska Dep. Fish and Game. Game Tech. Bull. No. 4. Fed. Aid in Wildl. Rest. Proj. W-17-R. Juneau. 57pp.
- COWAN, M.I. 1969. What and where are the mule and black-tailed deer? Pages 335–360 in The deer of North America. W.P. Taylor, ed. Stackpole Co., Harrisburg Penn. 668pp.
- GRIESE, H.J. AND S. MILLER. 1986. Summary of Alaska Game Management Unit 6 deer hunter surveys, 1980, 1983 and 1984. Appendix to H.J. Griese. 1986. Unit 6 deer surveyinventory progress report. Pages 17–26 in B. Townsend, ed. Annual report of surveyinventory activities. Part VI. Deer. Vol. XVII. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-22-5. Job 2.0. Juneau. 30pp.
- HARESTAD, A. AND F. BUNNELL. 1987. Persistence of black-tailed deer pellets in coastal habitats. J. Wildl. Manage. 51(1): 33-37.
- KIRCHHOFF, M.D. 1992. Effects of forest fragmentation on deer in southeast Alaska. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Res. Prog. Rep.W-23-4, Study 2.10. Juneau. 40pp.
- AND K.W. PITCHER. 1988. Deer pellet-group surveys in Southeast Alaska, 1981–1987. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Res. Final Rep. Proj. W-22-6. Job 2.9. Juneau. 113pp.

AND J.W. SCHOEN. 1987. Forest cover and snow:implications for deer habitat in Southeast Alaska. J. Wildl. Manage. 51(1):28–33.

- . 1983. Black-tailed deer use in relation to forest clear-cut edges in southeastern Alaska.
 J. Wildl. Manage. 47(2):497–500.
- MARASCUILO, L.A., AND M. MCSWEENEY. 1977. Nonparametric and Distribution-Free Methods for the Social Sciences. Brook/Cole, Monterey, CA. 556pp.
- PARKER, K.L., C.T. ROBBINS, AND T.A. HANLEY. 1984. Energy expenditures for locomotion by mule deer and elk. J. Wildl. Manage. 48(2):474–488.
- REYNOLDS, J.R. 1979. History and current status of Sitka black-tailed deer in Prince William Sound. Pages 177–183 in O.C. Wallmo and J.W. Schoen, eds. Sitka black-tailed deer: Proc. of a Conf. in Juneau, Ak. U.S. Dep. Agric. For. Serv, Ak. Reg., Juneau. Series No. R10-48. 231pp.
- ROBARDS, F.C. 1952. Annual report game, fur and game fish. U.S. Fish and Wildl. Serv. Cordova. Memorandum.
- SCHOEN, J.W. 1978. Evaluation of deer range and habitat utilization in various successional stages. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Res. Final Rep. Proj. W-17-10. Job 2.5R. Juneau. 28pp.
- ———, M.D. KIRCHHOFF, AND M.H. THOMAS. 1985. Seasonal habitat use by Sitka black-tailed deer in southeastern Alaska. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Res. Final Rep. Proj. W-17-11, W-21-1 thru W-22-4. Job 2.6R. Juneau. 44pp.
- SHISHIDO, N. 1986. Seasonal distribution and winter habitat use by Sitka black-tailed deer in the Prince William Sound region, Alaska. M.S. Thesis. Univ. of Alaska, Fairbanks. 105pp.
- STEEL, G.D. AND J.H. TORRIE. 1960. Principle and Procedures of Statistics. McGraw-Hill. New York. 481pp.
- YEO, J.J., AND J.M. PEEK. 1992. Habitat selection by female Sitka black-tailed deer in logged forests of southeastern Alaska. J. Wildl. Manage. 56(2):253-261.

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Figure 1. Unit 6 deer pellet-group transect locations and harvest area boundaries.



Figure 2. Port San Juan snow depth and duration index, 1980–95. ^{a-c} Means with different letters are significantly different (P < 0.05, F = 9.15).

				Number
		Regulatory	Mean pellet	of
Island	Specific location	year	groups/plot	plots
Hawkins Island	N.E. Hawkins	1993/94	1.16 ^{a,b}	225
		1994/95	1.07 ^b	237
		1995/96	1.80 ^c	242
	S.W. Hawkins	1994/95	0.76 ^a	200
		1995/96	0.98 ^a	222
		1000/00	6.009	
Hinchinbrook Island	Hook Point	1992/93	1.30°	237
		1994/95	1.21 ^{a,0}	244
		1995/96	1.37°	234
	Port Etches	1993/94	1.26 ^a	225
		1994/95	1.55 ^b	228
		1995/96	1.94 ^c	235
N		1002/04	0.078	104
Montague Island	коску Вау	1993/94	0.97	194
		1994/95	0.98	240
		1995/96	1.16	233
	San Juan Bay	1992/93	0.77 ^a	228
		1994/95	1.06 ^{b,c}	232
		1995/96	1.23°	237

 Table 1
 Unit 6 deer population trends as indicated by pellet-group surveys, 1992–1995

^{a-c} Means with different letters within specific locations are significantly different (p<0.1).

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							Estimated	
	Regulatory	Estimated legal harvest			illegal			
Area	Year	<u> </u>	(%)	F	(%)	Total	harvest	Total
Hawkins Island	1991/92	281	(83)	58	(17)	339	40	379
	1992/93	178	(62)	111	(38)	289	30	319
	1993/94	185	(61)	120	(39)	305	20	325
	1994/95	317	(62)	194	(38)	511	40	551
	1995/96	208	(71)	84	(29)	292	20	312
Hinchinbrook Island	1991/92	155	(64)	88	(36)	243	30	273
	1992/93	322	(65)	174	(35)	496	30	526
	1993/94	242	(65)	129	(35)	371	20	391
	1994/95	423	(57)	321	(43)	744	30	774
	1995/96	236	(66)	124	(34)	360	30	390
Montague Island	1991/92	460	(69)	210	(31)	670	60	730
	1992/93	421	(60)	284	(40)	705	40	745
	1993/94	236	(65)	125	(35)	361	30	391
	1994/95	545	(66)	279	(34)	824	30	854
	1995/96	538	(71)	220	(29)	758	60	818
Western PWS	1991/92	277	(78)	78	(22)	355	30	385
	1992/93	333	(72)	132	(28)	465	30	495
	1993/94	149	(81)	36	(19)	185	20	205
	1994/95	305	(70)	130	(30)	435	30	465
	1995/96	216	(81)	52	(19)	268	20	288

Table 2Unit 6 deer harvest, 1991–1995

							Estimated	
	Regulatory		Estimated legal harvest				illegal	
Area	year	M	(%)	F	(%)	Total	harvest	Total
Northern and	1991/92	40	(75)	13	(25)	53	30	83
Eastern PWS	1992/93	51	(48)	56	(52)	107	20	127
	1993/94	26	(63)	15	(37)	41	20	61
	1994/95	89	(65)	47	(35)	136	20	156
	1995/96	32	(80)	8	(20)	40	3	43
Unit 6 - Unknown	1991/92	37	(77)	11	(23)	48	0	48
	1992/93	81	(79)	21	(21)	102	0	102
	1993/94	5	(100)	0	(0)	5	0	5
	1994/95	32	(86)	5	(14)	37	0	37
	1995/96	4	(50)	4	(50)	8	0	8
Unit 6 - Total	1991/92	1250	(73)	458	(27)	1708	190	1898
	1992/93	1386	(64)	778	(36)	2164	150	2314
	1993/9	843	(66)	425	(34)	1268	110	1378
	1994/95	1711	(64)	976	(36)	2687	150	2837
	1995/96	1234	(71)	<u>49</u> 2	(29)	1726	133	1859

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Table 2 Continued

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********			Unsuccessful								
Regulatory year	Local resident ^a	Nonlocal resident	Non- resident	Total	(%)	Local resident	Nonlocal resident	Non- resident	Total	(%)	Hunters
1991/92	387	377	8	772	(46)	220	682	17	919	(54)	1691
1992/93	418	451	9	878	(61)	141	392	24	557	(39)	1435
1993/94	233	325	4	572	(57)	177	256	0	433	(43)	1005
1994/95	483	441	12	936	(68)	170	250	29	449	(32)	1385
1995/96	280	404	10	694	(56)	240	300	0	540	(44)	1234

 Table 3 Unit 6 deer hunter residency and success, 1991-1995

^a Resident of Unit 6

Table 4 Unit 6 deer harvest chronology percent by month, 1991–1995

Regulatory						
year	August	September October		November	December	n
1991/92	11	6	5	43	25	375
1992/93	5	4	8	39	44	510
1993/94	6	5	15	50	23	363
1994/95	6	4	16	49	26	563
1995/96	8	6	8	56	20	431

			Percent of h	narvest							
Regulatory	Highway										
Year	Airplane	Boat	3- and 4-Wheeler	vehicle	Foot	Unknown	n				
1991/92	33	62	0	3	0	2	370				
1992/93	29	64	0	3	3	0	348				
1993/94	26	69	1	2	3	0	314				
1994/95	25	68	1	1	4	0	304				
1995/96	26	72	0	1	4	0	305				

 Table 5 Unit 6 deer harvest percent by transport method, 1991–1995

Table 6 Unit 6 early winter deer pellet group persistence by cover type, 1995–1996

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		Pellet-g	roups visible		Mean number of pellets visible					
Date	Open wet	Open dry	Closed wet	Closed dry	Open wet	Open dry	Closed wet	Closed dry		
11/26/95	20	20	20	20	47	43	42	39		
12/29/95	20	20	19	19	43	36	31	29		
04/29/96	20	19	19	19	38	25	31	25		
06/02/96	20	18	18	19	32	20	21	20		
06/15/96	20	18	16	16	30	17	15	16		

LOCATION

GAME MANAGEMENT UNIT: 8 (5,097 mi²)

GEOGRAPHIC DESCRIPTION: Kodiak and adjacent islands

BACKGROUND

The Sitka black-tailed deer population originated from 4 transplants, totaling 30 deer, made to Long Island and Kodiak Island between 1924 and 1934 (Burris and McKnight 1973). By the early 1940s deer occupied northeastern Kodiak Island, and the first hunt was in 1953. The deer population continued to expand into unoccupied habitat, and by the late 1960s deer were distributed throughout Kodiak, Afognak and adjacent islands (Smith 1979). The population suffered high mortality during the 1968–69 and 1970–71 winters, causing declines in harvests and hunter success (Alexander 1970, 1973). An increase in the population occurred from 1972 to the mid 1980s, when the population reached peak numbers, exceeding 100,000 animals (Smith 1989). Winter severity increased beginning in the 1987/88 winter causing a declining population trend through 1992. An increasing trend in the population since 1993 correlated with less severe winters.

Annual hunter harvest surveys have been used to assess trends in the deer population since 1989. We assessed winter mortality by searching for and examining deer carcasses in selected coastal wintering areas. Aerial surveys were done to assess winter conditions and physical appearance of deer. In 1990, the U.S. Fish and Wildlife Service (USFWS) began using various aerial and ground surveys to monitor deer population trends on the Kodiak National Wildlife Refuge.

There were liberal seasons and bag limits during the past 2 decades. Seasons ranged from 153 to 184 days, and bag limits ranged from 4 to 7 deer of either sex. The bag limit was increased from 3 to 4 deer in 1970–71, with a 1 August–31 December season. The season was extended to 15 January in 1978–79, followed by an extension to 31 January in 1981/82. Bag limits of 5 and 7 deer were in effect in 1982–83. For the 1983–84 season the bag limit was reduced from 7 to 5 deer , and the season length was reduced from 184 to 160 days. That regulation was in effect through the 1990/91 regulatory year. The bag limit was reduced to 4 deer and a limit of 1 antlerless deer was imposed from October 1–November 30 in part of northeastern Kodiak Island and the Afognak Island group for the 1991–92 season. The bag limit remained at 5 deer for Unit 8 residents hunting the Kodiak National Wildlife Refuge under federal subsistence regulations.

MANAGEMENT DIRECTION

MANAGEMENT OBJECTIVE

To maintain a deer population that will sustain an annual harvest of 8,000 deer.

METHODS

Questionnaires were mailed to hunters annually beginning with the 1989–90 season to assess trends in hunting effort and harvest. The questionnaires were sent to a random sample of deer

harvest ticket holders, and harvest estimates were derived from questionnaires returned. In 1994, 2861 questionnaires were sent, and 1838 were returned (64%). In 1995–96, 2831 questionnaires were sent, and 1873 were returned (66%). Field interviews and posthunt interviews provided preliminary harvest data. The US Fish and Wildlife Service (FWS) interviewed hunters annually in the Kodiak National Wildlife Refuge during October through December enforcement boat patrols. a few outfitters and transporters submitted voluntary summaries of hunting activities.

We assessed natural mortality by searching for deer carcasses in selected coastal winter ranges each year. We made occasional flights to observe snow conditions and condition of deer during winter months. Reports from the public also provided information on winter conditions and deer mortality.

The FWS conducted winter aerial surveys in several locations on the Kodiak National Wildlife Refuge to assess techniques for monitoring population trends.

RESULTS AND DISCUSSION

POPULATION STATUS AND TREND

Population Size

The deer population has been increasing since 1993, arresting a decline that began with the 1987–88 winter. Survival was much improved during the 1992–93 and 1993–94 winters (Smith 1995), and that trend continued through the winters of 1994–95 and 1995–96. Smith (1993) estimated that by 1992 the population in the northern part of Kodiak Island had declined to about 50% of the abundance compared to the mid-1980s. Anecdotal reports from hunters indicate the population recovery was most pronounced in southern Kodiak Island, which typically has less persistent snow cover. Deer numbers in the inner Ugak Bay area of eastern Kodiak Island remained low, and some local residents petitioned to reduce the bag limit after the 1994–95 winter. The deer population was estimated at 100,000 in the mid-1980s, but no methodology for objectively estimating deer numbers in Unit 8 had been developed.

Population Composition

An increase in the percentage of males in the harvest since the 1993–94 season (Table 1) indicates that survival of males has improved. Anecdotal reports from hunters in 1994–95 and 1995–96 supported the conclusion that more mature bucks were available to harvest. Hunters had reported that larger bucks were scarce in 1992–93 and 1993–94 (Smith 1995).

Distribution and Movements

Deer are throughout Unit 8 except in the more remote Semedi, Barren, and Chirikof island groups. Sitkinak Island, a 90 mi.² island 12 miles south of Kodiak Island, was colonized by deer most recently, within the past 10 to 15 years. Hunters first reported killing deer there in the 1991–92 season.

Selinger (1995) documented movements between summer and winter ranges for 21 radiocollared deer monitored in 1990 and 1991 near Spiridon Bay on western Kodiak Island. Distances

between summer and winter range did not exceed 3 miles for 14 deer, but 7 deer moved as far as 20 miles. The mean date of movement between winter and summer ranges was May 29, and 30 October was the mean date for movement between summer and winter ranges. Summer home ranges were larger than winter home ranges, averaging 252 ha and 73 ha, respectively.

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MORTALITY

Harvest

<u>Season and Bag Limits</u>. The open season for subsistence, resident, and nonresident hunters was 1 August to 31 October in that portion of Kodiak Island north of a line from the head of Settlers Cove to Crescent Lake (57° 52'N, 152° 8'W) and east of a line from the outlet of Crescent Lake to Mount Ellison Peak and from Mount Ellison Peak to Pokati Point at Whale Passage, and that portion of Kodiak Island east of a line from the mouth of Saltery Creek to the mouth of Elbow Creek, and adjacent small islands in Chiniak Bay. The bag limit was 1 deer; however, antlerless deer could be taken only from 25–31 October.

The open season for subsistence, resident, and nonresident hunters was 1 August to 31 December in that portion of Kodiak Island and adjacent islands south and west of a line from the head of Terror Bay to the head of the most southwestern arm of Ugak Bay. The bag limit was 4 deer; however, antlerless deer could be taken only from 1 October to 31 December. The open season for the remainder of Unit 8 was 1 August to 31 December. The bag limit was 4 deer; however, antlerless deer could be taken only from 1 October to 31 December, and no more than 1 antlerless deer could be taken from 1 October to 30 November.

Federal subsistence hunting regulations conformed to state regulations, except that residents of Unit 8 had a bag limit of 5 deer when hunting on the Kodiak National Wildlife Refuge.

Board of Game Actions and Emergency Orders. Current regulations have been in effect since the 1991–92 season. No changes were made during this reporting period.

The Federal Subsistence Board (FSB) implemented 2 changes in subsistence hunting regulations for federal lands in the Kodiak National Wildlife Refuge and the Alaska Maritime Wildlife Refuge. In 1995 the FSB implemented a regulation that allowed qualified subsistence hunters (residents of Unit 8) to harvest deer for others under terms of a "Designated Hunter Permit." A qualified hunter could hunt for an unlimited number of other people during the season but was limited to 2 bag limits in possession. Responding to a "Request for Special Action," the FSB granted a request by a member of the Kodiak–Aleutians Federal Subsistence Regional Advisory Council to open a winter hunt for 24 February–24 March on Federal lands in the Kodiak National Wildlife Refuge and Alaska Maritime National Wildlife Refuge. The justification for the hunt was that poor weather in 1995 had prevented subsistence hunters from obtaining adequate supplies of deer meat for food. The State objected to the timing of the hunt in late winter when deer were most stressed. Hunting was by special permit, and the bag limit was 2 deer of either sex. The Designated Hunter Permits were valid for the winter hunt. The FSB closed the winter hunt on March 11.

<u>Hunter Harvest</u>. The estimated annual harvest increased to 10,041 deer in 1994–95 but declined to 7193 deer in 1995–96 (Table 1). The 1994–95 harvest was the highest since the 1989–90 season. The estimated number of hunters afield exhibited a similar pattern, with an increase to 4708 hunters in 1994–95, declining to 3984 hunters in 1995–96 (Table 2).

Harvest was more evenly distributed in 1994–95 and 1995–96 than was found in the previous 2 seasons. Smith (1995) noted that harvest in southern Kodiak Island (hunt areas 18–26) increased from 24% in 1989–90 to 40% and 42% for 1992–93 and 1993–94, respectively. In 1994–95 and 1995–96, 33% and 38% of the harvest, respectively, was from the southern Kodiak area. The population decline was more precipitous in the northern part of Unit 8, prompting hunters to concentrate more effort in the southern Kodiak Island area. With several charter boats operations, the Olga Bay and Alitak Bay areas became especially popular destinations. Harvest from the northern islands, Shuyak, Afognak, and Raspberry islands was 21% and 23% of the total in 1994–95 and 1995–96, respectively.

Males composed 80% (1994–95) and 82% (1995–96) of the harvests. In 1994–95 the mean number of deer/hunter afield was 2.2 deer, declining slightly to 1.8 deer in 1995–96 (Table 3).

A regulatory change that imposed a bag limit of 1 antlerless deer in part of northern Kodiak, Afognak, Raspberry, and Shuyak Islands (hunt areas 10–14, 30, 35) beginning in 1991–92 correlated with a decline in the harvest frequency of females. For the 5 seasons the 1 antlerless bag limit was in effect, female harvest averaged 22% for Afognak and adjacent islands (hunt areas 10–13) compared to 32% for the 2 preceding seasons, 1989–90 and 1990–91. For northern Kodiak (hunt areas 4, 30, 35), the average percent females declined from 44% to 30%. Factors reducing the female harvest were the antlerless deer bag limit and an increasing trend in the population with increased availability of bucks.

<u>Hunter Residency and Success</u>. The number of hunters afield in 1994–95 and 1995–96 increased from the low of just under 3000 recorded in 1993–94 to over 4700 (Table 2). Unit 8 residents composed 44% and 41% of the hunters in 1994–95 and 1995–96. Nonlocal residents composed 47% of the hunters both years. Nonresidents composed 9% and 12% of the hunters.

Hunter success was 83% in 1994–95, the highest in several years (Table 2). Hunter success declined to 73% in 1995–96. Hunters reported that deer remained at higher elevations later in 1995 when fall weather conditions with negligible snow persisted through January.

In 1994–95, 28% of hunters took the full 4-deer bag limit on nonfederal lands and 25% did so in 1995–96 (Table 4). Only 3% and 6% of the hunters harvested the 5-deer bag limit for federal lands.

In the 1996 federal special subsistence hunt, 92 people obtained permits, 58 returned permit reports, 25 reported hunting, and hunters reported 38 deer were killed. In 1995 58 Designated Hunter Permits were issued, 27 permit reports were returned, and 52 deer were harvested for other Unit 8 residents.

<u>Harvest Chronology</u>. November was the peak month of harvest in 1994–95 and 1995–96 (Table 5).

<u>Transport Methods</u>. Hunters slightly favored boats over aircraft as a transport method in 1994–95 and 1995–96 (Table 6). A shift toward aircraft use since the late 1980s corresponded with recent increases in harvest in more remote southern Kodiak Island.

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<u>Other Mortality</u>. Winter kill has been light since 1991–92, based on mortality surveys in coastal winter range (Table 7). More deer carcasses were found in spring 1995 than in the 2 previous springs, but winter losses were well below those recorded in 1989 and 1990. Only a single adult was found among 37 carcasses found in 15 miles of coastline in spring 1996. Snowfall usually begins to accumulate at sea level by late November, but did not occur until February 1996.

Illegal deer harvest by hunters outside the hunting season occurs commonly. The illegal harvest is estimated at 10–15% of the legal take. Predation by free-roaming dogs occurs commonly near communities and isolated residences. An estimated 20–25 deer are killed annually in motor vehicle collisions. Brown bear predation occurs, predominantly in late winter, but is not a serious limiting factor.

HABITAT

Assessment

High deer densities in the late 1970s through the mid 1980s resulted in heavily browsed winter range. The recent decline in the population reduced pressure on winter range, but we have not assessed browse conditions.

Much of the Sitka spruce forest of central and eastern Afognak Island has been clear-cut since 1975. Mature spruce has been converted to seral shrub-grass communities. Logging began in 1993 on private land in the Chiniak Peninsula of northeastern Kodiak Island. Studies in southeastern Alaska indicated that old-growth forest was critical in maintaining deer populations (Wallmo and Schoen 1980). Logging of deer winter range on Afognak Island initially reduces carrying capacity; subsequent increased production of herbaceous and shrubby vegetation may benefit deer, depending on snow conditions (Smith 1993). Selinger (1995) noted that deer on Kodiak Island occupying nonconiferous brush and deciduous forest habitat have much larger summer ranges than deer in heavily forested Southeast Alaska. He hypothesized that Kodiak deer may have adopted a strategy that allows them to accumulate greater fat reserves in summer, which enhances their survival in areas without coniferous forest.

NONREGULATORY MANAGEMENT PROBLEMS/NEEDS

Methodology for the deer hunter questionnaire survey should be reevaluated in the context of increasingly specific demands for harvest and hunting effort data related to federal regulatory authority for subsistence hunting. Conflicting results from harvest surveys used by the Division of Wildlife Conservation and Division of Subsistence cloud the validity of current methodology (Smith 1995). Subsistence harvest on federal lands under the Federal Designated Hunter

provision may not be measured accurately with the hunter questionnaire, and harvest under the state's proxy system could introduce additional error.

Improving precision in assessing deer population trends is desirable, but it is difficult and expensive. Hunter questionnaire surveys are the most economical, although indirect method of monitoring deer population trends in Unit 8. The US Fish and Wildlife Service initiated aerial and ground deer counts in wintering areas in the Kodiak National Wildlife Refuge in 1992, concluding that aerial surveys required intensive effort to develop corrections for variations in sightability (Zwiefelhofer and Stovall 1992). Pellet group counts are used in forested habitat of southeastern Alaska to monitor deer population trends (Kirchoff and Pitcher 1988). The US Fish and Wildlife Service established some pellet group transects in the Olga Bay area in 1994, but results were inconclusive and the surveys were dropped in 1996.

CONCLUSIONS AND RECOMMENDATIONS

An increasing trend in the population continued and hunting effort was stable. The harvest of 10,401 deer in 1994–95 was the highest take since 1987–88, the season before a major decline in the deer population began. An increase in male deer harvested since 1992 reflects higher survival rates correlated with lighter snow accumulations. The deer population on Afognak, Raspberry, and Shuyak Islands has recovered enough to remove the antlerless deer bag limit in effect since 1991. The antlerless deer bag limit should be retained in northern Kodiak where hunting pressure is more intense and the population recovery slower.

Conflicts between state and federal regulation of deer hunting on the Kodiak National Wildlife Refuge are increasing. The Designated Hunter regulation potentially could greatly increase harvest from Refuge lands closest to the city of Kodiak. By harvesting 5 deer for themselves and 5 deer for each of the 2 designated hunters allowed, hunters could take 15 deer per trip. Hunters are mobile, land ownership is mixed, and it is increasingly difficult to enforce state regulations. A serious clash between state and federal regulatory methods appears inevitable when a severe winter causes the deer population to decline.

LITERATURE CITED

- Alexander, J. E. 1970. Unit 8 deer survey-inventory progress report. Pages 77-78 in D. E. McKnight, ed. Annual report of survey-inventory activities. Part I. Moose, deer, and elk. Vol. I. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-17-2. Jobs No. 1, 2, and 13. Juneau. 82 pp.
- J. E. 1973. Unit 8 deer survey-inventory progress report. Pages 170–171 in D. E. McKnight, ed. Annual report of survey-inventory activities. Part I. Moose, deer, and elk. Vol III. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-17-4. Jobs No. 1, 2 and 13. Juneau. 179 pp.
- Burris, O. E. and D. E. McKnight. 1973. Game transplants in Alaska. Tech. Bull. No. 4. Alaska Dep. Fish and Game. Juneau. 57 pp.

Kirchhoff, M. D. and K. E. Pitcher. 1988. Evaluation of methods for assessing deer population trends in southeast Alaska. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Job 2.9. Proj. W-22-6. 32 pp.

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- Selinger, J. S. 1995. Seasonal habitat relationships of adult female deer on Kodiak Island, Alaska. M. Sc. Thesis, Univ. Alaska, Fairbanks. 49 pp.
- Smith, R. B. 1979. History and current status of Sitka black-tailed deer in the Kodiak Archipelago. Pages 184–195. in O. C. Wallmo and J. W. Schoen, eds. Sitka black-tailed deer: Proceedings of a conference in Juneau, Alaska. U.S. Dep. Agric. For. Serv., Alaska Reg., Juneau. Series No. R10-48.
- ———, R. B. 1989. Unit 8 deer survey-inventory progress report. Pages 78–112 in S. O. Morgan, ed. Annual report of survey-inventory activities. Part VI. Deer, Vol. XIX. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Proj. W-23-1. Study 2.0. Juneau. 112 pp.
- ———, R. B. 1994. Unit 8 deer survey-inventory management report. Pages 78–89 in S. M. Abbott, ed. Deer survey-inventory report. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Proj. W-23-4 and W-23-5. Study 2.0. Juneau. 89 pp.
- ———, R. B. 1995. Unit 8 deer survey-inventory management report. Pages 75–85 in M. V. Hicks, ed. Deer survey-inventory report. Alaska Dep. Fish and Game. Fed. Aid in Wildl Rest. Grants W-24-1 and W-24-2. Study 2.0. Juneau. 85 pp.
- Wallmo, O. C. and J. W. Schoen. 1980. Response of deer to secondary forest succession in southeast Alaska. For. Sci. 26:448-462.
- Zwiefelhofer, D. and R. Stovall. 1992. Summary of the 1992 black-tailed deer winter population index surveys on the Kodiak National Wildlife Refuge. U.S. Fish and Wildlife Service. Unpubl. rep. 29 pp.

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Regulatory	Est	imated legal ha	rvest ^a		
year	M (%)	F (%)	Unk.	Total	Total
1987/88 1988/89b	10,844 (80)	2,702 (20)	245	13,791	3,791
1989/90	6,923 (73)	2,625 (27)	490	10,038	10,038
1990/91	5,367 (67)	2,739 (33)		8,106	8,106
1991/92	6,569 (73)	2,379 (27)		8,948	8,948
1992/93	5,144 (73)	1,899 (27)		7,043	7,043
1993/94	5,124 (82)	1,130 (18)		6,254	6,254
1994/95	8,270 (80)	2,130 (20)		10,401	10,401
1995/96	5,806 (81)	1,387 (19)		7,193	7,193

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Table 1 Unit 8 deer harvest, 1987–95

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^aFrom mail questionnaire survey.

b_{No survey.}

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		S	uccessful				Unsuccessful		
Regulatory year	Local ^a resident	Nonlocal resident	Nonresident	Total (%)	Local ^a resident	Nonlocal resident	Nonresident	Total (%)	Total hunters
1987/88 1988/89b	1,851	2,410	290	4,551 (76)	645	665	161	1,471 (24)	6,022
1989/90	1,341	1,851	368	3,560 (74)	487	585	183	1,255 (26)	4,815
1990/91	1,260	1,627	185	3,071 (74)	550	448	107	1,105 (26)	4,176
1991/92	1,414	1,702	262	3,378 (76)	479	479	85	1,043 (24)	4,421
1992/93	1,221	1,345	207	2,774 (67)	541	645	160	1,345 (33)	4,119
1993/94	935	1,247	159	2,341 (80)	256	286	63	605 (20)	2,946
1994/95	1,690	1,917	287	3,893 (83)	372	314	129	815 (17)	4,708
1995/96	1,164	1,440	300	2,904 (73)	480	440	160	1,080 (27)	3,984

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Table 2 Unit 8 deer hunter residency and success, 1987–95

^aIncludes residents of Unit 8.

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b_{No} survey.

<u> </u>		% Successful			Estimated			Mean	
Regulatory	% Hunter	hunters taking	%	%	total	Estimated	Mean no.	no. days	
year	success	bag limit [*]	Male	Female	harvest	no. hunters	deer/hunter	hunted/deer	
1980-81	73	37	74	26	5,347	3,440	1.6	3.8	
1983-84	81	24	74	26	9,897	4,113	2.4	2.3	
1984-85	81	23	74	26	8,905	3,948	2.3	2.6	
1987-88	76	27	80	20	13,791	6,022	2.3	2.3	
1989-90	74	15	73	27	10,038	4,815	2.1	2.5	
1990-91	74	19	67	33	8,106	4,176	1.9	2.9	
1991-92	76	5	73	27	8,948	4,421	2.0	2.7	
1992-93	67	5	73	27	7,043	4,119	1.7	3.7	
1993-94	80	4	82	18	6,254	2,946	2.1	2.4	
1994-95	83	3	80	20	10,401	4,708	2.2	2.4	
1995-96	73	6	81	19	7,193	3,984	1.8	3.0	

Table 3 Unit 8 comparison of deer hunter questionnaire results for 1980 through 1995 seasons^a

⁶⁰ ^aBag limit 4 deer in 1980; 5 deer in 1983–1990; 5 deer on Kodiak National Wildlife Refuge and 4 deer on nonfederal lands in 1991– 1993.

Table 4 Number and percent of hunters who took 1, 2, 3, 4, 5 deer, 1991–95 in Unit 8

	1995-	199596		1994–95 1993–94 ^a 1992–93 ^a		1991-	92a				
	Hunters	%	Hunters	%	Hunters	%	Hunters	%	Hunters	%	
1 deer	948	33	1,116	29	638	7	804	29	915	27	
2 deer	651	22	723	19	462	20	630	23	692	21	
3 deer	469	16	700	18	491	21	529	19	637	19	
4 deer	726	25	1,106	28	645	28	665	24	963	29	
5 deer	78	3	218	6	83	4	139	5	157	5	

^a Bag limit 5 deer in federal lands within the Kodiak National Wildlife Refuge; only residents of Unit 8 eligible.

Regulatory			Har	vest periods			
year	August	September	October	November	December	January	n
1980/81	6	9	24	33	22	6	5,347
1983/84	5	7	25	37	18	7	9,897
1984/85	5	9	28	41	15	3	8,905
1987/88	5	8	26	41	18	3	13,791
1989/90	3	6	20	51	18	3	10,038
1990/91	5	4	24	43	23	2	8,106
1991/92	5	5	20	40	30	0	8,948
1992/93	4	5	26	39	26	0	7,043
1993/94	5	7	31	39	19	0	6,254
1994/95	4	5	29	36	24	0	10,401
1995/96	6	4	25	47	19	0	7,115

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Table 5 Unit 8 deer harvest chronology percent by time period, 1980–95

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Percent of harvest											
Regulatory				3- or			Highway				
year	Airplane	Horse	Boat	4-Wheeler	Snowmachine	ORV	vehicle	Other	Unknown	n	
1987/88	34		40		• •	5	16	2	3	2,638	
1988/89a											
1989/90	38		31	~~		4	14	4	9	3,156	
1990/91	43	<1	35	4	<1	1	9	9	0	724	
1991/92	43	<1	39	5	<1	1	11	14	0	862	
1992/93	46	<1	39	4	0	2	9	9	0	831	
1993/94	45	<1	42	5	0	1	9	12	0	889	
1994/95	36	<1	44	5	<1	1	12	14	0	888	
1995/96	40	<1	42	5	0	1	11	12	0	821	

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Table 6	Unit 8 deer harvest	percent by transport method.	1987–95
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^aNo survey.

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Table 7 Unit 8 sex and age composition of deer winter-kill from beach mortality transects, 1988–1995

Regulatory		Adul	lt			Fa	wn		Unk. age/	nk. age/ All			
Year	M (%)	F (%)	Unk.	Total	M (%)	F (%)	Unk.	Total	sex	M (%)	F (%)	Unk.	Total
1987-88	8(89)	1(11)	3	12	6(50)	6(50)	18	30	10	14	7	31	52
1988-89	22(85)	4(15)	0	26	43(57)	32(43)	69	144	16	65(64)	36(36)	85	186
1989-90	9(41)	13(59)	16	38	9(50)	9(50)	73	91	2	18(45)	22(55)	91	131
1990-91										3(75)	1(25)	4	8
1991-92	25(76)	8(24)	4	17	31(57)	23(43)	22	76	17	57(64)	32(36)	43	132
1992-93	Ó	0	0	0	0	0	1	1	0	0	Ó	1	1
1993-94	15	0	2	17	2	2	8	12	0	17 (89)	2(11)	10	29
1994-95	5	1	10	16	7	8	27	42	2	12 (57)	9 (43)	39	60
1995-96	0	0	1	1	4	2	28	34	1	4 (67)	2 (33)	31	37

Alaska's Game Management Units

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public. These funds are also used to educate hunters to develop the skills, knowledge, and attitudes for responsible hunting. Seventy-five percent of the funds for this report are from Federal Aid.



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